Workshop Service Manual for Range Rover Sport L320 2009-2013 Sec.1

- 1: General Information
  - 100: Service Information
    - 100-00: General Information
      - Description and Operation
        - About This Manual
        - About This Manual
        - Important Safety Instructions
        - How To Use This Manual
        - General Service Information
        - Standard Workshop Practices
        - Health and Safety Precautions
        - Solvents, Sealants and Adhesives
        - Road/Roller Testing
        - Special Tool Glossary
        - Petrol and Petrol-Ethanol Fuel Systems Health and Safety Precautions
        - DTC: Adaptive Damping Control Module (ADCM)
        - DTC: Adaptive Speed Control Module (ASCM)
        - DTC: Air Suspension Control Module
        - DTC: Anti-Lock Braking System Control Module (ABS)
        - DTC: Audio Amplifier Control Module (AAM)
        - DTC: Auto High Beam Control Module (AHBCM)
        - DTC: Automatic Temperature Control Module (ATC)
        - DTC: Central Junction Box (CJB)
        - DTC: Digital Radio Control Module (DRCM)
        - DTC: Driver/Passenger Door Module (DDM/PDM)
        - DTC: Driver/Passenger Seat Module (DSM/PSM)
        - DTC: Dynamic Response Control Module (DRM)
        - DTC: Electric Park Brake Control Module (EPBCM)
        - DTC: Electric Steering Column Lock Control Module (ESCL)
        - DTC: Fuel Fired Booster Heater Control Module (FFBH)
        - DTC: Headlamp Leveling Control Module (HCM)
        - DTC: Instrument Cluster (IC)
        - DTC: Integrated Audio Module (IAM) - High Line
        - DTC: Integrated Control Panel (ICP)
        - DTC: Integrated Control Panel B (ICPB)
        - DTC: Keyless Vehicle Module (KVM)
        - DTC: Occupant Classification Sensor Control Module (OCSCM)
        - DTC: Parking Aid Control Module (PACM)
        - DTC: Rear Differential Control Module (RDCM)
        - DTC: Rear Seat Entertainment Control Module (RSECM)
        - DTC: Rear View Camera (RVC)
        - DTC: Restraints Control Module (RCM)
        - DTC: Satellite Radio Control Module (SRCM)
        - DTC: Steering Angle Sensor Module (SASM)
        - DTC: Tailgate Control Module (TGCM)
        - DTC: Terrain Response Switch Pack (TR)
        - DTC: (TS)
        - DTC: Module Name: Transfer Case Control Module
        - DTC: Transmission Control Switch (TCS)
        - DTC: Transmission Control Module (TCM)
        - DTC: TV Control Module (TVCM)
        - TDV6 3.0L Diesel , DTC: Engine Control Module (ECM)
        - V8 5.0L Petrol/V8 S/C 5.0L Petrol, DTC: Engine Control Module (ECM)
    - 100-01: Identification Codes
      - Description and Operation
        - Identification Codes
    - 100-02: Jacking and Lifting
      - Description and Operation
        - Jacking
        - Lifting
        - Vehicle Recovery
    - 100-03: Maintenance Schedules
      - Description and Operation
        - Maintenance Schedules - Gasoline Engines
        - Maintenance Schedules - Diesel Engines
    - 100-11: Vehicle Transportation Aids and Vehicle Storage
      - Description and Operation

            - New Vehicle Storage
            - New Vehicle Storage Form
    - 101: Pre-Delivery Information
        - 101-01: Pre-Delivery Inspection Manual
            - Description and Operation
                - Preliminary
                - Vehicle Interior
                - Vehicle Exterior
                - Road Test
                - Quality Assurance Checks
        - 101-02: Showroom Preparation
            - Description and Operation
                - Showroom Preparation

General Information - About This Manual

Description and Operation

Introduction

This manual has been written in a format that is designed to meet the needs of technicians worldwide. The objective is to use common formats and include similar content in each manual.

This manual provides general descriptions for accomplishing diagnosis and testing, service and repair work with tested and effective techniques. Following them will help to ensure reliability.

Important Safety Instructions

Appropriate service methods and correct repair procedures are essential for the safe, reliable operation of all motor vehicles as well as the personal safety of the individual carrying out the work.

Anyone who departs from the instructions provided in this manual must first establish that personal safety or vehicle integrity is not compromised by the choice of method, tools or components.

Warnings, Cautions and Notes in This Manual

 WARNING: Warnings are used to indicate that failure to follow a procedure correctly may result in personal injury.

 CAUTION: Cautions are used to indicate that failure to follow a procedure correctly may result in damage to the vehicle or equipment being used.

 NOTE: Notes are used to provide additional essential information required to carry out a complete and satisfactory repair.

Generic warnings or cautions are in their relevant description and operation procedure within section 100-00. If the generic warnings or cautions are required for a procedure, there will be a referral to the appropriate description and operation procedure.

If a warning, caution or note only applies to one step, it is placed at the beginning of the specific step.

Trustmark Authoring Standards (TAS) Removal and Installation Procedures

 NOTE: TAS style procedures can be identified by steps that have no accompanying step text and the magenta color of the electrical connectors and fasteners such as nuts, bolts, clamps or clips.

A TAS removal and installation procedure uses a sequence of color illustrations to indicate the order to be followed when removing/disassembling or installing/assembling a component.

Many of the TAS procedures will have the installation information within the removal steps. These procedures will have the following note at the beginning of the procedure:

 NOTE: Removal steps in this procedure may contain installation details.

Items such as O-ring seals, gaskets, seals, self-locking nuts and bolts are to be discarded and new components installed unless otherwise stated within the procedure. Coated nuts or bolts are to be reused, unless damaged or otherwise stated within the procedure.

Specification procedures will contain all technical data that are not part of a repair procedure.

TAS Graphics

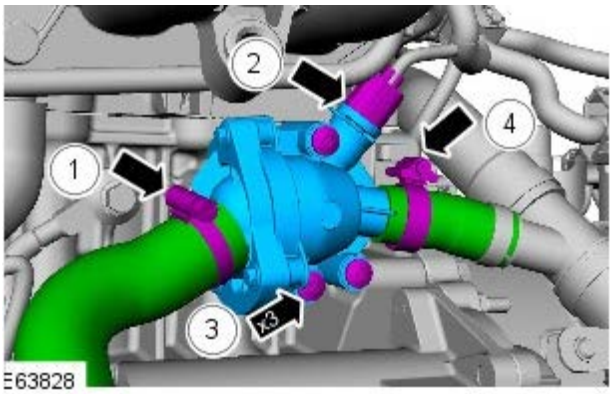
Colors used in the graphic are as follows:

- Blue - Indicates the target item, item to be removed/installed or disassembled/assembled
- Green and Brown - Indicates a secondary item that needs to be detached, removed/installed or disassembled/assembled prior to the target item
- Magenta - Indicates electrical connectors and fasteners such as nuts, bolts, clamps or clips
- Pale Blue - is for the special tool(s) and general equipment.

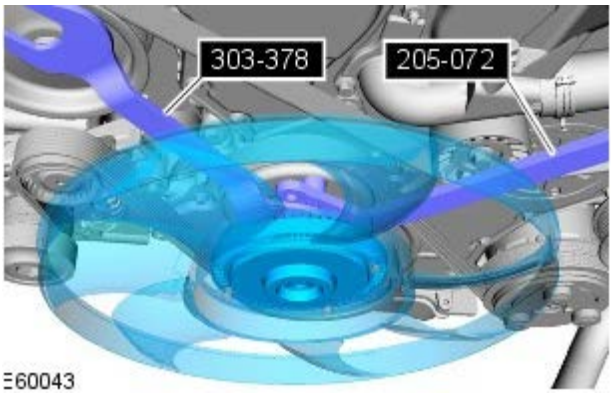
There may be multiple steps assigned to one illustration.

Numbered pointers are used to indicate the number of electrical connectors and fasteners such as nuts, bolts, clamps or clips.

Items in the illustration can be transparent or use cutouts to show hidden detail(s).



E63828

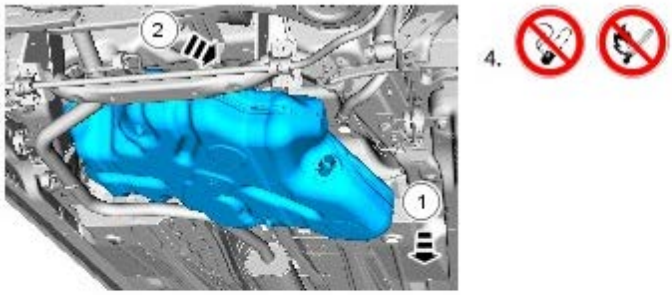


E60043

TAS Symbols

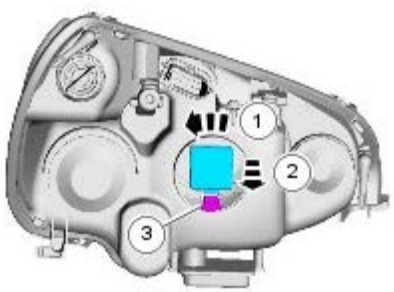
Symbols are used inside the graphics and in the text area to enhance the information display. The following paragraphs describe the various types and categories of symbols.

Prohibition symbols advise on prohibited actions to either avoid damage or health and safety related risks.




E85026

Health and Safety symbols recommend the use of particular protection equipment to avoid or at least reduce the risk or severity of possible injuries.

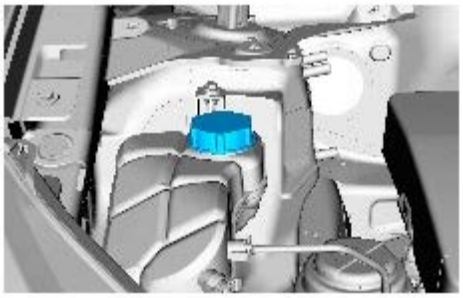


2.



E85027

Warning symbols are used to indicate potential risks resulting from a certain component or area.

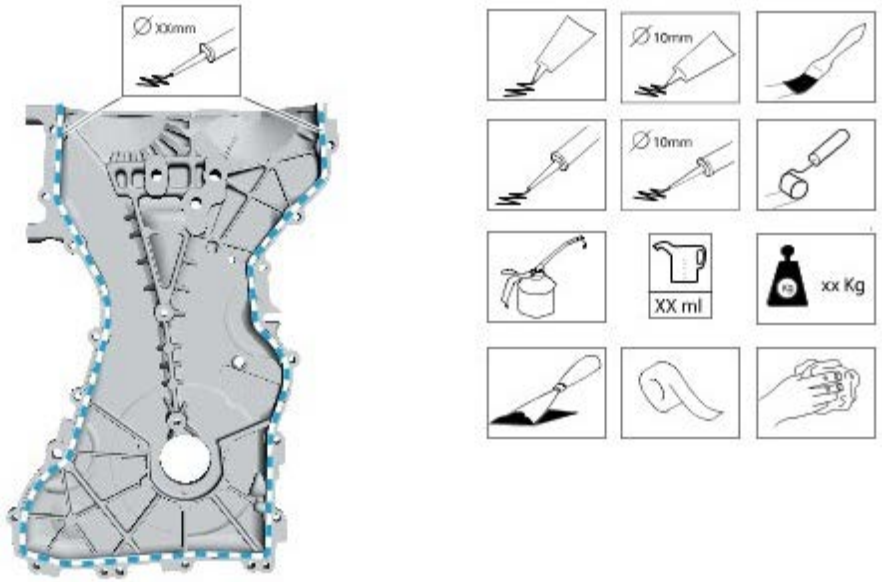


3.



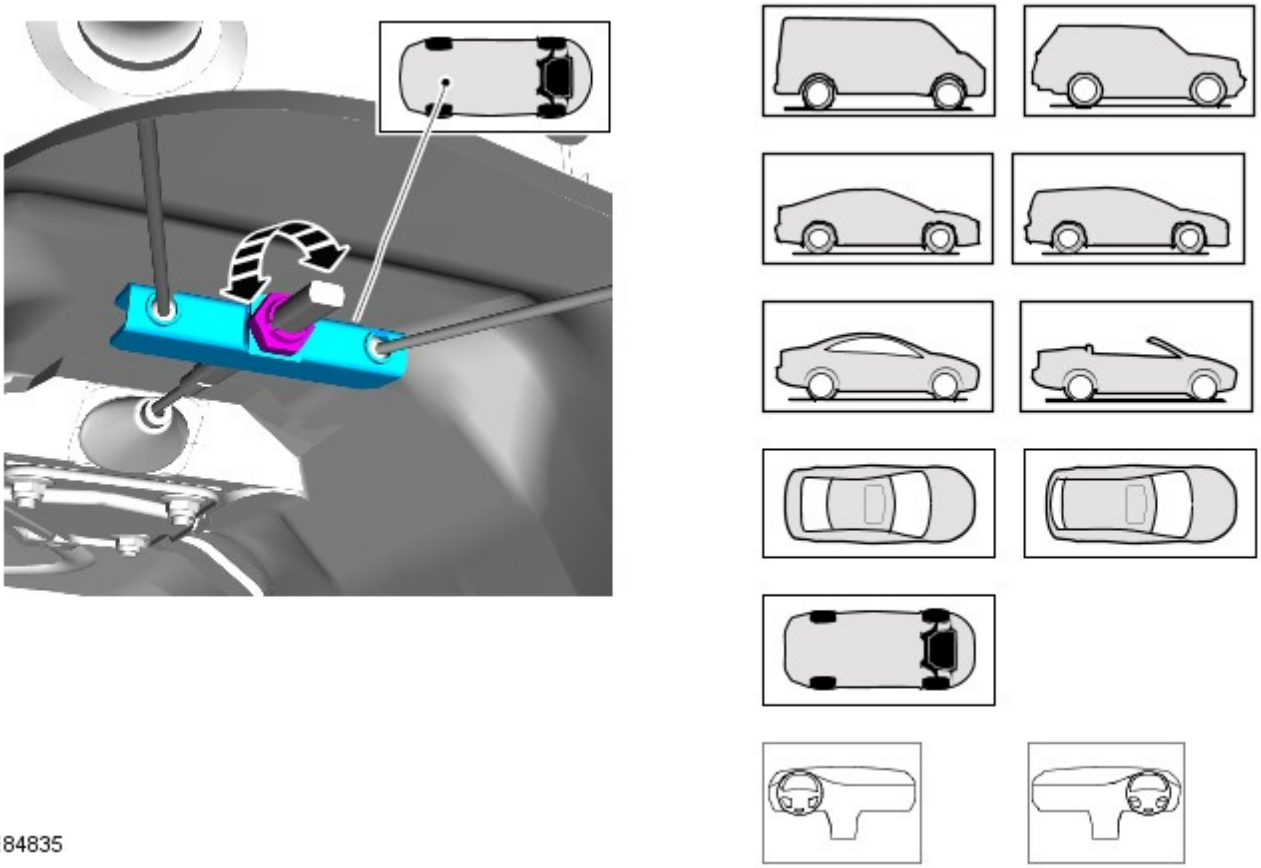
E85028

Instruction symbols are used to apply sealer, lubricant, weight, tape or cleaning detergent to a component.



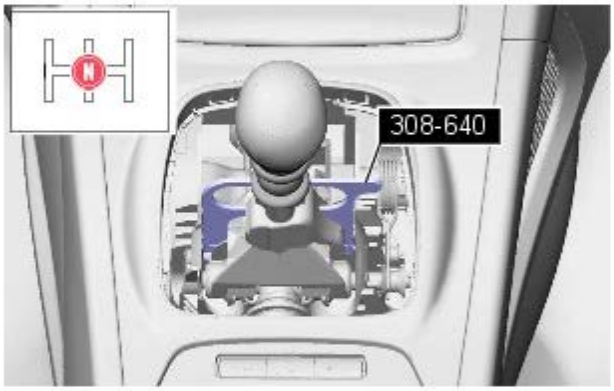
E84834

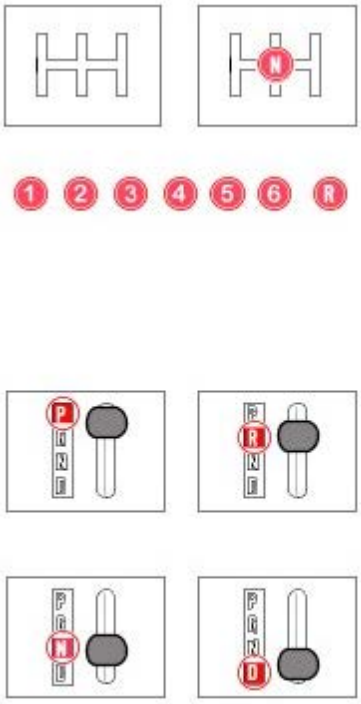
Location symbols are used to show the location of a component or system within the vehicle.



E84835

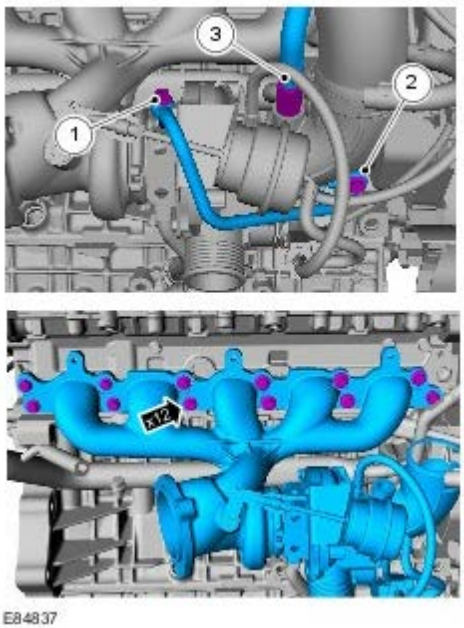
Gearshift lever or selector lever position symbols are used to show which gearshift lever or selector lever position is to be set.

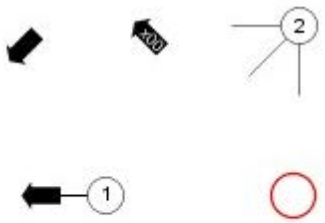




E84836

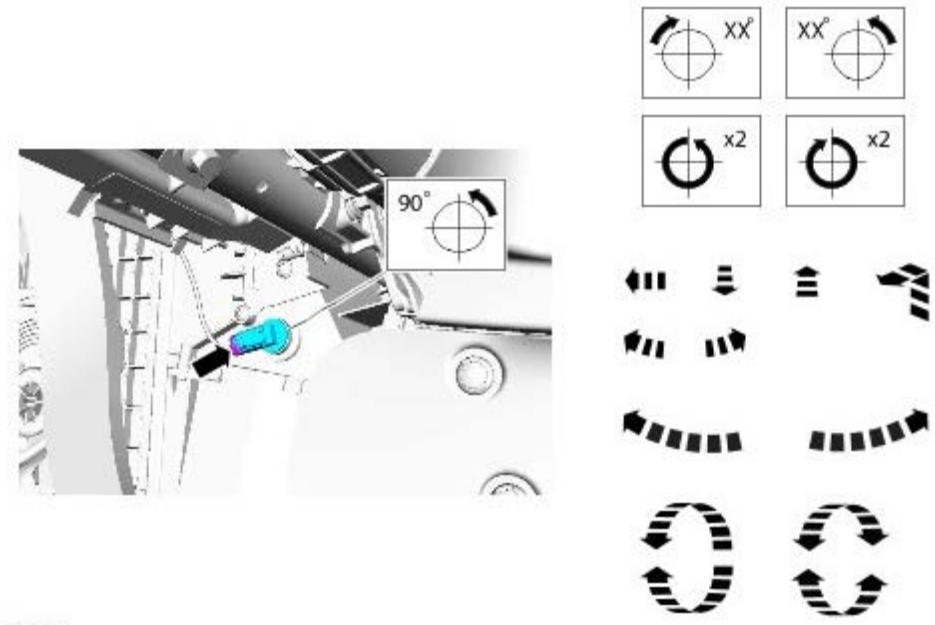
Pointer symbols are used to draw the attention to components and give special instructions such as a required sequence or number of components. The number of components is reflected by the value inside the luty arrow. A sequence number is located inside the circle. Numbers inside circles are also used to allocate special information such as tightening torques or chemicals to a particular component.





E84837

Movement arrows are used to show three dimensional or rotational movements. These movements can include specific values inside the symbol if required.



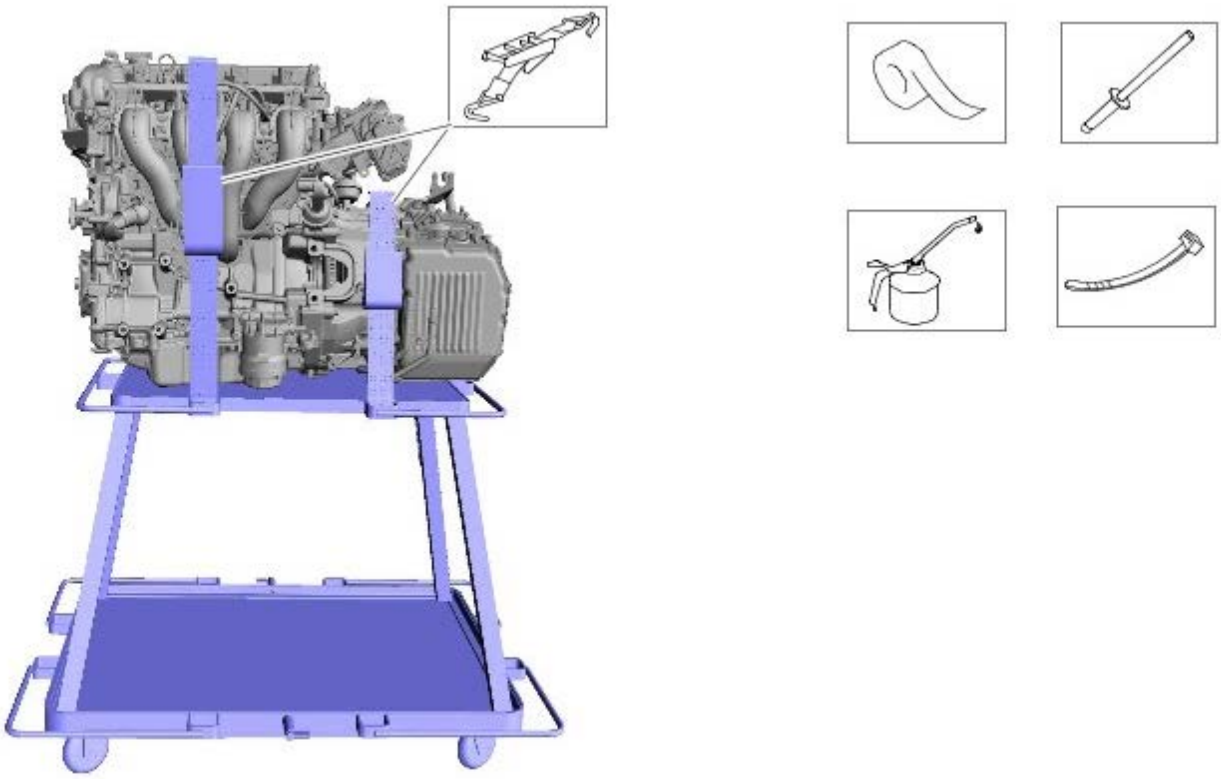
E84838

Standard tool symbols recommend the use of certain standard tools. These tools can include dimension values if required.



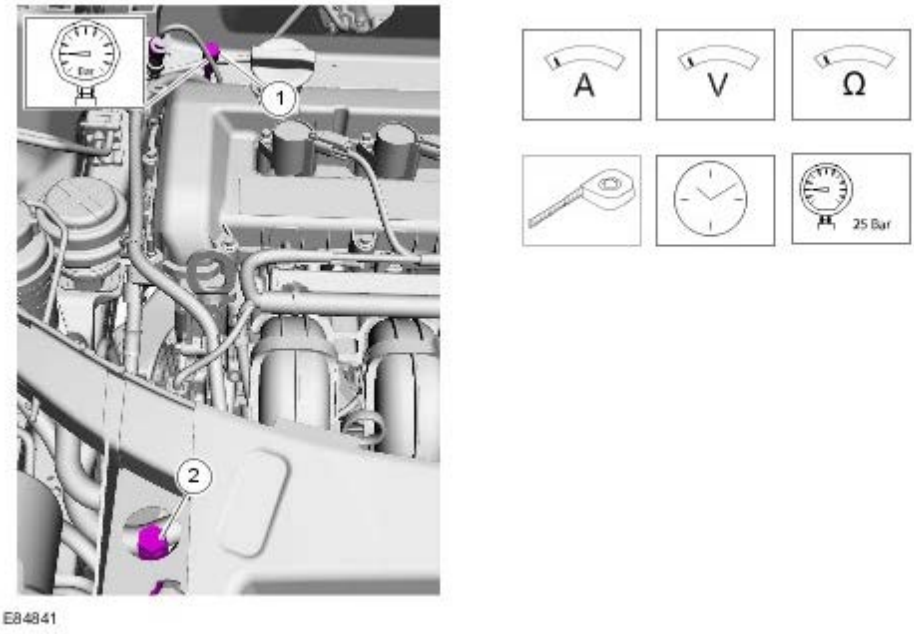
E84839

The following graphic illustrates a set of symbols that are used to provide detailed information on where to apply a material.



E84840

Measurement symbols provide detailed information on where to carry out a specific measurement. These symbols can include specific values if required.



E84841

Special Tools and Torque Figure(s)

Special tools will be shown with the tool number in the illustration. The special tool number(s), general equipment, material(s) and torque figure(s) used for the procedure step will be shown in the text column.

General Information - About This Manual

Description and Operation

Notes, Cautions and Warnings

Throughout this manual, important information is highlighted by the use of NOTES, CAUTIONS and WARNINGS. NOTES give additional information on a topic or procedure, CAUTIONS are given to prevent damage to the vehicle, and WARNINGS are given to prevent personal injury.

General Information - Important Safety Instructions

Description and Operation

Safety Notice

Appropriate service methods and correct repair procedures are essential for the safe, reliable operation of all motor vehicles, as well as the safety of the person doing the work. This manual provides general directions for accomplishing service and repair work with tested effective techniques. Following them will help assure reliability.

There are numerous variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the person doing the work. This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from the instructions provided in the manual must first establish that neither personal safety or vehicle integrity is compromised from choices of methods, tools or parts.

General Information - How To Use This Manual

Description and Operation

How to use This Manual

This manual covers all aspects necessary in order to service the vehicle effectively.

The manual is structured into five main sections, General Information, Chassis, Powertrain, Electrical and Body and Paint with each section dealing with a specific part of a vehicle system.

Each of the five main sections contain sub-sections dealing with items which form a part of that specific system.

Pages at the start of the manual list all sections available. Each section has a contents list detailing, where applicable, Specifications, Description and Operation, Diagnosis and Testing, General Procedures and Repair Procedures.

Where components need to be removed or disassembled in sequence, each operation in the sequence will be identified numerically and also graphically in an accompanying illustration.

 NOTE: Dimensions quoted are to design engineering specifications with service limits quoted, where applicable.

Workshop Manual Organization

The five main sections, together with the areas which they cover are given below:

- **Section 1** - General Information.
- **Section 2** - Chassis.
- **Section 3** - Powertrain.
- **Section 4** - Electrical.
- **Section 5** - Body and Paint.

Sub-section numbers appear after the initial section number, for example, **Section 412-03** covers air conditioning, which is part of the electrical section.

In the number given above, the first digit of the number **'4'** indicates the section **i.e. Electrical**.

The second and third digits **'12'** of the number indicate the vehicle system **i.e. Air Conditioning**.

The last two digits of the number **'03'** indicate the part of the system covered by the sub-section **i.e. Air Conditioning Compressor**.

General Information - General Service Information

Description and Operation

Introduction

This manual has been written in a format that is designed to meet the needs of Land Rover technicians worldwide and to assist them in the efficient repair and maintenance of Land Rover vehicles.

This manual provides descriptions and methods for accomplishing adjustment, service and repair work using tested and effective procedures. Following these procedures will help ensure product reliability.

Special Tools

The Special Tool(s) Table provided at the beginning of each procedure lists the special tool(s) required to carry out repair operations within that specific procedure. Wherever possible, illustrations are provided which will assist technicians in identifying the special tool(s) required and also showing such tool(s) in use.

Special tools may be obtained from the manufacturer, SPX Tools, the addresses of their branches will be found in the Special Tools Glossary contained within this Section.

Important Safety Instructions

Appropriate service methods and correct repair procedures are essential for the safe and reliable operation of all motor vehicles as well as ensuring the personal safety of the individual carrying out the work.

This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Any person who departs from the instructions provided in this manual must first establish that they compromise neither their personal safety nor the vehicle integrity by their choice of methods, tools or parts.

Individuals who undertake their own repairs should have some skill or training and limit repairs to components which could not affect the safety of the vehicle or its passengers. Any repairs required to safety critical items such as steering, brakes, suspension or supplemental restraint system should be carried out by a Land Rover Dealer. Repairs to such items should NEVER be attempted by untrained individuals.

Warnings, Cautions and Notes which appear in this manual

As you read through this manual, you will come across Warnings, Cautions and Notes. A Warning, Caution or Note is placed at the beginning of a series of steps. If the warning, caution or note only applies to one step, it is placed at the beginning of the specific step after the step number.

Warnings, Cautions and Notes have the following meanings:

Warning: Procedures which must be followed to avoid the possibility of personal injury.

Caution: Calls attention to procedures which must be followed to avoid damage to components.

Note: Gives helpful information.

References

References to the Left Hand (LH) or Right Hand (RH) side given in this manual are made when viewing the vehicle or unit from the rear.

Fault Diagnostic Equipment

The vehicle is equipped with a number of electronic control systems to provide optimum performance of the vehicle's systems.

Diagnostic Equipment (T4) is available and must be used where specified. The use of this equipment will assist with the fault diagnostic abilities of the Dealer workshop. In particular, the equipment can be used to interrogate the electronic systems for diagnosis of faults which may become evident during the life of the vehicle.

This manual is produced as a reference source to supplement T4.

Features of the equipment include:

a. Fully upgradeable support for the technician

b. Structured diagnostics to accommodate all skill levels

c. Direct print-out of screen information and test results

Testing the vehicle

Operations covered in this manual do not include reference to testing the vehicle after repair. It is essential that work is inspected and tested after completion and if necessary, a road test of the vehicle is carried out, particularly where safety related items are concerned.

Repairs and Replacement Parts

Land Rover parts are manufactured to the same exacting standards as the original factory fitted components. For

this reason, it is essential that only genuine Land Rover parts are used during maintenance or repair.

Attention is particularly drawn to the following points concerning repairs and the fitting of replacement parts and accessories.

Safety features and corrosion prevention treatments embodied in the vehicle may be impaired if other than Land Rover recommended parts are fitted. In certain territories, legislation prohibits the fitting of parts not to manufacturer's specification. Torque wrench setting figures, where given, must be adhered to and locking devices, where specified must be used. If the efficiency of a locking device is impaired during removal it must be replaced.

Owners purchasing accessories whilst travelling abroad must ensure that the accessory and its fitted location on the vehicle conform to legal requirements.

The terms of the vehicle warranty may be invalidated by the fitting of parts other than those recommended by Land Rover.

 NOTE: The fitting of non-approved Land Rover parts and accessories or the carrying out of non-approved alterations or conversions may be dangerous. Any of the foregoing could affect the safety of the vehicle and occupants; also, the terms and conditions of the vehicle warranty may also be invalidated .

All Land Rover recommended parts have the full backing of the vehicle warranty.

Land Rover Dealers are obliged to supply only Land Rover recommended parts.

Specifications

Land Rover are constantly seeking to improve the specification, design and production of their vehicles and alterations take place accordingly. Whilst every effort is made to ensure the accuracy of this Manual, it should not be regarded as an infallible guide to current specifications of any particular vehicle.

This Manual does not constitute an offer for sale of any particular vehicle. Land Rover dealers are not agents of Land Rover and have no authority to bind the manufacturer by any expressed or implied undertaking or representation.

General Information - Standard Workshop Practices

Description and Operation

Vehicle in Workshop

When working on a vehicle in the workshop always make sure that:

Where practicable, the parking brake is applied and the wheels are securely chocked to prevent the vehicle moving forwards or backwards.
Whenever possible, the ignition key is removed before any work is carried out on the vehicle.
If the engine is to be run, there is adequate ventilation, or an extraction hose is used to remove exhaust fumes.
There is adequate room to raise the vehicle and remove the wheels, if necessary.
Fender covers are always installed if any work is to be carried out in the engine compartment.
Where practicable, the battery is disconnected if working on the engine, underneath the vehicle, or if the vehicle is raised.

Prior to disconnecting the battery, refer to the Electrical Section of this manual - Battery disconnection/connection. For additional information, refer to: Specifications (414-00 Battery and Charging System - General Information, Specifications).

 CAUTION: When electric arc welding on a vehicle, always disconnect the generator wiring to prevent the possibility of a surge of current causing damage to the internal components of the generator.

If using welding equipment on the vehicle, a suitable fire extinguisher is readily available.

Towing the Vehicle

 WARNING: When towing is necessary, reference must be made to the Jacking, Lifting and Towing Section of this Manual.

When the vehicle is being towed the ignition switch must be in position II (steering lock released and warning lights illuminated). Only then will the steering, turn signal lamps, horn and stop lamps be operational. Failure to follow these instructions may result in personal injury. It must be noted that with the engine not running, the power steering and brake booster will be inoperative therefore, greater effort will be needed to steer the vehicle and apply the brakes.

Battery - General

Prior to carrying out any procedures which involve disconnecting/ or connecting the battery, refer to the Electrical Section of this manual - Battery disconnection/connection. For additional information, refer to: Specifications (414-00 Battery and Charging System - General Information, Specifications).

CAUTIONS:

 A discharged battery condition may have been caused by an electrical short circuit. If this condition exists there will be an apparently live circuit on the vehicle even when all normal circuits are switched off. This can cause arcing when the jumper cables are connected.

 While it is not recommended that the vehicle is jump started, it is recognized that this may occasionally be the only practical way to mobilize a vehicle. Prior to attempting a jump start, refence must be made to the Electrical Section of this manual - Jump Starting.

Following jump starting of a disabled vehicle, the discharged battery must be checked for serviceability and recharged off the vehicle as soon as possible to avoid permanent damage.

Do not rely on the generator to restore a discharged battery. For a generator to recharge a battery, it would take in excess of eight hours continuous driving with no additional loads placed on the battery.

Always make sure that the jumper cables are adequate for the task.
Always make sure that the slave battery is of the same voltage as the vehicle battery. The batteries must be connected in parallel.
Always make sure that switchable electric circuits are switched off before connecting jumper cables. This reduces the risk of arcing occurring when the final connection is made.

General Installation Instructions

Component removal

Whenever possible, clean components and the surrounding area before removal.

- Blank off openings exposed by component removal.
- Following disconnection, seal fuel, oil or hydraulic lines immediately using suitable blanking plugs or caps.
- Seal open ends of exposed oilways using suitable tapered hardwood plugs or conspicuous plastic plugs.
- Immediately a component is removed, place it in a suitable container; use a separate container for each component and its associated parts.

- Clean bench and provide marking materials, labels and containers before disassembling components.

Disassembling

Observe scrupulous cleanliness when disassembling components, particularly when brake, fuel, air suspension or hydraulic system parts are disassembled. A particle of dirt or cloth fragment could cause a serious malfunction if trapped in these systems.

- Blow out all tapped holes, crevices, oilways and fluid passages with dry, compressed air.

 WARNING: Suitable eye protection must be worn.

- Use suitable marker ink to identify mating parts, do not use a scriber or centre punch as they could initiate cracks or distortion.
- Wire or tape mating parts together where necessary to prevent accidental interchange.
- Suitably identify parts which are to be renewed and to those parts requiring further inspection. Keep these parts separate.
- To make sure that the correct replacement part has been obtained, do not discard a part due for renewal until after comparing it with the new part.

Cleaning components

Always use cleaning agents which are suitable for the work being undertaken and the components being cleaned. NEVER use gasoline (petrol) as a cleaning agent (degreaser). Always make sure that the component being cleaned is compatible with the cleaning agent.

Always follow the manufacturer's instructions regarding the use of cleaning agents and make sure that the environment in which the work is being undertaken is suitable. See Health and Safety Precautions for further information regarding cleaning.

General inspection of components

All components should be inspected for wear or damage before reassembling.

- Always make sure that component to be inspected is clean and free from oil or grease.
- When a component is to be checked dimensionally against design specified values, use the appropriate measuring equipment i.e. micrometers, verniers, surface plates, dial test indicators (DTI).
- Always make sure that all measuring equipment is correctly calibrated before use.
- Reject a component which is not within specified values/limits or if it appears to be damaged.
- A component may be reinstalled if dimensions obtained during checking are at the maximum tolerance limit and it is in an undamaged condition.
- Bearing journal clearances should be checked where necessary using Plastigage.
- Gaskets, seals and O-ring seals are to be re-used unless damaged.

Joints and Joint Faces

All gaskets should be installed dry unless stated otherwise. Always apply the specified lubricant to O-rings and install O-rings using the fingers only.

Use gasket removal spray and/or plastic scrapers to remove traces of old gasket.

 CAUTION: DO NOT use metal scrapers or emery cloth as these may damage the sealing surfaces.

Many joints use sealants instead of gaskets as the sealing medium. Where this is the case, the sealant together with its part number will be found listed in the relevant repair operation and also in the sealants table.

 CAUTION: Always remove all traces of the old sealant prior to reassembly. Use plastic scrapers, specified solvents where available or dry, lint free cloth. DO NOT use metal scrapers or emery cloth as these may damage the sealing surfaces. Make sure that sealing surfaces are free from oil or grease as sealants will not adhere properly to contaminated surfaces.

Do not allow sealant to enter tapped holes or oilways.

Locking Devices

Always replace locking devices with one of the same design and of the correct size.

Tab washers

Always release locking tabs before loosening fixings, do not reuse tab washers.

Locknuts

Always use a backing spanner when loosening and tightening locknuts, brake and fuel pipe unions.

Roll pins

Always install new roll pins of the correct size.

Circlips

Always install new circlips ensuring that they are of the correct size for the groove.

Woodruff keys

Woodruff keys may be reused provided there is no indication of wear or distortion.

Remove any burrs from edges of keyways using a fine file.

Split pins

Never attempt to straighten and reuse a split pin, always make sure that replacement pins are of the correct size for the hole in which they are to be installed.

Screw Threads

- Damaged nuts, bolts and screws must always be discarded. Attempting to recut or repair damaged threads with a tap or die impairs the strength and fit of the threads and is not recommended.

NOTES:

During certain repair operations, it may be necessary to remove traces of thread locking agents using a tap. Where this is necessary, the instruction to do so will appear in the relevant operation and it is essential that a tap of the correct size and thread is used.

New Taptite bolts when used cut their own threads on the first application.

- Some bolts are coated with a thread locking agent and unless stated otherwise, they must not be reused. New bolts having the same part number as the original must always be installed. When nuts or bolts are to be discarded, the repair operation and relevant torque chart will include an instruction to that effect. Do not use proprietary thread locking agents as they may not meet the specification required. See also Encapsulated ('Patched') Bolts and Screws.
- Always make sure that replacement nuts and bolts are at least equal in strength to those that they are replacing. Castellated nuts must not be loosened to accept a split pin except in recommended cases when this forms part of an adjustment.
- Do not allow oil or grease to enter blind holes, the hydraulic action resulting from tightening the bolt or stud can split the housing and also give a false torque reading.
- Always tighten a nut, bolt or screw to the specified torque figure, damaged or corroded threads can give a false torque reading.
- Nut and bolt loosening and tightening sequences, where given, must ALWAYS be followed. Distortion of components or faulty sealing of joints will result if the sequences are not followed. Where an instruction is given to tighten in stages, these stages must be adhered to; do not attempt to combine stages particularly where certain stages involve tightening by degrees.
- To check or re-tighten a fixing to a specified torque, first loosen a quarter of a turn, then retighten to the specified torque figure.
- Unless instructed otherwise, do not lubricate bolt or nut threads prior to installing.

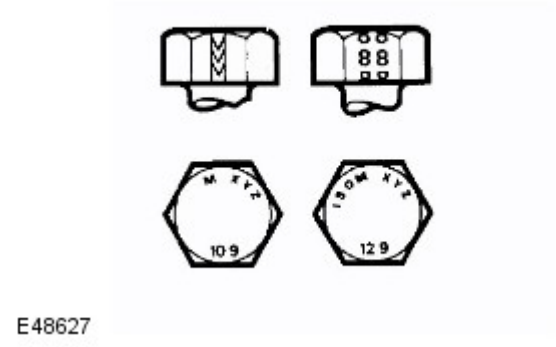
Where it is stated that bolts and screws may be reused, the following procedures must be carried out:

- Check that threads are undamaged.
- Remove all traces of locking agent from the threads.

CAUTION: DO NOT use a wire brush; take care that threads are not damaged.

- Make sure that threads are clean and free from oil or grease.
- Apply the specified locking agent to the bolt threads.

Bolt and Nut Identification



An ISO metric bolt or screw made of steel and larger than 6 mm in diameter can be identified by either of the symbols ISO M or M embossed or indented on top of the bolt head.

In addition to marks identifying the manufacturer, the top of the bolt head is also marked with symbols indicating

the strength grade e.g. 8.8, 10.9, 12.9, 14.9. Alternatively, some bolts and screws have the M and strength grade symbol stamped on the flats of the hexagon.

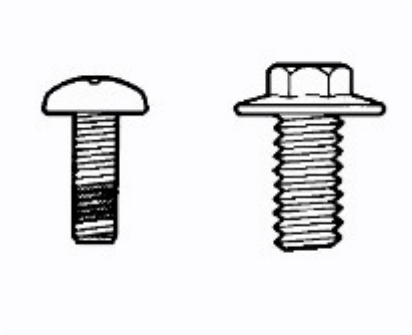
Encapsulated ('Patched') bolts and screws



E48628

Encapsulated ('patched') bolts and screws have a thread locking agent applied to the threads during manufacture. Most thread locking agents are colored, the band of color extending for 360 degrees around the thread. Some locking agents however, are neutral in color and may not be so easily identified apart from a slightly darker area of thread where the locking agent has been applied. The locking agent is released and activated by the tightening process and is then chemically cured to provide the locking action.

Self-locking bolts and screws



E48629

Unless stated in a specific repair procedure, self-locking bolts and screws i.e. nylon patched or trilobular thread can be reused provided that resistance is felt when the locking portion enters the female thread.

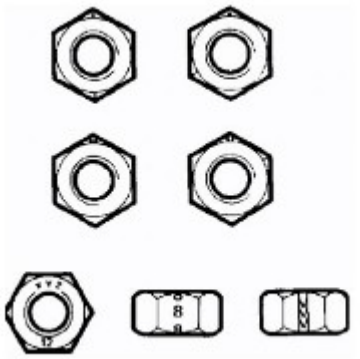
Nylon patched bolts and screws have a locking agent either applied to, or inserted in the threaded portion. They are identified by the presence of a colored section of thread extending approximately 180 degrees around the thread or by a colored plug inserted into the bolt.

Trilobular bolts have a special thread form which creates a slight interference with the thread of the hole or nut into which it is screwed.

CAUTION: Do Not reuse self-locking fasteners in critical locations e.g. drive plates/flywheel or engine bearings. Do not install non self-locking fasteners where a self-locking fastener is specified.

Trilobular bolts should not be used as a substitute for patched bolts.

Nut identification



E48630

A nut with an ISO metric thread is marked on one face or one of the hexagonal flats with the strength grade symbol 8, 12, 14. Some nuts with the strength grade 4, 5 or 6 are also marked and some have the metric symbol M on the hexagonal flat opposite the strength grade marking.

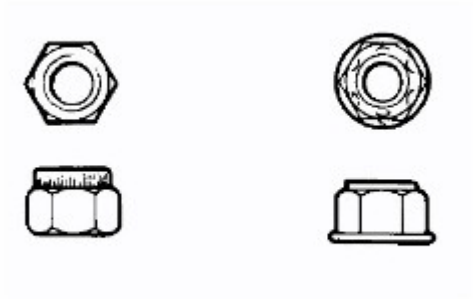
A clock face system is sometimes used as an alternative method of indicating the strength grade. The external chamfers or a face of the nut is marked in a position relative to the appropriate hour mark on a clock face to indicate the strength grade.

A dot is used to locate the 12 o'clock position and a dash to indicate the strength grade. If the grade is above 12, two dots identify the 12 o'clock position.

When tightening a slotted or castellated nut, never loosen it to insert a split pin except where specified as part of an adjustment procedure. If difficulty is experienced in correctly positioning the slot, alternative washers or nuts should be selected.

Where a nut is tightened to adjust or maintain bearing pre-load, the tightening procedure must be adhered to.

Self-locking nuts



E48631

Unless stated otherwise, self-locking nuts once removed must be discarded and new nuts of the same type and strength grade installed.

Air Suspension

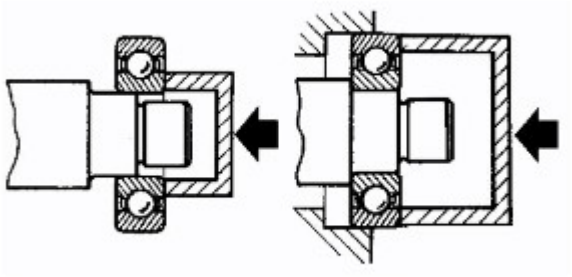
Always make sure that suitable eye protection is worn when working on the air suspension system.

Ball and Roller Bearings

When removing and installing bearings, make sure that the following practices are observed to make sure component serviceability:

CAUTION: Service tools have been developed for removing the majority of bearings; these must always be used where specified.

- Remove all traces from bearing under inspection by cleaning with a suitable degreasant; maintain absolute cleanliness throughout operations.
- Conduct a visual inspection for markings on rolling elements, raceways, outer surfaces of outer or inner surfaces of inner rings. Reject any bearings found to be marked since marking in these areas indicates onset of wear.
- Hold inner race of bearing between finger and thumb of one hand and rotate outer race to check that it revolves absolutely smoothly. Repeat holding outer race and rotating inner race. DO NOT spin the bearing.
- Rotate outer ring gently using a reciprocating movement whilst holding inner ring; feel for any check or obstruction to rotation. Reject bearing if movement is not absolutely smooth.
- Check bearing for blueing or signs of overheating.
- Lubricate bearing with the specified lubricant.
- Inspect bearing surface of shaft and bearing housing for discoloration or other markings which indicate overheating of bearing or movement between bearing and seating.
- Before installing bearing, make sure that shaft and bearing housing are clean and free from burrs.
- If one bearing of a pair shows signs of wear, overheating etc., it is advisable to replace bearings as a pair unless it is suspected that one bearing may have been faulty when installed, was installed incorrectly or the fault arose due to oil seal failure.
- Never reinstall a bearing unless it is in a fully serviceable condition.



E48560

- When installing a bearing to a shaft, only apply force to the inner ring of the bearing. When installing a bearing into a housing, only apply force to the outer ring of the bearing.

CAUTION: Service tools have been developed for installing the majority of bearings; these must always be used where specified.

- In the case of grease lubricated bearings, fill the space between the bearing and outer seal with the recommended grade of grease before installing the seal.

CAUTION: When a waxed oil seal (installed dry) type of oil seal is to be installed, take great care that grease does not contaminate the running surface of the seal.

- Always make suitable reference marks between the components of separable bearings e.g. taper roller bearings when disassembling to make sure correct location of components when assembling. Never install new rollers in an outer ring, always install a new bearing assembly.

Brake Pads and Linings

Always install the correct grade and specification of brake pads and linings. When replacing these items, always replace as complete axle sets.

Brake Hydraulics

Always observe the following recommendations when working on the braking system:

WARNING: Do not intermix brake fluid of different specifications.

- Always use two spanners when loosening or tightening brake pipes or hose connections.
- Make sure that hoses run in a natural curve and are not kinked or twisted.
- Install brake pipes and hoses securely in their retaining clips and make sure that they cannot contact a potential chafing point.
- Containers used for brake fluid must be kept absolutely clean.
- Do not store brake fluid in unsealed containers, the fluid will absorb water which will lower the boiling point of the fluid.
- Do not allow brake fluid to be contaminated with other fluids such as mineral oil and do not put brake fluid in a container which has previously been used for storing other fluids.
- Do not reuse brake fluid which has been bled from the system.
- Always use brake fluid or a suitable brake cleaning fluid to clean hydraulic components.
- Unless stated otherwise, use only clean brake fluid to lubricate hydraulic seals and components.
- Always install blanking plugs to hoses, pipes or components immediately after disconnection.
- Check thread compatibility of original equipment with replacement components.
- Observe absolute cleanliness when working with hydraulic components.

Pipes and Hoses

When removing or installing flexible hydraulic pipes and hoses, make sure that the following procedures are observed to make sure component serviceability:

- Prior to removal, clean area around hose or pipe end which is to be disconnected.
- Obtain appropriate blanking plugs or caps before disconnecting hose or pipe end fittings in order that connections can be plugged immediately following disconnection.
- Always install blanking plugs or caps to pipes and unions immediately following disconnection.
- Clean hose or pipe and blow through with an air line.

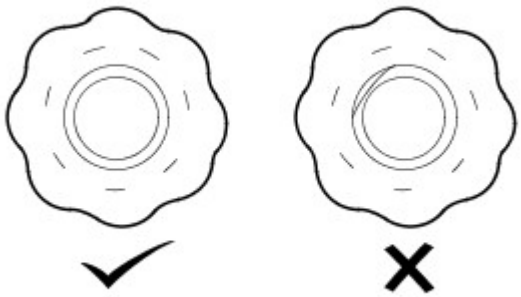
WARNING: Suitable eye protection must be worn.

- Check hoses externally for cracks, separation of plies, security of end fittings and external damage; replace faulty hoses.
- Check pipes for signs of corrosion and chafing, replace as necessary.

CAUTION: If pipes are found to be chafed, rectify clips, mounting points etc., to prevent further problems in service.

- When installing hoses, make sure that no unnecesary bends are introduced and that hoses are not kinked, twisted or positioned close to potential chafing points.
- When installing pipes, make sure that pipes are positioned and clipped clear of potential chafing points.
- Always replace sealing washers installed to banjo bolts, sealing plugs etc.
- Always use a backing spanner when tightening unions and do not overtighten union nuts or banjo bolts.
- After any work on hydraulic systems, always check for fluid leaks whilst a second operator applies working pressure to the brake pedal or operates the system that has been worked on.

Fuel system hoses

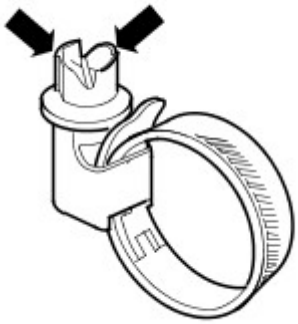


E48632

All fuel hoses are made up of two laminations, an armored rubber outer sleeve and an inner viton core. Whenever a hose is removed, make sure that the inner bore is inspected to check that the viton lining has not become separated from the outer sleeve.

WARNING: Never attempt to repair fuel foses or rectify leaking 'quick-fit' connectors the fuel hose and connectors must be replaced as an assembly.

Fuel system hose clips



E48636

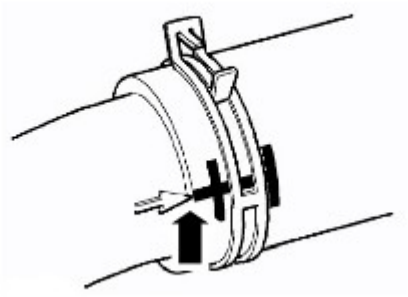
Certain fuel system hose clips are of the 'break-off head' type where a slot in the screw head shears off when the clip is tightened to a specific torque. These clips may be removed using a screwdriver and must be replaced with new clips on reassembly. Clips must be tightened until the portion of the slot shears off. Do not attempt to tighten clips by any other method, do not install any other type of clip.

Cooling system hoses

CAUTION: The following precautions must be observed to make sure that the integrity of the cooling system hoses and their connection to the system is maintained.

Hose orientation and connection

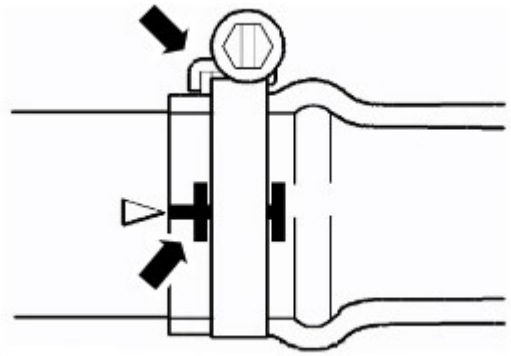
Correct orientation of cooling system hoses is important to make sure that hoses do not become fatigued or damaged through contact with adjacent components.



E48633

Where orientation marks are provided on the hose and corresponding component, the marks must be aligned when the hose is installed. Hoses must be installed fully on to their connection points, usually a moulded form on a pipe provides a positive indicator.

Hose clips



E48634

Markings are usually provided on the hose to indicate the correct clip position. If no markings are provided, position the clip directly behind the retaining lip at the end of the stub pipe. Worm drive clips should be orientated with the crimped side of the drive housing facing towards the end of the hose or the hose may become pinched between the clip and the stub pipe retaining lip. Unless otherwise stated, worm drive clips should be tightened to 3 Nm (2 lbf.ft). Make sure that hose clips do not foul adjacent components.



E48635

Oetiker clips may be removed by bending the tag (arrowed) and releasing the free end of the clip. Clips must not be reused. When installing new clips, make sure clip is positioned on hose before tightening and make sure that when clip is tightened, the tag is located in the longitudinal slot in the free end of the clip (arrowed in illustration).

Heat protection

Always make sure that heatshields and protective sheathing are in good condition; replace if damage is evident. Particular care must be taken when routing hoses close to hot engine components such as the exhaust manifolds and exhaust gas recirculation (EGR) pipes. Hoses will relax and deflect slightly when hot, make sure this movement is taken into account when routing and securing hoses.

Electrical Precautions

General

The following guidelines are intended to make sure the safety of the operator whilst preventing damage to the electrical and electronic components of this vehicle.

Equipment

Prior to commencing any test procedure on the vehicle, make sure that the relevant test equipment is working correctly and that any harness or connectors are in good condition. It is particularly important to check the condition of all plugs and leads of mains operated equipment.

Polarity

Never reverse connect the vehicle battery and always make sure the correct polarity when connecting test equipment.

High voltage circuits

Whenever disconnecting live ht circuits, always use insulated pliers and never allow the open end of the ht lead to contact other components, particularly ECU's.

Vehicles installed with Bi-Xenon headlamp bulbs

 WARNING: The following precautions must be observed as failure to comply may result in exposure to ultra-violet rays, severe electric shock, burns or risk of an explosion.

- Safety goggles and gloves must be worn.
- Make sure that headlamps are switched off before removing bulbs.
- Do not touch the glass portion of the bulb.
- On no account should headlamps be switched on with the bulb removed from the headlamp.
- Bulb testing may only be carried out with the bulb installed in the headlamp.
- Bulbs must be disposed of in accordance with the local authority bye-laws.

Connectors and harnesses

The engine compartment of a vehicle is a particularly hostile environment for electrical components and connectors. Always observe the following:

- Make sure electrically related items are dry and oil free before disconnecting/connecting test equipment.
- Make sure that disconnected multiplugs and sensors are protected from any possible oil, coolant or other liquid contamination. Any such contamination could impair performance or lead to component failure.
- Never force connectors apart or pull on the wiring harness.
- Always make sure locking tabs are disengaged before disconnecting multiplugs etc. and make sure that correct orientation is achieved before connection.
- Make sure that any protection covers, insulation etc. are replaced if disturbed.

Having confirmed that a component is faulty, carry out the following:

- Switch off the ignition and disconnect the battery.
- Remove the component and support the disconnected harness.
- When replacing electrical components, keep oily hands away from electrical connections and make sure that locking tabs on connectors are fully engaged.

Battery Disconnection/Connection

Always refer to the Electrical Section of this manual - Battery Connection/Disconnection prior to attempting to connect or disconnect the battery.
For additional information, refer to: Specifications (414-00 Battery and Charging System - General Information, Specifications).

Fuel Handling Precautions

The following information lists basic precautions which must be observed if fuel is to be handled safely. It also outlines other areas of risk which must not be ignored. As this information is issued for basic guidance only, consult your local Fire Department where any doubt as to personal and environmental safety exists - See also Health and Safety Precautions.

General precautions

Always have the correct type of fire extinguisher containing Foam, CO2, Gas or powder accessible when handling or draining fuel or dismantling fuel systems. Fire extinguishers must also be located in areas where fuel is stored.

Make sure that suitable warning signs are exhibited.

Keep all sources of ignition well away from areas where fuel is being handled.

Make sure that any leadlamps are flameproof and kept clear of spillage.

WARNINGS:

 Do not disassemble or reassemble fuel system components whilst vehicle is over a pit.

 No one should be permitted to repair components associated with fuel without first having specialist training.

Always disconnect the vehicle battery before carrying out disassembly, reassembly or draining work on a fuel system.

Fuel tank and system draining

Draining must be carried out in accordance with the procedures given in the relevant Fuel System section of this manual.

WARNINGS:

Never drain fuel or work on a fuel system while the vehicle is over a pit. Extraction or draining of fuel must be carried out in a well ventilated area.

Always attach fuel vapor warning labels to fuel tanks immediately after draining.

Containers used for storing fuel must be clearly marked with the contents and placed in a safe storage area which meets the requirements of the local authority.

CAUTION: Some fuel lines are now installed with 'quick release' connectors. If a connector is damaged, no attempt must be made to repair the connector, a new fuel line and connector(s) assembly must be installed.

Always release pipe clips fully before attempting to disconnect fuel pipes.

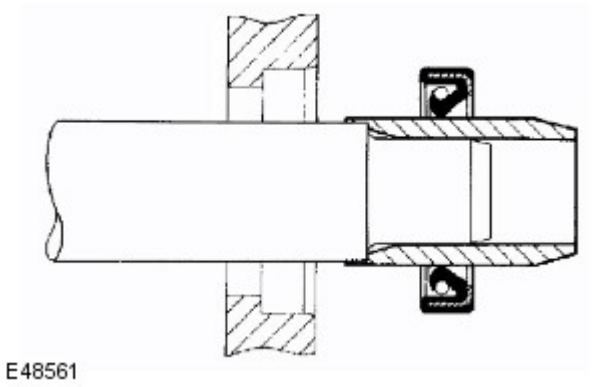
Fuel tank repairs

CAUTION: No attempt should be made to repair a plastic fuel tank. If the structure of the tank is damaged, a new tank must be installed.

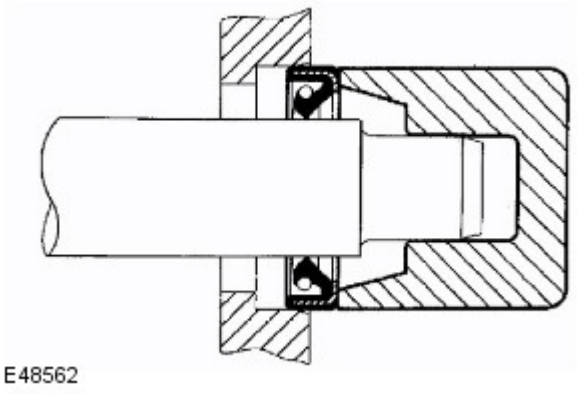
Oil seals

Never use a seal which has been improperly stored or handled.

- Take great care when removing old seals that the sealing surfaces and seal housing are not damaged.
- Carefully examine seal before installing to make sure that it is clean and undamaged.
- Make sure that the surface on which the seal is to run and also the seal housing is clean and free from burrs or scratches. Renew the component if the sealing surface cannot be restored.
- Special tools and protection sleeves are provided for installing the majority of seals and must be used when specified.
- Many seals are now coated with a protective wax and DO NOT need to be lubricated prior to installing. Always check the relevant repair procedure which will state if a seal must be installed dry. Never touch these seals with oily hands as the oil will contaminate the protective coating and affect the sealing properties of the seal; also, make sure that installing tools and protection sleeves are free from oil and grease. Seals which must be lubricated prior to installing should have the recommended lubricant applied to the areas specified in the repair procedure.
- Make sure that a seal is installed the correct way round. For example, the lip of the seal must face towards the lubricant which it is sealing.
- When installing an oil seal, make sure that it is positioned square to shaft and housing. Where the seal is to be installed to a housing prior to installing over a shaft, take care not to allow the weight of an unsupported shaft to rest on the seal.


E48561

- Always use the recommended special tool and protection sleeve to install an oil seal. If no tool is specified, use a suitable mandrel approximately 0.4 mm (0.015 in) smaller than the outside diameter of the seal. Use adhesive tape on the shaft to protect the sealing lip of the seal.



- Press or drift the seal in to the depth of its housing if the housing is shouldered or flush with the face of the housing where no shoulder is provided. Make sure that the seal is not tilted in the housing when it is installed.

Supplementary Restraint System (SRS) Precautions

WARNING: Do not install rear facing child seats in the front passenger seat.

The SRS contains components which are potentially hazardous to service personnel if not handled correctly. The following guidelines and precautions are intended to alert personnel to potential sources of danger and emphasise the importance of ensuring the integrity of the SRS components installed to the vehicle.

WARNING: The following precautions MUST be adhered to when working on the SRS system:

- **The correct procedures must always be used when working on SRS components.**
- **Persons working on the SRS system must be fully trained and have been issued with the safety guidelines.**
- **The airbag modules contain extremely flammable and hazardous compounds. Contact with water, acids or heavy metals may produce harmful or explosive results. Do not dismantle, incinerate or bring into contact with electricity before the unit has been deployed.**
- **Always replace a seat belt assembly that has withstood the strain of a severe vehicle impact or if the webbing shows signs of fraying.**
- **Always disconnect the vehicle battery before carrying out any electric welding on a vehicle installed with an SRS system.**

CAUTION: Do not expose airbag modules or seat belt pre-tensioners to temperatures exceeding 85° C (185° F).

It should be noted that these precautions are not restricted to operations performed when servicing the SRS system. The same care should be exercised when working on ancillary systems and components located in the vicinity of SRS components; these include but are not limited to:

- Steering wheel airbag, rotary coupler.
- Passenger front airbag.
- Head airbag modules - front and rear.
- Seat belt pre-tensioners.
- SRS harnesses, link leads and connectors.
- Side (thorax) air bags.

Making the system safe

Before working on or in the vicinity of SRS components, make sure the system is rendered safe by performing the following operations:

- Remove the ignition key.
- Disconnect battery, earth lead first.
- Wait 2 minutes for the SRS power circuit to discharge before commencing work.

NOTE: The SRS uses energy reserve capacitors to keep the system active in the event of electrical supply failure under crash conditions. It is necessary to allow the capacitors sufficient time to discharge (2 minutes) in order to avoid the risk of accidental deployment.

Installation

In order to make sure system integrity, it is essential that the SRS system is regularly checked and maintained so that it is ready for effective operation in the event of a collision. Carefully inspect SRS components before installation. Do not install a part that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

WARNING: The integrity of the SRS systems is critical for safety reasons. Make sure the following precautions

are always adhered to:

- **Do not install accessories or other objects to trim panels which cover ITS airbags.**
- **Never install used SRS components from another vehicle or attempt to repair an SRS component.**
- **When repairing an SRS system, only use genuine new parts.**
- **Never apply electrical power to an SRS component unless instructed to do so as part of an approved test procedure.**
- **Special fixings are necessary for installing an airbag module – do not use other fixings and make sure that all fixings are tightened to the correct torque.**
- **Always use new fixings when replacing an SRS component.**

CAUTIONS:

Take care not to trap airbag modules when installing interior trim components.

Make sure SRS components are not contaminated by oil or grease.

NOTES:

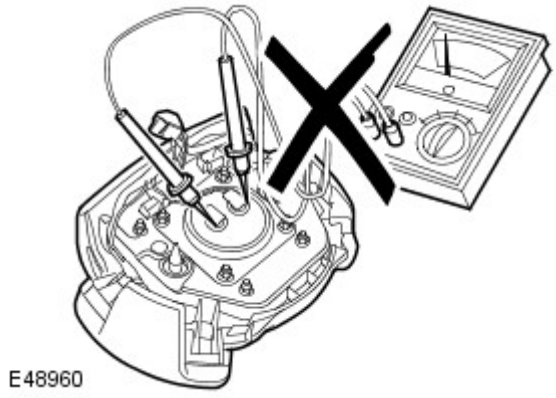
Following seat belt pre-tensioner deployment, the seat belts can still be used as conventional seat belts but will need to be replaced as soon as possible to make sure full SRS protection.

If the SRS components are to be replaced, the part number/bar code of the new unit must be recorded.

SRS component testing precautions

The SRS components are triggered using relatively low operating currents, always adhere to the following :

WARNING: Never use a multimeter or other general purpose equipment on SRS components. Use only T4 to diagnose system faults.


E48960

WARNING: Do not use electrical test equipment on the SRS harness while it is connected to any of the SRS components, it may cause accidental deployment and injury.

Handling and storage

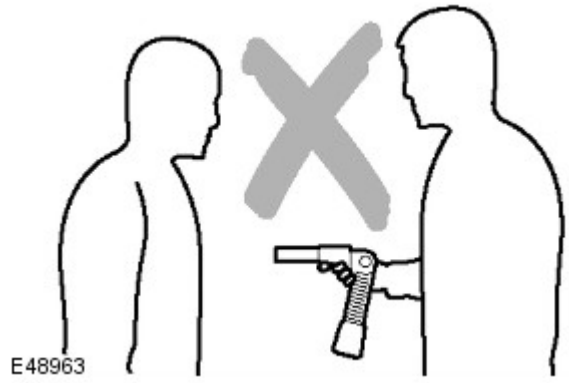
Always observe the following precautions when handling SRS components:


E48961

- Never drop an SRS component. The airbag diagnostic control unit is a particularly shock sensitive device and must be handled with extreme care. Airbag modules and seat belt pre-tensioners could deploy if subjected to a strong shock.
- Never wrap your arms around an airbag module. If a module has to be carried, hold it by the cover with the

cover uppermost and the base away from your body.

- Never transport airbag modules or seat belt pre-tensioners in the passenger compartment of a vehicle. Always use the luggage compartment of the vehicle for carrying airbag modules and seat belt pre-tensioner units.
- Never attach anything to an airbag cover or any trim component covering an airbag module. Do not allow anything to rest on top of an airbag module.
- Always keep components cool, dry and free from contamination.
- Never apply grease or cleaning solvents to seat belt pre-tensioner units, component failure could result.
- Always store an airbag module with the deployment side uppermost. If it is stored deployment side down, accidental deployment will propel the airbag module with sufficient force to cause serious injury.
- Keep new airbag modules in their original packaging until just prior to installing. Place the old module in the empty packaging for carriage.



WARNINGS:

When handling an inflatable tubular structure (ITS) airbag module, hold by the gas generator housing, DO NOT hold by the airbag. Do not wrap the thumb around the gas generator while holding. Do not drape airbag over shoulder or around neck. For seat buckle type pre-tensioners, hold by the piston tube, with the open end of the piston tube pointing towards the ground and the buckle facing away from your body. Do not cover the end of the piston tube. DO NOT hold buckle type pre-tensioners by the bracket assembly or cable. Never point the piston tube towards your body or other people.

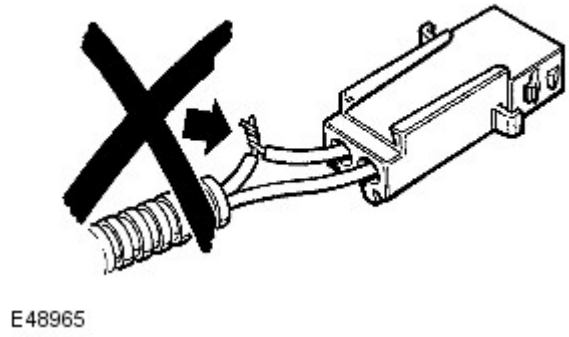
Airbag modules and seat belt pre-tensioners are classed as explosive devices. For overnight and longer term storage, they must be stored in a secure steel cabinet which has been approved as suitable for the purpose and has been registered with the local authority.

Store airbag modules or seat belt pre-tensioners in a designated storage area. If there is no designated storage area available, store in the locked luggage compartment of the vehicle and inform the workshop supervisor.

CAUTION: Improper handling or storage can internally damage the airbag module making it inoperative. If you suspect the airbag module has been damaged, install a new module and refer to the deployment/disposal procedures for disposal of the damaged module.

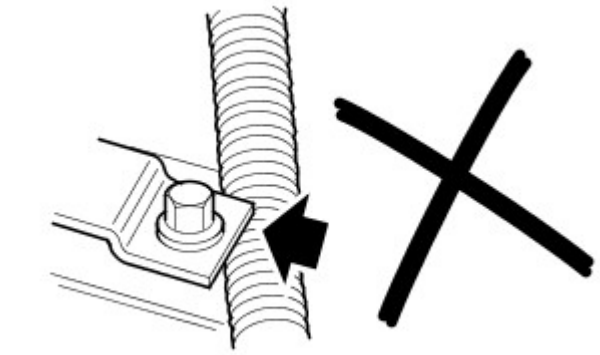
SRS harness and connectors

Always observe the following precautions with regards to SRS system electrical wiring:



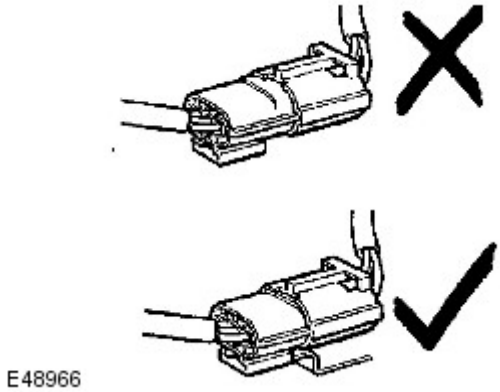
- Never attempt to modify, splice or repair SRS wiring.
- Never install electrical equipment such as a mobile telephone, two-way radio or in-car entertainment system in such a way that it could generate electrical interference in the airbag harness. Seek specialist advice when installing such equipment.

NOTE: SRS wiring can be identified by a special yellow outer sleeve protecting the wires (black with yellow stripe protective coverings are sometimes used).



E48964

WARNING: Always make sure SRS wiring is routed correctly. Be careful to avoid trapping or pinching the SRS wiring.



E48966

WARNING: Do not leave the connectors hanging loose or allow SRS components to hang from their harnesses. Look for possible chafing points.

Side impact crash sensor inspection

After any degree of side body damage, inspect the side impact crash sensors. Replace a crash sensor if there is any sign of damage.

CAUTION: Take extra care when painting or carrying out bodywork repairs in the vicinity of the crash sensors. Avoid direct exposure of the crash sensors or link harnesses to heat guns, welding or spraying equipment. Take care not to damage sensor or harness when reinstalling components.

Rotary coupler

CAUTION: Always follow the procedure for installing and checking the rotary coupler as instructed in the SRS repairs section. Comply with all safety and installation procedures to make sure the system functions correctly. Observe the following precautions:

- Do not unlock and rotate the rotary coupler when it is removed from the vehicle.
- Do not turn the road wheels when the rotary coupler is removed from the vehicle.
- Always make sure the rotary coupler is removed and installed in its central position and with the front road wheels in the straight ahead position - refer to SRS repair section for the correct removal and installation procedure.
- If a new rotary coupler is being installed, make sure the locking tab holding the coupler's rotational position is not broken; units with a broken locking tab must not be used.

Airbag location labels

WAITING AIRBAG LOCATION AND DESIGN LABELS - DUE MARCH - NEIL HARRISON 46404

Airbag and pre-tensioner deployment

WARNING: During deployment parts of the airbag module become hot enough to burn you. Wait 30 minutes after deployment before touching the airbag module.

Deployment procedures and precautions as detailed in this manual should be strictly adhered to. Only personnel who have undergone the appropriate training should undertake deployment of airbag and pre-tensioner modules. The following precautions must be complied with:

- Only use deployment equipment approved for the intended purpose.
- Deployment of airbag / pre-tensioner modules must be performed in a well ventilated area which has been designated for the purpose.
- Make sure airbag / pre-tensioner modules are not damaged or ruptured before attempting to deploy.
- Where local legislation exists, notify the relevant authorities of intention to deploy airbag and pretensioner units.
- When deploying airbag pre-tensioner units, make sure that all personnel are at least 15 metres (45 feet) away from the deployment zone.
- Make sure deployment tool is connected correctly, in compliance with the instructions detailed in the SRS section of this manual. In particular, make sure deployment tool is NOT connected to battery supply before connecting to airbag module connector.
- When deploying seat belt pre-tensioners, make sure pre-tensioner unit is secured correctly to the seat.
- When removing deployed airbag modules and pre-tensioner units, wear protective clothing. Use gloves and seal deployed units in a plastic bag.
- Following deployment of any component of the SRS system within the vehicle, all SRS components must be replaced. DO NOT reuse or salvage any parts of the SRS system.
- Do not lean over an airbag module when connecting deployment equipment.

If a vehicle is to be scrapped, undeployed airbag modules and pre-tensioner units must be manually deployed. In this case airbags can be deployed in the vehicle. Before deployment, make sure the airbag module is secure within its correct mounting position. Deployment of the driver's airbag in the vehicle may damage the steering wheel; if the vehicle is not being scrapped, deploy the module outside of the vehicle.

SRS Component Replacement Policy

CAUTIONS:

 The Restraints Control Module (RCM) will log a crash fault after every impact which is severe enough to cause airbag deployment. **It is possible to have three crashes/impacts logged after one event where, for example, a front, side and rollover has occurred. After the third fault is logged, the SRS warning lamp will be illuminated and the RCM must be installed. After any airbag deployment a new RCM must be installed.**

 The SRS side impact sensor must be replaced if there are any signs of physical damage or if the restraints control module (RCM) is registering a fault.

The following information details the policy for replacement of SRS components as a result of a vehicle accident.

Impacts which do not deploy the airbags or pre-tensioners

Check for structural damage in the area of the impact paying particular attention to bumper armatures, longitudinals and bracketry.

Impacts which deploy the airbags or pre-tensioners

The replacement and inspection policy is dependent on the type and severity of the crash condition. The following guidelines are the minimum that should be exercised as a result of the deployment of specific SRS components.

Check for structural damage in the area of impact paying particular attention to bumper armatures, longitudinals and bracketry.

Front Airbag Deployment - Driver and Passenger

 CAUTION: If the front airbags are deployed, the following components must be replaced:

- Driver airbag module
- Passenger airbag module
- Fly leads (where applicable) connecting front airbag modules to SRS harness
- Front seat belt buckle pre-tensioner
- Rear seat belt pre-tensioners - if installed
- Driver's seat belt retractor - if installed
- Rotary coupler
- Any front impact sensors that have been physically damaged or if a fault is being registered
- Restraints control module (RCM) if the three crashes/impacts have been stored

Additionally, the following items must be inspected for damage and replaced as necessary:

- Front passenger's seat belt retractor and webbing, tongue latching function, 'D' loop and body anchorage point
- Rear seat belt buckles, webbing, buckle covers, body anchorage points and tongue latching function
- Fascia moulding adjacent to passenger airbag module
- Steering wheel
- Front seat frames and head restraints
- Steering column - if adjustment is lost or if there are signs of collapse
- Seat belt height adjusters

Rear seat belts

Side Air Bags

 CAUTION: If the side (thorax) air bags are deployed, the following components must be replaced on the side of the vehicle on which the deployment occurred:

- Side (thorax) airbag
- Any side impact sensors that have been physically damaged or if a fault is being registered
- Restraints Control Module (RCM) if the three crashes/impacts have been stored

Additionally, the following items must be inspected for damage and replaced as necessary:

- Front seat belts, retractors and webbing, tongue latching function, 'D' loop and body anchorage points
- Rear seat belt buckles, webbing, buckle covers, tongue latching function, and body anchorage points
- Front seat frame and head restraints
- Door trim casing
- Seat belt height adjusters
- Rear seat belts

Head airbag modules

 CAUTION: If the head airbag modules are deployed, the following components must be replaced on the side of the vehicle on which the deployment occurred:

- Head airbag modules
- Link lead between airbag gas generator and restraints control module (RCM) harness
- Airbag retaining clips
- Internal trim finisher
- Front seat belt buckle pre-tensioners
- Any side impact sensors that have been physically damaged or if a fault is being registered
- Restraints Control Module (RCM) if the three crashes/impacts have been stored

Additionally, the following items must be inspected for damage and replaced as necessary:

- Headlining
- Component mounting brackets
- Front seat belts, retractors and webbing, tongue latching function, 'D' loop and body anchorage points
- Rear seat belt buckles, webbing, buckle covers, tongue latching function, and body anchorage points
- Adjacent trim components
- Seat belt height adjusters

Rear impacts

 CAUTION: If the seat belt pre-tensioners are deployed during a rear impact, the following components must be replaced:

- Seat belt pre-tensioners
- Front and rear seat belt retractors used during the impact
- Restraints Control Module (RCM) if the three crashes/impacts have been stored

Additionally, the following items must be inspected for damage and replaced as necessary:

- Seat belt height adjusters
- Front seat belts, retractors and webbing, tongue latching function, 'D' loop and body anchorage points
- Rear seat belt buckles, webbing, buckle covers, tongue latching function, and body anchorage points

Air Conditioning System Precautions

The air conditioning system contains fluids and components which could be potentially hazardous to the service engineer or the environment if not serviced and handled correctly. The following guidelines are intended to alert the service engineer to potential sources of danger and emphasise the importance of ensuring the integrity of the Air Conditioning operating conditions and components installed to the vehicle.

Where necessary, additional specific precautions are detailed in the relevant sections of this Manual and also in the Health and Safety Section. These precautions must be referred to prior to commencing repair operations.

The refrigerant used in the air conditioning system is HFC-134a (Hydrofluorocarbon) R134a.

WARNINGS:

 Servicing must only be carried out by personnel familiar with both the vehicle system and the charging and testing equipment. All operations must be carried out in a well ventilated area away from open flame and heat sources.

 R134a is a hazardous liquid and when handled incorrectly can cause serious injury. Suitable protective clothing, consisting of face protection, heat proof gloves, rubber boots and rubber apron or waterproof overalls, must be worn when carrying out operations on the air conditioning system.

Remedial actions

 WARNING: Due to its low evaporating temperature, R134a must be handled with care. R134a splashed on any part of the body will cause immediate freezing of that area. Also, refrigerant cylinders and replenishment trolleys when discharging will freeze skin to them if contact is made.

If an accident involving R134a should occur, conduct the following remedial actions:

- If liquid R134a enters the eye, do not rub it. Gently run large quantities of eye wash over affected eye to raise the temperature. If an eye wash is not available, cool, clean water may be used to flush the eye. After rinsing, cover the eye with a clean pad and seek immediate medical attention.
- If liquid R134a is splashed onto the skin, run large quantities of water over the affected area to raise the temperature. Implement the same action if the skin comes in contact with discharging cylinders. Wrap the contaminated body parts in blankets (or similar materials) and seek immediate medical attention.
- If the debilitating effects of inhalation of R134a vapour are suspected, seek fresh air. If the affected person is unconscious, move them away from the contaminated area to fresh air and apply artificial respiration and/or oxygen and seek immediate medical attention.

Service precautions

Observe the following precautions when handling components used in the air conditioning system:

- Air conditioning units must not be lifted by their hoses, pipes or capillary lines.
- Hoses and lines must not be subjected to any twist or stress; the efficiency of the system will be impaired by kinks or restrictions. Make sure that hoses are correctly positioned before tightening couplings, and make sure that all clips and supports are utilised.
- Flexible hoses should not be positioned closer than 100 mm (4.0 in) to the exhaust manifold unless protected by heat shielding.
- Completed assemblies must be checked for refrigeration lines touching metal panels. Any direct contact of components and panels may transmit noise and so must be eliminated.
- The appropriate torque wrench must be used when tightening refrigerant connections to the stipulated value. An additional spanner must be used to hold the union to prevent twisting of the pipe when tightening connections.
- Before connecting any hose or pipe, make sure that refrigerant oil is applied to the seat of the new O-rings, **BUT NOT** to the threads of the connection.
- All protective plugs or caps must remain in place in the component until immediately prior to connection.
- Make sure components are at room temperature before uncapping/unplugging, to prevent condensation of moisture from the air that enters it.
- When disconnecting, immediately plug or cap all air conditioning pipes to prevent ingress of dirt and moisture into the system.
- Components must not remain uncapped/unplugged, if a system has been left uncapped/unplugged for 20 minutes or longer, a new receiver/drier must be installed.
- The receiver/drier contains desiccant which absorbs moisture. It must be positively sealed at all times. A receiver/drier that has been left uncapped for longer than 20 minutes must not be used; install a new unit.
- The receiver/drier should be the last component connected to the system to make sure optimum dehydration and maximum moisture protection of the system.
- Use alcohol and a clean lint-free cloth to clean dirty connections.
- Make sure that all new parts installed are marked for use with R134a.
- When a major repair has been completed, a leak test should be conducted; refer to the Repairs Section of this manual for the correct procedure.

Refrigerant oil

 CAUTION: Refrigerant oil easily absorbs water and must not be stored for long periods. Do not pour unused refrigerant oil back into the container. Always use an approved refrigerant oil.

When replacing components in the air conditioning system, drain the refrigerant oil from the component being replaced into a graduated container. On assembly, add the quantity of refrigerant oil drained to the new component - See Air Conditioning Compressor Replacement in this Section.

Compressor

A new compressor is sealed and pressurised with Nitrogen gas. When installing a new compressor, slowly release the sealing cap; gas pressure should be heard to vent as the seal is broken.

 CAUTION: A new compressor should always be sealed and could be pressurised with nitrogen gas. To avoid possible oil loss, release the sealing cap(s) slowly. Do not remove the cap(s) until immediately prior to connecting the air conditioning pipes to the compressor.

Rapid refrigerant discharge

If the air conditioning system is involved in accident damage and the system is punctured, the refrigerant will discharge rapidly. The rapid discharge of refrigerant will also result in the loss of most of the oil from the system. The compressor must be removed and all the remaining oil in the compressor drained and refilled as instructed in the air conditioning section of this manual.

Precautions for refrigerant recovery, recycling and recharging

When the air conditioning system is recharged, any existing refrigerant is first recovered from the system and recycled. The system is then charged with the required weight of refrigerant and volume of refrigerant oil.

 WARNING: Refrigerant must always be recycled before reuse to make sure that the purity of the refrigerant is high enough for safe use in the air conditioning system. Recycling should always be carried out with equipment which is design certified by Underwriter Laboratory Inc. for compliance with SAE J1991. Other equipment may not recycle refrigerant to the required level of purity.

CAUTIONS:

 A R134a Refrigerant Recovery Recycling Recharging Station must not be used with any other type of refrigerant. Refrigerant R134a from domestic and commercial sources must not be used in motor vehicle air conditioning systems.

 The system must be evacuated immediately before recharging commences. Delay between evacuation and recharging is not permitted.

Air Conditioning Compressor Replacement

A new compressor is supplied filled with a full charge (X cm^3) of refrigerant oil.

A calculated quantity of oil must be drained from the new compressor before installing. To calculate the quantity of oil to be drained:

- Remove the drain plug from the old compressor.
- Invert the compressor and gravity drain the oil into a calibrated measuring cylinder. Rotate the compressor clutch to make sure the compressor is completely drained.
- Note the quantity of oil drained (Y cm^3).
- Calculate the quantity of oil to be drained from the new compressor using the following formula: **X cm^3 — (Y cm^3 + 20 cm^3) = Q cm^3**
- Remove the drain plug from the new compressor and drain Q cm3 of oil. install and tighten the compressor drain plug.

Vehicle Weights

Item	kg	lb
Maximum Gross Vehicle Weight (GVW)		
Petrol engine vehicles naturally aspirated	3070	6768
Petrol engine vehicles supercharged	3125	6889
Diesel engine vehicles	3070	6768
Maximum weight of unbraked trailer:		
On-road	750	1650
Off-road	750	1650
Maximum towable weight (mass) - Trailers with overrun brakes		
On-road	3500	7700
Off-road	1000	2205
Maximum roof rack load (Including the mass of the roof rack):		
On-road	75	110
Off-road	75	110

Vehicle Dimensions

Item	mm	in
Length - including number plate plinth - All models	4798	188.9
Width - All models:		
Mirrors extended	2170	85.4
Mirrors folded	1983	78.1
Maximum height - At standard ride height - All models:		
With roof rack and rails	1784	70.2
With roof antenna module	1812	71.3
With sunroof open	1817	71.5
Wheelbase - All models	2745	108
Front overhang - All models	880	45.8
Rear overhang - All models	1163	44.5
Track - All models:		
Front	1605	63.2
Rear	1612	63.5
Underbody Clearences:		
Standard ride height - Running clearance to exhaust - Minimum - Kerb weight	172	6.8
Standard ride height - Ground to front undertray clearance	188	7.4
Standard ride height - Ground to rear differential casing clearance	200	7.9
Off-road height - Running clearance to exhaust - Minimum - Kerb weight	227	8.9
Off-road height - Ground to front undertray clearance	243	9.6
Off-road height - Ground to rear differential casing clearance	255	10
Suspension articulation - All models:		
Front	255	10.03

Rear	310	12.2
Departure angle - Towbar NOT installed:		
Standard ride height with full size spare wheel	24.1°	24.1°
Standard ride height with space saver wheel	26°	26°
Off-road height with full size spare wheel	27.4°	27.4°
Off-road height with full space saver wheel	29°	29°
Departure angle - Towbar installed - NOT NAS vehicles:		
Standard ride height	15.1°	15.1°
Off-road ride height	17.8°	17.8°
Departure angle - Towbar installed - NAS vehicles:		
Standard ride height	13.9°	13.9°
Off-road ride height	16.9°	16.9°
Departure angle - Adjustable height towbar installed:		
Standard ride height	13.3°	13.3°
Off-road ride height	16°	16°
Wading depth:		
Off-road height	700	27.5
Approach angle:		
Standard ride height	30.2°	30.2°
Off-road ride height	34°	34°
Ramp angle:		
Standard ride height	20°	20°
Off-road ride height	25°	25°

General Information - Health and Safety Precautions

Description and Operation

Introduction

Modern vehicles contain many materials and liquids which if not handled with care can be hazardous to both personal health and the environment. Also, many of the procedures associated with vehicle maintenance and repair involve physical hazards or other risks to health.

This subsection lists some of these hazardous operations and the materials and equipment associated with them. Precautions necessary to avoid these hazards are identified.

The list is not exhaustive and all operations and procedures and the handling of materials, should be carried out with health and safety in mind.

Before using any product the Materials Safety Data Sheet supplied by the manufacturer or supplier should be consulted.

 WARNING: Many liquids and other substances used in motor vehicles are poisonous and should under no circumstances be consumed and should, as far as possible, be kept from contact with the skin. These liquids and substances include acid, anti-freeze, brake fluid, fuel, windscreen washer additives, lubricants, refrigerants and various adhesives.

Acids and Alkalis

For example - alkalis such as caustic soda used in cleaning materials; acids such as sulphuric acid used in batteries.

Both alkalis and acids are irritant and corrosive to the skin, eyes, nose and throat. They cause burns and can destroy ordinary protective clothing.

Avoid splashes to the skin, eyes and clothing. Wear suitable protective impervious apron, gloves and goggles. Do not breath mists.

Make sure access to eye wash bottles, shower and soap are readily available for splashing accidents.

Display Eye Hazard sign.

Air Bags

Highly flammable, explosive – observe No Smoking policy.

Used within the vehicle as safety restraints.

The inflator contains a high-energy propellant which, when ignited, produces a VERY HOT GAS (2500°C).

The gas inflator (generator) used in air bags is Sodium Azide. This material is hermetically sealed in each air bag module and is completely consumed during deployment. No attempt should be made to open an air bag inflator as this will lead to the risk of exposure to Sodium Azide. If a gas generator is ruptured, full protective clothing should be worn when dealing with the spillage.

After normal deployment, gloves and safety goggles should be worn during the handling process.

Deployed air bags should be disposed of in a plastic bag in accordance with local regulations at an approved chemical waste site.

Following any direct contact with Sodium Azide:

Wash affected areas thoroughly with water.
SEEK IMMEDIATE MEDICAL ASSISTANCE.

Air Bags - Do's

Do store modules in an upright position.
Do keep modules dry.
Do carry modules with the cover side pointing away from the body.
Do place modules with their cover side upwards.
Do carefully inspect modules for damage.
Do stand to one side when connecting modules.
Do make sure all test equipment is properly calibrated and maintained.
Do wash hands after handling deployed air bags.

Air Bags - Do Not

Do Not store highly flammable material together with modules or gas generators.
Do Not store gas generators at temperatures exceeding 80°C.
Do Not store modules upside down.
Do Not attempt to open a gas generator housing.
Do Not expose gas generators to open flame or sources of heat.
Do Not place anything on top of a module cover.
Do Not use damaged modules.
Do Not touch a fired module or gas generator for at least 10 minutes after firing.

Do Not use any electrical probes on the wiring circuit.

Air Suspension

Whenever work is being undertaken on the air suspension system, suitable eye protection must be worn.

Air Conditioning Refrigerant

Highly flammable, combustible – observe No Smoking policy.

Skin contact may result in frostbite.

Instructions given by the manufacturer must be followed. Avoid naked lights, wear suitable protective gloves and goggles.

If refrigerant comes into contact with the skin or eyes, rinse the affected areas with water immediately. Eyes should also be rinsed with an appropriate irrigation solution such as a solution of 9% Sodium Chloride and Purified Water. **DO NOT RUB THE EYES AND SEEK IMMEDIATE MEDICAL ATTENTION.**

Air Conditioning Refrigerant

Do Not

Do Not expose refrigerant bottles to sunlight or heat.
Do Not expose refrigerant bottles to frost.
Do Not drop refrigerant bottles.
Do Not vent refrigerant to atmosphere under any circumstance.
Do Not mix refrigerants.

Adhesives and Sealants

Many adhesives and sealants are highly flammable – OBSERVE NO SMOKING POLICY. These items, should be stored in flameproof cabinets in No Smoking areas. Cleanliness and tidiness in use should be observed, for example disposable paper covering benches. All adhesives and sealants should be dispensed from applicators where possible; containers, including secondary containers, should be labelled appropriately.

Anaerobic, Cyanoacrylate (super-glues) and other Acrylic Adhesives

Many are irritant, sensitizing or harmful to the skin and respiratory tract. Some are eye irritants.

Skin and eye contact should be avoided and the manufacturer's instructions followed.

Cyanoacrylate adhesives (super-glues) MUST NOT contact the skin or eyes. If skin or eye tissue is bonded, cover with a clean moist pad and **SEEK IMMEDIATE MEDICAL ATTENTION.** Do not attempt to pull skin tissue apart. Use in well ventilated areas as vapors can cause irritation to the nose and eyes.

For two-pack systems see Resin-based and Isocyanate Adhesives/Sealers.

Solvent-based Adhesives/Sealers - See Solvents

Follow manufacturers instructions.

Water-based Adhesives/Sealers

Those based on polymer emulsions and rubber/latex may contain small amounts of volatile, toxic and harmful chemicals. Skin and eye contact should be avoided and adequate ventilation provided during use.

Hot Melt Adhesives

In the solid state, they are safe. In the molten state they may cause burns and health hazards may arise from the inhalation of toxic fumes.

Use appropriate protective clothing and a thermostatically controlled heater with a thermal cut-out and adequate extraction.

Resin-based Adhesives/Sealers, for example Epoxide and Formaldehyde Resin-based

Mixing should be carried out in well ventilated areas as harmful or toxic volatile chemicals may be released.

Skin contact with uncured resins and hardeners can result in irritation, dermatitis, and absorption of toxic or harmful chemicals through the skin. Splashes can damage the eyes.

Provide adequate ventilation and avoid skin and eye contact.

Isocyanate (Polyurethane) Adhesives/Sealers

See also Resin-based Adhesives

Individuals suffering from asthma or respiratory allergies should not work with or near these materials as sensitivity reactions can occur.

Over exposure is irritating to the eyes and respiratory system. Excessive concentrations may produce effects on the nervous system including drowsiness. In extreme cases, loss of consciousness may result. Long term exposure to vapour concentrations may result in adverse health effects.

Prolonged contact with the skin may lead to skin irritation and in some cases, dermatitis.

Splashes entering the eye will cause discomfort and possible damage.

Any spraying should preferably be carried out in ventilated booths which incorporate facilities for removing vapors and spray droplets from the breathing zone.

Wear appropriate gloves, eye and respiratory protection.

Antifreeze

May be flammable when undiluted.

Vapors may be given off from coolant antifreeze when heated. Avoid breathing these vapors.

Antifreeze may be absorbed through the skin in toxic or harmful quantities. Antifreeze, if swallowed, can be fatal; **SEEK IMMEDIATE MEDICAL ATTENTION.**

Battery Acids

See also Alkalis and Acids.

Gases released during battery charging are explosive. Always remove the battery from the vehicle prior to charging. Never use naked flames or allow sparks near charging or recently charged batteries. NEVER add acid to a battery, the chemical reaction produced will be violent and explosive. In cases of eye contact, wash affected area with copious amounts of water and **SEEK IMMEDIATE MEDICAL ATTENTION.**

Make sure there is adequate ventilation during battery charging, observe NO SMOKING POLICY.

Brake Pads and Linings

Always fit the correct grade and specification of brake pads and linings. When renewing pads and linings, always replace as complete axle sets.

Brake and Clutch Fluid

Splashes to the skin and eyes are irritating and in the long term can be damaging, avoid prolonged skin contact. In cases of eye contact, wash affected area with copious amounts of water and SEEK IMMEDIATE MEDICAL ATTENTION.

Chemical Materials

All chemical materials should always be used with caution and stored and handled with care. They may be toxic, harmful, corrosive, irritant or highly flammable and give rise to hazardous fumes and dusts.

The effects of excessive exposure to chemicals may be immediate or delayed; briefly experienced or permanent; cumulative; superficial; life threatening; or may reduce life expectancy.

Chemical Materials - Do's

Do carefully read and observe hazard and precaution warnings given on material containers (labels) and in any accompanying leaflets, posters or other instructions. Material health and safety data sheets can be obtained from manufacturers.
Do remove chemical materials from the skin and clothing as soon as practicable after soiling. Change heavily soiled clothing and have it cleaned.
Do organise work practices and protective clothing to avoid soiling of the skin and eyes.
Do avoid breathing vapors, aerosols, dusts or fumes; inadequate container labelling; fire and explosion hazards.
Do wash before job breaks, before eating, smoking, drinking or using toilet facilities when handling chemical materials.
Do keep work areas clean, uncluttered and free of spills.
Do store chemical materials according to national and local regulations.
Do keep chemical materials out of the reach of children.

Chemical Materials - Do Not

Do Not mix chemical materials except under the manufacturers instructions; some chemicals can form other toxic or harmful chemicals, give off toxic or harmful fumes or become explosive when mixed together.
Do Not spray chemical materials, particularly those based on solvents, in confined spaces, for example when people are inside a vehicle.
Do Not apply heat or flame to chemical materials except under the manufacturers instructions. Some are highly flammable and some may release toxic or harmful fumes.
Do Not leave containers open. Fumes given off can build up to toxic, harmful or explosive concentrations. Some fumes are heavier than air and will accumulate in confined areas such as pits.
Do Not transfer chemical materials to unlabelled containers.
Do Not clean hands or clothing with chemicals. Chemicals, particularly solvents and fuels, will dry skin and may cause irritation leading to dermatitis or be absorbed through the skin in toxic or harmful quantities.
Do Not use emptied containers for other materials except when they have been cleaned under supervised conditions.
Do Not sniff or smell chemical materials, even brief exposure to high concentrations of fumes can be toxic or harmful.

Corrosion Protection Materials

Some corrosion protection materials are highly flammable – observe NO SMOKING POLICY.

These materials are varied and the manufacturers instructions must always be followed. The materials may contain solvents, resins or petroleum products. Skin and eye contact should be avoided. They should only be sprayed in conditions of adequate ventilation and not in confined spaces.

Dust

Dust or powder produced during repair operations may be irritant, harmful or toxic. Avoid breathing dusts from powdery chemical materials or those arising from dry abrasion operations. Wear respiratory protection if ventilation is inadequate.

Fine dusts of combustible material can present an explosion hazard. Avoid explosive limits and sources of ignition.

Electrical Equipment

Electric shock can result from the use of faulty electrical equipment or from the misuse of equipment in good condition.

Make sure that electrical equipment is maintained in good condition and frequently tested. Faulty equipment should be labelled and preferably removed from the work station.

Make sure that flexes, cables, plugs and sockets are not frayed, kinked, cut, cracked or otherwise damaged. If using cable reel extension equipment, ALWAYS ensure that the cable is fully unwound from the reel.

Make sure that electrical equipment and flexes do not come into contact with water.

Make sure that electrical equipment is protected by the correct rated fuse.

Never misuse electrical equipment and never use equipment which is in any way faulty. The results could be fatal.

Make sure that the cables of mobile electrical equipment cannot get trapped and damaged, such as in a vehicle hoist.

Make sure that the designated electrical workers are trained in basic First Aid.

In cases of electrocution:

Switch off the power supply before approaching the victim.
If this is not possible, **DO NOT TOUCH THE VICTIM** but push or drag the person from the source of electricity using dry, non-conductive material.
Commence resuscitation if trained to do so.
SEEK IMMEDIATE MEDICAL ATTENTION.

Exhaust Fumes

These contain asphyxiating, harmful and toxic chemicals and particles such as carbon oxides, nitrogen oxides, aldehydes, lead and aromatic hydrocarbons. Engines should be run only under conditions of adequate exhaust extraction or general ventilation and not in confined spaces.

Gasoline (Petrol) engine

There may not be adequate warning of odour or of irritation before toxic or harmful effects arise. These may be immediate or delayed.

Gas Oil (Diesel engine)

Soot, discomfort and irritation usually give adequate warning of hazardous fume concentrations.

Fibre Insulation

The fibrous nature of surfaces and cut edges can cause skin irritation. This is usually a physical and not a chemical effect.

Precautions should be taken to avoid excessive skin contact through careful organization of work practices and the use of gloves.

Fire

Many of the materials found on or associated with the repair of vehicles are highly flammable. Some give off toxic or harmful fumes if burnt; others such as fluoroelastomers when burnt or damaged by excessive heat can break down and produce highly corrosive hydrofluoric acid - See Fluoroelastomers.

Should any material be in a burnt or overheated condition, handle with extreme caution and wear protective clothing when handling such items. Dispose of such material in accordance with local regulations.

Decontaminate and dispose of protective clothing immediately after use.

Observe strict fire safety when storing and handling flammable materials or solvents, particularly near electrical equipment or welding processes.

Make sure, before using electrical or welding equipment, that there is no fire hazard present.

Have a suitable fire extinguisher available when using welding or heating equipment.

First Aid

Apart from meeting any legal requirements it is desirable for someone in the workshop to be trained in First Aid procedures.

Splashes in the eye should be flushed carefully with clean water for at least ten minutes.

Soiled skin should be washed with soap and water.

In case of cold burns, from alternative fuels, place affected area in cool to cold water.

Individuals affected by inhalation of gases and fumes should be removed to fresh air immediately. If effects persist, consult a doctor.

If liquids are swallowed inadvertently, consult a doctor giving him the information on the container or label. Do not induce vomiting unless this action is indicated on the label.

Fluoroelastomers (Synthetic Rubber)

Many 'O' rings, seals, hoses, flexible pipes and other similar which appear to be manufactured from natural rubber are, in fact, made of synthetic materials called Fluoroelastomers.

Under normal operating conditions, these materials are safe and do not constitute a health hazard. However, if the materials are damaged by burning or exposure to excessive heat, they can break down and produce highly corrosive hydrofluoric acid.

 WARNING: Contact with hydrofluoric acid can cause serious burns on contact with the skin. If skin contact does occur, carry out the following steps immediately:

Remove any contaminated clothing.

SEEK IMMEDIATE MEDICAL ATTENTION

Irrigate affected area of skin with copious amounts of cold water or limewater for 15 to 60 minutes.

Foams - Polyurethane

Used in sound and noise insulation. Cured foams used in seat and trim cushioning.

Unreacted components are irritating and may be harmful to the skin and eyes. Wear gloves and goggles.

Individuals with chronic respiratory diseases, asthma, bronchial medical problems, or histories of allergic diseases should not work in or near uncured materials.

The components, vapors or spray mists can cause direct irritation, sensitivity reactions and may be toxic or harmful.

Vapors and spray mists must not be inhaled. These materials must be applied with adequate ventilation and respiratory protection. Do not remove the respirator immediately after spraying, wait until the vapour/mists have cleared.

Burning of the uncured components and the cured foams can generate toxic and harmful fumes. Smoking, naked flames or the use of electrical equipment during foaming operations and until vapors/mists have cleared should not be allowed. Any heat cutting of cured foams or partially cured foams should be carried out in areas having suitable fume extraction equipment.

Fuels

Avoid skin contact with fuel where possible. Should contact occur, wash the affected skin with soap and water.

Gasoline (Petrol)

Highly flammable - OBSERVE NO SMOKING POLICY.

Swallowing gasoline (petrol) can result in mouth and throat irritation and absorption from the stomach can result in drowsiness and unconsciousness. Small amounts can be fatal to children. Inhalation into the lungs, through vomiting, is a very serious hazard.

Gasoline (petrol) dries the skin and can cause irritation and prolonged or repeated contact may cause dermatitis; if it is allowed to enter the eyes, it will cause severe smarting. Wash affected area with copious amounts of water and **SEEK IMMEDIATE MEDICAL ATTENTION.**

Gasoline (petrol) may contain appreciable quantities of benzene, which is toxic upon inhalation and the concentration of vapors must be kept very low. High concentrations will cause eye, nose and throat irritation, nausea, headache, depression and symptoms of drunkenness. Very high concentrations will result in rapid loss of consciousness.

Make sure there is adequate ventilation when handling and using gasoline (petrol). Great care must be taken to avoid the serious consequences of inhalation in the event of vapour build up arising from spillages in confined spaces.

Special precautions apply to cleaning and maintenance operations on gasoline (petrol) storage tanks.

Gasoline (petrol) should not be used as a cleaning agent. It must not be siphoned by mouth.

Gas-oil (Diesel Fuel)

Combustible.

Prolonged skin contact with high boiling point gas oils (diesel fuel) may cause serious skin disorders including skin cancer.

Inhalation into the lungs will cause internal bleeding **- SEEK IMMEDIATE MEDICAL ATTENTION.**

If swallowed, DO NOT induce vomiting - SEEK IMMEDIATE MEDICAL ATTENTION.

Kerosene (Paraffin)

Used also as heating fuel, solvent and cleaning agent.

Flammable - OBSERVE NO SMOKING POLICY.

Irritation of the mouth and throat may result from swallowing. The main hazard from swallowing arises if liquid aspiration into the lungs occurs.

Liquid contact dries the skin and can cause irritation or dermatitis. Splashes in the eye may be slightly irritating.

In normal circumstances the low volatility does not give rise to harmful vapors. Exposure to mists and vapors from kerosene at elevated temperature should be avoided (mists may arise in dewaxing). Avoid skin and eye contact and make sure there is adequate ventilation.

If swallowed, DO NOT induce vomiting - SEEK IMMEDIATE MEDICAL ATTENTION.

Gas Cylinders

Gases such as oxygen, acetylene, argon and propane are normally stored in cylinders at pressures of up to 138 bar (13800 kPa) (2000 lbf/in²) and great care should be taken in handling these cylinders to avoid mechanical damage to them or to the valve gear attached. The contents of each cylinder should be clearly identified by appropriate markings.

Cylinders should be stored in well ventilated enclosures, and protected from ice and snow or direct sunlight. Fuel gases, for example acetylene and propane should not be stored in close proximity to oxygen cylinders.

Care should be exercised to prevent leaks from gas cylinders and lines and also to avoid sources of ignition.

Only trained personnel should undertake work involving gas cylinders.

General Workshop Tools and Equipment

It is essential that all tools and equipment are maintained in good condition and the correct safety equipment is used where required.

Never use tools or equipment for any purpose other than that for which they were designed. Never overload equipment such as hoists, jacks, axle and chassis stands or lifting slings. Damage caused by overloading is not always immediately apparent and may result in a fatal failure the next time that the equipment is used.

Do not use damaged or defective tools or equipment, particularly high speed equipment such as grinding wheels. A damaged grinding wheel can disintegrate without warning and cause serious injury.

Wear suitable eye protection when using grinding, chiselling or sand blasting equipment.

Wear a suitable breathing mask when using abrasive blasting equipment or using spraying equipment.

Make sure there is adequate ventilation to control dusts, mists and fumes.

High Pressure Air, Lubrication and Oil Test Equipment

Always keep high pressure equipment in good condition, and regularly maintained, particularly at joints and unions.

Never direct a high pressure nozzle, for example diesel injector, at the skin as the fluid may penetrate to the underlying tissue and cause serious injury.

Jacking

Always refer to the Jacking and Lifting section of this manual prior to raising the vehicle off the ground.

When vehicle is to be raised by means of a jack, ensure that it is standing on level ground, that parking brake is applied and wheels are chocked. ALWAYS use the recommended jacking points and ensure that vehicle jack has sufficient load capacity for the weight of the vehicle.

 WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Ensure that hoists have sufficient load capacity for the weight of the vehicle.

Legal Aspects

There are many laws and regulations relating to health and safety in the use and disposal of materials and equipment in a workshop.

For a safe working environment and to avoid environmental pollution, workshops should be familiar, in detail, with the many health and safety laws and regulations within their country, published by both national and local authorities.

Lubricants and Greases

Avoid all prolonged and repeated contact with mineral oils. All lubricants and greases may be irritating to the eyes and skin.

Used Engine Oil

Prolonged and repeated contact with engine oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities must be provided.

Do not employ used engine oils as lubricants or for any application where appreciable skin contact is likely to occur.

Health Protection Precautions

Avoid prolonged and repeated contact with oils, particularly used engine oils.
Wear protective clothing, including impervious gloves where practicable.
Do not put oily rags into pockets.
Avoid contaminating clothes, particularly underpants, with oil.
Heavily soiled clothing and oil-impregnated footwear should not be worn. Overalls must be cleaned regularly.
First Aid treatment should be obtained immediately for open cuts and wounds.
Use barrier creams, applying them before each work period, to help the removal of oil from the skin.
Wash with soap and water to make sure all oil is removed (skin cleansers and nail brushes will help).
Preparations containing lanoline replace the natural skin oils which have been removed.
Do not use gasoline (petrol), kerosene (paraffin), diesel fuel (gas oil), thinners or solvents for cleaning skin.
If skin disorders develop, obtain medical advice without delay.
Where practicable, degrease components prior to handling.
Where there is a risk of eye contact, eye protection should be worn, for example chemical goggles or face shields; in addition an eye wash facility should be provided.

Environmental Precautions

This section provides general information which can help to reduce the environmental impacts from the activities carried out in workshops.

Emissions to air

Many of the activities that are carried out in workshops emit gases and fumes which can contribute to global warming, depletion of the ozone layer and/or the formation of photochemical smog at ground level. By considering how the workshop activities are carried out, these gases and fumes can be minimised, thus reducing the impact on the environment.

Exhaust fumes

Running car engines is an essential part of workshop activities and exhaust fumes need to be ventilated to atmosphere. However, the amount of time engines are running and the position of the vehicle should be carefully considered at all times, to reduce the release of poisonous gases and minimise the inconvenience to people living nearby.

Solvents

Some of the cleaning agents used are solvent based and will evaporate rapidly to atmosphere if used carelessly, or if containers are left unsealed. All containers must be firmly closed when not required and solvent should be used sparingly. Wherever possible, solvents having a low toxicity and flammability should be selected. Always follow the instructions supplied by the solvent manufacturer. Similarly, many paints are solvent based and the spray should be used in such a way as to reduce emissions to a minimum.

Refrigerant

It is illegal to release any refrigerant into the atmosphere. Discharge and replacement of these materials from air conditioning units should only be carried out using the appropriate equipment.

Discharges to water

Most workshops will have two systems for discharging waste water - storm drains and foul drains. Storm drains should only receive clean water i.e. rainwater. Foul drains will accept many of the normal waste water i.e. washing water, detergents and domestic type waste BUT NOT oil, petrol, solvent, acids, hydraulic fluid, antifreeze and similar fluids. If in doubt, always consult the local authority or water company.

Spillages

Every precaution must be taken to prevent spillage of oil, fuel, solvents etc., reaching the drains. All handling of such materials must take place well away from drains and preferably in an area with a suitable containing wall to prevent discharge into drains or watercourses. If a spillage occurs, it must be soaked up immediately using a spill kit where provided.

Checklist

Spillage prevention:

- Store liquids in a secure area.
- Make sure that taps on liquid containers are secure and cannot be accidentally turned on.
- Protect bulk storage tanks from vandalism by locking the valves.
- Transfer liquids from one container to another in an area away from open drains.
- Ensure lids are replaced securely on containers.
- Have spill kits available near to points of storage and liquid handling areas.

Spill Kits

Special materials are available to absorb a number of different substances. They can be in granular form, ready to use and are supplied in suitable containers. Disposal of used spill absorbing material is dealt with in Waste management.

Land contamination

Oils, fuels and solvents etc. can contaminate any soil with which they come into contact. Such materials MUST never be disposed of by pouring on to soil and every precaution must be taken to avoid spillage reaching soil. Waste materials stored on open ground could either leak or have contaminating substances washed off them that would contaminate the land. Always store these materials in suitable skips or similarly robust containers.

Legal compliance

Some sites may have a discharge consent for effluent discharge to the foul drain for a car wash etc. It is essential to know the types of effluent which are allowed to be discharged into the drain and to check the results of any monitoring carried out by the Water Company.

Where paint spraying operations are carried out it may be necessary to apply to the Local Authority for an air emissions licence to operate the plant. If such a licence is necessary, additional precautions will be necessary to comply with the requirements and the results of any air quality monitoring must be checked regularly.

Checklist

Always adhere to the following:

- Know what legal consents and licences apply to the operations.
- Check that the emissions and discharges comply with legal requirements.

Waste Management

Pollution can be reduced by careful handling, storage and disposal of all waste materials that occur on sites. Legislation makes it illegal to dispose of waste materials other than to licensed waste carriers and disposal sites.

This means that it is necessary to not only know what the waste materials are but also to have the necessary documentation and licences.

Handling and storage of waste

Ensure that waste materials are not poured down the drain or on to soil and are stored in such a way that they do not escape on to land or soil.

All waste must be segregated into individual types e.g. oils, metals, batteries, scrap components etc. This will prevent any reaction between different materials and assist in disposal.

Disposal of waste

Dispose of waste in accordance with the following guidelines:

- **Fuel, hydraulic fluid, anti-freeze and oil:** Keep separate and dispose of to specialist contractors.
- **Refrigerant:** Collect in specialist equipment and reuse.
- **Detergents:** Safe to pour down the foul drain if diluted.
- **Paint, thinners:** Keep separate and dispose of to specialist contractor.
- **Components:** Return to supplier for refurbishment or disassemble and reuse any suitable parts. Dispose of remainder in ordinary waste.
- **Small parts:** Reuse any suitable parts, dispose of the remainder in ordinary waste.
- **Metals:** Can be sold if separate from general waste.
- **Tyres:** Keep separate and dispose of to specialist contractor. DO NOT attempt to dispose of tyres by burning.
- **Components / materials containing asbestos:** Keep separate and dispose of to specialist contractor.
- **Oil and fuel wastes (e.g. rags, used spill kit material):** Keep separate and dispose of to specialist contractors.

- **Air filters:** Keep separate and dispose of to specialist contractors.
- **Rubber / plastics:** Dispose of in ordinary waste.
- **Hoses:** Dispose of in ordinary waste.
- **Batteries:** Keep separate and dispose of to specialist contractors.
- **Air bags - DANGER EXPLOSIVES:** Keep separate and dispose of to specialist contractors.
- **Electrical components:** Return to supplier for refurbishment or disassemble and reuse any suitable components. Dispose of remainder in ordinary waste.
- **Catalytic converters:** May be sold if kept separate from general waste.
- **Packaging:** Compact/recycle as much as possible and dispose of in ordinary waste.
- **Office / paper waste:** Recycle paper and toner and ink cartridges, dispose of remainder in ordinary waste.

Noise

Car alarm testing, panel beating, running engines, using air tools etc. are operations which invariably produce a large amount of noise. The location of such activities and also the time of day must be carefully considered having regard to the proximity of houses schools etc.

Some operations may produce high noise levels which could, in time, damage hearing. In these cases, suitable ear protection must be worn.

Solder

Solders are mixtures of metals such that the melting point of the mixture is below that of the constituent metals (normally lead and tin). Solder application does not normally give rise to toxic lead fumes, provided a gas/air flame is used. Oxy-acetylene flames should not be used, as they are much hotter and will cause lead fumes to be produced.

Some fumes may be produced by the application of any flame to surfaces coated with grease, and inhalation of these should be avoided.

Removal of excess solder should be undertaken with care, to make sure that fine lead dust is not produced, which can give toxic effects if inhaled. Respiratory protection may be necessary.

Solder spillage and filings should be collected and removed promptly to prevent general air contamination by lead.

High standards of personal hygiene are necessary in order to avoid ingestion of lead or inhalation of solder dust from clothing.

Solvents

For example acetone, white spirit, toluene, xylene, trichloroethane.

Used in cleaning and dewaxing materials, paints, plastics, resins and thinners.

Some may be highly flammable or flammable.

Skin contact will degrease the skin and may result in irritation and dermatitis following repeated or prolonged contact. Some can be absorbed through the skin in toxic or harmful quantities.

Splashes in the eye may cause severe irritation and could lead to loss of vision.

Brief exposure of high concentrations of vapors or mists will cause eye and throat irritation, drowsiness, dizziness, headaches and, in the worst circumstances, unconsciousness.

Repeated or prolonged exposure to excessive but lower concentrations of vapors or mists, for which there might not be adequate warning indications, can cause more serious toxic or harmful effects.

Aspiration into the lungs, for example through vomiting, is the most serious consequence of swallowing.

Avoid splashes to the skin, eyes and clothing. Wear protective gloves, goggles and clothing if necessary.

Make sure there is good ventilation when in use, avoid breathing fumes, vapors and spray mists and keep containers tightly sealed. Do not use in confined spaces.

When spraying materials containing solvents, for example paints, adhesives, and metal coatings, use extraction ventilation or personal respiratory protection in the absence of adequate general ventilation.

Do not apply heat or flame except under specific and detailed manufacturers instructions.

Suspended Loads

 CAUTION: Never improvise lifting tackle.

There is always a danger when loads are lifted or suspended. Never work under an unsupported, suspended or raised load, for example a suspended engine.

Always make sure that lifting equipment such as jacks, hoists, axle stands and slings are adequate and suitable for

the job, in good condition and regularly maintained.

Viton

In common with many other manufacturers vehicles, some components installed to Land Rover vehicles have seals, 'O' rings or gaskets which contain a material known as 'Viton'.

Viton is a fluoroelastomer, that is a synthetic rubber type which contains Fluorine. Although Viton is the most well known fluoroelastomer, there are others, including Fluorel and Tecmoflon.

When used under design conditions fluoroelastomers are perfectly safe. If, however, they are exposed to temperatures in excess of 400°C, the material will not burn, but will decompose, and one of the products formed is hydrofluoric acid.

This acid is extremely corrosive and may be absorbed directly, through contact, into the general body system. **WHERE CASES OF SKIN CONTACT OCCUR, SEEK IMMEDIATE MEDICAL HELP.**

O-rings, seals or gaskets which have been exposed to very high temperatures will appear charred or as a black sticky substance.

DO NOT, under any circumstances touch them or the attached components.

Enquiries should be made to determine whether Viton or any other fluoroelastomer has been used in the affected O-ring, seal or gasket. If they are of natural rubber or nitrile there is no hazard. If in doubt, be cautious as the material may be Viton or any fluoroelastomer.

If Viton or any other fluoroelastomers have been used, the affected area should be decontaminated before the commencement of work.

Disposable heavy duty plastic gloves should be worn at all times, and the affected area washed down using wire wool and a limewater (calcium hydroxide) solution to neutralise the acid before disposing of the decomposed Viton residue and final cleaning of the area. After use, the plastic gloves should be discarded carefully and safely.

Welding

Welding processes include Resistance Welding (Spot Welding), Arc Welding and Gas Welding.

Resistance Welding

This process may cause particles of molten metal to be emitted at a high velocity, and the eyes and skin must be protected.

Arc Welding

This process emits a high level of ultra-violet radiation which may cause arc-eye and skin burns to the operator and to other persons nearby. Gas-shielded welding processes are particularly hazardous in this respect. Personal protection must be worn, and screens used to shield other people.

CONTACT LENS WEARERS ARE ADVISED TO REVERT TO ORDINARY SPECTACLES WHEN ARC WELDING as the arc spectrum is believed to emit microwaves which dry out the fluid between the lens and the eye. This may result in blindness when the lens is removed from the eye.

Metal spatter will also occur, and appropriate eye and skin protection is necessary.

The heat of the welding arc will produce fumes and gases from the metals being welded, the rods and from any applied coatings or contamination on the surfaces being worked on. These gases and fumes may be toxic and inhalation of these should be avoided. The use of extraction ventilation to remove the fumes from the working area may be necessary particularly in cases where the general ventilation is poor, or where considerable welding work is anticipated. In extreme cases or confined spaces where adequate ventilation cannot be provided, air-fed respirators may be necessary.

 CAUTION: Some of the components installed to the vehicle e.g. the interior cross beam and underbonnet cross member are manufactured from magnesium alloy. On no account should any welding operations be attempted on these components.

Gas Welding (and Cutting)

Oxy-acetylene torches may be used for welding and cutting, and special care must be taken to prevent leakage of these gases, with consequent risk of fire and explosion.

The process will produce metal spatter and eye and skin protection is necessary.

The flame is bright, and eye protection should be used, but the ultra-violet emission is much less than that from arc welding, and lighter filters may be used.

The process itself produces few toxic fumes, but such fumes and gases may be produced from coatings on the work, particularly during cutting away of damaged body parts, and inhalation of the fumes should be avoided.

In brazing, toxic fumes may be produced from the metals in the brazing rod, and a severe hazard may arise if brazing rods containing cadmium are used. In this event particular care must be taken to avoid inhalation of fumes and expert advice may be required.

SPECIAL PRECAUTIONS MUST BE TAKEN BEFORE ANY WELDING OR CUTTING TAKES PLACE ON VESSELS WHICH HAVE CONTAINED COMBUSTIBLE MATERIALS, FOR EXAMPLE BOILING OR STEAMING OUT OF

FUEL TANKS.

Warning Symbols on Vehicles

Decals showing warning symbols will be found on various vehicle components.

These decals must not be removed. The warnings are for the attention of owners/operators and persons carrying out service or repair operations on the vehicle.

General Information - Solvents, Sealants and Adhesives

Description and Operation

Solvents

 WARNING: Always handle all solvents, sealers and adhesives with extreme care. Some contain chemicals or give off fumes which can be dangerous to health. Always follow the manufacturers instructions. If in doubt about any substance, particularly a solvent, DO NOT use it.

 CAUTION: If in doubt about the suitability of any proprietary solvent or sealer for a particular application, contact the manufacturer of the product for information.

The Health and Safety Precautions subsection refers to some commonly used chemicals and materials, hazards associated with their use, and safety measures to be taken. Some of these chemicals may be included as an ingredient in a sealer or adhesive.

Sealers

Certain procedures in this manual involve the use of sealants during installation of components. Where a sealant is required, the application, together with the Land Rover part number is given in the General Specification at the start of each section and an instruction that a sealant must be used appears in the relevant repair procedure.

It is essential that the sealant(s) specified for a particular procedure are used, DO NOT use any other sealant.

Always remove traces of old sealant using a plastic scraper or suitable solvent, never use emery cloth or metal scrapers.

Adhesives

Whenever a procedure involves the use of an adhesive, the adhesive specified must be used and the manufacturer's instructions regarding application together with any health and safety precautions must be followed.

General Information - Road/Roller Testing

Description and Operation

Road or rolling road testing may be carried out for various reasons and a procedure detailing pre-test checks, through engine starting and stopping, pre-driving checks, on-test checks to final checks on completion of the test are given.

Unless complete vehicle performance is being checked, the full road test procedure need not be carried out. Instead, those items particularly relevant to the system(s) being checked can be extracted.

Pre-Test Checks

 WARNING: If the brake system hydraulic fluid level is low, pedal travel is excessive or a hydraulic leak is found, do not attempt to road test the vehicle until the reason for the low fluid level, excessive pedal travel or hydraulic leak is found and rectified.

It is suggested that pre-test and functional tests of those systems/circuits which affect the safe and legal operations of the vehicle, such as brakes, lights and steering, should always be carried out before the road or rolling road test.

Engine oil level
Engine coolant level
Tires, for correct pressure, compatible types and tread patterns, and wear within limits.
There is sufficient fuel in the tank to complete the test.
Check all around the engine, transmission and under the vehicle for oil, coolant, hydraulic and fuel leaks. Make a note of any apparent leaks and wipe off the surrounding areas to make it easier to identify the extent of the leak on completion of the test.

Starting the Engine

 NOTE: On initial drive away from cold and within the first 1.5 km (1 mile), do not depress accelerator pedal beyond half travel until the vehicle has attained a minimum speed of 25 km/h (15 miles/h). Never operate at high engine speed or with the accelerator pedal at full travel whilst the engine is cold.

With the ignition switched off, check:

The parking brake is applied.
Automatic gearbox: The selector lever is in 'P' - Park
Transfer case: 'H' - High is selected
All instrument gauges read zero.

With the ignition switched on, check:

Ignition controlled warning lights come on.
Engine temperature gauge registers a reading compatible with the engine temperature.
Fuel gauge registers a reading appropriate to the fuel level in the tank.
The operation of the parking brake warning light and fluid level warning indicator light.

On Road Test Check:

 CAUTION: At commencement of road testing, check the brake operation while still travelling at low speed before continuing with the test. If the brakes pull to one side, or appear to be otherwise faulty, do not continue with the road test until the fault has been found and rectified.

The parking brake releases completely.
Gear changing is smooth, and there are no abnormal noises or vibrations from the gearbox.
The engine power output is satisfactory, acceleration is smooth and accelerator pedal operation is not stiff or heavy, and engine speed returns to idle correctly.
There is no excessive or abnormally colored smoke from the engine under normal driving, heavy load or overrun conditions.
Steering operation is smooth, accurate, not excessively heavy or with excessive free play or vibration. Does not pull to one side and self centres smoothly after cornering.
All instruments register the correct readings and operate correctly.
Switches and controls operate smoothly and positively, warning or indicator lights operate correctly and the direction indicator control self cancels when the steering is returned to the straight ahead position.
Heating and ventilation systems work correctly and effectively.
Brakes operate efficiently.

Brake Testing

Avoid brake testing on busy roads where it can cause inconvenience or danger to other road users.

 CAUTION: Brake testing which includes heavy brake applications should not be carried out with new brake pads/discs until the components have bedded-in. New brake friction components will not reach full efficiency until the bedding-in process is complete. Note that when new parking brake shoes or rear brake discs have been installed, it is essential that the 'bedding-in' procedure given in Section 206-05 - Parking Brake Removal and

Installation is carried out.

Test the brakes at several speeds within the normal operating range using both light and heavy pedal pressure. Note any tendency to snatch, pull or drag, and any undue delay in application or release.

Allow the vehicle to coast and note any tendency to pull to one side, or evidence that the brakes are binding.

After stopping the vehicle (not immediately after a period of heavy braking), carefully check the brake temperature. A disc which feels appreciably hotter than the others, could indicate that the pads on that disc are binding.

After completion of the test, check for:

Oil, coolant, hydraulic, air and fuel leaks.
Abnormal temperature of any moving components or assemblies, e.g. wheel hubs, transmission etc., which might indicate over tightness or lack of lubrication.

Rolling Road Testing

Four-Wheel Rolling Road

 CAUTION: When utilising a four-wheel rolling road for testing, ensure all relevant health and safety requirements are adhered to.

Provided that front and rear rollers are rotating at identical speeds and that normal workshop safety standards are applied, there is no speed restriction during testing except any that may apply to the tires.

Ensure that the parking brake is released prior to engaging roller driving mechanism.

Two-Wheel Rolling Road

 CAUTION: On no account should an attempt be made to carry out any form of testing on a two-wheel rolling road.

General Information - Special Tool Glossary

Description and Operation

Service Tools

Special service tools have been developed to facilitate removal, dismantling and assembly of mechanical components in a cost effective and time efficient manner. The use of such special tools also helps prevent the potential for damage to components.

Some operations described in this manual cannot be carried out properly without the aid of the relevant service tools.

See the following list for regional special tool points of contact:

Europe and European countries not in the following list.

Tel: 0049 (0) 6182 959 497

Fax: 0049 (0) 6182 959 226

e-mail: CSS2@bosch-automotive.com

Non-European Export

Tel: 0049 (0) 6182 959 491

Fax: 0049 (0) 6182 959 246

e-mail: CSS4@bosch-automotive.com

Overseas orders for the following countries should be placed with the local distributor.

United Kingdom

Tel: 0044 (0)1327 303400

Fax: 0044 (0)1327 303499

e-mail: CSS.UK@bosch-automotive.com

Scandinavia and the Baltics

Tel: 0049 (0) 6182 959 495

Fax: 0049 (0) 6182 959 228

e-mail: CSS5@bosch-automotive.com

Spain and Portugal

Tel: 0034 949 208329

Fax: 0034 949 208327

e-mail: CSS.iberica@bosch-automotive.com

North America

Tel: 001 866 628 5508

Fax: 001 800 578 7375 or 001 586 578 7375

Australia

Tel: 0061 3 9544 6222

Fax: 0061 3 9544 5222

e-mail: customerservice.au@service-solutions.com

Japan and East Asia

Tel: 0081 3 5436 3615

Fax: 0081 3 5436 3622

e-mail: jp.customerservices@service-solutions.com

Italy

Tel: 0039 0521 338170

Fax: 0039 0521 837370

e-mail: CSS.Italy@bosch-automotive.com

Belgium, Netherlands and Luxembourg

Tel: 0031 4645 72716

Fax: 0031 4645 72711

e-mail: CSS.Benelux@bosch-automotive.com

China

Tel: 0086 21 2218 2668

Fax: 0086 21 2218 2677

e-mail: karen.zhai@cn-bosch.com

India

Tel: 0091 20 6725 4823

Fax: 0091 96 2393 1332

e-mail: semi.singh@in.bosch.com

Mexico - LAM Region

Tel: 0052 55 2595 1630

Fax: 0052 55 2595 1639

e-mail: herramientas@service-solutions.com

Brazil

Tel: 0055 (11) 5853 7487

Fax: 0055 (11) 5853 7489

e-mail: ferramentas@service-solutions.com

France

Tel: 0033 2 52 84 00 40

Fax: 0033 2 43 60 43 62

e-mail: css-france@bosch-automotive.com

Korea

Tel: 0082 31 457 9520

Fax: 0082 31 427 9522

e-mail: sungmin.kim@kr.bosch.com / hongyoung.choi@kr.bosch.com

General Information - Petrol and Petrol-Ethanol Fuel Systems Health and Safety Precautions

Description and Operation

WARNINGS:

 Fuel may not give adequate warning before toxic or harmful effects arise.

 Exposure to fuel can be harmful and can cause severe health damage or death.

 Extreme care must be exercised when handling hot fluids. Always wash off spilled fluids from affected areas of skin immediately.

 Highly flammable mixtures are always present and may ignite when working on fuel systems. Do not allow naked flames, sparks or lighted substances to come near fuel related components.

 Fuel must not be used as a cleaning agent.

 Keep fuel containers tightly closed, out of direct sunlight and in a cool area. Keep away from heat sources, ignition sources and oxidizing agents.

 SKIN CONTACT: Excessive or prolonged skin contact with diesel fuel may cause serious skin disorders including skin cancer.

 SKIN CONTACT: Fuel is mildly irritating to the skin and may cause dermatitis due to defatting effect. Remove contaminated clothing. Wash affected areas of skin with soap and water. Seek medical attention for any persistent skin irritation or abnormality. Wash contaminated clothing before reuse.

 EYE CONTACT: Fuel is mildly irritating to the eyes. Flush with plenty of running water, blinking as often as possible. Do not force the eyelid open. Seek medical attention for any persistent eye irritation or abnormality.

 SWALLOWED: Fuel is moderately toxic and tends to foam on vomiting. If drawn into the lungs, inflammation may develop. Do not induce vomiting. If spontaneous vomiting occurs place the victim in a forward position to reduce the risk of fuel being drawn into the lungs. Give nothing by mouth. If breathing but unconscious, place in the recovery position. If breathing has stopped, apply artificial respiration. Seek immediate medical attention.

 INHALED: Fuel is toxic to the respiratory and other body systems. Exposure may result in various symptoms including drowsiness, unconsciousness or severe health damage. Move a victim to fresh air. Keep a victim warm and at rest. If unconscious, place in the recovery position. If not breathing, apply artificial respiration. Give cardiac massage if necessary. Seek immediate medical attention.

CAUTIONS:

 Fuel injection equipment is manufactured to very precise tolerances and fine clearances. It is essential that absolute cleanliness is observed when working with these components.

 Make sure that the workshop area in which the vehicle is being worked on is as clean and as dust free as possible.

General Information - Diagnostic Trouble Code (DTC) Index DTC: Adaptive Damping Control Module (ADCM)

Description and Operation

Adaptive Damping Control Module (SUMB)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Suspension Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Ride and Handling Optimization (204-06 Ride and Handling Optimization, Diagnosis and Testing).

DTC	Description	Possible Cause	Action
C101D-12	Left Front Vertical Acceleration Sensor - Circuit short to battery	• Left front vertical accelerometer circuit short to power	• Refer to the electrical circuit diagrams and check left front vertical accelerometer circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system
C101D-14	Left Front Vertical Acceleration Sensor - Circuit short to ground or open	• Left front vertical accelerometer circuit short to ground or open circuit • Left front vertical accelerometer fault	• Refer to the electrical circuit diagrams and check front vertical accelerometer circuit for short to ground, open circuit. If no fault found on wiring suspect accelerometer. Replace accelerometer, clear DTC and retest the system
C101D-22	Left Front Vertical Acceleration Sensor - Signal amplitude > maximum	• Left front vertical accelerometer signal amplitude above maximum • Left front vertical accelerometer insecurely mounted • Left front vertical accelerometer signal circuit short to another circuit • Left front vertical accelerometer internal fault	• With vehicle parked on a level surface, read left front vertical accelerometer voltage and check it lies in range 1.9 to 2.1 volts. If not OK then check electrical wiring for shorts, loose connections and repair as required. If wiring OK then suspect faulty accelerometer/incorrectly installed accelerometer. Check the accelerometer is correctly mounted, secure or renew accelerometer as required. Clear DTC and retest system

C101D-26	Left Front Vertical Acceleration Sensor - Signal rate of change below threshold	• Left front vertical accelerometer signal rate of change below threshold • Left front vertical accelerometer signal circuit short to another circuit • Left front vertical accelerometer internal fault	• Refer to the electrical circuit diagrams and check left front vertical accelerometer signal circuit for faults, if circuit is correct suspect faulty accelerometer. Replace the accelerometer, clear the DTC and retest the system
C101D-78	Left Front Vertical Acceleration Sensor - Alignment or adjustment incorrect	• Left front vertical accelerometer alignment or adjustment incorrect • Left front vertical accelerometer bracket bent • Left front vertical accelerometer damaged	• Check left front vertical accelerometer for location and security, if correct suspect faulty accelerometer. Replace the accelerometer/bracket as required, clear the DTC and retest the system
C101E-12	Right Front Vertical Acceleration Sensor - Circuit short to battery	• Right front vertical accelerometer circuit short to power	• Refer to the electrical circuit diagrams and check right front vertical accelerometer circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system
C101E-14	Right Front Vertical Acceleration Sensor - Circuit short to ground or open	• Right front vertical accelerometer circuit short to ground or open circuit • Right front vertical accelerometer fault	• Refer to the electrical circuit diagrams and check right front vertical accelerometer circuit for short to ground, open circuit. If no fault found on wiring suspect accelerometer. Replace accelerometer, clear DTC and retest the system
C101E-22	Right Front Vertical Acceleration Sensor - Signal amplitude > maximum	• Right front vertical accelerometer signal amplitude above maximum • Right front vertical accelerometer insecurely mounted • Right front vertical accelerometer signal circuit short to another circuit • Right front vertical accelerometer internal fault	• With vehicle parked on a level surface, read right front vertical accelerometer voltage and check it lies in range 1.9 to 2.1 volts. If not OK then check electrical wiring for shorts, loose connections and repair as required. If wiring OK then suspect faulty accelerometer/incorrectly installed accelerometer. Check the accelerometer is correctly mounted, secure or renew accelerometer as required. Clear DTC and retest system
C101E-26	Right Front Vertical Acceleration Sensor - Signal rate of change below threshold	• Right front vertical accelerometer signal circuit short to another circuit • Right front vertical accelerometer	• Refer to the electrical circuit diagrams and check right front vertical accelerometer signal circuit for faults, if circuit is correct suspect faulty accelerometer. Replace the accelerometer, clear the DTC and retest the system

		internal fault	
C101E-78	Right Front Vertical Acceleration Sensor - Alignment or adjustment incorrect	• Right front vertical accelerometer alignment or adjustment incorrect • Right front vertical accelerometer bracket bent • Right front vertical accelerometer damaged	• Check the right front vertical accelerometer for location and security. If correct, suspect a faulty accelerometer. Replace the accelerometer/bracket as required, clear the DTC and retest the system
C1024-00	System Temporarily Disabled Due To Power Interruption During Driving - No sub type information	• Loss of power to adaptive damping system control module whilst driving	• Refer to the electrical circuit diagrams and check power and ground circuits to adaptive damping system control module for intermittent or poor connection. Repair wiring circuits as required, clear DTC and retest the system
C102C-12	Right Rear Vertical Acceleration Sensor - Circuit short to battery	• Right rear vertical accelerometer circuit short to power	• Refer to the electrical circuit diagrams and check right rear vertical accelerometer circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system
C102C-14	Right Rear Vertical Acceleration Sensor - Circuit short to ground or open	• Right rear vertical accelerometer circuit short to ground, open circuit • Right rear vertical accelerometer fault	• Refer to the electrical circuit diagrams and check right rear vertical accelerometer circuit for short to ground, open circuit. If no fault found on wiring suspect accelerometer. Renew accelerometer, clear DTC and retest the system
C102C-22	Right Rear Vertical Acceleration Sensor - Signal amplitude > maximum	• Right rear vertical accelerometer - Signal amplitude > maximum • Right rear vertical accelerometer insecurely mounted • Right rear vertical accelerometer signal circuit short to another circuit • Right rear vertical accelerometer internal fault	• With vehicle parked on a level surface, read right rear vertical accelerometer voltage and check it lies in range 1.9 to 2.1 volts. If not OK then check electrical wiring for shorts, loose connections and repair as required. If wiring OK then suspect faulty accelerometer/incorrectly installed accelerometer. Check the accelerometer is correctly mounted, secure or renew accelerometer as required. Clear DTC and retest system
C102C-26	Right Rear Vertical Acceleration Sensor - Signal rate of change below threshold	• Right rear vertical accelerometer signal rate of change below threshold • Right rear vertical accelerometer signal circuit short to another circuit • Right rear vertical accelerometer internal fault	• Refer to the electrical circuit diagrams and check right rear vertical accelerometer signal circuit for faults, if circuit is correct suspect faulty accelerometer. Replace the accelerometer, clear the DTC and retest the system

C102C-78	Right Rear Vertical Acceleration Sensor - Alignment or adjustment incorrect	• Right rear vertical accelerometer alignment or adjustment incorrect • Right rear vertical accelerometer bracket bent • Right rear vertical accelerometer damaged	• Check right rear vertical accelerometer for location and security, if correct suspect faulty accelerometer. Replace the accelerometer/bracket as required, clear the DTC and retest the system
C1030-12	Left Rear Vertical Acceleration Sensor - Circuit short to battery	• Left rear vertical accelerometer circuit short to power	• Refer to the electrical circuit diagrams and check left rear vertical accelerometer circuit. Repair circuit, clear the DTC and retest the system
C1030-14	Left Rear Vertical Acceleration Sensor - Circuit short to ground or open circuit	• Left rear vertical accelerometer circuit short to ground, open circuit • Left rear vertical accelerometer fault	• Refer to the electrical circuit diagrams and check left rear vertical accelerometer circuit. If no fault found, suspect accelerometer. Renew accelerometer, clear DTC and retest the system
C1030-22	Left Rear Vertical Acceleration Sensor - Signal amplitude > maximum	• Left rear vertical accelerometer signal amplitude greater than maximum • Left rear vertical accelerometer insecurely mounted • Left rear vertical accelerometer signal circuit short circuit • Left rear vertical accelerometer internal fault	• With vehicle parked on a level surface, check the left rear vertical accelerometer voltage is between 1.9 to 2.1 volts. If not, check the electrical circuit for short circuit or loose connections and repair as required. If no circuit fault is found, suspect faulty accelerometer/incorrectly installed accelerometer. Check the accelerometer is correctly mounted, secure or renew accelerometer as required, clear DTC and retest system
C1030-26	Left Rear Vertical Acceleration Sensor - Signal rate of change below threshold	• Left rear vertical accelerometer signal rate of change below threshold • Left rear vertical accelerometer signal circuit short circuit • Left rear vertical accelerometer internal fault	• Refer to the electrical circuit diagrams and check left rear vertical accelerometer signal circuit for faults. If circuit is correct suspect the accelerometer. Renew the accelerometer, clear the DTC and retest the system
C1030-78	Left Rear Vertical Acceleration Sensor - Alignment or adjustment incorrect	• Left rear vertical accelerometer alignment or adjustment incorrect • Left rear vertical accelerometer bracket bent • Left rear	• Check the left rear vertical accelerometer for location and security. If correct, suspect faulty accelerometer. Renew the accelerometer/bracket as required, clear the DTC and retest the system

		vertical accelerometer damaged	
C110C-01	Left Front Damper Solenoid - General electrical failure	• General electrical failure • Left front damper solenoid circuit fault	• Refer to the electrical circuit diagrams and check front left damper solenoid circuit. If no faults are evident suspect a faulty adaptive damping system control module
C110C-14	Left Front Damper Solenoid - Circuit short to ground or open	• Front left damper solenoid circuit short to ground, open circuit or high circuit resistance • Front left damper solenoid failure	• Refer to the electrical circuit diagrams and check front left damper solenoid circuit for short to ground or open circuit. Check for corrosion, backed out terminals and poor crimping of terminals
C110C-18	Left Front Damper Solenoid - Circuit current below threshold	• Left front damper solenoid circuit current below threshold • Front left damper actuator open circuit at startup	• Refer to the electrical circuit diagrams and check front left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C110C-19	Left Front Damper Solenoid - Circuit current above threshold	• Front left damper solenoid circuit current above threshold	• Refer to the electrical circuit diagrams and check front left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C110C-1D	Left Front Damper Solenoid - Circuit current out of range	• Left front damper solenoid circuit current out of range • Front left damper solenoid circuit short to ground/power, open circuit • Front left damper solenoid failure	• Refer to the electrical circuit diagrams and check front left damper solenoid circuit. Check and install a new front left damper as required
C110C-64	Left Front Damper Solenoid - Signal plausibility failure	• Left front damper solenoid signal plausibility failure • Front left damper solenoid measured current control loop failed • Front left damper solenoid open circuit	• Refer to the electrical circuit diagrams and check front left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C110D-01	Right Front Damper Solenoid - General electrical failure	• General electrical failure • Right front damper solenoid circuit fault	• Refer to the electrical circuit diagrams and check front right damper solenoid circuit. If no faults are evident suspect a faulty control module
C110D-14	Right Front Damper Solenoid -	• Right front damper solenoid circuit	• Where available, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check

	Circuit short to ground or open	short to ground, open circuit • Right front damper failure	right front damper solenoid circuit for short to ground, open circuit. Check and install a new damper as required
C110D-18	Right Front Damper Solenoid - Circuit current below threshold	• Right front damper solenoid circuit current below threshold • Front right damper actuator open circuit at startup	• Refer to the electrical circuit diagrams and check front right damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C110D-19	Right Front Damper Solenoid - Circuit current above threshold	• Front right damper solenoid circuit current above threshold	• Refer to the electrical circuit diagrams and check front right damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C110D-1D	Right Front Damper Solenoid - Circuit current out of range	• Right front damper solenoid circuit current out of range • Front right damper solenoid circuit short to ground/power, open circuit • Front right damper solenoid failure	• Refer to the electrical circuit diagrams and check front right damper solenoid circuit for short to ground, power or open circuit. Check and install a new front right shock actuator as required
C110D-64	Right Front Damper Solenoid - Signal plausibility failure	• Front right damper solenoid measured current control loop failed • Front right damper solenoid open circuit	• Refer to the electrical circuit diagrams and check front right damper solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms
C110E-01	Left Rear Damper Solenoid - General electrical failure	• General electrical failure • Left rear damper solenoid circuit fault	• Refer to the electrical circuit diagrams and check rear left damper solenoid circuit. If no faults are evident suspect a faulty adaptive damping system control module
C110E-14	Left Rear Damper Solenoid - Circuit short to ground or open	• Rear left damper solenoid circuit short to ground, open circuit or high circuit resistance • Rear left damper solenoid failure	• Refer to the electrical circuit diagrams and check rear left damper solenoid circuit for short to ground or open circuit. Check for corrosion, backed out terminals and poor crimping of terminals
C110E-18	Left Rear Damper Solenoid - Circuit current below threshold	• Left rear damper solenoid circuit current below threshold • Rear left damper actuator open circuit at startup	• Refer to the electrical circuit diagrams and check rear left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C110E-19	Left Rear Damper	• Rear left damper	• Refer to the electrical circuit diagrams and check rear left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

	Solenoid - Circuit current above threshold	solenoid circuit current above threshold	
C110E-1D	Left Rear Damper Solenoid - Circuit current out of range	• Left rear damper solenoid circuit current out of range • Rear left damper solenoid circuit short to ground/power, open circuit • Rear left damper solenoid failure	• Refer to the electrical circuit diagrams and check rear left damper solenoid circuit for short to ground, power or open circuit. Check and install a new damper as required
C110E-64	Left Rear Damper Solenoid - Signal plausibility failure	• Left rear damper solenoid signal plausibility failure • Rear left damper solenoid measured current control loop failed • Rear left damper solenoid open circuit	• Refer to the electrical circuit diagrams and check rear left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C110F-01	Right Rear Damper Solenoid - General electrical failure	• General electrical failure • Right rear damper solenoid circuit fault	• Refer to the electrical circuit diagrams and check rear right damper solenoid circuit. If no faults are evident suspect a faulty adaptive damping system control module
C110F-14	Right Rear Damper Solenoid - Circuit short to ground or open	• Rear right damper solenoid circuit short to ground, open circuit or high circuit Resistance • Rear right damper solenoid failure	• Refer to the electrical circuit diagrams and check rear right damper solenoid circuit. Check for corrosion, backed out terminals and poor crimping of terminals
C110F-18	Right Rear Damper Solenoid - Circuit current below threshold	• Right rear damper solenoid circuit current below threshold • Rear right damper actuator open circuit at startup	• Refer to the electrical circuit diagrams and check rear right damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C110F-19	Right Rear Damper Solenoid - Circuit current above threshold	• Rear right damper solenoid circuit current above threshold	• Refer to the electrical circuit diagrams and check rear right damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C110F-1D	Right Rear Damper Solenoid - Circuit current out of range	• Right rear damper solenoid circuit current out of range • Rear right damper solenoid circuit short to ground/power,	• Refer to the electrical circuit diagrams and check rear right damper solenoid circuit. Check and install a new right left damper as required

		• open circuit • Rear right damper solenoid failure	
C110F-64	Right Rear Damper Solenoid - Signal plausibility failure	• Right rear damper solenoid signal plausibility failure • Rear right damper solenoid measured current control loop failed • Rear right damper solenoid open circuit	• Refer to the electrical circuit diagrams and check rear right damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)
C1A03-12	Left Front Height Sensor - Circuit short to battery	• Left front height sensor circuit short to power • Left front height sensor circuit shorted to another cable • Left front height sensor internal fault	• Refer to the electrical circuit diagrams and check front left height sensor circuit. If circuit correct suspect sensor internal fault, renew as required
C1A03-14	Left Front Height Sensor - Circuit short to ground or open	• Wiring to left front height sensor (signal) open circuit • Wiring to left front height sensor partial short to ground • Wiring to left front height sensor short to other cable • Left front height sensor internal electrical fault	• Disconnect electrical connector to height sensor and inspect connector pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at adaptive damping system control module: - A. Check for short circuits between any of the three terminals and vehicle ground - B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only - C. Check voltages at terminals within height sensor connector (sensor not connected): voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V. All voltages should be within ± 0.15V
C1A03-21	Left Front Height Sensor - Signal amplitude < minimum	• Left front height sensor signal amplitude below minimum • Left front height sensor linkage not connected • Left front height sensor or bracket loose • Left front height sensor bracket bent • Incorrect height calibration • Left front height sensor linkage toggled • Left front height sensor water ingress • Wiring to left front height sensor partial short to ground • Wiring to left front height sensor short to other cable • Left front height sensor electrical fault	 NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at adaptive damping system control module then: A. Check for short circuits between any of the three terminals and vehicle ground. B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C. Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the

		Left front height sensor linkage bent • Incorrect height sensor installed	sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the height sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A03-22	Left Front Height Sensor - Signal amplitude > maximum	• Left front height sensor signal amplitude above maximum • Left front height sensor linkage not connected • Left front height sensor or bracket loose • Left front height sensor bracket bent • Incorrect height calibration • Left front height sensor linkage toggled • Left front height sensor water ingress • Wiring to left front height sensor partial short to ground • Wiring to left front height sensor short to other cable • Left front height sensor electrical fault • Left front height sensor linkage bent • Incorrect height sensor installed	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at adaptive damping system control module then: A. Check for short circuits between any of the three terminals and vehicle ground. B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C. Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A03-76	Left Front Height Sensor - Wrong mounting position	• Incorrect left front height sensor mounting position	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Check for correct height sensor installation and orientation. Rectify as necessary
C1A03-78	Left Front Height Sensor - Alignment or adjustment incorrect	• Left front height sensor alignment or adjustment incorrect	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A04-12	Right Front Height Sensor - Circuit short to	• Right front height sensor circuit short to	• Refer to the electrical circuit diagrams and check front right height sensor circuit. If circuit correct suspect a height sensor internal fault, renew as required

	battery	power • Right front height sensor circuit shorted to another cable • Right front height sensor internal fault	
C1A04-14	Right Front Height Sensor - Circuit short to ground or open	• Wiring to right front height sensor (signal) open circuit • Wiring to right front height sensor partial short to ground • Wiring to right front height sensor short to other cable • Right front height sensor internal electrical fault	• Disconnect electrical connector to height sensor and inspect connector pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at adaptive damping system control module: - A. Check for short circuits between any of the three terminals and vehicle ground - B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only - C. Check voltages at terminals within height sensor connector (sensor not connected): voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V. All voltages should be within ± 0.15V
C1A04-21	Right Front Height Sensor - Signal amplitude < minimum	• Right front height sensor signal amplitude below minimum • Right front height sensor linkage not connected • Right front height sensor or bracket loose • Right front height sensor bracket bent • Incorrect height calibration • Right front height sensor linkage toggled • Right front height sensor water ingress • Wiring to right front height sensor partial short to ground • Wiring to right front height sensor short to other cable • Right front height sensor electrical fault • Right front height sensor linkage bent • Incorrect height sensor installed	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at adaptive damping system control module then: A. Check for short circuits between any of the three terminals and vehicle ground. B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C. Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A04-22	Right Front Height Sensor - Signal amplitude > maximum	• Right front height sensor signal amplitude above maximum • Right front height sensor linkage not	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect

		connected • Right front height sensor or bracket loose • Right front height sensor bracket bent • Incorrect height calibration • Right front height sensor linkage toggled • Right front height sensor water ingress • Wiring to right front height sensor partial short to ground • Wiring to right front height sensor short to other cable • Right front height sensor electrical fault • Right front height sensor linkage bent • Incorrect height sensor installed	electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at adaptive damping system control module then: A. Check for short circuits between any of the three terminals and vehicle ground. B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C. Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A04-76	Right Front Height Sensor - Wrong mounting position	• Incorrect right front height sensor mounting position	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Check for correct sensor installation and orientation. Rectify as necessary
C1A04-78	Right Front Height Sensor - Alignment or adjustment incorrect	• Right front height sensor alignment or adjustment incorrect	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A05-12	Left Rear Height Sensor - Circuit short to battery	• Left rear height sensor circuit short to power • Left rear height sensor circuit shorted to another cable • Left rear height sensor internal fault	• Refer to the electrical circuit diagrams and check rear left height sensor circuit. If circuit correct suspect a sensor internal fault, renew as required
C1A05-14	Left Rear Height Sensor - Circuit short to ground or open	• Wiring to left rear height sensor (signal) open circuit • Wiring to left rear height sensor partial short to ground • Wiring to left rear height sensor short to other cable • Left rear height sensor internal	• Disconnect electrical connector to height sensor and inspect connector pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at adaptive damping system control module: - A. Check for short circuits between any of the three terminals and vehicle ground - B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only - C. Check voltages at terminals within height sensor connector (sensor not connected): voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V. All voltages should

		electrical fault	be within ± 0.15V
C1A05-21	Left Rear Height Sensor - Signal amplitude < minimum	• Left rear height sensor signal amplitude below minimum • Left rear height sensor linkage not connected • Left rear height sensor or bracket loose • Left rear height sensor bracket bent • Incorrect height calibration • Left rear height sensor linkage toggled • Left rear height sensor water ingress • Wiring to left rear height sensor partial short to ground • Wiring to left rear height sensor short to other cable • Left rear height sensor electrical fault • Left rear height sensor linkage bent • Incorrect left rear height sensor installed	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at adaptive damping system control module then: A. Check for short circuits between any of the three terminals and vehicle ground. B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C. Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A05-22	Left Rear Height Sensor - Signal amplitude > maximum	• Left rear height sensor signal amplitude above maximum • Left rear height sensor linkage not connected • Left rear height sensor or bracket loose • Left rear height sensor bracket bent • Incorrect height calibration • Left rear height sensor linkage toggled • Left rear height sensor water ingress • Wiring to left rear height sensor partial short to ground • Wiring to left rear height sensor short to other cable • Left rear height sensor electrical	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at adaptive damping system control module then: A. Check for short circuits between any of the three terminals and vehicle ground. B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C. Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the

		fault • Left rear height sensor linkage bent • Incorrect height sensor installed	sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A05-76	Left Rear Height Sensor - Wrong mounting position	• Incorrect left rear height sensor mounting position	 NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Check for correct height sensor installation and orientation. Rectify as necessary
C1A05-78	Left Rear Height Sensor - Alignment or adjustment incorrect	• Left rear height sensor alignment or adjustment incorrect	 NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1A06-12	Right Rear Height Sensor - Circuit short to battery	• Right rear height sensor circuit short to power • Right rear height sensor circuit shorted to another cable • Right rear height sensor internal fault	• Refer to the electrical circuit diagrams and check the rear right height sensor circuit. If circuit correct suspect a height sensor internal fault, renew as required
C1A06-14	Right Rear Height Sensor - Circuit short to ground or open	• Wiring to right rear height sensor (signal) open circuit • Wiring to right rear height sensor partial short to ground • Wiring to right rear height sensor short to other cable • Right rear height sensor internal electrical fault	• Disconnect electrical connector to height sensor and inspect connector pins & terminals for evidence of corrosion or water ingress. If no corrosion found, disconnect harness at adaptive damping system control module: - A. Check for short circuits between any of the three terminals and vehicle ground - B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only - C. Check voltages at terminals within height sensor connector (sensor not connected): voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V. All voltages should be within ± 0.15V
C1A06-21	Right Rear Height Sensor - Signal amplitude < minimum	• Right rear height sensor signal amplitude below minimum • Right rear height sensor linkage not connected • Right rear height sensor or bracket loose • Right rear height sensor bracket bent • Incorrect height calibration • Right rear height sensor linkage toggled • Right rear	 NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at adaptive damping system control module then: A. Check for short circuits between any of the three terminals and vehicle ground. B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C. Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V

		height sensor water ingress • Wiring to right rear height sensor partial short to ground • Wiring to right rear height sensor short to other cable • Right rear height sensor electrical fault • Right rear height sensor linkage bent • Incorrect height sensor installed	All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A06-22	Right Rear Height Sensor - Signal amplitude > maximum	• Right rear height sensor - Signal amplitude above maximum • Right rear height sensor linkage not connected • Right rear height sensor or bracket loose • Right rear height sensor bracket bent • Incorrect height calibration • Right rear height sensor linkage toggled • Right rear height sensor water ingress • Wiring to right rear height sensor partial short to ground • Wiring to right rear height sensor short to other cable • Right rear height sensor electrical fault • Right rear height sensor linkage bent • Incorrect height sensor installed	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at adaptive damping system control module then: A. Check for short circuits between any of the three terminals and vehicle ground. B. Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C. Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure
C1A06-76	Right Rear Height Sensor - Wrong mounting position	• Incorrect right rear height sensor mounting position	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Check for correct height sensor installation and orientation. Rectify as necessary

C1A06-78	Right Rear Height Sensor - Alignment or adjustment incorrect	• Right rear height sensor alignment or adjustment incorrect	NOTE: If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system
C1B14-1C	Sensor Supply Voltage A - Circuit voltage out of range	• Sensor supply voltage A out of range • Any height sensor supply partial short to other circuit or ground • Any height sensor internal failure • Internal control module failure	• Refer to the electrical circuit diagrams and check the height sensor supply circuit. Check all height sensors. Check the adaptive damping system control module sensor supply output voltage. Measured voltage should be between 4.995 volts and 4.85 volts
C1B15-1C	Sensor Supply Voltage B - Circuit voltage out of range	• Sensor supply voltage B out of range • Any vertical accelerometer supply partial short to other circuit or ground. • Any vertical accelerometer internal failure • Internal control module failure	• Refer to the electrical circuit diagrams and check accelerometer supply for circuit fault. Check all vertical accelerometers. Check adaptive damping system control module sensor supply output voltage. Measured voltage should be between 4.995 volts and 4.85 volts
U0001-88	High speed CAN Communication Bus - Bus off	• Bus off	• Refer to the electrical circuit diagrams and check the power and ground connections to the adaptive damping system control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0100-00	Lost Communication With ECM/PCM A - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the engine control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the engine control module and the adaptive damping system control module
U0101-00	Lost Communication with TCM - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the transmission control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transmission control module and the adaptive damping system control module
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the transfer case control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transfer case control module and the adaptive damping system control module
U0103-00	Lost Communication With Gear Shift Control Module A - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the transmission control switch. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transmission control switch and the adaptive damping system control module
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the anti-lock brake system control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network

	Module - No sub type information		between the anti-lock brake system control module and the adaptive damping system control module
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the steering angle sensor module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the steering angle sensor module and the adaptive damping system control module
U0132-00	Lost Communication With Suspension Control Module A - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the air suspension control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the air suspension control module and the adaptive damping system control module
U0140-00	Lost Communication With Body Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the central junction box. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the adaptive damping system control module
U0142-00	Lost Communication With Body Control Module B - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the central junction box. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the adaptive damping system control module
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the instrument cluster. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the instrument cluster and the adaptive damping system control module
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• No sub type information	• Check the central junction box vehicle configuration file. Ensure the part number of adaptive damping system control module is correct
U0401-68	Invalid Data Received from ECM/PCM A - Event information	• Event information	• Check the engine control module for related DTCs and refer to the relevant DTC index
U0402-68	Invalid Data Received from TCM - Event information	• Event information	• Check the transmission control module for related DTCs and refer to the relevant DTC index
U0403-68	Invalid Data Received From Transfer Case Control Module - Event information	• Event information	• Check the transfer case control module for related DTCs and refer to the relevant DTC index
U0404-68	Invalid Data Received from Gear Shift Control Module A - Event information	• Event information	• Check the transmission control switch for related DTCs and refer to the relevant DTC index
U0415-68	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Event information	• Event information	• Check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0421-68	Invalid Data Received from Suspension Control Module	• Event information	• Check the air suspension control module for related DTCs and refer to the relevant DTC index

	A - Event information		
U0422-68	Invalid Data Received From Body Control Module - Event information	• Event information	• Check the central junction box for related DTCs and refer to the relevant DTC index
U0428-68	Invalid Data Received From Steering Angle Sensor Module (SASM) - Event information	• Event information	• Check the steering angle sensor module for related DTCs and refer to the relevant DTC index
U0443-68	Invalid Data Received From Body Control Module B - Event information	• Event information	• Check the central junction box for related DTCs and refer to the relevant DTC index
U1A14-00	CAN Initialization Failure - No sub type information	• CAN network harness short circuit or disconnected	• Refer to the electrical circuit diagrams and check the power and ground connections to the adaptive damping system control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the adaptive damping system control module
U2100-00	Initial Configuration Not Complete - No sub type information	• Car configuration data not loaded (new central junction box installed to vehicle and not initialized)	• Configure the adaptive damping system control module using the manufacturers approved diagnostic system. Clear DTC and retest
U2101-00	Control Module Configuration Incompatible - No sub type information	• Car configuration data transmitted over CAN does not match adaptive damping system control module internal configuration	• Carry out the new module software installation procedure using the manufacturers approved diagnostic system. Clear DTC and retest
U3000-01	Control module - General electrical failure	• General electrical failure	• Check integrity of electrical connectors and pins to the adaptive damping system control module. Refer to the electrical circuit diagrams and check the power and ground circuits to the adaptive damping system control module. Check the damper negative circuits for short to ground. Clear the DTC and retest. If the problem persists, renew the adaptive damping system control module
U3000-04	Control Module - System internal failures	• Module internal failure	• Refer to the electrical circuit diagrams and check the power and ground circuits to the adaptive damping system control module. Clear the DTC and retest. If the problem persists, renew the adaptive damping system control module
U3000-43	Control Module - Special memory failure	• Module internal failure	• Refer to the electrical circuit diagrams and check the power and ground circuits to the adaptive damping system control module. Clear the DTC and retest. If the problem persists, renew the adaptive damping system control module
U3000-45	Control Module - Program memory failure	• Module internal failure	• Refer to the electrical circuit diagrams and check the power and ground circuits to the adaptive damping system control module. Clear the DTC and retest. If the problem persists, renew the adaptive damping system control module
U3000-47	Control Module - Watchdog/safety microcontroller failure	• Module internal watchdog/safety micro controller failure	• If this DTC is logged contact your local in market support
U3000-52	Control Module - Not activated	• Adaptive damping system control module has been	• Install the latest software via the new module installation procedure using the manufacturers approved diagnostic system

		replaced and not programmed	
U3000-54	Control Module - Missing calibration	• Adaptive damping system control module has been replaced and no software is installed	• Install the latest software via the new module installation procedure using the manufacturers approved diagnostic system
U3003-1C	Battery Voltage - Circuit voltage out of range	• Circuit voltage out of range (supply voltage at adaptive damping control module below 10.5V or above 18V for 30 seconds)	• Check the battery is in good condition and fully charged, refer to the battery care manual. Refer to the starting and charging section of the workshop manual and check the performance of the charging system. Refer to the electrical circuit diagrams and check power and ground circuit to adaptive damping system control module
U3003-62	Battery Voltage - Signal compare failure	• Signal compare failure • High resistance connections • Adaptive damping system control module internal failure	• Check the battery is in good condition and fully charged, refer to the battery care manual. Refer to the starting and charging section of the workshop manual and check the performance of the charging system. Refer to the electrical circuit diagrams and check power and ground circuit to adaptive damping system control module

General Information - Diagnostic Trouble Code (DTC) Index DTC: Adaptive Speed Control Module (ASCM)

Description and Operation

Adaptive Speed Control Module (ASCM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the digital multimeter leads into account

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If diagnostic trouble codes are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Adaptive Speed Control Module (ASCM), for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Speed Control (310-03A Speed Control - TDV6 3.0L Diesel, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1A84-81	Car Configuration Data - Invalid serial data received	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Incorrect car configuration file parameters in the central junction box	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary. Clear the DTCs and retest
C1A67-54	Forward Looking Sensor - Missing calibration	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • The radar may be horizontally misaligned. This DTC will clear when the speed control sensor is correctly aligned	• Refer to the relevant section of the workshop manual and carry out adaptive speed control sensor alignment procedure • Investigate for signs of mild impact damage around radar and mounting bracket
C1A67-87	Forward Looking Sensor - Missing	NOTE: Adaptive cruise	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault

	message	control is disabled and instrument pack displays warning message "cruise not available" • Adaptive speed control module internal communication error between DSP and Host	persists, install a new adaptive speed control module
C1A67-96	Forward Looking Sensor - Component internal failure	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Adaptive speed control module internal communication error between DSP and Host	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new adaptive speed control module
C1A67-97	Forward Looking Sensor - Component or system operation obstructed or blocked	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "radar sensor blocked" • Adaptive speed control module obstructed by snow, heavy rain or paint protection covering • The adaptive speed control module misaligned	• Check and clear any obstructions from the sensor. This DTC will be cleared automatically when environmental conditions allow • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, refer to the relevant section of the workshop manual and adjust the adaptive speed control module alignment
C1A67-98	Forward Looking Sensor - Component or system over temperature	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Adaptive speed control module sensor is over temperature	• Using the manufacturer approved diagnostic system, clear the DTCs and retest • Consider the atmospheric conditions before suspecting the component • This fault will be cleared automatically when environmental conditions allow
P174E-29	Output Shaft Speed / ABS Wheel Speed Correlation - Signal invalid	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Speed signals mis-match	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index • Clear the DTCs and retest
U0001-88	High Speed CAN Communication Bus - Bus off	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0100-00	Lost Communication With ECM/PCM "A" - No sub type	NOTE: Adaptive cruise control is disabled and instrument pack displays	• Refer to the electrical circuit diagrams and test the engine control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic

	information	warning message "cruise not available" • Engine control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0101-00	Lost Communication with TCM - No sub type information	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Transmission control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the transmission control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0103-00	Lost Communication With Gear Shift Control Module A - No sub type information	 NOTE: Adaptive cruise control will function as normal • Transmission control switch power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the transmission control switch power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Anti-lock brake system control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the anti-lock brake system control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Electric park brake control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the electric park brake control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance

U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Instrument cluster power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the instrument cluster power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0300-00	Internal Control Module Software Incompatibility - No sub type information	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Car configuration signal not received • Car configuration file incorrect	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U0300-55	Internal Control Module Software Incompatibility - Not configured	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Car configuration signal not received • Car configuration file incorrect	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U0401-00	Invalid Data Received From ECM/PCM - No sub type information	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Missing/invalid data from the engine control module - The engine control module did not respond correctly to the adaptive cruise control cancel request - The engine control module did not respond correctly to the adaptive cruise control auto brake cancel request	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0401-67	Invalid Data Received From ECM/PCM - Signal incorrect after event	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Missing/invalid data from the engine control module - The engine control module did not respond	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index

		correctly to the adaptive cruise control resume active request	
U0401-81	Invalid Data Received From ECM/PCM - Invalid serial data received	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Missing/invalid data from the engine control module - The engine control module has inhibited the adaptive cruise control	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0415-53	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Deactivated	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Missing/invalid data from the anti-lock brake system control module	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0415-81	Invalid Data Received From Anti-Lock Brake System Control Module - Invalid serial data received	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Missing/invalid data from the anti-lock brake system control module	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0417-67	Invalid Data Received From Park Brake Control Module - Signal incorrect after event	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Missing/invalid data from the electric park brake control module - The parking brake module did not respond correctly to the adaptive cruise control EPB apply request	• Using the manufacturer approved diagnostic system, check the electric park brake control module for related DTCs and refer to the relevant DTC index
U0417-81	Invalid Data Received From Park Brake Control Module - Invalid serial data received	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Missing/invalid data from the electric park brake control module - The parking brake module has inhibited the adaptive cruise control	• Using the manufacturer approved diagnostic system, check the electric park brake control module for related DTCs and refer to the relevant DTC index
U0418-	Invalid Data		• Using the manufacturer approved diagnostic

68	Received From Brake System Control Module - Event information	 NOTE: Instrument pack displays warning message "forward alert not available" • Missing/invalid data from the anti-lock brake system control module - The anti-lock brake system control module has inhibited intelligent emergency braking / advanced emergency brake assist functions	system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0421-81	Invalid Data Received from Suspension Control Module A - Invalid serial data received	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Missing/invalid data from the air suspension control module - The air suspension control module has inhibited the adaptive cruise control	• Using the manufacturer approved diagnostic system, check the air suspension control module for related DTCs and refer to the relevant DTC index
U0423-81	Invalid Data Received From Instrument Panel Control Module - Invalid serial data received	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Missing/invalid data from the instrument cluster - The instrument cluster has inhibited the adaptive cruise control • Central junction box missing or not updated CAN message	• Using the manufacturer approved diagnostic system, check the instrument cluster for related DTCs and refer to the relevant DTC index
U1A00-88	Private Communication Network - Bus off	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Speed control module indicates bus off, on private CAN bus	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, contact dealer technical support. Under no circumstance should any parts be replaced to overcome this issue
U1A14-49	CAN Initialization Failure - Internal electronic failure	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit,	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Clear the DTCs and retest

		high resistance	
U2101-00	Control Module Configuration Incompatible - No sub type information	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Car configuration file mis-match	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U3000-41	Control Module - General checksum failure	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Speed control module internal micro controller error	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new adaptive speed control module
U3000-42	Control Module - General memory failure	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Adaptive speed control module internal failure - RAM test error	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new adaptive speed control module
U3000-44	Control Module data - Memory failure	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Adaptive speed control module internal failure - DSP RAM test error	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new adaptive speed control module
U3000-49	Control Module - Internal electronic failure	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Adaptive speed control module internal failure - Clock error	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new adaptive speed control module
U3000-63	Control Module - Circuit/component protection time-out	NOTE: Instrument pack displays warning message "forward alert not available" • Adaptive speed control module internal protection has been activated	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, contact dealer technical support
U3000-96	Control Module - Component internal failure	NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Speed control module hardware ID mismatch	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, contact dealer technical support

U3003-16	Battery Voltage - Circuit voltage below threshold	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Adaptive speed control module power or ground circuit open circuit, high resistance • Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD112). Refer to the electrical circuit diagrams and test the adaptive speed control module power and ground circuits for open circuit, high resistance • Refer to the relevant section of the workshop manual and test the battery and charging system
U3003-17	Battery Voltage - Circuit voltage above threshold	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD112). Refer to the relevant section of the workshop manual and test the battery and charging system
U3003-62	Battery Voltage - Signal compare failure	 NOTE: Adaptive cruise control is disabled and instrument pack displays warning message "cruise not available" • Mis-match between the voltage at the adaptive speed control module and the voltage value broadcast on the CAN bus	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD112) - and compare it to battery voltage

General Information - Diagnostic Trouble Code (DTC) Index DTC: Air Suspension Control Module

Description and Operation

Air Suspension Control Module

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Ride Levelling Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Vehicle Dynamic Suspension (204-05 Vehicle Dynamic Suspension, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1A84-55	Car Configuration Data - Not configured	• System not configured - Data does not match that expected for specification • Incorrect software version loaded	• Configure the car configuration file using the approved diagnostic system. Ensure the air suspension control module software is the correct version (available from the TOPIx web-site). Clear the DTC and test for normal operation
C112F-72	Air Spring Valve - Actuator stuck open	• Corner valve stuck open (fully or partially) • Vehicle driven while system in "Tight Tolerance" mode	• Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Complete corner valve checks. If necessary, clear tight tolerance mode. Clear the DTC and retest
C1130-66	Air Spring Air Supply - Signal has too many transitions / events	• Air spring leak • Leak in air harness to air spring • Corner valve leak to gallery • Air supply unit assembly fault • Vehicle driven while system in "Tight Tolerance" mode	• Visually inspect the system for air leakage. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1130-7A	Air Spring Air Supply - Fluid leak or seal failure	• Detached or burst air pipe • Leaking air spring or pipe to air spring (large leak) • Loose pipe connection • Insufficient pressure from air supply unit • Height sensor fault	• Visually inspect the system for an excessive air leak. Check the height sensor linkage(s) for damage/restrictions. Visually inspect the air harness for evidence of melting, crushing, kinking or collapsing. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1131-92	Air Supply - Performance or incorrect operation	• Loose or burst air pipe • Detached air pipe • Leaking pipe from reservoir valve block to	• Visually inspect the system for air leakage. Check the reservoir valve block pipes for correct routing and installation

		air supply unit or either axle valve block • Insufficient pressure from air supply unit • Reservoir valve block piped incorrectly	
C1A01-19	LED - Circuit current above threshold	• Switch pack LED circuit current above threshold • LED cathode (negative) connection shorted to positive • One or more LEDs short circuit	NOTE: Circuit - LED_NEG - • Refer to the electrical circuit diagrams and check the circuit between the air suspension control module and switch pack for short circuit to battery. Repair as necessary. Clear the DTC and test for normal operation. If the DTC is still logged suspect the switch pack
C1A03-1C	Left Front Height Sensor - Circuit voltage out of range	• Height sensor disconnected • Height sensor harness wiring short circuit to ground, power or high resistance • Height sensor fault	• Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A03-26	Left Front Height Sensor - Signal rate of change below threshold	• Sensor signal rate of change below threshold, signal voltage stuck • Height sensor linkage disconnected • Height sensor fault • Height sensor harness wiring short circuit to ground, power or high resistance	• Check height sensor linkage is connected and not damaged. Visually inspect the height sensor for security, damage and correct orientation/installation. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Repair/renew as necessary. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A03-27	Left Front Height Sensor - Signal rate of change above threshold	• Left-hand front height sensor signal rate of change above threshold • Height sensor harness wiring short circuit to ground, power or intermittent connection • Height sensor fault	• Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Visually inspect the height sensor for security, damage and correct orientation/installation. Repair/renew as necessary. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A03-29	Left Front Height Sensor - Signal invalid	• Left-hand front height sensor signal invalid • Incorrect height calibration process	• Calibrate the system using the approved diagnostic system
C1A03-78	Left Front Height Sensor - Alignment or adjustment incorrect	• Sensor alignment or adjustment incorrect; signal out of range • Height sensor linkage not connected • Height sensor linkage toggled • Height sensor loose • Height sensor bracket bent • Incorrect height calibration • Wiring to height sensor short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault	• Check height sensor linkage is connected and not damaged. Visually inspect the height sensor for security, damage and correct orientation/installation. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Repair/renew as necessary. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A03-92	Left Front Height Sensor - Performance or incorrect operation	• Left-hand front height sensor height performance not as expected/signal changing slower than expected • Axle valve block pipes connected incorrectly • Height sensor incorrectly installed • Blocked/damaged or crushed gallery pipe	NOTE: If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. • Check that the vehicle is free of obstructions. Check the height sensor for correct installation and torque of fixings. If necessary, calibrate the system using the approved diagnostic system. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check for an air

		• Blocked/damaged or crushed air spring pipe • Corner valve stuck closed (mechanically) • Reservoir valve stuck open (mechanically)	spring leak. Check the air harness for evidence of melting, crushing, kinking or collapsing. Check the front and rear valve block pipes for correct routing and installation. Refer to the approved diagnostic system for corner, reservoir and exhaust valve checks. Check the corner valve for leaks
C1A04-1C	Right Front Height Sensor - Circuit voltage out of range	• Right-hand front height sensor signal voltage out of range • Height sensor disconnected • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance • Height sensor fault	• Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A04-26	Right Front Height Sensor - Signal rate of change below threshold	• Right-hand front height sensor signal rate of change below threshold/signal voltage stuck • Height sensor linkage disconnected • Height sensor fault • Height sensor harness wiring short circuit to ground, short circuit to power or short to each other	• Check height sensor linkage is connected and not damaged. Visually inspect the wiring harness and connectors for water ingress. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A04-27	Right Front Height Sensor - Signal rate of change above threshold	• Right-hand front height sensor signal rate of change above threshold • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance • Height sensor fault	• Visually inspect the wiring harness and connectors for damage or water ingress. Visually inspect the height sensor for security, damage and correct orientation/installation. Repair/renew as necessary. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A04-29	Right Front Height Sensor - Signal invalid	• Right-hand front height sensor signal invalid • Incorrect height calibration process	• Calibrate the system using the approved diagnostic system
C1A04-78	Right Front Height Sensor - Alignment or adjustment incorrect	• Sensor alignment or adjustment incorrect; signal out of range • Height sensor linkage not connected • Height sensor linkage toggled • Height sensor loose • Height sensor bracket bent • Incorrect height calibration • Wiring to height sensor short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault	• Check height sensor linkage is connected and not damaged. Visually inspect the height sensor for security, damage and correct orientation/installation. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Repair/renew as necessary. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A04-92	Right Front Height Sensor - Performance or incorrect operation	• Right-hand front height sensor height changing slower than expected • Axle valve block pipes incorrectly installed (unions reversed) • Height sensor incorrectly installed • A gallery pipe is blocked/damaged/crushed • An air spring pipe is blocked/damaged/crushed • Corner valve stuck closed • Reservoir valve stuck open (mechanically)	 NOTE: If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. • Check that the vehicle is free of obstructions. Check the height sensor for correct installation and torque of fixings. If necessary, calibrate the system using the approved diagnostic system. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check for an air spring leak. Check the air harness for evidence of melting, crushing, kinking or collapsing. Check the front and rear valve block pipes for correct routing and installation. Check the reservoir valve block pipes for correct routing and installation. Refer to

			the approved diagnostic system for corner, reservoir and exhaust valve checks. Check the corner valve for leaks
C1A05-1C	Left Rear Height Sensor - Circuit voltage out of range	• Right-hand front height sensor signal voltage out of range • Height sensor disconnected • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance • Height sensor fault	• Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A05-26	Left Rear Height Sensor - Signal rate of change below threshold	• Left-hand rear height sensor signal voltage stuck whilst vehicle is driven • Height sensor linkage disconnected • Height sensor fault • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance	• Check height sensor linkage is connected and not damaged. Visually inspect the wiring harness and connectors for water ingress. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A05-27	Left Rear Height Sensor - Signal rate of change above threshold	• Left-hand rear height sensor signal rate of change above threshold • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance • Height sensor linkage disconnected • Height sensor failure	• Check height sensor linkage is connected and not damaged. Visually inspect the wiring harness and connectors for water ingress. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A05-29	Left Rear Height Sensor - Signal invalid	• Left-hand rear height sensor signal invalid • Incorrect height calibration process	• Calibrate the system using the approved diagnostic system
C1A05-78	Left Rear Height Sensor - Alignment or adjustment incorrect	• Sensor alignment or adjustment incorrect; signal out of range • Height sensor linkage not connected • Height sensor linkage toggled • Height sensor loose • Height sensor bracket bent • Incorrect height calibration • Wiring to height sensor short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault	• Check height sensor linkage is connected and not damaged. Visually inspect the height sensor for security, damage and correct orientation/installation. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Repair/renew as necessary. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A05-92	Left Rear Height Sensor - Performance or incorrect operation	• Left-hand rear height sensor height changing slower than expected • Axle valve block pipes connected incorrectly • Height sensor incorrectly installed • A gallery pipe is blocked/damaged/crushed • An air spring pipe is blocked/damaged/crushed • Corner valve stuck closed (mechanically) • Reservoir valve stuck open (mechanically)	NOTE: If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. • Check that the vehicle is free of obstructions. Check the height sensor for correct installation and torque of fixings. If necessary, calibrate the system using the approved diagnostic system. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check for an air spring leak. Check the air harness for evidence of melting, crushing, kinking or collapsing. Check the front and rear valve block pipes for correct routing and installation. Check the reservoir valve block pipes for correct routing and installation. Refer to the approved diagnostic system for corner, reservoir and exhaust valve checks. Check the corner valve for leaks

C1A06-1C	Right Rear Height Sensor - Circuit voltage out of range	• Right-hand front height sensor signal voltage out of range • Height sensor disconnected • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance • Height sensor fault	• Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A06-26	Right Rear Height Sensor - Signal rate of change below threshold	• Right-hand rear height sensor signal voltage stuck whilst vehicle is driven • Height sensor linkage disconnected • Height sensor fault • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance	• Check height sensor linkage is connected and not damaged. Visually inspect the wiring harness and connectors for water ingress. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A06-27	Right Rear Height Sensor - Signal rate of change above threshold	• Right- hand rear height sensor signal rate of change above threshold • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance • Height sensor linkage disconnected • Height sensor fault	• Check height sensor linkage is connected and not damaged. Visually inspect the wiring harness and connectors for water ingress. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A06-29	Right Rear Height Sensor - Signal invalid	• Right-hand rear height sensor signal invalid • Incorrect height calibration process	• Calibrate the system using the approved diagnostic system
C1A06-78	Right Rear Height Sensor - Alignment or adjustment incorrect	• Sensor alignment or adjustment incorrect; signal out of range • Height sensor linkage not connected • Height sensor linkage toggled • Height sensor loose • Height sensor bracket bent • Incorrect height calibration • Wiring to height sensor short to ground • Wiring to height sensor short to other cable • Height sensor electrical fault	• Check height sensor linkage is connected and not damaged. Visually inspect the height sensor for security, damage and correct orientation/installation. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Repair/renew as necessary. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A06-92	Right Rear Height Sensor - Performance or incorrect operation	• Right-hand rear height sensor height changing slower than expected • Axle valve block pipes incorrectly installed (unions reversed) • Height sensor incorrectly installed • A gallery pipe is blocked/damaged/crushed • An air spring pipe is blocked/damaged/crushed • Corner valve stuck shut (mechanically) • Reservoir valve stuck open (mechanically)	 NOTE: If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. • Check that the vehicle is free of obstructions. Check the height sensor for correct installation and torque of fixings. If necessary, calibrate the system using the approved diagnostic system. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check for an air spring leak. Check the air harness for evidence of melting, crushing, kinking or collapsing. Check the front and rear valve block pipes for correct routing and installation. Check the reservoir valve block pipes for correct routing and installation. Refer to the approved diagnostic system for corner, reservoir and exhaust valve checks. Check the corner valve for leaks
C1A07-62	Cross Articulation -		• Follow the process detailed in the relevant special service message. Check the condition and security

	Signal compare failure	 NOTE: This DTC may be set by a fault relating to any of the height sensors. It will only set if fault is present and vehicle speed is greater than 55kph (35mph) for more than 25 seconds. • Incorrect height calibration, e.g. height sensor removed and re-installed or renewed without re-calibrating • Height sensor linkage damaged/bent (after calibration) • Height sensor linkage loose/disconnected • Height sensor bracket damaged/bent • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance • Height sensor fault	of the height sensor bracket(s). Check the height sensor for correct installation and fixings torque. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A08-1C	Pressure Sensor Supply - Circuit voltage out of range	• Pressure sensor supply voltage out of range • Pressure sensor harness wiring short circuit to ground, short circuit to power or high resistance • Pressure sensor failure • Wiring to pressure sensor short to other cable	• Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check the pressure sensor circuit. Renew the sensor if faulty
C1A10-64	Pressure Fluctuates When System Inactive - Signal plausibility failure	• Signal plausibility failure • Axle valve block pipes connected incorrectly • Pneumatic parts disconnected while system active • Corner valve stuck open (mechanically) • Pressure sensor harness wiring short circuit to ground, short circuit to power or high resistance • Pressure sensor fault (calibration drift) • Pressure gallery leak • Exhaust valve fault	• Check the air spring pipes from the front and rear valve blocks are connected to the correct ports. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check for leaks. Refer to the electrical circuit diagrams and check the pressure sensor circuit. Renew the sensor if faulty
C1A13-64	Pressure Does Not Decrease When Venting Gallery - Signal plausibility failure	• Signal plausibility failure • Reservoir valve block pipes incorrectly installed (unions reversed) • Exhaust valve stuck closed • Exhaust valve does not hold minimum retention pressure • Gallery pipe blocked/damaged • Air suspension exhaust silencer blocked/restricted • Axle valve block pipes connected incorrectly • Pressure sensor fault	• Check the pipes from the reservoir valve block are connected to the correct ports. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check the pressure sensor circuit. Renew the sensor if faulty
C1A18-64	Pressure Increase Too Rapid When Filling Reservoir - Signal plausibility failure	• Signal plausibility failure • Reservoir valve stuck closed (mechanically) • Reservoir pipe blocked/damaged • Reservoir port blocked/restricted • Pressure sensor fault	• Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Renew the sensor if faulty

C1A20-64	Pressure Increase Too Slow When Filling Reservoir - Signal plausibility failure	Signal plausibility failure • Gallery pipe air leak • Air supply unit fault • Reservoir pipe air leak • Reservoir air leak • Intake filter blocked/restricted • Intake pipe blocked/restricted • Air suspension intake silencer blocked/restricted • Corner valve stuck open	Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check the Air suspension intake pipe and silencer for blockage/restriction
C1A24-64	No Temperature Increase When Compressor Requested - Signal plausibility failure	• Signal plausibility failure • Air supply unit cylinder head temperature sensor disconnected • Air supply unit cylinder head temperature sensor detached from cylinder head • Air supply unit cylinder head temperature sensor fault	 NOTE: Circuit - COMP_TEMP_SIG - COMP_TEMP_GND - • Check the security of the air supply unit cylinder head temperature sensor and electrical connection. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A24-67	No Temperature Increase When Compressor Requested - Signal incorrect after event	• Signal plausibility failure • Air supply unit cylinder head temperature sensor disconnected • Air supply unit cylinder head temperature sensor fault • Air supply unit disconnected • Air supply unit ground circuit high resistance • Air supply unit fault	 NOTE: Circuit - COMP_TEMP_SIG - COMP_TEMP_GND - • Check the security of the air supply unit cylinder head temperature sensor and electrical connection. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
C1A27-12	Compressor - Circuit short to battery	• Air supply unit voltage present when air supply unit not requested • Air supply unit relay fault • Air supply unit harness wiring short circuit to power • Air supply unit motor connector disconnected • Air supply unit ground terminal loose	 NOTE: Circuit - COMP_V - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check the air supply unit power supply circuit. Check the security and integrity of the air supply unit ground connection. Check the operation of the air supply unit relay. Repair/renew as necessary
C1A27-14	Compressor - Circuit short to ground or open	• Air supply unit circuit short to ground or open circuit • Air supply relay/air supply unit fusible link (Fuse 10E) in battery junction box failed/not installed • Air supply unit relay failure	 NOTE: Circuit - COMP_V - • Check/renew fuses as necessary. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check the operation of the air supply unit relay. Repair/renew as necessary
C1A27-29	Compressor - Signal invalid	• Air supply unit relay control voltage signal invalid	• Refer to DTC C1A27-12 which will be set first
C1A28-64	Wrong Number of LEDs Illuminated - Signal plausibility failure	• Switch pack disconnected • Air suspension control module supply (BATTERY) fuse (26E) in battery junction box failed • LED circuit short circuit to power • One or more LEDs short circuit to each other • Switch pack failure • Switch pack harness wiring short circuit to ground, short circuit to power or high resistance	 NOTE: Circuit - LED_NEG - HIGH_LED - STD_HT_LED - CRAWL_LED - ACCESS_HT_LED - RAISING_LED - LOWERING LED - • Check/renew fuse as necessary. Refer to the electrical circuit diagrams and check LED circuits for short to ground, power or open circuit. Repair as necessary. Check for high resistance between air suspension control module and center console switch pack. Check for one or more LEDs short circuit to each other. Clear the DTC and test for normal operation. If no fault was found with the above circuit tests and the DTC is persists, suspect center console switch pack
C1A29-	Switch	• Ride height change switch	

92	Activation Too Long - Performance or incorrect operation	performance or incorrect operation • Switch pressed for more than 255 seconds • Switch pack harness wiring short circuit to ground, short circuit to power • Switch pack failure	NOTE: Circuit - LOWER_SW - RAISE_SW - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check circuits for short to ground, power, or between harness. Check for high resistance between air suspension control module and center console switch pack. Check switch pack for mechanical damage, stuck contacts. Clear the DTC and test for normal operation. If no fault was found with the above circuit tests and the DTC is persists, suspect center console switch pack
C1A30-64	Both Switches Pressed At Same Time - Signal plausibility failure	• Signal plausibility failure • Air suspension control module supply (BATTERY) fuse (26E) in battery junction box failed • Switch pack harness wiring short circuit to ground • Switch pack failure	NOTE: Circuit - LOWER_SW - RAISE_SW - • Check/renew fuse as necessary. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check circuits for short to ground, power, or between harness. Check for high resistance between air suspension control module and center console switch pack. Check switch pack for mechanical damage, stuck contacts. Clear the DTC and test for normal operation. If no fault was found with the above circuit tests and the DTC is persists, suspect center console switch pack
C1A31-01	Left Front Corner Valve - General electrical failure	• Left-hand front corner valve general electrical failure • Front valve block disconnected • Front valve block circuit short circuit to ground, open circuit or high resistance • Left-hand front corner valve failure	NOTE: Circuit - FL_CV_POS - FL_CV_NEG - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check valve circuit. Renew the valve block assembly if faulty. Clear the DTC and retest
C1A32-01	Right Front Corner Valve - General electrical failure	• Right-hand front corner valve general electrical failure • Front valve block disconnected • Front valve block circuit short circuit to ground, open circuit or high resistance • Right-hand front corner valve failure	NOTE: Circuit - FR_CV_POS - FR_CV_NEG - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check valve circuit. Renew the valve block assembly. Clear the DTC and retest
C1A33-01	Left Rear Corner Valve - General electrical failure	• Left-hand rear corner valve, general electrical failure • Rear valve block disconnected • Rear valve block circuit short circuit to ground, open circuit or high resistance • Left-hand rear corner valve failure	NOTE: Circuit - RL_CV_POS - RL_CV_NEG - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check valve circuit. Renew the valve block assembly if faulty. Clear the DTC and retest
C1A34-01	Right Rear Corner Valve - General electrical failure	• Right-hand rear corner valve general electrical failure • Rear valve block circuit short circuit to ground, open circuit or high resistance • Rear valve block disconnected • Right-hand rear corner valve failure	NOTE: Circuit - RR_CV_POS - RR_CV_NEG - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check valve circuit. Renew the valve block assembly if faulty. Clear the DTC and retest
C1A35-01	Reservoir Valve - General	• Reservoir valve general electrical failure	NOTE: Circuit - RES_V_POS - RES_V_NEG -

	electrical failure	Reservoir valve block harness wiring short circuit to ground or open circuit • Reservoir valve block disconnected • Reservoir valve block failure	• Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check valve circuit. Renew the valve block assembly if faulty. Clear the DTC and retest
C1A36-01	Exhaust Valve - General electrical failure	• Exhaust valve general electrical failure • Exhaust valve harness wiring short circuit to ground or open circuit • Exhaust valve disconnected • Exhaust valve failure	 NOTE: Circuit - EXH_V_POS - EXH_V_NEG - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check valve circuit. If exhaust valve is faulty, renew the air supply unit. Clear the DTC and retest
C1A37-01	Front Cross-Link Valve - General electrical failure	• Front cross-link valve general electrical failure • Front valve block harness wiring short circuit to ground or open circuit • Front valve block disconnected • Front cross-link valve failure	 NOTE: Circuit - F_XV_POS - F_XV_NEG - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check valve circuit. Renew the valve block assembly if faulty. Clear the DTC and retest
C1A38-01	Rear Cross-Link Valve - General electrical failure	• Rear cross-link valve general electrical failure • Rear valve block harness wiring short circuit to ground or open circuit • Rear valve block disconnected • Rear cross-link valve failure	 NOTE: Circuit - R_XV_POS - R_XV_NEG - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Refer to the electrical circuit diagrams and check valve circuit. Renew the valve block assembly if faulty. Clear the DTC and retest
C1A68-1C	Left Front Height Sensor Supply - Circuit voltage out of range	• Left-hand front height sensor supply circuit voltage out of range • Height sensor harness wiring short circuit to ground or power • Height sensor failure	 NOTE: If a height sensor is changed, the vehicle ride height must be re-calibrated. • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check the height sensor connector for damage and security. Refer to the electrical circuit diagrams and check height sensor circuit. Renew the sensor if faulty. Clear the DTC and retest
C1A69-1C	Right Front Height Sensor Supply - Circuit voltage out of range	• Right-hand front height sensor supply circuit voltage out of range • Height sensor harness wiring short circuit to ground or power • Height sensor failure	 NOTE: If a height sensor is changed, the vehicle ride height must be re-calibrated. • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check the height sensor connector for damage and security. Refer to the electrical circuit diagrams and check height sensor circuit. Renew the sensor if faulty. Clear the DTC and retest
C1A70-1C	Left Rear Height Sensor Supply - Circuit voltage out of range	• Left-hand rear height sensor supply circuit voltage out of range • Height sensor harness wiring short circuit to ground, short circuit to power or high resistance • Height sensor failure	 NOTE: If a height sensor is changed, the vehicle ride height must be re-calibrated. • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check the height sensor connector for damage and security. Refer to the electrical circuit diagrams and check height sensor circuit. Renew the sensor if faulty. Clear the DTC and retest
C1A71-1C	Right Rear Height Sensor Supply - Circuit voltage out of range	• Right-hand rear height sensor supply circuit voltage out of range • Height sensor harness wiring short circuit to ground or power • Height sensor failure	 NOTE: If a height sensor is changed, the vehicle ride height must be re-calibrated. • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check the height sensor connector for damage and security. Refer to the electrical circuit diagrams and check height sensor circuit. Renew

			the sensor if faulty. Clear the DTC and retest
C1A99-1C	Pressure Sensor - Circuit voltage out of range	• Pressure sensor circuit voltage out of range • Sensor disconnected • Pressure sensor circuit short circuit to ground or to each other • Pressure sensor fault	NOTE: Circuit - PRESSURE_5V - PRESSURE_SIG - PRESSURE_GND - • Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check the sensor connector for damage and security. Refer to the electrical circuit diagrams and check height sensor circuit. Renew the sensor if faulty. Clear the DTC and retest
C1B18-62	Module Power Supplies - Signal compare failure	• Signal compare failure • Inconsistent battery and ignition voltages received by air suspension control module • Air suspension control module supply circuit(s) short circuit to ground • Air suspension control module supply circuit(s) high resistance	• Where available, refer to the guided diagnostic routine for this code on the approved diagnostic system. Refer to the electrical circuit diagrams and check the power supply circuits to the module. Check the module connector for security and integrity
C1B21-1C	Compressor Brush Card Temperature Sensor - Circuit voltage out of range	• Air supply unit brush card temperature sensor circuit voltage out of range • Air supply unit brush card temperature sensor harness wiring short circuit to ground, short circuit to power or high resistance • Air supply unit brush card temperature sensor failure	NOTE: Circuit - MOT_TEMP_SIG - MOT_TEMP_GND - • Where available, refer to the guided diagnostic routine for this code on the approved diagnostic system. Refer to the electrical circuit diagrams and check the air supply unit temperature circuit between the air supply unit and the module. Renew the air supply unit if temperature sensor faulty
U0073-88	Control Module Communication Bus 'A' Off - Bus off	• CAN bus connections short circuit to each other	• Refer to the electrical circuit diagrams and check the power and ground connections to the ride levelling module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the engine control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the engine control module and the air suspension control module
U0101-00	Lost Communication With TCM - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the transmission control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transmission control module and the air suspension control module
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the transfer case control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transfer case control module and the air suspension control module
U0122-00	Lost Communication With Vehicle Dynamics Control Module - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the vehicle dynamics control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the anti-lock brake system control module and the air suspension control module

U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the steering angle sensor module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the steering angle sensor module and the air suspension control module
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the park brake module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the electric park brake control module and the air suspension control module
U0133-00	Lost Communication With Active Roll Control Module - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the active roll control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the dynamic response control module and the air suspension control module
U0136-00	Lost Communication With Differential Control Module - Rear - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the differential control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the rear differential control module and the air suspension control module
U0138-00	Lost Communication with All Terrain Control Module - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the all terrain control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the terrain response switchpack and the air suspension control module
U0140-00	Lost Communication With Body Control Module - No sub type information	• CAN bus fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the body control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the air suspension control module
U0300-55	Internal Control Module Software Incompatibility - Not configured	• Incorrect software loaded • CAN wiring to central junction box high resistance • Incorrect instrument cluster CAN configuration	• Configure the air suspension control module and instrument cluster as necessary using the approved diagnostic system
U0416-68	Invalid Data Received From Vehicle Dynamics Control Module - Event information	• Invalid data received from anti-lock brake system control module	• Check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0417-68	Invalid Data Received From Park Brake Control Module - Event information	• Invalid data received from electric park brake control module	• Check the electric park brake control module for related DTCs and refer to the relevant DTC index
U0428-68	Invalid Data Received From Steering Angle Sensor Module - Event information	• Invalid data received from steering angle sensor module	• Check the steering angle sensor module for related DTCs and refer to the relevant DTC index

U1A14-49	CAN Initialization failure- Internal electronic failure	• Internal electronic failure	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U2000-67	Motor Temperature - Signal incorrect after event	• Motor signal incorrect after event • Air supply unit brush card temperature sensor not connected electrically • Air supply unit brush card temperature sensor failure • Air supply unit disconnected • Air supply unit ground connection disconnected	 NOTE: Circuit - MOT_TEMP_SIG - MOT_TEMP_GND - • Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check the air supply unit connector for security and integrity. Check the air supply unit ground connection. Renew the air supply unit if temperature sensor faulty
U2007-11	Valve(s) - Circuit short to ground	• Valve circuit short circuit to ground when system is inactive • Water ingress to wiring harness or connectors • Valve harness wiring short circuit to ground or high resistance	• Visually inspect the wiring harness and connectors between the air suspension control module and the control valves for water ingress. Refer to the electrical circuit diagrams and check the valve circuits
U2007-67	Valve(s) - Signal incorrect after event	• Valve signal incorrect after event • Valve positive connections shorted to power or ground • Electrical leakage between permanent battery volts and any valve positive connection	• Visually inspect the wiring harness and connectors between the air suspension control module and the control valves for water ingress. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system
U210A-16	Temperature Sensor - Circuit voltage below threshold	• Air supply unit cylinder head temperature sensor circuit voltage below threshold • Temperature sensor circuit short to ground or short to other cable	 NOTE: Circuit - COMP_TEMP_SIG - COMP_TEMP_GND - • Refer to the electrical circuit diagrams and check the air supply unit temperature circuit between the air supply unit and the control module. Renew the air supply unit assembly
U3000-05	Control Module - System programming failures	• System programming failures, air suspension control module has been set in tight tolerance mode using diagnostic tester	• This DTC is not a fault but is logged when the air suspension has been set in tight tolerance mode. Use the manufacturers approved diagnostic equipment to set system into normal (customer) mode
U3000-1C	Control Module - Circuit voltage out of range	• Circuit voltage out of range • Vehicle battery voltage has been too low to operate the air suspension system • Valve positive circuit intermittent short to ground	• This may not be a fault. Check the battery state of charge and check for other DTCs that would determine a flat battery condition. Clear the DTC and retest. If the DTC persists, visually inspect the wiring harness and connectors between the air suspension control module and the control valves for water ingress. Refer to the electrical circuit diagrams and check the valve circuits
U3000-1D	Control Module - Circuit current out of range	• Circuit current out of range • Rear valve block disconnected • Any valve positive short circuit to ground (more than 20A flowing)	• Check the rear valve block connector for security and integrity (rear axle valve block is used as part of power-up diagnostic check). Refer to the electrical circuit diagrams and check the valve circuits
U3000-49	Control Module - Internal electronic failure	• Valve signal incorrect after event • Valve circuit isolation switch test failed • Valve positive connections shorted to power or ground • Electrical leakage	• Visually inspect the wiring harness and connectors between the air suspension control module and the control valves for water ingress. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Clear the DTC and retest. If the problem persists, renew the air suspension control module

		between permanent battery volts and any valve positive connection • Internal electronic failure	
U3000-52	Control Module - Not activated	• Not activated, vehicle has been set in manufacturing mode using diagnostic tester	• This DTC is not a fault, use the manufacturers approved diagnostic equipment to set system into normal (customer) mode
U3000-53	Control Module - Deactivated	• Deactivated; the system has been deflated using the diagnostic deflation routine	• This DTC is not a fault. Clear deflation routine using manufacturers approved diagnostic equipment
U3000-54	Control Module - Missing calibration	• Missing calibration; module has not been calibrated (height sensors)	• This DTC is not a fault, use the manufacturers approved diagnostic equipment to calibrate the ride height
U3000-55	Control Module - Not configured	• Not configured; system set in calibration mode using diagnostic tester	• This DTC is not a fault, use the manufacturers approved diagnostic equipment to calibrate the ride height
U3002-62	Vehicle Identification Number - Signal compare failure	• Signal compare failure • Air suspension control module has been swapped from another vehicle (NOTE Air suspension requires re-calibration) • Instrument pack has been changed and not re-coded	• Program the relevant module using the approved diagnostic system and calibrate the ride height
U300D-01	Ignition Input On/Start - General electrical failure	• General electrical failure • Ignition fuse failed/missing • No wake-up signal to module	• Refer to the electrical circuit diagrams and check the power supply fuse and circuit to the air suspension control module

General Information - Diagnostic Trouble Code (DTC) Index DTC: Anti-Lock Braking System Control Module (ABS)

Description and Operation

Anti-Lock Braking System (ABS)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the ABS module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Anti-Lock Control - Traction Control (206-09A Anti-Lock Control - Traction Control, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
C0030-38	Left Front Tone Wheel - Signal frequency incorrect	• Signal frequency incorrect • Damaged ABS sensor ring	• Check front left wheel speed sensor ring for missing teeth or damage. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0031-14	Left Front Wheel Speed Sensor - Circuit short to ground or open	• Sensor short circuit to ground or open circuit • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0031-25	Left Front Wheel Speed Sensor - Signal shape / waveform failure	• Sensor short circuit to ground • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0031-2F	Left Front Wheel Speed Sensor - Signal erratic	• Sensor circuit fault • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to

			extinguish on the gear shifter (if installed) before returning the ignition state to on
C0031-31	Left Front Wheel Speed Sensor - No signal	• No sensor signal • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0031-62	Left Front Wheel Speed Sensor - Signal compare failure	• Sensor signal compare failure • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0031-64	Left Front Wheel Speed Sensor - Signal plausibility failure	• Sensor signal plausibility failure • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0033-38	Right Front Tone Wheel - Signal frequency incorrect	• Signal frequency incorrect • Damaged wheel speed sensor ring	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-14	Right Front Wheel Speed Sensor - Circuit short to ground or open	• Sensor short circuit to ground or open • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-25	Right Front Wheel Speed Sensor - Signal shape / waveform failure	• Sensor signal shape / waveform failure • Sensor short circuit to ground • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-2F	Right Front Wheel Speed Sensor - Signal erratic	• Sensor signal erratic • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-	Right Front	• No sensor signal	• Check the sensor lead and connector for damage. If

31	Wheel Speed Sensor - No signal	• Sensor fault	damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-62	Right Front Wheel Speed Sensor - Signal compare failure	• Sensor signal compare failure • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-64	Right Front Wheel Speed Sensor - Signal plausibility failure	• Sensor signal plausibility failure • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0036-38	Left Rear Tone Wheel - Signal frequency incorrect	• Signal frequency incorrect • Damaged wheel speed sensor ring	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-14	Left Rear Wheel Speed Sensor - Circuit short to ground or open	• Sensor short circuit to ground or open circuit • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-25	Left Rear Wheel Speed Sensor - Signal shape / waveform failure	• Sensor signal shape / waveform failure • Sensor short circuit to ground • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-2F	Left Rear Wheel Speed Sensor - Signal erratic	• Sensor signal erratic • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-31	Left Rear Wheel Speed Sensor - No signal	• No sensor signal • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or

			cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-62	Left Rear Wheel Speed Sensor - Signal compare failure	• Sensor signal compare failure • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-64	Left Rear Wheel Speed Sensor - Signal plausibility failure	• Sensor signal plausibility failure • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0039-38	Right Rear Tone Wheel - Signal frequency incorrect	• Signal frequency incorrect • Damaged wheel speed sensor ring	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-14	Right Rear Wheel Speed Sensor - Circuit short to ground or open	• Sensor short circuit to ground or open circuit • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-25	Right Rear Wheel Speed Sensor - Signal shape / waveform failure	• Sensor signal shape / waveform failure • Sensor short circuit to ground • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-2F	Right Rear Wheel Speed Sensor - Signal erratic	• Sensor signal erratic • Sensor fault	• heck the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-31	Right Rear Wheel Speed Sensor - No signal	• No sensor signal • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning

			the ignition state to on
C003A-62	Right Rear Wheel Speed Sensor - Signal compare failure	• Sensor signal compare failure • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-64	Right Rear Wheel Speed Sensor - Signal plausibility failure	• Sensor signal plausibility failure • Sensor fault	• Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensor and the anti-lock brake system control module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0051-28	Steering Wheel Position Sensor - Signal bias level out of range / zero adjustment failure	• Signal bias level out of range/zero adjustment failure • Incorrect angle sensor installed • Wheel speed sensor wiring incorrectly wired across one axle • Steering angle sensor fault	• Check for a correctly installed steering angle sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensors and the anti-lock brake system control module to ensure the sensors on one axle are correctly wired to the correct control module left or right pin outs. Renew the steering angle sensor. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle (not always in a straight line) for at least 9 seconds to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0051-67	Steering Wheel Position Sensor - Signal incorrect after event	• Sensor signal incorrect after event • Steering angle sensor fault • Control module software error	• Check for other DTCs that may aid diagnosis, especially in the steering angle sensor module. Renew the steering angle sensor. Clear the DTC and retest. If the problem persists, renew the anti-lock brake system control module
C0062-28	Longitudinal Acceleration Sensor - Signal bias level out of range / zero adjustment failure	• Sensor signal bias level out of range/zero adjustment failure • Incorrectly installed sensor	• Check installation and mounting of sensor cluster. Clear the DTC and retest, if problem persists renew the sensor. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0062-54	Longitudinal Acceleration Sensor - Missing calibration	• Sensor missing calibration • Incorrect sensor installed • Incorrectly configured sensor	• Ensure the correct sensor has been installed. Check mounting, connector and fuse of the sensor. Configure the sensor cluster using the manufacturers approved diagnostic system
C0062-64	Longitudinal Acceleration Sensor - Signal plausibility failure	• Sensor signal plausibility failure • Incorrectly installed sensor	• Clear the DTC and retest. Check mounting, connector and fuse of the sensor. Configure the sensor cluster using the manufacturers approved diagnostic system
C0063-14	Yaw Rate Sensor - Circuit short to ground or open	• Sensor circuit short to ground or open • Sensor fault	• The most likely cause of the fault is an open circuit on the harness. Refer to the electrical circuit diagrams and check the circuit between the sensor and the anti-lock brake system control module. Repair as necessary. Clear the DTC and retest. If the problem persists, renew the sensor
C0063-1C	Yaw Rate Sensor - Circuit voltage out of range	• Sensor circuit voltage out of range	• Refer to the electrical circuit diagrams and check the sensor power supply circuit
C0063-27	Yaw Rate Sensor - Signal rate of change above	• Sensor circuit power supply fuse failure • Sensor insecurely	• Refer to the electrical circuit diagrams and check the sensor power supply fuse. Check the yaw rate sensor connector condition. Ensure the sensor is correctly secured. If problem persists, renew the sensor. If the problem still

	threshold	mounted • Sensor fault • Control module software error	persists, renew the anti-lock brake system control module
C0063-28	Yaw Rate Sensor - Signal bias level out of range / zero adjustment failure	• Sensor signal bias level out of range/zero adjustment failure • Sensor insecurely mounted • Sensor fault	• Ensure the sensor is correctly secured. If problem persists, renew the sensor
C0063-41	Yaw Rate Sensor - General checksum failure	• Sensor general checksum failure • Sensor fault • Control module fault	• Renew the sensor. If the problem persists, renew the anti-lock brake system control module
C0063-49	Yaw Rate Sensor - Internal electronic failure	• Sensor internal electronic failure	• Clear the DTC and retest. If the problem persists, renew the sensor
C0063-4A	Yaw Rate Sensor - Incorrect component installed	• Incorrect sensor installed	• Clear the DTC and retest. If the fault still exists renew the yaw rate sensor with the suitable sensor cluster and repeat test cycle
C0063-64	Yaw Rate Sensor - Signal plausibility failure	NOTE: This DTC is set when the sensor value is not within the expected range compared to the steering angle senor. • Sensor signal plausibility failure • Sensor insecurely mounted	NOTE: This DTC can be set if the vehicle is being tested on chassis dyno rollers. • Ensure the sensor is correctly secured. Check that the steering angle sensor is correctly calibrated using the manufacturers recommended diagnostic system. If problem persists, renew the sensor. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 80kph (not always in a straight line) to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0063-86	Yaw Rate Sensor - Signal invalid	• Sensor signal invalid • Incorrectly configured sensor	• Clear the DTC and retest. If the problem persists, renew the sensor
C0063-95	Yaw Rate Sensor - Incorrect assembly	• Sensor incorrect assembly/internal sensor fault	• Ensure the correct sensor has been installed. Clear the DTC and retest. If the problem persists, renew the sensor. If the problem persists, renew the anti-lock brake system control module
C0063-96	Yaw Rate Sensor - Component internal failure	• Sensor power supply intermittent connection • Sensor ground intermittent connection • Sensor internal failure	• Refer to the electrical circuit diagrams and check the sensor power supply and ground connections to the sensor. Check the sensor connecter and anti-lock brake system control module for security and integrity (water ingress of damaged pins). If the problem persists, renew the yaw rate sensor. Calibrate the new sensor using the manufacturers approved diagnostic system. If the fault returns after an ignition cycle, renew the control module
C0064-64	Roll Rate Sensor - Signal plausibility failure	• Sensor signal plausibility failure • Sensor insecurely mounted	• Ensure the sensor is correctly installed/secured. Clear DTC and retest. If problem persists, renew the sensor
C006A-54	Multi-axis Acceleration Sensor - Missing calibration	• Sensor missing calibration • Serial number of yaw rate sensor saved in stored in control module memory does not match serial number of sensor • Incorrect sensor installed	• Check that the correct sensor has been installed. Configure the sensor cluster using the manufacturers approved diagnostic system. If calibration fails several times, renew the control module

		Installed sensor not correctly calibrated	
C0072-4B	Brake Temperature Too High - Over temperature	• Excessive use of brakes • Excessive use of traction control system	• This DTC is for information only. Clear the DTC
C101F-49	Generic Valve Failure - Internal electronic failure	• Anti-lock brake system modulator internal fault	• Renew the anti-lock brake system control module
C1109-24	Vehicle Dynamics Control Switch - Signal stuck high	 NOTE: If the dynamic stability control switch is pressed for longer than 1 minute, the switch is deemed to be malfunctioning. • Signal stuck high - dynamic stability control switch operation fault	• Check the switch operation. Refer to the electrical circuit diagrams and check the dynamic stability control switch and circuits. Check and install a new dynamic stability control switch as required
C1A77-16	Valve Relay Supply Circuit - Circuit voltage below threshold	• Circuit voltage below threshold • Fuse • Harness/connector damaged	• Refer to the electrical circuit diagrams and check the harness connection and fuse to the valve relay circuits
C1A90-12	Wheel Speed Sensor Supply - Circuit short to battery	• Wheel speed sensor supply circuit short circuit to power	• Refer to the electrical circuit diagrams and check the wheel speed sensor power supply line circuits between the sensors and the anti-lock brake system control module
C1A95-4A	Wheel Speed Sensor - Incorrect component installed	• The incorrect wheel speed sensor has been installed	• Check the correct wheel speed sensors are installed. Clear the DTC and retest
C1A95-64	Wheel Speed Sensor - Signal plausibility failure	• Signal plausibility failure • Wheel speed sensor fault (any) • Sensor ring damaged, incorrect or defective • Harness fault • Incorrect wheel/tire assembly size	• Check for correct wheel/tire sizes. Check the wheel speed sensors and circuits for damage. Remove the sensor and visually inspect the sensor ring on the constant velocity joint for missing or damaged teeth. If the sensor ring is damaged, renew the constant velocity joint. Use an oscilloscope to examine the signals from all wheel speed sensors for abnormal high frequencies (modulation and peak signals). Renew sensors as necessary. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph for at least 30 seconds to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C1A96-64	Brake Light Switch - Signal plausibility failure	• Signal plausibility failure • Stop lamp switch fault • Harness/connector issue	• Check the Stop lamp function. Ensure the brake pedal switch is correctly installed and configured. Refer to the electrical circuit diagrams and check the brake pedal switch circuit, rectify as necessary. Check the engine control module for DTCs. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph with at least one brake pedal press to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C1A97-24	Lateral Accelerometer - Signal stuck high	• Signal stuck high • Yaw rate/lateral acceleration sensor internal error	• Renew the combined lateral acceleration/yaw rate sensor
C1A98-2F	Yaw Rate Sensor - Signal erratic	• Yaw rate sensor signal fault for 2 minutes	• Information only, regard as normal operation. Clear the DTC, cycle the ignition and retest. If the fault reoccurs, renew the combined lateral acceleration/yaw rate sensor.

			When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C1A98-96	Yaw Rate Sensor - Component internal failure	• Incorrect assembly • Sensor installation incorrect • Yaw rate/lateral acceleration sensor internal error	• Check the combined lateral acceleration/yaw rate sensor installation and orientation. Check mounting, connector and fuse of the sensor. Clear the DTC and retest. If the problem persists, renew the combined lateral acceleration/yaw rate sensor
C1B00-29	Steering Angle Sensor - Signal invalid	• Sensor signal invalid • Sensor installation incorrect • steering angle sensor fault	• Check steering angle sensor module for DTCs. Check the steering angle sensor installation and orientation. Clear the DTC and retest. If the problem persists, renew the sensor
C1B00-49	Steering Angle Sensor - Internal electronic failure	• Sensor internal electronic failure	• Check steering angle sensor module for DTCs. Renew the sensor
C1B00-64	Steering Angle Sensor - Signal plausibility failure	• Sensor signal plausibility failure • Sensor installation incorrect • steering angle sensor fault • Yaw rate sensor installation incorrect	• Check steering angle sensor module for DTCs. Check the steering angle sensor installation and orientation. Check the yaw rate sensor installation and orientation. Clear the DTC and retest. If the problem persists, renew the steering angle sensor module
C1B00-92	Steering Angle Sensor - Performance or incorrect operation	• Sensor performance or incorrect operation • Sensor installation incorrect • steering angle sensor fault	• Check steering angle sensor module for DTCs. Check the steering angle sensor installation and orientation. Check the yaw rate sensor installation and orientation. Clear the DTC and retest. If the problem persists, renew the steering angle sensor
C1B02-16	Return Pump - Circuit voltage below threshold	• Return pump circuit voltage below threshold • Harness damaged • Defective fuse	• Refer to the electrical circuit diagrams and check the circuit, fuses and the connection to the anti-lock brake system control module. Rectify as necessary. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C1B02-49	Return Pump - Internal electronic failure	• Anti-lock brake system control module internal electronic failure	• Renew the anti-lock brake system modulator
C1B22-24	Hill Descent Switch - Signal stuck high	NOTE: If the hill decent control switch is pressed for longer than 1 minute, the switch is deemed to be malfunctioning. • Signal stuck high • Harness/connector issue	• Check the switch operation. Refer to the electrical circuit diagrams and check the switch and circuit for short to power
C2009-64	Front Axle Wheel Speed Sensors Swapped - Signal plausibility failure	• Sensor location swapped	• Swap the front wheel speed sensor locations. Clear the DTC and retest. In order to clear the DTC/warning lamp after fault is rectified, the vehicle must be driven above 15km/h
C200A-64	Rear Axle Wheel Speed	• Sensor location swapped	• Swap the rear wheel speed sensor locations. Clear the DTC and retest. In order to clear the DTC/warning lamp after

	Sensors Swapped - Signal plausibility failure		fault is rectified, the vehicle must be driven above 15km/h
U0001-88	High Speed CAN Communication Bus - Bus off	• CAN bus off	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0074-88	Control Module Communication Bus "B" Off - Bus off	• CAN Bus off	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the engine control module and the anti-lock brake system control module
U0101-00	Lost Communication With TCM - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transmission control module and the anti-lock brake system control module
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transfer case control module and the anti-lock brake system control module
U0103-00	Lost Communication With Gear Shift Control Module A - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the gear shift control module and the anti-lock brake system control module
U0104-00	Lost Communication With Cruise Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the cruise control module and the anti-lock brake system control module
U0123-00	Lost Communication With Yaw Rate Sensor Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the yaw rate sensor control module and the anti-lock brake system control module
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the steering angle sensor module and the anti-lock brake system control module
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the park brake control module and the anti-lock brake system control module

U0132-00	Lost Communication With Suspension Control Module "A" - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the suspension control module and the anti-lock brake system control module
U0133-00	Lost Communication With Active Roll Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the dynamic response control module and the anti-lock brake system control module
U0136-00	Lost Communication With Differential Control Module - Rear - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the rear differential control module and the anti-lock brake system control module
U0138-00	Lost Communication With All Terrain Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the all terrain control module and the anti-lock brake system control module
U0140-00	Lost Communication With Body Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the anti-lock brake system control module
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Control module has been installed to the incorrect vehicle	• Ensure the correct module is installed
U0401-68	Invalid Data Received from ECM/PCM A - Event information	• Invalid data received	• Check the engine control module for related DTCs and refer to the relevant DTC index
U0402-68	Invalid Data Received from TCM - Event information	• Invalid data received	• Check the transmission control module for related DTCs and refer to the relevant DTC index
U0403-68	Invalid Data Received From Transfer Case Control Module - Event information	• Invalid data received	• Check the transfer case control module for related DTCs and refer to the relevant DTC index
U0404-68	Invalid Data Received From Gear Shift Control Module A - event information	• Event information - transmission control switch related concern	• Check the transmission control switch for related DTCs and refer to the relevant DTC index
U0405-68	Invalid Data Received From Cruise Control Module - Event information	• Invalid data received	• Check the speed control module for related DTCs and refer to the relevant DTC index
U0417-68	Invalid Data Received From Park Brake Control Module - Event information	• Invalid data received	• Check the park brake control module for related DTCs and refer to the relevant DTC index
U0421-68	Invalid Data Received from	• Invalid data received	• Check the air suspension control module for related DTCs and refer to the relevant DTC index

	Suspension Control Module A - Event information		
U0428-68	Invalid Data Received From Steering Angle Sensor Module - Event information	• Invalid data received	• Check the steering angle sensor control module for related DTCs and refer to the relevant DTC index
U0437-68	Invalid Data Received From Differential Control Module-Rear - Event information	• Invalid data received	• Check the rear differential control module for related DTCs and refer to the relevant DTC index
U0439-68	Invalid Data Received From All Terrain Control Module - Event information	• Invalid data received	• Check the all terrain control module for related DTCs and refer to the relevant DTC index
U1A14-00	CAN Initialisation Failure - No sub type information	• Incorrect control module installed to vehicle	• Check that the correct anti-lock brake system control module has been installed. Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U2101-00	Control Module Configuration Incompatible - No sub type information	• Car configuration file incorrectly configured	• Check that the correct anti-lock brake system control module has been installed. Configure the car configuration file using the manufacturers approved diagnostic system
U2101-68	Control Module Configuration Incompatible - Event information	• Vehicle variant code distributed via CAN is not matching the code stored in the central junction box memory • Anti-lock brake system control module has been installed from another vehicle (codes do not match expected) • New anti-lock brake system control module has been installed and at first use code did not match (becomes historic after first use)	• Check that the correct anti-lock brake system control module has been installed. Configure the car configuration file using the manufacturers approved diagnostic system
U3000-00	Control Module - No sub type information	• Incorrect control module installed to vehicle	• Check that the correct anti-lock brake system control module module has been installed. Refer to the electrical circuit diagrams and check the power and ground circuits to the component. Configure the module(s) using the manufacturers approved diagnostic system. Refer to the network communications section of the workshop manual
U3000-45	Control Module - Program memory failure	• Program memory failure (software error)	• Clear the DTC and retest. Repeat for several times. If the problem persists, renew the anti-lock brake system control module
U3000-49	Control Module - Internal electronic failure	• Internal electronic failure	• Renew the anti-lock brake system control module
U3000-4B	Control Module - Over temperature	• Module over temperature has been detected • Excessive anti-lock brake system interaction has	• Allow the unit to cool, clear the DTC and retest. If the problem persists, as a last resort renew the anti-lock brake system control module. Consider environmental conditions before suspecting the module

		been invoked, possibly by diagnostic equipment	
U3000-53	Control Module - De-activated	• Deactivated during software download to other modules on vehicle	• This is not a fault. Anti-lock brake system control module temporarily deactivated following programming session. Please cycle the ignition to clear
U3000-68	Control Module - Event information	• Stability assist operation is in progress and this has been continuing for an unfeasible length of time	• Check for other related DTCs. Check the wheel speed sensors, combined yaw rate/lat acceleration sensor and steering angle sensor module
U3000-87	Control Module - Missing message	• Car configuration file missing message	• Configure the car configuration file using the manufacturers approved diagnostic system
U3002-81	Vehicle Identification Number - Invalid serial data received	• Invalid vehicle identification number	• Configure the car configuration file using the manufacturers approved diagnostic system
U3003-62	Battery Voltage - Signal compare failure	• Signal compare failure	• Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section
U3006-16	Control Module Input Power "A" - Circuit voltage below threshold	• Anti-lock brake system control module circuit voltage below threshold • Battery voltage low • Battery ground cable: high resistance • Battery connections loose/corroded • Battery current drain	• Refer to the electrical circuit diagrams and check the module power and ground circuits. Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section
U3006-17	Control Module Input Power "A" - Circuit voltage above threshold	• Anti-lock brake system control module circuit voltage above threshold • Charging system fault	• Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section
U3006-1C	Control Module Input Power "A" - Circuit voltage out of range	• Anti-lock brake system control module circuit voltage out of range, a momentary low voltage occurred	• Check the battery condition and state of charge. Check the vehicle charging system. Check the connecter security to the module. Refer to the relevant workshop manual section

General Information - Diagnostic Trouble Code (DTC) Index DTC: Audio Amplifier Control Module (AAM)

Description and Operation

Audio Amplifier Module (AAM)

CAUTIONS:

 Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

 When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTES:

 If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

 Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

 When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the digital multimeter leads into account

 Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

 Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

 If diagnostic trouble codes are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals

 Where an 'on demand self-test' is referred to, this can be accessed via the 'diagnostic trouble code monitor' tab on the manufacturers approved diagnostic system

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Audio Amplifier Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Information and Entertainment System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).

DTC	Description	Possible Cause	Action
B128A-11	Speaker #13 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	 NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128A-12	Speaker #13 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	 NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128A-13	Speaker #13 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	 NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module

B128A-1A	Speaker #13 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128A-1E	Speaker #13 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128B-11	Speaker #14 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128B-12	Speaker #14 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128B-13	Speaker #14 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128B-1A	Speaker #14 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128B-1E	Speaker #14 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128C-11	Speaker #15 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check front center speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128C-12	Speaker #15 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check front center speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128C-13	Speaker #15 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check front center speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module

B128C-1A	Speaker #15 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	 NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check front center speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B128C-1E	Speaker #15 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	 NOTE: Only applies to vehicles fitted with premium audio system • Refer to electrical circuit diagrams, check front center speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A01-11	Speaker #1 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front tweeter circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A01-12	Speaker #1 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front tweeter circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A01-13	Speaker #1 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front tweeter circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A01-1A	Speaker #1 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front tweeter circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A01-1E	Speaker #1 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front tweeter circuits for open circuit, high resistance or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A02-11	Speaker #2 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front sub-woofer circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A02-12	Speaker #2 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front sub-woofer circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A02-13	Speaker #2 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front sub-woofer circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A02-1A	Speaker #2 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front sub-woofer circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A02-1E	Speaker #2 - Circuit	• Wiring harness fault	• Refer to electrical circuit diagrams, check left front sub-woofer circuits for open circuit, high resistance, or short circuit. Check

	resistance out of range	• Speaker fault • Audio amplifier fault	speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A03-11	Speaker #3 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front tweeter circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A03-12	Speaker #3 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front tweeter circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A03-13	Speaker #3 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front tweeter circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A03-1A	Speaker #3 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front tweeter circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A03-1E	Speaker #3 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front tweeter circuits for open circuit, high resistance or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A04-11	Speaker #4 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front sub-woofer circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A04-12	Speaker #4 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front sub-woofer circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A04-13	Speaker #4 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front sub-woofer circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A04-1A	Speaker #4 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front sub-woofer circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A04-1E	Speaker #4 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front sub-woofer circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A05-11	Speaker #5 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear tweeter speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module

B1A05-12	Speaker #5 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear tweeter speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A05-13	Speaker #5 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear tweeter speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A05-1A	Speaker #5 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear tweeter speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A05-1E	Speaker #5 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear tweeter speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A06-11	Speaker #6 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear sub-woofer circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A06-12	Speaker #6 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear sub-woofer circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A06-13	Speaker #6 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear sub-woofer circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A06-1A	Speaker #6 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear sub-woofer circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A06-1E	Speaker #6 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left rear sub-woofer circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A07-11	Speaker #7 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right rear tweeter speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A07-12	Speaker #7 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right rear tweeter speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A07-13	Speaker #7 - Circuit open	• Wiring harness fault • Speaker fault • Audio	• Refer to electrical circuit diagrams, check right rear tweeter speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module

		amplifier fault	
B1A07-1A	Speaker #7 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right rear tweeter speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A07-1E	Speaker #7 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right rear tweeter speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A08-11	Speaker #8 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right rear sub-woofer circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A08-12	Speaker #8 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right rear sub-woofer circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A08-13	Speaker #8 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right rear sub-woofer circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A08-1A	Speaker #8 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right rear sub-woofer circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A08-1E	Speaker #8 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right rear sub-woofer circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A09-11	Speaker #9 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front mid range speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A09-12	Speaker #9 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front mid range speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A09-13	Speaker #9 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front mid range speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A09-1A	Speaker #9 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left front mid range speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A09-	Speaker #9 -	• Wiring	• Refer to electrical circuit diagrams, check left front mid range

1E	Circuit resistance out of range	harness fault • Speaker fault • Audio amplifier fault	speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A10-11	Speaker #10 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front mid range speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A10-12	Speaker #10 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front mid range speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A10-13	Speaker #10 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front mid range speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A10-1A	Speaker #10 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front mid range speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A10-1E	Speaker #10 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right front mid range speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A11-11	Speaker #11 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left sub-woofer circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A11-12	Speaker #11 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left sub-woofer circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A11-13	Speaker #11 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left sub-woofer circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A11-1A	Speaker #11 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left sub-woofer circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A11-1E	Speaker #11 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check left sub-woofer circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A12-11	Speaker #12 - Circuit short to ground	• Wiring harness fault • Speaker fault • Audio amplifier	• Refer to electrical circuit diagrams, check right sub-woofer circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module

		fault	
B1A12-12	Speaker #12 - Circuit short to battery	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right sub-woofer circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A12-13	Speaker #12 - Circuit open	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right sub-woofer circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A12-1A	Speaker #12 - Circuit resistance below threshold	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right sub-woofer circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1A12-1E	Speaker #12 - Circuit resistance out of range	• Wiring harness fault • Speaker fault • Audio amplifier fault	• Refer to electrical circuit diagrams, check right sub-woofer circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module
B1297-01	Digital Headphone Module - General electrical failure	• Wiring harness fault • Infra-red headphone transmitter module fault • Audio amplifier fault	NOTE: Applies to vehicles with digital wireless headphones installed only • Refer to electrical circuit diagrams and check data signal circuits between the audio amplifier and the infra-red transmitter module for short circuit. Confirm power and ground supplies are present at the module. Repair wiring harness as required. Clear DTC and retest system. If fault resets suspect: - 1. Infra-red transmitter module - 2. Audio amplifier module
B1297-13	Digital Headphone Module - Circuit open	• Wiring harness fault • Infra-red headphone transmitter module fault • Audio amplifier fault	NOTE: Applies to vehicles with digital wireless headphones installed only • Refer to electrical circuit diagrams and check data signal circuits between the audio amplifier and the infra-red transmitter module for open circuit. Confirm power and ground supplies are present at the module. Repair wiring harness as required. Clear DTC and retest system. If fault resets suspect: - 1. Infra-red transmitter module - 2. Audio amplifier module
U2300-54	Central Configuration - Missing calibration	• Configuration missing	• Check/amend the car configuration file using the manufacturer approved diagnostic system
U2300-56	Central Configuration - Invalid / incomplete configuration	• Vehicle configuration file error	• Check the vehicle is configured correctly using the manufacturer approved diagnostic system
U2300-64	Central Configuration - Signal plausibility failure	• Configuration file error • Substituted component • New (blank) component	• Check the components installed to the vehicle are correct (not substituted from another vehicle). Install the original or a new component as required. This DTC will occur once if a new module is installed. Clear the DTC, cycle the ignition state to off. Lock the vehicle (to ensure the infotainment system has reset). Unlock the vehicle, cycle the ignition state to on. Retest the system
U3000-55	Control Module - Not configured	• Configuration file error	• The local configuration file has not been programmed into the audio amplifier. Programme the audio amplifier with the correct file using the manufacturer approved diagnostic system. This DTC will occur once if a new module is installed. Clear the DTC, cycle the ignition state to off. Lock the vehicle (to ensure the infotainment system has reset). Unlock the vehicle, cycle the ignition state to on. Retest the system
U3000-96	Control Module -	• Audio amplifier	• Check power and ground supplies to the audio amplifier module. If no fault found suspect internal fault within audio amplifier module.

	Component internal failure	internal fault	Clear DTCs and run amplifier on demand self test
U3000-98	Control Module - Component or system over temperature	• Audio amplifier cooling vents obstructed • Speaker circuit fault • Internal electronic failure	• Check for possible causes of the amplifier overheating. Check that the amplifier module ventilation is not obstructed (rear right quarter of luggage compartment). Check for speaker circuit related DTCs. Check for internal electronic failure related DTCs

General Information - Diagnostic Trouble Code (DTC) Index DTC: Auto High Beam Control Module (AHBCM)

Description and Operation

Headlamp Control Module B (HCM2)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Headlamp Control Module B, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Autolamps (417-01 Exterior Lighting, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1286-16	Interior mirror - Circuit voltage below threshold	• Rear view mirror circuit short circuit to ground	• Refer to the electrical circuit diagrams and check rear view mirror supply voltage circuit for short circuit to ground • Check voltage between pin 1 and pin 3 of the rear view mirror connector. The voltage should to be above 8.5 volt for normal condition • Using the manufacturer approved diagnostic system, clear DTC and retest • If DTC is set permanent and voltage is above 8.5 volt. Check and install new rear view mirror as required
B1286-17	Interior mirror - Circuit voltage above threshold	• High voltage detected at rear view (battery voltage > 16.5 volts)	• Refer to the workshop manual and the battery care manual, inspect the vehicle battery and ensure it is fully charged and serviceable before performing further tests • Check the vehicle charging system performance to ensure the voltage regulation is correct • Using the manufacturer approved diagnostic system, clear DTC and retest
B1286-44	Interior mirror - Data memory failure	• Rear view mirror internal failure	• Check and install new rear view mirror as required
B1286-47	Interior mirror - Watchdog/safety micro controller failure	• Rear view mirror internal failure	• Check and install new rear view mirror as required
B1286-49	Interior mirror - Internal electronic failure	• Rear view mirror internal failure	• Check and install new rear view mirror as required
B1286-60	Interior mirror – Reserved by document	• Rear view mirror operation temperature below limit	• Allow the vehicle rear view temperature to increase, the rear view mirror will self recover after temperature reaches normal conditions

B1286-78	Interior mirror - Alignment or adjustment incorrect	• Rear view mirror increased sensitivity mode has been activated	• Increased sensitivity mode is cancelled when the ignition is cycled • Clear the DTC and re-test
B1286-96	Interior mirror - Component internal failure	• Rear view mirror internal failure	• Using the manufacturer approved diagnostic system, clear DTC and retest • Check and install new rear view mirror as required
B1286-97	Interior mirror - Component or system operation obstructed or blocked	• Rear view mirror temporary disabled • Rear view mirror camera has detected a partial or total blockage of the field of view	• Check to see if anything is blocking the field of view of the interior mirror camera • Using the manufacturer approved diagnostic system, clear DTC and retest • The rear view mirror will self recover after failure condition has been rectified
B1286-98	Interior mirror - Component or system over temperature	• Rear view mirror temporary disabled because of operation temperature above limit	• Rear view mirror will self recover after the temperature reaches normal condition
B12AC-11	Electrochromic door mirror - Circuit short to ground	• Electrochromic door mirror output circuit short circuit to ground	• Refer to electrical circuit diagrams and check both door mirrors circuit for short circuit to ground
B12AC-12	Electrochromic door mirror - Circuit short to battery	• Electrochromic door mirror output circuit short circuit to power	• Refer to electrical circuit diagrams and check both door mirrors circuit for short circuit to power
B12EB-78	Camera horizontal alignment - Alignment or adjustment incorrect	• Rear view mirror camera misaligned in the horizontal direction. Windscreen button and mirror attachment alignment incorrect • Rear view mirror internal failure	• Check accuracy of mirror attachment and windscreen button • Check and install new rear view mirror as required
B12EC-78	Camera vertical alignment - Alignment or adjustment incorrect	• Rear view mirror camera misaligned in the horizontal direction. Windscreen button and mirror attachment alignment incorrect • Rear view mirror internal failure	• Check accuracy of mirror attachment and windscreen button • Check and install new rear view mirror as required
B134A-78	Target aim verification - camera horizontal alignment - Alignment or adjustment incorrect	• Rear view mirror camera misaligned in the horizontal direction. Windscreen button and mirror attachment alignment incorrect • Rear view mirror internal failure	• Check accuracy of mirror attachment and windscreen button • Check and install new rear view mirror as required
B134B-78	Target aim vertical - camera horizontal alignment - Alignment or adjustment incorrect	• Rear view mirror camera misaligned in the horizontal direction. Windscreen button and mirror attachment alignment incorrect • Rear view mirror internal failure	• Check accuracy of mirror attachment and windscreen button • Check and install new rear view mirror as required
U0010-88	Medium speed CAN communication bus - Bus off	• Medium speed CAN bus circuit fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the module • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check the CAN network
U0140-00	Lost communication with body control module - No sub type information	• Lost communication with central junction box	• Refer to the electrical circuit diagrams and check the power and ground connections to the module • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check the CAN network between the interior mirror and central junction box

U0300-00	Internal control module software incompatibility - No sub type information	• Rear view mirror is not configured correctly	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the rear view mirror
U201A-57	Control module main calibration data - Invalid/incomplete software component	• Rear view mirror is not configured correctly	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the rear view mirror • Using the manufacturer approved diagnostic system check and up-date the car configuration file as required. Clear the DTC and re-test
U2100-00	Initial configuration not complete - No sub type information	• Rear view mirror is not configured correctly	• Using the manufacturer approved diagnostic system check and up-date the car configuration file as required. Clear the DTC and re-test
U2101-00	Control module configuration incompatible - No sub type information	• Rear view mirror is not configured correctly	• Using the manufacturer approved diagnostic system check and up-date the car configuration file as required. Clear the DTC and re-test

General Information - Diagnostic Trouble Code (DTC) Index DTC: Automatic Temperature Control Module (ATC)

Description and Operation

Automatic Temperature Control Module (ATC)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Climate Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Climate Control System (412-00 Climate Control System - General Information, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
P0530-11	A/C Refrigerant Pressure Sensor A Circuit - Circuit short to ground	• Refrigerant pressure sensor circuit short to ground • Refrigerant pressure sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the refrigerant pressure sensor circuit for short to ground • Install a new refrigerant pressure sensor as necessary • Install a new automatic temperature control module as necessary
P0530-15	A/C Refrigerant Pressure Sensor A Circuit - Circuit short to battery or open	• Refrigerant pressure sensor circuit short to power, open circuit • Refrigerant pressure sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the refrigerant pressure sensor circuit for short to power, open circuit • Install a new refrigerant pressure sensor as necessary • Install a new automatic temperature control module as necessary
P0645-11	A/C Clutch Relay Control Circuit - Circuit short to ground	• Compressor clutch relay control circuit short to ground	• Refer to the electrical circuit diagrams and test the compressor clutch relay control circuit for short to ground
C1B14-13	Sensor Supply Voltage A - Circuit open	• Fresh/recirculated air motor circuit short to ground, open circuit • Fresh/recirculated air motor failure • Automatic temperature	• Refer to the electrical circuit diagrams and test the fresh/recirculated air motor circuit for short to ground, open circuit • Install a new fresh/recirculated air motor as necessary • Install a new automatic temperature control module as necessary

		control module failure	
C1B15-13	Sensor Supply Voltage B - Circuit open	• Fresh/recirculated air motor position sensor circuit open circuit • Evaporator temperature sensor circuit open circuit • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the fresh/recirculated air motor position sensor circuit for open circuit • Refer to the electrical circuit diagrams and test the evaporator temperature sensor circuit for open circuit • Install a new automatic temperature control module as necessary
B1030-01	Left Front Seat Heater - General electrical failure	• Left front seat heater circuit short to ground, short to power, open circuit • Left front seat heater element(s) failure • Left front seat heater thermistor failure • Left front seat heater control module failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the left front seat heater circuit for short to ground, short to power, open circuit • Install a new left front seat heater element as necessary • Install a new left front seat heater control module as necessary • Install a new automatic temperature control module as necessary
B1030-4B	Left Front Seat Heater - Over temperature	• Left front seat heater thermistor failure • Left front seat heater control module failure • Automatic temperature control module failure	• Install a new left front seat heater element as necessary • Install a new left front seat heater control module as necessary • Install a new automatic temperature control module as necessary
B1030-87	Left Front Seat Heater - Missing message	• Left front seat heater LIN circuit short to ground, short to power, open circuit • Left front seat heater control module failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the left front seat heater LIN circuit for short to ground, short to power, open circuit • Install a new left front seat heater control module as necessary • Install a new automatic temperature control module as necessary
B1032-01	Right Front Seat Heater - General electrical failure	• Right front seat heater circuit short to ground, short to power, open circuit • Right front seat heater element(s) failure • Right front seat heater thermistor failure • Right front seat heater control module failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the right front seat heater circuit for short to ground, short to power, open circuit • Install a new right front seat heater element as necessary • Install a new right front seat heater control module as necessary • Install a new automatic temperature control module as necessary
B1032-4B	Right Front Seat Heater - Over	• Right front seat heater thermistor failure	• Install a new right front seat heater element as necessary • Install a new right front seat heater control module as necessary

	temperature	• Right front seat heater control module failure • Automatic temperature control module failure	• Install a new automatic temperature control module as necessary
B1032-87	Right Front Seat Heater - Missing message	• Right front seat heater LIN circuit short to ground, short to power, open circuit • Right front seat heater control module failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the right front seat heater LIN circuit for short to ground, short to power, open circuit • Install a new right front seat heater control module as necessary • Install a new automatic temperature control module as necessary
B1034-01	Left Front Seat Heater Element - General electrical failure	• Left front seat heater circuit short to ground, short to power, open circuit • Left front seat heater element failure • Left front seat heater control module failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the left front seat heater circuit for short to ground, short to power, open circuit • Install a new left front seat heater element as necessary • Install a new left front seat heater control module as necessary • Install a new automatic temperature control module as necessary
B1036-01	Right Front Seat Heater Element - General electrical failure	• Right front seat heater circuit short to ground, short to power, open circuit • Right front seat heater element failure • Right front seat heater control module failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the right front seat heater circuit for short to ground, short to power, open circuit • Install a new right front seat heater element as necessary • Install a new right front seat heater control module as necessary • Install a new automatic temperature control module as necessary
B1038-01	Left Front Seat Heater Sensor - General electrical failure	• Left front seat heater circuit short to ground, short to power, open circuit • Left front seat heater sensor failure • Left front seat heater control module failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the left front seat heater circuit for short to ground, short to power, open circuit • Install a new left front seat heater as necessary • Install a new left front seat heater control module as necessary • Install a new automatic temperature control module as necessary
B103A-01	Right Front Seat Heater Sensor - General electrical failure	• Right front seat heater circuit short to ground, short to power, open circuit • Right front seat heater sensor failure • Right front seat heater control module failure • Automatic	• Refer to the electrical circuit diagrams and test the right front seat heater circuit for short to ground, short to power, open circuit • Install a new right front seat heater as necessary • Install a new right front seat heater control module as necessary • Install a new automatic temperature control module as necessary

		temperature control module failure	
B1081-00	Left Temperature Damper Motor - No sub type information	• Foreign object obstructing left temperature blend door • Left temperature blend motor circuit short to ground, short to power, open circuit • Left temperature blend door damaged • Left temperature blend motor failure	• Check and remove any obstruction in the left temperature blend door • Refer to the electrical circuit diagrams and test the left temperature blend motor circuit for short to ground, short to power, open circuit • Install a new left temperature blend door as necessary • Install a new left temperature blend motor as necessary
B1081-49	Left Temperature Damper Motor - Internal electronic failure	• Left temperature blend motor failure	• Install a new left temperature blend motor as necessary
B1082-00	Right Temperature Damper Motor - No sub type information	• Foreign object obstructing right temperature blend door • Right temperature blend motor circuit short to ground, short to power, open circuit • Right temperature blend door damaged • Right temperature blend motor failure	• Check and remove any obstruction in the right temperature blend door • Refer to the electrical circuit diagrams and test the right temperature blend motor circuit for short to ground, short to power, open circuit • Install a new right temperature blend door as necessary • Install a new right temperature blend motor as necessary
B1082-49	Right Temperature Damper Motor - Internal electronic failure	• Right temperature blend motor failure	• Install a new right temperature blend motor as necessary
B1083-01	Recirculation Damper Motor - General electrical failure	• Foreign object obstructing recirculation door • Recirculation motor circuit short to ground, short to power, open circuit • Recirculation door damaged • Recirculation motor failure • Automatic temperature control module failure	• Check and remove any obstruction in the recirculation door • Refer to the electrical circuit diagrams and test the recirculation motor circuit for short to power, open circuit • Install a new recirculation door as necessary • Install a new recirculation motor as necessary • Install a new automatic temperature control module as necessary
B1085-00	Defroster Damper Motor - No sub type information	• Foreign object obstructing demist distribution door • Demist distribution motor circuit short to ground, short to power, open circuit	• Check and remove any obstruction in the demist distribution door • Refer to the electrical circuit diagrams and test the demist distribution motor circuit for short to ground, short to power, open circuit • Install a new demist distribution door as necessary • Install a new demist distribution motor as necessary

		• Demist distribution door damaged • Demist distribution motor failure	
B1085-49	Defroster Damper Motor - Internal electronic failure	• Demist distribution motor failure	• Install a new demist distribution motor as necessary
B1086-00	Air Distribution Damper Motor - No sub type information	• Foreign object obstructing face/feet distribution door • Face/feet distribution motor circuit short to ground, short to power, open circuit • Face/feet distribution door damaged • Face/feet distribution motor failure	• Check and remove any obstruction in the face/feet distribution door • Refer to the electrical circuit diagrams and test the face/feet distribution motor circuit for short to ground, short to power, open circuit • Install a new face/feet distribution door as necessary • Install a new face/feet distribution motor as necessary
B1086-49	Air Distribution Damper Motor - Internal electronic failure	• Face/feet distribution motor failure	• Install a new face/feet distribution motor as necessary
B1087-88	LIN Bus "A" - Bus off	• LIN bus A circuit short to ground, short to power, high resistance, open circuit • All LIN bus A actuators failed • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the LIN bus A circuit for short to ground, short to power, high resistance, open circuit • Install new actuators as necessary • Install a new automatic temperature control module as necessary
B1088-88	LIN Bus "B" - Bus off	• LIN bus B circuit short to ground, short to power, high resistance, open circuit • All LIN bus B actuators failed • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the LIN bus B circuit for short to ground, short to power, high resistance, open circuit • Install new actuators as necessary • Install a new automatic temperature control module as necessary
B10BE-11	Solar Sensor - Circuit short to ground	• Sunload sensor circuit short to ground • Sunload sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the sunload sensor circuit for short to ground • Install a new sunload sensor as necessary • Install a new automatic temperature control module as necessary
B11EE-01	A/C Compressor - General electrical failure	• Refrigerant solenoid valve circuit short to ground, short to each other • Refrigerant solenoid valve failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the refrigerant solenoid valve circuit for short to ground, short to each other • Install a new refrigerant solenoid valve as necessary • Install a new automatic temperature control module as necessary

B11F0-11	Air Intake Damper Position Sensor - Circuit short to ground	• Recirculation motor circuit short to ground • Recirculation motor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the recirculation motor circuit for short to ground • Install a new recirculation motor as necessary • Install a new automatic temperature control module as necessary
B11F0-15	Air Intake Damper Position Sensor - Circuit short to battery or open	• Recirculation motor circuit short to power, open circuit • Recirculation motor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the recirculation motor circuit for short to power, open circuit • Install a new recirculation motor as necessary • Install a new automatic temperature control module as necessary
B11FF-84	A/C Refrigerant Pressure - Signal below allowable range	• Insufficient refrigerant in system • Refrigerant pressure sensor failure • Automatic temperature control module failure	• Using the manufacturer approved diagnostic system, datalogger. test and review Climate control system / Air conditioning / External ambient temperature. If the external ambient temperature is < 5°C, this DTC should be ignored and cleared. If the external ambient temperature shows > 5°C, test the refrigerant system using a suitable charging station • Install a new refrigerant pressure sensor as necessary • Install a new automatic temperature control module as necessary
B11FF-85	A/C Refrigerant Pressure - Signal above allowable range	• Excessive refrigerant in system • Blockage in air conditioning system pipework or condenser • Air conditioning fan inoperative • Refrigerant pressure sensor failure • Automatic temperature control module failure	• Test the refrigerant system using a suitable charging station • Test the condenser and pipework for damage or restriction • Test the air conditioning fan for correct operation • Install a new refrigerant pressure sensor as necessary • Install a new automatic temperature control module as necessary
B12B2-11	AUX Heater Coolant Diverter Valve - Circuit short to ground	• Auxiliary heater coolant diverter valve circuit short to ground • Auxiliary heater coolant diverter valve failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the auxiliary heater coolant diverter valve circuit for short to ground • Install a new auxiliary heater coolant diverter valve as necessary • Install a new automatic temperature control module as necessary
B1A59-11	Sensor 5 Volt Supply - Circuit short to ground	• Sensor 5 volt supply circuit short to ground • Refrigerant pressure sensor failure • Fresh/recirculated air motor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the sensor 5V supply circuit for short to ground • Install a new refrigerant pressure sensor as necessary • Install a new fresh/recirculated air motor as necessary • Install a new automatic temperature control module as necessary
B1A59-13	Sensor 5 Volt Supply - Circuit open	• Sensor 5 volt supply circuit open circuit • Refrigerant pressure sensor failure	• Refer to the electrical circuit diagrams and test the sensor 5V supply circuit for open circuit • Install a new refrigerant pressure sensor as necessary • Install a new automatic temperature control module as necessary

		• Automatic temperature control module failure	
B1A60-11	Pollution Sensor - Hydrocarbon - Circuit short to ground	• Pollution sensor circuit short to ground • Pollution sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the pollution sensor circuit for short to ground • Install a new pollution sensor as necessary • Install a new automatic temperature control module as necessary
B1A61-11	Cabin Temperature Sensor - Circuit short to ground	• In-vehicle temperature sensor circuit short to ground • In-vehicle temperature sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the in-vehicle temperature sensor circuit for short to ground • Install a new in-vehicle temperature sensor as necessary • Install a new automatic temperature control module as necessary
B1A61-15	Cabin Temperature Sensor - Circuit short to battery or open	• In-vehicle temperature sensor circuit short to power, open circuit • In-vehicle temperature sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the in-vehicle temperature sensor circuit for short to power, open circuit • Install a new in-vehicle temperature sensor as necessary • Install a new automatic temperature control module as necessary
B1A63-11	Right Solar Sensor - Circuit short to ground	• Sunload sensor (right circuit) short circuit to ground • Sunload sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the sunload sensor (right circuit) for short circuit to ground • Install a new sunload sensor as necessary • Install a new automatic temperature control module as necessary
B1A64-11	Left Solar Sensor - Circuit short to ground	• Sunload sensor (left circuit) short circuit to ground • Sunload sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the sunload sensor (left circuit) for short to ground • Install a new sunload sensor as necessary • Install a new automatic temperature control module as necessary
B1A67-13	Sensor Ground - Circuit open	• Sensor(s) ground circuit open circuit • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the sensor circuit for open circuit. DTCs B1A61-15, B1A59-13 and P0530-15 will also be logged • Install a new automatic temperature control module as necessary
B1A69-11	Humidity Sensor - Circuit short to ground	• Humidity sensor circuit short to ground • Humidity sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the humidity sensor circuit for short to ground • Install a new combined in-vehicle temperature & humidity sensor as necessary • Install a new automatic temperature control module as necessary
B1A69-15	Humidity Sensor - Circuit	• Humidity sensor circuit short to	• Refer to the electrical circuit diagrams and test the humidity sensor circuit for short to power, open circuit

	short to battery or open	power, open circuit • Humidity sensor failure • Automatic temperature control module failure	• Install a new combined in-vehicle temperature & humidity sensor as necessary • Install a new automatic temperature control module as necessary
B1B62-11	Pollution Sensor - NOx - Circuit short to ground	• Pollution sensor circuit short to ground • Pollution sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the pollution sensor circuit for short to ground • Install a new pollution sensor as necessary • Install a new automatic temperature control module as necessary
B1B71-11	Evaporator Temperature Sensor - Circuit short to ground	• Evaporator temperature sensor circuit short to ground • Evaporator temperature sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the evaporator temperature sensor circuit for short to ground • Install a new evaporator temperature sensor as necessary • Install a new automatic temperature control module as necessary
B1B71-15	Evaporator Temperature Sensor - Circuit short to battery or open	• Evaporator temperature sensor circuit short to power, open circuit • Evaporator temperature sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the evaporator temperature sensor circuit for short to power, open circuit • Install a new evaporator temperature sensor as necessary • Install a new automatic temperature control module as necessary
B1B72-11	LIN Bus #1 Power Supply Circuit - Circuit short to ground	• LIN bus A circuit short to ground • Face/feet distribution motor failure • Demist distribution motor failure • Left temperature blend motor failure • Right temperature blend motor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the LIN bus A circuit for short to ground • Install a new face/feet distribution motor as necessary • Install a new demist distribution motor as necessary • Install a new left temperature blend motor as necessary • Install a new right temperature blend motor as necessary • Install a new automatic temperature control module as necessary
B1B73-11	LIN Bus #2 Power Supply Circuit - Circuit short to ground	• LIN bus B circuit short to ground • Rear air distribution motor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the LIN bus B circuit for short to ground • Install a new rear air distribution motor as necessary • Install a new automatic temperature control module as necessary
B1B7B-00	Left Rear Air Blend Actuator - No sub type information	• LIN bus B circuit short to ground, power, open circuit • Foreign object obstructing rear temperature	• Refer to the electrical circuit diagrams and test the LIN bus B circuit for short to ground, short to power, open circuit • Check and remove any obstruction in the rear temperature blend door • Refer to the electrical circuit diagrams and test the rear temperature distribution motor circuit for short to ground, short to power, open circuit

		blend door • Rear temperature distribution motor circuit short to ground, short to power, open circuit • Rear temperature blend door damaged • Rear temperature blend motor failure	• Install a new rear blend distribution door as necessary • Install a new rear temperature blend motor as necessary
B1B7B-49	Left Rear Air Blend Actuator - Internal electronic failure	• Rear temperature blend motor failure	• Install a new rear temperature blend motor as necessary
B1B7D-00	Rear Air Distribution Actuator - No sub type information	• LIN bus B circuit short to ground, power, open circuit • Foreign object obstructing rear air distribution door • Rear air distribution motor circuit short to ground, short to power, open circuit • Rear air distribution door damaged • Rear air distribution motor failure	• Refer to the electrical circuit diagrams and test the LIN bus B circuit for short to ground, short to power, open circuit • Check and remove any obstruction in rear air distribution door • Refer to the electrical circuit diagrams and test the rear air distribution motor circuit for short to ground, short to power, open circuit • Install a new rear air distribution door as necessary • Install a new rear air distribution motor as necessary
B1B7D-49	Rear Air Distribution Actuator - Internal electronic failure	• Rear air distribution motor failure	• Install a new rear distribution motor as necessary
B1B81-11	Rear Evaporator Temperature Sensor - Circuit short to ground	• Rear evaporator temperature sensor circuit short to ground • Rear evaporator temperature sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the rear evaporator temperature sensor circuit for short to ground • Install a new rear evaporator temperature sensor as necessary • Install a new automatic temperature control module as necessary
B1B81-15	Rear Evaporator Temperature Sensor - Circuit short to battery or open	• Rear evaporator temperature sensor circuit short to power, open circuit • Rear evaporator temperature sensor failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the rear evaporator temperature sensor circuit for short to power, open circuit • Install a new rear evaporator temperature sensor as necessary • Install a new automatic temperature control module as necessary
B1C0A-88	Rear Control panel - Bus off	• LIN bus B circuit short to ground, short to power, open circuit • Rear air distribution motor failure • Rear temperature blend motor	• Refer to the electrical circuit diagrams and test the LIN bus B circuit for short to ground, short to power, open circuit • Install a new rear air distribution motor as necessary • Install a new rear temperature blend motor as necessary • Install a new automatic temperature control module as necessary

		failure • Automatic temperature control module failure	
U0010-88	Medium Speed CAN Communication Bus - Bus off	• CAN circuit short to ground, short to power, open circuit	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the CAN network
U0140-87	Lost Communication With Body Control Module - Missing message	• Lost communication with the central junction box • CAN circuit short to ground, short to power, open circuit • Central junction box failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the power and ground connections to the central junction box. Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the CAN network • Install a new central junction box as necessary • Install a new automatic temperature control module as necessary
U0166-87	Lost Communication With Auxiliary Heater Control Module - Missing message	• Lost communication with the fuel fired booster heater • CAN circuit short to ground, short to power, open circuit • Fuel fired booster heater failure • Central junction box failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the power and ground connections to the fuel fired booster heater. Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the CAN network • Install a new fuel fired booster heater as necessary • Install a new central junction box as necessary • Install a new automatic temperature control module as necessary
U0256-87	Lost Communication With Front Controls Interface Module "A" - Missing message	• Lost communication with the integrated control panel • CAN circuit short to ground, short to power, open circuit • Integrated control panel failure • Central junction box failure • Automatic temperature control module failure	• Refer to the electrical circuit diagrams and test the power and ground connections to the integrated control panel. Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the CAN network • Install a new integrated control panel as necessary • Install a new central junction box as necessary • Install a new automatic temperature control module as necessary
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Central junction box not configured • Automatic temperature control module not configured • Automatic temperature control module failure	• Re-configure the central junction box using the manufacturer approved diagnostic system, clear DTC and re-test • Re-configure the automatic temperature control module using the manufacturer approved diagnostic system • Install a new automatic temperature control module as necessary
U0422-86	Invalid Data Received From Body Control Module - Signal invalid	• Car configuration file incorrect • Central junction box not configured • Automatic temperature	• Check that the car configuration file is correct • Re-configure the central junction box using the manufacturer approved diagnostic system • Clear the automatic temperature control module DTC and re-test • Install a new central junction box as necessary

		control module not configured • Central junction box failure	
U0425-86	Invalid Data Received From Auxiliary Heater Control Module - Signal invalid	• Fuel fired booster heater not configured • Fuel fired booster heater failure	• Re-configure the fuel fired booster heater using the manufacturer approved diagnostic system, clear DTC and re-test • Install a new fuel fired booster heater as necessary
U0557-86	Invalid Data Received From Front Controls Interface Module "A" - Signal invalid	• Integrated control panel not configured • Integrated control panel failure	• Re-configure the integrated control panel using the manufacturer approved diagnostic system, clear DTC and re-test • Install a new integrated control panel as necessary
U1A14-49	CAN Initialisation failure- Internal electronic failure	• CAN network fault • Automatic temperature control module failure	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and test the CAN network • Install a new automatic temperature control module as necessary
U3000-55	Control Module - Not configured	• Car configuration file incorrect • Central junction box not configured • Central junction box failure	• Check that the car configuration file is correct • Check that the VIN is correct. Re-configure the central junction box using the manufacturer approved diagnostic system, clear DTC and re-test • Re-configure the automatic temperature control module using the manufacturer approved diagnostic system • Install a new central junction box as necessary
U3000-87	Control Module - Missing message	• CAN link between the instrument cluster and the automatic temperature control module fault • Automatic temperature control module failure	• Test the instrument cluster for related DTCs and refer to the relevant DTC index • Install a new automatic temperature control module as necessary
U3002-81	Vehicle Identification Number - Invalid serial data received	• Central junction box not configured • Automatic temperature control module not configured • Automatic temperature control module failure	• Test the central junction box for related DTCs and refer to the relevant DTC index • Re-configure the central junction box using the manufacturer approved diagnostic system, clear DTC and re-test • Install a new automatic temperature control module as necessary

General Information - Diagnostic Trouble Code (DTC) Index DTC: Central Junction Box (CJB)

Description and Operation

Central Junction Box (CJB)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the warranty policy and procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system)

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the digital multimeter leads into account

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion

If diagnostic trouble codes are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals

Where an 'on demand self-test' is referred to, this can be accessed via the 'diagnostic trouble code monitor' tab on the manufacturers approved diagnostic system

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Central Junction Box (CJB), for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1009-51	Ignition Authorization - Not programmed	• Central junction box software invalid/incomplete	• Using the manufacturer approved diagnostic system, re-configure the central junction box with the latest level software
B1009-62	Ignition Authorization - Signal compare failure	NOTE: This DTC is only likely to occur following component replacement applications failing prior to completion • Central junction box fault • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, re-configure the central junction box with the latest level software • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1009-63	Ignition Authorization - Circuit/component protection time-out	NOTE: Only diagnose this DTC if the customer has reporting a starting fault	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open

		Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Instrument cluster internal failure • Central junction box internal failure • Battery voltage too low	circuit, high resistance
B1009-81	Ignition Authorization - Invalid serial data received	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Instrument cluster internal failure	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the instrument cluster for related DTCs and refer to the relevant DTC index
B100D-51	Column Lock Authorization - Not programmed	• Electric steering column lock control module software invalid/incomplete	• Using the manufacturer approved diagnostic system, re-configure the electric steering column lock control module with the latest level software
B100D-64	Column Lock Authorization - Signal plausibility failure	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	NOTE: Prior to clearing this DTC, carry out the Vehicle Functional Reset application using the manufacturer approved diagnostic system • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B100D-67	Column Lock Authorization - Signal incorrect after event	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B100D-81	Column Lock Authorization - Invalid serial data received	NOTE: This DTC is only likely to occur following component replacement applications failing prior to completion • Encrypted data exchange between instrument cluster and the central junction box does not match	NOTE: Prior to clearing this DTC, carry out the Vehicle Functional Reset application using the manufacturer approved diagnostic system • Using the manufacturer approved diagnostic system, re-configure the central junction box with the latest level software. If the fault persists, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B100D-87	Column Lock Authorization - Missing message	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B100D-96	Column Lock Authorization - Component internal failure	• Side load on steering (for example, wheel touching kerb) • Electric steering column lock power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Electric steering	NOTE: Prior to clearing this DTC, carry out the Vehicle Functional Reset application using the manufacturer approved diagnostic system • Check that there is no side load on the steering • Refer to the electrical circuit diagrams and test the electric steering column lock power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short

		column lock internal failure	circuit to ground, short circuit to power, open circuit, high resistance • If the fault persists, install a new electric steering column lock
B1024-83	Start Control Unit - Value of signal protection calculation incorrect	• Central junction box internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new central junction box
B1024-87	Start Control Unit - Missing message	• Central junction box internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new central junction box
B1026-11	Steering Column Lock - Circuit short to ground	NOTE: Circuit reference POWER • Electric steering column lock circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the electric steering column lock circuit for short circuit to ground
B102B-67	Passive Key - Signal incorrect after event	• Central junction box fault • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Keyless vehicle module fault	• Using the manufacturer approved diagnostic system, re-configure the central junction box with the latest level software • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the keyless vehicle module for related DTCs and refer to the relevant DTC index
B102B-87	Passive Key - Missing message	• Confirm placement of the smart key within the vehicle • Keyless vehicle module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Smart key battery low/battery contact issue • Interference from spurious RF signal • Serial data circuit short circuit to ground, short circuit to power, open circuit, high resistance	NOTE: The action below is only required if this DTC and DTC B1B01-87 have been stored, or vehicle start issue has been reported • Check whereabouts of keys, including spare and confirm correct functionality • Refer to the electrical circuit diagrams and test the keyless vehicle module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Install a new smart key battery as necessary • Check vehicle surroundings for possible sources of interference, move vehicle and retest • Refer to the electrical circuit diagrams and test the serial data circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1046-23	Front Fog Lamp Control Switch - Signal stuck low	NOTE: This DTC will set if the switch is active for more than 60 seconds • Front fog lamp switch circuit short circuit to ground • Front fog lamp switch stuck active	• Refer to the electrical circuit diagrams and test the front fog lamp switch circuit for short circuit to ground • Test the operation of the front fog lamp switch. Install a new front fog lamp switch as necessary
B1047-23	Rear Fog Lamp Control Switch - Signal stuck low	NOTE: This DTC will set if the switch is active for more than 60 seconds • Rear fog lamp switch circuit short circuit to ground • Rear fog lamp switch stuck active	• Refer to the electrical circuit diagrams and test the rear fog lamp switch circuit for short circuit to ground • Test the operation of the rear fog lamp switch. Install a new rear fog lamp switch as necessary

B1051-23	Front Washer Switch - Signal stuck low	 NOTE: This DTC will set if the switch is active for more than 60 seconds • Front washer switch circuit short circuit to ground • Front washer switch stuck active	• Refer to the electrical circuit diagrams and test the front washer switch circuit for short circuit to ground • Test the operation of the front washer switch. Install a new front washer switch as necessary
B1052-23	Rear Washer Switch - Signal stuck low	 NOTE: This DTC will set if the switch is active for more than 60 seconds • Rear washer switch circuit short circuit to ground • Rear washer switch stuck active	• Refer to the electrical circuit diagrams and test the rear washer switch circuit for short circuit to ground • Test the operation of the rear washer switch. Install a new rear washer switch as necessary
B1087-86	LIN Bus "A" - Signal invalid	• Clock power or ground circuit open circuit, high resistance • Steering wheel left switchpack power or ground circuit open circuit, high resistance • LIN bus A circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the clock power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the steering wheel left switchpack power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the LIN bus A circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1087-88	LIN Bus "A" - Bus off	• LIN bus A circuit short circuit to ground, short circuit to power, open circuit, high resistance - Analogue clock - Steering wheel left switchpack	• Refer to the electrical circuit diagrams and test the LIN bus A circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1088-86	LIN Bus "B" - Signal invalid	• Rain/light sensor power or ground circuit open circuit, high resistance • Battery back-up sounder power or ground circuit open circuit, high resistance • Volumetric sensor power or ground circuit open circuit, high resistance • LIN bus A circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the rain/light sensor power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the battery back-up sounder power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the volumetric sensor power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the LIN bus B circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1088-88	LIN Bus "B" - Bus off	• LIN bus B circuit short circuit to ground, short circuit to power, open circuit, high resistance - Rain/light sensor - Battery back-up sounder - Volumetric sensor	• Refer to the electrical circuit diagrams and test the LIN bus B circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B108B-11	Start Button Circuit "A" - Circuit short to ground	 NOTE: Circuit reference SW1 • Stop/start switch circuit 1 short circuit	• Refer to the electrical circuit diagrams and test the stop/start switch circuit 1 for short circuit to ground

		to ground	
B108B-12	Start Button Circuit "A" - Circuit short to battery	 NOTE: Circuit reference SW1 • Stop/start switch circuit 1 short circuit to power	• Refer to the electrical circuit diagrams and test the stop/start switch circuit 1 for short circuit to power
B108B-13	Start Button Circuit "A" - Circuit open	 NOTE: Circuit reference SW1 • Stop/start switch circuit 1 open circuit, high resistance	• Refer to the electrical circuit diagrams and test the stop/start switch circuit 1 for open circuit, high resistance
B108B-23	Start Button Circuit "A" - Signal stuck low	NOTES:  Circuit reference SW1  This DTC will set if the switch is active for more than 30 seconds • Stop/start switch circuit 1 short circuit to ground • Stop/start switch stuck active	• Refer to the electrical circuit diagrams and test the stop/start switch circuit 1 for short circuit to ground • Test the operation of the stop/start switch. Install a new stop/start switch as necessary
B108C-11	Start Button Circuit "B" - Circuit short to ground	 NOTE: Circuit reference SW2 • Stop/start switch circuit 2 short circuit to ground	• Refer to the electrical circuit diagrams and test the stop/start switch circuit 2 for short circuit to ground
B108C-12	Start Button Circuit "B" - Circuit short to battery	 NOTE: Circuit reference SW2 • Stop/start switch circuit 2 short circuit to power	• Refer to the electrical circuit diagrams and test the stop/start switch circuit 2 for short circuit to power
B108C-13	Start Button Circuit "B" - Circuit open	 NOTE: Circuit reference SW2 • Stop/start switch circuit 2 open circuit, high resistance	• Refer to the electrical circuit diagrams and test the stop/start switch circuit 2 for open circuit, high resistance
B108C-23	Start Button Circuit "B" - Signal stuck low	NOTES:  Circuit reference SW2  This DTC will set if the switch is active for more than 30 seconds • Stop/start switch circuit 2 short circuit to ground • Stop/start switch stuck active	• Refer to the electrical circuit diagrams and test the stop/start switch circuit 2 for short circuit to ground • Test the operation of the stop/start switch. Install a new stop/start switch as necessary
B1095-11	Wiper On/Off Relay - Circuit short to ground	 NOTE: Circuit reference FR WIPER ON/OFF • Wiper on/off relay circuit short circuit to	• Refer to the electrical circuit diagrams and test the wiper on/off relay circuit for short circuit to ground

		ground	
B1095-12	Wiper On/Off Relay - Circuit short to battery	NOTE: Circuit reference FR WIPER ON/OFF • Wiper on/off relay circuit short circuit to power	• Refer to the electrical circuit diagrams and test the wiper on/off relay circuit for short circuit to power
B1095-13	Wiper On/Off Relay - Circuit open	NOTE: Circuit reference FR WIPER ON/OFF • Wiper on/off relay circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the wiper on/off relay circuit for open circuit, high resistance
B1096-11	Wiper High/Low Relay - Circuit short to ground	NOTE: Circuit reference FR WIPER SLOW/FAST • Wiper fast/slow relay circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the wiper fast/slow relay circuit for short circuit to ground
B1096-12	Wiper High/Low Relay - Circuit short to battery	NOTE: Circuit reference FR WIPER SLOW/FAST • Wiper fast/slow relay circuit short circuit to power	• Refer to the electrical circuit diagrams and test the wiper fast/slow relay circuit for short circuit to power
B1096-13	Wiper High/Low Relay - Circuit open	NOTE: Circuit reference FR WIPER SLOW/FAST • Wiper fast/slow relay circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the wiper fast/slow relay circuit for open circuit, high resistance
B1097-11	Heated Windshield Relay - Circuit short to ground	• Heated windshield relay circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the heated windshield relay circuit for short circuit to ground
B1097-12	Heated Windshield Relay - Circuit short to battery	• Heated windshield relay circuit short circuit to power	• Refer to the electrical circuit diagrams and test the heated windshield relay circuit for short circuit to power
B1097-13	Heated Windshield Relay - Circuit open	• Heated windshield relay circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the heated windshield relay circuit for open circuit, high resistance
B109E-51	Remote Keyless Entry - Not programmed	• Keyless vehicle module not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the keyless vehicle module with the latest level software
B10A2-31	Crash Input - No signal	• Invalid crash signal received from restraints control module	• Using the manufacturer approved diagnostic system, check the restraints control module for related DTCs and refer to the relevant DTC index
B10A2-38	Crash Input - Signal frequency incorrect	• Invalid crash signal received from restraints control module	• Using the manufacturer approved diagnostic system, check the restraints control module for related DTCs and refer to the relevant DTC index
B10AB-51	Remote Keyless Entry Synchronization - Not programmed	• Keyless vehicle module not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the keyless vehicle module with the latest level software
B10AD-09	Rain Sensor - Component failures	• Rain/light sensor power or ground circuit open circuit, high resistance • Rain/light sensor obscured • Rain/light sensor incorrectly installed • Rain/light sensor	• Refer to the electrical circuit diagrams and test the rain/light sensor power and ground circuits for open circuit, high resistance • Check that the rain/light sensor is not obscured • Check the rain/light sensor installation • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rain/light sensor

		internal failure	
B10AD-83	Rain Sensor - Value of signal protection calculation incorrect	• Rain/light sensor power or ground circuit open circuit, high resistance • Rain/light sensor internal failure	• Refer to the electrical circuit diagrams and test the rain/light sensor power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rain/light sensor
B10AD-87	Rain Sensor - Missing message	• Rain/light sensor power or ground circuit open circuit, high resistance • LIN bus B circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the rain/light sensor power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the LIN bus B circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B10AD-96	Rain Sensor - Component internal failure	• Rain/light sensor internal failure	• Using the manufacturer approved diagnostic system, clear the DTC. If the fault persists, install a new rain/light sensor
B10E5-11	PCM Wake-Up Signal - Circuit short to ground	• Engine control module wake-up signal circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the engine control module wake-up signal circuit for short circuit to ground
B10F2-4B	Sunroof Control - Over temperature	• Roof opening panel movement restricted by debris or damage • Roof opening panel temperature sensor not calibrated/defective	• Test the roof opening panel for smooth operation. If the fault persists, install a new roof opening panel control module • Install a new roof opening panel motor as necessary
B10F2-74	Sunroof Control - Actuator slipping	• Roof opening panel control motor slipping due to mechanical failure	• Remove the roof opening panel motor and inspect the cables and mechanism. Test the roof opening panel for smooth operation and obstructions that would cause the motor to slip. Install a new roof opening panel motor as necessary
B10F2-93	Sunroof Control - No operation	• Roof opening panel control module power or ground circuit open circuit, high resistance • LIN bus 3 circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the roof opening panel control module power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the LIN bus 3 circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B10F2-9A	Sunroof Control - Component or system operating conditions	NOTE: This DTC may be set if the roof opening panel is operated excessively • Roof opening panel motor time out	• Allow the roof opening panel motor to cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest
B10F8-11	Accessory Socket 'A' Relay - Circuit short to ground	• Accessory relay A circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the accessory relay A circuit for short circuit to ground
B10F8-12	Accessory Socket 'A' Relay - Circuit short to battery	• Accessory relay A circuit short circuit to power	• Refer to the electrical circuit diagrams and test the accessory relay A circuit for short circuit to power
B10F8-13	Accessory Socket 'A' Relay - Circuit open	• Accessory relay A circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the accessory relay A circuit for open circuit, high resistance
B10F9-11	Accessory Socket 'B' Relay - Circuit short to ground	• Accessory relay B circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the accessory relay B circuit for short circuit to ground
B10F9-12	Accessory Socket 'B' Relay - Circuit short to battery	• Accessory relay B circuit short circuit to power	• Refer to the electrical circuit diagrams and test the accessory relay B circuit for short circuit to power
B10F9-	Accessory Socket 'B'	• Accessory relay B	• Refer to the electrical circuit diagrams and test

13	Relay - Circuit open	circuit open circuit, high resistance	the accessory relay B circuit for open circuit, high resistance
B1102-11	Trailer Stop Lamp - Circuit short to ground	• Trailer stop lamp circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the trailer stop lamp circuit for short circuit to ground
B1115-11	High Mounted Stop Lamp Control - Circuit short to ground	• High mounted stop lamp circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the high mounted stop lamp circuit for short circuit to ground
B112B-83	Steering Wheel Module - Value of signal protection calculation incorrect	• An internal memory checksum error in the steering wheel switchpack has been detected by the central junction box	• Check the steering wheel switchpack functions to localize the failure. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new steering wheel left switchpack
B112B-87	Steering Wheel Module - Missing message	NOTE: Circuit reference LIN 1 • Steering wheel left switchpack power or ground circuit open circuit, high resistance • LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Steering wheel left switchpack internal failure	• Refer to the electrical circuit diagrams and test the steering wheel left switchpack power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new steering wheel left switchpack
B112B-96	Steering Wheel Module - Component internal failure	• Steering wheel left switchpack internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new steering wheel left switchpack
B112C-83	Interior Motion Sensor - Value of signal protection calculation incorrect	• Volumetric sensor internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new volumetric sensor
B112C-87	Interior Motion Sensor - Missing message	NOTE: Circuit reference BBS LIN • Volumetric sensor power or ground circuit open circuit, high resistance • LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Volumetric sensor internal failure	• Refer to the electrical circuit diagrams and test the volumetric sensor power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new volumetric sensor
B112C-96	Interior Motion Sensor - Component internal failure	• Volumetric sensor internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new volumetric sensor
B113E-23	External Boot/Trunk Release Switch - Signal stuck low	NOTE: This DTC will set if the switch is active for more than 60 seconds • Upper tailgate release switch circuit short circuit to ground • Upper tailgate release switch stuck active	• Refer to the electrical circuit diagrams and test the upper tailgate release switch circuit for short circuit to ground • Test the operation of the upper tailgate release switch. Install a new upper tailgate release switch as necessary
B1140-11	Engine Crank Authorization - Circuit short to ground	NOTE: Circuit reference CRANK • Engine crank signal	• Refer to the electrical circuit diagrams and test the engine crank signal circuit for short circuit to ground

		circuit short circuit to ground	
B1140-15	Engine Crank Authorization - Circuit short to battery or open	 NOTE: Circuit reference CRANK • Engine crank signal circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the engine crank signal circuit for short circuit to power, open circuit, high resistance
B1146-11	Passive Sounder Supply - Circuit short to ground	• Passive sounder circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the passive sounder circuit for short circuit to ground
B1146-15	Passive Sounder Supply - Circuit short to battery or open	• Passive sounder circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the passive sounder circuit for short circuit to battery, open circuit, high resistance
B1182-51	Tire Pressure Monitoring System - Not programmed	• No action, no customer symptom	• No action required
B11D1-86	LIN Bus "C" - Signal invalid	 NOTE: Circuit reference LIN3 • Roof opening panel control module LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the roof opening panel control module LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B11D1-88	LIN Bus "C" - Bus off	 NOTE: Circuit reference LIN3 • Roof opening panel control module LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the roof opening panel control module LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B11D9-92	Vehicle Battery - Performance or incorrect operation	• Battery monitoring system control module internal failure	• Install a new battery monitoring system control module as necessary
B11DB-49	Battery Monitoring Module - Internal electronic failure	• Battery monitoring system control module internal failure	• Install a new battery monitoring system control module as necessary
B11DB-83	Battery Monitoring Module - Value of signal protection calculation incorrect	• Battery monitoring system control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new battery monitoring system control module
B11DB-87	Battery Monitoring Module - Missing message	 NOTE: This DTC is inhibited if the car configuration file is correct • Battery monitoring system control module power or ground circuit open circuit, high resistance • Battery monitoring system control module LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Battery monitoring system control module internal failure	• Refer to the electrical circuit diagrams and test the battery monitoring system control module power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the battery monitoring system control module LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new battery monitoring system control module

B123A-11	Left Front Turn Indicator - Circuit short to ground	Left front turn signal indicator circuit short circuit to ground	Refer to the electrical circuit diagrams and test the left front turn signal indicator circuit for short circuit to ground
B123A-15	Left Front Turn Indicator - Circuit short to battery or open	• Left front turn signal indicator circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the left front turn signal indicator circuit for short circuit to battery, open circuit, high resistance
B123B-11	Right Front Turn Indicator - Circuit short to ground	• Right front turn signal indicator circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the right front turn signal indicator circuit for short circuit to ground
B123B-15	Right Front Turn Indicator - Circuit short to battery or open	• Right front turn signal indicator circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the right front turn signal indicator circuit for short circuit to battery, open circuit, high resistance
B1247-11	Left Rear Turn Indicator - Circuit short to ground	• Left rear turn signal indicator circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the left rear turn signal indicator circuit for short circuit to ground
B1247-15	Left Rear Turn Indicator - Circuit short to battery or open	• Left rear turn signal indicator circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the left rear turn signal indicator circuit for short circuit to battery, open circuit, high resistance
B1248-11	Right Rear Turn Indicator - Circuit short to ground	• Right rear turn signal indicator circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the right rear turn signal indicator circuit for short circuit to ground
B1248-15	Right Rear Turn Indicator - Circuit short to battery or open	• Right rear turn signal indicator circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the right rear turn signal indicator circuit for short circuit to battery, open circuit, high resistance
B124A-11	Right Daytime Running Light - Circuit short to ground	• Right daytime running light circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the right daytime running light circuit for short circuit to ground
B124A-15	Right Daytime Running Light - Circuit short to power or open circuit	• Right daytime running light circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the right daytime running light circuit for short circuit to power, open circuit, high resistance
B124B-11	Left Daytime Running Light - Circuit short to ground	• Left daytime running light circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the left daytime running light circuit for short circuit to ground
B124B-15	Left Daytime Running Light - Circuit short to power or open circuit	• Left daytime running light circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the left daytime running light circuit for short circuit to power, open circuit, high resistance
B1298-73	Steering Column Adjust Up Switch - Actuator stuck closed	• Steering column adjust switch internal failure - Tilt up switch stuck active	• Test the operation of the steering column adjust switch. Install a new steering column adjust switch as necessary
B1299-73	Steering Column Adjust Down Switch - Actuator stuck closed	• Steering column adjust switch internal failure - Tilt down switch stuck active	• Test the operation of the steering column adjust switch. Install a new steering column adjust switch as necessary
B129A-86	LIN Bus "D" - Signal invalid	• Immobilizer antenna unit LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the immobilizer antenna unit LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B129A-88	LIN Bus "D" - Bus off	• Immobilizer antenna unit LIN bus circuit short circuit to	• Refer to the electrical circuit diagrams and test the immobilizer antenna unit LIN bus circuit for short circuit to ground, short circuit to power,

		ground, short circuit to power, open circuit, high resistance	open circuit, high resistance
B12A1-73	Steering Column Adjust Out Switch - Actuator stuck closed	• Steering column adjust switch internal failure - Reach out switch stuck active	• Test the operation of the steering column adjust switch. Install a new steering column adjust switch as necessary
B12A2-73	Steering Column Adjust In Switch - Actuator stuck closed	• Steering column adjust switch internal failure - Reach in switch stuck active	• Test the operation of the steering column adjust switch. Install a new steering column adjust switch as necessary
B12A3-11	Steering Column Adjust Motor Drive A - Circuit short to ground	• Steering column adjust motor drive A circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the steering column adjust motor drive A circuit for short circuit to ground
B12A3-15	Steering Column Adjust Motor Drive A - Circuit short to battery or open	• Steering column adjust motor drive A circuit short to power or open circuit • Motor fault	• Refer to the electrical circuit diagrams and check the circuit between the steering column adjust motor and the central junction box. If no circuit faults are evident, suspect the steering column adjust motor
B12A4-11	Steering Column Adjust Motor Drive B - Circuit short to ground	• Steering column adjust motor drive B circuit short to ground • Motor fault	• Refer to the electrical circuit diagrams and check the circuit between the steering column adjust motor and the central junction box. If no circuit faults are evident, suspect the steering column adjust motor
B12A4-15	Steering Column Adjust Motor Drive B - Circuit short to battery or open	• Steering column adjust motor drive B circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the steering column adjust motor drive B circuit for short circuit to power, open circuit, high resistance
B12C9-86	LIN Bus "E" - Signal invalid	• Battery monitoring system control module LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the battery monitoring system control module LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B12C9-88	LIN Bus "E" - Bus off	• Battery monitoring system control module LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the battery monitoring system control module LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B12E8-23	Liftgate/Tailgate Control/Release Switch - Signal stuck low	NOTE: This DTC will set if the switch is active for more than 60 seconds • Lower tailgate release switch circuit short circuit to ground • Lower tailgate release switch stuck active	• Refer to the electrical circuit diagrams and test the lower tailgate release switch circuit for short circuit to ground • Test the operation of the lower tailgate release switch. Install a new lower tailgate release switch as necessary
B12EE-11	Tailgate/Trunk Release - Circuit short to ground	• Upper tailgate release actuator circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the upper tailgate release actuator circuit for short circuit to ground
B12EE-15	Tailgate/Trunk Release - Circuit short to battery or open	• Upper tailgate release actuator circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the upper tailgate release actuator circuit for short circuit to power, open circuit, high resistance
B12F3-11	Secondary Tailgate Release - Circuit short to ground	• Lower tailgate release actuators circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the lower tailgate release actuators circuit for short circuit to ground
B12F3-	Secondary Tailgate	• Lower tailgate release	• Refer to the electrical circuit diagrams and test

15	Release - Circuit short to battery or open	actuators circuit short circuit to power, open circuit, high resistance	the lower tailgate release actuators circuit for short circuit to power, open circuit, high resistance
B12F4-12	Vehicle Speed Output - Circuit short to battery	• Vehicle speed signal circuit short circuit to power	• Refer to the electrical circuit diagrams and test the vehicle speed signal circuit for short circuit to power
B12F5-12	Fridge Relay Control - Circuit short to battery	• Fridge relay circuit short circuit to power	• Refer to the electrical circuit diagrams and test the fridge relay circuit for short circuit to power
B12FA-11	Power Steering Solenoid Control A - Circuit short to ground	 NOTE: Circuit reference Solenoid valve + • Servotronic valve circuit short circuit to ground	 NOTE: This DTC does NOT apply to L319 Discovery • Refer to the electrical circuit diagrams and test the servotronic valve circuit for short circuit to ground
B12FA-13	Power Steering Solenoid Control A - Circuit open	 NOTE: Circuit reference Solenoid valve + • Servotronic valve circuit open circuit, high resistance	 NOTE: This DTC does NOT apply to L319 Discovery • Refer to the electrical circuit diagrams and test the servotronic valve circuit for open circuit, high resistance
B12FB-12	Power Steering Solenoid Control B - Circuit short to battery	 NOTE: Circuit reference Solenoid valve - • Servotronic valve circuit short circuit to power	 NOTE: This DTC does NOT apply to L319 Discovery • Refer to the electrical circuit diagrams and test the servotronic valve circuit for short circuit to power
B12FB-14	Power Steering Solenoid Control B - Circuit short to ground or open	 NOTE: Circuit reference Solenoid valve - • Servotronic valve circuit short circuit to ground, open circuit, high resistance (customer may complain of heavy steering or variable steering effort required)	NOTES:  This DTC does NOT apply to L319 Discovery  This DTC will not be logged during an on demand self-test routine. The DTC is only logged if the fault is noted continuously for over two seconds, during the on demand self-test routine the output from the servotronic valve is only monitored for a one second duration • Refer to the electrical circuit diagrams and check the servotronic valve circuit for short circuit to ground, open circuit, high resistance (note, the fault may be an intermittent one). Repair circuit as required, clear DTC and retest
B12FB-1F	Power Steering Solenoid Control B - Circuit intermittent	 NOTE: Circuit reference Solenoid valve - • Servotronic valve circuit - Short circuit to ground, short circuit to power, open circuit, high resistance (customer may complain of heavy steering or variable steering effort required)	 NOTE: This DTC does NOT apply to L319 Discovery • Refer to the electrical circuit diagrams and check the servotronic valve circuit for short circuit to ground, short circuit to power, open circuit, high resistance (note, the fault may be an intermittent one). Repair circuit as required, clear DTC and retest
B130B-11	Right Rear Fog Lamp - Circuit short to ground	• Rear right fog lamp circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the rear right fog lamp circuit for short circuit to ground
B130B-15	Right Rear Fog Lamp - Circuit short to battery or open	• Rear right fog lamp circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the rear right fog lamp circuit for short circuit to battery, open circuit, high resistance
B130E-11	Left Rear Fog Lamp - Circuit short to	• Rear left fog lamp circuit short circuit to	• Refer to the electrical circuit diagrams and test the rear left fog lamp circuit for short circuit to

	ground	ground	ground
B130E-15	Left Rear Fog Lamp - Circuit short to battery or open	• Rear left fog lamp circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the rear left fog lamp circuit for short circuit to battery, open circuit, high resistance
B1311-83	Clock Module - Value of signal protection calculation incorrect	 NOTE: Circuit reference LIN1 • Clock power or ground circuit open circuit, high resistance • Clock LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Clock internal failure	• Refer to the electrical circuit diagrams and test the clock power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the clock LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new clock
B1311-87	Clock Module - Missing message	 NOTE: Circuit reference LIN1 • Clock power or ground circuit open circuit, high resistance • Clock LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Clock internal failure	• Refer to the electrical circuit diagrams and test the clock power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and test the clock LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new clock
B1311-96	Clock Module - Component internal failure	• Clock internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new clock
B134E-11	Switch Illumination Adjustment Control - Circuit short to ground	• Switch illumination adjustment circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the switch illumination adjustment circuit for short circuit to ground
B134E-12	Switch Illumination Adjustment Control - Circuit short to battery	• Switch illumination adjustment circuit short circuit to power	• Refer to the electrical circuit diagrams and test the switch illumination adjustment circuit for short circuit to power
B134E-13	Switch Illumination Adjustment Control - Circuit open	• Switch illumination adjustment circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the switch illumination adjustment circuit for open circuit, high resistance
B134F-23	Headlamp Flash Switch - Signal stuck low	 NOTE: This DTC will set if the switch is active for more than 60 seconds • Headlamp flash switch circuit short circuit to ground • Headlamp flash switch stuck active	• Refer to the electrical circuit diagrams and test the headlamp flash switch circuit for short circuit to ground • Test the operation of the headlamp flash switch. Install a new headlamp flash switch as necessary
B136A-11	Heated Washer Jet/Nozzle Output Control - Circuit short to ground	• Heated washer jet circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the heated washer jet circuit for short circuit to ground
B136A-12	Heated Washer Jet/Nozzle Output Control - Circuit short to battery	• Heated washer jet circuit short circuit to power	• Refer to the electrical circuit diagrams and test the heated washer jet circuit for short circuit to power
B136A-13	Heated Washer Jet/Nozzle Output Control - Circuit open	• Heated washer jet circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the heated washer jet circuit for open circuit, high resistance
B136B-11	Suspension Control Module Wake-up Signal - Circuit short to ground	• Air suspension control module wake-up signal circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the air suspension control module wake-up signal circuit for short circuit to ground

B136B-15	Suspension Control Module Wake-up Signal - Circuit short to battery or open	• Air suspension control module wake-up signal circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the air suspension control module wake-up signal circuit for short circuit to battery, open circuit, high resistance
B1A75-11	Fuel sender No.1 - Circuit short to ground	NOTE: Circuit reference ACTIVE • Fuel level sensor A circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the fuel level sensor A circuit for short circuit to ground
B1A75-15	Fuel sender No.1 - Circuit short to battery or open	NOTE: Circuit reference ACTIVE • Fuel level sensor A circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the fuel level sensor A circuit for short circuit to battery, open circuit, high resistance
B1A75-1C	Fuel sender No.1 - Circuit voltage out of range	NOTE: Circuit reference ACTIVE • Fuel level sensor A circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the fuel level sensor A circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1A76-11	Fuel sender No.2 - Circuit short to ground	NOTE: Circuit reference PASSIVE • Fuel level sensor B circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the fuel level sensor B circuit for short circuit to ground
B1A76-15	Fuel sender No.2 - Circuit short to battery or open	NOTE: Circuit reference PASSIVE • Fuel level sensor B circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the fuel level sensor B circuit for short circuit to battery, open circuit, high resistance
B1A76-1C	Fuel sender No.2 - Circuit voltage out of range	NOTE: Circuit reference PASSIVE • Fuel level sensor B circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the fuel level sensor B circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1A84-51	Car Configuration Data - Not programmed	• Central junction box not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the central junction box with the latest level software
B1A85-96	Ambient Light Sensor - Component internal failure	• Rain/light sensor obscured • Rain/light sensor incorrectly installed • Rain/light sensor internal failure	• Check that the rain/light sensor is not obscured • Check the rain/light sensor installation • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rain/light sensor
B1A91-31	Speed/Position Sensor A - No signal	• Roof opening panel control module power or ground circuit open circuit, high resistance • Roof opening panel control module LIN bus circuit short circuit to ground, short	• Refer to the electrical circuit diagrams and test the roof opening panel control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the roof opening panel control module LIN bus circuit for short circuit to ground, short circuit to

		circuit to power, open circuit, high resistance • Roof opening panel position sensor A signal failure	power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new roof opening panel motor
B1A92-31	Speed/Position Sensor B - No signal	• Roof opening panel control module power or ground circuit open circuit, high resistance • Roof opening panel control module LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Roof opening panel position sensor B signal failure	• Refer to the electrical circuit diagrams and test the roof opening panel control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the roof opening panel control module LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new roof opening panel motor
B1B01-55	Key Transponder - Not configured	• Keyless vehicle module not configured	• Using the manufacturer approved diagnostic system, configure the keyless vehicle module
B1B01-64	Key Transponder - Signal plausibility failure	• Keyless vehicle module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Keyless vehicle module ID not synchronised	• Refer to the electrical circuit diagrams and test the keyless vehicle module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, re-configure the keyless vehicle module as a new module
B1B01-81	Key Transponder - Invalid serial data received	• Keyless vehicle module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Keyless vehicle module ID not synchronised	• Refer to the electrical circuit diagrams and test the keyless vehicle module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, re-configure the keyless vehicle module as a new module
B1B01-87	Key Transponder - Missing message	NOTE: This DTC may be set if the engine start switch is operated without a valid smart key present • Keyless vehicle module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Keyless vehicle module ID not synchronised	• Refer to the electrical circuit diagrams and test the keyless vehicle module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, re-configure the keyless vehicle module as a new module
B1B33-51	Target ID Transfer - Not programmed	• A new engine control module has been installed	• Using the manufacturer approved diagnostic system, re-configure the engine control module with the latest level software
B1B33-64	Target ID Transfer - Signal plausibility failure	• Invalid signal received from engine control module	• No action necessary, clear/ignore DTC
B1B33-81	Target ID Transfer - Invalid serial data received	• Invalid serial data received from engine control module	• No action necessary, clear/ignore DTC
B1B33-	Target ID Transfer -		• Using the manufacturer approved diagnostic

87	Missing message	NOTE: Only diagnose this DTC if the customer has reporting a starting fault • Invalid message received from engine control module	system, clear the DTCs and retest. If the fault persists, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1B56-46	Sunroof Module - Calibration/parameter memory failure	• Roof opening panel control module LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Central junction box software • Roof opening panel not initialized • Roof opening panel control module internal failure	• Refer to the electrical circuit diagrams and test the roof opening panel control module LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, re-configure the central junction box with the latest level software • Refer to the relevant section of the workshop manual and perform - Manual Roof Opening Panel Initialization • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new roof opening panel control module
B1B56-83	Sunroof Module - Value of signal protection calculation incorrect	• Roof opening panel control module LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Central junction box software • Roof opening panel not initialized • Roof opening panel control module internal failure	• Refer to the electrical circuit diagrams and test the roof opening panel control module LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, re-configure the central junction box with the latest level software • Refer to the relevant section of the workshop manual and perform - Manual Roof Opening Panel Initialization • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new roof opening panel control module
B1B56-87	Sunroof Module - Missing message	NOTES: This DTC is inhibited if the car configuration file is correct Circuit reference LIN3 • Roof opening panel control module LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the roof opening panel control module LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1C32-11	Steering Column Tilt Solenoid - Circuit short to ground	• Steering column tilt solenoid circuit short circuit to ground	NOTE: This component is a serviceable item • Refer to the electrical circuit diagrams and test the steering column tilt solenoid circuit for short circuit to ground
B1C32-15	Steering Column Tilt Solenoid - Circuit short to power or open circuit	• Steering column tilt solenoid circuit short circuit to battery, open circuit, high resistance	NOTE: This component is a serviceable item • Refer to the electrical circuit diagrams and test the steering column tilt solenoid circuit for short circuit to battery, open circuit, high resistance
B1C33-12	Steering Column Tilt Feedback Signal - Circuit short to power	• Steering column tilt position sensor circuit short circuit to power	• Refer to the electrical circuit diagrams and test the steering column tilt position sensor circuit for short circuit to power
B1C33-14	Steering Column Tilt Feedback Signal - Circuit short to ground or open circuit	• Steering column tilt position sensor circuit short circuit to ground, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the steering column tilt position sensor circuit for short circuit to ground, open circuit, high resistance

B1C34-11	Steering Column Telescopic Solenoid - Circuit short to ground	Steering column reach solenoid circuit short circuit to ground	NOTE: This component is a serviceable item • Refer to the electrical circuit diagrams and test the steering column reach solenoid circuit for short circuit to ground
B1C34-15	Steering Column Telescopic Solenoid - Circuit short to power or open circuit	• Steering column reach solenoid circuit short circuit to battery, open circuit, high resistance	NOTE: This component is a serviceable item • Refer to the electrical circuit diagrams and test the steering column reach solenoid circuit for short circuit to battery, open circuit, high resistance
B1C35-12	Steering Column Telescopic Feedback Signal - Circuit short to power	• Steering column reach position sensor circuit short circuit to power	• Refer to the electrical circuit diagrams and test the steering column reach position sensor circuit for short circuit to power
B1C35-14	Steering Column Telescopic Feedback Signal - Circuit short to ground or open circuit	• Steering column reach position sensor circuit short circuit to ground, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the steering column reach position sensor circuit for short circuit to ground, open circuit, high resistance
B1C36-11	Steering Column Adjust Switch - Circuit short to ground	• Steering column adjust switch circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the steering column adjust switch circuit for short circuit to ground
B1C37-23	Master Lock Switch Stuck - Signal stuck low	NOTE: This DTC will set if the switch is active for more than 60 seconds • Interior central locking lock switch circuit short circuit to ground • Interior central locking lock switch stuck active	• Refer to the electrical circuit diagrams and test the interior central locking lock switches circuits for short circuit to ground • Test the operation of the interior central locking lock switches. Install a new interior central locking switch as necessary
B1C38-23	Master Unlock Switch Stuck - Signal stuck low	NOTE: This DTC will set if the switch is active for more than 60 seconds • Interior central locking unlock switch circuit short circuit to ground • Interior central locking unlock switch stuck active	• Refer to the electrical circuit diagrams and test the interior central locking unlock switches circuits for short circuit to ground • Test the operation of the interior central locking unlock switches. Install a new interior central locking switch as necessary
B1C43-23	Master Interior Lamp Switch Stuck - Signal stuck low	NOTE: This DTC will set if the switch is active for more than 60 seconds • Interior lamp switch circuit short circuit to ground • Interior lamp switch stuck active	• Refer to the electrical circuit diagrams and test the interior lamp switch circuit for short circuit to ground • Test the operation of the interior lamp switch. Install a new interior lamp as necessary
B1C44-67	Rear Wiper Park Position Switch Stuck - Signal incorrect after event	• Rear wiper park position switch circuit short circuit to power, short circuit to ground, open circuit	• Ensure motor/mechanism is not jammed or seized. Refer to the electrical circuit diagrams and test the rear wiper park position switch circuit for short circuit to ground. Install a new rear wiper motor as necessary
B1C45-67	Front Wiper Park Position Switch Stuck - Signal incorrect after event	• Front wiper park position switch circuit short circuit to power, short circuit to ground, open circuit	• Ensure motor/mechanism is not jammed or seized. Refer to the electrical circuit diagrams and test the front wiper park position switch circuit for short circuit to ground. Install a new front wiper motor as necessary
B1C53-29	Front Wiper Intermittent Data - Signal invalid	NOTE: Circuit reference DATA 1 / DATA 2 / DATA 3	• Refer to the electrical circuit diagrams and test the Front wiper variable intermittent wipe switch circuits for short circuit to ground, short circuit to power, open circuit, high resistance

		• Front wiper variable intermittent wipe switch circuits short circuit to ground, short circuit to power, open circuit, high resistance	
B1C55-12	Horn Relay - Circuit short to battery	NOTE: Circuit reference HORN • Horn relay / horn switch circuits short circuit to power	• Refer to the electrical circuit diagrams and test the horn relay / horn switch circuits for short circuit to power
B1C77-11	Rear Wiper Relay - Circuit short to ground	NOTE: Circuit reference REAR WIPER • Rear wiper relay circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the rear wiper relay circuit for short circuit to ground
B1C77-12	Rear Wiper Relay - Circuit short to battery	NOTE: Circuit reference REAR WIPER • Rear wiper relay circuit short circuit to power	• Refer to the electrical circuit diagrams and test the rear wiper relay circuit for short circuit to power
B1C77-13	Rear Wiper Relay - Circuit open	NOTE: Circuit reference REAR WIPER • Rear wiper relay circuit open circuit	• Refer to the electrical circuit diagrams and test the rear wiper relay circuit for open circuit
B1C82-11	Headlamp Washer Relay A - Circuit short to ground	NOTE: Circuit reference POWER WASH L • Headlamp wash relay A circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the headlamp wash relay A circuit for short circuit to ground
B1C82-12	Headlamp Washer Relay A - Circuit short to battery	NOTE: Circuit reference POWER WASH L • Headlamp wash relay A circuit short circuit to power	• Refer to the electrical circuit diagrams and test the headlamp wash relay A circuit for short circuit to power
B1C82-13	Headlamp Washer Relay A - Circuit open	NOTE: Circuit reference POWER WASH L • Headlamp wash relay A circuit open circuit	• Refer to the electrical circuit diagrams and test the headlamp wash relay A circuit for open circuit
B1C90-11	Auxiliary Driving Lamps Relay - Circuit short to ground	• Auxiliary driving lamps relay circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the auxiliary driving lamps relay circuit for short circuit to ground
B1C90-12	Auxiliary Driving Lamps Relay - Circuit short to battery	• Auxiliary driving lamps relay circuit short circuit to power	• Refer to the electrical circuit diagrams and test the auxiliary driving lamps relay circuit for short circuit to power
B1C90-13	Auxiliary Driving Lamps Relay - Circuit open	• Auxiliary driving lamps relay circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the auxiliary driving lamps relay circuit for open circuit, high resistance
B1C98-11	Left Corner Lamp Circuit - Circuit short to ground	• Left cornering lamp circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the left cornering lamp circuit for short circuit to ground
B1C98-15	Left Corner Lamp Circuit - Circuit short to battery or open	• Left cornering lamp circuit short circuit to battery, open circuit,	• Refer to the electrical circuit diagrams and test the left cornering lamp circuit for short circuit to battery, open circuit, high resistance

		high resistance	
B1C99-11	Right Corner Lamp Circuit - Circuit short to ground	• Right cornering lamp circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the right cornering lamp circuit for short circuit to ground
B1C99-15	Right Corner Lamp Circuit - Circuit short to battery or open	• Right cornering lamp circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the right cornering lamp circuit for short circuit to battery, open circuit, high resistance
B1D00-11	Left Low Beam - Circuit short to ground	• Left headlamp low beam circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the left headlamp low beam circuit for short circuit to ground
B1D00-15	Left Low Beam - Circuit short to battery or open	• Left headlamp low beam circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the left headlamp low beam circuit for short circuit to battery, open circuit, high resistance
B1D01-11	Right Low Beam - Circuit short to ground	• Right headlamp low beam circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the right headlamp low beam circuit for short circuit to ground
B1D01-15	Right Low Beam - Circuit short to battery or open	• Right headlamp low beam circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the right headlamp low beam circuit for short circuit to battery, open circuit, high resistance
B1D02-11	Left High Beam - Circuit short to ground	• Left headlamp high beam circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the left headlamp high beam circuit for short circuit to ground
B1D02-15	Left High Beam - Circuit short to battery or open	• Left headlamp high beam circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the left headlamp high beam circuit for short circuit to battery, open circuit, high resistance
B1D03-11	Right High Beam - Circuit short to ground	• Right headlamp high beam circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the right headlamp high beam circuit for short circuit to ground
B1D03-15	Right High Beam - Circuit short to battery or open	• Right headlamp high beam circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the right headlamp high beam circuit for short circuit to battery, open circuit, high resistance
B1D08-11	Left Trailer Direction Indicator Circuit - Circuit short to ground	NOTE: This DTC may be set by a fault in the trailer • Trailer left turn signal indicator circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the trailer left turn signal indicator circuit for short circuit to ground
B1D09-11	Right Trailer Direction Indicator Circuit - Circuit short to ground	NOTE: This DTC may be set by a fault in the trailer • Trailer right turn signal indicator circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the trailer right turn signal indicator circuit for short circuit to ground
B1D13-11	Interior Lights Circuit "A" - Circuit short to ground	• Interior lamps circuits short circuit to ground	• Refer to the electrical circuit diagrams and test the interior lamps circuits for short circuit to ground
B1D17-83	Battery Backed Sounder - Value of signal protection calculation incorrect	• Battery back-up sounder internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new battery back-up sounder
B1D17-87	Battery Backed Sounder - Missing message	NOTE: This DTC is inhibited if the car configuration file is correct • Car configuration file	• Using the manufacturer approved diagnostic system, check and update the car configuration file as necessary

		contains invalid data	
B1D17-96	Battery Backed Sounder - Component internal failure	• Battery back-up sounder internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new battery back-up sounder
B1D35-23	Hazard Switch Stuck - Signal stuck low	NOTE: This DTC will set if the switch is active for more than 60 seconds • Hazard warning lamp switch circuit short circuit to ground • Hazard warning lamp switch stuck active	• Refer to the electrical circuit diagrams and test the hazard warning lamp switch circuit for short circuit to ground • Test the operation of the hazard warning lamp switch. Install a new hazard warning lamp switch as necessary
B1D97-96	Tilt Sensor - Component internal failure	• Battery back-up sounder internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new battery back-up sounder
C0079-54	Variable effort steering - Missing calibration	• Car configuration file contains invalid data	• Using the manufacturer approved diagnostic system, check and update the car configuration file as necessary
C111A-11	Right Stop Lamp - Circuit short to ground	• Right stop lamp circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the right stop lamp circuit for short circuit to ground
C111A-15	Right Stop Lamp - Circuit short to battery or open	• Right stop lamp circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the right stop lamp circuit for short circuit to battery, open circuit, high resistance
C111B-11	Left Stop Lamp - Circuit short to ground	• Left stop lamp circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the left stop lamp circuit for short circuit to ground
C111B-15	Left Stop Lamp - Circuit short to battery or open	• Left stop lamp circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the left stop lamp circuit for short circuit to battery, open circuit, high resistance
C1A56-16	Left Front Tire Pressure Sensor and Transmitter Assembly - Circuit voltage below threshold	• No action, no customer symptom	• No action required
C1A56-86	Left Front Tire Pressure Sensor and Transmitter Assembly - Signal invalid	• No action, no customer symptom	• No action required
C1A56-93	Left Front Tire Pressure Sensor and Transmitter Assembly - No operation	• Tire low pressure wheel sensor damaged • Tire low pressure wheel sensor RF interference • Tire low pressure wheel sensor battery flat • Tire low pressure wheel sensor faulty	NOTE: Ignore instrument cluster positional information, as can be incorrect if wheels moved after/during failure occurrence • Complete visual external inspection to ensure tire low pressure wheel sensors are fitted • Complete 'tire pressure monitoring wheel sensor test' • If all 4 sensors fail: - Check for receiver faults and RF receiver is correct part number - Review potential electrical interference to tire pressure monitoring system receiver inside the car. e.g. charging units, power adapters, laptop/navigation screens, etc • If 1-3 sensors fail, replace non-transmitting sensors
C1A57-12	Left Front Initiator - Circuit short to battery	• Tire pressure monitoring antenna harness fault • Tire pressure monitoring antenna failure	• Refer to pinpoint test D in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear DTC and retest. If fault persists check and install new initiator as required
C1A57-14	Left Front Initiator - Circuit short to	• Tire pressure monitoring antenna	• Check front left initiator connected in wheel arch

	ground or open	disconnected • Tire pressure monitoring antenna harness fault • Tire pressure monitoring antenna failure	For additional information, refer to: Tire Pressure Monitoring System (TPMS) Front Antenna (204-04 Wheels and Tires, Removal and Installation). • Refer to pinpoint test D in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear DTC and retest. If fault persists check and install new initiator as required
C1A58-16	Right Front Tire Pressure Sensor and Transmitter Assembly - Circuit voltage below threshold	• No action, no customer symptom	• No action required
C1A58-86	Right Front Tire Pressure Sensor and Transmitter Assembly - Signal invalid	• No action, no customer symptom	• No action required
C1A58-93	Right Front Tire Pressure Sensor and Transmitter Assembly - No operation	• Tire low pressure wheel sensor damaged • Tire low pressure wheel sensor RF interference • Tire low pressure wheel sensor battery flat • Tire low pressure wheel sensor faulty	NOTE: Ignore instrument cluster positional information, as can be incorrect if wheels moved after/during failure occurrence • Complete visual external inspection to ensure tire low pressure wheel sensors are fitted • Complete 'tire pressure monitoring wheel sensor test' • If all 4 sensors fail: - Check for receiver faults and RF receiver is correct part number - Review potential electrical interference to tire pressure monitoring system receiver inside the car. e.g. charging units, power adapters, laptop/navigation screens, etc • If 1-3 sensors fail, replace non-transmitting sensors
C1A59-12	Right Front Initiator - Circuit short to battery	• Tire pressure monitoring antenna harness fault • Tire pressure monitoring antenna failure	• Refer to pinpoint test D in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear DTC and retest. If fault persists check and install new initiator as required
C1A59-14	Right Front Initiator - Circuit short to ground or open	• Tire pressure monitoring antenna disconnected • Tire pressure monitoring antenna harness fault • Tire pressure monitoring antenna failure	• Check front right initiator connected in wheel arch For additional information, refer to: Tire Pressure Monitoring System (TPMS) Front Antenna (204-04 Wheels and Tires, Removal and Installation). • Refer to pinpoint test D in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear DTC and retest. If fault persists check and install new initiator as required
C1A60-16	Left Rear Tire Pressure Sensor and Transmitter Assembly - Circuit voltage below threshold	• No action, no customer symptom	• No action required
C1A60-86	Left Rear Tire Pressure Sensor and Transmitter Assembly - Signal invalid	• No action, no customer symptom	• No action required
C1A60-93	Left Rear Tire Pressure Sensor and Transmitter Assembly - No operation	• Tire low pressure wheel sensor damaged • Tire low pressure wheel sensor RF interference • Tire low pressure wheel sensor battery flat • Tire low pressure wheel sensor faulty	NOTE: Ignore instrument cluster positional information, as can be incorrect if wheels moved after/during failure occurrence • Complete visual external inspection to ensure tire low pressure wheel sensors are fitted • Complete 'tire pressure monitoring wheel sensor test' • If all 4 sensors fail: - Check for receiver faults and RF receiver is correct part number

			- Review potential electrical interference to tire pressure monitoring system receiver inside the car. e.g. charging units, power adapters, laptop/navigation screens, etc • If 1-3 sensors fail, replace non-transmitting sensors
C1A61-12	Left Rear Initiator - Circuit short to battery	• Tire pressure monitoring antenna harness fault • Tire pressure monitoring antenna failure	• Refer to pinpoint test D in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear DTC and retest. If fault persists check and install new initiator as required
C1A61-14	Left Rear Initiator - Circuit short to ground or open	• Tire pressure monitoring antenna disconnected • Tire pressure monitoring antenna harness fault • Tire pressure monitoring antenna failure	• Check rear left initiator connected in wheel arch For additional information, refer to: Tire Pressure Monitoring System (TPMS) Rear Antenna (204-04 Wheels and Tires, Removal and Installation). • Refer to pinpoint test D in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear DTC and retest. If fault persists check and install new initiator as required
C1A62-16	Right Rear Tire Pressure Sensor and Transmitter Assembly - Circuit voltage below threshold	• No action, no customer symptom	• No action required
C1A62-86	Right Rear Tire Pressure Sensor and Transmitter Assembly - Signal invalid	• No action, no customer symptom	• No action required
C1A62-93	Right Rear Tire Pressure Sensor and Transmitter Assembly - No operation	• Tire low pressure wheel sensor damaged • Tire low pressure wheel sensor RF interference • Tire low pressure wheel sensor battery flat • Tire low pressure wheel sensor faulty	NOTE: Ignore instrument cluster positional information, as can be incorrect if wheels moved after/during failure occurrence • Complete visual external inspection to ensure tire low pressure wheel sensors are fitted • Complete 'tire pressure monitoring wheel sensor test' • If all 4 sensors fail: - Check for receiver faults and RF receiver is correct part number - Review potential electrical interference to tire pressure monitoring system receiver inside the car. e.g. charging units, power adapters, laptop/navigation screens, etc • If 1-3 sensors fail, replace non-transmitting sensors
C1A63-12	Right Rear Initiator - Circuit short to battery	• Tire pressure monitoring antenna harness fault • Tire pressure monitoring antenna failure	• Refer to pinpoint test D in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear DTC and retest. If fault persists check and install new initiator as required
C1A63-14	Right Rear Initiator - Circuit short to ground or open	• Tire pressure monitoring antenna disconnected • Tire pressure monitoring antenna harness fault • Tire pressure monitoring antenna failure	• Check rear right initiator connected in wheel arch For additional information, refer to: Tire Pressure Monitoring System (TPMS) Rear Antenna (204-04 Wheels and Tires, Removal and Installation). • Refer to pinpoint test D in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear DTC and retest. If fault persists check and install new initiator as required
C1D18-00	Wheel Localization Failed - No sub type information	• At least two tire pressure monitoring system antennas are dislodged	NOTE: If set with other DTC's, this should be ignored • If set with no other DTC's, check the tire pressure monitoring system initiator antennas

			are correctly located in the wheel arches For additional information, refer to: Tire Pressure Monitoring System (TPMS) Front Antenna (204-04 Wheels and Tires, Removal and Installation) / Tire Pressure Monitoring System (TPMS) Rear Antenna (204-04 Wheels and Tires, Removal and Installation).
C1D21-05	Wheel Module - System programming failures	• Tire low pressure wheel sensor(s) removed • Incorrect tire low pressure wheel sensor fitted (type/frequency/part No.) • Tire low pressure wheel sensor damaged between drive cycles • Tire low pressure wheel sensor external RF interference	• Complete visual external inspection to ensure tire low pressure wheel sensor are fitted. (e.g. no winter wheels, space saver, etc) • Check number of tire low pressure wheel sensor failed (via PID 4127) • If all 4 sensors fail: - Check for receiver faults and RF receiver is correct part number - Review potential electrical interference to tire pressure monitoring system receiver inside the car. e.g. charging units, power adapters, laptop/navigation screens, etc • If 1-3 sensors fail, identify faulty sensors using 'tire pressure monitoring wheel sensor test' and replace faulty sensors
C2004-11	Headlamp Washer Relay B - Circuit short to ground	NOTE: Circuit reference POWER WASH R • Headlamp washer relay B circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the headlamp washer relay B circuit for short circuit to ground
C2004-12	Headlamp Washer Relay B - Circuit short to power	NOTE: Circuit reference POWER WASH R • Headlamp washer relay B circuit short circuit to power	• Refer to the electrical circuit diagrams and test the headlamp washer relay B circuit for short circuit to power
C2004-13	Headlamp Washer Relay B - Circuit open	NOTE: Circuit reference POWER WASH R • Headlamp washer relay B circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the headlamp washer relay B circuit for open circuit, high resistance
P0230-12	Fuel Pump Primary Circuit - Circuit short to battery	• Fuel pump relay circuit short circuit to power	• Refer to the electrical circuit diagrams and test the fuel pump relay circuit for short circuit to power
U0001-88	High Speed CAN Communication Bus - Bus off	• High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0004-00	High Speed CAN Communication Bus (+) Low - No sub type information	• High speed CAN bus high circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the high speed CAN bus high circuit for short circuit to ground
U0005-00	High Speed CAN Communication Bus (+) High - No sub type information	• High speed CAN bus high circuit short circuit to power	• Refer to the electrical circuit diagrams and test the high speed CAN bus high circuit for short circuit to power
U0008-00	High Speed CAN Communication Bus (-) High - No sub type information	• High speed CAN bus low circuit short circuit to power	• Refer to the electrical circuit diagrams and test the high speed CAN bus low circuit for short circuit to power
U0009-00	High Speed CAN Communication Bus (-) shorted to Bus (+) - No sub type information	• High speed CAN bus high circuit short circuit to high speed CAN bus low circuit	• Refer to the electrical circuit diagrams and test the high speed CAN bus high circuit for short circuit to the high speed CAN bus low circuit
U0010-88	Medium Speed CAN Communication Bus - Bus off	• Medium speed CAN bus circuit short circuit to ground, short	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test

		circuit to power, open circuit, high resistance	the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0013-00	Medium Speed CAN Communication Bus (+) Low - No sub type information	• Medium speed CAN bus high circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the medium speed CAN bus high circuit for short circuit to ground
U0014-00	Medium Speed CAN Communication Bus (+) High - No sub type information	• Medium speed CAN bus high circuit short circuit to power	• Refer to the electrical circuit diagrams and test the medium speed CAN bus high circuit for short circuit to power
U0017-00	Medium Speed CAN Communication Bus (-) High - No sub type information	• Medium speed CAN bus low circuit short circuit to power	• Refer to the electrical circuit diagrams and test the medium speed CAN bus low circuit for short circuit to power
U0018-00	Medium Speed CAN Communication Bus (-) shorted to Bus (+) - No sub type information	• Medium speed CAN bus high circuit short circuit to high speed CAN bus low circuit	• Refer to the electrical circuit diagrams and test the medium speed CAN bus high circuit for short circuit to the medium speed CAN bus low circuit
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	• Engine control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Engine control module internal failure	• Refer to the electrical circuit diagrams and test the engine control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new engine control module
U0101-00	Lost Communication With Transmission Control Module - No sub type information	• Transmission control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transmission control module internal failure	• Refer to the electrical circuit diagrams and test the transmission control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control module
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	• Transfer case control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case control module internal failure	• Refer to the electrical circuit diagrams and test the transfer case control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module
U0103-00	Lost Communication with Gear Shift Control Module A - No sub type information	• Transmission control switch power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transmission control switch internal failure	• Refer to the electrical circuit diagrams and test the transmission control switch power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No	• Anti-lock brake system control module power or ground circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the anti-lock brake system control module power and ground circuits for open circuit, high resistance

	sub type information	• High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Anti-lock brake system control module internal failure	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new anti-lock brake system control module
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• Steering angle sensor module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Steering angle sensor module internal failure	• Refer to the electrical circuit diagrams and test the steering angle sensor module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new steering angle sensor module
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	• Electric park brake control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Electric park brake control module internal failure	• Refer to the electrical circuit diagrams and test the electric park brake control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new electric park brake control module
U0132-00	Lost Communication With Suspension Control Module "A" - No sub type information	• Air suspension control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Air suspension control module internal failure	• Refer to the electrical circuit diagrams and test the air suspension control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new air suspension control module
U0138-00	Lost Communication with All Terrain Control Module - No sub type information	• Terrain response switchpack power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Terrain response switchpack internal failure	• Refer to the electrical circuit diagrams and test the terrain response switchpack power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new terrain response switchpack
U0139-00	Lost Communication With Suspension Control Module "B" - No sub type information	• Adaptive damping system control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Adaptive damping system control module internal failure	• Refer to the electrical circuit diagrams and test the adaptive damping system control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new adaptive damping system

			control module
U0151-00	Lost Communication With Restraints Control Module - No sub type information	• Restraints control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Restraints control module internal failure	• Refer to the electrical circuit diagrams and test the restraints control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new restraints control module
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information	• Instrument cluster power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Instrument cluster internal failure	• Refer to the electrical circuit diagrams and test the instrument cluster power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new instrument cluster
U0164-00	Lost Communication With HVAC Control Module - No sub type information	• Automatic temperature control module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Automatic temperature control module internal failure	• Refer to the electrical circuit diagrams and test the automatic temperature control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new automatic temperature control module
U0184-00	Lost Communication With Radio - No sub type information	• Integrated audio module / audio head unit power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Integrated audio module / audio head unit internal failure	• Refer to the electrical circuit diagrams and test the integrated audio module / audio head unit power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module / audio head unit
U0199-00	Lost Communication with Driver Door Module (DDM) - No sub type information	• Driver door module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Driver door module internal failure	• Refer to the electrical circuit diagrams and test the driver door module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new driver door module
U0200-00	Lost Communication With "Door Control Module "B" - No sub type information	• Passenger door module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Passenger door	• Refer to the electrical circuit diagrams and test the passenger door module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic

		module internal failure	system, clear the DTCs and retest. If the fault persists, install a new passenger door module
U0208-00	Lost Communication With "Seat Control Module "A" - No sub type information	• Driver seat module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Driver seat module internal failure	• Refer to the electrical circuit diagrams and test the driver seat module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new driver seat module
U0214-00	Lost Communication With Remote Function Actuation - No sub type information	• Keyless vehicle module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Keyless vehicle module internal failure	• Refer to the electrical circuit diagrams and test the keyless vehicle module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new keyless vehicle module
U0241-00	Lost Communication With Headlamp Control Module "A" - No sub type information	• Headlamp leveling control module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Headlamp leveling control module internal failure	• Refer to the electrical circuit diagrams and test the headlamp leveling control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new headlamp leveling control module
U0242-00	Lost Communication With Headlamp Control Module "B" - No sub type information	• Auto high beam control module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Auto high beam control module internal failure	• Refer to the electrical circuit diagrams and test the auto high beam control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new auto high beam control module
U0257-00	Lost Communication With Front Controls / Display Interface Module - No sub type information	• Touch screen power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Touch screen internal failure	• Refer to the electrical circuit diagrams and test the touch screen power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new touch screen
U025D-00	Lost Communication With Front Controls Interface Module "B" - No sub type information	• Touch screen switchpack power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Touch screen switchpack internal	• Refer to the electrical circuit diagrams and test the touch screen switchpack power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault

		failure	persists, install a new touch screen switchpack
U1000-00	Solid State Driver Protection Active - Driver Disabled - No sub type information	• Central junction box output circuit - Short circuit to ground, short circuit to power	NOTE: The relevant output is disabled while this DTC is set. Do not clear the DTC until the fault has been rectified • Using the manufacturer approved diagnostic system, check for other central junction box short circuit to ground and/or short circuit to power DTCs and refer to the relevant DTC index for corrective actions • Once circuit faults have been rectified, clear DTC and retest
U200D-11	Control Module Output Power A - Circuit short to ground	• Output power A circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the output power A circuit for short circuit to ground
U200D-14	Control Module Output Power A - Circuit short to ground or open	• Output power A circuit short circuit to ground, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the output power A circuit for short circuit to ground, open circuit, high resistance
U200D-15	Control Module Output Power A - Circuit short to battery or open	• Output power A circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the output power A circuit for short circuit to battery, open circuit, high resistance
U200E-11	Control Module Output Power B - Circuit short to ground	• Output power B circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the output power B circuit for short circuit to ground
U2010-11	Switch Illumination - Circuit short to ground	• Switch illumination circuit short circuit to ground	• Refer to the electrical circuit diagrams and test the switch illumination circuit for short circuit to ground
U2017-51	Control Module Software #2 - Not programmed	• Central junction box software invalid/incomplete	• Using the manufacturer approved diagnostic system, re-configure the central junction box with the latest level software
U201B-54	Control Module Calibration Data #2 - Missing calibration	• Adjustable steering column not calibrated	• Using the manufacturer approved diagnostic system, perform routine - Calibrate Steering Column
U201F-04	External Receiver - System internal failures	• Issue with tire pressure monitoring system RF receiver	NOTE: Ignore all other tire pressure monitoring system DTCs if this is set • Check tire pressure monitoring system RF receiver fuse • Clear the DTC and retest. If fault persists, check and install a new tire pressure monitoring system RF receiver
U201F-11	External Receiver - Circuit short to ground	• Issue with tire pressure monitoring system RF receiver	NOTE: Ignore all other tire pressure monitoring system DTCs if this is set • Check tire pressure monitoring system RF receiver fuse • Check circuits to tire pressure monitoring system RF receiver using pinpoint tests A in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear the DTC and retest. If fault persists, check and install a new tire pressure monitoring system RF receiver
U201F-12	External Receiver - Circuit short to battery	• Issue with tire pressure monitoring system RF receiver	NOTE: Ignore all other tire pressure monitoring system DTCs if this is set • Check tire pressure monitoring system RF receiver fuse • Check circuits to tire pressure monitoring system RF receiver using pinpoint tests B in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see

			section 204-04) and proceed as directed • Clear the DTC and retest. If fault persists, check and install a new tire pressure monitoring system RF receiver
U201F-87	External Receiver - Missing message	• Issue with tire pressure monitoring system RF receiver	NOTE: Ignore all other tire pressure monitoring system DTCs if this is set • Check tire pressure monitoring system RF receiver fuse • Check tire pressure monitoring system RF receiver connected at module • Check circuits to tire pressure monitoring system RF receiver using pinpoint tests C in the tire pressure monitoring system diagnosis and testing section of the workshop manual (see section 204-04) and proceed as directed • Clear the DTC and retest. If fault persists, check and install a new tire pressure monitoring system RF receiver
U2101-00	Control Module Configuration Incompatible - No sub type information	• Central junction box is not configured correctly	• Using the manufacturer approved diagnostic system, check and update the car configuration file as necessary. Clear the DTC and retest
U2104-23	Trip Meter Reset Button - Signal stuck low	NOTE: This DTC will set if the switch is active for more than 60 seconds • Trip computer switch circuit short circuit to ground • Trip computer switch stuck active	NOTE: The trip computer switch is integral with the steering column left multifunction switch • Refer to the electrical circuit diagrams and test the trip computer switch circuit for short circuit to ground • Test the operation of the trip switch. Install a new trip computer switch as necessary
U2300-64	Central Configuration - Signal plausibility failure	• Tire pressure monitoring system configuration data is invalid caused by incorrect car/local configuration file(s)	• Using the manufacturer approved diagnostic system, check and update the car/local configuration file as necessary. Clear the DTC and retest
U3000-49	Control Module - Internal electronic failure	• Central junction box - Internal failure	NOTE: The relevant output is disabled while this DTC is set • Using the manufacturer approved diagnostic system, check for other central junction box short circuit to ground and/or short circuit to power DTCs and refer to the relevant DTC index for corrective actions • Install a new central junction box as required. Clear DTCs and retest
U3001-54	Control Module Improper Shutdown - Missing calibration	NOTE: This DTC is set when the steering column tilt or reach motor is active. The DTC is cleared when the new steering column position has been successfully stored • Steering column tilt/reach position not stored	• Using the manufacturer approved diagnostic system, check for steering column adjustment related DTCs. Clear the DTC and operate the steering column through the complete tilt and reach range

General Information - Diagnostic Trouble Code (DTC) Index DTC: Digital Radio Control Module (DRCM)

Description and Operation

Digital Radio Control Module (DRCM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Digital Radio Control Module (DRCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Information and Entertainment System (415-00, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1A56-11	Antenna - Circuit short to ground	• Digital radio L-band antenna circuit short circuit to ground • Digital radio L-band antenna amplifier circuit short circuit to ground • Digital radio L-band antenna amplifier internal failure • Digital radio control module internal failure	• Refer to electrical circuit diagrams and check the digital radio L-band antenna circuit for short circuit to ground • Refer to electrical circuit diagrams and check the digital radio L-band antenna amplifier circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio L-band antenna amplifier • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module
B1A56-12	Antenna - Circuit short to battery	• Digital radio L-band antenna circuit short circuit to power • Digital radio L-band antenna amplifier circuit short circuit to power • Digital radio L-band antenna amplifier internal	• Refer to electrical circuit diagrams and check the digital radio L-band antenna circuit for short circuit to power • Refer to electrical circuit diagrams and check the digital radio L-band antenna amplifier circuit for short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio L-band antenna amplifier • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module

		failure • Digital radio control module internal failure	
B1A56-13	Antenna - Circuit open	• Digital radio L-band antenna circuit open circuit, high resistance • Digital radio L-band antenna amplifier circuit open circuit, high resistance • Digital radio L-band antenna amplifier internal failure • Digital radio control module internal failure	• Refer to electrical circuit diagrams and check the digital radio L-band antenna circuit for open circuit, high resistance • Refer to electrical circuit diagrams and check the digital radio L-band antenna amplifier circuit for open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio L-band antenna amplifier • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module
B1D55-11	Antenna #2 - Circuit short to ground	• Digital radio band 3 antenna circuit short circuit to ground • Digital radio band 3 antenna amplifier circuit short circuit to ground • Digital radio band 3 antenna amplifier internal failure • Digital radio control module internal failure	• Refer to electrical circuit diagrams and check the digital radio band 3 antenna circuit for short circuit to ground • Refer to electrical circuit diagrams and check the digital radio band 3 antenna amplifier circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio band 3 antenna amplifier • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module
B1D55-12	Antenna #2 - Circuit short to battery	• Digital radio band 3 antenna circuit short circuit to power • Digital radio band 3 antenna amplifier circuit short circuit to power • Digital radio band 3 antenna amplifier internal failure • Digital radio control module internal failure	• Refer to electrical circuit diagrams and check the digital radio band 3 antenna circuit for short circuit to power • Refer to electrical circuit diagrams and check the digital radio band 3 antenna amplifier circuit for short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio band 3 antenna amplifier • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module
B1D55-13	Antenna #2 - Circuit open	• Digital radio band 3 antenna circuit open circuit, high resistance • Digital radio band 3 antenna amplifier circuit open circuit, high resistance • Digital radio band 3 antenna amplifier internal failure • Digital radio control module internal failure	• Refer to electrical circuit diagrams and check the digital radio band 3 antenna circuit for open circuit, high resistance • Refer to electrical circuit diagrams and check the digital radio band 3 antenna amplifier circuit for open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio band 3 antenna amplifier • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module
U2100-00	Initial Configuration Not Complete - No sub type information	• Car configuration data not loaded (new module installed to vehicle and not initialized)	• Using the manufacturer approved diagnostic system, re-configure the digital radio control module with the latest level software • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module

		• Digital radio control module internal failure	
U2101-00	Control Module Configuration Incompatible - No sub type information	• Central car configuration parameter missing or corrupted	• Using the manufacturer approved diagnostic system, re-configure the digital radio control module with the latest level software
U3000-46	Control module - Calibration/parameter memory failure	• Digital radio control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module
U3000-49	Control Module - Internal electronic failure	• Digital radio control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module
U3000-98	Control Module - Component or system over temperature	• Digital radio control module cooling vents obstructed • Digital radio control module internal failure	• Check that the digital radio control module cooling vents / air circulation are not obstructed. Cool the vehicle interior down by ensuring it is in the shade and have the air conditioning on cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new digital radio control module
U3003-62	Battery voltage - Signal compare failure	• Mismatch between the voltage at the digital radio control module and the voltage value broadcast on the CAN bus	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111) - and compare it to battery voltage. Refer to the electrical circuit diagrams and check the digital radio control module power and ground circuits for open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index DTC: Driver/Passenger Door Module (DDM/PDM)

Description and Operation

Driver/Passenger Door Module (DDM/PDM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the digital multimeter leads into account

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Driver/Passenger Door Modules (DDM/PDM). For additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Driver Door Module (DDM) (419-10 Multifunction Electronic Modules, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B108F-23	Cabin Lock/Unlock Switch - Signal stuck low	• Cabin lock/unlock switch signal stuck • Switch pressed for longer than 20 seconds • Switch circuit short circuit to ground • Switch failure	• Check the switch operation and serviceability. Refer to the electrical circuit diagrams and check the switch circuit
B109C-11	Front Courtesy Light - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test front courtesy light circuit for short to ground
B109C-15	Front Courtesy Light - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test front courtesy light circuit for short to power or open circuit
B10EB-11	Driver Door Double Locking Motor - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test driver door double locking motor circuit for short to ground
B10EB-15	Driver Door Double Locking Motor - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test driver door double locking motor circuit for short to power or open circuit
B10EC-11	Passenger Door Double Locking Motor - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test passenger door double locking motor circuit for short to ground
B10EC-	Passenger Door	• Short to power or open	• Refer to the electrical circuit diagrams and test

15	Double Locking Motor - Circuit short to battery or open	circuit	passenger door double locking motor circuit for short to power or open circuit
B10ED-11	Rear Door Driver Side Double Locking Motor - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test the driver side rear door double locking motor circuit for short to ground
B10ED-15	Rear Door Driver Side Double Locking Motor - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test driver side rear door double locking motor circuit for short to power or open circuit
B10EE-11	Rear Door Passenger Side Double Locking Motor - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test the passenger side rear door double locking motor circuit for short to ground
B10EE-15	Rear Door Passenger Side Double Locking Motor - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test passenger side rear door double locking motor circuit for short to power or open circuit
B1108-11	Driver Door Central Locking Motor - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test driver door central locking motor circuit for short to ground
B1108-15	Driver Door Central Locking Motor - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test driver door central locking motor circuit for short to power or open circuit
B1109-11	Passenger Door Central Locking Motor - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test passenger door central locking motor circuit for short to ground
B1109-15	Passenger Door Central Locking Motor - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test passenger door central locking motor circuit for short to power or open circuit
B110A-11	Rear Door Driver Side Central Locking Motor - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test driver side rear door central locking motor circuit for short to ground
B110A-15	Rear Door Driver Side Central Locking Motor - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test driver side rear door central locking motor circuit for short to power or open circuit
B110B-11	Rear Door Passenger Side Central Locking Motor - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test passenger side rear door central locking motor circuit for short to ground
B110B-15	Rear Door Passenger Side Central Locking Motor - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test passenger side rear door central locking motor circuit for short to power or open circuit
B1163-11	Left Mirror Heater Output Short To Ground - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test left mirror heater output circuit for short to ground
B1163-15	Left Mirror Heater Output Short To Power - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test left mirror heater output circuit for short to power or open circuit
B1164-11	Right Mirror Heater Output Short To Ground - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test right mirror heater output circuit for short to ground
B1164-15	Right Mirror Heater Output Short To	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test right mirror heater output circuit for short to

	Power - Circuit short to battery or open		power or open circuit
B1165-11	Left Front Puddle Lamp Output Short To Ground - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test left front puddle lamp output circuit for short to ground
B1165-15	Left Front Puddle Lamp Output Open Load Or Short To Power - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test left front puddle lamp output circuit for short to power or open circuit
B1166-11	Right Front Puddle Lamp Output Short To Ground - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test right front puddle lamp output circuit for short to ground
B1166-15	Right Front Puddle Lamp Output Open Load Or Short To Battery - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test right front puddle lamp output circuit for short to power or open circuit
B117C-07	Rear Power Window Up - Mechanical failures	• Set when window is reversed during window up due to mechanical problems, window channel restriction preventing window closure or window mechanism fault	• Check for mechanical problems with the window operation. Check for obstructions in the window channels and that the glass is not restricted in the full range of travel
B117C-72	Rear Power Window Up - Actuator stuck open	• Door module internal relay sticking open	• Renew the relevant rear door module
B117C-73	Rear Power Window Up - Actuator stuck closed	• Door module internal relay sticking closed	• Renew the relevant rear door module
B117C-92	Rear Power Window Up - Performance or incorrect operation	• Set when auto window up was interrupted (e.g. by pressing local switch)	• Check the window operation. Clear the DTC and retest
B117D-72	Rear Power Window Down - Actuator stuck open	• Door module internal relay sticking open	• Renew the relevant rear door module
B117D-73	Rear Power Window Down - Actuator stuck closed	• Door module internal relay sticking closed	• Renew the relevant rear door module
B117E-07	Front Power Window Up - Mechanical Failures	• Set when window is reversed during window up due to mechanical problems, window channel restriction preventing window closure or Window mechanism fault	• Check for mechanical problems with the window operation. Check for obstructions in the window channels and that the glass is not restricted in the full range of travel
B117E-72	Front Power Window Up - Actuator stuck open	• Door module internal relay sticking open	• Renew the relevant front door module
B117E-73	Front Power Window Up - Actuator stuck closed	• Door module internal relay sticking closed	• Renew the relevant front door module
B117E-92	Front Power Window Up - Performance or incorrect operation	• Set when auto window up was interrupted (e.g. by pressing local switch)	• Check the window operation. Clear the DTC and retest
B117F-72	Front Power Window Down - Actuator stuck open	• Door module internal relay sticking open	• Renew the relevant front door module
B117F-73	Front Power Window Down - Actuator stuck	• Door module internal relay sticking closed	• Renew the relevant front door module

	closed		
B1189-29	Front Window Position Sensor - Signal invalid	• Missing signal from hall sensor 1 or 2 • Sensor circuit fault • Hall sensor fault	• Refer to the electrical circuit diagrams and check the hall sensor circuit between the door module and window motor. Repair as necessary. If the problem persists, renew the window motor
B118A-29	Rear Window Position Sensor - Signal invalid	• Missing signal from hall sensor 1 or 2 • Sensor circuit fault • Hall sensor fault	• Refer to the electrical circuit diagrams and check the hall sensor circuit between the door module and window motor. Repair as necessary. If the problem persists, renew the window motor
B11D1-83	LIN Bus "C" - Value of signal protection calculation incorrect	• LIN bus checksum error; driver switchpack internal fault	• Refer to the electrical circuit diagrams and check the LIN bus circuit between the driver door window switch and the door module. Check the connectors for integrity and security. Clear the DTC and retest. If the problem persists, renew the driver door window switch
B11D1-86	LIN Bus "C" - Signal invalid	• LIN bus header error; driver switchpack internal fault	• Refer to the electrical circuit diagrams and check the LIN bus circuit between the driver door window switch and the door module. Check the connectors for integrity and security. Clear the DTC and retest. If the problem persists, renew the driver door window switch
B11D1-87	LIN Bus "C" - Missing message	• Slave node communication missing; driver switchpack internal fault	• Refer to the electrical circuit diagrams and check the LIN bus circuit between the driver door window switch and the door module. Check the connectors for integrity and security. Clear the DTC and retest. If the problem persists, renew the driver door window switch
B11F6-11	Driver Folding Mirror Motor - Circuit short to ground	• Driver folding mirror motor circuit short circuit to ground • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror fold circuit between the driver door module and the mirror assembly. Repair as necessary
B11F6-15	Driver Folding Mirror Motor - Circuit short to battery or open	• Driver mirror heater output circuit short circuit to power or open circuit • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror fold circuit between the driver door module and the mirror assembly. Repair as necessary
B11F7-11	Passenger Folding Mirror Motor - Circuit short to ground	• Passenger folding mirror motor circuit short circuit to ground • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror fold circuit between the passenger door module and the mirror assembly. Repair as necessary
B11F7-15	Passenger Folding Mirror Motor - Circuit short to battery or open	• Passenger mirror heater output circuit short circuit to power or open circuit • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror fold circuit between the passenger door module and the mirror assembly. Repair as necessary
B1A98-83	LIN Bus Circuit #1 - Value of signal protection calculation incorrect	• Rear door module not on LIN bus	• Refer to the electrical circuit diagrams and check the LIN bus circuit between the rear door module and the front door module. Check the connectors for integrity and security. Clear the DTC and retest. If the problem persists, renew the rear door module
B1A98-86	LIN Bus Circuit #1 - Signal invalid	• Rear door module not on LIN bus	• Refer to the electrical circuit diagrams and check the LIN bus circuit between the rear door module and the front door module. Check the connectors for integrity and security. Clear the DTC and retest. If the problem persists, renew the rear door module
B1A98-87	LIN Bus Circuit #1 - Missing message	• Rear door module not on LIN bus	• Refer to the electrical circuit diagrams and check the LIN bus circuit between the rear door module and the front door module. Check the connectors for integrity and security. Clear the DTC and retest. If the problem persists, renew the rear door module
B1C09-11	Driver Left/Right Mirror Motor Circuit - Circuit short to ground	• Driver mirror adjustment motor circuit short circuit to ground • Mirror left/right motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the driver door module and the mirror assembly. Repair as necessary

B1C09-15	Driver Left/Right Mirror Motor Circuit - Circuit short to battery or open	• Driver mirror adjustment motor circuit short circuit to power or open circuit • Mirror left/right motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the driver door module and the mirror assembly. Repair as necessary
B1C10-11	Driver Up/Down Mirror Motor Circuit - Circuit short to ground	• Driver mirror adjustment motor circuit short circuit to ground • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the driver door module and the mirror assembly. Repair as necessary
B1C10-15	Driver Up/Down Mirror Motor Circuit - Circuit short to battery or open	• Driver mirror adjustment motor circuit short circuit to power or open circuit • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the driver door module and the mirror assembly. Repair as necessary
B1C11-11	Passenger Left/Right Mirror Motor Circuit - Circuit short to ground	• Passenger mirror adjustment motor circuit short circuit to ground • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the passenger door module and the mirror assembly. Repair as necessary
B1C11-15	Passenger Left/Right Mirror Motor Circuit - Circuit short to battery or open	• Passenger mirror adjustment motor circuit short circuit to power or open circuit • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the passenger door module and the mirror assembly. Repair as necessary
B1C12-11	Passenger Up/Down Mirror Motor Circuit - Circuit short to ground	• Passenger mirror adjustment motor circuit short circuit to ground • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the passenger door module and the mirror assembly. Repair as necessary
B1C12-15	Passenger Up/Down Mirror Motor Circuit - Circuit short to battery or open	• Passenger mirror adjustment motor circuit short circuit to power or open circuit • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the passenger door module and the mirror assembly. Repair as necessary
B1C13-11	Driver Up/Down Mirror Motor Feedback Circuit - Circuit short to ground	• Driver mirror adjustment motor circuit short circuit to ground • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the driver door module and the mirror assembly. Repair as necessary
B1C13-15	Driver Up/Down Mirror Motor Feedback Circuit - Circuit short to battery or open	• Driver mirror adjustment motor circuit short circuit to power or open circuit • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the driver door module and the mirror assembly. Repair as necessary
B1C14-11	Driver Left/Right Mirror Motor Feedback Circuit - Circuit short to ground	• Driver mirror adjustment motor circuit short circuit to ground • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the driver door module and the mirror assembly. Repair as necessary
B1C14-15	Driver Left/Right Mirror Motor Feedback Circuit - Circuit short to battery or open	• Driver mirror adjustment motor circuit short circuit to power or open circuit • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the driver door module and the mirror assembly. Repair as necessary
B1C15-11	Passenger Up/Down Mirror Motor Feedback Circuit - Circuit short to ground	• Passenger mirror adjustment motor circuit short circuit to ground • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the passenger door module and the mirror assembly. Repair as necessary
B1C15-15	Passenger Up/Down Mirror Motor Feedback Circuit - Circuit short to battery or open	• Passenger mirror adjustment motor circuit short circuit to power or open circuit • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the passenger door module and the mirror assembly. Repair as necessary
B1C16-11	Passenger Left/Right Mirror Motor Feedback Circuit - Circuit short to ground	• Passenger mirror adjustment motor circuit short circuit to ground • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the passenger door module and the mirror assembly. Repair as necessary
B1C16-15	Passenger Left/Right Mirror Motor Feedback Circuit - Circuit short to battery or	• Passenger mirror adjustment motor circuit short circuit to power or open circuit • Mirror motor failure	• Refer to the electrical circuit diagrams and check the mirror motor circuit between the passenger door module and the mirror assembly. Repair as necessary

	open		
B1C39-29	Key Lock Switch - Signal invalid	• Key lock switch signal invalid, stuck/jammed • Switch held for longer than 20 seconds • Key lock switch circuit short to ground (where connected) • Key lock switch failure • Central junction box fault	• Refer to the electrical circuit diagrams and the key lock switch circuit. Clear the DTC and retest. If no other DTCs are present, ignore this fault. If the DTC returns, suspect an internal fault with the central junction box
B1D06-11	Left Turn Indicator - Circuit short to ground	• Left turn signal short circuit to ground	• Refer to the electrical circuit diagrams and check left turn signal for short circuit to ground
B1D06-15	Left Turn Indicator - Circuit short to battery or open	• Left turn signal short circuit to power • Left turn signal high resistance, open circuit	• Refer to the electrical circuit diagrams and check left turn signal for short circuit high resistance, open circuit
B1D07-11	Right Turn Indicator - Circuit short to ground	• Right turn signal short circuit to ground	• Refer to the electrical circuit diagrams and check right turn signal for short circuit to ground
B1D07-15	Right Turn Indicator - Circuit short to battery or open	• Right turn signal circuit short circuit to power • Right turn signal circuit high resistance, open circuit	• Refer to the electrical circuit diagrams and check right turn signal for short circuit high resistance, open circuit
C1B14-11	Sensor Supply #1 - Circuit short to ground	• Short to ground	• Refer to the electrical circuit diagrams and test window sensor supply circuit for short to ground
C1B14-15	Sensor Supply #1 - Circuit short to battery or open	• Short to power or open circuit	• Refer to the electrical circuit diagrams and test window sensor supply circuit for short to power or open circuit
C1B15-11	Sensor Supply Voltage A - Circuit short to ground	• Hall sensor supply circuit short to ground • Hall sensor fault	• Refer to the electrical circuit diagrams and check the hall sensor supply circuit between the rear door module and the window motor. If the problem persists, renew the window motor
C1B15-15	Sensor Supply Voltage A - Circuit short to battery or open	• Hall sensor supply circuit short to power or open circuit • Hall sensor fault	• Refer to the electrical circuit diagrams and check the hall sensor supply circuit between the rear door module and the window motor. If the problem persists, renew the window motor
U0010-00	Medium Speed CAN Communication Bus - No sub type information	• Medium speed CAN communication bus	• Carry out network integrity test using manufacturer approved diagnostic system. Refer to electrical circuit diagrams and test medium speed CAN network for open, short circuit and high resistance
U0140-00	Lost Communication With CJB - No sub type information	• Logged when subscribed CAN message missing from central junction box	• Refer to the electrical circuit diagrams and test power and ground supplies to central junction box. Check CAN network between the door module and the central junction box. Carry out network integrity test using manufacturer approved diagnostic system
U0208-00	Lost Communication With Driver Seat Module (DSM) - No sub type information	• Missing message	• Refer to the electrical circuit diagrams and test power and ground supplies to driver seat module. Check CAN network between door module and driver seat module. Carry out network integrity test using manufacturer approved diagnostic system
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Car configuration file mismatch with vehicle specification	NOTE: After updating the car configuration file, set the ignition to on and wait 30 seconds before clearing the DTCs • Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U2002-24	Switch - Signal stuck high	• Signal stuck high	• Clear DTC and re-test. If DTC remains, install a new passenger side window switch
U2004-24	Auxiliary Switch Pack - Signal stuck	• Signal stuck high • Left or right rear door	• Refer to the electrical circuit diagrams and check the left and right door switch circuits

	high	local switch pressed for longer than 20 seconds • Switch circuit short to ground or power	
U2010-11	Switch Illumination - Circuit short to ground	• Switch illumination circuit short to ground	• Refer to electrical circuit diagrams and check the switch illumination circuit
U2012-08	Car Configuration Parameter(s) - Bus signal/message failures	• Car configuration file contains features not available on door module variant fitted	• Cycle the ignition status and re-test. If DTC remains, re-configure the central junction box using the manufacturer approved diagnostic system
U2013-24	Switch Pack - Signal stuck high	• Signal stuck high	• Clear DTC and re-test. If DTC remains, install a new driver side window switch pack
U2014-44	Control Module Hardware - Data memory failure	• Door module internal fault	• Install a new door module
U2100-00	Initial Configuration Not Complete - No sub type information	• Car configuration file invalid / not received	• Re-configure the door module using the manufacturer approved diagnostic system. Check the configuration of the car configuration file
U2101-00	Control Module Configuration Incompatible - No sub type information	• Car configuration file invalid / not received	• Re-configure the door module using the manufacturer approved diagnostic system. Check the configuration of the car configuration file
U3003-62	Battery Voltage - Signal compare failure	• Mis-match of battery voltage, of 2 volts or lower, between door module and central junction box	• Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power and ground supply circuits to both modules

General Information - Diagnostic Trouble Code (DTC) Index DTC: Driver/Passenger Seat Module (DSM/PSM)

Description and Operation

Driver Seat Module (DSM) / Passenger Seat Module (PSM)

CAUTIONS:

 Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

 When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

 If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

 Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

 When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

 Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

 Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

 If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

 Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Driver Seat Module (DSM) / Passenger Seat Module (PSM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Seats (501-10 Seating, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1060-11	Seat Headrest Motor Output - Circuit short to ground	• Head restraint motor circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the head restraint motor circuit for short circuit to ground
B1060-15	Seat Headrest Motor Output - Circuit short to battery or open	• Head restraint motor circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the head restraint motor circuit for short circuit to power, open circuit, high resistance
B1064-31	Seat Headrest Motor Sensor - No signal	• Head restraint motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the head restraint motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B106D-24	Headrest Up Switch - Signal stuck high	• Head restraint up switch circuit short circuit to power • Head restraint up switch stuck active	• Refer to the electrical circuit diagrams and check the head restraint up switch circuit for short circuit to power • Test the operation of the head restraint up switch

B106E-24	Headrest Down Switch - Signal stuck high	• Head restraint down switch circuit short circuit to power • Head restraint down switch stuck active	• Refer to the electrical circuit diagrams and check the head restraint down switch circuit for short circuit to power • Test the operation of the head restraint down switch
B1087-83	LIN Bus "A" - Value of signal protection calculation incorrect	• Seat memory switchpack internal failure	• Install a new seat memory switchpack
B1087-86	LIN Bus "A" - Signal invalid	• Seat memory switchpack internal failure	• Install a new seat memory switchpack
B1087-87	LIN Bus "A" - Missing message	• Seat memory switchpack power or ground circuit open circuit, high resistance • LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Seat memory switchpack internal failure	• Refer to the electrical circuit diagrams and check the seat memory switchpack power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Install a new seat memory switchpack
B1B86-11	Seat Height Motor Relay - Circuit short to ground	 NOTE: Circuit reference HEIGHT MOTOR UP / HEIGHT MOTOR DOWN • Seat height motor circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the seat height motor circuit for short circuit to ground
B1B86-15	Seat Height Motor Relay - Circuit short to battery or open	 NOTE: Circuit reference HEIGHT MOTOR UP / HEIGHT MOTOR DOWN • Seat height motor circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the seat height motor circuit for short circuit to power, open circuit, high resistance
B1B87-31	Seat Height Motor Speed/Position Sensor - no signal	 NOTE: Circuit reference HEIGHT MOTOR SENSE / HEIGHT HALL SENS GND • Seat height motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the seat height motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1B88-11	Seat Slide Motor Relay - Circuit short to ground	 NOTE: Circuit reference SLIDE MOTOR FORWARD / SLIDE MOTOR REARWARD • Seat forward/rearward motor circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the seat forward/rearward motor circuit for short circuit to ground
B1B88-15	Seat Slide Motor Relay - Circuit short to battery or open	 NOTE: Circuit reference SLIDE MOTOR FORWARD / SLIDE MOTOR REARWARD • Seat forward/rearward motor circuit short circuit to power, open circuit, high	• Refer to the electrical circuit diagrams and check the seat forward/rearward motor circuit for short circuit to power, open circuit, high resistance

		resistance	
B1B89-31	Seat Slide Motor Speed/Position Sensor - No signal	 NOTE: Circuit reference SLIDE MOTOR SENSE / SLIDE HALL SENS GND • Seat forward/rearward motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the seat forward/rearward motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1B90-11	Seat Tilt Motor Relay - Circuit short to ground	 NOTE: Circuit reference TILT MOTOR UP / TILT MOTOR DOWN • Seat tilt motor circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the seat tilt motor circuit for short circuit to ground
B1B90-15	Seat Tilt Motor Relay - Circuit short to battery or open	 NOTE: Circuit reference TILT MOTOR UP / TILT MOTOR DOWN • Seat tilt motor circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the seat tilt motor circuit for short circuit to power, open circuit, high resistance
B1B91-31	Seat Tilt Motor Speed/Position Sensor - No signal	 NOTE: Circuit reference TILT MOTOR SENSE / TILT HALL SENS GND • Seat tilt motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the seat tilt motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1B92-11	Seat Recline Motor Relay - Circuit short to ground	 NOTE: Circuit reference SQUAB MOTOR INCLINE / SQUAB MOTOR RECLINE • Seat backrest recline motor circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the seat backrest recline motor circuit for short circuit to ground
B1B92-15	Seat Recline Motor Relay - Circuit short to battery or open	 NOTE: Circuit reference SQUAB MOTOR INCLINE / SQUAB MOTOR RECLINE • Seat backrest recline motor circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the seat backrest recline motor circuit for short circuit to power, open circuit, high resistance
B1B93-31	Seat Recline Motor Speed/Position Sensor - No signal	 NOTE: Circuit reference SQUAB MOTOR SENSE / SQUAB HALL SENS GND • Seat backrest recline motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the seat backrest recline motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance

B1B94-24	Seat Height Up Switch - Signal stuck high	• Seat height up switch circuit short circuit to power • Seat height up switch stuck active	• Refer to the electrical circuit diagrams and check the seat height up switch circuit for short circuit to power • Test the operation of the seat height up switch
B1B95-24	Seat Height Down Switch - Signal stuck high	• Seat height down switch circuit short circuit to power • Seat height down switch stuck active	• Refer to the electrical circuit diagrams and check the seat height down switch circuit for short circuit to power • Test the operation of the seat height down switch
B1B96-24	Seat Slide Forward Switch - Signal stuck high	• Seat slide forward switch circuit short circuit to power • Seat slide forward switch stuck active	• Refer to the electrical circuit diagrams and check the seat slide forward switch circuit for short circuit to power • Test the operation of the seat slide forward switch
B1B97-24	Seat Slide Backward Switch - Signal stuck high	• Seat slide rearward switch circuit short circuit to power • Seat slide rearward switch stuck active	• Refer to the electrical circuit diagrams and check the seat slide rearward switch circuit for short circuit to power • Test the operation of the seat slide rearward switch
B1B98-24	Seat Tilt Up Switch - Signal stuck high	• Seat tilt up switch circuit short circuit to power • Seat tilt up switch stuck active	• Refer to the electrical circuit diagrams and check the seat tilt up switch circuit for short circuit to power • Test the operation of the seat tilt up switch
B1B99-24	Seat Tilt Down Switch - Signal stuck high	• Seat tilt down switch circuit short circuit to power • Seat tilt down switch stuck active	• Refer to the electrical circuit diagrams and check the seat tilt down switch circuit for short circuit to power • Test the operation of the seat tilt down switch
B1C00-24	Seat Recline Up Switch - Signal stuck high	• Seat backrest recline up switch circuit short circuit to power • Seat backrest recline up switch stuck active	• Refer to the electrical circuit diagrams and check the seat backrest recline up switch circuit for short circuit to power • Test the operation of the seat backrest recline up switch
B1C01-24	Seat Recline Down Switch - Signal stuck high	• Seat backrest recline down switch circuit short circuit to power • Seat backrest recline down switch stuck active	• Refer to the electrical circuit diagrams and check the seat backrest recline down switch circuit for short circuit to power • Test the operation of the seat backrest recline down switch
B1C02-24	Memory Store Switch - Signal stuck high	• Memory store switch stuck active	• Test the operation of the memory store switch
B1C03-24	Memory #1 Switch - Signal stuck high	• Memory 1 switch stuck active	• Test the operation of the memory 1 switch
B1C04-24	Memory #2 Switch - Signal stuck high	• Memory 2 switch stuck active	• Test the operation of the memory 2 switch
B1C05-24	Memory #3 Switch - Signal stuck high	• Memory 3 switch stuck active	• Test the operation of the memory 3 switch
U0010-88	Medium speed CAN Communication Bus - Bus off	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0140-00	Lost Communication With Body Control Module - No sub type information	• Central junction box power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Central junction box system fault	• Refer to the electrical circuit diagrams and check the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index

U0142-00	Lost Communication With Body Control Module "B" - No sub type information	• Central junction box power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Central junction box system fault	• Refer to the electrical circuit diagrams and check the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information	• Instrument cluster power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Instrument cluster system fault	• Refer to the electrical circuit diagrams and check the instrument cluster power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the instrument cluster for related DTCs and refer to the relevant DTC index
U0199-00	Lost Communication With "Door Control Module A" - No sub type information	• Driver door module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Driver door module fault	• Refer to the electrical circuit diagrams and check the driver door module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the driver door module for related DTCs and refer to the relevant DTC index
U0300-00	Software Incompatibility - No sub type information	• Driver/passenger seat module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the driver/passenger seat module with the latest level software
U1A14-49	CAN Initialization Failure - Internal electronic failure	• Driver/passenger seat module internal failure	• Using the manufacturer approved diagnostic system, re-configure the driver/passenger seat module with the latest level software. Clear the DTCs and retest. If the fault persists, install a new driver/passenger seat module
U1A4C-00	Build / End of Line mode Active - No sub type information	• Error/mismatch in car configuration file	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary. Clear the DTC and re-test
U3000-49	Control Module - Internal electronic failure	• Driver/passenger seat module internal failure	• Install a new driver/passenger seat module
U3001-46	Control Module Improper Shutdown - Calibration/parameter memory failure	• Driver/passenger seat module power has been disconnected whilst in manufacturing mode	 NOTE: This DTC is for information only • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, re-configure the driver/passenger seat module with the latest level software
U3002-81	Vehicle Identification Number - Invalid serial data received	• Driver/passenger seat module previously installed on another vehicle • New driver/passenger seat module installed and VIN not yet programmed	• Install the original or a new driver/passenger seat module as necessary • Using the manufacturer approved diagnostic system, perform routine - Learn VIN (0x0404)
U3003-16	Battery Voltage - Circuit voltage below threshold	• Driver/passenger seat module power or ground circuit open circuit, high resistance • Battery/charging	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the electrical circuit diagrams and check the driver/passenger seat module power and ground circuits for open circuit, high resistance

		system fault	• Refer to the relevant section of the workshop manual and test the battery and charging system
U3003-17	Battery Voltage - Circuit voltage above threshold	• Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the relevant section of the workshop manual and test the battery and charging system

General Information - Diagnostic Trouble Code (DTC) Index DTC: Dynamic Response Control Module (DRM)

Description and Operation

Dynamic Response Control Module (DRM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Dynamic Response Control Module (DRM), for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Active Stabilization System (204-06 Ride and Handling Optimization, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1A84-64	Car Configuration Data - Signal plausibility failure	• Data does not match that expected for VIN range	• Configure the car configuration file using the approved diagnostic system. Clear the DTC and test for normal operation re-configure the dynamic response control module using the manufacturer approved diagnostic system, clear DTC and re-test
C1024-00	System Temporarily Disabled Due To Power Interruption During Driving - No sub type information	• Dynamic response control module power circuit, open circuit, high resistance • Dynamic response control module ground circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check dynamic response control module power circuit for open circuit, high resistance. Check engine management system control relay. Refer to the electrical circuit diagrams and check dynamic response control module ground circuit for open circuit, high resistance
C1111-22	Control Lateral Acceleration - Signal amplitude > maximum	• Dynamic response control module failure	• Check for associated codes giving more information. Check and install a new dynamic response control module as required
C1111-27	Control Lateral Acceleration - Signal rate of change above threshold	• Intermittent lower lateral accelerometer signal • Lower lateral accelerometer	• Check for associated codes giving more information. Refer to the electrical circuit diagrams and check lower lateral accelerometer circuit for intermittent open circuit, high resistance. Check and install a new lower lateral accelerometer as required. Carry out the accelerometer tests using the approved diagnostic system. Check and

		failure • Internal dynamic response control module calculation fault	install a new lower lateral accelerometer as required
C1112-00	Roll Angle - No sub type information	• Internal dynamic response control module calculation fault • Dynamic response control module failure	• Check for associated codes giving more information. Check and install a new dynamic response control module as required
C1112-29	Roll Angle - Signal invalid	• Internal dynamic response control module calculation fault • Dynamic response control module failure	• Check for associated codes giving more information. Check and install a new dynamic response control module as required
C1113-00	Off Road Determination - No sub type information	• Internal dynamic response control module calculation fault • Dynamic response control module failure	• Check for associated codes giving more information. Check and install a new dynamic response control module as required
C1114-00	Roll Axis Torque - No sub type information	• Internal dynamic response control module calculation fault • Dynamic response control module failure	• Check for associated codes giving more information. Check and install a new dynamic response control module as required
C1116-29	Torque/Pressure - Signal invalid	• Internal dynamic response control module calculation fault • Dynamic response control module failure	• Check for associated codes giving more information. Check and install a new dynamic response control module as required
C1117-29	Direction Control Valve(s) - Signal invalid	• Internal dynamic response control module calculation fault • Dynamic response control module failure	• Check for associated codes giving more information. Check and install a new dynamic response control module as required
C1117-71	Direction Control Valve(s) - Actuator stuck	• Sticking direction control valves	• Check and install a new valve block
C1117-95	Direction Control Valve(s) - Incorrect assembly	• Incorrect connection of the pressure control and direction control valves • Direction control valve circuit high resistance • Damaged direction control valve	• Check the valve connections and rectify as necessary. Check the direction control valves. Check direction control valve circuit for high resistance. Check and install a new direction control valve as required
C1119-09	Hydraulic Pressure - Component failures	• Low fluid • Leak in high pressure primary circuit • Leaking reservoir • Leak in secondary circuit • Direction control valves stuck open • Pressure control valve fault • Pressure transducer fault	• Check and top up the fluid as required. Check and rectify any leaks as required. Check and install a new pressure control valve as required. Check and install a new pressure transducer as required. Check and install a new filter as required. Check the front and rear actuators. Check and install a new actuator as required

		• Blocked filter • Actuator fault	
C1119-22	Hydraulic Pressure - Signal amplitude > maximum	• Pressure transducer fault • Pressure control valve fault	• Check and install a new pressure transducer as required • Check and install a new pressure control valve as required
C1119-62	Hydraulic Pressure - Signal compare failure	• Low fluid • Leak in high pressure primary circuit • Leaking reservoir • Leak in secondary circuit • Direction control valves stuck open • Pressure control valve fault • Pressure transducer fault • Blocked filter • Actuator fault • Broken drop link • Broken stabilizer bar • Air in system	• Check and top up the fluid as required. Check and rectify any leaks as required. Check and install a new pressure control valve as required. Check and install a new pressure transducer as required. Check and install a new filter as required. Check the system front and rear actuators. Check and install a new actuator as required. Check and install new drop links or stabilizer bars as necessary. Carry out the manual bleed procedure
C1119-7B	Hydraulic Pressure - Low fluid level	• Low fluid • Leak in high pressure primary circuit • Leaking reservoir • Leak in secondary circuit • Blocked filter • Low pump flow • Blocked or kinked suction hose	• Check and top up the fluid as required. Check and rectify any leaks as required. Check and install a new filter as required. Check and replace the pump as required Check the suction hose for blockage or kinking, rectify or replace as required
C1119-91	Hydraulic Pressure - Parametric	• Pressure control valve fault • Contaminated fluid • Kinked or blocked return pipe • Pressure transducer fault	• For sticking / faulty valves, install a new pressure control valve as required. Clean the system, replace the fluid. Check and replace the return pipe as necessary. For a pressure transducer fault, install a new pressure transducer
C1A97-62	Lateral Accelerometer Circuit- Signal compare failure	• Damaged accelerometers • Bent brackets	• Check the accelerometers and brackets. Check and install new accelerometers as required
C1A99-16	Pressure Sensor - Circuit voltage below threshold	• Pressure sensor circuit short to ground, open circuit • Pressure sensor failure	• Refer to the electrical circuit diagrams and check pressure sensor circuit for short to ground, open circuit. Check and install a new pressure sensor as required
C1A99-17	Pressure Sensor - Circuit voltage above threshold	• Pressure sensor circuit short to power • Pressure sensor failure	• Refer to the electrical circuit diagrams and check pressure sensor circuit for short to power. Check and install a new pressure sensor as required
C1A99-1C	Pressure Sensor - Circuit voltage out of range	• Pressure sensor circuit short to ground, short to power, open circuit, high resistance • Pressure sensor failure	• Refer to the electrical circuit diagrams and check pressure sensor circuit for short to ground, short to power, open circuit, high resistance. Check and install a new pressure sensor as required
C1A99-26	Pressure Sensor - Signal rate of change below threshold	• Pressure sensor circuit short to ground, short to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check pressure sensor circuit for short to ground, short to power, open circuit, high resistance. Check and install a new pressure sensor as required

		Pressure sensor failure	
C1B03-01	Directional Control Valve #1 - General electrical failure	• Directional control valve 1 circuit short to ground, short to power, open circuit, high resistance, short to another circuit • Dynamic response control module failure	• Refer to the electrical circuit diagrams and check directional control valve 1 circuit for short to ground, short to power, open circuit, high resistance, short to another circuit. Check and install a new dynamic response control module as required
C1B03-12	Directional Control Valve #1 - Circuit short to battery	• Directional control valve 1 circuit short to power • Directional control valve 1 failure	• Refer to the electrical circuit diagrams and check directional control valve 1 circuit for short to power. Check and install a new directional control valve 1 solenoid coil as required
C1B03-14	Directional Control Valve #1 - Circuit short to ground or open	• Directional control valve 1 circuit short to ground, open circuit • Directional control valve 1 failure	• Refer to the electrical circuit diagrams and check directional control valve 1 circuit for short to ground, open circuit. Check and install a new directional control valve 1 solenoid coil as required
C1B03-18	Directional Control Valve #1 - Circuit current below threshold	• Directional control valve 1 circuit high resistance • Directional control valve 1 failure	• Refer to the electrical circuit diagrams and check directional control valve 1 circuit for high resistance. Check and install a new directional control valve 1 solenoid coil as required
C1B03-19	Directional Control Valve #1 - Circuit current above threshold	• Directional control valve 1 circuit short to power • Directional control valve 1 failure	• Refer to the electrical circuit diagrams and check directional control valve 1 circuit for short to power. Check and install a new directional control valve 1 solenoid coil as required
C1B03-1D	Directional Control Valve #1 - Circuit current out of range	• Directional control valve 1 circuit open circuit, high resistance • Directional control valve 1 failure	• Refer to the electrical circuit diagrams and check directional control valve 1 circuit for open circuit, high resistance. Check and install a new directional control valve 1 solenoid coil as required
C1B04-00	Initial (Hit) Current - Directional control valve #1 - No sub type information	• Directional control valve 1 circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check directional control valve 1 circuit for open circuit, high resistance
C1B05-00	Hold Current - Directional control valve #1 - No sub type information	• Directional control valve 1 circuit high resistance • Air in system	• Refer to the electrical circuit diagrams and check directional control valve 1 circuit for high resistance. Carry out the manual bleed procedure
C1B06-00	Off State Current Monitor - Directional control valve #1 - No sub type information	• Directional control valve 1 off current greater than the limit • Directional control valve 1 off current greater than 0.1 Amps • Directional control valve 1 circuit short to another circuit	• Disconnect the dynamic response control module 30 way connector, refer to the electrical circuit diagrams and check directional control valve 1 circuit for short to another circuit
C1B07-01	Directional Control Valve #2 - General electrical failure	• Directional control valve 2 short to ground, short to power, open circuit, high resistance, short to another circuit • Dynamic response	• Refer to the electrical circuit diagrams and check directional control valve 2 circuit for short to ground, short to power, open circuit, high resistance, short to another circuit. Check and install a new dynamic response control module as required

		control module failure	
C1B07-12	Directional Control Valve #2 - Circuit short to battery	• Directional control valve 2 circuit short to power • Directional control valve 2 failure	• Refer to the electrical circuit diagrams and check directional control valve 2 circuit for short to power. Check and install a new directional control valve 2 solenoid coil as required
C1B07-14	Directional Control Valve #2 - Circuit short to ground or open	• Directional control valve 2 circuit short to ground, open circuit • Directional control valve 2 failure	• Refer to the electrical circuit diagrams and check directional control valve 2 circuit for short to ground, open circuit. Check and install a new directional control valve 2 solenoid coil as required
C1B07-18	Directional Control Valve #2 - Circuit current below threshold	• Directional control valve 2 circuit high resistance • Directional control valve 2 failure	• Refer to the electrical circuit diagrams and check directional control valve 2 circuit for high resistance. Check and install a new directional control valve 2 solenoid coil as required
C1B07-19	Directional Control Valve #2 - Circuit current above threshold	• Directional control valve 2 circuit short to power • Directional control valve 2 failure	• Refer to the electrical circuit diagrams and check directional control valve 2 circuit for short to power. Check and install a new directional control valve 2 solenoid coil as required
C1B07-1D	Directional Control Valve #2 - Circuit current out of range	• Directional control valve 2 circuit open circuit, high resistance • Directional control valve 2 failure	• Refer to the electrical circuit diagrams and check directional control valve 2 circuit for open circuit, high resistance. Check and install a new directional control valve 2 solenoid coil as required
C1B08-00	Initial (Hit) Current - Directional control valve #2 - No sub type information	• Directional control valve 2 circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check directional control valve 2 circuit for open circuit, high resistance
C1B09-00	Hold Current - Directional control valve #2 - No sub type information	• Directional control valve 2 circuit high resistance • Air in system	• Refer to the electrical circuit diagrams and check directional control valve 2 circuit for high resistance. Carry out the manual bleed procedure
C1B10-00	Off State Current Monitor - Directional control valve #2 - No sub type information	• Directional control valve 2 off current greater than the limit • Directional control valve 2 off current greater than 0.1 Amps • Directional control valve 2 circuit short to another circuit	• Disconnect the dynamic response control module 30 way connector, refer to the electrical circuit diagrams and check directional control valve 2 circuit for short to another circuit
C1B11-01	Pressure Control Valve - General electrical failure	• Pressure control valve circuit short to ground, short to power, open circuit, high resistance, short to another circuit • Pressure control valve failure	• Refer to the electrical circuit diagrams and check pressure control valve circuit for short to ground, short to power, open circuit, high resistance, short to another circuit. Check and install a new pressure control valve as required
C1B11-12	Pressure Control Valve - Circuit short to battery	• Pressure control valve circuit short to power • Pressure control valve failure	• Refer to the electrical circuit diagrams and check pressure control valve circuit for short to power. Check and install a new pressure control valve solenoid coil as required
C1B11-14	Pressure Control Valve - Circuit short to ground or open	• Pressure control valve circuit short to ground, open circuit	• Refer to the electrical circuit diagrams and check pressure control valve circuit for short to ground, open circuit. Check and install a new pressure control valve solenoid coil as required

		• Pressure control valve failure	
C1B11-18	Pressure Control Valve - Circuit current below threshold	• Pressure control valve circuit open circuit, high resistance • Pressure control valve failure	• Refer to the electrical circuit diagrams and check pressure control valve circuit for open circuit, high resistance. Check and install a new pressure control valve solenoid coil as required
C1B11-19	Pressure Control Valve - Circuit current above threshold	• Pressure control valve circuit short circuit to power	• Refer to the electrical circuit diagrams and check pressure control valve circuit for short to power. Check and install a new pressure control valve solenoid coil as required
C1B11-1D	Pressure Control Valve - Circuit current out of range	• Pressure control valve circuit high resistance • Pressure control valve failure	• Refer to the electrical circuit diagrams and check pressure control valve circuit for high resistance. Check and install a new pressure control valve solenoid coil as required
C1B11-62	Pressure Control Valve - Signal compare failure	• Low / contaminated fluid • Pressure control valve fault • Low flow / low pressure pump • Pressure transducer fault • Air in system	• Check fluid condition and replace as required. Check and top up fluid level as required. Check and install a new pressure control valve as required. Check the pump operation and hoses, rectify as necessary. Check and install a new pressure transducer as required. Carry out the manual bleed procedure
C1B11-64	Pressure Control Valve - Signal plausibility failure	• Pressure control valve circuit high resistance • Pressure control valve failure	• Refer to the electrical circuit diagrams and check pressure control valve circuit for high resistance. Check and install a new pressure control valve solenoid coil as required
C1B12-12	Lower Lateral Accelerometer - Circuit short to battery	• Lower lateral accelerometer signal circuit short to power or another circuit	• Refer to the electrical circuit diagrams and check lower lateral accelerometer circuit for short to power, short to another circuit
C1B12-14	Lower Lateral Accelerometer - Circuit short to ground or open	• Lower lateral accelerometer signal circuit short ground, short to another circuit, open circuit • Lower lateral accelerometer failure	• Refer to the electrical circuit diagrams and check lower lateral accelerometer circuit for short to ground, short to another circuit, open circuit. Check and install a new lower lateral accelerometer as required
C1B12-22	Lower Lateral Accelerometer - Signal amplitude > maximum	• Lower lateral accelerometer loose • Lower lateral accelerometer signal circuit short circuit to ground, short to another circuit • Lower lateral accelerometer failure	• Check the lower lateral accelerometer installation, rectify as necessary. Refer to the electrical circuit diagrams and check lower lateral accelerometer circuit for short to ground, short to another circuit, open circuit. Check and install a new lower lateral accelerometer as required
C1B12-26	Lower Lateral Accelerometer - Signal rate of change below threshold	• Lower lateral accelerometer loose • Lower lateral accelerometer signal circuit short circuit to ground, short to another circuit • Lower lateral accelerometer failure	• Check the lower lateral accelerometer installation, rectify as necessary. Refer to the electrical circuit diagrams and check lower lateral accelerometer circuit for short to ground, short to another circuit, open circuit. Check and install a new lower lateral accelerometer as required
C1B12-28	Lower Lateral Accelerometer - Signal bias level	• Lower lateral accelerometer mounting	• Check the lower lateral accelerometer installation, rectify as necessary. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new

	out of range / zero adjustment failure	damaged • Lower lateral accelerometer loose • Lower lateral accelerometer failure	lower lateral accelerometer as necessary
C1B12-76	Lower Lateral Accelerometer - Wrong mounting position	• Lower lateral accelerometer mounting damaged • Lower lateral accelerometer failure	• Check the lower lateral accelerometer installation, rectify as necessary. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new lower lateral accelerometer as necessary
C1B13-12	Upper Lateral Accelerometer - Circuit short to battery	• Upper lateral accelerometer signal circuit short to power, short to another circuit • Upper lateral accelerometer failure	• Refer to the electrical circuit diagrams and check upper lateral accelerometer circuit for short to power, short to another circuit. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new upper lateral accelerometer as necessary
C1B13-14	Upper Lateral Accelerometer - Circuit short to ground or open	• Upper lateral accelerometer signal circuit short circuit to ground, short to anther circuit • Upper lateral accelerometer failure	• Refer to the electrical circuit diagrams and check upper lateral accelerometer circuit for short to ground, short to another circuit. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new upper lateral accelerometer as necessary
C1B13-22	Upper Lateral Accelerometer - Signal amplitude > maximum	• Upper lateral accelerometer loose • Upper lateral accelerometer signal circuit short to another circuit • Upper lateral accelerometer failure	• Check the upper lateral accelerometer installation, rectify as necessary. Refer to the electrical circuit diagrams and check upper lateral accelerometer circuit for short to another circuit. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new upper lateral accelerometer as necessary
C1B13-26	Upper Lateral Accelerometer - Signal rate of change below threshold	• Upper lateral accelerometer signal circuit short to another circuit • Upper lateral accelerometer failure	• Refer to the electrical circuit diagrams and check upper lateral accelerometer circuit for short to another circuit. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new upper lateral accelerometer as necessary
C1B13-28	Upper Lateral Accelerometer - Signal bias level out of range / zero adjustment failure	• Upper lateral accelerometer mounting damaged • Upper lateral accelerometer loose • Upper lateral accelerometer failure	• Check the upper lateral accelerometer installation, rectify as necessary. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new upper lateral accelerometer as necessary
C1B13-76	Upper Lateral Accelerometer - Wrong mounting position	• Upper lateral accelerometer mounting damaged • Upper lateral accelerometer failure	• Check the upper lateral accelerometer installation, rectify as necessary. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new upper lateral accelerometer as necessary
C1B14-1C	Sensor Supply Voltage A - Circuit voltage out of range	• Lower lateral accelerometer or pressure transducer supply circuit short to ground, short to another circuit • Lower lateral	• Refer to the electrical circuit diagrams and check lower lateral accelerometer or pressure transducer supply circuit for short to ground, short to another circuit. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new lower lateral accelerometer as necessary. Check and install a new pressure transducer as necessary. Check and install a new dynamic response control module as required

		accelerometer fault • Pressure transducer fault • Dynamic response control module failure	
C1B15-1C	Sensor Supply Voltage B - Circuit voltage out of range	• Upper lateral accelerometer or pressure transducer supply circuit short to ground, short to another circuit • Upper lateral accelerometer fault • Pressure transducer fault • Dynamic response control module failure	• Refer to the electrical circuit diagrams and check upper lateral accelerometer or pressure transducer supply circuit for short to ground, short to another circuit. Carry out the accelerometer tests using the approved diagnostic system. Check and install a new upper lateral accelerometer as necessary. Check and install a new pressure transducer as necessary. Check and install a new dynamic response control module as required
P1145-29	Calculated Torque Error - Signal invalid	• Internal control module calculation failure • Dynamic response control module failure	• Check for associated codes giving more information. Check and install a new dynamic response control module
U0001-88	High Speed CAN Communications Bus – Bus off	• Bus off	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	• CAN circuit fault • CAN module fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the engine control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the engine control module and the dynamic response control module
U0101-00	Lost Communication With TCM - No sub type information	• CAN circuit fault • CAN module fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the transmission control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transmission control module and the dynamic response control module
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	• CAN circuit fault • CAN module fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the transfer case control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transfer case control module and the dynamic response control module
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	• CAN circuit fault • CAN module fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the anti-lock brake system control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the anti-lock brake system control module and the dynamic response control module
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• CAN circuit fault • CAN module fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the Steering angle sensor module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Steering angle sensor module and the dynamic response control module
U0132-00	Lost Communication With Suspension Control Module	• CAN circuit fault • CAN module fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the air suspension control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN

	"A" - No sub type information		network between the air suspension control module and the dynamic response control module
U0140-00	Lost Communication With Body Control Module - No sub type information	• CAN circuit fault • CAN module fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the central junction box. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the dynamic response control module
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Dynamic response control module not configured or incorrectly configured	• Clear DTC and re-test. Re-configure the dynamic response control module using the manufacturer approved diagnostic system
U0401-68	Invalid Data Received From ECM/PCM A - Event information	• Engine control module fault	• Check the engine control module for related DTCs using the approved diagnostic system. Clear DTC and re-check. Check for CAN or module DTCs. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0402-68	Invalid Data Received From TCM - Event information	• Transmission control module fault	• Check the transmission control module for related DTCs using the approved diagnostic system. Clear DTC and re-check. Check for CAN or module DTCs. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0403-68	Invalid Data Received From Transfer Case Control Module - Event information	• Transfer case control module fault	• Check the transfer case control module for related DTCs using the approved diagnostic system. Clear DTC and re-check. Check for CAN or module DTCs. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0415-00	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - No sub type information	• Road speed signal fault • Wheel speed sensor(s) fault	• Check for CAN or anti-lock brake system control module DTCs. Check wheel speed sensor(s) for damage. Check wheel speed sensor air gap and correct as required. Check wheel speed rotors for damage. Check and replace wheel speed sensor(s) as required. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0415-68	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Event information	• Yaw rate sensor wrong orientation/ position • Yaw rate sensor fault	• Check yaw rate sensor is correctly positioned / installed. Check for CAN or anti-lock brake system control module DTCs. Check the power and ground circuits to the yaw rate sensor. Check and replace yaw rate sensor as required. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0421-68	Invalid Data Received From Suspension Control Module A - Event information	• Suspension out of calibration • Air suspension control module fault	• Calibrate the vehicle ride height using the approved diagnostic system. Check for CAN or air suspension control module related DTCs. Check the power and ground circuits to the air suspension control module. Check and install a new air suspension control module as required. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0428-68	Invalid Data Received From Steering Angle Sensor Module - Event information	• Steering angle sensor out of calibration • Steering angle sensor fault	• Calibrate the Steering angle sensor using the approved diagnostic system. Check for CAN or module DTCs. Check the power and ground circuits to the Steering angle sensor. Check and install a new steering angle sensor as required. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0428-85	Invalid Data Received From Steering Angle Sensor Module - Signal above allowable range	• Steering angle sensor out of calibration • Steering angle sensor fault	• Calibrate the Steering angle sensor using the approved diagnostic system. Check for CAN or module DTCs. Check the power and ground circuits to the Steering angle sensor module. Check and install a new steering angle sensor module as required. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0428-86	Invalid Data Received From Steering Angle Sensor Module - Signal invalid	• Steering angle sensor out of calibration • Wheels out of alignment • Steering angle sensor fault	• Calibrate the Steering angle sensor using the approved diagnostic system. Check the wheel alignment, adjust as necessary. Check for CAN or Steering angle sensor module DTCs. Check the power and ground circuits to the Steering angle sensor module. Check and install a new steering angle sensor module as required. Using the manufacturer approved diagnostic system, complete a

			CAN network integrity test
U1A14-49	CAN Initialisation Failure - Internal electronic failure	• Dynamic response control module internal fault	• Refer to the electrical circuit diagrams and check the power and ground connections to the dynamic response control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network. Check and install a new dynamic response control module as required
U2007-98	Valve(s) - Component or system over temperature	 NOTE: The DTC detects pressure control valve over temperature. Estimated valve temperature over 142°c. The temperature is derived from the resistance of the PCV coil. • Restricted filter • Restricted high pressure or return line pipework • Contaminated fluid • Pressure control valve faulty • Continuous use at high lateral acceleration	• Check the filter and pipework and replace as required. Check the fluid condition, replace and clean as necessary. Clear DTC and re-test. Check and install a new pressure control valve as required
U3000-01	Control Module - General electrical failure	• Pressure control valve circuit short circuit or very low resistance. Short to power • Directional control valve circuit short to power or very low resistance	• Using the manufacturer approved diagnostic system check for associated codes giving more information. Refer to the electrical circuit diagrams and check pressure control valve and directional control valve negative connections circuit for fault
U3000-04	Control Module - System internal failures	• Dynamic response control module internal fault	• Check and install a new dynamic response control module as required
U3000-43	Control Module - Special memory failure - special memory failure	• Dynamic response control module internal fault	• Check and install a new dynamic response control module as required
U3000-45	Control Module - Programme memory failure	• Dynamic response control module internal fault	• Check and install a new dynamic response control module as required
U3000-47	Control Module - Watchdog / safety Micro controller failure	• Dynamic response control module internal fault	• Check and install a new dynamic response control module as required
U3000-52	Control Module - Not activated	• Dynamic response control module not configured or incorrectly configured	• Clear DTC and re-test. Re-configure the dynamic response control module using the manufacturer approved diagnostic system
U3000-54	Control Module - Missing calibration	• Dynamic response control module not configured or incorrectly configured	• Clear DTC and re-test. Re-configure the dynamic response control module using the manufacturer approved diagnostic system
U3003-1C	Battery Voltage - Circuit voltage out of range	• Dynamic response control module power supply circuit high resistance, open circuit • Charging system fault	• Refer to the electrical circuit diagrams and check dynamic response control module power supply circuit for high resistance, open circuit. Check vehicle battery. Check for charging system DTCs, rectify as necessary
U3003-	Battery Voltage	• Inconsistent	• Refer to the electrical circuit diagrams and check the

62	- Signal compare failure	battery voltages received by dynamic response control module • Dynamic response control module supply circuit(s) short to ground, short to power, high resistance, open circuit • Dynamic response control module internal failure	dynamic response control module power supply circuit for high resistance, open circuit. Check vehicle battery. Check for charging system DTCs, rectify as necessary

General Information - Diagnostic Trouble Code (DTC) Index DTC: Electric Park Brake Control Module (EPBCM)

Description and Operation

Electric Park Brake Control Module (EPBCM)

CAUTIONS:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Electric Park Brake Control Module (EPBCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Parking Brake (206-05 Parking Brake and Actuation, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
C0062-01	Longitudinal Acceleration Sensor - General electrical failure	• Electric park brake control module internal failure	NOTE: The longitudinal acceleration sensor is integral with the electric park brake control module • Using the manufacturer approved diagnostic system, clear the DTCs. Perform Drive Cycle 2. If the fault persists, install a new electric park brake control module
C0062-02	Longitudinal Acceleration Sensor - General signal failure	• Electric park brake control module internal failure	NOTE: The longitudinal acceleration sensor is integral with the electric park brake control module • Using the manufacturer approved diagnostic system, clear the DTCs. Perform Drive Cycle 2. If the fault persists, install a new electric park brake control module
C0062-54	Longitudinal Acceleration Sensor - Missing calibration	• Longitudinal acceleration sensor calibration failure	NOTE: The longitudinal acceleration sensor is integral with the electric park brake control module • Using the manufacturer approved diagnostic system,

			perform routine - Sensor Calibration (0x211D)
C1104-68	Brake Bedding Mode - Event information	• Electric park brake control module in brake bedding mode	NOTE: This DTC is for information only • Cycle the ignition to exit brake bedding mode
C1A43-01	Motor Supply - General electrical failure	• Electric park brake control module internal failure	NOTE: The electric park brake actuator is integral with the electric park brake control module • Using the manufacturer approved diagnostic system, clear the DTCs. Perform Drive Cycle 3. If the fault persists, install a new electric park brake control module
C1A43-19	Motor Supply - Circuit current above threshold	• Electric park brake actuator current above threshold	NOTE: The electric park brake actuator is integral with the electric park brake control module • Check for mechanical failures causing the electric park brake to jam on
C1A43-67	Motor Supply - Signal incorrect after event	• Electric park brake control module internal failure	NOTE: The electric park brake actuator is integral with the electric park brake control module • Test the functionality of the electric park brake. Using the manufacturer approved diagnostic system, check for related DTCs. Clear the DTCs and retest. If the fault persists, install a new electric park brake control module
C1A46-01	Mismatch Between Motor Drive Current and Resultant Force - General electrical failure	• Electric park brake control module internal failure	• Test the functionality of the electric park brake. Using the manufacturer approved diagnostic system, check for related DTCs. Clear the DTCs and retest. If the fault persists, install a new electric park brake control module
C1A46-64	Mismatch Between Motor Drive Current and Resultant Force - Signal plausibility failure	• Electric park brake control module internal failure	• Test the functionality of the electric park brake. Using the manufacturer approved diagnostic system, check for related DTCs. Clear the DTCs and retest. If the fault persists, install a new electric park brake control module
C1A47-01	Force Sensor - General electrical failure	• Electric park brake control module internal failure	NOTE: The force sensor is integral with the electric park brake control module • Using the manufacturer approved diagnostic system, clear the DTCs. Perform Drive Cycle 1. If the fault persists, install a new electric park brake control module
C1A47-02	Force Sensor - General signal failure	• Electric park brake control module internal failure	NOTE: The force sensor is integral with the electric park brake control module • Using the manufacturer approved diagnostic system, clear the DTCs. Perform Drive Cycle 3. If the fault persists, install a new electric park brake control module
C1A47-54	Force Sensor - Missing calibration	• Electric park brake control module internal failure	NOTE: The force sensor is integral with the electric park brake control module • Using the manufacturer approved diagnostic system, clear the DTCs. Perform Drive Cycle 1. If the fault persists, install a new electric park brake control module
C1A48-01	Warning Lamp - General electrical failure	NOTE: Circuit reference STATUS LAMP • Electric park brake warning lamp circuit short circuit to ground,	• Refer to the electrical circuit diagrams and check the electric park brake warning lamp circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new electric park brake control module • Using the manufacturer approved diagnostic system,

		short circuit to power, open circuit, high resistance • Electric park brake control module internal failure • Instrument cluster internal failure	clear the DTCs and retest. If the fault persists, install a new instrument cluster
C1A53-68	Manual Emergency Release Activated - Event information	• Electric park brake emergency release cable has been activated or is stuck/damaged • Park brake cables seized/damaged • Electric park brake control module internal failure	• Check that the electric park brake emergency release cable is not permanently pulled (or stuck). Attempt to re-engage the electric park brake by operating the apply switch twice. If successful, clear the DTCs and test by operating the emergency release and re-engaging the electric park brake • Check the integrity of the park brake cables • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new electric park brake control module
U0073-88	Control Module Communication Bus "A" Off - Bus off	• High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	• Engine control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Engine system fault	• Refer to the electrical circuit diagrams and check the engine control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0101-00	Lost Communication with TCM - No sub type information	• Transmission control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transmission system fault	• Refer to the electrical circuit diagrams and check the transmission control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	• Transfer case control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case system fault	• Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the transfer case control module for related DTCs and refer to the relevant DTC index
U0121-00	Lost Communication With Anti-Lock	• Anti-lock brake system control	• Refer to the electrical circuit diagrams and check the anti-lock brake system control module power and

	Brake System (ABS) Control Module - No sub type information	module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Anti-lock brake system fault	ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0140-00	Lost Communication With Body Control Module - No sub type information	• Central junction box power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Central junction box system fault	• Refer to the electrical circuit diagrams and check the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0300-55	Internal Control Module Software Incompatibility - Not configured	• Electric park brake control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the electric park brake control module with the latest level software
U0401-00	Invalid Data Received From ECM/PCM A - No sub type information	• Missing/invalid data from the engine control module	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0401-68	Invalid Data Received from ECM/PCM A - Event information	• Missing/invalid data from the engine control module	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0402-00	Invalid data received from the TCM - No sub type information	• Missing/invalid data from the transmission control module	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0403-00	Invalid Data Received From The Transfer Case Control Module - No sub type information	• Missing/invalid data from the transfer case control module	• Using the manufacturer approved diagnostic system, check the transfer case control module for related DTCs and refer to the relevant DTC index
U0415-00	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - No sub type information	• Missing/invalid data from the anti-lock brake system control module	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0422-00	Invalid Data Received From Body Control Module - No sub type information	• Missing/invalid data from the central junction box	• Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0422-68	Invalid Data Received From Body Control Module - Event information	• Missing/invalid data from the central junction box	• Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0452-68	Invalid Data Received From Restraints Control Module - Event information	• Missing/invalid data from the restraints control module	• Using the manufacturer approved diagnostic system, check the restraints control module for related DTCs and refer to the relevant DTC index
U1A14-49	CAN Initialization Failure - Internal electronic failure	• Electric park brake control module internal	• Using the manufacturer approved diagnostic system, clear the DTCs. Perform Drive Cycle 1. If the fault persists, install a new electric park brake control

		failure	module
U2002-01	Switch - General electrical failure	 NOTE: Circuit reference SW1 / SW2 / SW3 / SW4 • Electric park brake switch circuits short circuit to ground, short circuit to power, open circuit, high resistance	 NOTE: This DTC can be set by operating the electric park brake switch very slowly • Refer to the electrical circuit diagrams and check the electric park brake switch circuits for short circuit to ground, short circuit to power, open circuit, high resistance
U2002-12	Switch - Circuit short to battery	 NOTE: Circuit reference SW1 / SW2 / SW3 / SW4 • Electric park brake switch circuit short circuit to power	• Refer to the electrical circuit diagrams and check the electric park brake switch circuit for short circuit to power
U2002-2F	Switch - Signal erratic	 NOTE: Circuit reference SW1 / SW2 / SW3 / SW4 • Electric park brake switch circuits short circuit to ground, short circuit to power, open circuit, high resistance	 NOTE: This DTC can be set by operating the electric park brake switch very slowly • Refer to the electrical circuit diagrams and check the electric park brake switch circuits for short circuit to ground, short circuit to power, open circuit, high resistance
U2002-92	Switch - Performance or incorrect operation	 NOTE: Circuit reference SW1 / SW2 / SW3 / SW4 • Electric park brake switch circuits short circuit to ground, short circuit to power, open circuit, high resistance	 NOTE: This DTC can be set by operating the electric park brake switch very slowly • Refer to the electrical circuit diagrams and check the electric park brake switch circuits for short circuit to ground, short circuit to power, open circuit, high resistance
U2012-00	Car Configuration Parameter(s) - No sub type information	• Car configuration file mismatch with vehicle specification	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U3000-00	Control Module - No sub type information	• Electric park brake control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest
U3000-16	Control Module - Circuit voltage below threshold	• Electric park brake control module power or ground circuit open circuit, high resistance • Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the electrical circuit diagrams and check the electric park brake control module power and ground circuits for open circuit, high resistance • Refer to the relevant section of the workshop manual and test the battery and charging system
U3000-17	Control Module - Circuit voltage above threshold	• Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the relevant section of the workshop manual and test the battery and charging system
U3000-4B	Control Module - Over temperature	• Electric park brake control	• Allow the electric park brake control module to cool, clear the DTC and retest. Do not renew the electric

		module internal temperature above threshold	park brake control module as this is a protection function to ensure no internal damage occurs
U300A-64	Ignition Switch - Signal plausibility failure	 NOTE: Circuit reference IGN • Ignition sense circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the ignition sense circuit for short circuit to ground, short circuit to power, open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index DTC: Electric Steering Column Lock Control Module (ESCL)

Description and Operation

Electric Steering Column Lock Control Module (ESCL)

CAUTIONS:

 Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

 When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

 If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

 Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

 When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

 Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

 Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

 If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

 Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Electric Steering Column Lock Control Module (ESCL). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.

DTC	Description	Possible Causes	Action
B100D-16	Column Lock Authorisation - Circuit voltage below threshold	• Electric steering column lock circuit short circuit to ground, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the electric steering column lock circuit for short circuit to ground, open circuit, high resistance. If the fault persists, install a new electric steering column lock
B100D-29	Column Lock Authorisation - Signal invalid	• Electric steering column lock control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - On Demand Self Test (0x0202). If the fault persists, install a new electric steering column lock
B100D-42	Column Lock Authorisation - General memory failure	• Electric steering column lock control module internal	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - On Demand Self Test (0x0202). If the fault persists, install a new electric steering column lock

		failure	
B100D-51	Column Lock Authorisation - Not programmed	• Electric steering column lock control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the electric steering column lock control module with the latest level software
B100D-62	Column Lock Authorisation - Signal compare failure	• Encrypted data exchange does not match between electric steering column lock and the instrument cluster	• Using the manufacturer approved diagnostic system, re-configure the electric steering column lock control module with the latest level software. Re-configure the instrument cluster with the latest level software. If the fault persists, perform a CAN network integrity test. Perform routine - On Demand Self Test (0x0202)
B100D-64	Column Lock Authorisation - Signal plausibility failure	• Incorrect conditions to allow locking action to continue	• Using the manufacturer approved diagnostic system, clear the DTCs and perform a CAN network integrity test. Perform routine - On Demand Self Test (0x0202). Check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index. Check the engine control module for related DTCs and refer to the relevant DTC index
B100D-72	Column Lock Authorisation - Actuator stuck open	• Electric steering column lock unable to reach locked state	• Ensure that the vehicle battery supply voltage is between 9 and 16volts. Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Voltage Supply (0xDD02). Clear the DTCs. Perform a CAN network integrity test. Perform routine - On Demand Self Test (0x0202). If the fault persists, install a new electric steering column lock
B100D-73	Column Lock Authorisation - Actuator stuck closed	• Electric steering column lock unable to reach unlocked state	• Ensure that the vehicle battery supply voltage is between 9 and 16volts. Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Voltage Supply (0xDD02). Clear the DTCs. Ensure that the column lock bolt movement is not obstructed or restricted (the parked position of the road wheels may be exerting a turning force through the steering column, preventing the lock from releasing. The steering wheel may need to be held against the force to allow the column lock to release). Perform a CAN network integrity test. Perform routine - On Demand Self Test (0x0202). If the fault persists, install a new electric steering column lock
B100D-77	Column Lock Authorisation - Commanded position not reachable	• Electric steering column lock unable to reach unlocked or locked state	• Ensure that the vehicle battery supply voltage is between 9 and 16volts. Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Voltage Supply (0xDD02). Clear the DTCs. Ensure that the column lock bolt movement is not obstructed or restricted (the parked position of the road wheels may be exerting a turning force through the steering column, preventing the lock from releasing. The steering wheel may need to be held against the force to allow the column lock to release). Perform a CAN network integrity test. Perform routine - On Demand Self Test (0x0202). If the fault persists, install a new electric steering column lock
B100D-92	Column Lock Authorisation - Performance or incorrect operation	• Electric steering column lock mechanism jammed, obstructed	• Ensure that the vehicle battery supply voltage is between 9 and 16volts. Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Voltage Supply (0xDD02). Clear the DTCs. Ensure that the column lock bolt movement is not obstructed or restricted (the parked position of the road wheels may be exerting a turning force through the steering column, preventing the lock from releasing. The steering wheel may need to be held against the force to allow the column lock to release). Perform a CAN network integrity test. Perform routine - On Demand Self Test (0x0202). If the problem persists, install a new electric steering column lock
B100D-94	Column Lock Authorisation - Unexpected operation	• Electric steering column lock mechanism jammed, obstructed	• Ensure that the vehicle battery supply voltage is between 9 and 16volts. Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Voltage Supply (0xDD02). Clear the DTCs. Ensure that the column lock bolt movement is not obstructed or restricted (the parked position of the road wheels may be exerting a turning force through the steering column, preventing the lock from releasing. The steering wheel

			may need to be held against the force to allow the column lock to release). Perform a CAN network integrity test. Perform routine - On Demand Self Test (0x0202). If the problem persists, install a new electric steering column lock
B100D-96	Column Lock Authorisation - Component internal failure	• Electric steering column lock mechanism jammed, obstructed	• Ensure that the vehicle battery supply voltage is between 9 and 16volts. Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Voltage Supply (0xDD02). Clear the DTCs. Ensure that the column lock bolt movement is not obstructed or restricted (the parked position of the road wheels may be exerting a turning force through the steering column, preventing the lock from releasing. The steering wheel may need to be held against the force to allow the column lock to release). Perform a CAN network integrity test. Perform routine - On Demand Self Test (0x0202). If the problem persists, install a new electric steering column lock
U0001-88	High Speed CAN Communication Bus - Bus off	• High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Electric steering column lock is not configured correctly	• Ensure that the vehicle battery supply voltage is between 9 and 16volts. Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Voltage Supply (0xDD02). Clear the DTCs. Ensure that the column lock bolt movement is not obstructed or restricted (the parked position of the road wheels may be exerting a turning force through the steering column, preventing the lock from releasing. The steering wheel may need to be held against the force to allow the column lock to release). Re-configure the electric steering column lock with the latest level software Perform a CAN network integrity test. Perform routine - On Demand Self Test (0x0202). If the problem persists, install a new electric steering column lock
U3002-81	Vehicle Identification Number - Invalid serial data received	• Electric steering column lock previously installed on another vehicle • New electric steering column lock installed and VIN not yet programmed	• Install the original or a new electric steering column lock as necessary • Using the manufacturer approved diagnostic system, perform routine - Learn VIN (0x0404)

General Information - Diagnostic Trouble Code (DTC) Index DTC: Fuel Fired Booster Heater Control Module (FFBH)

Description and Operation

Fuel Fired Booster Heater (FFBH)

CAUTIONS:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Fuel Fired Booster Heater (FFBH). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Fuel Fired Booster Heater (412-02B Auxiliary Heating, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1206-53	Crash Occurred - Deactivated	• Crash signal received from restraints control module	NOTE: Fuel fired booster heater operation is inhibited when this DTC is set. • Using the manufacturer approved diagnostic system, check the restraints control module for related DTCs and refer to the relevant DTC index
B1D22-11	Coolant Temperature Sensor - Circuit short to ground	• Fuel fired booster heater coolant temperature sensor circuit short circuit to ground	• Install a new fuel fired booster heater coolant temperature sensor as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D22-15	Coolant Temperature Sensor - Circuit short to battery or open	• Fuel fired booster heater coolant temperature sensor circuit short circuit to power, open	• Install a new fuel fired booster heater coolant temperature sensor as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)

		circuit, high resistance	
B1D23-13	Overheat Sensor - Circuit open	• Fuel fired booster heater coolant temperature sensor circuit open circuit, high resistance	• Install a new fuel fired booster heater coolant temperature sensor as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D24-11	Glow Plug - Circuit short to ground	• Fuel fired booster heater glow plug circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the fuel fired booster heater glow plug circuit for short circuit to ground. Install a new fuel fired booster heater glow plug as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D24-15	Glow Plug - Circuit short to battery or open	• Fuel fired booster heater glow plug circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the fuel fired booster heater glow plug circuit for short circuit to power, open circuit, high resistance. Install a new fuel fired booster heater glow plug as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D25-11	Heater Fuel Pump - Circuit short to ground	• Fuel fired booster heater fuel pump circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the fuel fired booster heater fuel pump circuit for short circuit to ground
B1D25-15	Heater Fuel Pump - Circuit short to battery or open	• Fuel fired booster heater fuel pump circuit short circuit to battery, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the fuel fired booster heater fuel pump circuit for short circuit to power, open circuit, high resistance
B1D26-11	Combustion Air Blower - Circuit short to ground	• Fuel fired booster heater internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
B1D26-15	Combustion Air Blower - Circuit short to battery or open	• Fuel fired booster heater internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
B1D26-92	Combustion Air Blower - Performance or incorrect operation	• Fuel fired booster heater internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
B1D26-93	Combustion Air Blower - No operation	• Fuel fired booster heater internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
B1D27-11	Heater Coolant Pump - Circuit short to ground	NOTE: Circuit reference + • Fuel fired booster heater coolant pump circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the fuel fired booster heater coolant pump circuit for short circuit to ground
B1D27-15	Heater Coolant Pump - Circuit short to battery or open	NOTE: Circuit reference + • Fuel fired booster heater coolant pump circuit short circuit to power,	• Refer to the electrical circuit diagrams and check the fuel fired booster heater coolant pump circuit for short circuit to power, open circuit, high resistance

		open circuit, high resistance	
B1D28-11	Fuel Pre-heater - Circuit short to ground	• Fuel fired booster heater glow plug circuit short circuit to ground	NOTE: The pre heat is performed by the ignition glow plug • Refer to the electrical circuit diagrams and check the fuel fired booster heater glow plug circuit for short circuit to ground. Install a new fuel fired booster heater glow plug as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
B1D28-15	Fuel Pre-heater - Circuit short to battery or open	• Fuel fired booster heater glow plug circuit short circuit to power, open circuit, high resistance	NOTE: The pre heat is performed by the ignition glow plug • Refer to the electrical circuit diagrams and check the fuel fired booster heater glow plug circuit for short circuit to power, open circuit, high resistance. Install a new fuel fired booster heater glow plug as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
B1D29-93	No Start, Even After Restart Attempt - No operation	• No fuel present at fuel fired booster heater module • Fuel fired booster heater air intake blocked • Fuel fired booster heater exhaust system blocked	• Check vehicle fuel level. Check fuel lines to fuel fired booster heater module for blockage, kinking or damage. Check fuel for aeration and correct fuel delivery. Check that the vehicle is not parked on an incline when the fuel fired booster heater is operated. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013) • Check the fuel fired booster heater air intake for blockage, kinking or damage. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013) • Check the fuel fired booster heater exhaust system for blockage, kinking or damage. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D30-93	No Start In Test Mode - No operation	• No fuel present at fuel fired booster heater module • Fuel fired booster heater air intake blocked • Fuel fired booster heater exhaust system blocked	• Check vehicle fuel level. Check fuel lines to fuel fired booster heater module for blockage, kinking or damage. Check fuel for aeration and correct fuel delivery. Check that the vehicle is not parked on an incline when the fuel fired booster heater is operated. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013) • Check the fuel fired booster heater air intake for blockage, kinking or damage. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013) • Check the fuel fired booster heater exhaust system for blockage, kinking or damage. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D31-94	Flame Detected Prior to Normal Operation - Unexpected operation	• Fuel fired booster heater glow plug circuit short circuit to ground, short circuit to power, open circuit, high resistance	NOTE: The glow plug and flame sensor are a combined unit • Refer to the electrical circuit diagrams and check the fuel fired booster heater glow plug circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Install a new fuel fired booster heater glow plug as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D32-92	Multiple Flame Interruption During Heating Cycle - Performance or incorrect operation	• No fuel present at fuel fired booster heater module • Fuel fired booster heater air intake blocked • Fuel fired booster heater exhaust system blocked	• Check vehicle fuel level. Check fuel lines to fuel fired booster heater module for blockage, kinking or damage. Check fuel for aeration and correct fuel delivery. Check that the vehicle is not parked on an incline when the fuel fired booster heater is operated. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013) • Check the fuel fired booster heater air intake for blockage, kinking or damage. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013) • Check the fuel fired booster heater exhaust system for

			blockage, kinking or damage. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D33-92	Flame Interruption During Normal Operation - Performance or incorrect operation	• No fuel present at fuel fired booster heater module • Fuel fired booster heater air intake blocked • Fuel fired booster heater exhaust system blocked	• Check vehicle fuel level. Check fuel lines to fuel fired booster heater module for blockage, kinking or damage. Check fuel for aeration and correct fuel delivery. Check that the vehicle is not parked on an incline when the fuel fired booster heater is operated. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013) • Check the fuel fired booster heater air intake for blockage, kinking or damage. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013) • Check the fuel fired booster heater exhaust system for blockage, kinking or damage. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D34-68	Heater In Lock Out Mode - Event information	• Fuel fired booster heater system fault	NOTE: This DTC is for information only. Diagnose and rectify other fuel fired booster heater DTCs first • Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013)
B1D63-11	External Control Relay - Circuit short to ground	• Fuel fired booster heater internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
B1D63-15	External Control Relay - Circuit short to battery or open	• Fuel fired booster heater internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
U0010-00	Medium Speed CAN Communication Bus - No sub type information	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0028-08	Vehicle Communication Bus A - Bus signal/message failures	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Fuel fired booster heater is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the fuel fired booster heater with the latest level software
U2101-00	Control Module Configuration Incompatible - No sub type information	• Car configuration file mismatch with vehicle specification	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U3000-16	Control Module - Circuit voltage below threshold	• Fuel fired booster heater power or ground circuit open circuit, high resistance • Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the electrical circuit diagrams and check the fuel fired booster heater power and ground circuits for open circuit, high resistance • Refer to the relevant section of the workshop manual and test the battery and charging system
U3000-17	Control Module - Circuit voltage above threshold	• Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the relevant section of the workshop manual and test the battery and charging system
U3000-	Control Module	• Fuel fired	• Using the manufacturer approved diagnostic system, clear the

43	- Special memory failure	booster heater internal failure	DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
U3000-49	Control Module - Internal electronic failure	• Fuel fired booster heater internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - AHCM Operation Check (0x9013). If the fault persists, install a new fuel fired booster heater
U3003-62	Battery Voltage - Signal compare failure	• Mismatch between the voltage at the fuel fired booster heater and the voltage value broadcast on the CAN bus	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02) - and compare it to battery voltage. Refer to the electrical circuit diagrams and check the fuel fired booster heater power and ground circuits for open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index DTC: Headlamp Leveling Control Module (HCM)

Description and Operation

Headlamp Leveling Control Module (HCM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Headlamp Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Headlamps (417-01 Exterior Lighting, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1041-04	Levelling Control - System internal failures	• Headlamp leveling control module internal failure	• Install a new headlamp leveling control module as required
B1041-54	Levelling Control - Missing calibration	NOTE: This DTC will normally be logged when a new module has been installed. • Levelling sensor calibration routine not carried out	NOTE: Sensor calibration routine must be carried out with the vehicle unladen and with correct tire pressures. • Calibrate the headlamp leveling sensors using the manufacturer approved diagnostic system, carry the out routine 'Headlamp Control Module System Calibration'
B1087-83	LIN Bus "A" - Value of signal protection calculation incorrect	• LIN bus circuit fault • No communication on the LIN bus • LIN bus EMC interference	NOTE: This circuit uses shielded cable • Refer to the electrical circuit diagrams and check the LIN bus circuit for harness damage
B1087-86	LIN Bus "A" - Signal invalid	• LIN bus circuit fault • No communication on the LIN bus • LIN bus EMC interference	NOTE: This circuit uses shielded cable • Refer to the electrical circuit diagrams and check the LIN bus circuit for harness damage
B1087-88	LIN Bus "A" - Bus off	• LIN bus circuit fault • No communication on the LIN bus	NOTE: This circuit uses shielded cable • Refer to the electrical circuit diagrams and check the LIN bus circuit for harness damage

B10AE-11	Headlamp Leveling Motor - Circuit short to ground	• Headlamp levelling motor control circuit short to ground	NOTE: Circuit - DCM R/L - • Refer to the electrical circuit diagrams and check headlamp leveling motor control circuit for short to ground
B10AE-12	Headlamp Leveling Motor - Circuit short to battery	• Headlamp levelling motor control circuit short to power	NOTE: Circuit - DCM R/L - • Refer to the electrical circuit diagrams and check headlamp leveling motor control circuit for short to power
B10AE-64	Headlamp Leveling Motor - Signal plausibility failure	• Signal plausibility failure (voltage out of range)	NOTE: Circuit - DCM R/L - • Refer to the electrical circuit diagrams and check headlamp leveling motor circuits for failure. Disconnect one headlamp connector, clear DTC and re-test. If DTC cleared, suspect headlamp leveling control module or circuits to the disconnected side of the failure. If DTC remains, reconnect first headlamp and disconnect second, clear DTC and re-test. If DTC cleared, suspect headlamp leveling control module or circuits to the disconnected side of the failure. If DTC remains, suspect common circuits of the failure. Refer to the electrical circuit diagrams and check as required
B1A59-11	Sensor 5 Volt Supply - Circuit short to ground	• Headlamp levelling sensor 5 volt supply circuit short to ground	NOTE: Circuits - SVSF+ - SVSR+ - • Refer to the electrical circuit diagrams and check headlamp levelling sensor 5 volt supply circuit for short to ground
B1A59-12	Sensor 5 Volt Supply - Circuit short to battery	• Headlamp levelling sensor 5 volt supply circuit short to power	NOTE: Circuits - SVSF+ - SVSR+ - • Refer to the electrical circuit diagrams and check headlamp levelling sensor 5 volt supply circuit for short to power
B1D64-01	Left Headlamp Swivelling Motor - General electrical failure	• Internal headlamp motor fault • Internal headlamp circuit fault	• Check the headlamp connections, clear the DTC and re-test. If the DTC remains install a new headlamp
B1D64-04	Left Headlamp Swivelling Motor - System internal failures	• Left headlamp swivelling motor fault	• Check the headlamp connections, clear the DTC, switch off the ignition and allow sufficient time for the headlamp leveling control module to power down and re-test. If the DTC persists, install a new headlamp
B1D64-87	Left Headlamp Swivelling Motor - Missing message	• Missing message	• Check the headlamp connections, clear DTC and re-test. If DTC remains install a new headlamp
B1D65-01	Right Headlamp Swivelling Motor - General electrical failure	• Internal headlamp motor fault • Internal headlamp circuit fault	• Check the headlamp connections, clear the DTC and re-test. If the DTC remains install a new headlamp
B1D65-04	Right Headlamp Swivelling Motor - System internal failures	• Right headlamp swivelling motor fault	• Check the headlamp connections, clear the DTC, switch off the ignition and allow sufficient time for the headlamp leveling control module to power down and re-test. If the DTC persists, install a new headlamp
B1D65-87	Right Headlamp Swivelling Motor - Missing message	• Missing message	• Check the headlamp connections, clear DTC and re-test, if DTC remains install a new headlamp
B1D68-00	Left Headlamp Swivelling Feedback Sensor - No sub type information	• Sensor not detected	• Check the headlamp connector for integrity. Refer to the circuit diagrams and check headlamp circuit. Clear DTC and re-test, if DTC remains install a new headlamp

B1D69-00	Right Headlamp Swivelling Feedback Sensor - No sub type information	• Sensor not detected	• Check the headlamp connector for integrity. Refer to the circuit diagrams and check headlamp circuit. Clear DTC and re-test, if DTC remains install a new headlamp
C1A04-11	Right Front Height Sensor - Circuit short to ground	• Height sensor harness wiring short circuit to ground	• Check the air suspension control module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A04-15	Right Front Height Sensor - Circuit short to battery or open	• Height sensor harness wiring short circuit to power	• Check the air suspension control module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A04-64	Right Front Height Sensor - Signal plausibility failure	• Height sensor signal plausibility failure	• Check the air suspension control module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A06-11	Right Rear Height Sensor - Circuit short to ground	• Height sensor harness wiring short circuit to ground	• Check the air suspension control module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A06-15	Right Rear Height Sensor - Circuit short to battery or open	• Height sensor harness wiring short circuit to power	• Check the air suspension control module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
C1A06-64	Right Rear Height Sensor - Signal plausibility failure	• Height sensor signal plausibility failure	• Check the air suspension control module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system
U0001-88	High Speed CAN Communication Bus - Bus off	• CAN bus off	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0101-00	Lost Communication with TCM - No sub type information	• CAN bus communication error	• Refer to the electrical circuit diagrams and check the power and ground connections to the transmission control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transmission control module and the headlamp leveling control module
U0102-00	Lost Communication with Transfer Case Control Module - No sub type information	• CAN bus communication error	• Refer to the electrical circuit diagrams and check the power and ground connections to the transfer case control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transfer case control module and the headlamp leveling control module

U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	• CAN bus communication error	• Refer to the electrical circuit diagrams and check the power and ground connections to the anti-lock brake system control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the anti-lock brake system control module and the headlamp leveling control module
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• CAN bus communication error	• Refer to the electrical circuit diagrams and check the power and ground connections to the steering angle sensor module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the steering angle sensor module and the headlamp leveling control module
U0140-00	Lost Communication With Body Control Module - No sub type information	• CAN bus communication error	• Refer to the electrical circuit diagrams and check the power and ground connections to the central junction box. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the headlamp leveling control module
U0142-00	Lost Communication With Body Control Module "B" - No sub type information	• CAN bus communication error	• Refer to the electrical circuit diagrams and check the power and ground connections to the central junction box. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the headlamp leveling control module
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Car configuration file information incompatible	• Check/amend car configuration file using the manufacturer approved diagnostic system
U0402-00	Invalid Data Received From Transmission Control Module - No sub type information	• No sub type information	• Check the transmission control module for related DTCs and refer to the relevant DTC index
U0403-00	Invalid Data Received From Transfer Case Control Module - No sub type information	• No sub type information	• Check the transfer case control module for related DTCs and refer to the relevant DTC index
U0415-00	Invalid Data Received From Anti-Lock Brake System Control Module - No sub type information	• Invalid data received from anti-lock brake system control module	• Check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0428-00	Invalid Data Received From Steering Angle Sensor Module - No sub type information	• No sub type information	• Check the steering angle sensor module for related DTCs and refer to the relevant DTC index
U2100-00	Initial Configuration Not Complete - No sub type information	• Car configuration file information not received completely	• Check/amend car configuration file using manufacturer approved diagnostic system
U2101-00	Control Module Configuration Incompatible - No sub type information	• Car configuration file information incompatible to ECU	• Check/amend car configuration file using manufacturer approved diagnostic system
U3002-81	Vehicle Identification Number - Invalid serial data received	• Stored VIN does not match most recent VIN	• Check/amend car configuration file using manufacturer approved diagnostic system
U3003-16	Battery Voltage - Circuit	• Circuit voltage below	• Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the

	voltage below threshold	threshold	electrical circuit diagrams and check the power and ground supply circuits to the headlamp leveling control module
U3003-17	Battery Voltage - Circuit voltage above threshold	• Circuit voltage above threshold	• Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power and ground supply circuits to the headlamp leveling control module
U3003-62	Battery Voltage - Signal compare failure	• Mis-match in battery voltage, between the central junction box and the headlamp leveling control module, of 2 volts or more	• Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power and ground supply circuits to the central junction box and the headlamp leveling control module

General Information - Diagnostic Trouble Code (DTC) Index DTC: Instrument Cluster (IC)

Description and Operation

Instrument Cluster (IC)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Instrument Cluster (IC), for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1009-51	Ignition Authorisation - Not programmed	• Ignition authorisation not programmed	• Using the manufacturer approved diagnostic system, re-configure the instrument cluster with the latest level software
B1009-87	Ignition Authorisation - Missing message	• Ignition authorisation message missing	• Using the manufacturer approved diagnostic system, re-configure the instrument cluster with the latest level software
B100D-64	Column Lock Authorisation - Signal plausibility failure	• Request to lock or unlock electric steering column lock has failed due to engine speed or vehicle speed	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
B1026-12	Steering Column Lock - Circuit short to battery	• Electric steering column lock ground circuit short circuit to power	• Refer to the electrical circuit diagrams and test the electric steering column lock ground circuit for short circuit to power
B1026-63	Steering Column Lock - Circuit/component protection time-out	• Electric steering column lock ground circuit short circuit to power	• Refer to the electrical circuit diagrams and test the electric steering column lock ground circuit for short circuit to power
B1A14-96	RCM Warning Lamp - Component internal failure	• Supplementary restraint system light emitting diode circuit failure (instrument cluster internal failure)	• Refer to the electrical circuit diagrams and test the instrument cluster power and ground circuits for open circuit, high resistance. Clear the DTC and retest. If the fault persists, install a new instrument cluster
B1A68-	Ambient Temperature	• Instrument	• Refer to the electrical circuit diagrams and test the

86	Sensor - Signal invalid	cluster internal temperature sensor signal is out of range/invalid	instrument cluster power and ground circuits for open circuit, high resistance. Clear the DTC and retest. If the fault persists, install a new instrument cluster
B1A85-96	Ambient Light Sensor - Component internal failure	• Instrument cluster internal light sensor failure	• Refer to the electrical circuit diagrams and test the instrument cluster power and ground circuits for open circuit, high resistance. Clear the DTC and retest. If the fault persists, install a new instrument cluster
P0610-55	Control Module Vehicle Options Error - Not configured	• Control module incorrectly configured	• Using the manufacturer approved diagnostic system, re-configure the instrument cluster with the latest level software
U0001-88	High Speed CAN Communication Bus - Bus off	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0010-88	Medium Speed CAN Communication Bus - Bus off	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	• Engine control module power or ground circuit open circuit, high resistance - Engine speed signal missing for more than 1 second • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the engine control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0101-00	Lost Communication with TCM - No sub type information	• Transmission control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the transmission control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0102-00	Lost Communication with Transfer Case Control Module - No sub type information	• Transfer case control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the transfer case control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0104-00	Lost Communication With Cruise Control	• Speed control module power	• Refer to the electrical circuit diagrams and test the speed control module power and ground circuits for

	Module - No sub type information	or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	• Anti-lock brake system control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the anti-lock brake system control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• Steering angle sensor module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the steering angle sensor module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	• Electric park brake control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the electric park brake control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0132-00	Lost Communication With Suspension Control Module "A" - No sub type information	• Air suspension control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the air suspension control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0133-00	Lost Communication With Active Roll Control Module - No sub type information	• Dynamic response control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the dynamic response control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance

U0136-00	Lost Communication With Differential Control Module - Rear - No sub type information	• Rear differential control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the rear differential control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0138-00	Lost Communication with All Terrain Control Module - No sub type information	• Terrain response switchpack power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the terrain response switchpack power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0139-08	Lost Communication With Suspension Control Module "B" - Bus signal / message failures	• Adaptive damping system control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the adaptive damping system control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0140-00	Lost Communication With Body Control Module - No sub type information	• Central junction box power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0141-00	Lost Communication With Body Control Module "A" - No sub type information	• Central junction box power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0151-00	Lost Communication With Restraints Control Module - No sub type information	• Restraints control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit,	• Refer to the electrical circuit diagrams and test the restraints control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance

		high resistance	
U0159-00	Lost Communication With Parking Assist Control Module "A" - No sub type information	• Park distance control module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the park distance control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0164-00	Lost Communication With HVAC Control Module - No sub type information	• Automatic temperature control module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the automatic temperature control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0184-00	Lost Communication With Radio - No sub type information	• Integrated audio module / audio head unit power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the integrated audio module / audio head unit power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0208-00	Lost Communication With "Seat Control Module A" - No sub type information	• Driver seat control module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the driver seat control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0214-00	Lost Communication With Remote Function Actuation - No sub type information	• Keyless vehicle module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the keyless vehicle module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0241-00	Lost Communication With Headlamp Control Module "A" - No sub type information	• Headlamp leveling control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to	• Refer to the electrical circuit diagrams and test the headlamp leveling control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance

		ground, short circuit to power, open circuit, high resistance	
U0242-00	Lost Communication With Headlamp Control Module "B" - No sub type information	• Rear view mirror power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the rear view mirror power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U025D-00	Lost Communication With Front Controls Interface Module "B" - No sub type information	• Integrated control panel power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the integrated control panel power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0264-00	Lost Communication With Camera Module-Rear - No sub type information	• Proximity camera control module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the proximity camera control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Instrument cluster expulsion from network management	• Using the manufacturer approved diagnostic system, check for other modules reporting CAN bus off or lost communication faults. If other modules report problems, check the software version in the central junction box. If no other modules report problems, re-configure the instrument cluster with the latest level software
U0402-68	Invalid Data Received from TCM - Event information	• Transmission control module network communications are missing partially or intermittently	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U2013-02	Switch Pack - General signal failure	• Steering wheel left switchpack LIN bus communications indicate switchpack failure	• Test the operation of the steering wheel left switchpack
U2013-08	Switch Pack - Bus signal/message failures	• Steering wheel left switchpack LIN bus communications have failed	• Refer to the electrical circuit diagrams and test the LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U3000-46	Control Module - Calibration/parameter memory failure	• Instrument cluster storage of odometer reading is corrupted	• Check the harness connector to the instrument cluster for security and integrity. Clear the DTC and retest. If the problem persists, install a new instrument cluster

U3000-49	Control Module - Internal electronic failure	• Instrument cluster internal failure	• Check the harness connector to the instrument cluster for security and integrity. Clear the DTC and retest. If the problem persists, install a new instrument cluster
U3000-55	Control Module - Not configured	• Tire size compensation is incorrectly configured	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U3000-87	Control Module - Missing message	• Car configuration file missing message	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U3002-81	Vehicle Identification Number - Invalid serial data received	• Invalid vehicle identification number	• Using the manufacturer approved diagnostic system, perform routine - Learn VIN (0404)
U3003-16	Control Module - Circuit voltage below threshold	• Instrument cluster power or ground circuit open circuit, high resistance • Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the electrical circuit diagrams and test the instrument cluster power and ground circuits for open circuit, high resistance • Refer to the relevant section of the workshop manual and test the battery and charging system
U3003-17	Control Module - Circuit voltage above threshold	• Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the relevant section of the workshop manual and test the battery and charging system
U3003-62	Control Module - Signal compare failure	• Mis-match between the instrument cluster voltage and the voltage value broadcast on the CAN bus	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Voltage Supply (0xDD02) - and compare it to battery voltage

General Information - Diagnostic Trouble Code (DTC) Index DTC: Integrated Audio Module (IAM) - High Line

Description and Operation

Integrated Audio Module (IAM)

CAUTIONS:

 Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

 When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTES:

 If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

 Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

 When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the digital multimeter leads into account.

 Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

 Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

 If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

 Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Integrated Audio Module (IAM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Information and Entertainment System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B119F-11	GPS Antenna - Circuit short to ground	 NOTE: Circuit reference GPS_SIGNAL • Navigation antenna not connected to the integrated audio module • Navigation antenna circuit short circuit to ground	• Confirm that the navigation antenna is connected to the integrated audio module • Refer to the electrical circuit diagrams and check the navigation antenna circuit for short circuit to ground
B119F-13	GPS Antenna - Circuit open	 NOTE: Circuit reference GPS_SIGNAL • Navigation antenna not	 NOTE: This DTC may be set even though no fault condition is present and should be ignored unless the customer has reported a navigation system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Confirm that the navigation antenna is connected to the

		connected to the integrated audio module • Navigation antenna circuit open circuit, high resistance	integrated audio module • Refer to the electrical circuit diagrams and check the navigation antenna circuit for open circuit, high resistance
B11A3-49	Gyroscope - Internal electronic failures	• Integrated audio module internal gyroscope failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B121C-13	Hard Drive - Circuit open	• Integrated audio module internal hard drive communication failure	 NOTE: This DTC may be set even though no fault condition is present and should be ignored unless the customer has reported a navigation system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, re-configure the integrated audio module with the latest level software. Insert a CD and copy one track to the hard drive to confirm correct operation. Return vehicle to standard settings and delete the file. If the fault persists, install a new integrated audio module
B121C-49	Hard Drive - Internal electronic failures	• Integrated audio module internal hard drive failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, re-configure the integrated audio module with the latest level software. Insert a CD and copy one track to the hard drive to confirm correct operation. Return vehicle to standard settings and delete the file. If the fault persists, install a new integrated audio module
B1252-09	USB Port - Component failures	 NOTE: Circuit reference USB_5B / USB_DATA_POS / USB_DATA_NEG / USB_DATA_GND / USB_SCR • No USB function	• Refer to the electrical circuit diagrams and check the USB circuits for short circuit to ground, short circuit to power, open circuit, high resistance. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1252-19	USB Port - Circuit current above threshold	• Excessive current drawn by a universal serial bus device	• Disconnect all universal serial bus devices. Connect a test universal serial bus memory stick. Using the manufacturer approved diagnostic system, perform routine - USB Connector Test (0x6018). If the fault persists, install a new integrated audio module
B1296-4A	Navigation Map Data - Incorrect component installed	• Navigation map does not match the market of the vehicle	 NOTE: This DTC may be set even though no fault condition is present and should be ignored unless the customer has reported a navigation system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Update the map data as necessary. Using the manufacturer approved diagnostic system, re-configure the integrated audio module with the latest level software. Check and up-date the car configuration file as necessary. Clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1A56-11	Antenna - Circuit short to ground	 NOTE: Circuit reference AM_FM • AM/FM antenna amplifier circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the AM/FM antenna amplifier circuit for short circuit to ground. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1A56-13	Antenna - Circuit open	 NOTE: Circuit reference AM_FM	• Refer to the electrical circuit diagrams and check the AM/FM antenna amplifier circuit for open circuit, high resistance. Using the manufacturer approved diagnostic

		• AM/FM antenna amplifier circuit open circuit, high resistance	system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1D50-07	Digital Disk Player - Mechanical failures	• Integrated audio module internal failure	NOTE: This DTC may be set even though no fault condition is present and should be ignored unless the customer has reported a navigation system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Perform basic visual inspection for foreign matter inside disk player. Remove foreign matter if possible. Using the manufacturer approved diagnostic system, clear the DTCs and retest with multiple disks. If the fault persists, install a new integrated audio module
B1D55-11	Antenna#2 - Circuit short to ground	NOTE: Circuit reference FM2 • FM/TMC antenna amplifier circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the FM/TMC antenna amplifier circuit for short circuit to ground. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1D55-13	Antenna#2 - Circuit open	NOTE: Circuit reference FM2 • FM/TMC antenna amplifier circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the FM/TMC antenna amplifier circuit for open circuit, high resistance. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1D57-11	Antenna#4 Circuit - Circuit short to ground	• VICS antenna circuit short circuit to ground	NOTE: Vehicle Information and Communication System (VICS) is a type of Traffic Message Channel system used in the Japan market only • Refer to the electrical circuit diagrams and check the VICS antenna circuit for short circuit to ground. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1D57-13	Antenna#4 Circuit - Circuit open	• VICS antenna circuit open circuit, high resistance	NOTE: Vehicle Information and Communication System (VICS) is a type of Traffic Message Channel system used in the Japan market only • Refer to the electrical circuit diagrams and check the VICS antenna circuit for open circuit, high resistance. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1D78-11	Auxiliary Input - Circuit short to ground	NOTE: Circuit reference AUX1 L+ / AUX1 R+ / AUX1 LR- • Auxiliary input 1 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the auxiliary input 1 circuit for short circuit to ground. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1D78-13	Auxiliary Input - Circuit open	NOTE: Circuit reference AUX1 L+ / AUX1 R+ / AUX1 LR- • Auxiliary input	• Refer to the electrical circuit diagrams and check the auxiliary input 1 circuit for open circuit, high resistance. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module

		1 circuit open circuit, high resistance	
B1D79-11	Microphone Input - Circuit short to ground	 NOTE: Circuit reference MIC_1_POS / MIC_1_NEG • Microphone 1 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the microphone 1 circuit for short circuit to ground. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
B1D79-13	Microphone Input - Circuit open	 NOTE: Circuit reference MIC_1_POS / MIC_1_NEG • Microphone 1 circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the microphone 1 circuit for open circuit, high resistance. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
P150E-00	Electronic Control Module Cooling Fan Circuit - No sub type information	• Integrated audio module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
U2005-62	Vehicle Speed - Signal compare failure	• Anti-lock brake system control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • MOST network failure - Speed signal broadcast is not received by the integrated audio module • Anti-lock brake system fault	NOTES:  This DTC may be set when the vehicle is being transported  This DTC may be set even though no fault condition is present and should be ignored unless the customer has reported a navigation system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Refer to the electrical circuit diagrams and check the anti-lock brake system control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuits for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the relevant section of the workshop manual and test the MOST network • Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index. Clear the DTCs and retest
U200D-11	Control Module Output Power A - Circuit short to ground	 NOTE: Circuit reference ANTENNA_AMP • AM/FM antenna amplifier circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the AM/FM antenna amplifier circuit for short circuit to ground. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
U200D-13	Control Module Output Power A - Circuit open	 NOTE: Circuit reference ANTENNA_AMP • AM/FM antenna amplifier circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the AM/FM antenna amplifier circuit for open circuit, high resistance. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
U2100-	Initial Configuration	• Medium speed	• Using the manufacturer approved diagnostic system,

00	Not Complete - No sub type information	CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Touch screen internal failure • MOST network failure • Integrated audio module is not configured correctly	perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the touch screen for related DTCs and refer to the relevant DTC index • Refer to the relevant section of the workshop manual and test the MOST network • Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U2101-00	Control Module Configuration Incompatible - No sub type information	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Touch screen internal failure • MOST network failure • Integrated audio module is not configured correctly	NOTES: Only applicable to the Japanese market This DTC may be set even though no fault condition is present and should be ignored unless the customer has reported a navigation system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the touch screen for related DTCs and refer to the relevant DTC index • Refer to the relevant section of the workshop manual and test the MOST network • Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U2200-41	Control Module Configuration Memory Corrupt - General checksum failure	• Integrated audio module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, re-configure the integrated audio module with the latest level software. If the fault persists, install a new integrated audio module
U2200-44	Control Module Configuration Memory Corrupt - Data memory failure	• Integrated audio module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, re-configure the integrated audio module with the latest level software. If the fault persists, install a new integrated audio module
U3000-41	Control Module - General checksum failure	• Integrated audio module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, re-configure the integrated audio module with the latest level software. If the fault persists, install a new integrated audio module
U3000-45	Control Module - Program memory failure	• Integrated audio module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, re-configure the integrated audio module with the latest level software. If the fault persists, install a new integrated audio module
U3000-46	Control Module - Calibration/parameter memory failure	• Integrated audio module internal failure	NOTE: This DTC may be set even though no fault condition is present and should be ignored unless the customer has reported a navigation system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, re-configure the integrated audio module with the latest level software. If the fault persists, install a new integrated audio module
U3000-	Control Module -	• Integrated	• Using the manufacturer approved diagnostic system,

49	Internal electronic failure	audio module internal failure	clear the DTCs and retest. If the fault persists, re-configure the integrated audio module with the latest level software. If the fault persists, install a new integrated audio module
U3000-4A	Control Module - Incorrect component installed	• Incorrect hardware or software detected • Integrated audio module internal failure	• Check that the installed hardware is correct • Using the manufacturer approved diagnostic system, re-configure the integrated audio module with the latest level software. Clear the DTCs and retest. If the fault persists, install a new integrated audio module
U3000-98	Control Module - Component or system over temperature	• Ventilation ducts obstructed • Integrated audio module internal failure	 NOTE: Allow vehicle to cool before performing any diagnostic steps. Move vehicle into shade and operate climate control on a cool setting • Check the ventilation ducts for obstructions • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated audio module
U3003-62	Battery Voltage - Signal compare failure	• Mismatch between the voltage at the integrated audio module and the voltage value broadcast on the CAN bus	• Refer to the electrical circuit diagrams and check the integrated audio module power and ground circuits for open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index DTC: Integrated Control Panel (ICP)

Description and Operation

Integrated Control Panel (ICP)

CAUTIONS:

 Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

 When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

 If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

 Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

 When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

 Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

 Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

 If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

 Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Integrated Control Panel (ICP). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Information and Entertainment System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
U0010-88	Medium Speed CAN Communication Bus - Bus off	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0140-00	Lost Communication With Body Control Module - No sub type information	• Central junction box power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Central junction box system fault	• Refer to the electrical circuit diagrams and check the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index

U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information	• Instrument cluster power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Instrument cluster system fault	• Refer to the electrical circuit diagrams and check the instrument cluster power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the instrument cluster for related DTCs and refer to the relevant DTC index
U0164-00	Lost Communication With HVAC Control Module - No sub type information	• Automatic temperature control module power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Automatic temperature control system fault	• Refer to the electrical circuit diagrams and check the automatic temperature control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the automatic temperature control module for related DTCs and refer to the relevant DTC index
U0166-00	Lost Communication With Auxiliary Heater Control Module - No sub type information	• Car configuration file mismatch with vehicle specification • Fuel fired booster heater power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Fuel fired booster heater system fault	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Refer to the electrical circuit diagrams and check the fuel fired booster heater power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the fuel fired booster heater for related DTCs and refer to the relevant DTC index
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Car configuration file mismatch with vehicle specification • Incorrect integrated control panel installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new integrated control panel as necessary
U0424-68	Invalid Data Received From HVAC Control Module - Event information	• Missing/invalid data from the automatic temperature control module	• Using the manufacturer approved diagnostic system, check the automatic temperature control module for related DTCs and refer to the relevant DTC index
U2002-24	Switch - Signal stuck high	• Integrated control panel switch stuck active • Integrated control panel internal failure	• Test the operation of the integrated control panel switches • Install a new integrated control panel as necessary
U2100-00	Initial Configuration Not Complete - No	• Integrated control panel is	• Using the manufacturer approved diagnostic system, re-configure the integrated control panel with the latest

	sub type information	not configured correctly	level software
U2101-00	Control Module Configuration Incompatible - No sub type information	• Car configuration file mismatch with vehicle specification • Incorrect integrated control panel installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new integrated control panel as necessary
U3000-41	Control Module - General checksum failure	• Integrated control panel internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated control panel
U3003-62	Battery Voltage - Signal compare failure	• Mismatch between the voltage at the integrated control panel and the voltage value broadcast on the CAN bus	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02) - and compare it to battery voltage. Refer to the electrical circuit diagrams and check the integrated control panel power and ground circuits for open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index DTC: Integrated Control Panel B (ICPB)

Description and Operation

Integrated Control Panel B (ICPB)

CAUTIONS:

 Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

 When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

 If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

 Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

 When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

 Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

 Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

 If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

 Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Integrated Control Panel B (ICPB). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Information and Entertainment System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1A85-11	Ambient Light Sensor - Circuit short to ground	• Ambient light sensor failure	 NOTE: The ambient light sensor and circuits are integral to the integrated control panel B • Clear the DTC and re-test. Using the manufacturer approved diagnostic system, check datalogger signal - Ambient Sensor Voltage (0x721C). Check that the voltage decreases when the sensor is covered and increases when a light source is directed into the sensor. If the sensor voltage does not change with varying light intensity install a new integrated control panel B as necessary
B1A85-12	Ambient Light Sensor - Circuit short to battery	• Ambient light sensor failure	 NOTE: The ambient light sensor and circuits are integral to the integrated control panel B • Clear the DTC and re-test. Using the manufacturer approved diagnostic system, check datalogger signal - Ambient Sensor Voltage (0x721C). Check that the voltage decreases when the sensor is covered and increases when a light source is directed into the sensor. If the sensor voltage does not change with varying light intensity install a new integrated control panel B

			as necessary
U0010-88	Medium Speed CAN Communication Bus - Bus off	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0140-00	Lost communication with body control module - No sub type information	• Central junction box power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Central junction box system fault	• Refer to the electrical circuit diagrams and check the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0256-00	Lost Communication With Front Controls Interface Module "A" - No sub type information	• Integrated control panel power or ground circuit open circuit, high resistance • Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Integrated control panel system fault	NOTE: This DTC relates to the compact disc eject switch • Refer to the electrical circuit diagrams and check the integrated control panel power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the integrated control panel for related DTCs and refer to the relevant DTC index
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Incorrect integrated control panel B installed	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated control panel B
U2002-24	Switch - Signal stuck high	• Integrated control panel B switch stuck active	• Test operation of all integrated control panel B switches. Clear the DTCs and retest. If the fault persists, install a new integrated control panel B
U3000-41	Control Module - General checksum failure	• Integrated control panel B internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new integrated control panel B
U3003-62	Battery Voltage - Signal compare failure	• Mismatch between the voltage at the integrated control panel B and the voltage value broadcast on the CAN bus	• Refer to the electrical circuit diagrams and check the integrated control panel B power and ground circuits for open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index DTC: Keyless Vehicle Module (KVM)

Description and Operation

Keyless Vehicle Module (KVM)

CAUTIONS:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Keyless Vehicle Module (KVM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B102B-00	Passive Key - No sub type information	• Smart key is not configured correctly	NOTE: This DTC is set if an invalid smart key is detected when the stop/start switch is operated • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, re-configure the smart key with the latest level software
B10A9-00	Remote Keyless Entry Less Than 2 Keys Programmed - No sub type information	• Secret key has been programmed to the vehicle but less than 2 key fobs have been programmed	• Clear DTC and retest. If the fault persists, configure the key fobs using the manufacturers approved diagnostic system
B10C1-15	Left Front Unlock Pull Switch - Short circuit to battery or open	• Front left exterior door handle power or ground circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the front left exterior door handle power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the front left exterior door handle unlock switch circuit for short circuit to power, open circuit, high resistance

		• Front left exterior door handle unlock switch circuit short circuit to power, open circuit, high resistance • Front left exterior door handle internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new front left exterior door handle
B10C1-23	Left Front Unlock Pull Switch - Signal stuck low	• Front left exterior door handle unlock switch circuit short circuit to ground • Front left exterior door handle internal failure	• Refer to the electrical circuit diagrams and check the front left exterior door handle unlock switch circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new front left exterior door handle
B10C2-15	Left Rear Unlock Pull Switch - Short circuit to battery or open	• Rear left exterior door handle power or ground circuit open circuit, high resistance • Rear left exterior door handle unlock switch circuit short circuit to power, open circuit, high resistance • Rear left exterior door handle internal failure	• Refer to the electrical circuit diagrams and check the rear left exterior door handle power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear left exterior door handle unlock switch circuit for short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear left exterior door handle
B10C2-23	Left Rear Unlock Pull Switch - Signal stuck low	• Rear left exterior door handle unlock switch circuit short circuit to ground • Rear left exterior door handle internal failure	• Refer to the electrical circuit diagrams and check the rear left exterior door handle unlock switch circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear left exterior door handle
B10C3-15	Right Front Unlock Pull Switch - Short circuit to battery or open	• Front right exterior door handle power or ground circuit open circuit, high resistance • Front right exterior door handle unlock switch circuit short circuit to power, open circuit, high resistance • Front right exterior door handle internal failure	• Refer to the electrical circuit diagrams and check the front right exterior door handle power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the front right exterior door handle unlock switch circuit for short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new front right exterior door handle
B10C3-23	Right Front Unlock Pull Switch - Signal stuck low	• Front right exterior door handle unlock switch circuit short circuit to ground • Front right exterior door handle internal failure	• Refer to the electrical circuit diagrams and check the front right exterior door handle unlock switch circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new front right exterior door handle
B10C4-15	Right Rear Unlock Pull Switch - Short circuit to battery or open	• Rear right exterior door handle power or ground circuit open circuit, high	• Refer to the electrical circuit diagrams and check the rear right exterior door handle power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear right exterior door handle unlock switch circuit for

		resistance • Rear right exterior door handle unlock switch circuit short circuit to power, open circuit, high resistance • Rear right exterior door handle internal failure	short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear right exterior door handle
B10C4-23	Right Rear Unlock Pull Switch - Signal stuck low	• Rear right exterior door handle unlock switch circuit short circuit to ground • Rear right exterior door handle internal failure	• Refer to the electrical circuit diagrams and check the rear right exterior door handle unlock switch circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear right exterior door handle
B10C5-23	Trunk Unlock Pull Switch - Signal stuck low	NOTE: Circuit reference EXT BOOT RELEASE SW • Upper tailgate exterior switch circuit short circuit to ground • Upper tailgate exterior switch internal failure	• Refer to the electrical circuit diagrams and check the upper tailgate exterior switch circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new upper tailgate exterior switch
B10C6-00	Exterior Trunk Antenna - No sub type information	• Tailgate exterior low frequency antenna circuit short circuit to ground, short circuit to power	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the tailgate exterior low frequency antenna circuit for short circuit to ground, short circuit to power
B10C6-11	Exterior Trunk Antenna - Circuit short to ground	• Tailgate exterior low frequency antenna circuit short circuit to ground, short circuit between positive and negative	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the tailgate exterior low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B10C6-12	Exterior Trunk Antenna - Circuit short to battery	• Tailgate exterior low frequency antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the tailgate exterior low frequency antenna circuit for short circuit to power
B10C6-13	Exterior Trunk Antenna - Circuit open	• Tailgate exterior low frequency antenna circuit open circuit, high resistance	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the tailgate exterior low frequency antenna circuit for open circuit, high resistance

B10C7-00	Interior Trunk Antenna - No sub type information	Passenger compartment left low frequency antenna circuit short circuit to ground, short circuit to power	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment left low frequency antenna circuit for short circuit to ground, short circuit to power
B10C7-11	Interior Trunk Antenna - Circuit short to ground	• Passenger compartment left low frequency antenna circuit short circuit to ground, short circuit between positive and negative	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment left low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B10C7-12	Interior Trunk Antenna - Circuit short to battery	• Passenger compartment left low frequency antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment left low frequency antenna circuit for short circuit to power
B10C7-13	Interior Trunk Antenna - Circuit open	• Passenger compartment left low frequency antenna circuit open circuit, high resistance	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment left low frequency antenna circuit for open circuit, high resistance
B10C8-00	Interior Center Antenna - No sub type information	• Passenger compartment right low frequency antenna circuit short circuit to ground, short circuit to power	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment right low frequency antenna circuit for short circuit to ground, short circuit to power
B10C8-11	Interior Center Antenna - Circuit short to ground	• Passenger compartment right low frequency antenna circuit short circuit to ground, short circuit between positive and negative	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment right low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B10C8-12	Interior Center Antenna - Circuit short to battery	• Passenger compartment right low frequency antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment right low frequency antenna circuit for short circuit to power
B10C8-13	Interior Center Antenna - Circuit open	• Passenger compartment right low	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s)

		frequency antenna circuit open circuit, high resistance	first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment right low frequency antenna circuit for open circuit, high resistance
B10C9-00	Interior Front Antenna - No sub type information	• Passenger compartment front low frequency antenna circuit short circuit to ground, short circuit to power	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment front low frequency antenna circuit for short circuit to ground, short circuit to power
B10C9-11	Interior Front Antenna - Circuit short to ground	• Passenger compartment front low frequency antenna circuit short circuit to ground, short circuit between positive and negative	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment front low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B10C9-12	Interior Front Antenna - Circuit short to battery	• Passenger compartment front low frequency antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment front low frequency antenna circuit for short circuit to power
B10C9-13	Interior Front Antenna - Circuit open	• Passenger compartment front low frequency antenna circuit open circuit, high resistance	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the passenger compartment front low frequency antenna circuit for open circuit, high resistance
B10CA-00	Left rear door handle Antenna - No sub type information	• Rear left door exterior handle low frequency antenna circuit short circuit to ground, short circuit to power	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the rear left door exterior handle low frequency antenna circuit for short circuit to ground, short circuit to power
B10CA-11	Left rear door handle Antenna - Circuit short to ground	• Rear left door exterior handle low frequency antenna circuit short circuit to ground, short circuit between positive and negative	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the rear left door exterior handle low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B10CA-	Left rear door	• Rear left door	• Using the manufacturer approved diagnostic system,

12	handle Antenna - Circuit short to battery	exterior handle low frequency antenna circuit short circuit to power	clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the rear left door exterior handle low frequency antenna circuit for short circuit to power
B10CA-13	Left rear door handle Antenna - Circuit open	• Rear left door exterior handle low frequency antenna circuit open circuit, high resistance	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the rear left door exterior handle low frequency antenna circuit for open circuit, high resistance
B10CB-00	Right rear door handle Antenna - No sub type information	• Rear right door exterior handle low frequency antenna circuit short circuit to ground, short circuit to power	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the rear right door exterior handle low frequency antenna circuit for short circuit to ground, short circuit to power
B10CB-11	Right rear door handle Antenna - Circuit short to ground	• Rear right door exterior handle low frequency antenna circuit short circuit to ground, short circuit between positive and negative	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the rear right door exterior handle low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B10CB-12	Right rear door handle Antenna - Circuit short to battery	• Rear right door exterior handle low frequency antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the rear right door exterior handle low frequency antenna circuit for short circuit to power
B10CB-13	Right rear door handle Antenna - Circuit open	• Rear right door exterior handle low frequency antenna circuit open circuit, high resistance	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the rear right door exterior handle low frequency antenna circuit for open circuit, high resistance
B10CC-23	Left Front Latch Clutch Switch - Signal stuck low	• Front left door latch clutch switch circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the front left door latch clutch switch circuit for short circuit to ground
B10CD-23	Left Rear Latch Clutch Switch - Signal stuck low	• Rear left door latch clutch switch circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the rear left door latch clutch switch circuit for short circuit to ground
B10CE-23	Right Front Latch Clutch Switch - Signal stuck low	• Front right door latch clutch switch circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the front right door latch clutch switch circuit for short circuit to ground
B10CF-	Right Rear Latch	• Rear right door	• Refer to the electrical circuit diagrams and check the

23	Clutch Switch - Signal stuck low	latch clutch switch circuit short circuit to ground	rear right door latch clutch switch circuit for short circuit to ground
B10D1-23	Left Front Lock Button - Signal stuck low	• Front left door exterior handle lock switch circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the front left door exterior handle lock switch circuit for short circuit to ground
B10D2-23	Left Rear Lock Button - Signal stuck low	• Rear left door exterior handle lock switch circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the rear left door exterior handle lock switch circuit for short circuit to ground
B10D3-23	Right Front Lock Button - Signal stuck low	• Front right door exterior handle lock switch circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the front right door exterior handle lock switch circuit for short circuit to ground
B10D4-23	Right Rear Lock Button - Signal stuck low	• Rear right door exterior handle lock switch circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the rear right door exterior handle lock switch circuit for short circuit to ground
B12D5-16	Door Handle Proximity Sensor - Circuit voltage below threshold	• Door handle proximity sensor circuit short circuit to ground • Keyless vehicle module power or ground circuit open circuit, high resistance • Keyless vehicle module internal failure	• Refer to the electrical circuit diagrams and check the door handle proximity sensor circuit for short circuit to ground • Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the keyless vehicle module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new keyless vehicle module
B12D6-11	Fast Door Unlock/Open Actuator - Circuit short to ground	• Door E latch circuit(s) short circuit to ground	NOTE: Faults on individual terminals/circuits cannot be detected • Refer to the electrical circuit diagrams and check the door E latch circuits for short circuit to ground
B12D6-12	Fast Door Unlock/Open Actuator - Circuit short to battery	• Door E latch circuit(s) short circuit to power	NOTE: Faults on individual terminals/circuits cannot be detected • Refer to the electrical circuit diagrams and check the door E latch circuits for short circuit to power
B12EA-96	Radio Frequency (RF) Receiver - Component internal failure	• RF receiver internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new RF receiver
B1334-23	Tailgate Glass Release Switch - Signal stuck low	• Tailgate glass switch circuit short circuit to ground • Tailgate glass switch stuck active	NOTE: This circuit/switch is available as an option • Refer to the electrical circuit diagrams and check the tailgate glass switch circuit for short circuit to ground • Test the operation of the tailgate glass switch
B1335-00	Front Triangulation / Loadspace Antenna - No sub type information	• Luggage compartment right low frequency antenna circuit short circuit to ground, short circuit to power	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the luggage compartment right low frequency antenna circuit for short circuit to ground, short circuit to power
B1335-	Front	• Luggage	

11	Triangulation / Loadspace Antenna - Circuit short to ground	compartment right low frequency antenna circuit short circuit to ground, short circuit between positive and negative	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the luggage compartment right low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B1335-12	Front Triangulation / Loadspace Antenna - Circuit short to battery	• Luggage compartment right low frequency antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the luggage compartment right low frequency antenna circuit for short circuit to power
B1335-13	Front Triangulation / Loadspace Antenna - Circuit open	• Luggage compartment right low frequency antenna circuit open circuit, high resistance	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the luggage compartment right low frequency antenna circuit for open circuit, high resistance
B1336-00	Left Front Door External Antenna - No sub type information	• Front left door exterior handle low frequency antenna circuit short circuit to ground, short circuit to power	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the front left door exterior handle low frequency antenna circuit for short circuit to ground, short circuit to power
B1336-11	Left Front Door External Antenna - Circuit short to ground	• Front left door exterior handle low frequency antenna circuit short circuit to ground, short circuit between positive and negative	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the front left door exterior handle low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B1336-12	Left Front Door External Antenna - Circuit short to battery	• Front left door exterior handle low frequency antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the front left door exterior handle low frequency antenna circuit for short circuit to power
B1336-13	Left Front Door External Antenna - Circuit open	• Front left door exterior handle low frequency antenna circuit open circuit, high resistance	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the front left door exterior handle low frequency antenna circuit for open circuit, high resistance
B1337-00	Right Front Door External Antenna - No sub type	• Front right door exterior handle low frequency	NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s)

	information	antenna circuit short circuit to ground, short circuit to power	first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the front right door exterior handle low frequency antenna circuit for short circuit to ground, short circuit to power
B1337-11	Right Front Door External Antenna - Circuit short to ground	• Front right door exterior handle low frequency antenna circuit short circuit to ground, short circuit between positive and negative	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the front right door exterior handle low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B1337-12	Right Front Door External Antenna - Circuit short to battery	• Front right door exterior handle low frequency antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the front right door exterior handle low frequency antenna circuit for short circuit to power
B1337-13	Right Front Door External Antenna - Circuit open	• Front right door exterior handle low frequency antenna circuit open circuit, high resistance	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the front right door exterior handle low frequency antenna circuit for open circuit, high resistance
B133D-00	Loadspace/Interior Boot Antenna - No sub type information	• Luggage compartment left low frequency antenna circuit short circuit to ground, short circuit to power	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the luggage compartment left low frequency antenna circuit for short circuit to ground, short circuit to power
B133D-11	Loadspace/Interior Boot Antenna - Circuit short to ground	• Luggage compartment left low frequency antenna circuit short circuit to ground, short circuit between positive and negative	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the luggage compartment left low frequency antenna circuit for short circuit to ground, short circuit between positive and negative
B133D-12	Loadspace/Interior Boot Antenna - Circuit short to battery	• Luggage compartment left low frequency antenna circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the luggage compartment left low frequency antenna circuit for short circuit to power
B133D-13	Loadspace/Interior Boot Antenna - Circuit open	• Luggage compartment left low frequency antenna circuit open circuit, high resistance	 NOTE: If any other low frequency antenna short circuit to power DTC is also set, perform the relevant corrective action(s) first • Using the manufacturer approved diagnostic system, clear the DTCs and retest. Perform routine - On Demand

			Self Test (0x0202). If the fault persists, refer to the electrical circuit diagrams and check the luggage compartment left low frequency antenna circuit for open circuit, high resistance
C1017-23	Boot/Trunk Primary Switch - Signal stuck low	• Tailgate lock switch circuit short circuit to ground	NOTE: This circuit/switch is available as an option • Refer to the electrical circuit diagrams and check the tailgate lock switch circuit for short circuit to ground
U0010-88	Medium Speed CAN Communication Bus - Bus off	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Car configuration file mismatch with vehicle specification	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U201F-00	External Receiver - No sub type information	NOTE: Circuit reference RX SERIAL DATA • RF receiver power or ground circuit open circuit, high resistance • LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • RF receiver internal failure • Keyless vehicle module internal failure	• Refer to the electrical circuit diagrams and check the RF receiver power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new RF receiver • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new keyless vehicle module
U201F-31	External Receiver - No signal	NOTE: Circuit reference RX SERIAL DATA • RF receiver power or ground circuit open circuit, high resistance • LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • RF receiver internal failure • Keyless vehicle module internal failure	• Refer to the electrical circuit diagrams and check the RF receiver power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new RF receiver • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new keyless vehicle module
U201F-95	External Receiver - Incorrect assembly	• Car configuration file mismatch with vehicle specification - RF receiver frequency • Incorrect RF receiver installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new RF receiver as necessary
U2100-00	Initial Configuration Not Complete - No sub type information	• Keyless vehicle module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the keyless vehicle module with the latest level software

U2101-00	Control Module Configuration Incompatible - No sub type information	Car configuration file mismatch with vehicle specification	Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U3000-49	Control Module - Internal electronic failure	• Keyless vehicle module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new keyless vehicle module
U3000-95	Control Module - Incorrect assembly	• Car configuration file mismatch with vehicle specification - Passive entry / passive start or passive start only • Incorrect keyless vehicle module installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new keyless vehicle module as necessary
U3002-81	Vehicle Identification Number - Invalid serial data received	• Keyless vehicle module previously installed on another vehicle • New keyless vehicle module installed and VIN not yet programmed	• Install the original or a new keyless vehicle module as necessary • Using the manufacturer approved diagnostic system, perform routine - Learn VIN (0x0404)

General Information - Diagnostic Trouble Code (DTC) Index DTC: Occupant Classification Sensor Control Module (OCSCM)

Description and Operation

Occupant Classification Sensor Control Module (OCSCM)

WARNING: TO AVOID ACCIDENTAL DEPLOYMENT AND POSSIBLE PERSONAL INJURY, THE BACKUP POWER SUPPLY MUST BE DEPLETED BEFORE REPAIRING OR REPLACING ANY AIR BAG SUPPLEMENTAL RESTRAINT SYSTEM (SRS) COMPONENTS. TO DEPLETE THE BACKUP POWER SUPPLY ENERGY, DISCONNECT THE BATTERY GROUND CABLE AND WAIT ONE MINUTE. FAILURE TO FOLLOW THIS INSTRUCTION MAY RESULT IN PERSONAL INJURY.

CAUTIONS:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Occupant Classification Sensor Control Module (OCSCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Air Bag Supplemental Restraint System (SRS) (501-20B, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1193-53	Crash Event Storage Full and Locked - Deactivated	• Crash event occurred	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - On Demand Self Test (0x0202)
B1A54-01	Occupant Belt Tension Sensor - General electrical failure	• Seatbelt tension sensor internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - On Demand Self Test (0x0202). If the problem persists, install a new seatbelt tension sensor as necessary
B1A54-02	Occupant Belt Tension Sensor - General signal failure	• Seatbelt tension sensor signal circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the seatbelt tension sensor signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1A54-	Occupant Belt	• Seatbelt tension sensor	• Refer to the electrical circuit diagrams and check

11	Tension Sensor - Circuit short to ground	signal circuit short circuit to ground	the seatbelt tension sensor signal circuit for short circuit to ground
B1A54-12	Occupant Belt Tension Sensor - Circuit short to battery	• Seatbelt tension sensor signal circuit short circuit to power	• Refer to the electrical circuit diagrams and check the seatbelt tension sensor signal circuit for short circuit to power
B1A54-13	Occupant Belt Tension Sensor - Circuit open	• Seatbelt tension sensor signal circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the seatbelt tension sensor signal circuit for open circuit, high resistance
B1A62-02	Pressure Sensor - General signal failure	• Occupant detection sensor signal circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the occupant detection sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1A62-11	Pressure Sensor - Circuit short to ground	• Occupant detection sensor signal circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the occupant detection sensor signal circuit for short circuit to ground
B1A62-12	Pressure Sensor - Circuit short to battery	• Occupant detection sensor signal circuit short circuit to power	• Refer to the electrical circuit diagrams and check the occupant detection sensor signal circuit for short circuit to power
B1A62-13	Pressure Sensor - Circuit open	• Occupant detection sensor signal circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the occupant detection sensor signal circuit for open circuit, high resistance
B1A62-7B	Pressure Sensor - Low fluid level	• Occupant classification sensor control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new occupant classification sensor control module
U0001-88	High Speed CAN Communication Bus - Bus off	• High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0151-00	Lost Communication With Restraints Control Module - No sub type information	• Restraints control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Restraints system fault	• Refer to the electrical circuit diagrams and check the restraints control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the restraints control module for related DTCs and refer to the relevant DTC index
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Master car configuration file ID does not correspond	• Check that the correct the occupant classification sensor control module is installed for vehicle specification. Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U2016-51	Control Module Main Software - Not programmed	• Occupant classification sensor control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new occupant classification sensor control module
U201A-51	Control Module Main Calibration Data - Not programmed	• Occupant classification sensor control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new occupant classification sensor control module
U3000-04	Control Module - System internal failures	• Occupant classification sensor control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new occupant classification sensor control module
U3000-54	Control Module - Missing calibration	• This diagnostic trouble code is set if routine - Calibrate OCS Empty Seat Offset (0x5000) - is requested and	• Check the following criteria have all been achieved: - Ignition status set to RUN/START - Verify seat is always empty after power-

		fails due to one of the pre-conditions to execute the routine	up before re-zero is requested - The occupant classification sensor control module has gone through the seat assembly plant calibration - No collision event received from the restraints control module during the current ignition cycle - No faults present in the current ignition cycle - The trigger message for calibrate empty seat offset has been received from the diagnostic tool - Occupant classification sensor control module has enough time to begin classification - Temperature is between 6°C (42°F) and 36°C (97°F)
U3003-16	Battery Voltage - Circuit voltage below threshold	• Occupant classification sensor control module power or ground circuit open circuit, high resistance • Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the occupant classification sensor control module power and ground circuits for open circuit, high resistance • Refer to the relevant section of the workshop manual and test the battery and charging system
U3003-17	Battery Voltage - Circuit voltage above threshold	• Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the relevant section of the workshop manual and test the battery and charging system

General Information - Diagnostic Trouble Code (DTC) Index DTC: Parking Aid Control Module (PACM)

Description and Operation

Parking Aid Control Module (PACM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

Physical damage to the sensor (impact damage or scratched sensor surface) must NOT be changed under warranty.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Parking Aid Control Module (PACM). For additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Parking Aid (413-13 Parking Aid, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1B36-01	Front Right Outer Sensor - General Electrical Failure	• Wiring harness fault • Front Right Outer Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the front bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B36-12	Front Right Outer Sensor - Circuit short to battery	• Wiring harness fault	• Refer to electrical wiring diagrams and check the front bumper harness for damage. Check sensor circuit for short circuit to power. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test
B1B36-96	Front Right Outer Sensor - Component internal failure	• Wiring harness fault • Front Right Outer Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the front bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection

			• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B38-01	Front Right Inner Sensor - General Electrical Failure	• Wiring harness fault • Front Right Inner Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the front bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B38-12	Front Right Inner Sensor - Circuit short to battery	• Wiring harness fault	• Refer to electrical wiring diagrams and check the front bumper harness for damage. Check sensor circuit for short circuit to power. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test
B1B38-96	Front Right Inner Sensor - Component internal failure	• Wiring harness fault • Front Right Inner Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the front bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B40-01	Front Left Outer Sensor - General Electrical Failure	• Wiring harness fault • Front Left Outer Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the front bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B40-12	Front Left Outer Sensor - Circuit short to battery	• Wiring harness fault	• Refer to electrical wiring diagrams and check the front bumper harness for damage. Check sensor circuit for short circuit to power. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test
B1B40-96	Front Left Outer Sensor - Component internal failure	• Wiring harness fault • Front Left Outer Sensor - Component	• Refer to electrical wiring diagrams and check the front bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-

		internal failure	connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B42-01	Front Left Inner Sensor - General Electrical Failure	• Wiring harness fault • Front Left Inner Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the front bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B42-12	Front Left Inner Sensor - Circuit short to battery	• Wiring harness fault	• Refer to electrical wiring diagrams and check the front bumper harness for damage. Check sensor circuit for short circuit to power. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test
B1B42-96	Front Left Inner Sensor - Component internal failure	• Wiring harness fault • Front Left Inner Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the front bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B44-01	Rear Right Outer Sensor - General Electrical Failure	• Wiring harness fault • Rear Right Outer Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the rear bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B44-12	Rear Right Outer Sensor - Circuit short to battery	• Wiring harness fault	• Refer to electrical wiring diagrams and check the rear bumper harness for damage. Check sensor circuit for short circuit to power. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test
B1B44-96	Rear Right Outer Sensor - Component internal failure	• Wiring harness fault • Rear Right Outer Sensor -	• Refer to electrical wiring diagrams and check the rear bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required

		Component internal failure	• Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B46-01	Rear Right Inner Sensor - General Electrical Failure	• Wiring harness fault • Rear Right Inner Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the rear bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B46-12	Rear Right Inner Sensor - Circuit short to battery	• Wiring harness fault	• Refer to electrical wiring diagrams and check the rear bumper harness for damage. Check sensor circuit for short circuit to power. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test
B1B46-96	Rear Right Inner Sensor - Component internal failure	• Wiring harness fault • Rear Right Inner Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the rear bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B48-01	Rear Left Outer Sensor - General Electrical Failure	• Wiring harness fault • Rear Left Outer Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the rear bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B48-12	Rear Left Outer Sensor - Circuit short to battery	• Wiring harness fault	• Refer to electrical wiring diagrams and check the rear bumper harness for damage. Check sensor circuit for short circuit to power. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test
B1B48-96	Rear Left Outer Sensor - Component	• Wiring harness fault • Rear Left Outer	• Refer to electrical wiring diagrams and check the rear bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open

	internal failure	Sensor - Component internal failure	circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B50-01	Rear Left Inner Sensor - General electrical failure	• Wiring harness fault • Rear Left Inner Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the rear bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B50-12	Rear Left Inner Sensor - Circuit short to battery	• Wiring harness fault	• Refer to electrical wiring diagrams and check the rear bumper harness for damage. Check sensor circuit for short circuit to power. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test
B1B50-96	Rear Left Inner Sensor - Component internal failure	• Wiring harness fault • Rear Left Inner Sensor - Component internal failure	• Refer to electrical wiring diagrams and check the rear bumper harness for damage/corrosion. Check sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair or replace any wiring harness as required • Check the connector for integrity and damage, then re-connect sensor to confirm connection • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test • If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for signs of water ingress/corrosion. Exchange the suspect sensor with another sensor within the bumper that is not reporting a fault. Clear the DTC and run the on demand self test to confirm if the fault code now appears for the new position of the suspect sensor. Renew the faulty sensor
B1B54-11	Function LED - Park Aid - Circuit short to ground	• Wiring harness fault • Switch/LED - Component internal failure	• Refer to electrical wiring diagrams and check the parking aid LED circuit for short circuit to ground. Repair or replace any wiring harness as required • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test. If the problem persists, suspect the switch/LED
B1B54-12	Function LED - Park Aid - Circuit short to battery	• Wiring harness fault • Switch/LED - Component internal failure • Control Module - Component internal failure	• Refer to electrical wiring diagrams and check the parking aid LED circuit for short circuit to power. Repair or replace any wiring harness as required • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test. If the problem persists, suspect the switch/LED
B1B57-11	Front Sensors Power Circuit- Circuit short to ground	• Wiring harness fault • Control Module - Component internal failure	• Check front and rear bumper harness for signs of damage and security of connections • Refer to electrical wiring diagrams and check the parking assist front sensor power circuit and rear sensor power circuit for short circuit to ground. Repair or replace any wiring harness as required • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test. If the problem persists, suspect the control module • Cycle the ignition off, then on, to power up parking aid system and check corrective action

B1B58-11	Rear Sensors Power Circuit - Circuit short to ground	• Wiring harness fault • Control Module - Component internal failure	• Check rear and front (if front PDC fitted) bumper harness for signs of damage and security of connections • Refer to electrical wiring diagrams and check the parking assist rear sensor power circuit and front sensor power circuit (if front PDC fitted) for short circuit to ground. Repair or replace any wiring harness as required • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test. If the problem persists, suspect the control module • Cycle the ignition off, then on, to power up parking aid system and check corrective action
B1C30-73	Disable Switch - Actuator stuck closed	• Wiring harness fault • Control Switch - Component internal failure	• Refer to electrical wiring diagrams and check the parking assist switch and switch circuit. Repair or replace any wiring harness as required • Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test. If the problem persists, suspect the control switch • Check the switch function
U0010-00	Medium Speed CAN Communication Bus - No sub type information	• Medium speed CAN failure - bus off	• Refer to the electrical circuit diagrams and check the Parking aid control module high speed CAN bus for short circuit to ground, short circuit to power, open circuit, high resistance, or short circuit between the paired CAN wires • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Cycle the ignition off, then on, and check if the DTC is still logged
U0140-00	Lost Communication With Body Control Module - No sub type information	• Loss of CAN communication with central junction box	• Refer to the electrical circuit diagrams and check the power and ground connections to the central junction box. Clear DTC and retest • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the parking aid control module
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information	• Loss of CAN communication with instrument cluster	• Refer to the electrical circuit diagrams and check the power and ground connections to the instrument cluster. Clear DTC and retest • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and the parking aid control module
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Car configuration file stored in Parking aid control module does not match the master car configuration file • Master car configuration file not being transmitted by master control module	• Using the manufacturer approved diagnostic system, check all other control modules, for related DTCs and refer to the relevant DTC index • Check the components installed on the vehicle were installed by the factory or a dealer • Install the original component or a new one as required.
U0422-00	Invalid Data Received From Body Control Module - No sub type information	• Invalid data received	• Using the manufacturer approved diagnostic system, check central junction box, for related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Cycle the ignition off, then on, and check if the DTC is still logged • Clear the DTC and re-test
U0423-00	Invalid Data Received From Instrument Panel Control Module - No sub type information	• Invalid data received	• Using the manufacturer approved diagnostic system, check instrument cluster, for related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Cycle the ignition off, then on, and check if the DTC is still logged • Clear the DTC and re-test
U2100-	Initial	• Car	

00	Configuration Not Complete - No sub type information	configuration file not the same as expected by the parking aid control module	 NOTE: After updating the car configuration file, set the ignition to on and wait 30 seconds before clearing the DTCs • Using the manufacturer approved diagnostic system, check and update the car configuration file as required. Clear the DTC and retest
U2101-00	Control Module Configuration Incompatible - No sub type information	• Parking aid control module configuration error	• Using the manufacturer approved diagnostic system check and up-date the car configuration file as required. Clear the DTC and re-test
U3000-49	Control Module - Internal electronic failure	• Parking aid control module internal failure	• Using the manufacturers approved diagnostic system clear the DTC, cycle the ignition off, then on, and check if the DTC is still logged • If the DTC is still logged suspect the parking aid control module
U3002-81	Vehicle Identification Number - Invalid serial data received	• VIN Mismatch, stored VIN does not match broadcast VIN	• Using the manufacturers approved diagnostic system clear the DTC, cycle the ignition off, then on, and check if the DTC is still logged • If the DTC is still logged replace the parking aid control module
U3003-62	Battery Voltage - Signal compare failure	• Signal compare failure in battery voltage, of 2 volts or more, between parking aid system control module and central junction box	• Using the manufacturer approved diagnostic system, check central junction box, for related DTCs and refer to the relevant DTC index • Check the vehicle charging system performance to ensure the voltage regulation is correct • Refer to relevant section of workshop manual and battery care manual. Check battery state of charge and starting/charging system performance • Refer to the electrical circuit diagrams and check parking aid control module power and ground circuits for short circuit to ground, short circuit to power, open circuit • Clear the DTC and retest

General Information - Diagnostic Trouble Code (DTC) Index DTC: Rear Differential Control Module (RDCM)

Description and Operation

Rear Differential Control Module (RDCM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Rear Differential Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Rear Drive Axle and Differential (205-02 Rear Drive Axle/Differential, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
P0562-00	System Voltage Low - No sub type information	• Rear differential control module voltage supply below 9V	• Check the battery charge condition, refer to the electrical circuit diagrams and check the wiring to the rear differential control module, repair as necessary
P0563-00	System Voltage High - No sub type information	• System voltage high (supply voltage supply greater than 16 volts)	• Check engine control module for stored DTCs, suspect charging system fault. Refer to the electrical circuit diagrams and check, power and ground circuit for fault
P0604-00	Internal Control Module Random Access Memory (RAM) Error - No sub type information	• Rear differential control module internal error	• Clear the DTC and retest. If the problem persists, renew the control module
P0605-00	Internal Control Module Read Only Memory (ROM) Error - No sub type information	• Rear differential control module internal error	• Clear the DTC and retest. If the problem persists, renew the control module
P0606-00	Control Module Processor - No sub type information	• Watchdog reset - Internal control module failure	• This is a control module internal check DTC and is not necessarily a fault. If no other DTCs are logged and no customer complaint exists, clear/ignore this DTC. If the problem persists, renew the control module
P0607-00	Control Module Performance - No sub type information	• Rear differential control module internal error - charge pump voltage below threshold	• Clear the DTC and retest. If the problem persists, renew the control module
P0652-00	Sensor Reference Voltage 'B' Circuit Low - No sub type information	• Position sensor supply below 5.7V • Sensor failure (within actuator)	• Refer to the electrical circuit diagrams and check the differential actuator sensor position circuit, repair as necessary. If no circuit problems exist, renew the differential actuator

P0653-00	Sensor Reference Voltage 'B' Circuit High - No sub type information	• Position sensor supply above 8.3V • Internal control module failure	• Refer to the electrical circuit diagrams and check the differential actuator hall sensor ref voltage at the control module or the actuator. If voltage is too high, then suspect control module fault
P0666-00	PCM/ECM/TCM Internal Temperature Sensor 'A' Circuit - No sub type information	• Rear differential control module internal temperature sensor value above 105°C	• This is a control module internal check DTC and is not necessarily a fault. If no other DTCs are logged and no customer complaint exists, clear this DTC and retest. Check the security of control module fixings. Check the module ground connection. Consider environmental conditions before suspecting the control module. If the problem persists, renew the control module
P0702-64	Transmission Control System Electrical - Signal plausibility failure	• Implausibility of differential motor temperature sensor and oil temperature sensor readout detected • Motor or oil temperature sensor circuit short circuit to ground or power	• Check the rear differential oil quantity and specification. Refer to the relevant section of the workshop manual. Check both temperature sensor circuits and connectors for damage/water ingress, repair as necessary. Where available, after vehicle has been switched off for at least an hour, use the manufacturer approved diagnostic system to read motor temperature and oil temperature sensor values. Temperature difference should be less than 25°C. Clear the DTC and retest
P0712-00	Transmission Fluid Temperature Sensor 'A' Circuit Low - No sub type information	• Differential actuator internal temperature sensor open circuit or short circuit to ground	• Refer to the electrical circuit diagrams and check the differential actuator sensor circuit, repair as necessary. If no circuit problems exist, renew the differential actuator
P0713-00	Transmission Fluid Temperature Sensor 'A' Circuit High - No sub type information	• Differential actuator internal temperature sensor open circuit or short circuit to power	• Refer to the electrical circuit diagrams and check the circuit between oil temp sensor and control module connector, repair as necessary. Measure oil temp sensor resistance at control module connector. Resistance should be less than 10K if oil temp >0°C. If not suspect, oil temp sensor open-circuit. If no circuit problems exist, renew the sensor
P0806-00	Clutch Position Sensor Circuit Range/Performance - No sub type information	• Mismatch of actual and expected/calculated actuator position - Internal differential actuator error	• Calibrate the clutch and range change mechanism using the manufacturer approved diagnostic system. Clear the DTC and retest. If the problem persists, renew the differential actuator
P0807-00	Clutch Position Sensor Circuit Low - No sub type information	• Differential actuator internal position sensor supply, ground, signal A or B open circuit or sensor supply, signal A or B short circuit to ground	• Refer to the electrical circuit diagrams and check the differential actuator motor position hall sensor signal circuit (A or B), repair as necessary. If no circuit problems exist, renew the differential actuator
P0808-00	Clutch Position Sensor Circuit High - No sub type information	• Differential actuator internal position sensor signal 1 or 2 short circuit to power	• Refer to the electrical circuit diagrams and check the differential actuator motor position hall sensor signal circuit (A or B), repair as necessary. If no circuit problems exist, renew the differential actuator
P080A-00	Clutch Position Not Learned - No sub type information	• Rear differential control module not calibrated • Differential clutch stuck or out of tolerance	• Using the manufacturer approved diagnostic system, calibrate the rear differential control module. Clear the DTC and retest. If the problem persists, renew the rear differential assembly
P0894-00	Transmission Component Slipping - No sub type information	• Differential actuator internal magnetic brake is slipping	• Renew the differential actuator
P0900-00	Clutch Actuator Circuit/Open - No sub type information	• Differential actuator supply open circuit	• Refer to the electrical circuit diagrams and check the differential actuator circuit, repair as necessary
P0901-	Clutch Actuator	• Differential actuator	• Refer to the electrical circuit diagrams and check the

00	Circuit Range/Performance - No sub type information	supply short circuit • Both DC motor supply leads are short circuited together • H Bridge overload detected	differential actuator circuit. Check the actuator circuit resistance carefully (a good motor also has a low resistance). Repair as necessary
P0902-00	Clutch Actuator Circuit Low - No sub type information	• Differential actuator supply circuit short to ground	• Refer to the electrical circuit diagrams and check the differential actuator circuit, repair as necessary
P0903-00	Clutch Actuator Circuit High - No sub type information	• Differential actuator supply circuit short to power	• Refer to the electrical circuit diagrams and check the differential actuator circuit, repair as necessary
P1603-00	EEPROM Malfunction - No sub type information	• Rear differential control module internal error	• Clear the DTC and retest. If the problem persists, renew the control module
P1783-00	Transmission Over-Temperature Condition - No sub type information	• Rear differential oil sump temperature sensor value above 160°C	• Confirm the customer complaint and vehicle usage at the time of DTC event. Check the operation of the rear differential. Check the rear differential oil quantity and specification. Refer to the relevant section of the workshop manual. Clear the DTC and retest. If the problem persists, suspect an electrical fault. Check for water ingress into wiring harness/connectors. Renew the actuator
P186A-00	Differential Lock-Up Actuator Brake Control Circuit/Open - No sub type information	• Open circuit of actuator internal magnetic brake supply leads	• Refer to the electrical circuit diagrams and check the differential actuator circuit, repair as necessary. If no circuit problems exist, renew the differential actuator
P186B-00	Differential Lock-Up Actuator Brake Control Circuit Low - No sub type information	• Short circuit to ground of both differential actuator internal magnetic brake pins	• Refer to the electrical circuit diagrams and check the differential actuator circuit, repair as necessary. If no circuit problems exist, renew the differential actuator
P186C-00	Differential Lock-Up Actuator Brake Control Circuit High - No sub type information	• Short circuit to power of both differential actuator internal magnetic brake pins	• Refer to the electrical circuit diagrams and check the differential actuator circuit, repair as necessary. If no circuit problems exist, renew the differential actuator
P186D-00	Clutch Actuator Stuck - No sub type information	• Actuator fault	• Using the manufacturers approved diagnostic system, calibrate the rear differential control module/clutch actuator. If the problem persists, renew the actuator
P2742-00	Transmission Fluid Temperature Sensor 'B' Circuit Low - No sub type information	• Rear differential oil sump temperature sensor short circuit to ground	• Refer to the electrical circuit diagrams and check the differential oil temperature sensor circuit, repair as necessary
P2743-00	Transmission Fluid Temperature Sensor 'B' Circuit High - No sub type information	• Rear differential oil sump temperature sensor open circuit or short circuit to power	• Refer to the electrical circuit diagrams and check the differential oil temperature sensor circuit, repair as necessary
P2785-00	Clutch Actuator Temperature Too High - No sub type information	• Extensive prolonged off-road use • Insufficient oil quantity • Incorrect oil specification • Internal actuator problem	• Check for other DTCs (e.g. P186B). If multiple DTCs exist, suspect a control module internal fault. Confirm the customer complaint and vehicle usage at the time of DTC event. Check the operation of the rear differential. Check the rear differential oil quantity and specification. Refer to the relevant section of the workshop manual. Clear the DTC and retest. If the problem persists, renew the actuator
P2787-00	Clutch Temperature Too High - No sub type information	• Rear differential clutch pack temperature (calculated) above 200°C	• Confirm the customer complaint and vehicle usage at the time of DTC event. Check the operation of the rear differential. Check the rear differential oil quantity and specification. Refer to the relevant section of the workshop manual. Clear the DTC and retest. If the problem persists, renew the actuator
U0001-	High Speed CAN	• Bus off	• Refer to the electrical circuit diagrams and check the

88	Communication Bus - Bus off		power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the engine control module and rear differential control module
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transfer case control module and rear differential control module
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the anti-lock brake system control module and rear differential control module
U0140-00	Lost Communication With Body Control Module - No sub type information	• No sub type information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the central junction box and rear differential control module
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Rear differential control module not configured • Incorrect software installed	• Check & confirm differential control module installed is correct. If correct, clear DTC, ignition off for 5 seconds, ignition on and then check if DTC reoccurs. If the problem persists, configure the module using the manufacturers approved diagnostic system
U0403-68	Invalid Data Received From Transfer Case Control Module - Event information	• Event information	• Check the transfer case control module for related DTCs and refer to the relevant DTC index
U0415-68	Lost Communication With Anti-Lock Brake System (ABS) Control Module - Event information	• Event information	• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the anti-lock brake system control module and rear differential control module
U0422-68	Invalid Data Received from Body Control Module - Event information	• Event information - invalid vehicle configuration message	• Check the generic electronics module for related DTCs and refer to the relevant DTC index
U1A14-49	CAN Initialization Failure - Internal electronic failure	• Rear differential control module has failed the CAN serial data communication software initialization or the CAN controller initialization • Internal control module failure	• Clear the DTC and retest. If the problem persists, configure the module using the manufacturers approved diagnostic system. Clear the DTC and retest. If the problem persists, renew the control module

General Information - Diagnostic Trouble Code (DTC) Index DTC: Rear Seat Entertainment Control Module (RSECM)

Description and Operation

Rear Seat Entertainment Control Module (RSECM)

CAUTIONS:

 Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

 When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

 If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

 Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

 When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

 Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

 Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

 If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

 Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Rear Seat Entertainment Control Module (RSECM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Information and Entertainment System (415-00, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B100F-29	Video Input "B" - Signal invalid	 NOTE: Circuit reference AUX PANEL VIDEO IN / AUX PANEL VIDEO GND • Auxiliary video in circuit short circuit to ground, short circuit to power, open circuit, high resistance • Auxiliary device internal failure • Rear seat entertainment control module internal failure	 NOTE: This DTC can only set when routine - Test Composite Video Blanking and Synchronisation Input (0x6015) - is run and fails • Refer to the electrical circuit diagrams and check the auxiliary video in circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Connect a known functional video signal source to the audio video input/output panel and select this source using the rear seat entertainment remote control. Check the left/right rear seat entertainment screen for a valid signal • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment control module
B1010-29	Video Input "C" - Signal invalid	 NOTE: Circuit reference	 NOTE: This DTC can only set when routine -

		HLDF_CVBS_VIDEO_IN / HLDF_CVBS_VIDEO_GND • Touch screen video in circuit short circuit to ground, short circuit to power, open circuit, high resistance • Touch screen internal failure • Rear seat entertainment control module internal failure	Test Composite Video Blanking and Synchronisation Input (0x6015) - is run and fails • Refer to the electrical circuit diagrams and check the touch screen video in circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the touch screen for related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment control module
B1252-57	USB Port - Invalid/incomplete software component	• A USB device is detected but the content format of the USB device is not supported	NOTE: This DTC can only set when routine - USB Interface Self Test (0x602E) - is run and fails • Using the manufacturer approved diagnostic system, clear the DTCs, remove and reconnect the USB device, and retest. If fault persists, replace the content of the USB device with content that is correctly formatted
B1252-93	USB Port - No operation	NOTE: Circuit reference AUX PANEL USB DATA POS / AUX PANEL USB DATA NEG • USB device circuit short circuit to ground, short circuit to power, open circuit, high resistance • USB device internal failure • Rear seat entertainment control module internal failure	NOTE: This DTC can only set when routine - USB Interface Self Test (0x602E) - is run and fails • Refer to the electrical circuit diagrams and check the USB circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Connect a known functional USB device to the audio video input/output panel and select this source using the rear seat entertainment remote control. Check the left/right rear seat entertainment screen for a valid signal • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment control module
B125E-4A	Left Rear Display - Incorrect component installed	NOTE: Circuit reference SUPPLY_HLDR_L_R / HLDR_MS_CAN_POS / HLDR_MS_CAN_NEG / HLDR_GND • Rear seat entertainment left screen power or ground circuit open circuit, high resistance • Rear seat entertainment CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Incorrect rear seat entertainment left screen installed	NOTE: This DTC is set when the rear seat entertainment control module has not read a valid serial number from the left rear seat entertainment screen within 25 seconds • Refer to the electrical circuit diagrams and check the rear seat entertainment left screen power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear seat entertainment CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Check that the rear seat entertainment left screen has not been substituted
B125E-96	Left Rear Display - Component internal failure	• Rear seat entertainment left screen internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment left screen
B125E-98	Left Rear Display - Component or system over temperature	• Rear seat entertainment left screen over temperature condition	• Allow the system to cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment left screen
B125F-4A	Right Rear Display - Incorrect component installed	NOTE: Circuit reference SUPPLY_HLDR_L_R / HLDR_MS_CAN_POS / HLDR_MS_CAN_NEG / HLDR_GND • Rear seat entertainment right screen power or	NOTE: This DTC is set when the rear seat entertainment control module has not read a valid serial number from the right rear seat entertainment screen within 25 seconds • Refer to the electrical circuit diagrams and check the rear seat entertainment right screen

		ground circuit open circuit, high resistance • Rear seat entertainment CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Incorrect rear seat entertainment right screen installed	power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear seat entertainment CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Check that the rear seat entertainment right screen has not been substituted
B125F-96	Right Rear Display - Component internal failure	• Rear seat entertainment right screen internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment right screen
B125F-98	Right Rear Display - Component or system over temperature	• Rear seat entertainment right screen over temperature condition	• Allow the system to cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment right screen
B1285-88	Video Input "D" - Bus off	NOTE: Circuit reference TV_LVDS_POS / TV_LVDS_NEG • TV control module low-voltage differential signalling circuit short circuit to ground, short circuit to power, open circuit, high resistance • Television system fault • Rear seat entertainment control module internal failure	• Refer to the electrical circuit diagrams and check the TV control module low-voltage differential signalling circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the TV control module for related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment control module
B12A0-11	Auxiliary Input 2 - Circuit short to ground	NOTE: Circuit reference AUX PANEL AUDIO IN RIGHT • Right auxiliary audio in circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the right auxiliary audio in circuit for short circuit to ground
B12A0-12	Auxiliary Input 2 - Circuit short to battery	NOTE: Circuit reference AUX PANEL AUDIO IN RIGHT • Right auxiliary audio in circuit short circuit to power	• Refer to the electrical circuit diagrams and check the right auxiliary audio in circuit for short circuit to power
B12ED-88	Video Input "F" - Bus off	NOTE: Circuit reference L_HLDR_LVDS_VIDEO_OUT_POS / L_HLDR_LVDS_VIDEO_OUT_NEG • Rear seat entertainment left screen low-voltage differential signalling circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the rear seat entertainment left screen low-voltage differential signalling circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B12F8-88	Video Input "G" - Bus off	NOTE: Circuit reference R_HLDR_LVDS_VIDEO_OUT_POS / R_HLDR_LVDS_VIDEO_OUT_NEG • Rear seat entertainment right screen low-voltage differential signalling circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the rear seat entertainment right screen low-voltage differential signalling circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B1D21-02	Remote Control Switch - General signal failure	NOTE: Circuit reference SUPPLY_REMOTE / REMOTE_DATA_IN /	NOTE: This DTC can only set when routine - TSRC (Touch Screen Remote Control Interface Self Test (0x602F) - is run and fails

		REMOTE_DATA_OUT / REMOTE_GND • Rear seat entertainment remote control docking station power or ground circuit open circuit, high resistance • Rear seat entertainment remote control data bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Rear seat entertainment remote control internal failure	• Refer to the electrical circuit diagrams and check the rear seat entertainment remote control docking station power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear seat entertainment remote control data bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Place the rear seat entertainment remote control in the docking station. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment remote control
B1D21-08	Remote Control Switch - Bus signal/message failures	• Rear seat entertainment remote control fault	• Using the manufacturer approved diagnostic system, re-configure the rear seat entertainment remote control with the latest level software
B1D21-1C	Remote Control Switch - Circuit voltage out of range	• Rear seat entertainment remote control fault	NOTE: This DTC can only set when routine - TSRC (Touch Screen Remote Control Interface Self Test (0x602F) - is run and fails • Install a new rear seat entertainment remote control battery
B1D21-57	Remote Control Switch - Invalid/incomplete software component	• Rear seat entertainment remote control fault	NOTE: This DTC can only set when routine - TSRC (Touch Screen Remote Control Interface Self Test (0x602F) - is run and fails • Using the manufacturer approved diagnostic system, re-configure the rear seat entertainment remote control with the latest level software
B1D21-71	Remote Control Switch - Actuator stuck	• Rear seat entertainment remote control fault	NOTE: This DTC can only set when routine - TSRC (Touch Screen Remote Control Interface Self Test (0x602F) - is run and fails • Test the operation of the rear seat entertainment remote control switches
B1D78-11	Auxiliary Input - Circuit short to ground	NOTE: Circuit reference AUX PANEL AUDIO IN LEFT • Left auxiliary audio in circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the left auxiliary audio in circuit for short circuit to ground
B1D78-12	Auxiliary Input - Circuit short to battery	NOTE: Circuit reference AUX PANEL AUDIO IN LEFT • Left auxiliary audio in circuit short circuit to power	• Refer to the electrical circuit diagrams and check the left auxiliary audio in circuit for short circuit to power
U0196-31	Lost Communication With Entertainment Control Module - Rear "A" - No signal	NOTE: Circuit reference SUPPLY_HLDR_L_R / HLDR_MS_CAN_POS / HLDR_MS_CAN_NEG / HLDR_GND • Rear seat entertainment left screen power or ground circuit open circuit, high resistance • Rear seat entertainment CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the rear seat entertainment left screen power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear seat entertainment CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0249-31	Lost Communication		• Refer to the electrical circuit diagrams and check the rear seat entertainment right screen

	With Entertainment Control Module - Rear "B" - No signal	NOTE: Circuit reference SUPPLY_HLDR_L_R / HLDR_MS_CAN_POS / HLDR_MS_CAN_NEG / HLDR_GND • Rear seat entertainment right screen power or ground circuit open circuit, high resistance • Rear seat entertainment CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear seat entertainment CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U1009-00	Invalid Data Received From Right Rear Display Module - No sub type information	NOTE: Circuit reference SUPPLY_HLDR_L_R / HLDR_MS_CAN_POS / HLDR_MS_CAN_NEG / R_HLDR_LVDS_VIDEO_OUT_POS / R_HLDR_LVDS_VIDEO_OUT_NEG / HLDR_GND • Rear seat entertainment CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Rear seat entertainment right screen low-voltage differential signalling circuit short circuit to ground, short circuit to power, open circuit, high resistance • Rear seat entertainment right screen power or ground circuit open circuit, high resistance • Rear seat entertainment right screen internal failure	NOTE: This DTC indicates that unexpected data was received from the rear seat entertainment right screen. This could be due to a reset, harness fault, incorrect programming or random corruption • Refer to the electrical circuit diagrams and check the rear seat entertainment CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear seat entertainment right screen low-voltage differential signalling circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear seat entertainment right screen power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment right screen
U100A-00	Invalid Data Received From Left Rear Display Module - No sub type information	NOTE: Circuit reference SUPPLY_HLDR_L_R / HLDR_MS_CAN_POS / HLDR_MS_CAN_NEG / L_HLDR_LVDS_VIDEO_OUT_POS / L_HLDR_LVDS_VIDEO_OUT_NEG / HLDR_GND • Rear seat entertainment CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Rear seat entertainment left screen low-voltage differential signalling circuit short circuit to ground, short circuit to power, open circuit, high resistance • Rear seat entertainment left screen power or ground circuit open circuit, high resistance • Rear seat entertainment left screen internal failure	NOTE: This DTC indicates that unexpected data was received from the rear seat entertainment left screen. This could be due to a reset, harness fault, incorrect programming or random corruption • Refer to the electrical circuit diagrams and check the rear seat entertainment CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear seat entertainment left screen low-voltage differential signalling circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the rear seat entertainment left screen power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment left screen
U200D-11	Control Module Output Power A - Circuit short to ground	NOTE: Circuit reference SUPPLY_HLDR_L_R • Rear seat entertainment left/right screen circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the rear seat entertainment left/right screen circuit for short circuit to ground
U200D-12	Control Module Output Power A -	NOTE: Circuit reference	• Refer to the electrical circuit diagrams and check the rear seat entertainment left/right

	Circuit short to battery	SUPPLY_HLDR_L_R • Rear seat entertainment left/right screen circuit short circuit to power	screen circuit for short circuit to power
U200D-19	Control Module Output Power A - Circuit current above threshold	 NOTE: Circuit reference SUPPLY_HLDR_L_R / HLDR_GND • Rear seat entertainment left/right screen circuit short circuit to ground, short circuit to power • Rear seat entertainment control module internal failure	 NOTE: This DTC is logged when the combined total current consumption of the rear screens exceeds 1.35 amps • Refer to the electrical circuit diagrams and check the rear seat entertainment left/right screen circuit for short circuit to ground, short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment control module
U200E-11	Control Module Output Power B - Circuit short to ground	 NOTE: Circuit reference SUPPLY_REMOTE • Rear seat entertainment remote control docking station supply circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the rear seat entertainment remote control docking station supply circuit for short circuit to ground
U200E-12	Control Module Output Power B - Circuit short to battery	 NOTE: Circuit reference SUPPLY_REMOTE • Rear seat entertainment remote control docking station supply circuit short circuit to power	• Refer to the electrical circuit diagrams and check the rear seat entertainment remote control docking station supply circuit for short circuit to power
U200E-19	Control Module Output Power B - Circuit current above threshold	 NOTE: Circuit reference SUPPLY_REMOTE/ REMOTE_GND • Rear seat entertainment remote control docking station circuit short circuit to ground, short circuit to power • Rear seat entertainment control module internal failure	 NOTE: If this DTC is set, install a new rear seat entertainment control module even if a circuit fault has been found and rectified • Refer to the electrical circuit diagrams and check the rear seat entertainment remote control docking station circuit for short circuit to ground, short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment control module
U2014-56	Control Module Hardware - Invalid/incomplete configuration	• Rear seat entertainment control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the rear seat entertainment control module with the latest level software
U2100-00	Initial Configuration Not Complete - No sub type information	• Rear seat entertainment control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the rear seat entertainment control module with the latest level software
U2101-00	Control Module Configuration Incompatible - No sub type information	• Car configuration file mismatch with vehicle specification • Incorrect rear seat entertainment control module installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new rear seat entertainment control module as necessary
U3000-19	Control Module - Circuit current above threshold	• Rear seat entertainment control module internal failure	 NOTE: If this DTC is set, install a new rear seat entertainment control module even if a circuit fault has been found and rectified • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment control module
U3000-	Control Module -	• Rear seat entertainment	• Using the manufacturer approved diagnostic

55	Not configured	control module is not configured correctly	system, re-configure the rear seat entertainment control module with the latest level software
U3000-98	Control Module - Component or system over temperature	• Rear seat entertainment control module over temperature	• Allow the vehicle to cool. Check the rear seat entertainment control module ventilation ducts for obstructions. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new rear seat entertainment control module
U3003-62	Battery Voltage - Signal compare failure	• Mismatch between the voltage at the rear seat entertainment control module and the voltage value broadcast on the CAN bus	• Refer to the electrical circuit diagrams and check the rear seat entertainment control module power and ground circuits for open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index DTC: Rear View Camera (RVC)

Description and Operation

Proximity Camera Control Module (IPMB)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Image Processing Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Video System (415-07 Video System, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B100E-29	Video Input "A" signal - Signal invalid	• Video output connection error • Video output line short or open circuit	• Refer to the electrical circuit diagrams and check the circuit between the proximity cameras and the touch screen
B12BD-19	Rear Camera - Circuit current above threshold	• Rear proximity camera circuit current above threshold • Rear proximity camera is drawing little or no current, indicating an open circuit fault or disconnected camera	NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points • Refer to the electrical circuit diagrams and check the rear proximity camera circuit for short to power, open circuit, high resistance
B12BD-31	Rear Camera - No signal	• Rear proximity camera circuit fault • Rear proximity camera faulty	NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points • Refer to the electrical circuit diagrams and check the rear proximity camera circuit for open circuit
B12BD-49	Rear Camera - Internal electronic failure	• Rear proximity camera internal electronic failure	• Clear DTC, wait for a minimum of 2 minutes, then retest • If fault persists, check and install a new rear proximity camera as required
B12BD-54	Rear Camera - Missing calibration	• Rear proximity camera not calibrated • Rear proximity camera not installed correctly	• Using the manufacturer approved diagnostic system calibrate the rear proximity camera • Check the rear proximity camera is fitted and aligned correctly

B12BE-19	Left Front Camera - Circuit current above threshold	• Front left proximity camera circuit current above threshold • Front left proximity camera is drawing little or no current, indicating an open circuit fault or disconnected camera	NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points • Refer to the electrical circuit diagrams and check the front left proximity camera circuit for short to power, open circuit, high resistance
B12BE-31	Left Front Camera - No signal	• Front left proximity camera circuit fault • Front left proximity camera faulty	NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points • Refer to the electrical circuit diagrams and check the front left proximity camera circuit for open circuit
B12BE-49	Left Front Camera - Internal electronic failure	• Front left proximity camera internal electronic failure	• Clear DTC, wait for a minimum of 2 minutes, then retest • If fault persists, check and install a new front left proximity camera as required
B12BE-54	Left Front Camera - Missing calibration	• Front left proximity camera not calibrated • Front left proximity camera not installed correctly	• Using the manufacturer approved diagnostic system calibrate the front left proximity camera • Check the front left proximity camera is fitted and aligned correctly
B12BF-19	Right Front Camera - Circuit current above threshold	• Front right proximity camera circuit current above threshold • Front right proximity camera is drawing little or no current, indicating an open circuit fault or disconnected camera	NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points • Refer to the electrical circuit diagrams and check the front right proximity camera circuit for short to power, open circuit, high resistance
B12BF-31	Right Front Camera - No signal	• Front right proximity camera circuit fault • Front right proximity camera faulty	NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points • Refer to the electrical circuit diagrams and check the front right proximity camera circuit for open circuit
B12BF-49	Right Front Camera - Internal electronic failure	• Front right proximity camera internal electronic failure	• Clear DTC, wait for a minimum of 2 minutes, then retest • If fault persists, check and install a new front right proximity camera as required
B12BF-54	Right Front Camera - Missing calibration	• Front right proximity camera not calibrated • Front right proximity camera not installed correctly	• Using the manufacturer approved diagnostic system calibrate the front right proximity camera • Check the front right proximity camera is fitted and aligned correctly
B12C0-19	Left Mirror Camera - Circuit current above	• Left mirror proximity camera circuit current above	NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points

	threshold	threshold • Left mirror proximity camera is drawing little or no current, indicating an open circuit fault or disconnected camera	• Refer to the electrical circuit diagrams and check the left mirror proximity camera circuit for short to power, open circuit, high resistance
B12C0-31	Left Mirror Camera - No signal	• Left mirror proximity camera circuit fault • Left mirror proximity camera faulty	 NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points • Refer to the electrical circuit diagrams and check the left mirror proximity camera circuit for open circuit
B12C0-49	Left Mirror Camera - Internal electronic failure	• Left mirror proximity camera internal electronic failure	• Clear DTC, wait for a minimum of 2 minutes, then retest • If fault persists, check and install a new left mirror proximity camera as required
B12C0-54	Left Mirror Camera - Missing calibration	• Left mirror proximity camera not calibrated • Left mirror proximity camera not installed correctly	• Using the manufacturer approved diagnostic system calibrate the left mirror proximity camera • Check the left mirror proximity camera is fitted and aligned correctly
B12C1-19	Right Mirror Camera - Circuit current above threshold	• Right mirror proximity camera circuit current above threshold • Right mirror proximity camera is drawing little or no current, indicating an open circuit fault or disconnected camera	 NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points • Refer to the electrical circuit diagrams and check the right mirror proximity camera circuit for short to power, open circuit, high resistance
B12C1-31	Right Mirror Camera - No signal	• Right mirror proximity camera circuit fault • Right mirror proximity camera faulty	 NOTE: When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points • Refer to the electrical circuit diagrams and check the right mirror proximity camera circuit for open circuit
B12C1-49	Right Mirror Camera - Internal electronic failure	• Right mirror proximity camera internal electronic failure	• Clear DTC, wait for a minimum of 2 minutes, then retest • If fault persists, check and install a new right mirror proximity camera as required
B12C1-54	Right Mirror Camera - Missing calibration	• Right mirror proximity camera not calibrated • Right mirror proximity camera not installed correctly	• Using the manufacturer approved diagnostic system calibrate the right mirror proximity camera • Check the right mirror proximity camera is fitted and aligned correctly
P1603-00	EEPROM Malfunction - No sub type information	• Proximity camera control module internal memory error	• Clear DTC, wait for a minimum of 2 minutes, then retest. If fault persists, check and install a new proximity camera control module as required
U0010-88	Medium Speed CAN Communication	• Bus off	• Refer to the electrical circuit diagrams and check CAN private network for short, open circuit. Carry out CAN network integrity tests using the manufacturer approved

	Bus - Bus off		diagnostic system. Refer to the network communications section of the workshop manual
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Incorrect software loaded • Lost CAN signal	• Check for other modules reporting CAN bus off or lost communication faults. If other modules report problems, check the software version in the central junction box using the manufacturers approved diagnostic system. If no other modules report problems, check the software version in the park distance control module. Update as necessary
U1A4B-49	Control Module Processor B - Internal electronic failure	• Internal electronic failure	• Clear DTC, wait for a minimum of 2 minutes, then retest. If the DTC resets, renew the proximity camera control module
U201A-51	Control Module Main Calibration Data - Not programmed	• Local config/calibration file missing/invalid (LCF)	• Configure the proximity camera control module using the approved diagnostic system
U3000-46	Control Module - Calibration / parameter memory failure	• Internal memory error	• Clear DTC, wait for a minimum of 2 minutes, then retest. If the DTC resets, renew the proximity camera control module
U3000-47	Control Module - Watchdog / safety MicroController failure	• Watchdog/safety MicroController failure	• Clear DTC, wait for a minimum of 2 minutes, then retest. If the DTC resets, renew the proximity camera control module
U3000-49	Control Module - Internal electronic failure	• Internal memory error	• Clear DTC, wait for a minimum of 2 minutes, then retest. If the DTC resets, renew the proximity camera control module
U3000-98	Control Module - Component or system over temperature	• Component or system over temperature	• Consider the environmental conditions before suspecting the proximity camera control module. Allow the proximity camera control module to cool, clear DTC, wait for a minimum of 2 minutes, then retest

General Information - Diagnostic Trouble Code (DTC) Index DTC: Restraints Control Module (RCM)

Description and Operation

Restraints Control Module (RCM)

WARNING: TO AVOID ACCIDENTAL DEPLOYMENT AND POSSIBLE PERSONAL INJURY, THE BACKUP POWER SUPPLY MUST BE DEPLETED BEFORE REPAIRING OR REPLACING ANY AIR BAG SUPPLEMENTAL RESTRAINT SYSTEM (SRS) COMPONENTS. TO DEPLETE THE BACKUP POWER SUPPLY ENERGY, DISCONNECT THE BATTERY GROUND CABLE AND WAIT ONE MINUTE. FAILURE TO FOLLOW THIS INSTRUCTION MAY RESULT IN PERSONAL INJURY.

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being checked and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Given the legal implications of a restraints system failure, harness repairs to the restraints control module circuits are not acceptable. Where the text refers to "REPAIR the circuit", this will normally mean the replacement of a harness.

When performing electrical voltage or resistance checks, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When checking resistance, always take the resistance of the DMM leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint checks.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint checks, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the restraints control module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Air Bag Supplemental Restraint System (SRS) (501-20B Supplemental Restraint System, Diagnosis and Testing).

DTC	Description	Possible Cause	Action
B0001-11	Driver Frontal Stage 1 Deployment Control - Circuit short to ground	NOTE: Circuit reference DR AIRBAG F1 / DR AIRBAG R1 • Driver airbag (stage 1) circuit short to ground	• Refer to electrical circuit diagrams and test the driver airbag (stage 1) circuit for short to ground • Test for intermittent shorts to ground within the clockspring by rotating the steering column during the tests
B0001-12	Driver Frontal Stage 1 Deployment Control - Circuit short to battery	NOTE: Circuit reference DR AIRBAG F1 / DR AIRBAG R1 • Driver airbag (stage 1) circuit short to power	• Refer to electrical circuit diagrams and test the driver airbag (stage 1) circuit for short to power • Test for intermittent shorts to power within the clockspring by rotating the steering column during the tests
B0001-1A	Driver Frontal Stage 1 Deployment Control - Circuit resistance below threshold	NOTE: Circuit reference DR AIRBAG F1 / DR AIRBAG R1 • Driver airbag (stage 1) circuit resistance below	• Refer to electrical circuit diagrams and test the driver airbag (stage 1) circuit for short circuit. Test connector security at clockspring and airbag • Test for intermittent short circuits within the clockspring by rotating the steering column during the tests

		threshold	
B0001-1B	Driver Frontal Stage 1 Deployment Control - Circuit resistance above threshold	NOTE: Circuit reference DR AIRBAG F1 / DR AIRBAG R1 • Driver airbag (stage 1) high circuit resistance	• Refer to electrical circuit diagrams and test the driver airbag (stage 1) circuit for high resistance or open circuit • Test for intermittent open circuit, high resistance faults within the clockspring by rotating the steering column during the tests
B0001-64	Driver Frontal Stage 1 Deployment Control - Signal plausibility failure	NOTE: Circuit reference DR AIRBAG F1 / DR AIRBAG R1 • Driver airbag (stage 1) signal plausibility failure	• Configuration error: This output has been switched off but the airbag is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0001-95	Driver Frontal Stage 1 Deployment Control - Incorrect assembly	NOTE: Circuit reference DR AIRBAG F1 / DR AIRBAG R1 • Driver airbag (stage 1) incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the driver airbag (stage 1) circuit for faults • Test for intermittent short circuits within the clockspring by rotating the steering column during the tests
B0002-11	Driver Frontal Stage 2 Deployment Control - Circuit short to ground	NOTE: Circuit reference DR AIRBAG F2 / DR AIRBAG R2 • Driver airbag (stage 2) circuit short to ground	• Refer to electrical circuit diagrams and test the driver airbag (stage 2) circuit for short to ground • Test for intermittent shorts to ground within the clockspring by rotating the steering column during the tests
B0002-12	Driver Frontal Stage 2 Deployment Control - Circuit short to battery	NOTE: Circuit reference DR AIRBAG F2 / DR AIRBAG R2 • Driver airbag (stage 2) circuit short to power	• Refer to electrical circuit diagrams and test the driver airbag (stage 2) circuit for short to power • Test for intermittent shorts to power within the clockspring by rotating the steering column during the tests
B0002-1A	Driver Frontal Stage 2 Deployment Control - Circuit resistance below threshold	NOTE: Circuit reference DR AIRBAG F2 / DR AIRBAG R2 • Driver airbag (stage 2) circuit resistance below threshold	• Refer to electrical circuit diagrams and test the driver airbag (stage 2) circuit for short circuit. Test connector security at clockspring and airbag • Test for intermittent short circuits within the clockspring by rotating the steering column during the tests
B0002-1B	Driver Frontal Stage 2 Deployment Control - Circuit resistance above threshold	NOTE: Circuit reference DR AIRBAG F2 / DR AIRBAG R2 • Driver airbag (stage 2) high circuit resistance	• Refer to electrical circuit diagrams and test the driver airbag (stage 2) circuit for high resistance or open circuit • Test for intermittent open circuit, high resistance faults within the clockspring by rotating the steering column during the tests
B0002-64	Driver Frontal Stage 2 Deployment Control - Signal plausibility failure	NOTE: Circuit reference DR AIRBAG F2 / DR AIRBAG R2 • Driver airbag (stage 2) signal plausibility failure	• Configuration error: This output has been switched off but the airbag is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0002-	Driver Frontal		• Refer to electrical circuit diagrams and test the driver

95	Stage 2 Deployment Control - Incorrect assembly	NOTE: Circuit reference DR AIRBAG F2 / DR AIRBAG R2 • Driver airbag (stage 2) incorrect assembly. Short circuit between two different circuits (at least two faults)	airbag (stage 2) circuit for faults • Test for intermittent short circuits within the clockspring by rotating the steering column during the tests
B0010-11	Passenger Frontal Stage 1 Deployment Control - Circuit short to ground	NOTE: Circuit reference PASS AIRBAG F1 / PASS AIRBAG R1 • Passenger airbag (stage 1) circuit short to ground	• Refer to electrical circuit diagrams and test the passenger airbag (stage 1) circuit for short to ground
B0010-12	Passenger Frontal Stage 1 Deployment Control - Circuit short to battery	NOTE: Circuit reference PASS AIRBAG F1 / PASS AIRBAG R1 • Passenger airbag (stage 1) circuit short to power	• Refer to electrical circuit diagrams and test the passenger airbag (stage 1) circuit for short to power
B0010-1A	Passenger Frontal Stage 1 Deployment Control - Circuit resistance below threshold	NOTE: Circuit reference PASS AIRBAG F1 / PASS AIRBAG R1 • Passenger airbag (stage 1) circuit resistance below threshold	• Refer to electrical circuit diagrams and test the passenger airbag (stage 1) circuit for short circuit. Test connectors for security
B0010-1B	Passenger Frontal Stage 1 Deployment Control - Circuit resistance above threshold	NOTE: Circuit reference PASS AIRBAG F1 / PASS AIRBAG R1 • Passenger airbag (stage 1) high circuit resistance	• Refer to electrical circuit diagrams and test the passenger airbag (stage 1) circuit for high resistance or open circuit
B0010-64	Passenger Frontal Stage 1 Deployment Control - Signal plausibility failure	NOTE: Circuit reference PASS AIRBAG F1 / PASS AIRBAG R1 • Passenger airbag (stage 1) signal plausibility failure	• Configuration error: This output has been switched off but the airbag is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0010-95	Passenger Frontal Stage 1 Deployment Control - Incorrect assembly	NOTE: Circuit reference PASS AIRBAG F1 / PASS AIRBAG R1 • Passenger airbag (stage 1) incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the passenger airbag (stage 1) circuit for faults
B0011-11	Passenger Frontal Stage 2 Deployment Control - Circuit short to ground	NOTE: Circuit reference PASS AIRBAG F2 / PASS AIRBAG R2 • Passenger airbag (stage 2) circuit short to ground	• Refer to electrical circuit diagrams and test the passenger airbag (stage 2) circuit for short to ground

B0011-12	Passenger Frontal Stage 2 Deployment Control - Circuit short to battery	NOTE: Circuit reference PASS AIRBAG F2 / PASS AIRBAG R2 • Passenger airbag (stage 2) circuit short to power	• Refer to electrical circuit diagrams and test the passenger airbag (stage 2) circuit for short to power
B0011-1A	Passenger Frontal Stage 2 Deployment Control - Circuit resistance below threshold	NOTE: Circuit reference PASS AIRBAG F2 / PASS AIRBAG R2 • Passenger airbag (stage 2) circuit resistance below threshold	• Refer to electrical circuit diagrams and test the passenger airbag (stage 2) circuit for short circuit. Test connectors for security
B0011-1B	Passenger Frontal Stage 2 Deployment Control - Circuit resistance above threshold	NOTE: Circuit reference PASS AIRBAG F2 / PASS AIRBAG R2 • Passenger airbag (stage 2) high circuit resistance	• Refer to electrical circuit diagrams and test the passenger airbag (stage 2) circuit for high resistance or open circuit
B0011-64	Passenger Frontal Stage 2 Deployment Control - Signal plausibility failure	NOTE: Circuit reference PASS AIRBAG F2 / PASS AIRBAG R2 • Passenger airbag (stage 2) signal plausibility failure	• Configuration error: This output has been switched off but the airbag is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0011-95	Passenger Frontal Stage 2 Deployment Control - Incorrect assembly	NOTE: Circuit reference PASS AIRBAG F2 / PASS AIRBAG R2 • Passenger airbag (stage 2) incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the passenger airbag (stage 2) circuit for faults
B0020-11	Left Side Air Bag Deployment Control - Circuit short to ground	NOTE: Circuit reference LH SIDE A/BAG F1 / LH SIDE A/BAG R1 • Left side airbag circuit short to ground	• Refer to electrical circuit diagrams and test the left side airbag (seat) circuit for short to ground
B0020-12	Left Side Air Bag Deployment Control - Circuit short to battery	NOTE: Circuit reference LH SIDE A/BAG F1 / LH SIDE A/BAG R1 • Left side airbag circuit short to power	• Refer to electrical circuit diagrams and test the left side airbag (seat) circuit for short to power
B0020-1A	Left Side Air Bag Deployment Control - Circuit resistance below threshold	NOTE: Circuit reference LH SIDE A/BAG F1 / LH SIDE A/BAG R1 • Left side airbag circuit resistance below threshold	• Refer to electrical circuit diagrams and test the left side airbag (seat) circuit for short circuit. Test connectors for security
B0020-1B	Left Side Air Bag Deployment	NOTE: Circuit	• Refer to electrical circuit diagrams and test the left side airbag (seat) circuit for high resistance or open circuit

	Control - Circuit resistance above threshold	reference LH SIDE A/BAG F1 / LH SIDE A/BAG R1 • Left side airbag high circuit resistance	
B0020-64	Left Side Air Bag Deployment Control - Signal plausibility failure	 NOTE: Circuit reference LH SIDE A/BAG F1 / LH SIDE A/BAG R1 • Left side airbag signal plausibility failure	• Configuration error: This output has been switched off but the airbag is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0020-95	Left Side Airbag Deployment Control - Incorrect assembly	 NOTE: Circuit reference LH SIDE A/BAG F1 / LH SIDE A/BAG R1 • Left side airbag incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the left side airbag (seat) circuit for faults
B0021-11	Left Curtain Deployment Control 1 - Circuit short to ground	 NOTE: Circuit reference LH SIDE CUR F1 / LH SIDE CUR R1 • Left side air curtain circuit short to ground	• Refer to electrical circuit diagrams and test the left side air curtain (rows 1 and 2) circuit for short to ground
B0021-12	Left Curtain Deployment Control 1 - Circuit short to battery	 NOTE: Circuit reference LH SIDE CUR F1 / LH SIDE CUR R1 • Left side air curtain circuit short to power	• Refer to electrical circuit diagrams and test the left side air curtain (rows 1 and 2) circuit for short to power
B0021-1A	Left Curtain Deployment Control 1 - Circuit resistance below threshold	 NOTE: Circuit reference LH SIDE CUR F1 / LH SIDE CUR R1 • Left side air curtain circuit resistance below threshold	• Refer to electrical circuit diagrams and test the left side air curtain (rows 1 and 2) circuit for short circuit. Test connectors for security
B0021-1B	Left Curtain Deployment Control 1 - Circuit resistance above threshold	 NOTE: Circuit reference LH SIDE CUR F1 / LH SIDE CUR R1 • Left side air curtain high circuit resistance, open circuit	• Refer to electrical circuit diagrams and test the left side air curtain (rows 1 and 2) circuit for high resistance or open circuit
B0021-64	Left Curtain Deployment Control 1 - Signal plausibility failure	 NOTE: Circuit reference LH SIDE CUR F1 / LH SIDE CUR R1 • Left side air curtain configuration error	• Configuration error: This output has been switched off but the airbag is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0021-95	Left Curtain Deployment Control 1 - Incorrect	 NOTE: Circuit reference LH SIDE CUR F1 / LH SIDE CUR R1	• Refer to electrical circuit diagrams and test the left side air curtain (rows 1 and 2) circuit for faults

	assembly	• Left side air curtain incorrect assembly. Short circuit between two different circuits (at least two faults)	
B0028-11	Right Side Air Bag Deployment Control - Circuit short to ground	NOTE: Circuit reference RH SIDE A/BAG F1 / RH SIDE A/BAG R1 • Right side airbag circuit short to ground	• Refer to electrical circuit diagrams and test the right side airbag (seat) circuit for short to ground
B0028-12	Right Side Air Bag Deployment Control - Circuit short to battery	NOTE: Circuit reference RH SIDE A/BAG F1 / RH SIDE A/BAG R1 • Right side airbag circuit short to power	• Refer to electrical circuit diagrams and test the right side airbag (seat) circuit for short to power
B0028-1A	Right Side Air Bag Deployment Control - Circuit resistance below threshold	NOTE: Circuit reference RH SIDE A/BAG F1 / RH SIDE A/BAG R1 • Right side airbag circuit resistance below threshold	• Refer to electrical circuit diagrams and test the right side airbag (seat) circuit for short circuit. Test connectors for security
B0028-1B	Right Side Air Bag Deployment Control - Circuit resistance above threshold	NOTE: Circuit reference RH SIDE A/BAG F1 / RH SIDE A/BAG R1 • Right side airbag high circuit resistance	• Refer to electrical circuit diagrams and test the right side airbag (seat) circuit for high resistance or open circuit
B0028-64	Right Side Air Bag Deployment Control - Signal plausibility failure	NOTE: Circuit reference RH SIDE A/BAG F1 / RH SIDE A/BAG R1 • Right side airbag signal plausibility failure	• Configuration error: This output has been switched off but the airbag is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0028-95	Right Side Airbag Deployment Control - Incorrect assembly	NOTE: Circuit reference RH SIDE A/BAG F1 / RH SIDE A/BAG R1 • Right side airbag incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the right side airbag (seat) circuit for faults
B0029-11	Right Curtain Deployment Control 1 - Circuit short to ground	NOTE: Circuit reference RH SIDE CUR F1 / RH SIDE CUR R1 • Right side air curtain circuit short to ground	• Refer to electrical circuit diagrams and test the right side air curtain (rows 1 and 2) circuit for short to ground
B0029-12	Right Curtain Deployment Control 1 - Circuit short to	NOTE: Circuit reference RH SIDE CUR F1 / RH SIDE CUR R1	• Refer to electrical circuit diagrams and test the right side air curtain (rows 1 and 2) circuit for short to power

	battery	• Right side air curtain circuit short to power	
B0029-1A	Right Curtain Deployment Control 1 - Circuit resistance below threshold	NOTE: Circuit reference RH SIDE CUR F1 / RH SIDE CUR R1 • Right side air curtain circuit resistance below threshold	• Refer to electrical circuit diagrams and test the right side air curtain (rows 1 and 2) circuit for short circuit. Test connectors for security
B0029-1B	Right Curtain Deployment Control 1 - Circuit resistance above threshold	NOTE: Circuit reference RH SIDE CUR F1 / RH SIDE CUR R1 • Right side air curtain high circuit resistance	• Refer to electrical circuit diagrams and test the right side air curtain (rows 1 and 2) circuit for high resistance or open circuit
B0029-64	Right Curtain Deployment Control 1 - Signal plausibility failure	NOTE: Circuit reference RH SIDE CUR F1 / RH SIDE CUR R1 • Right side air curtain configuration error	• Configuration error: This output has been switched off but the airbag is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0029-95	Right Curtain Deployment Control 1 - Incorrect assembly	NOTE: Circuit reference RH SIDE CUR F1 / RH SIDE CUR R1 • Right side air curtain incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the right side air curtain (rows 1 and 2) circuit for faults
B0050-11	Driver Seatbelt Sensor - Circuit short to ground	NOTE: Circuit reference BUCKLE SWITCH-DR • Driver safety belt buckle switch circuit short to ground	• Refer to electrical circuit diagrams and test the driver safety belt buckle switch circuit for short to ground
B0050-12	Driver Seatbelt Sensor - Circuit short to battery	NOTE: Circuit reference BUCKLE SWITCH-DR • Driver safety belt buckle switch circuit short to power	• Refer to electrical circuit diagrams and test the driver safety belt buckle switch circuit for short to power
B0050-1D	Driver Seatbelt Sensor - Circuit current out of range	NOTE: Circuit reference BUCKLE SWITCH-DR • Driver safety belt buckle switch circuit current out of range	• Refer to electrical circuit diagrams and test the driver safety belt buckle switch circuit for fault
B0050-64	Driver Seatbelt Sensor - Signal plausibility failure	NOTE: Circuit reference BUCKLE SWITCH-DR	• Configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system

		• Driver safety belt buckle switch signal plausibility failure	
B0090-11	Left Frontal Restraints Sensor - Circuit short to ground	NOTE: Circuit reference LH CRASH SENS F / LH CRASH SENS R • Left front impact sensor circuit short to ground	• Refer to electrical circuit diagrams and test the left front impact sensor circuit for short to ground
B0090-12	Left Frontal Restraints Sensor - Circuit short to battery	NOTE: Circuit reference LH CRASH SENS F / LH CRASH SENS R • Left front impact sensor circuit short to power	• Refer to electrical circuit diagrams and test the left front impact sensor circuit for short to power
B0090-64	Left Frontal Restraints Sensor - Signal plausibility failure	NOTE: Circuit reference LH CRASH SENS F / LH CRASH SENS R • Left front impact sensor signal plausibility failure	• Configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0090-81	Left Frontal Restraints Sensor - Invalid serial data received	NOTE: Circuit reference LH CRASH SENS F / LH CRASH SENS R • Left front impact sensor open circuit • Left front impact sensor fault	• Refer to electrical circuit diagrams and test the left front impact sensor circuit for open circuit fault • Install a new left front impact sensor as necessary
B0090-92	Left Frontal Restraints Sensor - Performance or incorrect operation	NOTE: Circuit reference LH CRASH SENS F / LH CRASH SENS R • Left front impact sensor performance or incorrect operation	• Test component fixings for security. If secure suspect left front impact sensor internal fault
B0090-96	Left Frontal Restraints Sensor - Component internal failure	NOTE: Circuit reference LH CRASH SENS F / LH CRASH SENS R • Left front impact sensor internal failure	• Suspect left front impact sensor internal fault
B0091-11	Left Side Restraints Sensor 1 - Circuit short to ground	NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 1 circuit short to ground	• Refer to electrical circuit diagrams and test the left side impact sensor 1 (door) circuit for short to ground
B0091-12	Left Side Restraints Sensor 1 -	NOTE: Circuit	• Refer to electrical circuit diagrams and test the left side impact sensor 1 (door) circuit for short to power

	Circuit short to battery	reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 1 circuit short to power	
B0091-64	Left Side Restraints Sensor 1 - Signal plausibility failure	 NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 1 configuration error	• Configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0091-81	Left Side Restraints Sensor 1 - Invalid serial data received	 NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 1 circuit open circuit • Left side impact sensor 1 failure	• Refer to electrical circuit diagrams and test the left side impact sensor 1 (door) circuit for open circuit fault • Install a new left side impact sensor 1 (door) as necessary
B0091-92	Left Side Restraints Sensor 1 - Performance or incorrect operation	 NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 1 internal failure	• Install a new left side impact sensor 1 (door) as necessary
B0091-96	Left Side Restraints Sensor 1 - Component internal failure	 NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 1 internal failure	• Install a new left side impact sensor 1 (door) as necessary
B0092-11	Left Side Restraints Sensor 2 - Circuit short to ground	 NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 2 circuit short to ground	• Refer to electrical circuit diagrams and test the left side impact sensor 2 (B pillar) circuit for short to ground
B0092-12	Left Side Restraints Sensor 2 - Circuit short to battery	 NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 2 circuit short to power	• Refer to electrical circuit diagrams and test the left side impact sensor 2 (B pillar) circuit for short to power
B0092-64	Left Side Restraints Sensor 2 - Signal plausibility failure	 NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 2 signal plausibility failure	• Configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0092-81	Left Side Restraints Sensor 2 - Invalid serial data received	 NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 2 circuit open circuit	• Refer to electrical circuit diagrams and test the left side impact sensor 2 (B pillar) circuit for open circuit fault • Install a new left side impact sensor 2 (B pillar) as necessary

		Left side impact sensor 2 fault	
B0092-92	Left Side Restraints Sensor 2 - Performance or incorrect operation	NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 2 performance or incorrect operation	• Suspect left side impact sensor 2 (B pillar) internal fault
B0092-96	Left Side Restraints Sensor 2 - Component internal failure	NOTE: Circuit reference LH SIDE SENS F1 / LH SIDE SENS R1 • Left side impact sensor 2 internal failure	• Suspect left side impact sensor 2 (B pillar) internal fault
B0093-11	Left Side Restraints Sensor 3 - Circuit short to ground	NOTE: Circuit reference LH SIDE SENS F2 / LH SIDE SENS R2 • Left side impact sensor 3 circuit short to ground	• Refer to electrical circuit diagrams and test the left side impact sensor 3 circuit for short to ground
B0093-12	Left Side Restraints Sensor 3 - Circuit short to battery	NOTE: Circuit reference LH SIDE SENS F2 / LH SIDE SENS R2 • Left side impact sensor 3 circuit short to power	• Refer to electrical circuit diagrams and test the left side impact sensor 3 circuit for short to power
B0093-64	Left Side Restraints Sensor 3 - Signal plausibility failure	NOTE: Circuit reference LH SIDE SENS F2 / LH SIDE SENS R2 • Left side impact sensor 3 configuration error	• Configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0093-81	Left Side Restraints Sensor 3 - Invalid serial data received	NOTE: Circuit reference LH SIDE SENS F2 / LH SIDE SENS R2 • Left side impact sensor 3 circuit open circuit • Left side impact sensor 3 failure	• Refer to electrical circuit diagrams and test the left side impact sensor 3 circuit for open circuit. Install a new left side impact sensor 3 as necessary
B0093-92	Left Side Restraints Sensor 3 - Performance or incorrect operation	NOTE: Circuit reference LH SIDE SENS F2 / LH SIDE SENS R2 • Left side impact sensor 3 internal failure	• Install a new left side impact sensor 3 as necessary
B0093-96	Left Side Restraints Sensor 3 - Component internal failure	NOTE: Circuit reference LH SIDE SENS F2 / LH SIDE SENS R2 • Left side impact sensor 3 internal failure	• Install a new left side impact sensor 3 as necessary
B0095-11	Right Frontal Restraints	NOTE: Circuit	• Refer to electrical circuit diagrams and test the right front impact sensor circuit for short to ground

	Sensor - Circuit short to ground	reference RH CRASH SENS F / RH CRASH SENS R • Right front impact sensor circuit short to ground	
B0095-12	Right Frontal Restraints Sensor - Circuit short to battery	NOTE: Circuit reference RH CRASH SENS F / RH CRASH SENS R • Right front impact sensor circuit short to power	• Refer to electrical circuit diagrams and test the right front impact sensor circuit for short to power
B0095-64	Right Frontal Restraints Sensor - Signal plausibility failure	NOTE: Circuit reference RH CRASH SENS F / RH CRASH SENS R • Right front impact sensor signal plausibility failure	• Configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0095-81	Right Frontal Restraints Sensor - Invalid serial data received	NOTE: Circuit reference RH CRASH SENS F / RH CRASH SENS R • Right front impact sensor open circuit • Right front impact sensor fault	• Refer to electrical circuit diagrams and test the right front impact sensor circuit for open circuit fault. Install a new right front impact sensor as necessary
B0095-92	Right Frontal Restraints Sensor - Performance or incorrect operation	NOTE: Circuit reference RH CRASH SENS F / RH CRASH SENS R • Right front impact sensor performance or incorrect operation	• Test component fixings for security. If secure suspect right front impact sensor internal fault
B0095-96	Right Frontal Restraints Sensor - Component internal failure	NOTE: Circuit reference RH CRASH SENS F / RH CRASH SENS R • Right front impact sensor internal failure	• Suspect right front impact sensor internal fault
B0096-11	Right Side Restraints Sensor 1 - Circuit short to ground	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 1 circuit short to ground	• Refer to electrical circuit diagrams and test the right side impact sensor 1 (door) circuit for short to ground
B0096-12	Right Side Restraints Sensor 1 - Circuit short to battery	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 1 circuit short to power	• Refer to electrical circuit diagrams and test the right side impact sensor 1 (door) circuit for short to power
B0096-	Right Side		• Configuration error: This input has been switched off but

64	Restraints Sensor 1 - Signal plausibility failure	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 1 configuration error	the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0096-81	Right Side Restraints Sensor 1 - Invalid serial data received	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 1 circuit open circuit • Right side impact sensor 1 failure	• Refer to electrical circuit diagrams and test the right side impact sensor 1 (door) circuit for open circuit fault. Install a new right side impact sensor 1 (door) as necessary
B0096-92	Right Side Restraints Sensor 1 - Performance or incorrect operation	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 1 internal failure	• Install a new right side impact sensor 1 (door) as necessary
B0096-96	Right Side Restraints Sensor 1 - Component internal failure	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 1 internal failure	• Install a new right side impact sensor 1 (door) as necessary
B0097-11	Right Side Restraints Sensor 2 - Circuit short to ground	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 2 circuit short to ground	• Refer to electrical circuit diagrams and test the right side impact sensor 2 (B pillar) circuit for short to ground
B0097-12	Right Side Restraints Sensor 2 - Circuit short to battery	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 2 circuit short to power	• Refer to electrical circuit diagrams and test the right side impact sensor 2 (B pillar) circuit for short to power
B0097-64	Right Side Restraints Sensor 2 - Signal plausibility failure	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 2 signal plausibility failure	• Configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0097-81	Right Side Restraints Sensor 2 - Invalid serial data received	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 2 circuit open circuit • Right side impact sensor 2 fault	• Refer to electrical circuit diagrams and test the right side impact sensor 2 (B pillar) circuit for open circuit fault. Install a new right side impact sensor 2 (B pillar) as necessary
B0097-92	Right Side Restraints Sensor 2 - Performance or	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1	• Suspect right side impact sensor 2 (B pillar) internal fault

	incorrect operation	• Right side impact sensor 2 performance or incorrect operation	
B0097-96	Right Side Restraints Sensor 2 - Component internal failure	NOTE: Circuit reference RH SIDE SENS F1 / RH SIDE SENS R1 • Right side impact sensor 2 internal failure	• Suspect right side impact sensor 2 (B pillar) internal fault
B0098-11	Right Side Restraints Sensor 3 - Circuit short to ground	NOTE: Circuit reference RH SIDE SENS F2 / RH SIDE SENS R2 • Right side impact sensor 3 circuit short to ground	• Refer to electrical circuit diagrams and test the right side impact sensor 3 circuit for short to ground
B0098-12	Right Side Restraints Sensor 3 - Circuit short to battery	NOTE: Circuit reference RH SIDE SENS F2 / RH SIDE SENS R2 • Right side impact sensor 3 circuit short to power	• Refer to electrical circuit diagrams and test the right side impact sensor 3 circuit for short to power
B0098-64	Right Side Restraints Sensor 3 - Signal plausibility failure	NOTE: Circuit reference RH SIDE SENS F2 / RH SIDE SENS R2 • Right side impact sensor 3 configuration error	• Configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B0098-81	Right Side Restraints Sensor 3 - Invalid serial data received	NOTE: Circuit reference RH SIDE SENS F2 / RH SIDE SENS R2 • Right side impact sensor 3 circuit open circuit • Right side impact sensor 3 failure	• Refer to electrical circuit diagrams and test the right side impact sensor 3 circuit for open circuit. Install a new right side impact sensor 3 as necessary
B0098-92	Right Side Restraints Sensor 3 - Performance or incorrect operation	NOTE: Circuit reference RH SIDE SENS F2 / RH SIDE SENS R2 • Right side impact sensor 3 internal failure	• Install a new right side impact sensor 3 as necessary
B0098-96	Right Side Restraints Sensor 3 - Component internal failure	NOTE: Circuit reference RH SIDE SENS F2 / RH SIDE SENS R2 • Right side impact sensor 3 internal failure	• Install a new right side impact sensor 3 as necessary
B00A0-49	Occupant Classification System - Internal electronic failure	• Occupant classification sensor control module internal fault	• Test the occupant classification sensor control module for stored DTCs
B00A0-64	Occupant Classification System -	• Signal plausibility failure	• For Federal specification vehicles, configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using

	Signal plausibility failure		the manufacturer approved diagnostic system • For non-Federal specification vehicles: This input has been switched off and the sensor is not installed. 1) This fault may be caused by an extended engine crank. Check for symptoms of poor engine starting or depleted battery charge levels. 2) Check the stowed unused safety belt tension sensor connector located on the passenger side rear heel board for any water ingress/dampness. Dry out, clean and prevent any further water ingress
B00A0-88	Occupant Classification System - Bus off	• CAN bus circuit fault	• Refer to electrical circuit diagrams and test the CAN bus circuit to the occupant classification sensor control module for fault
B00A0-92	Occupant Classification System - Performance or incorrect operation	• Occupant classification sensor control module internal fault	• Test the occupant classification sensor control module for stored DTCs
B00B5-11	Driver Seat Track Position Restraints Sensor - Circuit short to ground	 NOTE: Circuit reference DR SEAT TRACK POS F • Driver seat track position sensor circuit short to ground	• Refer to electrical circuit diagrams and test the driver seat track position sensor circuit for short to ground
B00B5-15	Driver Seat Track Position Restraints Sensor - Circuit short to battery or open	 NOTE: Circuit reference DR SEAT TRACK POS F • Driver seat track position sensor circuit short to power or open circuit	• Refer to electrical circuit diagrams and test the driver seat track position sensor circuit for short to power or open circuit
B00B5-1D	Driver Seat Track Position Restraints Sensor - Circuit current out of range	 NOTE: Circuit reference DR SEAT TRACK POS F • Driver seat track position sensor circuit current out of range	• Refer to electrical circuit diagrams and test the driver seat track position sensor circuit for fault
B00B5-64	Driver Seat Track Position Restraints Sensor - Signal plausibility failure	 NOTE: Circuit reference DR SEAT TRACK POS F • Signal plausibility failure	• Configuration error: This input has been switched off but the sensor is actually installed. Re-configure the restraints control module using the manufacturer approved diagnostic system
B00C0-96	Passenger Seat Occupant Classification Sensor "A" - Component internal failure	• Occupant classification system module internal fault	• Test the occupant classification sensor control module for stored DTCs
B00D2-68	Restraint System Malfunction Indicator 1 - Event information	• Events information	• Suspect instrument cluster internal fault. Test for stored DTCs
B00D2-87	Restraint System Malfunction Indicator 1 - Missing message	• Missing message from the instrument cluster	• Test the CAN bus circuit to the instrument cluster for circuit fault
B00D5-14	Restraint System	• Passenger airbag deactivation lamp	• Refer to electrical circuit diagrams and test the passenger airbag deactivation lamp circuit for short to ground or open

	Passenger Disable Indicator - Circuit short to ground or open	circuit short to ground or open circuit	
B00D5-55	Restraint System Passenger Disable Indicator - Not configured	• Module not configured	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B00DF-00	Passenger Restraints Disable Switch - No sub type information	• Passenger airbag deactivation switch stuck • Passenger airbag deactivation switch internal failure	• Install a new passenger airbag deactivation switch as necessary
B00DF-54	Passenger Restraints Disable Switch - Missing calibration	• Passenger airbag deactivation switch missing calibration	• Calibrate the passenger airbag deactivation switch using the manufacturer approved diagnostic system
B00DF-64	Passenger Restraints Disable Switch - Signal plausibility failure	• Passenger airbag deactivation switch configuration error	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1211-11	Driver Seatbelt Retractor Pretensioner Deployment Control - Circuit short to ground	• Driver safety belt retractor and pretensioner deployment control circuit short to ground	• Refer to electrical circuit diagrams and test the driver safety belt retractor and pretensioner deployment control circuit short to ground
B1211-12	Driver Seatbelt Retractor Pretensioner Deployment Control - Circuit short to battery	• Driver safety belt retractor and pretensioner deployment control circuit short to power	• Refer to electrical circuit diagrams and test the driver safety belt retractor and pretensioner deployment control circuit short to power
B1211-1A	Driver Seatbelt Retractor Pretensioner Deployment Control - Circuit resistance below threshold	• Driver safety belt retractor and pretensioner deployment control circuit resistance below threshold	• Refer to electrical circuit diagrams and test the driver safety belt retractor and pretensioner deployment control circuit for circuit shorted to each other
B1211-1B	Driver Seatbelt Retractor Pretensioner Deployment Control - Circuit resistance above threshold	• Driver safety belt retractor and pretensioner deployment control circuit open circuit, high resistance	• Refer to electrical circuit diagrams and test the driver safety belt retractor and pretensioner deployment control circuit open circuit, high resistance
B1211-64	Driver Seatbelt Retractor Pretensioner Deployment Control - Signal plausibility failure	• Driver safety belt retractor and pretensioner deployment control configuration error	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1211-95	Driver Seatbelt Retractor Pretensioner Deployment Control - Incorrect assembly	• Driver safety belt retractor and pretensioner deployment control short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the driver safety belt retractor and pretensioner deployment control circuit for faults

B1212-11	Driver Seatbelt Buckle Pretensioner Deployment Control - Circuit short to ground	NOTE: Circuit reference DR PRETEN F1 / DR PRETEN R1 • Driver safety belt pretensioner deployment control circuit short to ground	• Refer to electrical circuit diagrams and test the driver safety belt pretensioner deployment control circuit short to ground
B1212-12	Driver Seatbelt Buckle Pretensioner Deployment Control - Circuit short to battery	NOTE: Circuit reference DR PRETEN F1 / DR PRETEN R1 • Driver safety belt pretensioner deployment control circuit short to power	• Refer to electrical circuit diagrams and test the driver safety belt pretensioner deployment control circuit short to power
B1212-1A	Driver Seatbelt Buckle Pretensioner Deployment Control - Circuit resistance below threshold	NOTE: Circuit reference DR PRETEN F1 / DR PRETEN R1 • Driver safety belt pretensioner deployment control circuit resistance below threshold	• Refer to electrical circuit diagrams and test the driver safety belt pretensioner deployment control circuit for circuit shorted to each other
B1212-1B	Driver Seatbelt Buckle Pretensioner Deployment Control - Circuit resistance above threshold	NOTE: Circuit reference DR PRETEN F1 / DR PRETEN R1 • Driver safety belt pretensioner deployment control circuit open circuit, high resistance	• Refer to electrical circuit diagrams and test the driver safety belt pretensioner deployment control circuit open circuit, high resistance
B1212-64	Driver Seatbelt Buckle Pretensioner Deployment Control - Signal plausibility failure	NOTE: Circuit reference DR PRETEN F1 / DR PRETEN R1 • Driver safety belt retractor pretensioner deployment control configuration error	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1212-95	Driver Seatbelt Buckle Pretensioner Deployment Control - Incorrect assembly	NOTE: Circuit reference DR PRETEN F1 / DR PRETEN R1 • Driver safety belt pretensioner deployment control short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the driver safety belt pretensioner deployment control circuit for faults
B1213-11	Passenger Seatbelt Buckle Pretensioner Deployment Control - Circuit short to ground	NOTE: Circuit reference PASS PRETEN F1 / PASS PRETEN R1 • Passenger safety belt pretensioner	• Refer to electrical circuit diagrams and test the passenger safety belt pretensioner deployment control circuit short to ground

		• deployment control circuit short to ground	
B1213-12	Passenger Seatbelt Buckle Pretensioner Deployment Control - Circuit short to battery	 NOTE: Circuit reference PASS PRETEN F1 / PASS PRETEN R1 • Passenger safety belt pretensioner deployment control circuit short to power	• Refer to electrical circuit diagrams and test the passenger safety belt pretensioner deployment control circuit short to power
B1213-1A	Passenger Seatbelt Buckle Pretensioner Deployment Control - Circuit resistance below threshold	 NOTE: Circuit reference PASS PRETEN F1 / PASS PRETEN R1 • Passenger safety belt pretensioner deployment control circuit resistance below threshold	• Refer to electrical circuit diagrams and test the passenger safety belt pretensioner deployment control circuit for circuit shorted to each other
B1213-1B	Passenger Seatbelt Buckle Pretensioner Deployment Control - Circuit resistance above threshold	 NOTE: Circuit reference PASS PRETEN F1 / PASS PRETEN R1 • Passenger safety belt pretensioner deployment control circuit open circuit, high resistance	• Refer to electrical circuit diagrams and test the passenger safety belt pretensioner deployment control circuit open circuit, high resistance
B1213-64	Passenger Seatbelt Buckle Pretensioner Deployment Control - Signal plausibility failure	 NOTE: Circuit reference PASS PRETEN F1 / PASS PRETEN R1 • Passenger safety belt retractor pretensioner deployment control configuration error	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1213-95	Passenger Seatbelt Buckle Pretensioner Deployment Control - Incorrect assembly	 NOTE: Circuit reference PASS PRETEN F1 / PASS PRETEN R1 • Passenger safety belt pretensioner deployment control short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the passenger safety belt pretensioner deployment control circuit for faults
B1A00-16	Control Module - Circuit voltage below threshold	• System voltage low at control module (supply voltage less than 9 volts)	• Refer to electrical circuit diagrams and test the power and ground circuit for fault
B1A00-17	Control Module - Circuit voltage above threshold	• System voltage high (supply voltage supply greater than 16 volts)	• Test the engine control module for stored DTCs. Suspect charging system fault. Refer to electrical circuit diagrams and test the power and ground circuits
B1A00-49	Control Module - Internal electronic	• Restraints control module internal electronic failure	• Suspect restraints control module internal fault. Install a new restraints control module as necessary

	failure		
B1A17-95	Driver Stage 1 Airbag Squib Short Circuit To Ignition Loop - Incorrect assembly	NOTE: Circuit reference DR AIRBAG F1 / DR AIRBAG R1 • Driver airbag (stage 1) incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the driver airbag (stage 1) circuit for faults
B1A19-95	Driver Stage 2 Airbag Squib Short Circuit To Ignition Loop - Incorrect assembly	NOTE: Circuit reference DR AIRBAG F2 / DR AIRBAG R2 • Driver airbag (stage 2) incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the driver airbag (stage 2) circuit for faults
B1A21-95	Passenger Stage 1 Airbag Squib Short Circuit To Ignition Loop - Incorrect assembly	NOTE: Circuit reference PASS AIRBAG F1 / PASS AIRBAG R1 • Passenger airbag (stage 1) incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the passenger airbag (stage 1) circuit for faults
B1A23-95	Passenger Stage 2 Airbag Squib Short Circuit To Ignition Loop - Incorrect assembly	NOTE: Circuit reference PASS AIRBAG F2 / PASS AIRBAG R2 • Passenger airbag (stage 2) incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the passenger airbag (stage 2) circuit for faults
B1A29-95	Left Side Airbag Squib Short Circuit To Ignition Loop - Incorrect assembly	NOTE: Circuit reference LH SIDE A/BAG F1 / LH SIDE A/BAG R1 • Left side airbag incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the left side airbag (seat) circuit for faults
B1A31-95	Right Side Airbag Squib Short Circuit To Ignition Loop - Incorrect assembly	NOTE: Circuit reference RH SIDE A/BAG F1 / RH SIDE A/BAG R1 • Right side airbag incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the right side airbag (seat) circuit for faults
B1A33-	Left Curtain		• Refer to electrical circuit diagrams and test the left side air

95	Airbag Squib Short Circuit To Ignition Loop - Incorrect assembly	NOTE: Circuit reference LH SIDE CUR F1 / LH SIDE CUR R1 • Left side air curtain incorrect assembly. Short circuit between two different circuits (at least two faults)	curtain (rows 1 and 2) circuit for faults
B1A35-95	Right Curtain Airbag Squib Short Circuit To Ignition Loop - Incorrect assembly	NOTE: Circuit reference RH SIDE CUR F1 / RH SIDE CUR R1 • Right side air curtain incorrect assembly. Short circuit between two different circuits (at least two faults)	• Refer to electrical circuit diagrams and test the right side air curtain (rows 1 and 2) circuit for faults
B1A40-11	Left Side (pelvic) 2 - Circuit short to ground	• Only logged in the event of incorrect restraints control module configuration. Not used for 2010MY	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1A40-12	Left Side (pelvic) 2 - Circuit short to battery	• Only logged in the event of incorrect restraints control module configuration. Not used for 2010MY	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1A40-1A	Left Side (pelvic) 2 - Circuit resistance below threshold	• Only logged in the event of incorrect restraints control module configuration. Not used for 2010MY	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1A40-1B	Left Side (pelvic) 2 - Circuit resistance above threshold	• Only logged in the event of incorrect restraints control module configuration. Not used for 2010MY	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1A40-64	Left Side (pelvic) 2 - Signal plausibility failure	• Only logged in the event of incorrect restraints control module configuration. Not used for 2010MY	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1A40-95	Left Side (pelvic) 2 - Incorrect assembly	• Only logged in the event of incorrect restraints control module configuration. Not used for 2010MY	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1A41-95	Left Side (pelvic) 2 Short circuit To Ignition Loop – Incorrect assembly	• Left side (pelvic) 2 incorrect assembly. Short circuit between two different circuits (at least two faults)	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1A55-14	Crash Record Output - Circuit short to ground or open	NOTE: Circuit reference CRASH OUTPUT • Crash record	• Refer to electrical circuit diagrams and test the crash record output circuit for short to ground or open circuit. If this has occurred after a software download then disconnect the battery for 1 minute

		output circuit short to ground or open	
B1A55-64	Crash Record Output - Signal plausibility failure	 NOTE: Circuit reference CRASH OUTPUT • Signal plausibility failure	• Re-configure the restraints control module using the manufacturer approved diagnostic system
B1D74-11	Passenger Airbag Cutoff Enable Switch - Circuit short to ground	• Passenger airbag activation switch circuit short circuit to ground	• Refer to electrical circuit diagrams and test the passenger airbag activation switch circuit for short circuit to ground
B1D74-12	Passenger Airbag Cutoff Enable Switch - Circuit short to battery	• Passenger airbag activation switch circuit short circuit to power	• Refer to electrical circuit diagrams and test the passenger airbag activation switch circuit for short circuit to power
B1D74-13	Passenger Airbag Cutoff Enable Switch - Circuit open	• Passenger airbag activation switch circuit open circuit, high resistance	• Refer to electrical circuit diagrams and test the passenger airbag activation switch circuit for open circuit, high resistance
B1D75-11	Passenger Airbag Cutoff Disable Switch - Circuit short to ground	• Passenger airbag deactivation switch circuit short circuit to ground	• Refer to electrical circuit diagrams and test the passenger airbag deactivation switch circuit for short circuit to ground
B1D75-12	Passenger Airbag Cutoff Disable Switch - Circuit short to battery	• Passenger airbag deactivation switch circuit short circuit to power	• Refer to electrical circuit diagrams and test the passenger airbag deactivation switch circuit for short circuit to power
B1D75-13	Passenger Airbag Cutoff Disable Switch - Circuit open	• Passenger airbag deactivation switch open circuit, high resistance	• Refer to electrical circuit diagrams and test the passenger airbag deactivation switch circuit for open circuit, high resistance
U0001-88	High Speed CAN Communication Bus - Bus off	• CAN bus circuit fault	• Refer to electrical circuit diagrams and test the CAN bus circuit for fault
U0122-87	Lost Communication With Vehicle Dynamics Control Module - Missing message	• Lost communication with the anti-lock brake system control module	• Refer to electrical circuit diagrams and test the power and ground connections to the anti-lock brake system control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and test the CAN network between the restraints control module and the anti-lock brake system control module
U0300-55	Internal Control Module Software Incompatibility - Not configured	• Mis-match between vehicle and restraints control module software levels	• Re-configure the restraints control module with the latest level software using the manufacturer approved diagnostic system
U1A02-66	Permanent Memory Store Full – Signal has too many transitions / events	• Wiring harness fault • Restraints control module internal fault	• Restraints control module memory full - refer to the new module installation note at the top of the DTC index (not warrantable change)
U1A03-87	Car Configuration Parameter – Missing message	• Missing message	• Test central junction box for stored DTCs. Refer to electrical circuit diagrams and test the CAN bus circuit to the central junction box for fault
U1A14-55	CAN Initialization Failure - Not configured	• Not configured	• Suspect restraints control module internal fault
U201A-4A	Control Module Main Calibration	• Incorrect component installed	• Re-configure the restraints control module using the manufacturer approved diagnostic system. Clear DTC and re-test. If DTC remains, suspect restraints control module

	Data - Incorrect component installed		internal fault
U201A-51	Control Module Main Calibration Data - Not programmed	• Restraints control module not programmed	• Re-configure the restraints control module with the latest level software using the manufacturer approved diagnostic system
U201B-4A	Control Module Calibration Data #2 - Incorrect component installed	• Incorrect component installed	• Re-configure the restraints control module using the manufacturer approved diagnostic system. Clear DTC and re-test. If DTC remains, suspect restraints control module internal fault
U201B-51	Control Module Calibration Data #2 - Not programmed	• Not programmed	• Re-configure the restraints control module using the manufacturer approved diagnostic system. Clear DTC and re-test. If DTC remains, suspect restraints control module internal fault
U201C-4A	Control Module Calibration Data #3 - Incorrect component installed	• Incorrect component installed	• Re-configure the restraints control module using the manufacturer approved diagnostic system. Clear DTC and re-test. If DTC remains, suspect restraints control module internal fault
U201C-51	Control Module Calibration Data #3 - Not programmed	• Not programmed	• Re-configure the restraints control module using the manufacturer approved diagnostic system. Clear DTC and re-test. If DTC remains, suspect restraints control module internal fault
U3000-49	Control Module - Internal electronic failure	• Internal electronic failure	• Suspect restraints control module internal fault
U3002-81	Vehicle Identification Number - Invalid serial data received	• Vehicle/component mis-match. Corrupt VIN data being transmitted, module previously installed to other vehicle	• Re-configure the restraints control module using the manufacturer approved diagnostic system. Clear DTC and re-test. If DTC remains, suspect restraints control module internal fault

General Information - Diagnostic Trouble Code (DTC) Index DTC: Satellite Radio Control Module (SRCM)

Description and Operation

Satellite Radio Control Module (SRCM)

CAUTIONS:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Satellite Radio Control Module (SRCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Information and Entertainment System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1A89-01	Satellite Antenna - General electrical failure	• Digital radio antenna circuit short circuit to ground, short circuit to power, open circuit, high resistance • Satellite radio control module internal failure	• Refer to the electrical circuit diagrams and check the digital radio antenna circuit for short circuit to ground, short circuit to power, open circuit, high resistance • If fault persists, install a new satellite radio control module
U3000-4A	Control Module - Incorrect component installed	• Car configuration file mismatch	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary. Clear the diagnostic trouble code and re-test
U3000-55	Control Module - Not configured	• Satellite radio control module not configured	• Using the manufacturer approved diagnostic system, re-configure the satellite radio control module with the latest level software
U3000-87	Control Module - Missing	• Satellite radio control module configuration	• Using the manufacturer approved diagnostic system, re-configure the satellite radio control module with the latest level software

	message	incomplete/corrupted	
U3000-98	Control Module - Component or system over temperature	• Satellite radio control module cooling vents obstructed • Satellite radio control module internal failure	• Check that the satellite radio control module cooling vents / air circulation are not obstructed. Cool the vehicle interior down by ensuring it is in the shade and have the A/C on cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new satellite radio control module

General Information - Diagnostic Trouble Code (DTC) Index DTC: Steering Angle Sensor Module (SASM)

Description and Operation

Steering Angle Sensor Module (SASM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Steering Angle Sensor Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Steering System (211-00 Steering System - General Information, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
C0051-04	Steering Wheel Position Sensor - System internal failures	• System internal failure • Harness/connector issue	• Refer to the electrical circuit diagrams and check the steering angle sensor module connector and circuits. Check the sensor calibration using the approved diagnostic/calibration system before renewing the steering angle sensor module
C0051-62	Steering Wheel Position Sensor - Signal compare failure	• Signal compare failure • Harness/connector issue	• Refer to the electrical circuit diagrams and check the steering angle sensor module connector and circuits. Check the steering angle sensor module calibration using the approved diagnostic/calibration system
C0051-64	Steering Wheel Position Sensor - Signal plausibility failure	• Signal plausibility failure • Harness/connector issue	• Refer to the electrical circuit diagrams and check the steering angle sensor module, connector and circuits. Check the steering angle sensor module calibration using the approved diagnostic/calibration system
U0001-88	High Speed CAN Communication Bus - Bus off	• Bus off	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0122-00	Lost Communication With Vehicle Dynamics Control Module - No sub type information	• Lost communication with the anti-lock brake system control module	• Refer to the electrical circuit diagrams and check power and ground supplies to the anti-lock brake system control module. Check CAN network between the steering angle sensor module and the anti-lock brake system control module. Alternatively, using the manufacturer approved diagnostic system, carry out CAN network integrity test
U0140-00	Lost Communication With Body Control Module - No sub type information	• Lost communication with the central junction box	• Configure the central junction box and the steering angle sensor module using the approved diagnostic/calibration system. Refer to the network communications section of the workshop manual
U0300-55	Internal Control Module Software	• Connector or connection failure • CAN hardware failure	• Configure the modules using the approved diagnostic/calibration system. Refer to the network communications section of the workshop manual

	Incompatibility - Not configured	CAN configuration failure - the steering angle sensor module has failed to recognize the correct master configuration ID - Indicates that an internal software mismatch has occurred which could be due to problems with software download between the master and the rest of network nodes	
U1A14-49	CAN Initialization failure- Internal electronic failure	• Steering angle sensor module internal CAN controller failure	• Renew the steering angle sensor module
U3002-62	Vehicle Identification Number - Signal compare failure	• Mismatch between received VIN and stored VIN in the steering angle sensor module	 NOTE: This DTC will occur if a steering angle sensor module has been substituted from another vehicle to fix an issue with the original steering angle sensor module/vehicle • Clear the diagnostic trouble code and retest. If the problem persists, check and install new steering angle sensor module as required

General Information - Diagnostic Trouble Code (DTC) Index DTC: Tailgate Control Module (TGCM)

Description and Operation

Tailgate Control Module (TGCM)

CAUTIONS:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault and may also cause additional faults in the vehicle being checked and/or the donor vehicle.

When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

If DTCs are recorded and, after performing the pinpoint tests a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Where an 'on demand self-test' is referred to, this can be accessed via the 'DTC Monitor' tab on the manufacturers approved diagnostic system.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Tailgate Control Module (TGCM), for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).

DTC	Description	Possible Cause	Action
B10D0-23	Trunk Latch Clutch Switch - Signal stuck low	NOTE: Circuit reference LATCH SECONDARY SIG • Tailgate latch not closed fully • Tailgate ajar switch circuit short circuit to ground • Tailgate ajar switch failure • Tailgate control module internal failure	• Check the tailgate latch for mechanical blockages • Refer to the electrical circuit diagrams and test the tailgate ajar switch circuit for short circuit to ground • Test the operation of the tailgate ajar witch • Install a new tailgate control module as necessary
B11C4-23	Boot/Trunk Close Button - Signal stuck low	NOTE: Circuit reference TAILGATE CLOSE • Tailgate close switch stuck active • Tailgate close	• Test the operation of the tailgate close switch. Install a new tailgate close switch as necessary • Refer to the electrical circuit diagrams and test the tailgate close switch circuit for short circuit to ground • Install a new tailgate control module as necessary

		switch circuit short circuit to ground • Tailgate control module internal failure	
B1316-02	Boot/Trunk Latch Power Close Unit - General signal failure	NOTE: Circuit reference STRIKER HOME • Tailgate latch not closed fully • Tailgate soft close actuator signal circuit short circuit to ground, short circuit to power, open circuit, high resistance • Tailgate soft close actuator internal failure • Tailgate control module internal failure	• Check the tailgate latch for mechanical blockages • Refer to the electrical circuit diagrams and test the tailgate soft close actuator signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Install a new tailgate soft close actuator as necessary • Install a new tailgate control module as necessary
B1316-93	Boot/Trunk Latch Power Close Unit - No operation	NOTE: Circuit reference CLOSE MTR+ / CLOSE MTR- / STRIKER HOME • Tailgate soft close actuator circuit short circuit to ground, short circuit to power, open circuit, high resistance • Tailgate soft close actuator signal circuit short circuit to ground, short circuit to power, open circuit, high resistance • Tailgate soft close actuator internal failure • Tailgate control module internal failure	• Refer to the electrical circuit diagrams and test the tailgate soft close actuator circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and test the tailgate soft close actuator signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Install a new tailgate soft close actuator as necessary • Install a new tailgate control module as necessary
C2005-11	Right Actuator - Circuit short to ground	NOTE: Circuit reference MOTOR+ / MOTOR- • Powered tailgate right strut circuit short circuit to ground • Powered tailgate right strut internal failure • Tailgate control module internal failure	• Refer to the electrical circuit diagrams and test the powered tailgate right strut circuit for short circuit to ground • Install a new powered tailgate right strut as necessary • Install a new tailgate control module as necessary
C2005-	Right Actuator -		• Refer to the electrical circuit diagrams and test the

12	Circuit short to battery	NOTE: Circuit reference MOTOR+ / MOTOR- • Powered tailgate right strut circuit short circuit to power • Powered tailgate right strut internal failure • Tailgate control module internal failure	powered tailgate right strut circuit for short circuit to power • Install a new powered tailgate right strut as necessary • Install a new tailgate control module as necessary
C2005-13	Right Actuator - Circuit open	NOTE: Circuit reference MOTOR+ / MOTOR- • Powered tailgate right strut circuit open circuit, high resistance • Powered tailgate right strut internal failure • Tailgate control module internal failure	• Refer to the electrical circuit diagrams and test the powered tailgate right strut circuit for open circuit, high resistance • Install a new powered tailgate right strut as necessary • Install a new tailgate control module as necessary
C2005-15	Right Actuator - Circuit short to battery or open	NOTE: Circuit reference HALL SENS PWR • Powered tailgate right strut position sensor power supply circuit short circuit to battery, open circuit, high resistance • Powered tailgate right strut internal failure • Tailgate control module internal failure	• Refer to the electrical circuit diagrams and test the powered tailgate right strut position sensor power supply circuit for short circuit to battery, open circuit, high resistance • Install a new powered tailgate right strut as necessary • Install a new tailgate control module as necessary
C2005-19	Right Actuator - Circuit current above threshold	NOTE: Circuit reference MOTOR+ / MOTOR- • Powered tailgate movement blocked • Powered tailgate right strut circuit short circuit to ground • Powered tailgate right strut internal failure • Tailgate control module internal failure	• Check that the tailgate movement is not inhibited by an obstruction above or inside the luggage compartment. Check the condition of the mechanical linkages/hinges • Refer to the electrical circuit diagrams and test the powered tailgate right strut circuit for short circuit to ground • Install a new powered tailgate right strut as necessary • Install a new tailgate control module as necessary

C2005-31	Right Actuator - No signal	NOTE: Circuit reference HALL 1 / HALL 2 / HALL GND • Powered tailgate right strut position sensor circuits short circuit to ground, short circuit to power, open circuit, high resistance • Powered tailgate right strut internal failure • Tailgate control module internal failure	• Refer to the electrical circuit diagrams and test the powered tailgate right strut position sensor circuits for short circuit to ground, short circuit to power, open circuit, high resistance • Install a new powered tailgate right strut as necessary • Install a new tailgate control module as necessary
C2006-11	Left Actuator - Circuit short to ground	NOTE: Circuit reference MOTOR+ / MOTOR- • Powered tailgate left strut circuit short circuit to ground • Powered tailgate left strut internal failure • Tailgate control module internal failure	• Refer to the electrical circuit diagrams and test the powered tailgate left strut circuit for short circuit to ground • Install a new powered tailgate left strut as necessary • Install a new tailgate control module as necessary
C2006-12	Left Actuator - Circuit short to battery	NOTE: Circuit reference MOTOR+ / MOTOR- • Powered tailgate left strut circuit short circuit to power • Powered tailgate left strut internal failure • Tailgate control module internal failure	• Refer to the electrical circuit diagrams and test the powered tailgate left strut circuit for short circuit to power • Install a new powered tailgate left strut as necessary • Install a new tailgate control module as necessary
C2006-13	Left Actuator - Circuit open	NOTE: Circuit reference MOTOR+ / MOTOR- • Powered tailgate left strut circuit open circuit, high resistance • Powered tailgate left strut internal failure • Tailgate control module internal failure	• Refer to the electrical circuit diagrams and test the powered tailgate left strut circuit for open circuit, high resistance • Install a new powered tailgate left strut as necessary • Install a new tailgate control module as necessary
C2006-15	Left Actuator - Circuit short to battery or open	NOTE: Circuit reference HALL SNS	• Refer to the electrical circuit diagrams and test the powered tailgate left strut position sensor power supply circuit for short circuit to battery, open circuit, high

		PWR • Powered tailgate left strut position sensor power supply circuit short circuit to battery, open circuit, high resistance • Powered tailgate left strut internal failure • Tailgate control module internal failure	resistance • Install a new powered tailgate left strut as necessary • Install a new tailgate control module as necessary
C2006-19	Left Actuator - Circuit current above threshold	 NOTE: Circuit reference MOTOR+ / MOTOR- • Powered tailgate movement blocked • Powered tailgate left strut circuit short circuit to ground • Powered tailgate left strut internal failure • Tailgate control module internal failure	• Check that the tailgate movement is not inhibited by an obstruction above or inside the luggage compartment. Check the condition of the mechanical linkages/hinges • Refer to the electrical circuit diagrams and test the powered tailgate left strut circuit for short circuit to ground • Install a new powered tailgate left strut as necessary • Install a new tailgate control module as necessary
C2006-31	Left Actuator - No signal	 NOTE: Circuit reference HALL 1 / HALL 2 / HALL SNS GND • Powered tailgate left strut position sensor circuits short circuit to ground, short circuit to power, open circuit, high resistance • Powered tailgate left strut internal failure • Tailgate control module internal failure	• Refer to the electrical circuit diagrams and test the powered tailgate left strut position sensor circuits for short circuit to ground, short circuit to power, open circuit, high resistance • Install a new powered tailgate left strut as necessary • Install a new tailgate control module as necessary
U0010-88	Medium Speed CAN Communication Bus - Bus off	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0140-00	Lost Communication With Central Junction Box - No sub type information	• Central junction box power or ground circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and test the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and test the medium speed

		• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Tailgate control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the tailgate control module with the latest level software
U0401-68	Invalid Data Received From ECM/PCM A - Event information	• Tailgate control module has received invalid data from the engine control module	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0415-68	Invalid Data Received From Anti-Lock Braking System (ABS) Control Module - Event information	• Tailgate control module has received invalid data for the anti-lock brake system control module	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U201A-51	Control Module Main Calibration Data - Not programmed	• Tailgate control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the tailgate control module with the latest level software
U201A-52	Control Module Main Calibration Data - Not activated	• Tailgate control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the tailgate control module with the latest level software
U2100-00	Initial Configuration Not Complete - No sub type information	• Tailgate control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the tailgate control module with the latest level software
U2101-00	Control Module Configuration Incompatible - No sub type information	• Tailgate control module is not configured correctly	• Using the manufacturer approved diagnostic system, check and install the latest relevant level of software to the tailgate control module • Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary. Clear the DTC and re-test
U3000-44	Control Module - Data memory failure	• Tailgate control module internal failure - RAM memory	• Install a new tailgate control module
U3000-45	Control Module - Program memory failure	• Tailgate control module internal failure - ROM memory	• Install a new tailgate control module
U3000-46	Control Module - Calibration/parameter memory failure	• Tailgate control module internal failure - Non volatile memory	• Install a new tailgate control module
U3000-49	Control Module - Internal electronic failure	• Tailgate control module internal failure	• Install a new tailgate control module
U3000-4B	Control Module - Over temperature	• The tailgate control module	• The ambient air temperature value received by the tailgate control module from the engine control module

		has received an ambient temperature value which exceeded 80°C	has exceeded 80°C. This signal is transmitted on CAN. If the value exceeds 80°C the tailgate control module strategy is to protect the powered tailgate struts by inhibiting operation. Using the manufacturer approved diagnostic system, check the engine control module for ambient air temperature related DTCs and refer to the relevant DTC index. Check if the vehicle has been exposed to very high ambient temperatures, for example in a paint curing oven
U3003-62	Battery Voltage - Signal compare failure	• Mis-match between the voltage at the tailgate control module and the voltage value broadcast on the CAN bus	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02) - and compare it to battery voltage

General Information - Diagnostic Trouble Code (DTC) Index DTC: Terrain Response Switch Pack (TR)

Description and Operation

Terrain Response Control Module (ATCM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

There are references to "power latch" within the DTC index. This is where the module must be reset by means of a complete power down and power up.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the All Terrain Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Ride and Handling Optimization (204-06 Ride and Handling Optimization, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
C1A00-46	Control Module - Calibration/parameter memory failure	• The terrain response switchpack has indicated a calibration/parameter memory failure for embedded systems using FLASH memory. This is equivalent to EEPROM in RAM/ROM/EEPROM embedded systems • Corruption in the non-volatile memory storage system (EEPROM) in the terrain response switchpack	• Rectify this DTC before attempting to rectify others. Record all DTCs logged and clear them. With ignition on select a terrain response special program, turn off the ignition, then turn back on the ignition and verify the selected special program is still active. If the selected terrain response special program is still not active and has returned to the general program, confirm if DTC has returned. Repeat procedure again once more. If DTC is still present install a new terrain response switchpack
C1A01-96	LED - Component internal failure	• LED circuit short circuit to ground or open circuit	NOTE: If the system is in 'failsafe default mode due to another issue no LEDs will illuminate. This fault does not cause the system to go to 'failsafe default'. • Refer to the description and operation section of workshop manual. Check terrain response system, special program LEDs. One or more of the LEDs is suspected of not illuminating as appropriate. With the engine running move the terrain response switchpack through all five programmes and confirm the appropriate special program LED does not illuminate when the terrain response switchpack is in that position. Suspect the terrain response switchpack, check and install a new

			terrain response switchpack as required
C1A02-94	Rotary Encoder Stuck In Intermediate Position - Unexpected operation	• The terrain response switchpack is held in an intermediate position (between the special programmes) for more than 60 seconds • Foreign object preventing correct operation of terrain response switchpack • Mechanical damage to the terrain response switchpack	NOTE: Suspect driver error do not replace the terrain response switchpack • Check for foreign object preventing correct operation of terrain response switchpack. Start the vehicle engine, rotate the terrain response switchpack until it has located a genuine detent, wait 60 seconds. Stop the vehicle engine, clear the DTC and retest
U0001-88	High Speed CAN Communication Bus Off - Bus off	• Bus off. The terrain response switchpack has detected the data bus is not available • CAN bus short circuit to ground, power or open circuit • Failure of another control module on the CAN bus	• Refer to the electrical circuit diagrams and check the power and ground connections to the terrain response switchpack. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0100-00	Lost Communication With The ECM/PCM 'A' - No sub type information	• The terrain response switchpack has not received one or more expected messages from the engine control module • Engine control module power circuit open circuit • Engine control module ground circuit open circuit • High speed CAN circuit communications failure • Engine control module disconnected from the high speed CAN communication bus • Engine control module high speed CAN high circuit open circuit • Engine control module high speed CAN Low circuit open circuit • Engine control module not configured • Engine control module failure	• Using the manufacturer approved diagnostic system, check the engine control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the engine control module. Refer to electrical circuit diagrams check the power and ground connections to engine control module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the engine control module. Check the system is operating correctly and the DTC does not return
U0101-00	Lost Communication With The TCM - No sub type information	• The terrain response switchpack has not received one or more expected messages from the transmission control module • High speed CAN circuit communications failure • Transmission control module power circuit open circuit • Transmission control	• Using the manufacturer approved diagnostic system, check the transmission control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the transmission control module. Refer to electrical circuit diagrams check the power and ground connections to transmission control module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the transmission control module. Check the system is operating correctly and the DTC does not return

		module ground circuit open circuit • Transmission control module disconnected from the high speed CAN communication bus • Transmission control module high speed CAN high circuit open circuit • Transmission control module high speed CAN low circuit open circuit • Transmission control module not configured • Transmission control module failure	
U0102-00	Lost Communication With The Transfer Case Control Module - No sub type information	• The terrain response switchpack has not received one or more expected messages from the transfer case control module • High speed CAN circuit communications failure • Transfer case control module power circuit open circuit • Transfer case control module ground circuit open circuit • Transfer case control module disconnected from the high speed CAN communication bus • Transfer case control module high speed CAN low circuit open circuit • Transfer case control module high speed CAN high circuit open circuit • Transfer case control module not configured • Transfer case control module failure	• Using the manufacturer approved diagnostic system, check the transfer case control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the transfer case control module. Refer to electrical circuit diagrams check the power and ground connections to transfer case control module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the transfer case control module. Check the system is operating correctly and the DTC does not return
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	• The terrain response switchpack has not received one or more expected messages from the anti-lock brake system control module • High speed CAN circuit communications failure • Anti-lock brake system control module power circuit open circuit • Anti-lock brake system control module ground circuit open circuit • Anti-lock brake system control module disconnected from the high speed CAN communication	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the anti-lock brake system control module. Refer to electrical circuit diagrams check the power and ground connections to anti-lock brake system control module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the anti-lock brake system control module. Check the system is operating correctly and the DTC does not return

		bus • Anti-lock brake system control module high speed CAN low circuit open circuit • Anti-lock brake system control module high speed CAN high circuit open circuit • Anti-lock brake system control module not configured • Anti-lock brake system control module failure	
U0132-00	Lost Communication With Suspension Control Module 'A' - No sub type information	• The terrain response switchpack has not received one or more expected messages from the air suspension control module • High speed CAN circuit communications failure • Air suspension control module power circuit open circuit • Air suspension control module ground circuit open circuit • Air suspension control module disconnected from the high speed CAN communication bus • Air suspension control module high speed CAN low circuit open circuit • Air suspension control module high speed CAN high circuit open circuit • Air suspension control module not configured • Air suspension control module failure	• Using the manufacturer approved diagnostic system, check the air suspension control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the air suspension control module. Refer to electrical circuit diagrams check the power and ground connections to air suspension control module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the air suspension control module. Check the system is operating correctly and the DTC does not return
U0139-00	Lost Communication With Suspension Control Module 'B' - No sub type information	• The terrain response switchpack has not received one or more expected messages from the adaptive damping system control module • High speed CAN circuit communications failure • Adaptive damping system control module power circuit open circuit • Adaptive damping system control module ground circuit open circuit • Adaptive damping system control module disconnected	• Using the manufacturer approved diagnostic system, check the adaptive damping system control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the adaptive damping system control module. Refer to electrical circuit diagrams check the power and ground connections to adaptive damping system control module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the adaptive damping system control module. Check the system is operating correctly and the DTC does not return

		from the high speed CAN communication bus • Adaptive damping system control module high speed CAN low circuit open circuit • Adaptive damping system control module high speed CAN high circuit open circuit • Adaptive damping system control module not configured • Adaptive damping system control module failure	
U0140-00	Lost Communication With Body Control Module - No sub type information	• The terrain response switchpack has not received one or more expected messages from the central junction box • High speed CAN circuit communications failure • Central junction box power circuit open circuit • Central junction box ground circuit open circuit • Central junction box disconnected from the high speed CAN communication bus • Central junction box high speed CAN low circuit open circuit • Central junction box high speed CAN high circuit open circuit • Central junction box not configured • Central junction box failure	• Using the manufacturer approved diagnostic system, check the central junction box for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the central junction box. Refer to electrical circuit diagrams check the power and ground connections to central junction box. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the central junction box. Check the system is operating correctly and the DTC does not return
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• The terrain response switchpack has failed to recognize a matching master configuration ID from the CAN data bus master • The terrain response switchpack has incorrect CAN configuration • CAN bus master not correctly configured • Message containing configuration ID not received due to CAN bus issue • Message containing configuration ID not transmitted by CAN bus master	• Using the manufacturer approved diagnostic system, check the CAN configuration in the terrain response switchpack, check correct software versions installed and update as necessary. If similar DTCs from other modules exist suspect CAN Bus or CAN bus master control module. Check CAN bus operation, check the CAN configuration in the CAN bus master module, check correct software versions installed and update as necessary. Check the system is operating correctly and the DTC does not return
U0401-68	Invalid Data Received From The ECM/PCM 'A' - Event information	• The terrain response switchpack has detected that the engine control module had operated in a way or at a time	• Using the manufacturer approved diagnostic system, check the engine control module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the engine control module

		that it had not been commanded to operate • The engine management system, engine control module is unable to support normal terrain response functionality, the terrain response system will go into default condition • Engine management fault • Engine control module failure	
U0402-68	Invalid Data Received From The TCM - Event information	• The terrain response switchpack has detected that the transmission control module had operated in a way or at a time that it had not been commanded to operate • The transmission control module is unable to support normal terrain response functionality, the terrain response system will go into default condition • Transmission system fault • Transmission control module failure	• Using the manufacturer approved diagnostic system, check the transmission control module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the transmission control module
U0403-68	Invalid Data Received From The Transfer Case Control Module - Event information	• The terrain response switchpack has detected that the transfer case control module had operated in a way or at a time that it had not been commanded to operate • The transfer case control module is unable to support normal terrain response functionality, the terrain response system will go into default condition • Transfer case system fault • Transfer case control module failure	• Using the manufacturer approved diagnostic system, check the transfer case control module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the transfer case control module
U0415-68	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Event information	• The terrain response switchpack has detected that the anti-lock brake system control module had operated in a way or at a time that it had not been commanded to operate • The anti-lock brake system control module is unable to support normal terrain response functionality, the	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the anti-lock brake system control module

		terrain response system will go into default condition • Anti-lock brake system fault • Anti-lock brake system control module failure	
U0421-68	Invalid Data Received From Suspension Control Module 'A' - Event information	• The terrain response switchpack has detected that the air suspension control module had operated in a way or at a time that it had not been commanded to operate • The air suspension control module is unable to support normal terrain response functionality, the terrain response system will go into default condition • Air suspension system fault • Air suspension control module failure	• Using the manufacturer approved diagnostic system, check the air suspension control module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the air suspension control module
U0422-68	Invalid Data Received From Body Control Module - Event information	• The terrain response switchpack has detected that the central junction box had operated in a way or at a time that it had not been commanded to operate • The central junction box is unable to support normal terrain response functionality, the terrain response system will go into default condition • Central junction box system fault • Central junction box failure	• Using the manufacturer approved diagnostic system, check the central junction box for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the central junction box
U043A-68	Invalid Data Received From Suspension Control Module "B" - Event information	• The terrain response switchpack has detected that the adaptive damping system control module had operated in a way or at a time that it had not been commanded to operate • The adaptive damping system control module is unable to support normal terrain response functionality, the terrain response system will go into default condition • Adaptive damping system fault • Adaptive damping system control module failure	• Using the manufacturer approved diagnostic system, check the adaptive damping system control module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the adaptive damping system control module

U2101-00	Control Module Configuration Incompatible - No sub type information	• The terrain response switchpack has detected a mismatch between the hardware connected and the hardware expected • Vehicle not correctly configured • Incorrect components installed for vehicle configuration	• Using the manufacturer approved diagnostic system, check the car configuration file, rectify as necessary. Check correct components for vehicle configuration are installed, rectify as necessary. Check the system is operating correctly and the DTC does not return

General Information - Diagnostic Trouble Code Index: Touch Screen DTC: (TS)

Description and Operation

Touch Screen (TS)

CAUTIONS:

 Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle

 When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTES:

 If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the warranty policy and procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

 Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system)

 When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the digital multimeter leads into account

 Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests

 Inspect connectors for signs of water ingress, and pins for damage and/or corrosion

 If diagnostic trouble codes are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals

 Where an 'on demand self-test' is referred to, this can be accessed via the 'diagnostic trouble code monitor' tab on the manufacturers approved diagnostic system

The table below lists all diagnostic trouble codes (DTCs) that could be logged in the touch screen, for additional diagnosis and testing information refer to the relevant diagnosis and testing section.
For additional information, refer to: Information and Entertainment System (415-00, Diagnosis and Testing).

DTC	Description	Possible Cause	Action
B1087-83	LIN Bus "A" - Value of signal protection calculation incorrect	• LIN bus to the rear view camera circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the LIN bus circuit to the rear view camera for short circuit to ground, short circuit to power, open circuit, high resistance
B1087-86	LIN Bus "A" - Signal invalid	• LIN bus to the rear view camera circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the LIN bus circuit to the rear view camera for short circuit to ground, short circuit to power, open circuit, high resistance
B1087-87	LIN Bus "A" - Missing message	• LIN bus to the rear view camera circuit short circuit to	• Refer to the electrical circuit diagrams and test the LIN bus circuit to the rear view camera for short circuit to ground, short circuit to power, open circuit, high resistance

		ground, short circuit to power, open circuit, high resistance	
B1087-88	LIN Bus "A" - Bus off	• LIN bus to the rear view camera circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and test the LIN bus circuit to the rear view camera for short circuit to ground, short circuit to power, open circuit, high resistance
B1D21-13	Remote control switch - Circuit open	• Steering wheel switchpack fault • Clockspring fault • Wiring harness fault	• No steering wheel remote in-car entertainment switchpack functionality. This DTC is logged if the module detects an open circuit on the steering wheel audio switch signal line. Refer to the electrical circuit diagrams and test the signal line running from the steering wheel audio switchpack through the clockspring to the touch screen for insecure connectors, open circuits, including intermittent faults (rotate steering wheel during checks). Also test ground connections to the control module for open circuits. Repair or replace wiring harness as required
U0010-00	Medium speed CAN communication bus - No sub type information	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the medium speed CAN circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0010-48	Medium speed CAN communication bus - Supervised software failure	• Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the medium speed CAN circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0140-00	Lost communication with central junction box - No sub type information	• Lost communication with the central junction box	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the central junction box • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the central junction box for short circuit to ground, short circuit to power, open circuit, high resistance
U0142-00	Lost communication with body control module "B" - No sub type information	• Lost communication with the central junction box	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the central junction box • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the central junction box for short circuit to ground, short circuit to power, open circuit, high resistance
U0155-00	Lost communication with instrument panel cluster - No sub type information	• Lost communication with the instrument cluster	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the instrument cluster • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the instrument cluster for short circuit to ground, short circuit to power, open circuit, high resistance
U0159-00	Lost communication with parking assist control module A - No sub type information	• Lost communication with the park distance control module	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the park distance control module • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the park distance control module for short circuit to ground, short circuit to power,

			open circuit, high resistance
U0164-00	Lost communications with HVAC control module - No sub type information	• Lost communication with the automatic temperature control module	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the automatic temperature control module • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the automatic temperature control module for short circuit to ground, short circuit to power, open circuit, high resistance
U0166-00	Lost Communication With Auxiliary Heater Control Module - No sub type information	• Lost communication with the fuel fired booster heater	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the fuel fired booster heater • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the fuel fired booster heater for short circuit to ground, short circuit to power, open circuit, high resistance
U0184-00	Lost communications with radio - No sub type information	• Lost communication with the integrated audio module	 NOTE: This DTC may be stored even though no fault condition is present and should be ignored unless the customer has reported an information and entertainment system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Using the manufacturer approved diagnostic system, complete a MOST network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the integrated audio module • Refer to the electrical circuit diagrams and test the MOST circuit between the touch screen and the integrated audio module
U0184-4A	Lost communications with radio - Incorrect component installed	• The serial number of the component does not match the serial number stored in the master module	• Check the serial number of the part is valid (as installed at the factory). If the part has been installed by a dealer the installation routine has not been performed correctly, install the component using the manufacturer approved diagnostic system. Clear the DTC and retest the system
U0186-00	Lost communication with audio amplifier A - No sub type information	• Lost communication with the audio amplifier module	 NOTE: This DTC may be stored even though no fault condition is present and should be ignored unless the customer has reported an information and entertainment system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the audio amplifier module • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the audio amplifier module for short circuit to ground, short circuit to power, open circuit, high resistance
U0186-4A	Lost communication with audio amplifier A - Incorrect component installed	• The serial number of the component does not match the serial number stored in the master module	• Check the serial number of the part is valid (as installed at the factory). If the part has been installed by a dealer the installation routine has not been performed correctly, install the component using the manufacturer approved diagnostic system. Clear the DTC and retest the system
U0191-00	Lost communication with television - No sub type information	• Lost communication with the TV control module	 NOTE: This DTC may be stored even though no fault condition is present and should be ignored unless the customer has reported an information and entertainment system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the TV control module • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the TV control module for short

			circuit to ground, short circuit to power, open circuit, high resistance
U0191-4A	Lost communication with television - Incorrect component installed	• The serial number of the component does not match the serial number stored in the master module	• Check the serial number of the part is valid (as installed at the factory). If the part has been installed by a dealer the installation routine has not been performed correctly, install the component using the manufacturer approved diagnostic system. Clear the DTC and retest the system
U0193-00	Lost communication with digital audio control module A - No sub type information	• Lost communication with the satellite radio control module	NOTE: This DTC may be stored even though no fault condition is present and should be ignored unless the customer has reported an information and entertainment system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the satellite radio control module • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the satellite radio control module for short circuit to ground, short circuit to power, open circuit, high resistance
U0193-4A	Lost communication with digital audio control module A - Incorrect component installed	• The serial number of the component does not match the serial number stored in the master module	• Check the serial number of the part is valid (as installed at the factory). If the part has been installed by a dealer the installation routine has not been performed correctly, install the component using the manufacturer approved diagnostic system. Clear the DTC and retest the system
U0194-00	Lost communication with digital audio control module B - No sub type information	• Lost communication with the digital radio control module	NOTE: This DTC may be stored even though no fault condition is present and should be ignored unless the customer has reported an information and entertainment system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the digital radio control module • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the digital radio control module for short circuit to ground, short circuit to power, open circuit, high resistance
U0194-4A	Lost communication with digital audio control module B - Incorrect component installed	• The serial number of the component does not match the serial number stored in the master module	• Check the serial number of the part is valid (as installed at the factory). If the part has been installed by a dealer the installation routine has not been performed correctly, install the component using the manufacturer approved diagnostic system. Clear the DTC and retest the system
U0196-00	Lost communication with entertainment control module - Rear A - No sub type information	• Lost communication with the rear seat entertainment control module	NOTE: This DTC may be stored even though no fault condition is present and should be ignored unless the customer has reported an information and entertainment system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the rear seat entertainment control module • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the rear seat entertainment control module for short circuit to ground, short circuit to power, open circuit, high resistance
U0196-4A	Lost communication with entertainment	• The serial number of the component does not	• Check the serial number of the part is valid (as installed at the factory). If the part has been installed by a dealer the installation routine has not been performed correctly, install the component using the manufacturer approved diagnostic

	control module - Rear A - Incorrect component installed	match the serial number stored in the master module	system. Clear the DTC and retest the system
U0208-00	Lost Communication With "Seat Control Module A" - No sub type information	• Lost communication with the driver seat module	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the driver seat module • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the driver seat module for short circuit to ground, short circuit to power, open circuit, high resistance
U0209-00	Lost Communication With "Seat Control Module B" - No sub type information	• Lost communication with the passenger seat module	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the passenger seat module • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the passenger seat module for short circuit to ground, short circuit to power, open circuit, high resistance
U023B-00	Lost communication with image processing module B - No sub type information	• Lost communication with the rear view camera	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the rear view camera • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the rear view camera for short circuit to ground, short circuit to power, open circuit, high resistance
U025D-00	Lost communication with front controls interface module - No sub type information	• Lost communication with the integrated control panel	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and test the power and ground connections to the integrated control panel • Refer to the electrical circuit diagrams and test the CAN circuit between the touch screen and the integrated control panel for short circuit to ground, short circuit to power, open circuit, high resistance
U0300-00	Internal control module software incapability - No sub type information	• Touch screen is not compatible with the vehicle	• Check the touch screen part number. Install the correct part as necessary. Check that the correct software is installed
U0300-51	Internal control module software incapability - Not programmed	• Touch screen software incorrect or missing	• Using the manufacturer approved diagnostic system, check the part numbers of the software installed. Re-configure the touch screen with the latest level software as necessary
U1A24-87	MOST ring complete. No Communication - Missing message	• MOST ring complete • MOST ring node internal fault	NOTE: This DTC may be stored even though no fault condition is present and should be ignored unless the customer has reported an information and entertainment system concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis • Refer to the electrical circuit diagrams and test the MOST ring for fault, bypass each MOST module in turn to isolate faulty node
U2003-87	Fibre optic communication bus - Missing message	• MOST ring incomplete	• Check MOST ring for disconnected modules or fibreoptic cable concerns
U3000-4B	Control module - Over temperature	• Touch screen panel backlight - High temperature detected	• Allow the system to cool, clear the diagnostic trouble code and check/monitor system for re-occurrence, if DTC re-occurs, check and install a new touch screen as necessary
U3000-98	Control module - Component or system over temperature	• System shut down request from another module on MOST ring • MOST module - Internal	• This DTC is logged if the touch screen display control module receives a system shut down request from another MOST module that is registering as over temperature. Allow the system to cool, clear the diagnostic trouble code and check/monitor system for re-occurrence • If DTC re-occurs, refer to the electrical circuit diagrams and check each MOST module for signs of overheating and related

		temperature over limit	DTCs and refer to the relevant DTC index
U3003-62	Battery voltage - Signal compare failure	• Mis-match between the supply voltage to the touch screen and the battery voltage value broadcast on the CAN bus	• Refer to the electrical circuit diagrams and test the power and ground circuits to the touch screen compared to battery voltage

General Information - Diagnostic Trouble Code (DTC) Index DTC: Module Name: Transfer Case Control Module

Description and Operation

Transfer Case Control Module (TCCM)

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Transfer Case Control Module (TCCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual
For additional information, refer to: Transfer Case (308-07 Transfer Case, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
P0560-00	System Voltage - No sub type information	• Transfer case control module power or ground circuit open circuit, high resistance • Battery/charging system fault • Transfer case control module internal failure	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance • Refer to the relevant section of the workshop manual and test the battery and charging system • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0561-00	System Voltage Unstable - No sub type information	• Transfer case control module power or ground circuit open circuit, high resistance • Battery/charging system fault • Transfer case control module internal failure	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance • Refer to the relevant section of the workshop manual and test the battery and charging system • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0562-00	System Voltage Low - No sub type information	• Transfer case control module power or ground circuit open circuit, high resistance	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance

		• Battery/charging system fault • Transfer case control module internal failure	• Refer to the relevant section of the workshop manual and test the battery and charging system • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0563-00	System Voltage High - No sub type information	• Battery/charging system fault	 NOTE: This DTC may be set when the vehicle is jump started. • Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the relevant section of the workshop manual and test the battery and charging system
P0607-00	Control Module Performance - No sub type information	• Transfer case control module internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0634-00	PCM / ECM / TCM Internal Temperature A Too High - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case control module internal failure	NOTES:  Transfer case motor resistance should be 0.2 ohms to 10.0 ohms.  This DTC may be induced by excessive high/low range changes.  This DTC may be induced by prolonged off-road driving. • Allow the vehicle to cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0641-00	Sensor Reference Voltage A Circuit - No sub type information	• Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case control module internal failure	 NOTE: Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0642-00	Sensor Reference Voltage A Circuit Low - No sub type information	• Transfer case motor position sensor circuit short circuit to ground • Transfer case control module internal failure	 NOTE: Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0643-00	Sensor Reference Voltage A Circuit High - No sub type	• Transfer case motor position sensor circuit short	 NOTE: Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V,

	information	circuit to power • Transfer case control module internal failure	resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0652-00	Sensor Reference Voltage B Circuit Low - No sub type information	• Transfer case selector fork position sensor circuit short circuit to ground • Transfer case control module internal failure	NOTE: Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. • Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0653-00	Sensor Reference Voltage B Circuit High - No sub type information	• Transfer case selector fork position sensor circuit short circuit to power • Transfer case control module internal failure	NOTE: Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. • Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0666-00	PCM/ECM/TCM Internal Temperature Sensor 'A' Circuit - No sub type information	• Transfer case solenoid circuit short circuit to ground • Transfer case control module internal failure	NOTE: Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. • Allow the vehicle to cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0702-00	Transmission Control System Electrical - No sub type information	• Transfer case control module power or ground circuit open circuit, high resistance • Battery/charging system fault	NOTE: This DTC may be set during a forced reset by the manufacturer approved diagnostic system. • Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance • Refer to the relevant section of the workshop manual and test the battery and charging system
P0712-00	Transmission Fluid Temperature Sensor A Circuit Low - No sub type information	• Transfer case motor temperature sensor circuit short circuit to ground • Transfer case control module internal failure	NOTE: Transfer case motor temperature sensor (temperature signal circuit to motor position sensor ground circuit) resistance should be 1.0k ohms to 30.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor temperature sensor circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0713-00	Transmission Fluid Temperature Sensor A Circuit	• Transfer case motor temperature sensor circuit short	NOTE: Transfer case motor temperature sensor (temperature signal circuit to motor position sensor ground

	High - No sub type information	circuit to power • Transfer case control module internal failure	circuit) resistance should be 1.0k ohms to 30.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor temperature sensor circuit for short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0780-00	Shift Malfunction - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case control module internal failure • Transfer case internal failure	NOTES:  Transfer case motor resistance should be 0.2 ohms to 10.0 ohms.  Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case and perform routine - Transfer Case Replacement
P0806-00	Clutch Position Sensor Circuit Range/Performance - No sub type information	• Transfer case selector fork position sensor not calibrated • Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case selector fork position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor failure • Transfer case selector fork position sensor failure • Transfer case control module internal failure • Transfer case internal failure	NOTES:  If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest.  Transfer case motor resistance should be 0.2 ohms to 10.0 ohms.  Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms.  Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. • Using the manufacturer approved diagnostic system, perform routine - Transfer Case Replacement. Clear the DTCs and retest • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system,

			clear the DTCs and retest. If the fault persists, install a new transfer case selector fork position sensor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case and perform routine - Transfer Case Replacement
P0807-00	Clutch Position Sensor Circuit Low - No sub type information	• Transfer case motor position sensor circuit short circuit to ground • Transfer case control module internal failure	 NOTE: Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0808-00	Clutch Position Sensor Circuit High - No sub type information	• Transfer case motor position sensor circuit short circuit to ground • Transfer case control module internal failure	 NOTE: Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0826-00	Up and Down Switch Circuit - No sub type information	• Transfer case high/low range switch stuck active • Transfer case high/low range switch signal circuit short circuit to power • Transfer case control module internal failure	NOTES:  This DTC will be set if the switch signal is active for > 255 seconds.  This DTC may be induced by the driver. • Check the operation of the transfer case high/low range switch • Using the manufacturer approved diagnostic system, check datalogger signal - TCCM Input Status (0x1983). Refer to the electrical circuit diagrams and check the transfer case high/low range switch signal circuits for short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0900-00	Clutch Actuator Circuit/Open - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case control module internal failure	 NOTE: Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0902-00	Clutch Actuator Circuit - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open	 NOTE: Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. • Refer to the electrical circuit diagrams and check the

		circuit, high resistance • Transfer case control module internal failure	transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0903-00	Clutch Actuator Circuit - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case control module internal failure	NOTE: Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0915-00	Gear Shift Position Circuit Range/Performance - No sub type information	• Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case selector fork position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case selector fork position sensor failure • Transfer case motor failure • Transfer case control module internal failure	NOTES: If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest. Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case selector fork position sensor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0916-00	Gear Shift Position Circuit Low - No sub type information	• Transfer case selector fork position sensor circuit short circuit to ground • Transfer case control module internal failure	NOTE: Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. • Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0917-00	Gear Shift Position Circuit High - No sub type information	• Transfer case selector fork position sensor circuit short circuit to power • Transfer case control module internal failure	NOTE: Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. • Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to power • Using the manufacturer approved diagnostic system,

			clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P173A-00	Clutch Actuator Position Sensor Circuit Range/Performance - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor failure • Transfer case control module internal failure	NOTES:  If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest.  Transfer case motor resistance should be 0.2 ohms to 10.0 ohms.  Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P173B-00	Clutch Actuator Position Sensor Circuit Low - No sub type information	• Transfer case motor position sensor circuit short circuit to ground • Transfer case control module internal failure	 NOTE: Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P173C-00	Clutch Actuator Position Sensor Circuit High - No sub type information	• Transfer case motor position sensor circuit short circuit to power • Transfer case control module internal failure	 NOTE: Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P1804-00	4-Wheel Drive High Indicator Circuit Failure - No sub type information	• Transfer case high range LED circuit short circuit to ground, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the transfer case high range LED circuit for short circuit to ground, open circuit, high resistance
P1806-00	4-Wheel Drive High Indicator Short Circuit To Battery - No sub type information	• Transfer case high range LED circuit short circuit to power	• Refer to the electrical circuit diagrams and check the transfer case high range LED circuit for short circuit to power

P1807-00	4-Wheel Drive High Indicator Short Circuit To Ground - No sub type information	• Transfer case high range LED circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the transfer case high range LED circuit for short circuit to ground
P1808-00	4-Wheel Drive Low Indicator Circuit Failure - No sub type information	• Transfer case low range LED circuit short circuit to ground, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the transfer case low range LED circuit for short circuit to ground, open circuit, high resistance
P1810-00	4-Wheel Drive Low Indicator Short Circuit To Battery - No sub type information	• Transfer case low range LED circuit short circuit to power	• Refer to the electrical circuit diagrams and check the transfer case low range LED circuit for short circuit to power
P181B-00	Clutch Actuator Changeover Solenoid Low - No sub type information	• Transfer case solenoid circuit short circuit to ground • Transfer case control module internal failure	 NOTE: Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. • Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P181C-00	Clutch Actuator Changeover Solenoid High - No sub type information	• Transfer case solenoid circuit short circuit to power • Transfer case control module internal failure	 NOTE: Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. • Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to power • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P181D-00	Clutch Actuator Changeover Solenoid Range/Performance - No sub type information	• Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case solenoid circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor failure • Transfer case solenoid failure • Transfer case control module internal failure • Transfer case internal failure	NOTES:  If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest.  Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms.  Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case solenoid and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install

			a new transfer case and perform routine - Transfer Case Replacement
P181E-00	Clutch Actuator Range/Performance - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case solenoid circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor failure • Transfer case solenoid failure • Transfer case control module internal failure • Transfer case internal failure	NOTES:  If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest.  Transfer case motor resistance should be 0.2 ohms to 10.0 ohms.  Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms.  Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case solenoid and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case and perform routine - Transfer Case Replacement
P181F-00	Clutch Control System Performance - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case solenoid circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case control module internal failure • Transfer case motor failure	NOTES:  If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest.  Transfer case motor resistance should be 0.2 ohms to 10.0 ohms.  Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms.  Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short

		• Transfer case solenoid failure • Transfer case internal failure	circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case solenoid and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case and perform routine - Transfer Case Replacement
P183A-00	Range Change Mechanism Failure - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor failure • Transfer case control module internal failure • Transfer case internal failure • Transmission fault - High drag torque in Neutral	NOTES:  If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest.  If any transmission control module DTCs are also set, perform the relevant corrective action(s) first and retest.  Transfer case motor resistance should be 0.2 ohms to 10.0 ohms.  Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case and perform routine - Transfer Case Replacement • Refer to the relevant section of the workshop manual and test the transmission
P186D-00	Clutch Actuator Stuck - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open	NOTES:  If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest.  Transfer case motor resistance should be 0.2 ohms to 10.0 ohms.

		circuit, high resistance • Transfer case solenoid circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor failure • Transfer case control module internal failure • Transfer case internal failure	 Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms.  Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case and perform routine - Transfer Case Replacement
P2711-00	Unexpected Mechanical Gear Disengagement - No sub type information	• Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case motor failure • Transfer case control module internal failure • Transfer case internal failure • Transmission fault - High drag torque in Neutral	NOTES:  If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest.  If any transmission control module DTCs are also set, perform the relevant corrective action(s) first and retest.  Transfer case motor resistance should be 0.2 ohms to 10.0 ohms.  Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case and perform routine - Transfer Case Replacement • Refer to the relevant section of the workshop manual and test the transmission
P2785-	Clutch Actuator	• Transfer case	NOTES:

00	Temperature Too High - No sub type information	motor temperature too high (> 150°C) • Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case control module internal failure	Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. This DTC may be induced by prolonged off-road driving. • Allow the vehicle to cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest • Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P2787-00	Clutch Temperature Too High - No sub type information	• Transfer case clutch temperature too high • Incorrect specification wheels/tires installed - Mismatch between axle speeds • Front/rear driveshaft failure • Front/rear differential failure • Front/rear left/right halfshaft failure	NOTE: This DTC may be induced by prolonged off-road driving. • Allow the vehicle to cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest • Check the wheel and tire specifications • Check the integrity of the front and rear driveshafts • Check the integrity of the front and rear differentials • Check the integrity of the halfshafts
P2789-00	Clutch Adaptive Learning at Limit - No sub type information	• Transfer case clutch not calibrated • Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case solenoid circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transfer case fluid contaminated with water • Transfer case clutch worn/burnt • Transfer case control module internal failure	NOTES: If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest. Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. • Using the manufacturer approved diagnostic system, perform routine - Transfer Case Replacement • Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the relevant section of the workshop manual and check the transfer case fluid level/condition. If water is present in the fluid, check the integrity of the transfer case breather and install a new transfer case and perform routine - Transfer Case Replacement • Check the integrity of the driveshafts, differentials and half shafts. Rectify as necessary and install a new transfer case and perform routine - Transfer Case Replacement • Using the manufacturer approved diagnostic system, perform routine - Transfer Case Replacement. Clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
U0001-88	High Speed CAN Communication Bus	• High speed CAN bus circuit short	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the

	- Bus off	circuit to ground, short circuit to power, open circuit, high resistance	electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	• Engine control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Engine system fault	• Refer to the electrical circuit diagrams and check the engine control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0101-00	Lost Communication with TCM - No sub type information	• Transmission control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transmission system fault	• Refer to the electrical circuit diagrams and check the transmission control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	• Anti-lock brake system control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Anti-lock brake system fault	• Refer to the electrical circuit diagrams and check the anti-lock brake system control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• Steering angle sensor module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Steering angle sensor system fault	• Refer to the electrical circuit diagrams and check the steering angle sensor module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the steering angle sensor module for related DTCs and refer to the relevant DTC index
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	• Electric park brake control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Electric park brake system fault	• Refer to the electrical circuit diagrams and check the electric park brake control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the electric park brake control module for related DTCs and refer to the relevant DTC index

U0132-00	Lost Communication With Suspension Control Module "A" - No sub type information	• Air suspension control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Air suspension system fault	• Refer to the electrical circuit diagrams and check the air suspension control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the air suspension control module for related DTCs and refer to the relevant DTC index
U0136-00	Lost Communication With Differential Control Module - Rear - No sub type information	• Rear differential control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Rear differential system fault	• Refer to the electrical circuit diagrams and check the rear differential control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the rear differential control module for related DTCs and refer to the relevant DTC index
U0138-00	Lost Communication with All Terrain Control Module - No sub type information	• Terrain response switchpack power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Terrain response system fault	• Refer to the electrical circuit diagrams and check the terrain response switchpack power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the terrain response switchpack for related DTCs and refer to the relevant DTC index
U0140-00	Lost Communication With Body Control Module - No sub type information	• Central junction box power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Central junction box system fault	• Refer to the electrical circuit diagrams and check the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Transfer case control module is not configured correctly • Incorrect transfer case control module installed	• Using the manufacturer approved diagnostic system, re-configure the transfer case control module with the latest level software • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
U0401-00	Invalid Data Received From ECM/PCM A - No sub type information	• Missing/invalid data from the engine control module	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0402-00	Invalid Data Received from TCM - No sub type information	• Missing/invalid data from the transmission control module	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0415-00	Invalid Data Received From Anti-	• Missing/invalid data from the anti-	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for

	Lock Brake System (ABS) Control Module - No sub type information	lock brake system control module	related DTCs and refer to the relevant DTC index
U0417-00	Invalid Data Received From Park Brake Control Module - No sub type information	• Missing/invalid data from the electric park brake control module	• Using the manufacturer approved diagnostic system, check the electric park brake control module for related DTCs and refer to the relevant DTC index
U0428-00	Invalid Data Received From Steering Angle Sensor Module - No sub type information	• Missing/invalid data from the steering angle sensor module	• Using the manufacturer approved diagnostic system, check the steering angle sensor module for related DTCs and refer to the relevant DTC index
U3000-55	Control Module - Not configured	• Car configuration file mismatch with vehicle specification • Incorrect transfer case control module installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
U3003-62	Battery Voltage - Signal compare failure	• Mismatch between the voltage at the transfer case control module and the voltage value broadcast on the CAN bus	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111) - and compare it to battery voltage. Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index DTC: Transmission Control Switch (TCS)

Description and Operation

Transmission Control Switch (TCS)

CAUTIONS:

 Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

 When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

 If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

 Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

 When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

 Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

 Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

 If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

 Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Transmission Control Switch (TCS). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: External Controls (307-05A Automatic Transmission/Transaxle External Controls - TDV6 3.0L Diesel /V8 5.0L Petrol/V8 S/C 5.0L Petrol, Vehicles With: 6HP28 6-Speed Automatic Transmission, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1087-08	LIN Bus "A" - Bus signal/message failures	 NOTE: Circuit reference LIN • Transmission control module power or ground circuit open circuit, high resistance • LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transmission system fault	• Refer to the electrical circuit diagrams and check the transmission control module power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
B1087-81	LIN Bus "A" - Invalid serial data received	• Transmission system fault	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index

B1087-82	LIN Bus "A" - Alive/sequence counter incorrect / not updated	• Transmission system fault	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
B1087-83	LIN Bus "A" - Value of signal protection calculation incorrect	• Transmission system fault	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
B1087-87	LIN Bus "A" - Missing message	 NOTE: Circuit reference LIN • Transmission control module power or ground circuit open circuit, high resistance • LIN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transmission system fault	• Refer to the electrical circuit diagrams and check the transmission control module power and ground circuits for open circuit, high resistance • Refer to the electrical circuit diagrams and check the LIN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
B1142-62	Ignition Status 1 - Signal compare failure	 NOTE: Circuit reference IGN • Ignition sense circuit short circuit to ground, short circuit to power, open circuit, high resistance - Power mode differs to that broadcast on high speed CAN	• Refer to the electrical circuit diagrams and check the ignition sense circuit for short circuit to ground, short circuit to power, open circuit, high resistance
B123C-01	Dynamic Stability Control Status Indicator - General electrical failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
B123D-64	Dynamic Stability Control Button - Signal plausibility failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
B123F-01	Adaptive Speed Limiter Mode Indicator - General electrical failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
B1241-64	Adaptive Speed Limiter Button - Signal plausibility failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
B1242-64	Winter Button - Signal plausibility failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
B1243-01	Winter Button Mode Indicator - General electrical failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
B1244-64	Dynamic / Sport Button - Signal plausibility failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
B1245-01	Dynamic / Sport Button Mode Indicator - General electrical failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
C113A-62	Wakeup Control - Signal compare	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault

	failure		persists, install a new transmission control switch
P0603-44	Internal Control Module Keep Alive Memory (KAM) Error - Data memory failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P0604-44	Internal Control Module Random Access Memory (RAM) Error - Data memory failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P0605-45	Internal Control Module Read Only Memory (ROM) Error - Program memory failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P0606-2F	ECM / PCM Processor - Signal erratic	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P0606-47	ECM / PCM Processor - Watchdog/safety microcontroller failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P0705-09	Transmission Range Sensor A Circuit (PRNDL Input) - Component failures	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P0705-46	Transmission Range Sensor A Circuit (PRNDL Input) - Calibration/parameter memory failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P0705-86	Transmission Range Sensor A Circuit (PRNDL Input) - Signal invalid	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P0814-01	Transmission Range Display Circuit - General electrical failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P081C-64	Park Input Circuit - Signal plausibility failure	• Hardwired park and transmission control switch position display signals are not consistent	• Refer to the electrical circuit diagrams and check the park signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
P084F-11	Park / Neutral Switch Output Circuit - Circuit short to ground	• Park/neutral signal circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the park/neutral signal circuit for short circuit to ground
P084F-15	Park / Neutral Switch Output Circuit - Circuit short to battery or open	• Park/neutral signal circuit short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check the park/neutral signal circuit for short circuit to battery, open circuit, high resistance
P176A-01	Transmission Range Selector Up and Down Position Circuit - General electrical failure	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P176A-13	Transmission Range Selector Up and Down Position Circuit - Circuit open	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P176A-19	Transmission Range Selector Up and Down Position Circuit - Circuit current above threshold	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch

P176A-94	Transmission Range Selector Up and Down Position Circuit - Unexpected operation	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P176B-71	Transmission Range Selector Up and Down Position Control Error - Actuator stuck	• Transmission control switch internal failure - Raise/lower failure	 NOTE: This DTC may be set by resisting the raising/lowering of the transmission control switch • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P176C-07	Transmission Range Selector Lock Control Error - Mechanical failures	• Transmission control switch internal failure - Rotation detected while locked	 NOTE: This DTC may be set by releasing the brake pedal whilst rotating the transmission control switch • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P176C-11	Transmission Range Selector Lock Control Error - Circuit short to ground	• Transmission control switch internal failure - Lock solenoid circuit short circuit to ground	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P176C-12	Transmission Range Selector Lock Control Error - Circuit short to battery	• Transmission control switch internal failure - Lock solenoid circuit short circuit to power	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P176C-73	Transmission Range Selector Lock Control Error - Actuator stuck closed	• Transmission control switch internal failure - Lock solenoid circuit failure	 NOTE: This DTC may be set by attempting to rotate the transmission control switch as it unlocks • Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
U0001-88	High Speed CAN Communication Bus - Bus off	• High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	• Engine control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Engine system fault	• Refer to the electrical circuit diagrams and check the engine control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0100-87	Lost Communication With ECM/PCM "A" - Missing message	• Missing/invalid data from the engine control module - Engine speed	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0101-00	Lost Communication with TCM - No sub type information	• Transmission control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Transmission system fault	• Refer to the electrical circuit diagrams and check the transmission control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index

U0101-87	Lost Communication with TCM - Missing message	• Missing/invalid data from the transmission control module - TCM_PosDisp	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	• Anti-lock brake system control module power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Anti-lock brake system fault	• Refer to the electrical circuit diagrams and check the anti-lock brake system control module power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0121-87	Lost Communication With Anti-Lock Brake System (ABS) Control Module - Missing message	• Missing/invalid data from the anti-lock brake system control module - Steering angle	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0140-00	Lost Communication With Body Control Module - No sub type information	• Central junction box power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Central junction box system fault	• Refer to the electrical circuit diagrams and check the central junction box power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - Missing message	• Instrument cluster power or ground circuit open circuit, high resistance • High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance • Instrument cluster system fault	• Refer to the electrical circuit diagrams and check the instrument cluster power and ground circuits for open circuit, high resistance • Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Using the manufacturer approved diagnostic system, check the instrument cluster for related DTCs and refer to the relevant DTC index
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Invalid master configuration ID received	• Using the manufacturer approved diagnostic system, re-configure the central junction box with the latest level software. Clear the DTCs and retest. If the fault persists, install a new transmission control switch
U0401-92	Invalid Data Received From ECM/PCM - Performance or incorrect operation	• Missing/invalid data from the engine control module	• Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0402-64	Invalid Data Received from Transmission control module - Signal plausibility failure	• Missing/invalid data from the transmission control module - Implausible lock request received	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0402-81	Invalid Data Received from Transmission control module - Invalid serial data received	• Missing/invalid data from the transmission control module - TCM_PosDisp / TCM_LockReq	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0402-82	Invalid Data Received from Transmission control module - Alive/sequence counter incorrect / not updated	• Missing/invalid data from the transmission control module - Alive counter	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index

U0402-83	Invalid Data Received from Transmission control module - Value of signal protection calculation incorrect	Missing/invalid data from the transmission control module - Checksum	Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0402-92	Invalid Data Received from Transmission control module - Performance or incorrect operation	• Missing/invalid data from the transmission control module	• Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0415-92	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Performance or incorrect operation	• Missing/invalid data from the anti-lock brake system control module	• Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0422-08	Invalid Data Received From Body Control Module - Bus signal/message failures	• Missing/invalid data from the central junction box	• Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0422-81	Invalid Data Received From Body Control Module - Invalid serial data received	• Missing/invalid data from the central junction box - Invalid power mode	• Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0422-92	Invalid Data Received From Body Control Module - Performance or incorrect operation	• Missing/invalid data from the central junction box	• Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0423-92	Invalid Data Received From Instrument Panel Control Module - Performance or incorrect operation	• Missing/invalid data from the instrument cluster	• Using the manufacturer approved diagnostic system, check the instrument cluster for related DTCs and refer to the relevant DTC index
U043A-92	Invalid Data Received From Suspension Control Module "B" - Performance or incorrect operation	• Missing/invalid data from the adaptive damping control module	• Using the manufacturer approved diagnostic system, check the adaptive damping control module for related DTCs and refer to the relevant DTC index
U101A-86	Lost Communication With Transmission Control Module (Multiple Bus) - Signal invalid	• CAN and LIN bus failure	NOTE: Ignore this DTC if no other CAN or LIN DTCs are set • Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U1A14-04	CAN Initialization Failure - System internal failures	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
U2012-4A	Car Configuration Parameter(s) - Incorrect component installed	• Car configuration file mismatch with vehicle specification • Incorrect transmission control switch installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new transmission control switch as necessary
U2100-00	Initial Configuration Not Complete - No sub type information	• Transmission control switch internal failure	• Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
U3003-16	Battery Voltage - Circuit voltage below threshold	• Transmission control switch power or ground circuit open circuit, high resistance • Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the electrical circuit diagrams and check the transmission control switch power and ground circuits for open circuit, high resistance • Refer to the relevant section of the workshop manual and test the battery and charging system
U3003-17	Battery Voltage - Circuit voltage above threshold	• Battery/charging system fault	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02). Refer to the relevant section of the workshop manual and test the

			battery and charging system
U3003-62	Battery Voltage - Signal compare failure	• Mismatch between the voltage at the transmission control switch and the voltage value broadcast on the CAN bus	• Using the manufacturer approved diagnostic system, check datalogger signal - Main ECU Supply Voltage (0xDD02) - and compare it to battery voltage. Refer to the electrical circuit diagrams and check the transmission control switch power and ground circuits for open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index DTC: Transmission Control Module (TCM)

Description and Operation

Transmission Control Module (TCM)

CAUTIONS:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance, always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

If a failure condition is reported indicating the need to renew the transmission assembly on a vehicle that remains under manufacturer warranty, an authorisation request must first go through the warranty prior approval programme before any work is begun.

The table below lists all diagnostic trouble codes (DTCs) that could be logged in the Transmission Control Module (TCM), for additional diagnosis and testing information refer to the relevant Diagnosis and Testing section
For additional information, refer to: Diagnostics - TDV6 3.0L Diesel , Vehicles With: 8HP70 8-Speed Automatic Transmission AWD (307-01B Automatic Transmission/Transaxle - TDV6 3.0L Diesel , Vehicles With: 8HP70 8-Speed Automatic Transmission AWD, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1087-41	LIN Bus "A" - General checksum failure	• Local interconnect network circuit fault	• Refer to the electrical circuit diagrams and check local interconnect network circuit to transmission control switch. Clear the DTC and retest
B1087-63	LIN Bus "A" - Circuit / component protection time-out	• Local interconnect network circuit fault	• Refer to the electrical circuit diagrams and check local interconnect network circuit to transmission control switch. Clear the DTC and retest
B1087-64	LIN Bus "A" - Signal plausibility failure	• Signal plausibility failure	• Transmission control switch position fault. Vehicle issue - Check transmission control switch
B1087-82	LIN Bus "A" - Alive / sequence counter incorrect / not updated	• Local interconnect network circuit fault	• Refer to the electrical circuit diagrams and check local interconnect network circuit to transmission control switch. Clear the DTC and retest
B1087-83	LIN Bus "A" - Signal plausibility	• Value of signal protection	• Gear selector position fault. Vehicle issue - Check gear selector unit

	failure - value of signal protection calculation incorrect	calculation incorrect	
B1087-88	LIN Bus "A" - Bus off	• Local interconnect network circuit fault	• Refer to the electrical circuit diagrams and check local interconnect network circuit to transmission control switch. Clear the DTC and retest
B108E-02	Display - General signal failure	• General signal failure	• Clear DTCs. Test drive the car and watch the displayed position matches the engaged gear. If the problem persists, renew the module
C1A88-64	High Pressure Switching Valve #1 - Signal plausibility failure	• Signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0071-02	Ambient Air Temperature Sensor Circuit "A" Range/Performance - General signal failure	• Ambient air temperature sensor range performance	• Check engine control module for related DTCs and refer to the relevant DTC index
P0121-86	Throttle/Pedal Position Sensor A Circuit Range/Performance - Signal invalid	• Accelerator pedal position sensor sensing circuit signal invalid • Accelerator pedal position sensor failure	• Check engine control module for related DTCs and refer to the relevant DTC index
P0219-64	Engine Overspeed Condition - Signal plausibility failure	• Crankshaft position sensor circuit • Camshaft position sensor circuit	• Check engine control module for related DTCs and refer to the relevant DTC index. Clear the DTC and retest
P0562-1C	System Voltage Low - Circuit voltage out of range	• Power supply voltage is out of range when the engine is running	• Check the battery and charging system. Refer to the relevant workshop manual section. Clear the DTC and retest
P0562-21	System Voltage Low - Signal amplitude < minimum	• Supply voltage to transmission control module very low	• Check the battery condition and state of charge. Check the transmission control module connector and power supply circuits
P0563-22	System Voltage High - Signal amplitude > maximum	• Power supply voltage is too high if the engine is running and there has been no jump-start or transmission limp-home event	• Check the battery condition and state of charge. Check the transmission control module connector and power supply circuits. Check if the vehicle has been jump-started. Clear the DTC and retest
P0601-41	Internal Control Module Memory Check Sum Error-General checksum failure	• Checksum error	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0606-04	Control Module Processor - System internal failures	• Internal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0606-11	Control Module Processor - Circuit short to ground	• Internal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0606-	Control Module	• Internal failure	• Check the transmission control module connector and the

62	Processor - Signal compare failure		power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0606-64	Control Module Processor - Signal plausibility failure	• Internal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0613-04	TCM Processor - System internal failures	• Internal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0613-06	TCM Processor - Algorithm based failures	• Internal processor watchdog error	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0613-11	TCM Processor - Circuit short to ground	• Internal circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0613-12	TCM Processor - Circuit short to battery	• Internal circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0613-13	TCM Processor - Circuit open	• Internal circuit open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0613-15	TCM Processor - Circuit short to battery or open	• Internal circuit short to power or open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0613-18	TCM Processor - Circuit current below threshold	• Internal circuit short to ground or open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P061B-02	Internal Control Module Torque Calculation Performance - General signal failure	• Internal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P061B-64	Internal Control Module Torque Calculation Performance# - Signal plausibility failure	• Signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P062F-04	Internal Control Module EEPROM Error - System internal failures	• EEPROM error	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0641-64	Sensor Reference Voltage A Circuit/Open - Signal plausibility failure	• Internal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, check and install a new transmission control module
P0642-21	Sensor Reference Voltage A Circuit Low - Signal amplitude < minimum	• Reference voltage circuit signal amplitude below minimum	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0643-22	Sensor Reference Voltage A Circuit High - Signal amplitude > maximum	• Reference voltage circuit signal amplitude above maximum	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0657-	Actuator Supply	• Supply voltage	• Check for other related DTCs. Check the park lock

13	Voltage A Circuit / Open - Circuit open	circuit open circuit	actuator, the actuator connector and wiring. Check the transmission control module connector and the power/ground circuits to the module. Clear the DTC and test the shift lever in all positions. If the problem persists, check and install a new transmission control module
P0657-64	Actuator Supply Voltage A Circuit / Open - Signal plausibility failure	• Actuator supply (pressure control valves etc) voltage plausibility fault	• Check solenoid at lever, check wiring and connectors, clear DTCs. Test position lever in all positions and cycle ignition. If the problem persists, check and install a new transmission control module
P0658-11	Actuator Supply Voltage A Circuit Low - Circuit short to ground	• Supply voltage circuit short circuit to ground	• Check the transmission control module connector and the power/ground circuits to the module. If the problem persists, check and install a new transmission control module
P0659-12	Actuator Supply Voltage A Circuit High - Circuit short to battery	• Supply voltage circuit short circuit to power	• Check the transmission control module connector and the power/ground circuits to the module. If the problem persists, check and install a new transmission control module
P0666-64	Control Module Internal Temperature Sensor "A" Circuit - Signal plausibility failure	• Internal temperature sensor	• Check for engine overheating and cooling system faults. Check the transmission control module connector and the power/ground circuits to the module. Allow the transmission control module to cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module
P0667-01	PCM / ECM / TCM Internal Temperature Sensor Range/Performance - General electrical failure	• Module internal temperature sensor general failure	• Check for engine overheating and cooling system faults. Check the transmission control module connector and the power/ground circuits to the module. Allow the transmission control module to cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module
P0668-21	PCM / ECM / TCM Internal Temperature Sensor A Circuit Low - Signal amplitude < minimum	• Module internal temperature too low • Temperature sensor circuit high resistance • Temperature sensor circuit short circuit to ground	• Check the transmission control module connector and the power/ground circuits to the module. Allow the transmission control module to cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module
P0669-22	ECM / ECM / TCM Internal Temperature Sensor A Circuit High - Signal amplitude > maximum	• Module internal temperature too high • Temperature sensor circuit short circuit to power	• Check for engine overheating and cooling system faults. Check the transmission control module connector and the power/ground circuits to the module. Allow the transmission control module to cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module
P06AC-01	PCM / ECM / TCM Internal Temperature Sensor B Range/Performance - General electrical failure	• General electrical failure	• Check for engine overheating and cooling system faults. Check the transmission control module connector and the power/ground circuits to the module. Allow the transmission control module to cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module
P06AC-64	PCM / ECM / TCM Internal Temperature Sensor B Range/Performance - Signal plausibility failure	• Signal plausibility failure	• Check for engine overheating and cooling system faults. Check the transmission control module connector and the power/ground circuits to the module. Allow the transmission control module to cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module
P06AD-22	PCM / ECM / TCM Internal Temperature Sensor B Circuit	• Signal amplitude greater than maximum	• Check for engine overheating and cooling system faults. Check the transmission control module connector and the power/ground circuits to the module. Allow the transmission control module to cool. Clear the DTC and

	Low - Signal amplitude > maximum		retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module
P06AE-21	PCM / ECM / TCM Internal Temperature Sensor B Circuit High - Signal amplitude < minimum	• Signal amplitude greater than minimum	• Transmission control module chip temperature fault. Allow cooling time. If the problem persists, renew the transmission control module
P0700-02	Transmission Control System (MIL Request) - General signal failure	• General signal failure	• Check for other DTCs and rectify those first. Clear the DTCs and road test the vehicle. If further DTCs are logged, investigate according to the individual faults logged
P0700-83	Transmission Control System (MIL Request) - Value of signal protection calculation incorrect	• Value of signal protection calculation incorrect	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0702-98	Transmission Control System Electrical - Component or system over temperature	• Component or system over temperature	• Check transmission cooling circuit. Clear DTCs and test drive the vehicle. If the problem persists, renew the transmission control module
P0710-04	Transmission Fluid Temperature Sensor A Circuit - System internal failures	• System internal failures	• Clear DTCs and test drive the vehicle. If the problem persists, renew the transmission control module
P0710-13	Transmission Fluid Temperature Sensor A Circuit - Circuit open	• Transmission fluid temperature sensor circuit open circuit • Temperature sensor fault	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required. Consider environmental conditions before condemning the module
P0710-27	Transmission Fluid Temperature Sensor A Circuit - Signal rate of change above threshold	• Transmission fluid temperature sensor signal rate of change above threshold	• Allow the transmission to cool, clear the DTC and retest. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0710-64	Transmission Fluid Temperature Sensor A Circuit - Signal plausibility failure	• Transmission fluid temperature sensor signal plausibility failure	• Allow the transmission to cool, clear the DTC and retest. Clear the DTC and retest. If the problem persists, renew the transmission control module
P0712-11	Transmission Fluid Temperature Sensor A Circuit Low - Circuit short to ground	• Sensor circuit short circuit to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0713-12	Transmission Fluid Temperature Sensor A Circuit High - Circuit short to battery	• Transmission Fluid Temperature Sensor circuit short circuit to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0715-12	Turbine/Input Shaft Speed Sensor A Circuit - Circuit short to battery	• Turbine sensor circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, renew the transmission control module.
P0715-64	Turbine/Input Shaft Speed Sensor A Circuit - Signal plausibility failure	• Turbine sensor signal plausibility failure	• Clear the DTC and test drive the vehicle. Check output speed and vehicle speed plausibility against turbine speed If the problem persists renew the transmission control module.

P0716-14	Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Circuit short to ground or open	Sensor circuit short circuit to ground or open circuit	Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0716-27	Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Signal rate of change above threshold	• Turbine sensor signal rate of change above threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0720-12	Output Shaft Speed Sensor Circuit - Circuit short to battery	• Sensor circuit short circuit to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0720-14	Output Shaft Speed Sensor Circuit - Circuit short to ground or open	• Sensor circuit short circuit to ground or open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0721-02	Output Shaft Speed Sensor Circuit Range/Performance - General signal failure	• Output shaft speed sensor general signal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0721-27	Output Shaft Speed Sensor Circuit Range/Performance - Signal rate of change above threshold	• Signal rate of change above threshold	• Check for the possible wheel lock up due to anti-lock brake system issue. Check anti-lock brake system control module for related DTCs. Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0721-62	Output Shaft Speed Sensor Circuit Range/Performance - Signal compare failure	• Output shaft speed sensor circuit signal compare failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0721-64	Output Shaft Speed Sensor Circuit Range/Performance - Signal plausibility failure	• Engine speed signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0725-83	Engine Speed Input Circuit - Value of signal protection calculation incorrect	• Engine speed input circuit failure	• Check engine control module for related DTCs and refer to the relevant DTC index
P0729-07	Gear 6 Incorrect Ratio - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P0730-00	Incorrect Gear Ratio - No sub type information	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P0731-07	Gear 1 Incorrect Ratio - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P0732-07	Gear 2 Incorrect Ratio - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P0733-07	Gear 3 Incorrect Ratio - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission

P0734-07	Gear 4 Incorrect Ratio - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P0735-07	Gear 5 Incorrect Ratio - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P0736-07	Reverse Incorrect Ratio - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P0736-64	Reverse Incorrect Ratio - Signal plausibility failure	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle using all gears in drive and reverse. Clear the DTC and retest. If the problem persists, or if any other gear ratio related DTCs are logged, renew the transmission
P0741-07	Torque Converter Clutch Solenoid Circuit Performance/Stuck Off - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the torque convertor. If the problem still persists, renew the transmission
P0745-11	Pressure Control Solenoid A - Circuit short to ground	• Pressure control solenoid A circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0745-12	Pressure Control Solenoid A - Circuit short to battery	• Pressure control solenoid A circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0745-13	Pressure Control Solenoid A - Circuit open	• Pressure control solenoid A circuit, open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0745-14	Pressure Control Solenoid A - Circuit short to ground or open	• Pressure control solenoid A circuit short to ground, open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0745-64	Pressure Control Solenoid A - Signal plausibility failure	• Pressure control solenoid A circuit signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0745-93	Pressure Control Solenoid A - No operation	• Control solenoid not operating	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0745-94	Pressure Control Solenoid A - Unexpected operation	• Control solenoid unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0748-11	Pressure Control Solenoid A Electrical - Circuit short to ground	• Pressure control solenoid A circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0748-12	Pressure Control Solenoid A Electrical - Circuit short to battery	• Pressure control solenoid A circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required

P0748-13	Pressure Control Solenoid A Electrical - Circuit open	• Pressure control solenoid A circuit, open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P076F-07	Gear 7 Ratio Incorrect - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P077E-02	Transmission Fluid Temperature Measurement System - Multiple Sensor Correlation - General signal failure	• General signal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0780-62	Shift Malfunction - Signal compare failure	• Signal compare failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0780-93	Shift Malfunction - No operation	• Internal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0780-94	Shift Malfunction - Unexpected operation	• Internal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0795-04	Pressure Control Solenoid C - System internal failures	• Internal failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P07AD-07	Transmission Friction Element "F" Stuck On - Mechanical failures	• Mechanical failures	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P07D9-07	Gear 8 Incorrect Ratio - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P07DC-07	Incorrect Shift from Gear 1 - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P07DD-07	Incorrect Shift from Gear 2 - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P07DE-07	Incorrect Shift from Gear 3 - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P07DF-07	Incorrect Shift from Gear 4 - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P07E0-07	Incorrect Shift from Gear 5 - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P07E1-07	Incorrect Shift from Gear 6 - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P07E2-07	Incorrect Shift from Gear 7 - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the

			problem persists, renew the transmission
P07E3-07	Incorrect Shift from Gear 8 - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P0801-94	Reverse Inhibit Control Circuit - Unexpected operation	• Reverse inhibit control circuit unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0810-04	Clutch Position Control Error - System internal failures	• Internal failure	• Clear DTCs and test drive the vehicle. Ensure the displayed position matches the engaged gear • Check and install a new transmission control module as required
P0826-01	Up and Down Switch Circuit - General electrical failure	• Tip switch electrical fault or harness fault	• Refer to the electrical circuit diagrams and check the circuit between the command shift switch and the transmission control module. Check the switch operation of the Transmission Shift Selector
P0826-2A	Up and Down Switch Circuit - Signal stuck in range	• Tip switch electrical fault or harness fault	• Refer to the electrical circuit diagrams and check the circuit between the command shift switch and the transmission control module. Check the switch operation of the transmission ontrol switch
P0826-64	Up and Down Switch Circuit - Signal plausibility failure	• Tip switch electrical fault or harness fault	• Refer to the electrical circuit diagrams and check the circuit between the command shift switch and the transmission control module. Check the switch operation of the transmission ontrol switch
P084F-11	Park / Neutral Switch Output Circuit - Circuit short to ground	• Park / neutral switch circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P084F-12	Park / Neutral Switch Output Circuit - Circuit short to battery	• Park / neutral switch circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P084F-13	Park / Neutral Switch Output Circuit - Circuit open	• Park / neutral switch circuit open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P084F-14	Park / Neutral Switch Output Circuit - Circuit short to ground or open	• Park / neutral switch circuit short to ground, open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P084F-29	Park / Neutral Switch Output Circuit - Signal invalid	• Park / neutral switch output circuit signal invalid	• Check for correct output signal at transmission control module pin 1 to transmission plug (check in all positions). If the signal appears normal, then check wiring and connectors to the module. If no signal present, install a new transmission control module as required
P0850-02	Park / Neutral Switch Output Circuit - General signal failure	• Park / neutral switch output circuit failure	• Clear DTC and retest. Test drive the vehicle and check parklock mechanism by engaging and disengaging the parking lock several times. If fault persists, check parklock components and renew as required. If fault persists, check and install a new transmission control module as required
P0850-29	Park / Neutral Switch Input Circuit - Signal invalid	• Starter inhibit signal invalid	• Clear DTC and retest. Test drive the vehicle and check parklock mechanism by engaging and disengaging the parking lock several times. If fault persists, check parklock components and renew as required. If fault persists, check and install a new transmission control module as required
P0851-01	Park / Neutral Switch Input Circuit Low - General electrical failure	• Switch input circuit general signal failure	• Clear DTC and retest. Test drive the vehicle and check parklock mechanism by engaging and disengaging the parking lock several times. If fault persists, check parklock components and renew as required. If fault persists, check and install a new transmission control module as required
P0852-01	Park / Neutral Switch Input Circuit High - General electrical	• Switch input circuit general signal failure	• Clear DTC and retest. Test drive the vehicle and check parklock mechanism by engaging and disengaging the parking lock several times. If fault persists, check parklock components and renew as required. If fault persists, check

	failure		and install a new transmission control module as required
P0942-07	Hydraulic Pressure Unit - Mechanical failures	 NOTE: This DTC is only active with vehicles fitted with stop/start functionality • Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission
P0942-62	Hydraulic Pressure Unit - Signal compare failure	 NOTE: This DTC is only active with vehicles fitted with stop/start functionality • Hydraulic pressure unit signal compare failure	• Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0965-64	Pressure Control Solenoid B Control Circuit Range/Performance - Signal plausibility failure	• Control circuit signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0965-93	Pressure Control Solenoid B Control Circuit Range/Performance - No operation	• Control circuit no operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0965-94	Pressure Control Solenoid B Control Circuit Range/Performance - Unexpected operation	• Control circuit unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0966-11	Pressure Control Solenoid B Control Circuit Low - Circuit short to ground	• Control circuit short circuit to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0966-12	Pressure Control Solenoid B Control Circuit Low - Circuit short to battery	• Control circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0966-14	Pressure Control Solenoid B Control Circuit Low - Circuit short to ground or open	• Control circuit short circuit to ground or open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0972-13	Shift Solenoid A Control Circuit Range/Performance - Circuit open	• Control circuit open circuit	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0972-64	Shift Solenoid A Control Circuit Range/Performance - Signal plausibility failure	• Control circuit signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0972-93	Shift Solenoid A Control Circuit Range/Performance - No operation	• Control circuit no operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0972-94	Shift Solenoid A Control Circuit Range/Performance - Unexpected operation	• Control circuit unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0973-11	Shift Solenoid A Control Circuit Low - Circuit short to	• Shift solenoid circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a

	ground		new transmission control module as required
P0973-18	Shift Solenoid A Control Circuit Low - Circuit current below threshold	• Control circuit current below threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0974-12	Shift Solenoid A Control Circuit High - Circuit short to battery	• Control circuit short to battery	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0974-19	Shift Solenoid A Control Circuit High - Circuit current above threshold	• Control circuit current above threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0975-13	Shift Solenoid B Control Circuit Range/Performance - Circuit open	• Control circuit open	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0975-64	Shift Solenoid B Control Circuit Range/Performance - Signal plausibility failure	• Control circuit signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0975-93	Shift Solenoid B Control Circuit Range/Performance - No operation	• Control circuit no operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0975-94	Shift Solenoid B Control Circuit Range/Performance - Unexpected operation	• Control circuit unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0976-11	Shift Solenoid B Control Circuit Low - Circuit short to ground	• Control circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0976-18	Shift Solenoid B Control Circuit Low - Circuit current below threshold	• Control circuit current below threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0977-12	Shift Solenoid B Control Circuit High - Circuit short to battery	• Control circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0977-19	Shift Solenoid B Control Circuit High - Circuit current above threshold	• Control circuit current above threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0978-21	Shift Solenoid C Control Circuit Range/Performance - Signal amplitude < minimum	• Control circuit signal amplitude < minimum	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0978-64	Shift Solenoid C Control Circuit Range/Performance - Signal plausibility failure	• Control circuit signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0978-93	Shift Solenoid C Control Circuit Range/Performance - No operation	• Control circuit no operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0978-94	Shift Solenoid C Control Circuit Range/Performance - Unexpected operation	• Control circuit unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0979-11	Shift Solenoid C Control Circuit Low - Circuit short to	• Control circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a

	ground		new transmission control module as required
P0979-14	Shift Solenoid C Control Circuit Low - Circuit short to ground or open	• Control circuit short to ground or open	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0980-12	Shift Solenoid C Control Circuit High - Circuit short to battery	• Control circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0980-19	Shift Solenoid C Control Circuit High - Circuit current above threshold	• Control circuit current above threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0981-64	Shift Solenoid D Control Circuit Range/Performance - Signal plausibility failure	• Control circuit signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0981-93	Shift Solenoid D Control Circuit Range/Performance - No operation	• Control circuit no operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0981-94	Shift Solenoid D Control Circuit Range/Performance - Unexpected operation	• Control circuit unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0982-11	Shift Solenoid D Control Circuit Low - Circuit short to ground	• Control circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0982-14	Shift Solenoid D Control Circuit Low - Circuit short to ground or open	• Control circuit short to ground or open	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0982-18	Shift Solenoid D Control Circuit Low - Circuit current below threshold	• Control circuit current below threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0983-12	Shift Solenoid D Control Circuit High - Circuit short to battery	• Control circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0983-19	Shift Solenoid D Control Circuit High - Circuit current above threshold	• Control circuit current above threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0984-64	Shift Solenoid E Control Circuit Range/Performance - Signal plausibility failure	• Control circuit signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0984-93	Shift Solenoid E Control Circuit Range/Performance - No operation	• Control circuit no operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0984-94	Shift Solenoid E Control Circuit Range/Performance - Unexpected operation	• Control circuit unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0985-11	Shift Solenoid E Control Circuit Low - Circuit short to ground	• Control circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0985-14	Shift Solenoid E Control Circuit Low - Circuit short to	• Control circuit short to ground or	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a

	ground or open	open	new transmission control module as required
P0985-18	Shift Solenoid E Control Circuit Low - Circuit current below threshold	• Control circuit current below threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0986-12	Shift Solenoid E Control Circuit High - Circuit short to battery	• Control circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P0986-19	Shift Solenoid E Control Circuit High - Circuit current above threshold	• Control circuit current above threshold	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P164C-62	Internal Control Module Start-Stop Performance - Signal compare failure	NOTE: This DTC is only active with vehicles fitted with stop/start functionality • Signal compare failure	• Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P1706-94	High Vehicle Speed Observed in Park - Unexpected operation	• Unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P1707-72	Transfer Case Neutral or Park/Neutral Indication Circuit - Actuator stuck open	• Actuator stuck open	• Ensure that emergency park release has not been pulled and is not sticking • Clear DTC. Test drive the vehicle, engaging and disengaging the parking lock several times. If the fault persists renew the park pawl as required
P1707-77	Transfer Case Neutral or Park/Neutral Indication Circuit - Commanded position not reachable	• Commanded position not reachable	• Ensure that emergency park release has not been pulled and is not sticking • Clear DTC. Test drive the vehicle, engaging and disengaging the parking lock several times. If the fault persists renew the park pawl as required
P177A-07	Transmission Friction Element A or B - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P177B-07	Transmission Friction Element A or C - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P177C-07	Transmission Friction Element A or D - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P177D-07	Transmission Friction Element A or E - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P177E-07	Transmission Friction Element B or C - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P177F-07	Transmission Friction Element B or D - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P178A-07	Transmission Friction Element B or E - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required

P178B-07	Transmission Friction Element C or D - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P178C-07	Transmission Friction Element C or E - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P178D-07	Transmission Friction Element D or E - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P2159-02	Vehicle Speed Sensor B Range/Performance - General signal failure	• General signal failure	• Check for related anti-lock brake system DTCs and refer to the relevant DTC index
P215B-62	Vehicle Speed / Output Shaft Speed Correlation - Signal compare failure	• Signal compare failure	• Check anti-lock brake system DTCs and refer to the relevant DTC index
P258F-02	Torque Management Request Output Signal - General signal failure	• General signal failure	• Clear DTC and retest. If fault persists, check and install a new transmission control module as required
P2700-07	Transmission Friction Element A Apply Time Range/Performance - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P2701-07	Transmission Friction Element B Apply Time Range/Performance - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P2702-07	Transmission Friction Element C Apply Time Range/Performance - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P2703-07	Transmission Friction Element D Apply Time Range/Performance - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P2704-07	Transmission Friction Element E Apply Time Range/Performance - Mechanical failures	• Mechanical failures	• Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the transmission as required
P2711-94	Unexpected Mechanical Gear Disengagement - Unexpected operation	• Gear disengagement unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P2713-04	Pressure Control Solenoid D - System internal failures	• System internal failures	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P2722-04	Pressure Control Solenoid E - System internal failures	• System internal failures	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P2757-93	Torque Converter Clutch Pressure Control Solenoid Control Circuit Perf	• Control solenoid control circuit no operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required

	or Stuck Off - No operation		
P2757-94	Torque Converter Clutch Pressure Control Solenoid Control Circuit Perf or Stuck Off - Unexpected operation	• Control circuit unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P2759-11	Torque Converter Clutch Pressure Control Solenoid Electrical - Circuit short to ground	• Control solenoid circuit short to ground	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P2759-12	Torque Converter Clutch Pressure Control Solenoid Electrical - Circuit short to battery	• Control solenoid circuit short to power	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P2761-13	Torque Converter Clutch Pressure Control Solenoid Control Circuit / Open - Circuit open	• Control solenoid circuit open	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P2762-64	Torque Converter Clutch Pressure Control Solenoid Control Circuit Range / Perf - Signal plausibility failure	• Control circuit signal plausibility failure	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P2784-02	Input / Turbine Speed Sensor A / B Correlation - General signal failure	• Sensor general signal failure, multiple input speed signal faults	• Check engine control module for related DTCs and refer to the relevant DTC index • Check anti-lock brake system DTCs and refer to the relevant DTC index
P2787-4B	Clutch Temperature Too High - Over temperature	• Clutch over temperature	• Allow the transmission to cool, clear the DTC and retest. Check transmission oil level and check for excessive gear changes during normal driving. Check shift paddles for intermittent operation and renew as required
P2787-98	Clutch Temperature Too High - Component or system over temperture	• Component or system over temperature	• Allow the transmission to cool, clear the DTC and retest. Clear the DTC and retest. Check transmission oil level and check for excessive gear changes during normal driving. Check shift paddles for intermittent operation. Refer to the relevant section of the workshop manual and check the transmission oil level and quality. Clear the DTC and test drive the vehicle using all gears in drive and reverse. Clear the DTC and retest. If the problem persists, or if any other gear ratio related DTCs are logged, renew the transmission
P2793-92	Gear Shift Direction Circuit - Performance or incorrect operation	• Gear shift direction circuit performance or incorrect operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P2793-94	Gear Shift Direction Circuit - Unexpected operation	• Gear shift direction circuit unexpected operation	• Check the transmission control module connector and the power/ground circuits to the transmission control module. Clear the DTC and retest. If the problem persists, install a new transmission control module as required
P279D-02	Four Wheel Drive (4WD) Range Signal Circuit - General signal failure	• General signal failure	• Check transfer case control module DTCs and refer to the relevant DTC index
P279D-64	Four Wheel Drive (4WD) Range Signal Circuit - Signal plausibility failure	• Signal plausibility failure	• Check transfer case control module DTCs and refer to the relevant DTC index
U0001-88	High Speed CAN Communication CAN Bus - Bus off	• CAN bus off	• Check the powertrain control module and anti-lock brake system ontrol module for other CAN bus off DTCs and refer to the relevant DTC index. Refer to the electrical

			circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test. Check fuses, examine fuse-box for water ingress, moisture or loose plugs. Refer to the electrical circuit diagrams and connect an Ohm meter between the pins for CAN high and CAN low. If the resistance is 0 Ohm with a short circuit at CAN bus, renew the transmission control module. If the resistance is infinite with open circuit at CAN bus, renew the transmission control module. A correct resistance should be approximately 40kOhm
U0100-63	Lost Communication With ECM/PCM "A" - Circuit / component protection time-out	• Circuit / component protection time-out • CAN signal error from engine control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0102-63	Lost Communication with Transfer Case Control Module - Circuit / component protection time-out	• Circuit / component protection time-out • CAN signal error from transfer case control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0103-63	Lost Communication With Gear Shift Control Module A - Circuit / component protection time-out	• Circuit / component protection time-out • LIN signal error from transmission control switch	• Refer to the electrical circuit diagrams and check module connectors / LIN harness between transmission control module and transmission control switch
U0121-63	Lost Communication With Anti-Lock Brake System (ABS) Control Module - Circuit / component protection time-out	• Circuit / component protection time-out • CAN signal error from anti-lock brake system control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0126-63	Lost Communication With Steering Angle Sensor Module - Circuit / component protection time-out	• Circuit / component protection time-out • CAN signal error from steering angle sensor module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0128-63	Lost Communication With Park Brake Control Module - Circuit / component protection time-out	• Circuit / component protection time-out • CAN signal error from electric park brake control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0138-63	Lost Communication with All Terrain Control Module - Circuit / component protection time-out	• Circuit / component protection time-out • CAN signal error from centre console	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test

		• switch pack • CAN bus fault	
U0140-63	Lost Communication With Body Control Module - Circuit / component protection time-out	• Circuit / component protection time-out • CAN signal error from central junction box • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0300-57	Internal Control Module Software Incompatibility - Invalid / incomplete software component	• Invalid / incomplete software component	• Check that the vehicle configuration is correctly set in the car configuration file using the manufacturer's approved diagnostic software. Check and update the transmission control module software version if necessary
U0401-02	Invalid Data Received from ECM/PCM A - General signal failure	• General signal failure	• Check engine control module for related DTCs. Refer to the relevant section in the workshop manual
U0401-29	Invalid Data Received from ECM/PCM A - Signal invalid	• Signal invalid • CAN signal error from engine control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0401-41	Invalid Data Received from ECM/PCM A - General checksum failure	• General checksum failure • CAN signal error from engine control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0401-64	Invalid Data Received from ECM/PCM A - Signal plausibility failure	• Signal plausibility failure	• Check for other module related DTCs. Refer to the relevant section in the workshop manual. Check the control module for correct software version using the manufacturers approved diagnostic system
U0401-82	Invalid Data Received from ECM/PCM A - Alive / sequence counter incorrect / not updated	• Alive / sequence counter incorrect / not updated • CAN signal error from engine control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0401-83	Invalid Data Received from ECM/PCM A - Value of signal protection calculation incorrect	• Value of signal protection calculation incorrect • CAN signal error from engine control module	• Check engine control module for other codes. Carry out repair actions. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits
U0404-41	Invalid Data Received from Gear Shift Control Module A - General checksum failure	• General checksum failure	• Refer to the electrical circuit diagrams and check module connectors / CAN harness between transmission control module and transmission control switch
U0404-64	Invalid Data Received from Gear Shift Control Module A - Signal plausibility failure	• Signal plausibility failure	• Refer to the electrical circuit diagrams and check module connectors / CAN harness between transmission control module and transmission control switch. Check transmission control switch for failure
U0404-82	Invalid Data Received from Gear Shift Control Module A - Alive /	• Alive / sequence counter incorrect / not	• Refer to the electrical circuit diagrams and check module connectors / CAN harness between transmission control module and transmission control switch

	sequence counter incorrect / not updated	updated	
U0404-83	Invalid Data Received from Gear Shift Control Module A - Value of signal protection calculation incorrect	• Value of signal protection calculation incorrect	• Refer to the electrical circuit diagrams and check module connectors / CAN harness between transmission control module and transmission control switch. Check transmission control switch for failure
U0415-29	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Signal invalid	• Signal invalid • CAN signal error from anti-lock brake system control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0415-41	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - General checksum failure	• General checksum failure • CAN signal error from anti-lock brake system control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0415-82	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Alive / sequence counter incorrect / not updated	• Alive / sequence counter incorrect / not updated • CAN signal error from anti-lock brake system control module • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0416-98	Invalid Data Received From Vehicle Dynamics Control Module - Component or system over temperature	• Component or system over temperature	• Check anti-lock brake system for other codes. Carry out repair actions. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits
U0422-41	Invalid Data Received From Body Control Module - General checksum failure	• General checksum failure • CAN signal error from central junction box • CAN bus fault	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0422-82	Invalid Data Received From Body Control Module - Alive / sequence counter incorrect / not updated	• Alive / sequence counter incorrect / not updated	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0422-83	Invalid Data Received From Body Control Module - Value of signal protection calculation incorrect	• Value of signal protection calculation incorrect • PowerMode CAN signal error from passenger compartment fuse box	• Check for other CAN bus codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN integrity test
U0424-08	Invalid Data Received From HVAC Control Module - Bus signal / message failures	• Bus signal / message failures	• Check integrated climate control module and switch pack for other codes. Carry out repair actions. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits

U101B-87	Lost Communication With GSM - Multiple Bus - Missing message	• Missing message	• Check for other CAN bus and LIN related DTC codes. Refer to the electrical circuit diagrams and check the module connector and power/ground circuits. Refer to network communication section of the workshop manual. Using the manufacturers approved diagnostic system, complete a CAN/LIN integrity test
U2101-56	Control Module Configuration Incompatible - Invalid / incomplete configuration	• Invalid / incomplete configuration	• Check that the vehicle configuration is correctly set in the car configuration file using the manufacturer's approved diagnostic software. Check and update the transmission control module software version if necessary
U3000-56	Control Module - Invalid / incomplete configuration	• Invalid / incomplete configuration	• Clear the DTC and retest. If the problem persists, contact Dealer Technical Support
U3001-94	Control Module Improper Shutdown - Unexpected operation	• Unexpected operation • Charging circuit short to ground, power, open circuit • Quiescent current high • Battery failure/worn out • Generator failure	• Refer to the electrical circuit diagrams and check charging circuit for short to ground, power, open circuit. Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system. If DTC remains check battery is in fully charged and serviceable condition using the Midtronics battery tester and battery care manual. If OK suspect the generator

General Information - Diagnostic Trouble Code (DTC) Index DTC: TV Control Module (TVCM)

Description and Operation

Television Control Module (TVCM) - Digital

CAUTIONS:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

When probing connectors to take measurements in the course of the pinpoint tests, use the adapter kit, part number 3548-1358-00.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Television Control Module (TVCM) - Digital. For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Information and Entertainment System (415-00, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B1A56-11	Antenna - Circuit short to ground	NOTE: Circuit reference - TV1 SIG • Antenna 1 signal circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the antenna 1 signal circuit for short circuit to ground
B1A56-12	Antenna - Circuit short to battery	NOTE: Circuit reference - TV1 SIG • Antenna 1 signal circuit short circuit to power	• Refer to the electrical circuit diagrams and check the antenna 1 signal circuit for short circuit to power
B1A56-13	Antenna - Circuit open	NOTE: Circuit reference - TV1 SIG • Antenna 1 signal circuit open circuit, high	• Refer to the electrical circuit diagrams and check the antenna 1 signal circuit for open circuit, high resistance

		resistance	
B1D55-11	Antenna #2 - Circuit short to ground	NOTE: Circuit reference - TV2 SIG • Antenna 2 signal circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the antenna 2 signal circuit for short circuit to ground
B1D55-12	Antenna #2 - Circuit short to battery	NOTE: Circuit reference - TV2 SIG • Antenna 2 signal circuit short circuit to power	• Refer to the electrical circuit diagrams and check the antenna 2 signal circuit for short circuit to power
B1D55-13	Antenna #2 - Circuit open	NOTE: Circuit reference - TV2 SIG • Antenna 2 signal circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the antenna 2 signal circuit for open circuit, high resistance
B1D56-11	Antenna #3 Circuit - Circuit short to ground	NOTE: Circuit reference - TV3 SIG • Antenna 3 signal circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the antenna 3 signal circuit for short circuit to ground
B1D56-12	Antenna #3 Circuit - Circuit short to battery	NOTE: Circuit reference - TV3 SIG • Antenna 3 signal circuit short circuit to power	• Refer to the electrical circuit diagrams and check the antenna 3 signal circuit for short circuit to power
B1D56-13	Antenna #3 Circuit - Circuit open	NOTE: Circuit reference - TV3 SIG • Antenna 3 signal circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the antenna 3 signal circuit for open circuit, high resistance
B1D57-11	Antenna #4 Circuit - Circuit short to ground	NOTE: Circuit reference - TV4 SIG • Antenna 4 signal circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the antenna 4 signal circuit for short circuit to ground
B1D57-12	Antenna #4 Circuit - Circuit short to battery	NOTE: Circuit reference - TV4 SIG • Antenna 4 signal circuit short circuit to power	• Refer to the electrical circuit diagrams and check the antenna 4 signal circuit for short circuit to power
B1D57-13	Antenna #4 Circuit - Circuit open	NOTE: Circuit reference - TV4 SIG • Antenna 4 signal circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the antenna 4 signal circuit for open circuit, high resistance
B1D58-11	Television Output - Circuit short to ground	NOTE: Circuit reference - CVBS OUT	• Refer to the electrical circuit diagrams and check the CVBS signal circuit for short circuit to ground

		• CVBS signal circuit short circuit to ground	
B1D58-12	Television Output - Circuit short to battery	NOTE: Circuit reference - CVBS OUT • CVBS signal circuit short circuit to power	• Refer to the electrical circuit diagrams and check the CVBS circuit for short circuit to power
B1D58-13	Television Output - Circuit open	NOTE: Circuit reference - CVBS OUT • CVBS signal circuit open circuit, high resistance	• Refer to the electrical circuit diagrams and check the CVBS circuit for open circuit, high resistance
U2100-00	Initial Configuration Not Complete - No sub type information	• Car configuration file mismatch with vehicle specification • Incorrect TV control module installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new TV control module as necessary
U2101-00	Control Module Configuration Incompatible - No sub type information	• Car configuration file mismatch with vehicle specification • Incorrect TV control module installed	• Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary • Install a new TV control module as necessary
U3000-46	Control Module - Calibration / parameter memory failure	• TV control module is not configured correctly	• Using the manufacturer approved diagnostic system, re-configure the TV control module with the latest level software
U3000-49	Control Module - Internal electronic failure	• TV control module failure	• Using the manufacturer approved diagnostic system check and install the latest relevant level of software to the TV control module • Clear the DTCs and retest. If fault persists, check and install new TV control module as required
U3000-98	Control Module - Component or system over temperature	• TV control module over temperature	• Check airflow to the TV control module. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new TV control module
U3003-62	Battery Voltage - Signal compare failure	• Mismatch between the voltage at the TV control module and the voltage value broadcast on the CAN bus	• Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111) - and compare it to battery voltage. Refer to the electrical circuit diagrams and check the TV control module power and ground circuits for open circuit, high resistance

General Information - Diagnostic Trouble Code (DTC) Index TDV6 3.0L Diesel , DTC: Engine Control Module (ECM)

Description and Operation

Engine Control Module (ECM) 3.0L TdV6

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Engine Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Electronic Engine Controls (303-14A, Diagnosis and Testing).

DTC	Description	Possible Cause	Action
B1087-93	LIN Bus "A" - No operation	• Generator LIN bus communication circuit failure	• Refer to the electrical circuit diagrams and check the generator LIN bus circuit, for short circuit to power, short circuit to ground, open circuit. Repair harness as required. Clear DTC and retest
B10A2-32	Crash Input - Signal low time < minimum	NOTE: - Circuit INI - • Restraints control module failure • Auxiliary junction box failure • Harness failure	• This DTC is set when the 'airbag deployed' signal supplied by the restraints control module is outside the specification expected by the engine control module • Check the restraints control module for DTCs and refer to the relevant DTC index • Check auxiliary junction box for DTCs and refer to the relevant DTC index • Refer to electrical circuit diagrams and check the supplementary restraints system input circuit for failures. This circuit is a single wire which connects the restraints control module to the auxiliary junction box and the engine control module. Check this circuit for short circuit to power, short circuit to ground, open circuit. Repair harness as required. Clear DTC and retest
B10A2-35	Crash Input - Signal high time > maximum	NOTE: - Circuit INI - • Restraints control module failure • Auxiliary junction box failure • Harness failure	• This DTC is set when the 'airbag deployed' signal supplied by the restraints control module is outside the specification expected by the engine control module • Check the restraints control module for DTCs and refer to the relevant DTC index • Check auxiliary junction box for DTCs and refer to the relevant DTC index • Refer to electrical circuit diagrams and check the supplementary restraints system input circuit for failures. This circuit is a single wire which connects the restraints control module to the auxiliary junction box and the engine control module. Check this circuit for short circuit to power, short

			circuit to ground, open circuit. Repair harness as required. Clear DTC and retest
B10A2-36	Crash Input - Signal frequency too low	 NOTE: - Circuit INI - • The engine control module detected excessive duration for one cycle of the output across a specified sample size • Restraints control module failure • Auxiliary junction box failure • Harness failure	• This DTC is set when the 'airbag deployed' signal supplied by the restraints control module is outside the specification expected by the engine control module • Check the restraints control module for DTCs and refer to the relevant DTC index • Check auxiliary junction box for DTCs and refer to the relevant DTC index • Refer to electrical circuit diagrams and check the supplementary restraints system input circuit for failures. This circuit is a single wire which connects the restraints control module to the auxiliary junction box and the engine control module. Check this circuit for short circuit to power, short circuit to ground, open circuit. Repair harness as required. Clear DTC and retest
B10A2-37	Crash Input - Signal frequency too high	 NOTE: - Circuit INI - • The engine control module detected insufficient duration for one cycle of the output across a specified sample size • Restraints control module failure • Auxiliary junction box failure • Harness failure	• This DTC is set when the 'airbag deployed' signal supplied by the restraints control module is outside the specification expected by the engine control module • Check the restraints control module for DTCs and refer to the relevant DTC index • Check auxiliary junction box for DTCs and refer to the relevant DTC index • Refer to electrical circuit diagrams and check the supplementary restraints system input circuit for failures. This circuit is a single wire which connects the restraints control module to the auxiliary junction box and the engine control module. Check this circuit for short circuit to power, short circuit to ground, open circuit. Repair harness as required. Clear DTC and retest
B11D9-00	Vehicle Battery - No sub type information	• Harness failure • Battery failure • Battery monitoring system module failure	• This DTC is set when the battery monitoring system fails a diagnostic check • Refer to the battery care manual and verify that the vehicle battery is fully charged and serviceable before continuing with further diagnostic tests • Refer to the electrical circuit diagrams and check the connections between the battery and the battery monitoring module are clean and secure • Ensure that full battery voltage is present on the monitor line pin at the battery monitoring system module connector. Ensure the battery ground connection is clean and secure • Check the LIN bus connections to the battery monitoring system module. Check LIN bus integrity. Check and install new battery monitoring system module as required
B11DB-87	Battery Monitoring Module - Missing message	• Harness failure • Battery monitoring system module failure	• This DTC is set when the engine control module has lost communication with the battery monitoring system module • Refer to the battery care manual and verify that the vehicle battery is fully charged and serviceable before continuing with further diagnostic tests • Refer to the electrical circuit diagrams and check the connections between the battery and the battery monitoring module are clean and secure • Ensure that full battery voltage is present on the monitor line pin at the battery monitoring system module connector. Ensure the battery ground connection is clean and secure • Check the LIN bus connections to the battery monitoring system module. Check LIN bus integrity. Check and install new battery monitoring system module as

			required
B1206-68	Crash Occurred - Event information	• Event information - The engine control module has received a crash signal from the restraints control module	• This DTC is set if the restraints control module has deployed the restraints systems following activation of the crash sensors. Check the restraints control module for DTCs and refer to the relevant DTC index
P0030-11	HO2S Heater Control Circuit (Bank 1, Sensor 1) - Circuit short to ground	NOTE: - Circuit LPPH_A - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Heated oxygen sensor heater control circuit short circuit to ground • Heated oxygen sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 1 (0x03A1). Refer to the electrical circuit diagrams and check the heated oxygen sensor heater control (heater ground) circuit for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0030-12	HO2S Heater Control Circuit (Bank 1, Sensor 1) - Circuit short to battery	NOTE: - Circuit LPPH_A - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Harness failure - Heated oxygen sensor heater control circuit short circuit to power • Heated oxygen sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 1 (0x03A1). Refer to the electrical circuit diagrams and check the heated oxygen sensor heater control (heater ground) circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0030-13	HO2S Heater Control Circuit (Bank 1, Sensor 1) - Circuit open	NOTE: - Circuit LPPH_A - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Heated oxygen sensor heater control circuit open circuit • Heated oxygen sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 1 (0x03A1). Refer to the electrical circuit diagrams and check the heated oxygen sensor heater control (heater ground) circuit for open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0030-4B	HO2S Heater Control Circuit (Bank 1, Sensor 1) - Over temperature	• Harness failure - Heated oxygen sensor heater control circuit short circuit to power • Heated oxygen sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 1 (0x03A1). Refer to the electrical circuit diagrams and check the heated oxygen sensor heater control (heater ground) circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required

P0033-00	Turbocharger/Supercharger Bypass Valve Control Circuit / Open - No sub type information	 NOTE: - Circuit CRV - • Harness failure - Boost air recirculation solenoid control circuit open circuit • Boost air recirculation solenoid failure	• Refer to the electrical circuit diagrams and check the boost air recirculation solenoid control circuit between the engine control module and the control valve for open circuit. Check the power supply to the control valve. Repair harness as required. Clear DTC and retest • Check and install new boost air recirculation solenoid as required
P0034-00	Turbocharger/Supercharger Bypass Valve Control Circuit Low - No sub type information	 NOTE: - Circuit CRV - • Harness failure - Boost air recirculation solenoid circuit short circuit to ground • Boost air recirculation solenoid failure	• Refer to the electrical circuit diagrams and check the boost air recirculation solenoid circuit between the engine control module and the control valve for a short circuit to ground. Check the power supply to the control valve. Repair harness as required. Clear DTC and retest • Check and install new boost air recirculation solenoid as required
P0035-00	Turbocharger/Supercharger Bypass Valve Control Circuit High - No sub type information	 NOTE: - Circuit CRV - • Harness failure - Boost air recirculation solenoid circuit short circuit to power • Boost air recirculation solenoid failure	• Refer to the electrical circuit diagrams and check the boost air recirculation solenoid circuit between the engine control module and the control valve for a short circuit to power. Check the power supply to the control valve. Repair harness as required. Clear DTC and retest • Check and install new boost air recirculation solenoid as required
P0039-4B	Turbocharger/Supercharger Bypass Valve Control Circuit Range/Performance - Over temperature	• Harness failure - Boost air recirculation solenoid circuit short to ground, short circuit to power, high resistance • Boost air recirculation solenoid failure	• Refer to the electrical circuit diagrams and check the boost air recirculation solenoid circuit between the engine control module and the control valve for a short circuit to ground, short circuit to power, high resistance. Check the power supply to the control valve. Repair harness as required. Clear DTC and retest • Check and install new boost air recirculation solenoid as required
P004A-00	Turbocharger/Supercharger Boost Control B Circuit / Open - No sub type information	 NOTE: - Circuit VGT_POS - VGT_NEG - • Harness failure - Variable geometry turbine vane actuator control circuit open circuit • Variable geometry turbine vane actuator control unit failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533), Boost Pressure Actuator Bank 2 - Controller output (0x03DE). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for open circuit. Check both of the circuits for open circuit. Repair harness as required. Clear DTC and retest • Check and install new variable geometry turbine vane actuator control unit as required
P004A-71	Turbocharger/Supercharger Boost Control B Circuit / Open - Actuator stuck	 NOTE: - Circuit VGT_POS - VGT_NEG - • Harness failure - Variable geometry turbine vane actuator control circuit open circuit • Variable geometry turbine vane actuator control unit failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533), Boost Pressure Actuator Bank 2 - Controller output (0x03DE). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for open circuit. Check both of the circuits for open circuit. Repair harness as required. Clear DTC and retest • Check and install new variable geometry turbine vane actuator control unit as required
P004B-16	Turbocharger/Supercharger Boost Control B Circuit Range/Performance - Circuit voltage below threshold	 NOTE: - Circuit VGT_POS - VGT_NEG - • The engine control module measured a voltage below a specified range but not necessarily a short	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for high resistance or short circuit to another circuit. Check both of the circuits for failures. Repair harness as

		circuit to ground • Harness failure - Variable geometry turbine vane actuator control circuit • Variable geometry turbine vane actuator control unit failure	required. Clear DTC and retest • Check and install new variable geometry turbine vane actuator control unit as required
P004B-19	Turbocharger/Supercharger Boost Control B Circuit Range/Performance - Circuit current above threshold	NOTE: - Circuit VGT_POS - VGT_NEG - • Harness failure - Variable geometry turbine vane actuator control circuit short circuit to ground, short circuit to power, high resistance • Variable geometry turbine vane actuator control unit failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for short circuit to ground, short circuit to power, high resistance. Check both of the circuits for failures. Repair harness as required. Clear DTC and retest • Check and install new variable geometry turbine vane actuator control unit as required
P004B-1D	Turbocharger/Supercharger Boost Control B Circuit Range/Performance - Circuit current out of range	NOTE: - Circuit VGT_POS - VGT_NEG - • Harness failure - Variable geometry turbine vane actuator control circuit • Mechanical failure on actuator mechanism • Variable geometry turbine vane actuator control unit failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for short circuit to another circuit. Check both of the circuits for failures. Repair harness as required. Clear DTC and retest • Check for mechanical failure on actuator mechanism • Check and install new variable geometry turbine vane actuator control unit as required
P004B-4B	Turbocharger/Supercharger Boost Control B Circuit Range/Performance - Over temperature	• Harness failure - Variable geometry turbine vane actuator control circuit short circuit to ground, short circuit to power, high resistance. • Mechanical failure on actuator mechanism • Variable geometry turbine vane actuator control unit failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for short circuit to ground, short circuit to power, high resistance. Check both of the circuits for failures. Repair harness as required. Clear DTC and retest • Check for mechanical failure on actuator mechanism • Check and install new variable geometry turbine vane actuator control unit as required
P004C-00	Turbocharger/Supercharger Boost Control B Circuit Low - No sub type information	NOTE: - Circuit VGT_POS - VGT_NEG - • Harness failure - Variable geometry turbine vane actuator control circuit short circuit to ground	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for short circuit to ground. Check both of the circuits for failures. Repair harness as required. Clear DTC and retest
P004C-11	Turbocharger/Supercharger Boost Control B Circuit Low - Circuit short to ground	NOTE: - Circuit VGT_POS - VGT_NEG - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for short circuit to ground. Check both of the circuits for failures. Repair harness as required. Clear DTC and retest

		expected • Harness failure - Variable geometry turbine vane actuator control circuit short circuit to ground	
P004C-12	Turbocharger/Supercharger Boost Control B Circuit Low circuit - Short to battery	 NOTE: - Circuit VGT_POS - VGT_NEG - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Harness failure - Variable geometry turbine vane actuator control circuit short circuit to power	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for short circuit to power. Check both circuits for failures. Repair harness as required. Clear DTC and retest
P004C-77	Turbocharger/Supercharger Boost Control B Circuit Low - Commanded position not reachable	• Harness failure - Variable geometry turbine vane actuator control circuit short circuit to ground, high resistance, open circuit • Harness failure - Variable geometry turbocharger sensor circuit, short circuit to ground, high resistance, open circuit • Mechanical failure on actuator mechanism • Variable geometry turbine vane actuator control unit failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the variable geometry turbocharger sensor circuit for short circuit to ground, high resistance, open circuit • Check for mechanical failure on actuator mechanism • Check and install new variable geometry turbine vane actuator control unit as required
P004D-00	Turbocharger/Supercharger Boost Control B Circuit High - No sub type information	 NOTE: - Circuit VGT_POS - VGT_NEG - • Harness failure - Variable geometry turbine vane actuator control circuit short circuit to power	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the boost control circuit for short circuit to power. Check both circuits for failures. Repair harness as required. Clear DTC and retest
P004D-77	Turbocharger/Supercharger Boost Control B Circuit High - Commanded Position Not Reachable	• Harness failure - Variable geometry turbine vane actuator control circuit short circuit to power • Harness failure - Variable geometry turbocharger sensor circuit, short circuit to power • Mechanical failure on actuator mechanism • Variable geometry turbine vane actuator control unit failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Boost Actuator Control Bank 2 (0x0533). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator control circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the variable geometry turbocharger sensor circuit for short circuit to power • Check for mechanical failure on actuator mechanism • Check and install new variable geometry turbine vane actuator control unit as required
P006A-00	MAP - Mass or Volume Air Flow Correlation - No sub type information	• Intake air system, high pressure boost leak bank 1 • Intake air system, high pressure boost	• If this DTC is logged with P1247-00, P0402-00 & P00BF-07, suspect intake air system, high pressure boost leak bank 1 • If this DTC is logged with P1247-00, suspect intake air system, high pressure

		leak bi-turbo mode bank 2 • Intake air system, low pressure boost leak bank 1 • Intake air system, low pressure boost leak bank 2	boost leak bi-turbo mode bank 2 • If this DTC is logged with P00BE-07 & P0401-00, suspect intake air system, low pressure boost leak bank 1 • If this DTC is logged with P00BC-00, suspect intake air system, low pressure boost leak bank 2 • Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine
P006A-22	MAP - Mass or Volume Air Flow Correlation - Signal amplitude > maximum	• The engine control module measured a signal voltage above a specified range but not necessarily a short circuit to power, gain too high • Error path indicating whether over boost monitoring is active or not • Failure in induction air circuit • Failure in boost air circuit • Mass air flow sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Manifold absolute pressure sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Mass air flow sensor failure • Manifold absolute pressure sensor failure	• Check for other DTCs associated with intake and boost air flow control actuators, refer to the relevant DTC index and act on those DTCs first • Refer to workshop manual and check intake air circuit, boost air circuit and associated control valves, intercooler and air filter for leaks, blockages, restrictions and control valve actuator malfunctions • Refer to the electrical circuit diagrams and check both mass air flow sensor circuits for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check manifold absolute pressure sensor wiring circuits for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor or manifold absolute pressure sensor as required
P0070-16	Ambient Air Temperature Sensor Circuit - Circuit voltage below threshold	NOTE: - Circuit AAT - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Ambient air temperature sensor circuit • Ambient air temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Ambient Air Temperature Sensor Voltage (0x03BA), Ambient Air Temperature (0xF466). This DTC is set when the ambient air temperature sensor signal line voltage at the engine control module is less than the threshold value. Refer to the electrical circuit diagrams and check both sides of the circuit for high resistance or short circuits. Repair harness as required. Clear DTC and retest • Check and install new ambient air temperature sensor as required
P0070-17	Ambient Air Temperature Sensor Circuit - Circuit voltage above threshold	NOTE: - Circuit AAT - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Ambient air temperature sensor circuit • Ambient air temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Ambient Air Temperature Sensor Voltage (0x03BA), Ambient Air Temperature (0xF466). This DTC is set when the ambient air temperature sensor signal line voltage at the engine control module is greater than the threshold value. Refer to the electrical circuit diagrams and check both sides of the circuit for high resistance or short circuits. Repair harness as required. Clear DTC and retest • Check and install new ambient air temperature sensor as required
P007A-16	Charge Air Cooler Temperature Sensor	NOTE: - Circuit ACT -	• Using the manufacturer approved diagnostic system check datalogger

	Circuit (Bank 1) - Circuit voltage below threshold	• The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Air charge temperature sensor circuit • Air charge temperature sensor failure	signals, Charge Air Temperature Voltage (0x03EE). This DTC is set when the air charge temperature sensor signal line voltage at the engine control module is less than the threshold value. Refer to the electrical circuit diagrams and check both sides of the circuit for high resistance or short circuits. Repair harness as required. Clear DTC and retest • Check and install new charge air temperature sensor as required
P007A-17	Charge Air Cooler Temperature Sensor Circuit (Bank 1) - Circuit voltage above threshold	 NOTE: - Circuit ACT - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Air charge temperature sensor circuit • Air charge temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Air Charge Temperature (0x051C). This DTC is set when the air charge temperature sensor signal line voltage at the engine control module is greater than the threshold value. Refer to the electrical circuit diagrams and check both sides of the circuit for high resistance or short circuits. Repair harness as required. Clear DTC and retest • Check and install new charge air temperature sensor as required
P007A-62	Charge Air Cooler Temperature Sensor Circuit (Bank 1) - Signal compare failure	• Harness failure - Air charge temperature sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Air charge temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Charge Air Temperature Voltage (0x03EE). Refer to the electrical circuit diagrams and check air charge temperature sensor circuit for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new charge air temperature sensor as required
P0087-00	Fuel Rail/System Pressure - Too Low - No sub type information	• Low level fuel condition • Fuel gauge sender unit sticking • Fuel lines restricted • Fuel lines leaking • Fuel pump failure • Fuel rail pressure sensor signal circuit short circuit to ground, short circuit to power, open circuit, high resistance • Fuel rail pressure sensor failure	• Check the fuel volume available in the fuel tank is sufficient, add fuel as required. Clear DTC and retest • Check the fuel gauge sender units for correct operation • Check fuel lines for restriction • Check fuel lines for leakage • Check for fuel pump related DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Repair harness as required • Check and install new fuel rail pressure sensor as required
P0087-16	Fuel Rail/System Pressure - Too Low - Circuit voltage below threshold	• The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Fuel rail pressure sensor circuit, short circuit to ground, open circuit, high resistance • Fuel rail pressure sensor failure	• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to ground, open circuit, high resistance. Repair harness as required. Clear DTC and retest • Check and install new fuel rail pressure sensor as required
P0087-21	Fuel Rail/System Pressure - Too Low - Signal amplitude < minimum	• The engine control module measured a signal voltage below a specified range but not necessarily a short circuit to ground, gain low	• Check fuel lines for restriction • Check fuel lines for leakage • Check fuel injector's for stuck open, leakage • Check for fuel pump related DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and

		Fuel lines restricted • Fuel lines leaking • Fuel injector's stuck open, leaking • Fuel pump failure • Fuel rail pressure sensor circuit short circuit to ground, open circuit, high resistance • Fuel pressure control valve circuit short circuit to ground, open circuit, high resistance • Fuel volume control valve circuit short circuit to ground, open circuit, high resistance • Fuel rail pressure sensor failure • Fuel pressure control valve failure • Fuel volume control valve failure	check fuel rail pressure sensor circuit for short circuit to ground, open circuit, high resistance. Repair harness as required • Refer to the electrical circuit diagrams and check fuel pressure control valve circuit for short circuit to ground, open circuit, high resistance. Repair harness as required • Refer to the electrical circuit diagrams and check fuel volume control valve circuit for short circuit to ground, open circuit, high resistance. Repair harness as required • Check and install new fuel rail pressure sensor as required • Check and install new fuel pressure control valve as required • Check and install new fuel volume control valve as required
P0088-00	Fuel Rail/System Pressure - Too High - No sub type information	• Fuel gauge sender unit sticking • Fuel rail pressure sensor signal circuit short circuit to power • Fuel rail pressure sensor ground circuit open circuit, high resistance • Fuel pressure control valve circuit short circuit to power, ground, open circuit, high resistance • Fuel volume control valve circuit short circuit to power, ground, open circuit, high resistance • Fuel rail pressure sensor failure • Fuel pressure control valve failure • Fuel volume control valve failure	• Check the fuel gauge sender units for correct operation • Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to power. Repair harness as required • Refer to the electrical circuit diagrams and check fuel rail pressure sensor ground circuit for open circuit, high resistance. Repair harness as required • Refer to the electrical circuit diagrams and check fuel pressure control valve circuit for short circuit to power, ground, open circuit, high resistance. Repair harness as required • Refer to the electrical circuit diagrams and check fuel volume control valve circuit for short circuit to power, ground, open circuit, high resistance. Repair harness as required • Check and install new fuel rail pressure sensor as required • Check and install new fuel pressure control valve as required • Check and install new fuel volume control valve as required
P0088-17	Fuel Rail/System Pressure - Too High - Circuit voltage above threshold	• The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Fuel rail pressure sensor signal circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to power
P0088-22	Fuel Rail/System Pressure - Too High - Signal amplitude > maximum	• The engine control module measured a signal voltage above a specified range but not necessarily a short circuit to power, gain too high • Fuel gauge sender unit sticking • Fuel lines restricted • Fuel rail pressure sensor circuit short circuit to power, ground, open circuit, high resistance • Fuel pressure control	• Check the fuel gauge sender units for correct operation • Check fuel lines for restriction • Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to power, ground, open circuit, high resistance. Repair harness as required • Refer to the electrical circuit diagrams and check fuel pressure control valve circuit for short circuit to power, ground, open circuit, high resistance. Repair harness as required • Refer to the electrical circuit diagrams and check fuel volume control valve circuit for short circuit to power, ground, open

		valve circuit short circuit to power, ground, open circuit, high resistance • Fuel volume control valve circuit short circuit to power, ground, open circuit, high resistance • Fuel rail pressure sensor failure • Fuel pressure control valve failure • Fuel volume control valve failure • Fuel pump failure	circuit, high resistance. Repair harness as required • Check and install new fuel rail pressure sensor as required • Check and install new fuel pressure control valve as required • Check and install new fuel volume control valve as required • Check for fuel pump related DTCs and refer to the relevant DTC index
P0089-21	Fuel Pressure Regulator Performance - Signal amplitude < minimum	• The engine control module measured a signal voltage below a specified range but not necessarily a short circuit to ground, gain low • Fuel pressure regulator signal circuit short circuit to ground, open circuit • Fuel pressure regulator reference voltage circuit high resistance • Fuel pressure regulator failure	• Refer to the electrical circuit diagrams and check fuel pressure regulator circuit for short circuit to ground, open circuit. Repair harness as required • Refer to the electrical circuit diagrams and check fuel pressure regulator reference voltage circuit for high resistance. Repair harness as required • Check and install new fuel pressure regulator as required
P0089-22	Fuel Pressure Regulator Performance - Signal amplitude > maximum	• The engine control module measured a signal voltage above a specified range but not necessarily a short circuit to power, gain too high • Fuel pressure regulator signal circuit short circuit to power • Fuel pressure regulator failure	• Refer to the electrical circuit diagrams and check fuel pressure regulator circuit for short circuit to power. Repair harness as required • Check and install new fuel pressure regulator as required
P0090-13	Fuel Pressure Regulator 1 Control Circuit/Open - Circuit open	NOTE: - Circuit PCV - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Fuel pressure control valve control circuit open circuit	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Pressure Relief Control Valve Duty Cycle (0x03C3). Refer to the electrical circuit diagrams and check the fuel pressure control valve control circuit for open circuit. Repair harness as required. Clear DTC and retest
P0090-4B	Fuel Pressure Regulator 1 Control Circuit/Open - Over temperature	• Fuel pressure control valve signal circuit short circuit to power, open circuit • Fuel pressure regulator failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Pressure Relief Control Valve Duty Cycle (0x03C3). Refer to the electrical circuit diagrams and check fuel pressure control valve circuit for short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check and install new fuel pressure regulator as required
P0091-11	Fuel Pressure Regulator 1 Control Circuit Low - Circuit short to ground	NOTE: - Circuit PCV - • The engine control module has detected a	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Pressure Relief Control Valve Duty Cycle (0x03C3). Refer to the electrical circuit diagrams and check the

		ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Fuel pressure control valve circuit short circuit to ground • Fuel pressure control valve failure	fuel pressure control valve circuit for short circuit to ground. Check power supply circuit to control valve. Repair harness as required. Clear DTC and retest • Check and install new fuel pressure control valve as required
P0091-16	Fuel Pressure Regulator 1 Control Circuit Low - Circuit voltage below threshold	 NOTE: - Circuit PCV - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Fuel pressure control valve circuit • Fuel pressure control valve failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Pressure Relief Control Valve Duty Cycle (0x03C3). This DTC is set when the voltage on the fuel pressure control valve circuit is less than the threshold expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel pressure control valve circuit for high resistance, short circuit to ground. Check power supply circuit to the fuel pressure control valve. Repair harness as required. Clear DTC and retest • Check and install new fuel pressure control valve as required
P0092-12	Fuel Pressure Regulator 1 Control Circuit High - Circuit short to battery	 NOTE: - Circuit PCV - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Harness failure - Fuel pressure control valve circuit short circuit to power	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Pressure Relief Control Valve Duty Cycle (0x03C3). Refer to the electrical circuit diagrams and check the fuel pressure control valve circuit for short circuit to power. Check power supply circuit to control valve. Repair harness as required. Clear DTC and retest
P0092-17	Fuel Pressure Regulator 1 Control Circuit High - Circuit voltage above threshold	 NOTE: - Circuit PCV - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Fuel pressure control valve circuit • Fuel pressure control valve failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Pressure Relief Control Valve Duty Cycle (0x03C3). This DTC is set when the voltage on the fuel pressure control valve circuit is more than the threshold expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel pressure control valve circuit for high resistance, short circuit to power. Check power supply circuit to the fuel pressure control valve. Repair harness as required. Clear DTC and retest • Check and install new fuel pressure control valve as required
P00AA-16	Intake Air Temperature Sensor 1 Circuit (Bank 2) - Circuit voltage below threshold	 NOTE: - Circuit IAT - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Intake air temperature sensor circuit • Intake air temperature sensor failure (part of	• Using the manufacturer approved diagnostic system check datalogger signals, Intake Air Temperature Sensor (0x1279), Intake Air Temperature (0xF40F). This DTC is set when the voltage on the intake air temperature sensor circuit is less than the threshold expected by the engine control module. The intake air temperature sensor is integrated into the electronics package of the mass air flow sensor and shares the same ground circuit as the mass air flow element of the sensor. Refer to the electrical circuit diagrams and check all

		mass air flow sensor)	the circuits connected to the mass air flow sensor for short circuit to ground, short circuit to power, open circuit, high resistance. Check mass air flow sensor 2 circuits as both sensors share the ground connection. Repair harness as required. Clear DTC and retest • Check and install new intake air temperature sensor as required
P00AA-17	Intake Air Temperature Sensor 1 Circuit (Bank 2) - Circuit voltage above threshold	NOTE: - Circuit IAT - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Intake air temperature sensor circuit • Intake air temperature sensor failure (part of mass air flow sensor)	• Using the manufacturer approved diagnostic system check datalogger signals, Intake Air Temperature Sensor (0x1279), Intake Air Temperature (0xF40F). This DTC is set when the voltage on the intake air temperature sensor circuit is more than the threshold expected by the engine control module. The intake air temperature sensor is integrated into the electronics package of the mass air flow sensor and shares the same ground circuit as the mass air flow element of the sensor. Refer to the electrical circuit diagrams and check all the circuits connected to the mass air flow sensor for short circuit to ground, short circuit to power, open circuit, high resistance. Check mass air flow sensor 2 circuits as both sensors share the ground connection. Repair harness as required. Clear DTC and retest • Check and install new intake air temperature sensor as required
P00AA-62	Intake Air Temperature Sensor 1 Circuit (Bank 2) - Signal compare failure	• Harness failure - Intake air temperature sensor circuit • Intake air temperature sensor failure (part of mass air flow sensor)	• Refer to the electrical circuit diagrams and check all the circuits connected to the mass air flow sensor for short circuit to ground, short circuit to power, open circuit, high resistance. Check mass air flow sensor 2 circuits as both sensors share the ground connection. Repair harness as required. Clear DTC and retest • Check and install new intake air temperature sensor as required
P00BC-00	Mass or Volume Air Flow A Circuit Range/Performance - Air Flow Too Low - No sub type information	• Boost air solenoid stuck shut bi-turbo mode • Turbine intake solenoid stuck shut • Intake system low pressure boost leak bank 2	• If this DTC is logged with P1247-00, suspect boost air solenoid stuck shut bi-turbo mode • If this DTC is logged with P22D3-77 & P22CF-71, suspect turbine intake solenoid stuck shut • If this DTC is logged with P006A-00, suspect intake system low pressure boost leak bank 2
P00BC-07	Mass or Volume Air Flow A Circuit Range/Performance - Air Flow Too Low - Mechanical failures	• Air flow disruption at sensing element of mass air flow sensor • Mass air flow sensor failure	• This DTC is set if the mass air flow signal from sensor 1 is less than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element. Clear DTC and retest • Check and install new mass air flow sensor as required
P00BC-64	Mass or Volume Air Flow A Circuit Range/Performance - Air Flow Too Low - Signal Plausibility Failure	• Boost air solenoid stuck shut bi-turbo mode • Turbine intake solenoid stuck shut • Intake system low pressure boost leak bank 2	• If this DTC is logged with P1247-00, suspect boost air solenoid stuck shut bi-turbo mode • If this DTC is logged with P22D3-77 & P22CF-71, suspect turbine intake solenoid stuck shut • If this DTC is logged with P006A-00, suspect intake system low pressure boost leak bank 2 • Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter

			and examine the induction pipes for debris which could disrupt air flow at the sensing element. Clear DTC and retest
P00BD-00	Mass or Volume Air Flow A Circuit Range/Performance - Air Flow Too High - No sub type information	• Air leak at air intake system A • Harness failure - Mass air flow sensor circuit short circuit to power • Mass air flow sensor failure	• Refer to the relevant sections of the workshop manual and check the induction system for air leaks • Refer to the electrical circuit diagrams and check mass air flow sensor for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor as required
P00BD-07	Mass or Volume Air Flow A Circuit Range/Performance - Air Flow Too High - Mechanical failures	• Boost air solenoid stuck open mono turbo mode • Turbine intake solenoid leakage when closed • Turbine intake solenoid stuck open • Intake air system, blocked low pressure air intake. This failure mode can be caused by snow packing in the intake system. Symptoms often disappear after the vehicle has been warmed and heat soaked. Similar symptoms to seized primary turbo • Primary turbo charger seized	• If this DTC is logged with P0235-94 suspect, boost air solenoid stuck open mono turbo mode • If this DTC is logged with P0235-94 suspect, turbine intake solenoid leakage when closed • If this DTC is logged with P0235-94, P22D2-77, P1247-00 & P22CF-71 suspect, turbine intake solenoid stuck open • If this DTC is logged with P0235-94, P22D2-77, P1247-00 & P22CF-71 suspect, intake air system, blocked low pressure air intake • If this DTC is logged with P00BE-07 & P1247-00 suspect, primary turbocharger seized • Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine
P00BD-64	Mass or Volume Air Flow A Circuit Range/Performance - Air Flow Too High - Signal Plausibility Failure	• Boost air solenoid stuck open mono turbo mode • Turbine intake solenoid leakage when closed • Turbine intake solenoid stuck open mono turbo mode • Intake system high pressure bank 2 in mono turbo mode	• If this DTC is logged with P0235-94 suspect, boost air solenoid stuck open mono turbo mode • If this DTC is logged with P0235-94 suspect, turbine intake solenoid leakage when closed • If this DTC is logged with P0235-94, P22D2-77, P1247-00 & P22CF-71 suspect, turbine intake solenoid stuck open • Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine
P00BE-00	Mass or Volume Air Flow B Circuit Range/Performance - Air Flow Too Low - No sub type information	• Boost air recirculation solenoid stuck open bi-turbo mode • Air flow disruption at sensing element of mass air flow sensor 2 • Harness failure - Mass air flow sensor circuit short circuit to ground, high resistance, open circuit • Mass air flow sensor 2 failure	• If this DTC is logged with P1247-00, suspect boost air recirculation solenoid stuck open. Refer to the relevant sections of the workshop manual and check the boost air recirculation solenoid circuit for short circuit to power, short circuit to ground, open circuit. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Check and install new boost air recirculation solenoid as required • Refer to the electrical circuit diagrams and check mass air flow sensor 2 for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor 2 as required
P00BE-07	Mass or Volume Air Flow B Circuit Range/Performance - Air Flow Too Low - Mechanical failures	• Air flow disruption at sensing element of mass air flow • Mass air flow failure	• This DTC is set if the mass air flow signal from sensor 2 is less than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter

			and examine the induction pipes for debris which could disrupt air flow at the sensing element. Clear DTC and retest • Check and install new mass air flow as required
P00BF-00	Mass or Volume Air Flow B Circuit Range/Performance - Air Flow Too High - No sub type information	• Air leak at air intake system B • Harness failure - Mass air flow sensor circuit short circuit to power • Mass air flow sensor 2 failure	• If this DTC is logged with P00BE-00, suspect boost air recirculation solenoid stuck open. Refer to the relevant sections of the workshop manual and check the boost air recirculation solenoid circuit for short circuit to power, short circuit to ground, open circuit. Refer to the relevant sections of the workshop manual and check the induction system for air leaks • Check and install new boost air recirculation solenoid as required. • Refer to the electrical circuit diagrams and check mass air flow sensor 2 for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor 2 as required
P00BF-07	Mass or Volume Air Flow B Circuit Range/Performance - Air Flow Too High - Mechanical failures	• Intake air system, high pressure boost leak	• If this DTC is logged with P1247-00, P006A-00 & P00BF-07, suspect intake air system, high pressure boost leak
P00CF-62	Secondary Compressor Outlet Pressure Sensor - Signal compare failure	• Boost air circuit leak or blockage • Boost air recirculation solenoid failure • Boost air solenoid failure • Mechanical failure - Sensor hose blocked or leaking • Harness failure - Boost air pressure sensor circuit • Boost air pressure sensor failure	• This DTC is set when the engine control module detects a signal compare failure on the boost air pressure sensor signal. Check the sensor hose for blockages or leaks. Check the sensor and harness for mechanical damage caused by heat or chaffing • Refer to the electrical circuit diagrams and check the secondary compressor outlet pressure sensor power and ground supplies for short circuit to ground, open circuit. Check the signal line for short circuit to ground, short circuit to power, open circuit. Repair harness as required • Check and install new secondary compressor outlet pressure sensor as required
P0101-21	Mass or Volume Air Flow A Circuit Range/Performance - Signal amplitude < minimum	• The engine control module measured a signal voltage below a specified range but not necessarily a short circuit to ground, gain low • Air flow disruption at sensing element of mass air flow sensor • Harness failure - Mass air flow sensor circuit short circuit to ground, high resistance, open circuit • Mass air flow sensor failure	• This DTC is set if the mass air flow signal from sensor 1 is less than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor as required
P0101-22	Mass or Volume Air Flow A Circuit Range/Performance - Signal amplitude > maximum	• The engine control module measured a signal voltage above a specified range but not necessarily a short circuit to power, gain too high • Air flow disruption at sensing element of mass air flow sensor • Harness failure - Mass air flow sensor circuit short circuit to power • Mass air flow sensor failure	• This DTC is set if the mass air flow signal from sensor 1 is more than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new mass air flow

			sensor as required
P0101-92	Mass or Volume Air Flow Sensor "A" Circuit Range/Performance - Performance or incorrect operation	• Air flow disruption at sensing element of mass air flow sensor • Harness failure - Mass air flow sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Mass air flow sensor failure	• This DTC is set if the mass air flow signal from sensor 1 is less than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor as required
P0102-00	Mass or Volume Air Flow A Circuit Low - No sub type information	 NOTE: - Circuit MAF_B - • Air flow disruption at sensing element of mass air flow sensor • Harness failure - Mass air flow sensor circuits • Mass air flow sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Air Flow Rate From mass air flow Sensor Bank 1 (0x0504). This DTC is set if the mass air flow signal from sensor 1 is less than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Refer to the electrical circuit diagrams and check the mass air flow sensor power and ground circuits for high resistance, short circuit to power, short circuit to ground. Check the mass air flow signal line for high resistance. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor as required
P0103-00	Mass or Volume Air Flow A Circuit High - No sub type information	 NOTE: - Circuit MAF_B - • Air flow disruption at sensing element of mass air flow sensor • Harness failure - Mass air flow sensor circuits • Mass air flow sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Air Flow Rate From Mass Air Flow Sensor Bank 1 (0x0504). This DTC is set if the mass air flow signal from sensor 1 is greater than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element. • Refer to the electrical circuit diagrams and check the mass air flow sensor power and ground circuits for high resistance, short circuit to power, short circuit to ground. Check the mass air flow signal line for high resistance. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor as required
P0105-16	Manifold Absolute Pressure/BARO circuit - Circuit voltage below threshold	 NOTE: - Circuit MAP_A - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Manifold absolute pressure sensor circuits	• Refer to the electrical circuit diagrams and check the 5 volt supply circuit for open circuit, high resistance, short circuit to ground. Check the sensor ground for open circuit, short circuit to power. Check the signal circuit for short circuit to ground, high resistance. Repair harness as required. Clear DTC and retest • Check and install new manifold absolute pressure sensor as required • Using the manufacturer approved diagnostic system check datalogger signals, Corrected Intake Manifold

		Manifold absolute pressure sensor failure • Blockage or leak between the intake manifold and the manifold absolute pressure sensor	Absolute Pressure (0x0322), Manifold Absolute Pressure Sensor Voltage (0x0301), Manifold Absolute Pressure Bank 1 (0x052C). This DTC is set when the voltage on the manifold absolute pressure sensor signal circuit is less than the threshold expected by the engine control module. Refer to the workshop manual and check the manifold absolute pressure sensor is correctly connected to the air intake manifold and there are no blockages or air leaks preventing communication of pressure changes between the manifold and the sensor
P0105-17	Manifold Absolute Pressure/BARO circuit - Circuit voltage above threshold	 NOTE: - Circuit MAP_A - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Manifold absolute pressure sensor circuits • Manifold absolute pressure sensor failure • Blockage or leak between the intake manifold and the manifold pressure sensor	• Refer to the electrical circuit diagrams and check the 5 volt supply circuit for short circuit to power. Check the sensor ground for open circuit, short circuit to power. Check the signal circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new manifold absolute pressure sensor as required • Using the manufacturer approved diagnostic system check datalogger signals, Corrected Intake Manifold Absolute Pressure (0x0504), Manifold Absolute Pressure Sensor Voltage (0x0301), Manifold Absolute Pressure Bank 1 (0x052C). This DTC is set when the voltage on the manifold absolute pressure sensor signal circuit is greater than the threshold expected by the engine control module. Refer to the workshop manual and check the manifold absolute pressure sensor is correctly connected to the air intake manifold and there are no blockages or air leaks preventing communication of pressure changes between the manifold and the sensor
P0105-65	Manifold Absolute Pressure/Barometric Pressure Sensor Circuit - Signal has too few transitions / events	 NOTE: - Circuit MAP_A - • Harness failure - Manifold absolute pressure sensor circuits • Manifold absolute pressure sensor failure • Blockage or leak between the intake manifold and the manifold pressure sensor	• Refer to the electrical circuit diagrams and check the 5 volt supply circuit for short circuit to power. Check the sensor ground for open circuit, short circuit to power. Check the signal circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new manifold absolute pressure sensor as required • Using the manufacturer approved diagnostic system check datalogger signals, Corrected Intake Manifold Absolute Pressure (0x0504), Manifold Absolute Pressure Sensor Voltage (0x0301), Manifold Absolute Pressure Bank 1 (0x052C). Refer to the workshop manual and check the manifold absolute pressure sensor is correctly connected to the air intake manifold and there are no blockages or air leaks preventing communication of pressure changes between the manifold and the sensor
P0107-00	Manifold Absolute Pressure/Barometric Pressure Sensor Circuit Low - No sub type information	 NOTE: - Circuit MAP_A - • Harness failure - Manifold absolute pressure sensor circuits • Manifold absolute pressure sensor failure • Blockage or leak between the intake manifold and the manifold pressure sensor	• Refer to the electrical circuit diagrams and check the 5 volt supply circuit for short circuit to power. Check the sensor ground for open circuit, short circuit to power. Check the signal circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new manifold absolute pressure sensor as required • Using the manufacturer approved diagnostic system check datalogger signals, Corrected Intake Manifold Absolute Pressure (0x0504), Manifold Absolute Pressure Sensor Voltage (0x0301), Manifold Absolute Pressure

			Bank 1 (0x052C). Refer to the workshop manual and check the manifold absolute pressure sensor is correctly connected to the air intake manifold and there are no blockages or air leaks preventing communication of pressure changes between the manifold and the sensor
P0107-16	Manifold Absolute Pressure/Barometric Pressure Sensor Circuit Low - Circuit voltage below threshold	 NOTE: - Circuit MAP_A - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Manifold absolute pressure sensor circuits • Manifold absolute pressure sensor failure • Blockage or leak between the intake manifold and the manifold pressure sensor	• Refer to the electrical circuit diagrams and check the 5 volt supply circuit for open circuit, short circuit to power, short circuit to ground. Check the sensor ground for open circuit, short circuit to power. Check the signal circuit for open circuit, short circuit to power, short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new manifold absolute pressure sensor as required • Using the manufacturer approved diagnostic system check datalogger signals, Corrected Intake Manifold Absolute Pressure (0x0504), Manifold Absolute Pressure Sensor Voltage (0x0301), Manifold Absolute Pressure Bank 1 (0x052C). This DTC is set when the manifold absolute pressure sensor signal voltage is lower than expected by the engine control module. Refer to the workshop manual and check the manifold absolute pressure sensor is correctly connected to the air intake manifold and there are no blockages or air leaks preventing communication of pressure changes between the manifold and the sensor
P0108-00	Manifold Absolute Pressure/Barometric Pressure Sensor Circuit High - No sub type information	 NOTE: - Circuit MAP_A - • Harness failure - Manifold absolute pressure sensor circuits • Manifold absolute pressure sensor failure • Blockage or leak between the intake manifold and the manifold pressure sensor	• Refer to the electrical circuit diagrams and check the 5 volt supply circuit for open circuit, short circuit to power, short circuit to ground. Check the sensor ground for open circuit, short circuit to power. Check the signal circuit for open circuit, short circuit to power, short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new manifold absolute pressure sensor as required • Using the manufacturer approved diagnostic system check datalogger signals, Corrected Intake Manifold Absolute Pressure (0x0504), Manifold Absolute Pressure Sensor Voltage (0x0301), Manifold Absolute Pressure Bank 1 (0x052C). Refer to the workshop manual and check the manifold absolute pressure sensor is correctly connected to the air intake manifold and there are no blockages or air leaks preventing communication of pressure changes between the manifold and the sensor
P0108-17	Manifold Absolute Pressure/Barometric Pressure Sensor Circuit High - Circuit voltage above threshold	 NOTE: - Circuit MAP_A - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Manifold absolute pressure sensor circuits • Manifold absolute pressure sensor failure • Blockage or leak between the intake manifold and the	• Refer to the electrical circuit diagrams and check the 5 volt supply circuit for open circuit, short circuit to power, short circuit to ground. Check the sensor ground for open circuit, short circuit to power. Check the signal circuit for open circuit, short circuit to power, short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new manifold absolute pressure sensor as required • Using the manufacturer approved diagnostic system check datalogger signals, Corrected Intake Manifold Absolute Pressure (0x0504), Manifold Absolute Pressure Sensor Voltage (0x0301), Manifold Absolute Pressure Bank 1 (0x052C). This DTC is set when

		manifold pressure sensor	the manifold absolute pressure sensor signal voltage is greater than expected by the engine control module. Refer to the workshop manual and check the manifold absolute pressure sensor is correctly connected to the air intake manifold and there are no blockages or air leaks preventing communication of pressure changes between the manifold and the sensor
P010A-92	Mass or Volume Air Flow Sensor "B" Circuit - Performance or incorrect operation	• Air flow disruption at sensing element of mass air flow • Harness failure - Mass air flow sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Mass air flow failure	• This DTC is set if the mass air flow signal from sensor 2 is greater than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Refer to the electrical circuit diagrams and check mass air flow sensor 2 for short circuit to ground, short circuit to power, open circuit, high resistance. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor 2 as required
P010B-21	Mass or Volume Air Flow B Circuit Range/Performance - Signal amplitude < minimum	• The engine control module measured a signal voltage below a specified range but not necessarily a short circuit to ground, gain low • Air flow disruption at sensing element of mass air flow • Harness failure - Mass air flow sensor circuit short circuit to ground, high resistance, open circuit • Mass air flow failure	• This DTC is set if the mass air flow signal from sensor 2 is less than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Refer to the electrical circuit diagrams and check mass air flow sensor 2 for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor 2 as required
P010B-22	Mass or Volume Air Flow B Circuit Range/Performance - Signal amplitude > maximum	• The engine control module measured a signal voltage above a specified range but not necessarily a short circuit to power, gain too high • Air flow disruption at sensing element of mass air flow sensor 2 • Harness failure - Mass air flow sensor circuit short circuit to power • Mass air flow failure	• This DTC is set if the mass air flow signal from sensor 2 is more than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Refer to the electrical circuit diagrams and check mass air flow sensor 2 circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor 2 as required
P010C-00	Mass or Volume Air Flow B Circuit Low - No sub type information	NOTE: - Circuit MAF_A - • Air flow disruption at sensing element of mass air flow • Harness failure - Mass air flow sensor circuits • Mass air flow failure	• Using the manufacturer approved diagnostic system check datalogger signals, Air Flow Rate From Mass Air Flow Sensor Bank 2 (0x0505). This DTC is set if the mass air flow signal from sensor 2 is less than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Refer to the electrical circuit diagrams and check the power and ground circuits for the mass air flow sensors for high

			resistance, short circuit to power, short circuit to ground. Check the mass air flow signal line between the engine control module and the mass air flow sensor for high resistance. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor as required
P010D-00	Mass or Volume Air Flow B Circuit High - No sub type information	 NOTE: - Circuit MAF_A - • Air flow disruption at sensing element of mass air flow • Harness failure - Mass air flow sensor circuits • Mass air flow failure	• Using the manufacturer approved diagnostic system check datalogger signals, Air Flow Rate From Mass Air Flow Sensor Bank 2 (0x0505). This DTC is set if the mass air flow signal from sensor 2 is greater than the value expected by the engine control module. Refer to the relevant sections of the workshop manual and check the induction system for air leaks, and obstructions to flow. Check the condition of the air filter and examine the induction pipes for debris which could disrupt air flow at the sensing element • Refer to the electrical circuit diagrams and check the power and ground circuits for the mass air flow sensors for high resistance, short circuit to power, short circuit to ground. Check the mass air flow signal line between the engine control module and the mass air flow sensor for high resistance. Repair harness as required. Clear DTC and retest • Check and install new mass air flow sensor as required
P0116-00	Engine Coolant Temperature Sensor 1 Circuit Range/Performance - No sub type information	 NOTE: - Circuit ECT_A - • Engine coolant level or flow failure • Harness failure - Engine coolant temperature sensor circuits • Engine coolant temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Coolant Temperature Sensor (0x0357), Engine Coolant Temperature (0xF405). This DTC is set if the engine coolant temperature value fails plausibility checks by the engine control module. Refer to the workshop manual and check the engine cooling system to ensure the coolant condition and level is correct • Refer to the electrical circuit diagrams and check the engine coolant temperature sensor circuits for high resistance, short circuit to other circuits. Repair harness as required. Clear DTC and retest • Check and install new engine coolant temperature sensor as required
P0116-16	Engine Coolant Temperature Sensor 1 Circuit Range/Performance - Circuit voltage below threshold	 NOTE: - Circuit ECT_A - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Engine coolant level or flow failure • Harness failure - Engine coolant temperature sensor circuits • Engine coolant temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Coolant Temperature Sensor (0x0357), Engine Coolant Temperature (0xF405). This DTC is set if the engine coolant temperature sensor signal voltage is less than the value expected by the engine control module. Refer to the workshop manual and check the engine cooling system to ensure the coolant condition and level is correct • Refer to the electrical circuit diagrams and check the engine coolant temperature sensor circuits for high resistance, short circuit to other circuits. Repair harness as required. Clear DTC and retest • Check and install new engine coolant temperature sensor as required
P0116-17	Engine Coolant Temperature Sensor 1 Circuit Range/Performance - Circuit voltage above threshold	 NOTE: - Circuit ECT_A - • The engine control module measured a voltage above a specified range but not necessarily a short	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Coolant Temperature Sensor (0x0357), Engine Coolant Temperature (0xF405). This DTC is set if the engine coolant temperature sensor signal voltage is greater than the value expected by the control module. Refer to

		circuit to power • Engine coolant level or flow failure • Harness failure - Engine coolant temperature sensor circuits • Engine coolant temperature sensor failure	the workshop manual and check the engine cooling system to ensure the coolant condition and level is correct • Refer to the electrical circuit diagrams and check the engine coolant temperature sensor circuits for high resistance, short circuit to other circuits. Repair harness as required. Clear DTC and retest • Check and install new engine coolant temperature sensor as required
P0116-21	Engine Coolant Temperature Sensor 1 Circuit Range/Performance - Signal amplitude < minimum	• The engine control module measured a signal voltage below a specified range but not necessarily a short circuit to ground, gain low • Engine coolant level or flow failure • Harness failure - Engine coolant temperature sensor circuit short circuit to ground, high resistance, open circuit • Engine coolant temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Coolant Temperature Sensor (0x0357), Engine Coolant Temperature (0xF405). This DTC is set if the engine coolant temperature sensor signal amplitude is lower than the value expected by the control module. Refer to the workshop manual and check the engine cooling system to ensure the coolant condition and level is correct • Refer to the electrical circuit diagrams and check the engine coolant temperature sensor circuit for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine coolant temperature sensor as required
P0116-22	Engine Coolant Temperature Sensor 1 Circuit Range/Performance - Signal amplitude > maximum	• The engine control module measured a signal voltage above a specified range but not necessarily a short circuit to power, gain too high • Engine coolant level or flow failure • Harness failure - Engine coolant temperature sensor circuit short circuit to power • Engine coolant temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Coolant Temperature Sensor (0x0357), Engine Coolant Temperature (0xF405). This DTC is set if the engine coolant temperature sensor signal amplitude is greater than the value expected by the control module. Refer to the workshop manual and check the engine cooling system to ensure the coolant condition and level is correct • Refer to the electrical circuit diagrams and check the engine coolant temperature sensor circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new engine coolant temperature sensor as required
P0130-00	O2 Sensor Circuit (Bank 1 Sensor 1) - No sub type information	NOTE: - Circuit LPV_A - LPPC_A • Harness failure - Heated oxygen sensor circuit open circuit • Heated oxygen sensor component failure	• Refer to the electrical circuit diagrams and check the heated oxygen sensor circuits for open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0130-11	O2 Circuit (Bank 1, Sensor 1) - Circuit short to ground	NOTE: - Circuit LPV_A - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Heated oxygen sensor circuit short circuit to ground • Heated oxygen sensor component failure	• Refer to the electrical circuit diagrams and check the heated oxygen sensor circuits for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0130-	O2 Circuit (Bank 1, Sensor		• Refer to the electrical circuit diagrams and

12	1) - Circuit short to battery	NOTE: - Circuit LPV_A - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Harness failure - Heated oxygen sensor circuit short circuit to power • Heated oxygen sensor component failure	check the heated oxygen sensor circuits for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0130-13	O2 Circuit (Bank 1, Sensor 1) - Circuit open	NOTE: - Circuit LPPC_A - LPV_A - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Heated oxygen sensor circuit open circuit • Heated oxygen sensor component failure	• Refer to the electrical circuit diagrams and check the heated oxygen sensor circuits for open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0130-1A	O2 Circuit (Bank 1, Sensor 1) - Circuit resistance below threshold	NOTE: - Circuit LPTR_A - • Harness failure - Heated oxygen sensor circuit failure • Heated oxygen sensor component failure	• This DTC is set when the heated oxygen sensor internal trim resistance value is less than that expected by the engine control module. Refer to the electrical circuit diagrams and check the heated oxygen sensor circuits for short circuits. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0130-1B	O2 Circuit (Bank 1, Sensor 1) - Circuit resistance above threshold	NOTE: - Circuit LPTR_A - • Harness failure - Heated oxygen sensor circuit failure • Heated oxygen sensor component failure	• This DTC is set when the oxygen sensor internal trim resistance value is greater than that expected by the engine control module. Refer to the electrical circuit diagrams and check the heated oxygen sensor circuits for short circuits, open circuits. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0130-26	O2 Circuit (Bank 1, Sensor 1) - Signal rate of change below threshold	• The signal transitions more slowly than is reasonably allowed • Exhaust system leak • Fuel control system failure • Heated oxygen sensor to engine control module circuit short circuit to ground, short circuit to power, high resistance • Heated oxygen sensor failure	• Check for and rectify any exhaust leak between cylinder head and catalytic converter. Check heated oxygen sensor is correctly installed in exhaust manifold • Check fuel control system for related DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check heated oxygen sensor to engine control module circuit for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0133-00	O2 Circuit Slow Response (Bank 1, Sensor 1) - No sub type information	• Exhaust system leak • Fuel control system failure • Heated oxygen sensor to engine control	• Check for and rectify any exhaust leak between cylinder head and catalytic converter. Check heated oxygen sensor is correctly installed in exhaust manifold • Check fuel control system for related DTCs

		module wiring shield high resistance • Heated oxygen sensor failure	and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check heated oxygen sensor to engine control module wiring shield for high resistance. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P0135-16	O2 Sensor Heater Circuit (Bank 1 Sensor 1) - Circuit voltage below threshold	 NOTE: - Circuit LPPH_A - • Heated oxygen sensor to engine control module circuit short circuit to ground, open circuit • Heated oxygen sensor failure	• Check fuel control system for related DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check heated oxygen sensor to engine control module circuit for short circuit to ground, open circuit • Check and install new heated oxygen sensor as required
P0148-00	Fuel Delivery Error - No sub type information	• This DTC is set after the engine control module internal monitoring function has evaluated high pressure fuel pump fatigue and wear against fuel rail pressure	• Check high pressure fuel pump for mechanical damage and excessive wear • Using the manufacturer approved diagnostic system, clear DTC and retest • Check and install new high pressure fuel pump as required
P0181-16	Fuel Temperature Sensor A Circuit Range/Performance - Circuit voltage below threshold	 NOTE: - Circuit IFTS - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Fuel temperature sensor circuit failure • Sensor component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Temperature "A" (0x0522), Fuel Rail Temperature Sensor Voltage (0x033F). This DTC is set when the voltage on the fuel temperature sensor circuit is less than that expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel temperature sensor signal circuit for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new fuel temperature sensor as required
P0181-17	Fuel Temperature Sensor A Circuit Range/Performance - Circuit voltage above threshold	 NOTE: - Circuit IFTS - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Fuel temperature sensor circuit failure • Sensor component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Temperature "A" (0x0522), Fuel Rail Temperature Sensor Voltage (0x033F). This DTC is set when the voltage on the fuel temperature sensor circuit is greater than that expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel temperature sensor signal and ground circuits for short circuit to power, open circuit or high resistance. Repair harness as required. Clear DTC and retest • Check and install new fuel temperature sensor as required
P0182-00	Fuel Temperature Sensor A Circuit Low - No sub type information	 NOTE: - Circuit IFTS - • Harness failure - Fuel temperature sensor circuit failure • Sensor component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Temperature "A" (0x0522), Fuel Rail Temperature Sensor Voltage (0x033F). This DTC is set when the voltage on the fuel temperature sensor circuit is less than that expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel temperature sensor signal circuit for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new fuel temperature sensor as required
P0183-00	Fuel Temperature Sensor A Circuit High - No sub type information	 NOTE: - Circuit IFTS -	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Temperature "A" (0x0522),

		Harness failure - Fuel temperature sensor circuit failure • Sensor component failure	Fuel Rail Temperature Sensor Voltage (0x033F). This DTC is set when the voltage on the fuel temperature sensor circuit is greater than that expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel temperature sensor signal and ground circuits for short circuit to power, open circuit or high resistance. Repair harness as required. Clear DTC and retest • Check and install new fuel temperature sensor as required
P0191-16	Fuel Rail Pressure Sensor A Circuit Range/Performance - Circuit voltage below threshold	 NOTE: - Circuit RPS - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Fuel supply system failure • Harness failure - Fuel rail pressure sensor circuit failure • Sensor component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Rail Pressure Sensor (0x0324), Fuel Rail Pressure (0xF423). The fuel rail pressure sensor is a pressure transducer mounted on the fuel rail. This DTC is set when the voltage on the signal line is less than that expected by the engine control module. Refer to the workshop manual and ensure that the fuel supply system is working correctly • Refer to the electrical circuit diagrams and check the sensor supply, signal and ground connections for intermittent failures, open circuits, short circuits, high resistance. Repair harness as required. Clear DTC and retest • Check and install new fuel rail pressure sensor as required
P0191-17	Fuel Rail Pressure Sensor A Circuit Range/Performance - Circuit voltage above threshold	 NOTE: - Circuit RPS - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Fuel supply system failure • Harness failure - Fuel rail pressure sensor circuit failure • Sensor component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Rail Pressure Sensor (0x0324), Fuel Rail Pressure (0xF423). The fuel rail pressure sensor is a pressure transducer mounted on the fuel rail. This DTC is set when the voltage on the signal line is greater than that expected by the engine control module. Refer to the workshop manual and ensure that the fuel supply system is working correctly • Refer to the electrical circuit diagrams and check the sensor supply, signal and ground connections for intermittent failures, open circuits, short circuits, high resistance. Repair harness as required. Clear DTC and retest • Check and install new fuel rail pressure sensor as required
P0192-16	Fuel Rail Pressure Sensor A Circuit Low - Circuit voltage below threshold	 NOTE: - Circuit RPS - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Fuel supply system failure • Harness failure - Fuel rail pressure sensor circuit failure • Sensor component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Rail Pressure Sensor (0x0324), Fuel Rail Pressure (0xF423). The fuel rail pressure sensor is a pressure transducer mounted on the fuel rail. This DTC is set when the voltage on the signal line is less than that expected by the engine control module. Refer to the workshop manual and ensure that the fuel supply system is working correctly • Refer to the electrical circuit diagrams and check the sensor supply, signal and ground connections for short circuit to power, short circuit to ground, open circuit, high resistance. Repair harness as required. Clear DTC and retest • Check and install new fuel rail pressure sensor as required
P0193-17	Fuel Rail Pressure Sensor A Circuit High - Circuit voltage above threshold	 NOTE: - Circuit RPS - • The engine control module measured a voltage above a specified range but	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Rail Pressure Sensor (0x0324), Fuel Rail Pressure (0xF423). The fuel rail pressure sensor is a pressure transducer mounted on the fuel rail. This DTC is set when the voltage on the signal

		not necessarily a short circuit to power • Fuel supply system failure • Harness failure - Fuel rail pressure sensor circuit failure • Sensor component failure	line is greater than that expected by the engine control module. Refer to the workshop manual and ensure that the fuel supply system is working correctly • Refer to the electrical circuit diagrams and check the sensor supply, signal and ground connections for short circuit to power, short circuit to ground, open circuit, high resistance. Repair harness as required. Clear DTC and retest • Check and install new fuel rail pressure sensor as required
P0194-00	Fuel Rail Pressure Sensor A Circuit Intermittent/Erratic - No sub type information	• Fuel supply system failure • Harness failure - Fuel rail pressure sensor circuit failure • Sensor component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Rail Pressure Sensor (0x0324), Fuel Rail Pressure (0xF423). The fuel rail pressure sensor is a pressure transducer mounted on the fuel rail. Refer to the workshop manual and ensure that the fuel supply system is working correctly • Refer to the electrical circuit diagrams and check the sensor supply, signal and ground connections for intermittent failures, open circuits, short circuits, high resistance. Repair harness as required. Clear DTC and retest • Check and install new fuel rail pressure sensor as required
P0195-00	Engine Oil Temperature Sensor Circuit - No sub type information	NOTE: - Circuit OTL - • Oil contaminated or level incorrect • Harness failure - Oil level and temperature sensor circuits • Oil level and temperature sensor failure	• Check the oil level is correct and the oil does not appear contaminated. Renew or top up oil as required • Refer to the electrical circuit diagrams and check the sensor power and ground supplies for open circuit or short circuit to ground. Check the signal line for open circuit, short circuit to power, short circuit to ground, high resistance and intermittent connections. Repair harness as required. Clear DTC and retest • Check and install new engine oil level and temperature sensor as required
P0195-23	Engine Oil Temperature Sensor Circuit - Signal stuck low	NOTE: - Circuit OTL - • The engine control module measures a signal that remains low when transitions are expected • Oil contaminated or level incorrect • Harness failure - Oil level and temperature sensor circuits • Oil level and temperature sensor failure	• Check the oil level is correct and the oil does not appear contaminated. Renew or top up oil as required • Refer to the electrical circuit diagrams and check the sensor power and ground supplies for open circuit or short circuit to ground. Check the signal line for open circuit, short circuit to power, short circuit to ground, high resistance and intermittent connections. Repair harness as required. Clear DTC and retest • Check and install new engine oil level and temperature sensor as required
P0195-62	Engine Oil Temperature Sensor Circuit - Signal compare failure	• Oil contaminated or level incorrect • Harness failure - Oil level and temperature sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Oil level and temperature sensor failure	• Check the oil does not appear contaminated and the level is correct. Renew or top up oil as required • Refer to the electrical circuit diagrams and check oil level and temperature sensor signal circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Start the engine from cold and allow to idle, check and record Sump Oil Temperature - Measured (0x03F3) datalogger signal. Continue to warm up at idle, after approximately 10 minutes check and record Sump Oil Temperature - Measured (0x03F3) signal. If value of signal has not increased by 5°C check and install new oil level and temperature sensor as required

P0201-00	Cylinder 1 Injector Circuit/Open - No sub type information	 NOTE: - Circuit O_P_PVL11 - O_P_PVH11 - • Harness failure - Cylinder 1 injector circuit open circuit • Cylinder 1 injector failure	This DTC is set when the engine control module detects an open circuit on the cylinder 1 injector control circuit. Refer to the electrical circuit diagrams and check the two control circuits between the engine control module and the fuel injector for high resistance, open circuits or intermittent connections. Repair harness as required. • Check and install new fuel injector as required
P0202-00	Cylinder 2 Injector Circuit/Open - No sub type information	 NOTE: - Circuit O_P_PVL12 - O_P_PVH12 - • Harness failure - Cylinder 2 injector circuit open circuit • Cylinder 2 injector failure	• This DTC is set when the engine control module detects an open circuit on the cylinder 2 injector control circuit. Refer to the electrical circuit diagrams and check the two control circuits between the engine control module and the fuel injector for high resistance, open circuits or intermittent connections. Repair harness as required • Check and install new fuel injector as required
P0203-00	Cylinder 3 Injector Circuit/Open - No sub type information	 NOTE: - Circuit O_P_PVL13 - O_P_PVH13 - • Harness failure - Cylinder 3 injector circuit open circuit • Cylinder 3 injector failure	• This DTC is set when the engine control module detects an open circuit on the cylinder 3 injector control circuit. Refer to the electrical circuit diagrams and check the two control circuits between the engine control module and the fuel injector for high resistance, open circuits or intermittent connections. Repair harness as required • Check and install new fuel injector as required
P0204-00	Cylinder 4 Injector Circuit/Open - No sub type information	 NOTE: - Circuit O_P_PVL21 - O_P_PVH21 - • Harness failure - Cylinder 4 injector circuit open circuit • Cylinder 4 injector failure	• This DTC is set when the engine control module detects an open circuit on the cylinder 4 injector control circuit. Refer to the electrical circuit diagrams and check the two control circuits between the engine control module and the fuel injector for high resistance, open circuits or intermittent connections. Repair harness as required • Check and install new fuel injector as required
P0205-00	Cylinder 5 Injector Circuit/Open - No sub type information	 NOTE: - Circuit O_P_PVL22 - O_P_PVH22 - • Harness failure - Cylinder 5 injector circuit open circuit • Cylinder 5 injector failure	• This DTC is set when the engine control module detects an open circuit on the cylinder 5 injector control circuit. Refer to the electrical circuit diagrams and check the two control circuits between the engine control module and the fuel injector for high resistance, open circuits or intermittent connections. Repair harness as required • Check and install new fuel injector as required
P0206-00	Cylinder 6 Injector Circuit/Open - No sub type information	 NOTE: - Circuit O_P_PVL23 - O_P_PVH23 - • Harness failure - Cylinder 6 injector circuit open circuit • Cylinder 6 injector failure	• This DTC is set when the engine control module detects an open circuit on the cylinder 6 injector control circuit. Refer to the electrical circuit diagrams and check the two control circuits between the engine control module and the fuel injector for high resistance, open circuits or intermittent connections. Repair harness as required • Check and install new fuel injector as required
P0216-00	Injector/Injection timing Control Circuit - No sub type information	• Internal engine control module power supply is unable to supply the fuel injectors with the maximum number of injections required • Internal engine control module monitoring has detected a fuel	• Refer to the workshop manual and the battery care manual, inspect the vehicle battery and ensure it is fully charged and serviceable before performing further tests • Check the vehicle charging system performance to ensure the voltage regulation is correct • Refer to the electrical circuit diagrams and check engine control module power and

		pressure not able to meet the demand for the number of fuel injections • At high engine speeds the internal engine control module monitoring has detected that the computing time available for the desired number of injections is not sufficient	ground circuits • Check fuel control system for related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, clear DTC and retest
P0219-00	Engine Overspeed Condition - No sub type information	• Camshaft or crankshaft position sensor circuit short circuit to ground, short circuit to power, open circuit • Camshaft or crankshaft position sensor failure	• Refer to the electrical circuit diagrams and check camshaft and crankshaft position sensor circuits for short circuit to ground, short circuit to power, open circuit • Check for engine oil ingestion to sensors. Check and install new camshaft and crankshaft position sensor as required
P0235-16	Turbocharger/Supercharger Boost Sensor A Circuit - Circuit voltage below threshold	NOTE: - Circuit SCOP - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Mechanical failure - Sensor hose blocked or leaking • Failure affecting intake air circuit or boost air circuit control valves or actuators • Harness failure - Boost air pressure sensor circuit • Boost air pressure sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbocharger/Supercharger Boost Sensor A Circuit (0x033C), Boost Absolute Pressure - Raw Value (0x033E). This DTC is set when the engine control module detects a signal voltage from the boost air pressure sensor signal line which is less than the threshold value. Check the sensor hose for blockages or leaks • Check the intake air and boost air circuits for failures including leaks, blockages, control valve actuator malfunctions • Refer to the electrical circuit diagrams and check the sensor power and ground supplies for open circuit or short circuit to ground. Check the signal line for open circuit, short circuit to ground, high resistance and intermittent connections. Repair harness as required. Clear DTC and retest • Check and install new boost air pressure sensor as required
P0235-17	Turbocharger/Supercharger Boost Sensor A Circuit - Circuit voltage above threshold	NOTE: - Circuit SCOP - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Mechanical failure - Sensor hose blocked or leaking • Failure affecting intake air circuit or boost air circuit control valves or actuators • Harness failure - Boost air pressure sensor circuit • Boost air pressure sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbocharger/Supercharger Boost Sensor A Circuit (0x033C), Boost Absolute Pressure - Raw Value (0x033E). This DTC is set when the engine control module detects a signal voltage from the boost air pressure sensor signal line which is greater than the threshold value. Check the sensor hose for blockages or leaks • Check the intake air and boost air circuits for failures including leaks, blockages, control valve actuator malfunctions • Refer to the electrical circuit diagrams and check the sensor power and ground supplies for open circuit or short circuit to ground. Check the signal line for open circuit, short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new boost air pressure sensor as required
P0235-94	Turbocharger/Supercharger Boost Sensor A Circuit - Unexpected operation	NOTE: - Circuit SCOP - • Boost air solenoid stuck open mono turbo mode • Turbine intake solenoid leakage when closed	• If this DTC is logged with P00BD-07 suspect, boost air solenoid stuck open mono turbo mode • If this DTC is logged with P00BD-07 suspect, turbine intake solenoid leakage when closed • If this DTC is logged with P00BD-07, P22D2-77, P1247-00 & P22CF-71 suspect, turbine intake solenoid stuck open

		Turbine intake solenoid stuck open • Intake air system, blocked low pressure air intake. This failure mode can be caused by snow packing in the intake system. Symptoms often disappear after the vehicle has been warmed and heat soaked. Similar symptoms to seized primary turbo	If this DTC is logged with P00BD-07, P22D2-77, P1247-00 & P22CF-71 suspect, intake air system, blocked low pressure air intake • Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine
P023D-00	Manifold Absolute Pressure-Turbocharger/Supercharger Boost Sensor A Correlation - No sub type information	• Induction system air leak or blockage • Boost air system leak or blockage • Manifold absolute pressure sensor A failure • Variable geometry turbocharger actuator A sticking, failure • Turbocharger A failure	• Check induction system for leaks, blockages • Check boost air system for leaks, blockages. Check for related DTCs and refer to the relevant DTC index • Check and install new manifold absolute pressure sensor as required • Check and install new variable geometry turbocharger actuator as required • Check turbocharger rod connection and oil seals
P0251-13	Injection Pump Fuel Metering Control A - Circuit open	NOTE: - Circuit MEU - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Fuel volume control valve circuit open circuit • Fuel volume control valve failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Volume Control Valve Duty Cycle (0x03C2), Fuel Volume Control Valve Current - Measured (0x03EA). Refer to the electrical circuit diagrams and check the fuel volume control valve circuit between the engine control module and the fuel volume control valve for open circuit. Check power supply to fuel volume control valve. Repair harness as required. Clear DTC and retest • Check and install new fuel volume control valve as required
P0251-4B	Injection Pump Fuel Metering Control A - Over temperature	• Harness failure - Fuel volume control valve circuit short circuit to ground, short circuit to power, high resistance • Fuel volume control valve failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Volume Control Valve Duty Cycle (0x03C2), Fuel Volume Control Valve Current - Measured (0x03EA). Refer to the electrical circuit diagrams and check the fuel volume control valve circuit between the engine control module and the fuel volume control valve for short circuit to ground, short circuit to power, high resistance. Check power supply to fuel volume control valve. Repair harness as required. Clear DTC and retest • Check and install new fuel volume control valve as required
P0252-16	Injection Pump Fuel Metering Control A Range/Performance - Circuit voltage below threshold	NOTE: - Circuit MEU - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Fuel volume control valve circuit • Fuel volume control valve failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Volume Control Valve Duty Cycle (0x03C2), Fuel Volume Control Valve Current - Measured (0x03EA). This DTC is set when the voltage on the signal circuit to the fuel volume control valve is less than that expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel volume control valve circuit between the engine control module and the fuel volume control valve for an intermittent open circuit, high resistance, short circuit to ground. Check the power supply to fuel volume control valve. Repair harness as required. Clear DTC and retest • Check and install new fuel volume control valve as required

P0252-17	Injection Pump Fuel Metering Control A Range/Performance - Circuit voltage above threshold	NOTE: - Circuit MEU - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Fuel volume control valve circuit • Fuel volume control valve failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Volume Control Valve Duty Cycle (0x03C2), Fuel Volume Control Valve Current - Measured (0x03EA). This DTC is set when the voltage on the signal circuit to the fuel volume control valve is greater than that expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel volume control valve circuit between the engine control module and the volume control valve for a short circuit to power. Check the power supply to fuel volume control valve. Repair harness as required. Clear DTC and retest • Check and install new fuel volume control valve as required
P0253-00	Injection Pump Fuel Metering Control A Low - No sub type information	NOTE: - Circuit MEU - • Harness failure - Fuel volume control valve circuit short circuit to ground, open circuit • Fuel volume control valve failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Volume Control Valve Duty Cycle (0x03C2), Fuel Volume Control Valve Current - Measured (0x03EA). This DTC is set when the voltage on the signal circuit to the fuel volume control valve is less than that expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel volume control valve circuit between the engine control module and the fuel volume control valve for a short circuit to ground, open circuit. Repair harness as required. Clear DTC and retest • Check and install new fuel volume control valve as required
P0254-00	Injection Pump Fuel Metering Control A High - No sub type information	NOTE: - Circuit MEU - • Harness failure - Fuel volume control valve circuit short circuit to power • Fuel volume control valve failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Volume Control Valve Duty Cycle (0x03C2), Fuel Volume Control Valve Current - Measured (0x03EA). This DTC is set when the voltage on the signal circuit to the fuel volume control valve is greater than that expected by the engine control module. Refer to the electrical circuit diagrams and check the fuel volume control valve circuit between the engine control module and the fuel volume control valve for a short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new fuel volume control valve as required
P0255-00	Injection Pump Fuel Metering Control A Intermittent - No sub type information	• Harness failure - Fuel volume control valve circuit intermittent short circuit to ground, short circuit to power, high resistance • Fuel volume control valve intermittent failure	• Using the manufacturer approved diagnostic system check datalogger signals, Fuel Volume Control Valve Duty Cycle (0x03C2), Fuel Volume Control Valve Current - Measured (0x03EA). Refer to the electrical circuit diagrams and check the fuel volume control valve circuit between the engine control module and the fuel volume control valve for an intermittent short circuit to ground, short circuit to power, high resistance. Repair harness as required. Clear DTC and retest • Check and install new fuel volume control valve as required
P0261-00	Cylinder 1 Injector Circuit Low - No sub type information	NOTE: - Circuit O_P_PVL11 - O_P_PVH11 - • Harness failure - Injector control circuit short circuit • Injector failure	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 1 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required

P0261-11	Cylinder 1 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit O_P_PVL11 - O_P_PVH11 - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Injector control circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 1 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0261-23	Cylinder 1 Injector Circuit Low - Signal stuck low	 NOTE: - Circuit O_P_PVL11 - O_P_PVH11 - • The engine control module measures a signal that remains low when transitions are expected • Harness failure - Short circuit between injector control circuits on different cylinders	• Refer to the electrical circuit diagrams and check the injector control circuits between the engine control module and the cylinder 1 injector for short circuit to other injector control circuits. Repair harness as required. Clear DTC and retest
P0264-00	Cylinder 2 Injector Circuit Low - No sub type information	 NOTE: - Circuit O_P_PVL12 - O_P_PVH12 - • Harness failure - Injector control circuit short circuit • Injector failure	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 2 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0264-11	Cylinder 2 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit O_P_PVL12 - O_P_PVH12 - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Injector control circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 2 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0264-23	Cylinder 2 Injector Circuit Low - Signal stuck low	 NOTE: - Circuit O_P_PVL12 - O_P_PVH12 - • The engine control module measures a signal that remains low when transitions are expected • Harness failure - Short circuit between injector control circuits on different cylinders	• Refer to the electrical circuit diagrams and check the injector control circuits between the engine control module and the cylinder 2 injector for short circuit to other injector control circuits. Repair harness as required. Clear DTC and retest
P0267-00	Cylinder 3 Injector Circuit Low - No sub type information	 NOTE: - Circuit O_P_PVL13 - O_P_PVH13 - • Harness failure - Injector control circuit short circuit	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 3 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to power. Repair

		• Injector failure	harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0267-11	Cylinder 3 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit O_P_PVL13 - O_P_PVH13 - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Injector control circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 3 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0267-23	Cylinder 3 Injector Circuit Low - Signal stuck low	 NOTE: - Circuit O_P_PVL13 - O_P_PVH13 - • The engine control module measures a signal that remains low when transitions are expected • Harness failure - Short circuit between injector control circuits on different cylinders	• Refer to the electrical circuit diagrams and check the injector control circuits between the engine control module and the cylinder 3 injector for short circuit to other injector control circuits. Repair harness as required. Clear DTC and retest
P0270-00	Cylinder 4 Injector Circuit Low - No sub type information	 NOTE: - Circuit O_P_PVL21 - O_P_PVH21 - • Harness failure - Injector control circuit short circuit • Injector failure	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 4 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0270-11	Cylinder 4 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit O_P_PVL21 - O_P_PVH21 - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Injector control circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 4 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0270-23	Cylinder 4 Injector Circuit Low - Signal stuck low	 NOTE: - Circuit O_P_PVL21 - O_P_PVH21 - • The engine control module measures a signal that remains low when transitions are expected • Harness failure - Short circuit between injector control circuits on different cylinders	• Refer to the electrical circuit diagrams and check the injector control circuits between the engine control module and the cylinder 4 injector for short circuit to other injector control circuits. Repair harness as required. Clear DTC and retest
P0273-00	Cylinder 5 Injector Circuit Low - No sub type information	 NOTE: - Circuit O_P_PVL22 - O_P_PVH22 -	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder

		• Harness failure - Injector control circuit short circuit • Injector failure	5 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0273-11	Cylinder 5 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit O_P_PVL22 - O_P_PVH22 - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Injector control circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 5 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0273-23	Cylinder 5 Injector Circuit Low - Signal stuck low	 NOTE: - Circuit O_P_PVL22 - O_P_PVH22 - • The engine control module measures a signal that remains low when transitions are expected • Harness failure - Short circuit between injector control circuits on different cylinders	• Refer to the electrical circuit diagrams and check the injector control circuits between the engine control module and the cylinder 5 injector for short circuit to other injector control circuits. Repair harness as required. Clear DTC and retest
P0276-00	Cylinder 6 Injector Circuit Low - No sub type information	 NOTE: - Circuit O_P_PVL23 - O_P_PVH23 - • Harness failure - Injector control circuit short circuit • Injector failure	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 6 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0276-11	Cylinder 6 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit O_P_PVL23 - O_P_PVH23 - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Injector control circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the injector control circuit between the engine control module and the cylinder 6 injector for short circuit to ground or short between the two wires. This circuit is a twisted pair, check both high and low sides for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new fuel injector as required
P0276-23	Cylinder 6 Injector Circuit Low - Signal Stuck Low	 NOTE: - Circuit O_P_PVL23 - O_P_PVH23 - • The engine control module measures a signal that remains low when transitions are expected • Harness failure - Short circuit between injector control circuits on different cylinders	• Refer to the electrical circuit diagrams and check the injector control circuits between the engine control module and the cylinder 6 injector for short circuit to other injector control circuits. Repair harness as required. Clear DTC and retest

P02CD-00	Cylinder 1 Fuel Injector Offset Learning at Max Limit - No sub type information	• Corrected set point voltage of the piezo actuator violates the on board diagnostic limit • Fuel injector internal components out of tolerance	• Check for other related DTCs and refer to the relevant DTC index. Clear DTC and retest • Check and install new a fuel injector as required
P02CF-00	Cylinder 2 Fuel Injector Offset Learning at Max Limit - No sub type information	• Corrected set point voltage of the piezo actuator violates the on board diagnostic limit • Fuel injector internal components out of tolerance	• Check for other related DTCs and refer to the relevant DTC index. Clear DTC and retest • Check and install new a fuel injector as required
P02D1-00	Cylinder 3 Fuel Injector Offset Learning at Max Limit - No sub type information	• Corrected set point voltage of the piezo actuator violates the on board diagnostic limit • Fuel injector internal components out of tolerance	• Check for other related DTCs and refer to the relevant DTC index. Clear DTC and retest • Check and install new a fuel injector as required
P02D3-00	Cylinder 4 Fuel Injector Offset Learning at Max Limit - No sub type information	• Corrected set point voltage of the piezo actuator violates the on board diagnostic limit • Fuel injector internal components out of tolerance	• Check for other related DTCs and refer to the relevant DTC index. Clear DTC and retest • Check and install new a fuel injector as required
P02D5-00	Cylinder 5 Fuel Injector Offset Learning at Max Limit - No sub type information	• Corrected set point voltage of the piezo actuator violates the on board diagnostic limit • Fuel injector internal components out of tolerance	• Check for other related DTCs and refer to the relevant DTC index. Clear DTC and retest • Check and install new a fuel injector as required
P02D7-00	Cylinder 6 Fuel Injector Offset Learning at Max Limit - No sub type information	• Corrected set point voltage of the piezo actuator violates the on board diagnostic limit • Fuel injector internal components out of tolerance	• Check for other related DTCs and refer to the relevant DTC index. Clear DTC and retest • Check and install new a fuel injector as required
P02EE-17	Cylinder 1 Injector Circuit Range/Performance - Circuit voltage above threshold	NOTE: - Circuit O_P_PVL11 - O_P_PVH11 - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 1 injector control circuit that is above the diagnostic threshold. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02EE-1C	Cylinder 1 Injector Circuit Range/Performance - Circuit voltage out of range	NOTE: - Circuit O_P_PVL11 - O_P_PVH11 - • The engine control module measured a voltage outside of the expected range, but not identified as too	• This DTC is set when the engine control module monitors a voltage on the cylinder 1 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for

		high or too low • Harness failure - Injector control circuit • Fuel injector failure	open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02EE-68	Cylinder 1 Injector Circuit Range/Performance - Event information	 NOTE: - Circuit O_P_PVL11 - O_P_PVH11 - • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 1 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02EF-17	Cylinder 2 Injector Circuit Range/Performance - Circuit voltage above threshold	 NOTE: - Circuit O_P_PVL12 - O_P_PVH12 - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 2 injector control circuit that is above the diagnostic threshold. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02EF-1C	Cylinder 2 Injector Circuit Range/Performance - Circuit voltage out of range	 NOTE: - Circuit O_P_PVL12 - O_P_PVH12 - • The engine control module measured a voltage outside of the expected range, but not identified as too high or too low • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 2 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02EF-68	Cylinder 2 Injector Circuit Range/Performance - Event information	 NOTE: - Circuit O_P_PVL12 - O_P_PVH12 - • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 2 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F0-17	Cylinder 3 Injector Circuit Range/Performance - Circuit voltage above threshold	 NOTE: - Circuit O_P_PVL13 - O_P_PVH13 -	• This DTC is set when the engine control module monitors a voltage on the cylinder 3 injector control circuit that is above the diagnostic threshold. The injector control circuit consists of a twisted pair of wires

		The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Injector control circuit • Fuel injector failure	between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F0-1C	Cylinder 3 Injector Circuit Range/Performance - Circuit voltage out of range	NOTE: - Circuit O_P_PVL13 - O_P_PVH13 - • The engine control module measured a voltage outside of the expected range, but not identified as too high or too low • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 3 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F0-68	Cylinder 3 Injector Circuit Range/Performance - Event information	NOTE: - Circuit O_P_PVL13 - O_P_PVH13 - • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 3 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F1-17	Cylinder 4 Injector Circuit Range/Performance - Circuit voltage above threshold	NOTE: - Circuit O_P_PVL21 - O_P_PVH21 - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 4 injector control circuit that is above the diagnostic threshold. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F1-1C	Cylinder 4 Injector Circuit Range/Performance - Circuit voltage out of range	NOTE: - Circuit O_P_PVL21 - O_P_PVH21 - • The engine control module measured a voltage outside of the expected range, but not identified as too high or too low • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 4 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required

P02F1-68	Cylinder 4 Injector Circuit Range/Performance - Event information	 NOTE: - Circuit O_P_PVL21 - O_P_PVH21 - • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 4 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F2-17	Cylinder 5 Injector Circuit Range/Performance - Circuit voltage above threshold	 NOTE: - Circuit O_P_PVL22 - O_P_PVH22 - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 5 injector control circuit that is above the diagnostic threshold. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F2-1C	Cylinder 5 Injector Circuit Range/Performance - Circuit voltage out of range	 NOTE: - Circuit O_P_PVL22 - O_P_PVH22 - • The engine control module measured a voltage outside of the expected range, but not identified as too high or too low • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 5 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F2-68	Cylinder 5 Injector Circuit Range/Performance - Event information	 NOTE: - Circuit O_P_PVL22 - O_P_PVH22 - • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 5 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F3-17	Cylinder 6 Injector Circuit Range/Performance - Circuit voltage above threshold	 NOTE: - Circuit O_P_PVL23 - O_P_PVH23 - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Injector control circuit	• This DTC is set when the engine control module monitors a voltage on the cylinder 6 injector control circuit that is above the diagnostic threshold. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other

		Fuel injector failure	circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F3-1C	Cylinder 6 Injector Circuit Range/Performance - Circuit voltage out of range	 NOTE: - Circuit O_P_PVL23 - O_P_PVH23 - • The engine control module measured a voltage outside of the expected range, but not identified as too high or too low • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 6 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P02F3-68	Cylinder 6 Injector Circuit Range/Performance - Event information	 NOTE: - Circuit O_P_PVL23 - O_P_PVH23 - • Harness failure - Injector control circuit • Fuel injector failure	• This DTC is set when the engine control module monitors a voltage on the cylinder 6 injector control circuit that is out of range. The injector control circuit consists of a twisted pair of wires between the engine control module and the Piezo actuator within the injector. Refer to the electrical circuit diagrams and check both the control circuits (high and low) for open circuit, short circuit to ground, short circuit to power, intermittent connections, high resistance, short to or interference from other circuits. Repair wiring harness as required • Check and install new a fuel injector as required
P0300-00	Random Misfire Detected - No sub type information	• Fuel injector circuit failure(s) (injector DTCs also flagged) • Fuel system failure	• Check for cylinder mis-fire, glow plug and injector DTCs and refer to the relevant DTC index. Refer to the electrical circuit diagrams and check injector circuits for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check for fuel system failure. Repair harness as required. Clear DTC and retest
P0301-00	Cylinder 1 Misfire Detected - No sub type information	• Fuel injector electrical circuit failure(s) (injector DTCs also flagged) • Fuel injector failure • Cylinder compression low	• Refer to the electrical circuit diagrams and check injector circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check for cylinder mis-fire, glow plug and injector DTCs and refer to the relevant DTC index • Check for fuel injector failure or blockage. Carry out cylinder compression tests
P0302-00	Cylinder 2 Misfire Detected - No sub type information	• Fuel injector electrical circuit failure(s) (injector DTCs also flagged) • Fuel injector failure • Cylinder compression low	• Refer to the electrical circuit diagrams and check injector circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check for cylinder mis-fire, glow plug and injector DTCs and refer to the relevant DTC index • Check for fuel injector failure or blockage. Carry out cylinder compression tests
P0303-00	Cylinder 3 Misfire Detected - No sub type information	• Fuel injector electrical circuit failure(s) (injector DTCs also flagged) • Fuel injector failure • Cylinder compression low	• Refer to the electrical circuit diagrams and check injector circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check for cylinder mis-fire, glow plug and injector DTCs and refer to the relevant DTC index • Check for fuel injector failure or blockage. Carry out cylinder compression tests

P0304-00	Cylinder 4 Misfire Detected - No sub type information	• Fuel injector electrical circuit failure(s) (injector DTCs also flagged) • Fuel injector failure • Cylinder compression low	• Refer to the electrical circuit diagrams and check injector circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check for cylinder mis-fire, glow plug and injector DTCs and refer to the relevant DTC index • Check for fuel injector failure or blockage. Carry out cylinder compression tests
P0305-00	Cylinder 5 Misfire Detected - No sub type information	• Fuel injector electrical circuit failure(s) (injector DTCs also flagged) • Fuel injector failure • Cylinder compression low	• Refer to the electrical circuit diagrams and check injector circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check for cylinder mis-fire, glow plug and injector DTCs and refer to the relevant DTC index • Check for fuel injector failure or blockage. Carry out cylinder compression tests
P0306-00	Cylinder 6 Misfire Detected - No sub type information	• Fuel injector electrical circuit failure(s) (injector DTCs also flagged) • Fuel injector failure • Cylinder compression low	• Refer to the electrical circuit diagrams and check injector circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check for cylinder mis-fire, glow plug and injector DTCs and refer to the relevant DTC index • Check for fuel injector failure or blockage. Carry out cylinder compression tests
P0336-29	Crankshaft Position Sensor A Circuit Range/Performance - Signal Invalid	NOTE: - Circuit CPS - • Crankshaft position sensor circuit for short circuit to ground, short circuit to power, open circuit, disconnected • Crankshaft position sensor circuit shielding failure • Crankshaft Position sensor failure • Crankshaft position sensor foreign matter on sensor face, gap incorrect • Target wheel failure	• Refer to the electrical circuit diagrams and check crankshaft position sensor circuit for short circuit to ground, short circuit to power, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new crankshaft position sensor circuit shielding as required • Check crankshaft position sensor for foreign matter on crankshaft position sensor face. Check crankshaft position sensor air gap • Check and install new crankshaft position sensor as required. Check and install new target wheel as required
P0336-31	Crankshaft Position Sensor A Circuit Range/Performance - No Signal	NOTE: - Circuit CPS - • Harness failure - Crankshaft position sensor circuits • Crankshaft position sensor failure • Crankshaft position sensor or reference target positioning incorrect	• Refer to the electrical circuit diagrams. Check the power supply and ground circuits to the sensor, check the signal circuit for open circuits, short circuit to power, and short circuit to ground. Repair harness as required. Clear DTC and retest • Refer to the relevant section of the workshop manual. Check the sensor and crankshaft target for damage, contamination, and correct mounting • Check and install new crankshaft position sensor as required. Check and install new target wheel as required
P0336-64	Crankshaft Position Sensor A Circuit Range/Performance - Signal plausibility failure	• Crankshaft position sensor circuit for short circuit to ground, short circuit to power, open circuit, disconnected • Crankshaft position sensor circuit shielding failure • Crankshaft Position sensor failure • Crankshaft position sensor foreign matter	• Refer to the electrical circuit diagrams and check crankshaft position sensor circuit for short circuit to ground, short circuit to power, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new crankshaft position sensor circuit shielding as required • Check crankshaft position sensor for foreign matter on crankshaft position sensor face. Check crankshaft position sensor air gap • Check and install new crankshaft position sensor as required. Check and install new

		• on sensor face, gap incorrect • Target wheel failure	target wheel as required
P0341-31	Camshaft Position Sensor A Circuit Range/Performance (Bank 1 or single sensor) - No Signal	NOTE: - Circuit CID - • Harness failure - Camshaft position sensor circuits • Camshaft position sensor failure • Camshaft position sensor or reference target positioning incorrect	• Refer to the electrical circuit diagrams. Check the power supply and ground circuits to the sensor, check the signal circuit for open circuit, short circuit to power, and short circuit to ground. Repair harness as required. Clear DTC and retest • Refer to the relevant section of the workshop manual. Check the sensor and camshaft target for damage, contamination, and correct mounting • Check and install new camshaft position sensor as required
P0341-3A	Camshaft Position Sensor A Circuit Range/Performance (Bank 1 or single sensor) - Incorrect has too many pulses	NOTE: - Circuit CID - • Harness failure - Camshaft position sensor circuits • Camshaft position sensor failure • Camshaft position sensor or reference target positioning incorrect	• Refer to the electrical circuit diagrams. Check the power supply and ground circuits to the sensor, check the signal circuit for open circuit, short circuit to power, and short circuit to ground. Repair harness as required. Clear DTC and retest • Refer to the relevant section of the workshop manual. Check the sensor and camshaft target for damage, contamination, and correct mounting. Check camshaft timing is to specification • Check and install new camshaft position sensor as required
P0342-64	Camshaft Position Sensor A Circuit Low (Bank 1 or single sensor) - Signal plausibility failure	• Harness failure - Camshaft position sensor circuit • Camshaft position sensor failure • Camshaft position sensor or reference target positioning incorrect	• Refer to the electrical circuit diagrams. Check the power supply and ground circuits to the sensor, check the signal circuit for open circuit, short circuit to power, and short circuit to ground. Repair harness as required. Clear DTC and retest • Check the sensor and camshaft target for damage, contamination, and correct mounting. Check camshaft timing is to specification • Check and install new camshaft position sensor as required
P0380-11	Glow Plug/Heater Circuit A - Circuit short to ground	NOTE: - Circuit GPC - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure between engine control module and glow plug control module - Short circuit to ground • Component failure - Glow plug control module failure	• Using the manufacturer approved diagnostic system check datalogger signal, Glow Plug Coil Duty Cycle (0x9A04). Refer to the electrical circuit diagrams and check the control circuit from the engine control module to the glow plug control module for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new glow plug control module as required
P0380-12	Glow Plug/Heater Circuit A - Circuit short to battery	NOTE: - Circuit GPC - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Harness failure	• Using the manufacturer approved diagnostic system check datalogger signal, Glow Plug Coil Duty Cycle (0x9A04). Refer to the electrical circuit diagrams and check the control circuit from the engine control module to the glow plug control module for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new glow plug control module as required

		between engine control module and glow plug control module - Short circuit to power • Component failure - Glow plug control module failure	
P0380-13	Glow Plug/Heater Circuit A - Circuit open	 NOTE: - Circuit GPC - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure between engine control module and glow plug control module - Open circuit • Component failure - Glow plug control module failure	• Using the manufacturer approved diagnostic system check datalogger signal, Glow Plug Coil Duty Cycle (0x9A04). Refer to the electrical circuit diagrams and check the control circuit from the engine control module to the glow plug control module for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new glow plug control module as required
P0380-4B	Glow Plug/Heater Circuit A - Over temperature	• Harness failure - Glow plug heater circuit A short circuit to ground, short circuit to power, high resistance	• Using the manufacturer approved diagnostic system check datalogger signal, Glow Plug Coil Duty Cycle (0x9A04). Refer to the electrical circuit diagrams and check the glow plug heater circuit A for short circuit to ground, short circuit to power, high resistance. Repair harness as required. Clear DTC and retest
P0401-00	Exhaust Gas Recirculation A Flow Insufficient Detected - No sub type information	• Intake air system, low pressure boost leak • Exhaust gas recirculation actuator circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• If this DTC is logged with P00BE-07 & P006A-00, suspect intake air system, low pressure boost leak • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0402-00	Exhaust Gas Recirculation A Flow Excessive Detected - No sub type information	• Intake air system, high pressure boost leak • Exhaust gas recirculation actuator circuit short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• If this DTC is logged with P1247-00, P006A-00 & P00BF-07, suspect intake air system, high pressure boost leak • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0403-13	Exhaust Gas Recirculation A Control Circuit - Circuit open	 NOTE: - Circuit EGR_A_NEG - EGR_A_POS - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Exhaust gas recirculation actuator circuit high resistance, open circuit, disconnected	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Bank 1 - Commanded (0x03FB) • Refer to the electrical circuit diagrams and check the bank 1 exhaust gas recirculation control circuit for open circuit. This circuit consists of two wires connected between the engine control module and the exhaust gas recirculation valve motor. Check both wires for open circuit. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation control actuator as required

		Exhaust gas recirculation actuator failure	
P0403-16	Exhaust Gas Recirculation A Control Circuit - Circuit voltage below threshold	NOTE: - Circuit EGR_A_NEG - EGR_A_POS - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Exhaust gas recirculation actuator circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Bank 1 - Commanded (0x03FB) • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0403-19	Exhaust Gas Recirculation A Control Circuit - Circuit current above threshold	NOTE: - Circuit EGR_A_NEG - EGR_A_POS - • Exhaust gas recirculation actuator circuit short circuit to power • Exhaust gas recirculation actuator failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Bank 1 - Commanded (0x03FB). Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0403-1D	Exhaust Gas Recirculation A Control Circuit - Circuit current out of range	NOTE: - Circuit EGR_A_NEG - EGR_A_POS - • Exhaust gas recirculation actuator circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Bank 1 - Commanded (0x03FB) • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for short circuit to ground, short circuit to power, high resistance, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0403-4B	Exhaust Gas Recirculation A Control Circuit - Over temperature	NOTE: - Circuit EGR_A_NEG - EGR_A_POS - • Exhaust gas recirculation actuator circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Bank 1 - Commanded (0x03FB) • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for short circuit to ground, short circuit to power, high resistance, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0403-71	Exhaust Gas Recirculation "A" Control Circuit / Open - Actuator stuck	NOTE: - Circuit EGR_A_NEG - EGR_A_POS - • Exhaust gas recirculation actuator circuit open circuit, disconnected • Exhaust gas recirculation actuator failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Bank 1 - Commanded (0x03FB) • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0404-19	Exhaust Gas Recirculation A Control Circuit	NOTE: - Circuit	• Using the manufacturer approved diagnostic system check datalogger

	Range/Performance - Circuit current above threshold	EGR_A_NEG - EGR_A_POS - • Exhaust gas recirculation actuator circuit short circuit to ground, short circuit to power, high resistance • Exhaust gas recirculation actuator failure	signals, EGR Bank 1 - Commanded (0x03FB) • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for short circuit to ground, short circuit to power, high resistance. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0405-00	Exhaust Gas Recirculation Sensor A Circuit Low - No sub type information	 NOTE: - Circuit EVP_A - • Exhaust gas recirculation actuator sensor circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Valve Position Bank 1 (0x052E) • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator sensor circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0405-11	Exhaust Gas Recirculation Sensor A Circuit Low - Circuit short to ground	 NOTE: - Circuit EVP_A - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Exhaust gas recirculation actuator position sensor circuit short circuit to ground • Exhaust gas recirculation actuator failure	• Refer to the electrical circuit diagrams and check the bank 1 exhaust gas recirculation sensor signal circuit for short circuit to ground. Check the power and ground circuits which supply the sensor. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation sensor as required
P0405-77	Exhaust Gas Recirculation Sensor A Circuit Low - Commanded position not reachable	• Exhaust gas recirculation actuator position sensor circuit short circuit to ground • Exhaust gas recirculation actuator failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Valve Position Bank 1 (0x052E) • Refer to the electrical circuit diagrams and check the bank 1 exhaust gas recirculation sensor signal circuit for short circuit to ground. Check the power and ground circuits which supply the sensor. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation sensor as required
P0406-00	Exhaust Gas Recirculation Sensor A Circuit High - No sub type information	 NOTE: - Circuit EVP_A - • Exhaust gas recirculation actuator circuit short circuit to power • Exhaust gas recirculation actuator failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Valve Position Bank 1 (0x052E) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 1 circuits for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation sensor as required
P0406-12	Exhaust Gas Recirculation Sensor A Circuit High - Circuit short to battery	 NOTE: - Circuit EVP_A - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement	• Refer to the electrical circuit diagrams and check the bank 1 exhaust gas recirculation sensor signal circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation sensor as required

		when another value was expected • Exhaust gas recirculation actuator position sensor circuit short circuit to power • Exhaust gas recirculation actuator failure	
P0406-77	Exhaust Gas Recirculation Sensor A Circuit High - Commanded position not reachable	• Exhaust gas recirculation actuator circuit short circuit to power • Exhaust gas recirculation actuator failure	• Refer to the electrical circuit diagrams and check the bank 1 exhaust gas recirculation sensor signal circuit for short circuit to power. Check the power and ground circuits which supply the sensor. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation sensor as required
P0407-00	Exhaust Gas Recirculation Sensor B Circuit Low - No sub type information	 NOTE: - Circuit TPS - • Harness failure - Throttle position sensor circuit • Throttle position sensor failure	• Refer to the electrical circuit diagrams and check the throttle position sensor circuits for short circuit to ground, open circuit. Repair harness as required, clear the DTC and retest system • Check and install new throttle position sensor as required
P0408-00	Exhaust Gas Recirculation Sensor B Circuit High - No sub type information	 NOTE: - Circuit TPS - • Harness failure - Throttle position sensor circuit • Throttle position sensor failure	• Refer to the electrical circuit diagrams and check the throttle position sensor circuits for short circuit to ground, open circuit. Repair harness as required, clear the DTC and retest system • Check and install new throttle position sensor as required
P0409-13	Exhaust Gas Recirculation Sensor A Circuit - Circuit open	 NOTE: - Circuit EVP_A - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Exhaust gas recirculation actuator circuit • Exhaust gas recirculation actuator failure	• Refer to the electrical circuit diagrams and check the bank 1 exhaust gas recirculation sensor signal circuit for open circuit. Check the power and ground circuits which supply the sensor. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation sensor as required
P0409-16	Exhaust Gas Recirculation Sensor A Circuit - Circuit voltage below threshold	 NOTE: - Circuit EVP_A - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Exhaust gas recirculation actuator circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator sensor circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0409-17	Exhaust Gas Recirculation Sensor A Circuit - Circuit voltage above threshold	 NOTE: - Circuit EVP_A - • The engine control module measured a	• Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator sensor circuit for short circuit to power. Repair harness as required. Clear DTC and retest

		voltage above a specified range but not necessarily a short circuit to power • Exhaust gas recirculation actuator circuit short circuit to power • Exhaust gas recirculation actuator failure	Check and install new exhaust gas recirculation actuator as required
P0409-92	Exhaust Gas Recirculation Sensor A Circuit - Performance or incorrect operation	• Exhaust gas recirculation actuator circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator sensor circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0426-00	Catalyst Temperature Sensor Circuit Range/Performance (Bank 1, Sensor Circuit 1) - No sub type information	NOTE: - Circuit CCCIT_B - • Exhaust gas temperature sensor post turbocharger circuit to ground, high resistance, open circuit, disconnected	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 1 Voltage (0x03BF), Exhaust Gas Temperature Bank 2 Sensor 1 (0x03F7) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger circuit for short circuit to ground, high resistance, open circuit, disconnected • Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 1 as required
P0427-00	Catalyst Temperature Sensor Circuit Low (Bank 1, Sensor Circuit 1) - No sub type information	NOTE: - Circuit CCCIT_B - • Exhaust gas temperature sensor post turbocharger circuit to ground, high resistance, open circuit, disconnected	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 1 Voltage (0x03BF), Exhaust Gas Temperature Bank 2 Sensor 1 (0x03F7) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger circuit for short circuit to ground, high resistance, open circuit, disconnected • Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 1 as required
P0428-00	Catalyst Temperature Sensor Circuit High (Bank 1, Sensor Circuit 1) - No sub type information	NOTE: - Circuit CCCIT_B - • Exhaust gas temperature sensor post turbocharger circuit to power	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 1 Voltage (0x03BF), Exhaust Gas Temperature Bank 2 Sensor 1 (0x03F7) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger circuit for short circuit to power • Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 1 as required
P042B-00	Catalyst Temperature Sensor Circuit Range/Performance (Bank1, Sensor Circuit 2) - No sub type information	NOTE: - Circuit CCCOT_A - • Exhaust gas temperature sensor post catalytic converter short circuit to ground, open circuit, high resistance • Exhaust gas temperature sensor post catalytic converter failure	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post catalytic converter circuit for short circuit to ground, open circuit, high resistance • Check and install new exhaust gas temperature sensor post catalytic converter as required

P042C-00	Catalyst Temperature Sensor Circuit Low (Bank 1, Sensor Circuit 2) - No sub type information	 NOTE: - Circuit CCCOT_A - • Exhaust gas temperature sensor post catalytic converter short circuit to ground, open circuit, high resistance • Exhaust gas temperature sensor post catalytic converter failure	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post catalytic converter circuit for short circuit to ground, open circuit, high resistance • Check and install new exhaust gas temperature sensor post catalytic converter as required
P042E-77	Exhaust Gas Recirculation A Control Stuck Open - Commanded position not reachable	• Exhaust gas recirculation actuator circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• Check for other related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, operate the exhaust recirculation valve through the full operating range whilst monitoring the position sensor signal value. If the position signal does not change smoothly in proportion to the commands check the operation of the valve • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P042F-77	Exhaust Gas Recirculation A Control Stuck Closed - Commanded position not reachable	• Exhaust gas recirculation actuator circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation actuator failure	• Check for other related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, operate the exhaust recirculation valve through the full operating range whilst monitoring the position sensor signal value. If the position signal does not change smoothly in proportion to the commands check the operation of the valve • Refer to the electrical circuit diagrams and check exhaust gas recirculation actuator circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation actuator as required
P0435-00	Catalyst Temperature Sensor Circuit (Bank 2, Sensor Circuit 1) - No sub type information	 NOTE: - Circuit CCCIT_B - • Exhaust gas temperature sensor post turbocharger bank 2, sensor 1 circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 1 Voltage (0x03BF), Exhaust Gas Temperature Bank 2 Sensor 1 (0x03F7) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger bank 2, sensor 1 circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 1 as required
P0436-00	Catalyst Temperature Sensor Circuit Range/Performance (Bank 2, Sensor Circuit 1) - No sub type information	 NOTE: - Circuit STOT - • Exhaust gas temperature sensor post turbocharger overheating • Exhaust gas temperature sensor post turbocharger short circuit short	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger circuit for short circuit to ground, open circuit, high resistance • Clear the DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger as required

		circuit to ground, open circuit, high resistance • Exhaust gas temperature sensor post turbocharger failure	
P0437-00	Catalyst Temperature Sensor Circuit Low (Bank 2, Sensor Circuit 1) - No sub type information	NOTE: - Circuit CCCIT_B - • Exhaust gas temperature sensor post turbocharger bank 2, sensor 1 circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas temperature sensor post turbocharger bank 2, sensor 1 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 1 Voltage (0x03BF), Exhaust Gas Temperature Bank 2 Sensor 1 (0x03F7) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger bank 2, sensor 1 circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 1 as required
P0438-00	Catalyst Temperature Sensor Circuit High (Bank 2, Sensor Circuit 1) - No sub type information	NOTE: - Circuit CCCIT_B - • Exhaust gas temperature sensor post turbocharger bank 2, sensor 1 circuit short circuit to power • Exhaust gas temperature sensor post turbocharger bank 2, sensor 1 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 1 Voltage (0x03BF), Exhaust Gas Temperature Bank 2 Sensor 1 (0x03F7). • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger bank 2, sensor 1 circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 1 as required
P043A-00	Catalyst Temperature Sensor Circuit (Bank 2, Sensor Circuit 2) - No sub type information	NOTE: - Circuit CCCOT_A - • Exhaust gas temperature sensor post turbocharger bank 2, sensor 2 circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas temperature sensor post turbocharger bank 2, sensor 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 2 Sensor 2 (0x03F8), Exhaust Gas Temperature Sensor Bank 2 Sensor 2 Voltage (0x03E9) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger bank 2, sensor 2 circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 2 as required
P043B-00	Catalyst Temperature Sensor Circuit Range/Performance (Bank 2, Sensor Circuit 2) - No sub type information	NOTE: - Circuit CCCOT_A - • Exhaust gas temperature sensor post turbocharger bank 2, sensor 2 circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas temperature sensor post turbocharger bank 2, sensor 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 2 Sensor 2 (0x03F8), Exhaust Gas Temperature Sensor Bank 2 Sensor 2 Voltage (0x03E9) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger bank 2, sensor 2 circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 2 as required

P043C-00	Catalyst Temperature Sensor Circuit Low (Bank 2, Sensor Circuit 2) - No sub type information	 NOTE: - Circuit CCCOT_A - • Exhaust gas temperature sensor post turbocharger bank 2, sensor 2 circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas temperature sensor post turbocharger bank 2, sensor 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 2 Sensor 2 (0x03F8), Exhaust Gas Temperature Sensor Bank 2 Sensor 2 Voltage (0x03E9) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger bank 2, sensor 2 circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 2 as required
P043D-00	Catalyst Temperature Sensor Circuit High (Bank 2, Sensor Circuit 2) - No sub type information	 NOTE: - Circuit CCCOT_A - • Exhaust gas temperature sensor post turbocharger bank 2, sensor 2 circuit short circuit to power • Exhaust gas temperature sensor post turbocharger bank 2, sensor 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 2 Sensor 2 (0x03F8), Exhaust Gas Temperature Sensor Bank 2 Sensor 2 Voltage (0x03E9) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger bank 2, sensor 2 circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 2 as required
P044A-13	Exhaust Gas Recirculation Sensor C Circuit - Circuit open	 NOTE: - Circuit EVP_B - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Exhaust gas recirculation valve bank 2 circuit high resistance, open circuit, disconnected • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Valve Position Bank 2 (0x052F) • Refer to the electrical circuit diagrams and check the bank 2 exhaust gas recirculation sensor signal circuit for open circuit. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P044A-16	Exhaust Gas Recirculation Sensor C Circuit - Circuit voltage below threshold	 NOTE: - Circuit EVP_B - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, high resistance, disconnected • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Valve Position Bank 2 (0x052F) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, high resistance, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P044A-17	Exhaust Gas Recirculation Sensor C Circuit - Circuit voltage above threshold	 NOTE: - Circuit EVP_B - • The engine control module measured a voltage above a specified range but	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Valve Position Bank 2 (0x052F). • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to power. Repair

		not necessarily a short circuit to power • Exhaust gas recirculation valve bank 2 circuit short circuit to power • Exhaust gas recirculation valve bank 2 failure	harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P044A-92	Exhaust Gas Recirculation Sensor C Circuit - Performance or incorrect operation	NOTE: - Circuit EVP_B - • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, short circuit to power, open circuit, high resistance, disconnected • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Valve Position Bank 2 (0x052F) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, short circuit to power, open circuit, high resistance, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P044C-00	Exhaust Gas Recirculation Sensor C Circuit Low - No sub type information	NOTE: - Circuit EVP_B - • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Valve Position Bank 2 (0x052F) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P044D-00	Exhaust Gas Recirculation Sensor C Circuit High - No sub type information	NOTE: - Circuit EVP_B - • Exhaust gas recirculation valve bank 2 circuit short circuit to power • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Valve Position Bank 2 (0x052F) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045A-13	Exhaust Gas Recirculation B Control Circuit - Circuit open	NOTE: - Circuit EGR_B_NEG - EGR_B_POS - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Exhaust gas recirculation valve bank 2 circuit open circuit, disconnected • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525) • Refer to the electrical circuit diagrams and check the bank 2 exhaust gas recirculation control circuit for open circuit, disconnected. Check both wires. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation control actuator as required
P045A-16	Exhaust Gas Recirculation B Control Circuit - Circuit voltage below threshold	NOTE: - Circuit EGR_B_NEG - EGR_B_POS - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Exhaust gas	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, high resistance, open circuit, disconnected. Check both circuits. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas

		recirculation valve bank 2 circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas recirculation valve bank 2 failure	recirculation valve bank 2 as required
P045A-19	Exhaust Gas Recirculation B Control Circuit - Circuit current above threshold	NOTE: - Circuit EGR_B_NEG - EGR_B_POS - • The engine control module has measured current flow above a specified range • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Check both circuits. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045A-1D	Exhaust Gas Recirculation B Control Circuit - Circuit current out of range	NOTE: - Circuit EGR_B_NEG - EGR_B_POS - • The engine control module has detected a current outside of the expected range, but not identified as too high or too low • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Check both circuits. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045A-4B	Exhaust Gas Recirculation B Control Circuit - Over temperature	NOTE: - Circuit EGR_B_NEG - EGR_B_POS - • The engine control module detected an internal temperature above the expected range • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, short circuit to power, high resistance • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, short circuit to power, high resistance. Check both circuits. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045A-71	Exhaust Gas Recirculation B Control Circuit - Actuator stuck	NOTE: - Circuit EGR_B_NEG - EGR_B_POS - • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, short circuit to power, open circuit, high resistance • Exhaust gas	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Check both circuits. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required

		recirculation valve bank 2 failure	
P045B-19	Exhaust Gas Recirculation B Control Circuit Range/Performance - Circuit current above threshold	• The engine control module has measured current flow above a specified range • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045C-00	Exhaust Gas Recirculation B Control Circuit Low - No sub type information	 NOTE: - Circuit EGR_B_NEG - EGR_B_POS - • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525) • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground, high resistance, open circuit, disconnected. Check both circuits. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045C-11	Exhaust Gas Recirculation B Control Circuit Low - Circuit short to ground	 NOTE: - Circuit EGR_B_NEG - EGR_B_POS - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Exhaust gas recirculation valve bank 2 circuit short circuit to ground • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525). Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045C-77	Exhaust Gas Recirculation B Control Circuit Low - Commanded position not reachable	• Exhaust gas recirculation valve bank 2 circuit short circuit to ground • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525). Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045D-00	Exhaust Gas Recirculation B Control Circuit High - No sub type information	 NOTE: - Circuit EGR_B_NEG - EGR_B_POS - • Exhaust gas recirculation valve bank 2 circuit short circuit to power • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525). Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045D-12	Exhaust Gas Recirculation B Control Circuit High - Circuit short to battery	 NOTE: - Circuit EGR_B_NEG - EGR_B_POS -	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525). Refer to the electrical circuit

		The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Exhaust gas recirculation valve bank 2 circuit short circuit to power • Exhaust gas recirculation valve bank 2 failure	diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045D-77	Exhaust Gas Recirculation B Control Circuit High - Commanded position not reachable	• Exhaust gas recirculation valve bank 2 circuit short circuit to power • Exhaust gas recirculation valve bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded EGR Bank 2 (0x0525). Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P045E-77	Exhaust Gas Recirculation B Control Stuck Open - Commanded position not reachable	• Exhaust gas recirculation valve B circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation valve B failure	• Check for other related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, operate the Exhaust Recirculation Valve through the full operating range whilst monitoring the position sensor signal value. If the position signal does not change smoothly in proportion to the commands check the operation of the valve • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve B circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve B as required
P045F-77	Exhaust Gas Recirculation B Control Stuck Closed - Commanded position not reachable	• Exhaust gas recirculation valve B circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Exhaust gas recirculation valve B failure	• Check for other related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, operate the Exhaust Recirculation Valve through the full operating range whilst monitoring the position sensor signal value. If the position signal does not change smoothly in proportion to the commands check the operation of the valve • Refer to the electrical circuit diagrams and check exhaust gas recirculation valve B circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve B as required
P046E-00	Exhaust Gas Recirculation Sensor "B" Circuit Range/Performance - No sub type information	 NOTE: - Circuit TPS - • Throttle position sensor short circuit to ground, short circuit to power, open circuit, high resistance • Throttle position sensor failure	• Refer to the electrical circuit diagrams and check throttle position sensor for short circuit to ground, short circuit to power, open circuit, high resistance. Repair harness as required. Clear DTC and retest • Check and install new throttle position sensor as required
P0480-11	Fan 1 Control Circuit - Circuit short to ground	 NOTE: - Circuit ECFC -	• Using the manufacturer approved diagnostic system check datalogger

		• The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Fan 1 control circuit - Short circuit to ground • Cooling fan 1 component failure	signals, Electric Fan PWM Control - Commanded (0x03F9). Refer to the electrical circuit diagrams and check the cooling fan 1 control circuit for short circuit to ground. Check the power and ground supplies to the cooling fan 1 control module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 1 control module as required
P0480-12	Fan 1 Control Circuit - Circuit short to battery	 NOTE: - Circuit ECFC - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Fan 1 control circuit - Short circuit to power • Cooling fan 1 component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Electric Fan PWM Control - Commanded (0x03F9). Refer to the electrical circuit diagrams and check the cooling fan 1 control circuit for short circuit to power. Check the power and ground supplies to the cooling fan 1 control module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 1 control module as required
P0480-13	Fan 1 Control Circuit - Circuit open	 NOTE: - Circuit ECFC - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Fan 1 control circuit - Open circuit • Cooling fan 1 component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Electric Fan PWM Control - Commanded (0x03F9). Refer to the electrical circuit diagrams and check the cooling fan 1 control circuit for open circuit. Check the power and ground supplies to the cooling fan 1 control module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 1 control module as required
P0480-16	Fan 1 Control Circuit - Circuit voltage below threshold	• The engine control module has determined that the fan 1 supply voltage is below the calibrated threshold • Fan 1 control circuit - Open circuit, short circuit to ground, high resistance • Cooling fan 1 control module failure	• Refer to the electrical circuit diagrams and check the fan 1 supply circuit for short circuit to ground, open circuit, high resistance. Check the power and ground supplies to the cooling fan 1 control module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 1 control module as required
P0480-17	Fan 1 Control Circuit - Circuit voltage above threshold	• The engine control module has determined that the fan 1 supply voltage is above the calibrated threshold • Fan 1 control circuit - Short circuit to power • Cooling fan 1 control module failure	• Refer to the electrical circuit diagrams and check the fan 1 supply circuit for short circuit to power. Check the power and ground supplies to the cooling fan 1 control module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 1 control module as required
P0480-71	Fan 1 Control Circuit - Actuator stuck	• Engine cooling fan **partially** stalled • Engine cooling fan stalling caused by deep water wading • Engine cooling fan stalling caused by	• Confirm if customer has been deep water wading • Check for damage to or blockages in fan and fouling of fan cowling. Rectify as required • Using the manufacturer approved diagnostic system check datalogger signal

		obstruction in fan cowling	- Electric Fan PWM Control - Commanded - (0x03F9) • Using the manufacturer approved diagnostic system, operate cooling fan 1 through the full operating range and check that the DTC does not reset
P0480-97	Fan 1 Control Circuit - Component or system operation obstructed or blocked	• Engine cooling fan stalled • Engine cooling fan stalling caused by deep water wading • Engine cooling fan stalling caused by obstruction in fan cowling	• Confirm if customer has been deep water wading • Check for damage to or blockages in fan and fouling of fan cowling. Rectify as required • Using the manufacturer approved diagnostic system check datalogger signal - Electric Fan PWM Control - Commanded - (0x03F9) • Using the manufacturer approved diagnostic system, operate cooling fan 1 through the full operating range and check that the DTC does not reset
P0481-11	Fan 2 Control Circuit - Circuit short to ground	NOTE: - Circuit ECFC_2 - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Fan 2 control circuit - Short circuit to ground • Cooling fan 2 component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Electric Fan PWM Control - Commanded (0x03FA). Refer to the electrical circuit diagrams and check the cooling fan 2 control circuit for short circuit to ground. Check the power and ground supplies to the cooling fan 2 control module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 2 control module as required
P0481-12	Fan 2 Control Circuit - Circuit short to battery	NOTE: - Circuit ECFC_2 - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Fan 2 control circuit - Short circuit to power • Cooling fan 2 component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Electric Fan PWM Control - Commanded (0x03FA). Refer to the electrical circuit diagrams and check the cooling fan 2 control circuit for short circuit to power. Check the power and ground supplies to the cooling fan 2 control module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 2 control module as required
P0481-13	Fan 2 Control Circuit - Circuit open	NOTE: - Circuit ECFC_2 - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Fan 2 control circuit - Open circuit • Cooling fan 2 component failure	• Using the manufacturer approved diagnostic system check datalogger signals, Electric Fan PWM Control - Commanded (0x03FA). Refer to the electrical circuit diagrams and check the cooling fan 2 control circuit for open circuit. Check the power and ground supplies to the cooling fan 2 control module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 2 control module as required
P0481-16	Fan 2 Control Circuit - Circuit voltage below threshold	• The engine control module has determined that the fan 2 supply voltage is below the calibrated	• Refer to the electrical circuit diagrams and check the fan 2 supply circuit for short circuit to ground, open circuit, high resistance. Check the power and ground supplies to the cooling fan 2 control

		threshold • Fan 2 control circuit - Open circuit, short circuit to ground, high resistance • Cooling fan 2 control module failure	module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 2 control module as required
P0481-17	Fan 2 Control Circuit - Circuit voltage above threshold	• The engine control module has determined that the fan 2 supply voltage is above the calibrated threshold • Fan 2 control circuit - Short circuit to power • Cooling fan 2 control module failure	• Refer to the electrical circuit diagrams and check the fan 2 supply circuit for short circuit to power. Check the power and ground supplies to the cooling fan 2 control module. Repair harness as required. Clear DTC and retest • Check and install new cooling fan 2 control module as required
P0481-71	Fan 2 Control Circuit - Actuator stuck	• Engine cooling fan **partially** stalled • Engine cooling fan stalling caused by deep water wading • Engine cooling fan stalling caused by obstruction in fan cowling	• Confirm if customer has been deep water wading • Check for damage to or blockages in fan and fouling of fan cowling. Rectify as required • Using the manufacturer approved diagnostic system check datalogger signal - Viscous Fan PWM Control - Commanded - (0x03FA) • Using the manufacturer approved diagnostic system, operate cooling fan 2 through the full operating range and check that the DTC does not reset
P0481-97	Fan 2 Control Circuit - Component or system operation obstructed or blocked	• Engine cooling fan stalled • Engine cooling fan stalling caused by deep water wading • Engine cooling fan stalling caused by obstruction in fan cowling	• Confirm if customer has been deep water wading • Check for damage to or blockages in fan and fouling of fan cowling. Rectify as required • Using the manufacturer approved diagnostic system check datalogger signal - Viscous Fan PWM Control - Commanded - (0x03FA) • Using the manufacturer approved diagnostic system, operate cooling fan 2 through the full operating range and check that the DTC does not reset
P0483-27	Fan Performance - Signal rate of change above threshold	• Engine cooling fan acceleration plausibility defect • This DTC is set if the calculated engine cooling fan acceleration value is greater than a calibrated value	• Refer to relevant section of workshop manual and check the viscous fan unit
P0483-36	Fan Performance - Signal frequency too low	NOTE: - Circuit VCFC - CFM - • The engine control module detected excessive duration for one cycle of the output across a specified sample size • Engine cooling fan speed below maximum threshold • Viscous fan circuit short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to electrical circuit diagrams and check the viscous fan circuit for short circuit to ground, short circuit to power, open circuit, high resistance
P0483-37	Fan Performance - Signal frequency too high	NOTE: - Circuit VCFC - CFM -	• Refer to electrical circuit diagrams and check the viscous fan circuit for short circuit to ground, short circuit to power, open circuit, high resistance

		The engine control module detected insufficient duration for one cycle of the output across a specified sample size • Engine cooling fan speed above maximum threshold • Viscous fan circuit short circuit to ground, short circuit to power, open circuit, high resistance	
P0486-13	Exhaust Gas Recirculation Sensor B Circuit - Circuit open	 NOTE: - Circuit TPS - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Throttle motor position sensor circuit open circuit • Throttle motor position sensor failure	• This DTC is set when the engine control module detects a no load error on the throttle motor position sensor circuit. This sensor is a potentiometer. Refer to the electrical circuit diagrams and check the sensor 5 volt supply and ground circuits. Check the sensor circuits for open circuits, short circuit to ground, short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new throttle motor position sensor failure
P0486-16	Exhaust Gas Recirculation Sensor B Circuit - Circuit voltage below threshold	 NOTE: - Circuit TPS - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Exhaust gas recirculation valve bank 2 circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas recirculation valve bank 2 failure	• Refer to the electrical circuit diagrams and check exhaust gas recirculation valve B circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve B as required
P0486-17	Exhaust Gas Recirculation Sensor B Circuit - Circuit voltage above threshold	 NOTE: - Circuit TPS - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Exhaust gas recirculation valve bank 2 circuit short circuit to power • Exhaust gas recirculation valve bank 2 failure	• Refer to the electrical circuit diagrams and check exhaust gas recirculation valve bank 2 circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation valve bank 2 as required
P0486-92	Exhaust Gas Recirculation Sensor B Circuit - Performance or incorrect operation	 NOTE: - Circuit TPS - • Throttle position sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Throttle position sensor failure	• Refer to the electrical circuit diagrams and check throttle position sensor circuit for short circuit to ground, short circuit to power, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new throttle position sensor as required

P0487-00	Exhaust Gas Recirculation Throttle Control Circuit A / Open - No sub type information	 NOTE: - Circuit TPA_POS - TPA_NEG - • Harness failure - Throttle motor control circuit open circuit, short circuit to ground, short circuit to power • Throttle motor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Throttle Actuator Control (0xF44C). This DTC is set when the engine control module detects an open load error on the throttle motor control circuit. Refer to the electrical circuit diagrams and check the throttle control circuits for open circuit, short circuit to ground, short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new throttle motor control actuator as required
P0487-19	Exhaust Gas Recirculation Throttle Control Circuit A / Open - Circuit current above threshold	 NOTE: - Circuit TPA_POS - TPA_NEG - • The engine control module has measured current flow above a specified range • Harness failure - Throttle motor control circuit short circuit to ground, high resistance, open circuit • Throttle motor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Throttle Actuator Control (0xF44C). Refer to the electrical circuit diagrams and check the throttle control circuits for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new throttle motor control actuator as required
P0487-1D	Exhaust Gas Recirculation Throttle Control Circuit A / Open - Circuit current out of range	 NOTE: - Circuit TPA_POS - TPA_NEG - • The engine control module has detected a current outside of the expected range, but not identified as too high or too low • Harness failure - Throttle motor control circuit short circuit to ground, short circuit to power, short circuit to other circuit • Throttle motor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Throttle Actuator Control (0xF44C). Refer to the electrical circuit diagrams and check the throttle plate actuator control circuits for short circuit to ground, short circuit to power, short circuit to other circuit. Repair harness as required. Clear DTC and retest • Check and install new throttle motor control actuator as required
P0488-16	Exhaust Gas Recirculation Throttle Control Circuit A Range/Performance - Circuit voltage below threshold	 NOTE: - Circuit TPA_POS - TPA_NEG - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Throttle motor control circuit open circuit, short circuit to ground, short circuit to power, high resistance, short circuit to another circuit • Throttle motor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Throttle Actuator Control (0xF44C). Refer to the electrical circuit diagrams and check the throttle plate actuator control circuits for open circuit, short circuit to ground, short circuit to power, high resistance, short circuit to other circuit. Repair harness as required. Clear DTC and retest • Check and install new throttle motor control actuator as required
P0488-19	Exhaust Gas Recirculation Throttle Control Circuit A Range/Performance - Circuit current above threshold	• The engine control module has measured current flow above a specified range • Harness failure - Throttle motor control circuit short circuit to ground, high resistance • Throttle motor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Throttle Actuator Control (0xF44C). Refer to the electrical circuit diagrams and check the throttle plate actuator control circuit for short circuit to ground, high resistance. Repair harness as required. Clear DTC and retest • Check and install new throttle motor control actuator as required

P0488-1D	Exhaust Gas Recirculation Throttle Control Circuit A Range/Performance - Circuit current out of range	NOTE: - Circuit TPA_POS - TPA_NEG - • The engine control module has detected a current outside of the expected range, but not identified as too high or too low • Harness failure - Throttle motor control circuit high resistance, open circuit, short circuit to ground, short circuit to power, short circuit to other circuit • Throttle motor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Throttle Actuator Control (0xF44C). Refer to the electrical circuit diagrams and check the throttle plate actuator control circuits for high resistance, open circuit, short circuit to ground, short circuit to power, short circuit to other circuit. Repair harness as required. Clear DTC and retest • Check and install new throttle motor control actuator as required
P0488-4B	Exhaust Gas Recirculation Throttle Control Circuit A Range/Performance - Over temperature	• The engine control module detected an internal temperature above the expected range • Harness failure - Throttle motor control circuit short circuit to ground, short circuit to power, high resistance • Throttle motor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Commanded Throttle Actuator Control (0xF44C). Refer to the electrical circuit diagrams and check the throttle motor control circuit for short circuit to ground, short circuit to power, high resistance. Repair harness as required. Clear DTC and retest • Check and install new throttle motor control actuator as required
P0488-72	Exhaust Gas Recirculation Throttle Control Circuit A Range/Performance - Actuator stuck open	• Harness failure - Exhaust gas recirculation throttle inlet control circuit short circuit to ground, short circuit to power, high resistance, open circuit • Exhaust gas recirculation throttle inlet control actuator failure	• Refer to the electrical circuit diagrams and check the exhaust gas recirculation throttle inlet control circuit for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation throttle inlet control actuator as required
P0488-73	Exhaust Gas Recirculation Throttle Control Circuit A Range/Performance - Actuator stuck closed	• Harness failure - Exhaust gas recirculation throttle inlet control circuit short circuit to ground, short circuit to power, high resistance, open circuit • Exhaust gas recirculation throttle inlet control actuator failure	• Refer to the electrical circuit diagrams and check the exhaust gas recirculation throttle inlet control circuit for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation throttle inlet control actuator as required
P0489-77	Exhaust Gas Recirculation Control Circuit Low - Commanded position not reachable	NOTE: - Circuit SENSOR_GND_5 - • Throttle position sensor circuit open circuit	• Check for related DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check the throttle position sensor circuit for open circuit. Repair harness as required. Clear DTC and retest
P0490-77	Exhaust Gas Recirculation A Control Circuit High - Commanded position not reachable	• Throttle position sensor circuit, short circuit to ground, short circuit to power, open circuit	• Check for related DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check the throttle position sensor circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest
P049D-00	Exhaust Gas Recirculation A Control Position Exceeded Learning Limit -	• Harness failure - Exhaust gas recirculation valve	• Refer to the electrical circuit diagrams and check the bank 1 exhaust gas recirculation control circuit for short circuit to ground,

	No sub type information	bank 1 control circuit short circuit to ground, short circuit to power, high resistance, open circuit • Exhaust gas recirculation valve bank 1 actuator failure	short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation control actuator as required
P049E-00	Exhaust Gas Recirculation B Control Position Exceeded Learning Limit - No sub type information	• Harness failure - Exhaust gas recirculation valve bank 2 control circuit short circuit to ground, short circuit to power, high resistance, open circuit • Exhaust gas recirculation valve bank 2 actuator failure	• Refer to the electrical circuit diagrams and check the bank 2 exhaust gas recirculation control circuit for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation control actuator as required
P0504-27	Brake Switch A / B Correlation - Signal rate of change above threshold	NOTE: - Circuit BOO_1 - BOO_2 - • Brake pedal switch plunger failure • Brake pedal switch not fitted correctly • Brake switch A failure	• Check for related brake pressure DTCs within the anti-lock brake system control module • Check brake pedal switch is fitted correctly. Clear DTC, start the engine and press the brake pedal, using maximum travel, for greater than 1 second taking care not to press the accelerator pedal • Check and install new brake switch as required
P0504-62	Brake Switch A / B Correlation - Signal compare failure	NOTE: - Circuit BOO_1 - BOO_2 - • Error check for brake plausibility • Brake pedal switch circuit short circuit to power, open circuit	• Refer to the electrical circuit diagrams and check brake pedal switch circuit for short circuit to power, open circuit. Repair harness as required. Clear DTC and retest
P050E-00	Cold Start Engine Exhaust Temperature Too Low - No sub type information	• Engine coolant temperature sensor circuit short circuit to ground, short circuit to power, open circuit, disconnected • Engine coolant temperature sensor failure	• Refer to the electrical circuit diagrams and check engine coolant temperature sensor circuit for short circuit to ground, short circuit to power, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new engine coolant temperature sensor as required
P050F-00	Brake Assist Vacuum Too Low - No sub type information	• Harness failure - Vacuum switch circuit short circuit to ground, short circuit to power, open circuit, disconnected • Vacuum switch failure	• Refer to the electrical circuit diagrams and check vacuum switch circuit for short circuit to ground, short circuit to power, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new vacuum switch as required
P0512-24	Starter Request Circuit - Signal stuck high	NOTE: - Circuit CRNK - • The engine control module measures a signal that remains high when transitions are expected • Harness failure - Starter request circuit failure • Central junction box failure • Post drive cycle not completed • Harness failure - CAN circuit	• This DTC is set when the engine control module detects the engine crank signal from the central junction box is stuck high. If this DTC is logged on its own clear the DTC using the manufacturer approved diagnostic system. Select PARK position. Set ignition OFF, wait 2 minutes for post drive to complete. Set ignition ON but do NOT crank. Wait 25 seconds. Crank engine and check if DTC is cleared. If this DTC is logged with lost communication DTCs refer to electrical circuit diagrams and check CAN circuit. If the engine cannot be cranked read the DTCs stored in the central junction box and refer to the relevant DTC index. Check the engine crank signal input circuit for open circuit, short circuit to power, short circuit to ground, short circuit to other circuits.

			Repair harness as required. Clear DTC and retest
P0512-64	Starter Request Circuit - Signal plausibility failure	 NOTE: - Circuit CRNK - • Harness failure - Starter request circuit failure • Central junction box failure • Postdrive cycle not completed • Harness failure - CAN circuit	• This DTC is set when the engine control module detects the engine crank signal from the passenger compartment fuse box is stuck high. If this DTC is logged on its own clear the DTC using the manufacturer approved diagnostic system. Select PARK position. Set ignition OFF, wait 2 minutes for post drive to complete. Set ignition ON but do NOT crank. Wait 25 seconds. Crank engine and check if DTC is cleared. If this DTC is logged with lost communication DTCs refer to electrical circuit diagrams and check CAN circuit. If the engine cannot be cranked read the DTCs stored in the central junction box and refer to the relevant DTC index. Check the engine crank signal input circuit for open circuits, short circuit to power, short circuit to ground, short to other circuits. Repair wiring harness as required, clear DTC and retest system
P0513-00	Incorrect Immobilizer Key - No sub type information	• Security key invalid	• Check for CAN network and engine control module related DTCs. Re-configure the engine control module using the manufacturer approved diagnostic system. Re-configure the instrument cluster using the manufacturer approved diagnostic system
P0528-00	Fan Speed Sensor Circuit No Signal - No sub type information	 NOTE: - Circuit CFM - • Harness failure - Cooling fan monitor circuit	• Using the manufacturer approved diagnostic system check datalogger signals, Fan Speed Indicated (0x0702). This DTC is set when the engine control module does not receive a signal on the cooling fan monitor circuit. Check the cooling fan monitor signal input circuit for open circuits, short circuit to power, short circuit to ground or other circuits. Repair harness as required. Clear DTC and retest
P052F-00	Glow Plug Control Module System Voltage - No sub type information	• Glow plug control module circuit short circuit to ground, short circuit to power, open circuit, disconnected • Glow plug control module failure	• Refer to the electrical circuit diagrams and check glow plug control module circuit for short circuit to ground, short circuit to power, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new glow plug control module as required
P0544-00	Exhaust Gas Temperature Sensor Circuit - Bank 1 Sensor 1 - No sub type information	 NOTE: - Circuit CCCIT_B - • Exhaust gas temperature sensor post turbocharger bank 2, sensor 1 circuit short circuit to ground • Exhaust gas temperature sensor post turbocharger bank 2, sensor 1 failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 1 Voltage (0x03BF), Exhaust Gas Temperature Bank 2 Sensor 1 (0x03F7) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger bank 2, sensor 1 circuit for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 1 as required
P0545-00	Exhaust Gas Temperature Sensor Circuit Low - Bank 1 Sensor 1 - No sub type information	 NOTE: - Circuit STOT - • Exhaust gas temperature sensor, bank 1 sensor 1 circuit short circuit to ground, high resistance, open circuit, disconnected • Exhaust gas	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor, bank 1 sensor 1 circuit for short circuit to ground, high resistance, open circuit, disconnected. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor, bank 1 sensor 1 as required

		temperature sensor, bank 1 sensor 1 failure	
P0546-00	Exhaust Gas Temperature Sensor Circuit High - Bank 1 Sensor 1 - No sub type information	NOTE: - Circuit STOT - • Exhaust gas temperature sensor, bank 1 sensor 1 circuit short circuit to power • Exhaust gas temperature sensor, bank 1 sensor 1 failure	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor, bank 1 sensor 1 circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas temperature sensor, bank1 sensor 1 as required
P0547-00	Exhaust Gas Temperature Sensor Circuit - Bank 2 Sensor 1 - No sub type information	NOTE: - Circuit STOT - • Exhaust gas temperature sensor post turbocharger short circuit to ground • Exhaust gas temperature sensor post turbocharger failure	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger circuit for short circuit to ground • Clear the DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger as required
P0548-00	Exhaust Gas Temperature Sensor Circuit Low - Bank 2 Sensor 1 - No sub type information	NOTE: - Circuit STOT - • Exhaust gas temperature sensor post turbocharger short circuit short circuit to ground, open circuit, high resistance • Exhaust gas temperature sensor post turbocharger failure	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger circuit for short circuit to ground, open circuit, high resistance • Clear the DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger as required
P0549-00	Exhaust Gas Temperature Sensor Circuit High - Bank 2 Sensor 1 - No sub type information	NOTE: - Circuit STOT - • Exhaust gas temperature sensor post turbocharger short circuit short circuit to power, open circuit, high resistance • Exhaust gas temperature sensor post turbocharger failure	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger circuit for short circuit to power, open circuit, high resistance • Clear the DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger as required
P0571-62	Brake Switch A Circuit - Signal compare failure	• The brake switch signal received over CAN is defective • Brake switch (footbrake switch) failure	• Using the manufacturer approved diagnostic system carry out network integrity test • Check for related DTCs and refer to the relevant DTC index • Check and install new brake switch as required
P0571-68	Brake Switch A Circuit - Event information	• Brake pedal pressed by driver at same time as accelerator pedal pressed • Brake pedal switch - Circuit BOO_1 - Short circuit to power • Brake switch (footbrake switch) failure	• Ensure driver has not lightly pressed brake pedal and accelerator pedal at the same time • Refer to the electrical circuit diagrams and check Brake switch - Circuit BOO_1 - For short circuit to power. Repair wiring harness as required, Clear DTC and retest. • Check and install new brake switch as required
P0575-81	Cruise Control Input Circuit - Invalid serial data received	• The DTC sets if the cancel, set minus, set plus, resume, headway increase and headway decrease speed control buttons	• Check speed control buttons are not jammed/contaminated/damaged. Check speed control module for related DTCs and refer to the relevant DTC index

		have been pressed for longer than a calibrated period of time. The system then assumes a stuck/damaged button and will cancel and/or disable cruise. The failure will be healed in the next driving cycle if the failure is removed	
P0602-00	Powertrain Control Module Programming Error - No sub type information	• Mismatch between car configuration file and engine control module calibration for expected engine power output • Incorrect engine control module calibration for vehicle specification	• Using the manufacturer approved diagnostic system re-configure the engine control module. Clear DTC and retest
P0605-00	Internal Control Module Read Only Memory (ROM) Error - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power and ground supplies for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P0606-00	Control Module Processor - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power and ground supplies for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P0606-44	Control Module Processor - Data memory failure	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power and ground supplies for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P0606-49	Control Module Processor - Internal electronic failure	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power and ground supplies for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P0607-00	Control Module Performance - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P060A-00	Internal Control Module Monitoring Processor Performance - No sub type	• Engine control module has reset due to hardware failure	• Check engine control module power and ground supply circuits for open circuits. Re-configure the engine control module

	information		using the manufacturer approved diagnostic system, Clear DTC and retest • Check and install new engine control module as required
P060A-16	Internal Control Module Monitoring Processor Performance - Circuit voltage below threshold	• The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P060A-17	Internal Control Module Monitoring Processor Performance - Circuit voltage above threshold	• The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power and ground supplies for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P060B-00	Internal Control Module A/D Processing Performance - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power and ground supplies for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P060B-16	Internal Control Module A/D Processing Performance - Circuit voltage below threshold	• The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P060B-17	Internal Control Module A/D Processing Performance - Circuit voltage above threshold	• The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P060B-46	Internal Control Module A/D Processing Performance - Calibration / parameter memory failure	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest

		failure	• Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P060B-49	Internal Control Module A/D Processing Performance - Internal electronic failure	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P060B-63	Internal Control Module A/D Processing Performance - Circuit / component protection time-out	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P060C-00	Internal Control Module Main Processor Performance - No sub type information	• Engine control module has reset due to hardware or software failure	• Clear DTC and road test vehicle including at least 5 ignition cycles. Re-check DTC and repeat above procedure. If DTC resets check and install new engine control module as required
P060D-00	Internal Control Module Accelerator Pedal Position Performance - No sub type information	• Accelerator pedal position sensor circuit, short circuit to ground, short circuit to power, high resistance, open circuit • Accelerator pedal position sensor failure • Engine control module failure	• Refer to the electrical circuit diagrams and check the reference voltage and ground connections to the accelerator pedal position sensor. Check signal circuits for high resistance, open circuits, short circuit to power, short circuit to ground. Clear DTC and retest • Check and install a accelerator pedal position sensor as required • Check and install new engine control module as required
P0610-00	Control Module Vehicle Options Error - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P0615-00	Starter Relay Circuit - No sub type information	NOTE: - Circuit SM_COMMAND_H - SM_COMMAND_L - • Starter relay circuit failure	• Refer to the electrical circuit diagrams and check starter relay circuit for short circuit to ground, short circuit to power, open circuit, high resistance
P061A-00	Internal Control Module Torque Performance - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply's for open circuit. Repair wiring

		• Engine control module failure	harness as required, clear DTC and retest system • Refer to the electrical circuit diagrams and check the engine control module ground supply's for open circuit. Repair wiring harness as required, clear DTC and retest system • Check and install new engine control module as required
P061B-00	Internal Control Module Torque Calculation Performance - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply's for open circuit. Repair wiring harness as required, clear DTC and retest system • Refer to the electrical circuit diagrams and check the engine control module ground supply's for open circuit. Repair wiring harness as required, clear DTC and retest system • Check and install new engine control module as required
P061C-00	Internal Control Module Engine RPM Performance - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P061C-11	Internal Control Module Engine RPM Performance - Circuit short to ground	• The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Internal failure within engine control module - Engine speed output short to ground	• Refer to the electrical circuit diagrams and check the power and ground supplies to the engine control module
P061C-12	Internal Control Module Engine RPM Performance - Circuit short to battery	• The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Internal failure within engine control module - Engine speed output short to power	• Refer to the electrical circuit diagrams and check the power and ground supplies to the engine control module
P061C-13	Internal Control Module Engine RPM Performance - Circuit open	• The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Internal failure within engine control module - Engine speed output open circuit	• Refer to the electrical circuit diagrams and check the power and ground supplies to the engine control module

P0620-00	Generator Control Circuit - No sub type information	• Electrical failure has been detected by the generator and reported to the engine control module by LIN bus • Generator failure	• Refer to the electrical circuit diagrams and check the generator circuit, for short circuit to power, short circuit to ground, open circuit. Repair harness as required. Clear DTC and retest • Check and install new generator as required
P0627-13	Fuel Pump A Control Circuit / Open - Circuit open	 NOTE: - Circuit LPPR - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Wiring harness failure between engine control module and central junction box • Lift pump relay failure	 NOTE: When this DTC is set the engine control module limits engine torque to protect the engine and avoid pulling air into the fuel system under high load • Check the operation of the lift pump relay. Replace if required. Refer to the electrical circuit diagrams and check the fuel lift pump relay control circuit between the engine control module and the central junction box for open circuit. Repair harness as required. Clear DTC and retest
P0628-11	Fuel Pump A Control Circuit Low - Circuit short to ground	 NOTE: - Circuit LPPR - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Wiring harness failure between engine control module and central junction box • Lift pump relay failure	 NOTE: When this DTC is set the fuel lift pump will run continuously when the ignition is on, even when the engine is stopped • Check the operation of the lift pump relay. Replace if required. Refer to the electrical circuit diagrams and check the fuel lift pump relay control circuit between the engine control module and the central junction box for a short circuit to ground. Repair harness as required. Clear DTC and retest
P0629-12	Fuel Pump A Control Circuit High - Circuit short to battery	 NOTE: - Circuit LPPR - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Wiring harness failure between engine control module and central junction box • Lift pump relay failure	 NOTE: When this DTC is set the engine control module limits engine torque to protect the engine and avoid pulling air into the fuel system under high load • Check the operation of the lift pump relay. Replace if required. Refer to the electrical circuit diagrams and check the fuel lift pump relay control circuit between the engine control module and the central junction box for a short circuit to power. Repair harness as required. Clear DTC and retest
P062A-92	Fuel Pump A Control Circuit Range/Performance - Performance or incorrect operation	• Lift pump relay has been driven by the central junction box, but has not been requested by the engine control module • Lift pump relay has been requested by the engine control module, but has not been driven by the central junction box • Wiring harness failure lift pump monitor circuit • Lift pump relay	• Check for related DTCs within the central junction box • Refer to the electrical circuit diagrams and check fuel lift pump relay circuit for short circuit to ground, short circuit to power, open circuit. Clear DTC and retest • Refer to the electrical circuit diagrams and check between the engine control module and the rear junction box for short circuit to ground. Clear DTC and retest • Refer to the electrical circuit diagrams and check the rear junction box to in tank fuel pump relay for short circuit to power. Clear DTC and retest • Check and install new fuel lift pump relay as required. Clear DTC and retest

P062B-00	Internal Control Module Fuel Injector Control Performance - No sub type information	Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-41	Internal Control Module Fuel Injector Control Performance - General checksum failure	• Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-48	Internal Control Module Fuel Injector Control Performance - Supervision software failure	• Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-49	Internal Control Module Fuel Injector Control Performance - Internal electronic failure	• Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-61	Internal Control Module Fuel Injector Control Performance - Signal calculation failure	• Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-	Internal Control Module	• Injector failure(s)	• Check for related injector DTCs and repair

62	Fuel Injector Control Performance - Signal compare failure	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-64	Internal Control Module Fuel Injector Control Performance - Signal plausibility failure	• Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-67	Internal Control Module Fuel Injector Control Performance - Signal incorrect after event	• Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-91	Internal Control Module Fuel Injector Control Performance - Parametric	• Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-92	Internal Control Module Fuel Injector Control Performance - Performance or incorrect operation	• Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-94	Internal Control Module Fuel Injector Control	• Injector failure(s) • Corrupt engine control	• Check for related injector DTCs and repair these first. Clear DTCs and retest

	Performance - Unexpected operation	module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062B-9A	Internal Control Module Fuel Injector Control Performance - Component or system operating conditions	• Injector failure(s) • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Check for related injector DTCs and repair these first. Clear DTCs and retest • Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P062D-00	Fuel Injector Driver Circuit Performance Bank 1 - No sub type information	• Bank 1 injector circuit(s) high resistance, short circuit to ground, short circuit to power, open circuit, disconnected • Injector bank 1 failure	• Check for related injector DTCs. Check injector connections to bank 1 cylinders. Refer to the electrical circuit diagrams and check bank 1 injector circuits for short circuit to ground, short circuit to power, open circuit, high resistance. Clear DTC and retest • Check and install new injector(s) as required
P062D-11	Fuel Injector Driver Circuit Performance Bank 1 - Circuit short to ground	• The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Wiring harness failure - Short circuit to ground	• Refer to the electrical circuit diagrams and check the wiring harness between engine control module and bank 1 fuel injectors for short circuit to ground
P062D-16	Fuel Injector Driver Circuit Performance Bank 1 - Circuit voltage below threshold	• The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Bank 1 injector circuit(s) high resistance, short circuit to ground, high resistance, open circuit, disconnected • Injector bank 1 failure	• Check for related injector DTCs. Check injector connections to bank 1 cylinders. Refer to the electrical circuit diagrams and check bank 1 injector circuits for short circuit to ground, open circuit, high resistance. Clear DTC and retest • Check and install new injector(s) as required
P062D-17	Fuel Injector Driver Circuit Performance Bank 1 - Circuit voltage above threshold	• The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Bank 1 injector circuit(s) short circuit to power • Injector bank 1 failure	• Check for related injector DTCs. Check injector connections to bank 1 cylinders. Refer to the electrical circuit diagrams and check bank 1 injector circuits for short circuit to power. Clear DTC and retest • Check and install new injector(s) as required
P062E-00	Fuel Injector Driver Circuit Performance Bank 2 - No sub type information	• Bank 2 injector circuit(s) high resistance, short	• Check for related injector DTCs. Check injector connections to bank 2 cylinders. Refer to the electrical circuit diagrams and

		circuit to ground, short circuit to power, high resistance, open circuit, disconnected • Injector bank 2 failure	check bank 2 injector circuits for short circuit to ground, short circuit to power, open circuit, high resistance. Clear DTC and retest • Check and install new injector(s) as required
P062E-11	Fuel Injector Driver Circuit Performance Bank 2 - Circuit short to ground	• The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Wiring harness failure - Short circuit to ground	• Refer to the electrical circuit diagrams and check the wiring harness between engine control module and bank 2 fuel injectors for short circuit to ground
P062E-17	Fuel Injector Driver Circuit Performance Bank 2 - Circuit voltage above threshold	• The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Bank 2 injector circuit(s) short circuit to power • Injector bank 2 failure	• Check for related injector DTCs. Check injector connections to bank 2 cylinders. Refer to the electrical circuit diagrams and check bank 2 injector circuits for short circuit to power. Clear DTC and retest • Check and install new injector(s) as required
P0633-00	Immobilizer Key Not Programmed - ECM/PCM - No sub type information	• Security key not programmed	• Check for CAN network interference/engine control module related errors. Re-configure the engine control module using the manufacturer approved diagnostic system. Re-configure the instrument cluster using the manufacturer approved diagnostic system
P0634-1B	Control Module Internal Temperature "A" Too High - Circuit resistance above threshold	• Engine control module internal temperature too high • Engine control module failure	• Clear DTC, wait 10 minutes and retest • Check and install new engine control module as required
P064C-00	Glow Plug Control Module - No sub type information	• Glow plug control module circuit short circuit to ground, short circuit to power, open circuit, disconnected • Glow plug control module failure	• Refer to the electrical circuit diagrams and check glow plug control module circuit for short circuit to ground, short circuit to power, open circuit, disconnected. Clear DTC and retest • Check and install new glow plug control module as required
P064D-00	Internal Control Module O2 Sensor Processor Performance - Bank 1 - No sub type information	• Heated oxygen sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Heated oxygen sensor failure • Engine control module failure	• Check and repair related heated oxygen sensor DTCs. Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, short circuit to power, high resistance, open circuit • Check and install new heated oxygen sensor as required. Clear DTC and retest • Check and install new engine control module as required
P064D-16	Internal Control Module O2 Sensor Processor Performance - Bank 1 - Circuit voltage below threshold	• The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Heated oxygen sensor circuit short circuit to ground, high resistance, open circuit • Heated oxygen sensor failure • Engine control module failure	• Check and repair related heated oxygen sensor DTCs. Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, high resistance, open circuit • Check and install new heated oxygen sensor as required. Clear DTC and retest • Check and install new engine control module as required

P0658-00	Actuator Supply Voltage A Circuit Low - No sub type information	• Actuator supply circuit voltage below threshold	• Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine • Refer to the electrical circuit diagrams and check engine control module power and ground supplies for short circuit to ground, open circuit
P0659-00	Actuator Supply Voltage A Circuit High - No sub type information	• Actuator supply circuit voltage above threshold	• Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine • Refer to the electrical circuit diagrams and check engine control module power and ground supplies for short circuit to power
P065A-00	Generator System Performance - No sub type information	• Generator circuit short circuit to ground, high resistance, open circuit • Generator mechanical failure	• Refer to the electrical circuit diagrams and check generator circuit for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new generator as required
P065B-16	Generator Control Circuit Range/Performance - Circuit voltage below threshold	• The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Charging circuit short circuit to ground, short circuit to power, open circuit • Quiescent current high • Battery failure/worn out • Generator failure	• Refer to the electrical circuit diagrams and check charging circuit for short circuit to ground, short circuit to power, open circuit. Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system • If DTC remains check battery is in fully charged and in a serviceable condition using the Midtronics battery tester and battery care manual. If ok suspect the generator • Check and install new generator as required
P065B-17	Generator Control Circuit Range/Performance - Circuit voltage above threshold	• The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Generator circuit short circuit to ground, high resistance, open circuit • Generator mechanical failure	• Refer to the electrical circuit diagrams and check generator circuit for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new generator as required
P0668-00	Control Module Internal Temperature Sensor "A" Circuit Low - No sub type information	• Engine control module internal temperature sensor failure	• Check and install new engine control module as required
P0669-00	Control Module Internal Temperature Sensor "A" Circuit High - No sub type information	• Engine control module internal temperature sensor failure	• Check and install new engine control module as required
P066A-00	Cylinder 1 Glow Plug Control Circuit Low - No sub type information	• The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Cylinder 1 glow plug circuit short circuit to ground • Glow plug failure • Glow plug control module failure	• Refer to the electrical circuit diagrams and check the glow plug control circuit between the glow plug control module and the glow plug connector for short circuit to ground, check the power supply and ground connections to the glow plug control module. Repair harness as required. Refer to relevant section of workshop manual, check cylinder 1 glow plug for internal short circuit to ground. Replace glow plug if required. Clear DTC and retest • Check and install new glow plug control module
P066C-00	Cylinder 2 Glow Plug Control Circuit Low - No sub type information	• The engine control module has detected a ground measurement for a period longer than expected or has	• Refer to the electrical circuit diagrams and check the glow plug control circuit between the glow plug control module and the glow plug connector for short circuit to ground, check the power supply and

		detected a ground measurement when another value was expected • Cylinder 2 glow plug circuit short circuit to ground • Glow plug failure • Glow plug control module failure	ground connections to the glow plug control module. Repair harness as required. Refer to relevant section of workshop manual, check cylinder 2 glow plug for internal short circuit to ground. Replace glow plug if required. Clear DTC and retest • Check and install new glow plug control module
P066E-00	Cylinder 3 Glow Plug Control Circuit Low - No sub type information	• The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Cylinder 3 glow plug circuit short circuit to ground • Glow plug failure • Glow plug control module failure	• Refer to the electrical circuit diagrams and check the glow plug control circuit between the glow plug control module and the glow plug connector for short circuit to ground, check the power supply and ground connections to the glow plug control module. Repair harness as required. Refer to relevant section of workshop manual, check cylinder 3 glow plug for internal short circuit to ground. Replace glow plug if required. Clear DTC and retest • Check and install new glow plug control module
P0671-00	Cylinder 1 Glow Plug Circuit / Open - No sub type information	• Glow plug control circuit open circuit, high resistance • Glow plug control connector disconnected • Glow plug failure	• Refer to the electrical circuit diagrams and check glow plug circuit for open circuit, high resistance. Repair wiring harness as required, clear DTC and retest system • Check glow plug connector is correctly connected, clear DTC and retest system • Check and install new glow plug as required
P0672-00	Cylinder 2 Glow Plug Circuit / Open - No sub type information	• Glow plug control circuit open circuit, high resistance • Glow plug control connector disconnected • Glow plug failure	• Refer to the electrical circuit diagrams and check glow plug circuit for open circuit, high resistance. Repair wiring harness as required, clear DTC and retest system • Check glow plug connector is correctly connected, clear DTC and retest system • Check and install new glow plug as required
P0673-00	Cylinder 3 Glow Plug Circuit / Open - No sub type information	• Glow plug control circuit open circuit, high resistance • Glow plug control connector disconnected • Glow plug failure	• Refer to the electrical circuit diagrams and check glow plug circuit for open circuit, high resistance. Repair wiring harness as required, clear DTC and retest system • Check glow plug connector is correctly connected, clear DTC and retest system • Check and install new glow plug as required
P0674-00	Cylinder 4 Glow Plug Circuit / Open - No sub type information	• Glow plug control circuit open circuit, high resistance • Glow plug control connector disconnected • Glow plug failure	• Refer to the electrical circuit diagrams and check glow plug circuit for open circuit, high resistance. Repair wiring harness as required, clear DTC and retest system • Check glow plug connector is correctly connected, clear DTC and retest system • Check and install new glow plug as required
P0675-00	Cylinder 5 Glow Plug Circuit / Open - No sub type information	• Glow plug control circuit open circuit, high resistance • Glow plug control connector disconnected • Glow plug failure	• Refer to the electrical circuit diagrams and check glow plug circuit for open circuit, high resistance. Repair wiring harness as required, clear DTC and retest system • Check glow plug connector is correctly connected, clear DTC and retest system • Check and install new glow plug as required
P0676-00	Cylinder 6 Glow Plug Circuit / Open - No sub type information	• Glow plug control circuit open circuit, high resistance • Glow plug control connector disconnected • Glow plug failure	• Refer to the electrical circuit diagrams and check glow plug circuit for open circuit, high resistance. Repair wiring harness as required, clear DTC and retest system • Check glow plug connector is correctly connected, clear DTC and retest system • Check and install new glow plug as required

P067A-00	Cylinder 4 Glow Plug Control Circuit Low - No sub type information	• The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Cylinder 4 glow plug circuit short circuit to ground • Glow plug failure • Glow plug control module failure	• Refer to the electrical circuit diagrams and check the glow plug control circuit between the glow plug control module and the glow plug connector for short circuit to ground, check the power supply and ground connections to the glow plug control module. Repair harness as required. Refer to relevant section of workshop manual, check cylinder 4 glow plug for internal short circuit to ground. Replace glow plug if required. Clear DTC and retest • Check and install new glow plug control module
P067C-00	Cylinder 5 Glow Plug Control Circuit Low - No sub type information	• The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Cylinder 5 glow plug circuit short circuit to ground • Glow plug failure • Glow plug control module failure	• Refer to the electrical circuit diagrams and check the glow plug control circuit between the glow plug control module and the glow plug connector for short circuit to ground, check the power supply and ground connections to the glow plug control module. Repair harness as required. Refer to relevant section of workshop manual, check cylinder 5 glow plug for internal short circuit to ground. Replace glow plug if required. Clear DTC and retest • Check and install new glow plug control module
P067E-00	Cylinder 6 Glow Plug Control Circuit Low - No sub type information	• The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Cylinder 6 glow plug circuit short circuit to ground • Glow plug failure • Glow plug control module failure	• Refer to the electrical circuit diagrams and check the glow plug control circuit between the glow plug control module and the glow plug connector for short circuit to ground, check the power supply and ground connections to the glow plug control module, ensure that the harness is checked for intermittent failures. Repair harness as required. Refer to relevant section of workshop manual, check cylinder 6 glow plug for internal short circuit to ground. Replace glow plug if required. Clear DTC and retest • Check and install new glow plug control module
P0683-00	Glow Plug Control Module to PCM Communication Circuit - No sub type information	NOTE: - Circuit GPC - • Engine control module to glow plug control module circuit failure • Glow plug control module failure • Engine control module failure	• This DTC is set when the data transmission on the control circuit between the engine control module and the glow plug control module has an error. Check for other related DTCs and refer to the relevant DTC index. Refer to the electrical circuit diagrams and check the glowplug control signal line from the engine control module to the glow plug control module for failures such as intermittent open circuits, high resistance, short circuit to ground, short circuit to power. Check the glowplug monitor signal line from the glowplug control module to the engine control module for intermittent open circuits, high resistance, short circuit to ground, short circuit to power • Refer to the electrical circuit diagrams and check power and ground supplies to the glowplug control module. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P068A-00	ECM/PCM Power Relay De-Energized - Too Early - No sub type information	• Vehicle battery disconnected before engine management system relay has powered down • Engine management system high current relay failure	• This DTC is set when the engine management system high current relay contacts open early - Indicating a power hold failure. Check the vehicle battery has not been disconnected before the engine management system relay has powered down. Check the operation of the engine management system high current relay.

		Central junction box failure • Harness failure - Relay control circuit	Refer to the electrical circuit diagrams and check the engine management system high current relay supply and control circuits for open circuits, high resistance, short circuit to ground, short circuit to power, short circuit to other circuits. Repair harness as required. Clear DTC and retest • Check and install new relay or central junction box as required
P06AF-00	Torque Management System - Forced Engine Shutdown - No sub type information	• Injection cut off demand for shut off coordinator • The DTC sets when the engine speed has exceeded the hard engine speed limiter. When this DTC sets, a request to the shut-off coordinator is made for a reversible shut-off of the injection power stages, ensuring no injections take place. It is reset when engine speed falls less than or equal to the hard limiter • Engine run away • Excessive injected fuel • Over boost from a turbocharger	• Check for related engine control module DTCs and repair these first. Clear the DTC and retest
P0700-00	Transmission Control System (MIL Request) - No sub type information	• MIL request by automatic gearbox • HS CAN network, short circuit to power, short circuit to ground, open circuit	• Check transmission control module for DTCs and refer to the relevant DTC index. Clear DTC and retest • If this DTC is logged with other HS CAN related DTCs refer to the electrical circuit diagrams and check HS CAN network for short circuit to power, short circuit to ground, open circuit
P0850-64	Park / Neutral Switch Input Circuit - Signal plausibility failure	NOTE: - Circuit PNS - • Hardwired park/neutral switch does not match the information within the CAN signal • Park/neutral switch circuit, short circuit to power, short circuit to ground, open circuit • HS CAN network failure	• Refer to the electrical circuit diagrams and check the park/neutral switch circuit, for short circuit to power, short circuit to ground, open circuit • If this DTC is logged with other HS CAN related DTCs refer to the electrical circuit diagrams and check HS CAN network for short circuit to power, short circuit to ground, open circuit
P0A09-16	DC/DC Converter Status Circuit Low - Circuit voltage below threshold	• The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P0A0F-00	Engine Failed to Start - No sub type information	• Engine control module has logged an extended crank with no engine start • Harness failure - Starter motor circuit and relays • Vehicle battery failure • Starter motor	• Check for related engine control module DTCs and repair these first. Clear DTC and retest • Refer to the electrical circuit diagrams and check the starter motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the workshop manual and the battery care manual, inspect the vehicle

		mechanical failure	battery and ensure it is fully charged and serviceable before performing further tests • Check Starter motor for mechanical failure. Install a new starter motor as required
P0A0F-71	Engine Failed to Start - Actuator stuck	• Vehicle battery failure • Jammed starter motor	• Refer to the workshop manual and the battery care manual, inspect the vehicle battery and ensure it is fully charged and serviceable before performing further tests • Check for a jammed or damaged starter motor. Install a new starter motor as required
P0A10-17	DC/DC Converter Status Circuit High - Circuit voltage above threshold	• The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P0A14-13	Engine Mount Control A Circuit / Open - Circuit open	 NOTE: - Circuit AEM_1 - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Wiring harness failure - Active engine mount solenoid circuit	• Refer to the electrical circuit diagrams and check the active engine mount solenoid control circuit for open circuit. Repair harness as required. Clear DTC and retest
P0A15-11	Engine Mount Control A Circuit Low - Circuit short to ground	 NOTE: - Circuit AEM_1 - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Wiring harness failure - Active engine mount solenoid circuit	• Refer to the electrical circuit diagrams and check the active engine mount solenoid control circuit for short circuit to ground. Repair harness as required. Clear DTC and retest
P0A16-12	Engine Mount Control A Circuit High - Circuit short to battery	 NOTE: - Circuit AEM_1 - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Wiring harness failure - Active engine mount solenoid circuit	• Refer to the electrical circuit diagrams and check the active engine mount solenoid control circuit for short circuit to power. Repair harness as required. Clear DTC and retest
P0A16-4B	Engine Mount Control A Circuit High - Over temperature	• Active engine mount solenoid circuit short circuit to ground,	• Refer to the electrical circuit diagrams and check active engine mount solenoid circuit for short circuit to ground, power. Repair

		short circuit to power • Active engine mount solenoid failure	harness as required. Clear DTC and retest • Check and install new engine mount control vacuum solenoid as required
P0A1A-00	Generator Control Module - No sub type information	• Generator to engine control module LIN circuit, open circuit • Generator/engine control module failure	• Check for good/clean contact at generator and engine control module LIN circuit connectors/pins. Refer to the electrical circuit diagrams and check generator to engine control module LIN circuit for open circuit. Check for engine control module hardware DTCs and refer to relevant DTC index. Clear DTCs and repeat automated diagnostic procedure using the manufacturer approved diagnostic system • Check and install new generator / engine control module as required
P0A1A-87	Generator Control Module - Missing message	• Generator to engine control module LIN circuit open circuit	• Check for good/clean contact at generator and engine control module LIN circuit connectors/pins. Refer to the electrical circuit diagrams and check generator to engine control module LIN circuit for open circuit. Check for engine control module hardware DTCs and refer to relevant DTC index. Clear DTCs and repeat automated diagnostic procedure using the manufacturer approved diagnostic system
P0A3B-00	Generator Over Temperature - No sub type information	• Generator wiring/connectors heat damaged • Generator circuit short circuit to ground, high resistance • Generator failure	• Check the generator wiring and connectors for heat damage • Refer to the electrical circuit diagrams and check generator wiring for short circuit to ground, high resistance. Repair harness as required. Clear DTC and retest • Check and install new generator as required
P0A94-00	DC/DC Converter Performance - No sub type information	 NOTE: - Circuit V_V_5V10 - V_V_5V9 - V_V_5V8 - V_V_5V7 - V_V_5V6 - V_V_5V5 - V_V_5V4 - V_V_5V3 - V_V_5V2 - V_V_5V1 - • Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check the engine control module power supply for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check the engine control module ground supply for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P115A-00	Low Fuel Level - Forced Limited Power - No sub type information	• Low level fuel condition • Fuel level sensor signal circuit - Short circuit to ground, short circuit to power, open circuit • Fuel level sensor failure	• Check the fuel level, add fuel if required. Clear DTC and retest • If there is sufficient fuel, refer to the electrical circuit diagrams and check the fuel level sensor circuits for short, open circuit. Repair harness as required. Clear DTC and retest • Check and install new fuel level sensor as required
P115A-68	Low Fuel Level - Forced Limited Power - Event information	• Low level fuel condition • Fuel level sensor signal circuit - Short circuit to ground, short circuit to power, open circuit • Fuel level sensor failure	• Check the fuel level, add fuel if required. Clear DTC and retest • If there is sufficient fuel, refer to the electrical circuit diagrams and check the fuel level sensor circuits for short, open circuit. Repair harness as required. Clear DTC and retest • Check and install new fuel level sensor as required
P115B-00	Low Fuel Level - Forced Engine Shutdown - No sub type information	• Low level fuel condition enabling run dry strategy • Fuel level sensor signal circuit - Short circuit to ground, short circuit to power,	• Check the fuel level, add fuel if required. Clear DTC and retest • If there is sufficient fuel, refer to the electrical circuit diagrams and check the fuel level sensor circuits for short, open circuit. Repair harness as required. Clear DTC and retest

		open circuit • Fuel level sensor failure	• Check and install new fuel level sensor as required
P115F-11	Electronic Control Module Cooling Fan Circuit - Circuit short to ground	NOTE: - Circuit EFC - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Engine control module cooling fan circuits • Cooling fan failure	• Refer to the electrical circuit diagrams and check the engine control module cooling fan circuit for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new cooling fan as required
P115F-12	Electronic Control Module Cooling Fan Circuit - Circuit short to battery	NOTE: - Circuit EFC - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Harness failure - Engine control module cooling fan circuits	• Refer to the electrical circuit diagrams and check the engine control module cooling fan circuit for short circuit to power. Repair harness as required. Clear DTC and retest
P115F-13	Electronic Control Module Cooling Fan Circuit - Circuit open	NOTE: - Circuit EFC - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Engine control module cooling fan circuits • Cooling fan failure	• Refer to the electrical circuit diagrams and check the engine control module cooling fan circuit for open circuit. Repair harness as required. Clear DTC and retest • Check and install new cooling fan as required
P115F-19	Electronic Control Module Cooling Fan Circuit - Circuit current above threshold	• Engine control module cooling fan circuit short circuit to ground • Engine control module cooling fan failure or obstructed	• Refer to the electrical circuit diagrams and check the engine control module cooling fan circuit for short circuit to ground. Repair harness as required. Clear DTC and retest • Check engine control module cooling fan for obstruction. Check and install new engine control module cooling fan as required
P120F-00	Fuel Pressure Regulator Excessive Variation - No sub type information	• Fuel pressure regulator signal circuit short circuit to ground, short circuit to power, open circuit • Fuel pressure regulator VREF circuit high resistance • Fuel pressure regulator failure	• Using the manufacturer approved diagnostic system check for fuel pump related DTCs • Refer to the electrical circuit diagrams and check the fuel pressure regulator signal circuit for short circuit to ground, short circuit to power, open circuit. Repair wiring harness as required, clear DTC and retest system • Refer to the electrical circuit diagrams and check the fuel pressure regulator VREF circuit for high resistance. Repair wiring harness as required, clear DTC and retest system • Check and install new Fuel pressure regulator as required

P1247-00	Turbocharger Boost Pressure Low - No sub type information	• Air intake system, low pressure intake blocked or restricted • Exhaust system blocked or restricted • Boost air recirculation solenoid stuck open in bi-turbo mode • Boost air solenoid stuck closed in bi-turbo mode • Turbine intake solenoid stuck open • Air intake system, boost air system high pressure boost air leak on bank 1 • Air intake system, boost air system high pressure boost air leak in bi-turbo mode on bank 2 • Variable geometry turbocharger compressor wheel seized	• Test air intake system for air leaks and check exhaust system for blockages or restriction • If this DTC is logged with P00BE-00, suspect boost air recirculation solenoid stuck open in bi-turbo mode • If this DTC is logged with P00BC-00, suspect boost air solenoid stuck closed in bi-turbo mode • If this DTC is logged with P0235-94, P00BD-07, P22D2-77 & P22CF-71 suspect turbine intake solenoid stuck open • If this DTC is logged with P006A-00, P0402-00 & P00BF-07 suspect air intake system, boost air system high pressure boost air leak on bank 1 • If this DTC is logged with P006A-00 suspect air intake system, boost air system high pressure boost air leak in bi-turbo mode on bank 2 • If this DTC is logged with P00BE-07 & P00BD-07 suspect variable geometry turbocharger compressor wheel seized • If this DTC is logged with P0235-94, P00BD-07, P22D2-77 & P22CF-71 suspect Air intake system, low pressure intake blocked or restricted
P1334-00	EGR Throttle Position Sensor Minimum/Maximum Stop Performance - No sub type information	• Exhaust gas recirculation throttle position sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Exhaust gas recirculation throttle position sensor failure • Engine control module failure	• Refer to the electrical circuit diagrams and check exhaust gas recirculation throttle position sensor circuit for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation throttle position sensor as required • Check and install new engine control module as required
P151B-00	Idle Speed Control - RPM Lower Than Expected - No sub type information	• Indicated torque at idle < minimum	• Using the manufacturer approved diagnostic system check for additional DTCs and refer to the relevant DTC index. Check engine oil level. Carry out cylinder compression tests. Check for mechanical failure of engine
P151C-00	Idle Speed Control - RPM Higher Than Expected - No sub type information	• Indicated torque at idle > maximum	• Using the manufacturer approved diagnostic system check for additional DTCs and refer to the relevant DTC index. Check engine oil level. Carry out cylinder compression tests. Check for mechanical failure of engine
P1551-32	Cylinder 1 Injector Circuit Range/Performance - Signal low time < minimum	 NOTE: - Circuit O_P_PVL11 - O_P_PVH11 - • This DTC is set when the engine control module detects that the injector signal low time is less than the minimum value • Injector control circuit failure • Injector failure • Engine control module failure	• Refer to the electrical circuit diagrams and check the injector control circuits for intermittent failures, open circuits, short circuit to power, short circuit to ground, short circuit to other circuits. Repair harness as required. Clear DTC and retest • Refer to the workshop manual and check the injector is to specification and has been installed correctly. Check and install new injector as required • Check and install new engine control module as required
P1551-35	Cylinder 1 Injector Circuit Range/Performance - Signal high time > maximum	 NOTE: - Circuit O_P_PVL11 - O_P_PVH11 - • This DTC is set when the engine control module detects that the injector signal high	• Refer to the electrical circuit diagrams and check the injector control circuits for intermittent failures, open circuits, short circuit to power, short circuit to ground, short circuit to other circuits. Repair harness as required. Clear DTC and retest • Refer to the workshop manual and check the injector is to specification and has

		time is greater than the maximum value • Injector control circuit failure • Injector failure • Engine control module failure	been installed correctly. Check and install new injector as required • Check and install new engine control module as required
P1552-32	Cylinder 2 Injector Circuit Range/Performance - Signal low time < minimum	NOTE: - Circuit O_P_PVL12 - O_P_PVH12 - • This DTC is set when the engine control module detects that the injector signal low time is less than the minimum value • Harness failure - fuel injector control circuit short circuit to ground • Harness failure - fuel injector control circuit short to each other	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to ground • Refer to the electrical circuit diagrams and check fuel injector control circuit for short to each other
P1552-35	Cylinder 2 Injector Circuit Range/Performance - Signal high time > maximum	NOTE: - Circuit O_P_PVL12 - O_P_PVH12 - • This DTC is set when the engine control module detects that the injector signal high time is greater than the maximum value • Harness failure - fuel injector control circuit short circuit to power • Harness failure - fuel injector control circuit short to each other	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to power • Refer to the electrical circuit diagrams and check fuel injector control circuit for short to each other
P1553-32	Cylinder 3 Injector Circuit Range/Performance - Signal low time < minimum	NOTE: - Circuit O_P_PVL13 - O_P_PVH13 - • This DTC is set when the engine control module detects that the injector signal low time is less than the minimum value • Harness failure - fuel injector control circuit short circuit to ground • Harness failure - fuel injector control circuit short to each other	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to ground • Refer to the electrical circuit diagrams and check fuel injector control circuit for short to each other
P1553-35	Cylinder 3 Injector Circuit Range/Performance - Signal high time > maximum	NOTE: - Circuit O_P_PVL13 - O_P_PVH13 - • This DTC is set when the engine control module detects that the injector signal high time is greater than the maximum value • Harness failure - fuel injector control circuit short circuit to power • Harness failure - fuel injector control circuit short to each other	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to power • Refer to the electrical circuit diagrams and check fuel injector control circuit for short to each other
P1554-32	Cylinder 4 Injector Circuit Range/Performance - Signal low time < minimum	NOTE: - Circuit O_P_PVL21 - O_P_PVH21 -	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to ground • Refer to the electrical circuit diagrams and

		• This DTC is set when the engine control module detects that the injector signal low time is less than the minimum value • Harness failure - fuel injector control circuit short circuit to ground • Harness failure - fuel injector control circuit short to each other	check fuel injector control circuit for short to each other
P1554-35	Cylinder 4 Injector Circuit Range/Performance - Signal high time > maximum	NOTE: - Circuit O_P_PVL21 - O_P_PVH21 - • This DTC is set when the engine control module detects that the injector signal high time is greater than the maximum value • Harness failure - fuel injector control circuit short circuit to power • Harness failure - fuel injector control circuit short to each other	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to power • Refer to the electrical circuit diagrams and check fuel injector control circuit for short to each other
P1555-32	Cylinder 5 Injector Circuit Range/Performance - Signal low time < minimum	NOTE: - Circuit O_P_PVL22 - O_P_PVH22 - • This DTC is set when the engine control module detects that the injector signal low time is less than the minimum value • Harness failure - fuel injector control circuit short circuit to ground • Harness failure - fuel injector control circuit short to each other	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to ground • Refer to the electrical circuit diagrams and check fuel injector control circuit for short to each other
P1555-35	Cylinder 5 Injector Circuit Range/Performance - Signal high time > maximum	NOTE: - Circuit O_P_PVL22 - O_P_PVH22 - • This DTC is set when the engine control module detects that the injector signal high time is greater than the maximum value • Harness failure - fuel injector control circuit short circuit to power • Harness failure - fuel injector control circuit short to each other	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to power • Refer to the electrical circuit diagrams and check fuel injector control circuit for short to each other
P1556-32	Cylinder 6 Injector Circuit Range/Performance - Signal low time < minimum	NOTE: - Circuit O_P_PVL23 - O_P_PVH23 - • This DTC is set when the engine control module detects that the injector signal low time is less than the minimum value • Harness failure - fuel injector control circuit short circuit to ground • Harness failure - fuel injector control circuit short to each other	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to ground • Refer to the electrical circuit diagrams and check fuel injector control circuit for short to each other

P1556-35	Cylinder 6 Injector Circuit Range/Performance - Signal high time > maximum	NOTE: - Circuit O_P_PVL23 - O_P_PVH23 - • This DTC is set when the engine control module detects that the injector signal high time is greater than the maximum value • Harness failure - fuel injector control circuit short circuit to power • Harness failure - fuel injector control circuit short to each other	• Refer to the electrical circuit diagrams and check fuel injector control circuit for short circuit to power • Refer to the electrical circuit diagrams and check fuel injector control circuit for short to each other
P1575-00	Pedal Position Out Of Self Test Range - No sub type information	• Brake pedal switch - Circuit Brake_SW_2 - Short circuit to power • Brake pedal switch - Circuit Brake_SW_2 - Open circuit • Brake switch failure	• Refer to the electrical circuit diagrams and check brake pedal switch - Circuit Brake_SW_2 - For short circuit to power • Refer to the electrical circuit diagrams and check brake pedal switch - Circuit Brake_SW_2 - For open circuit • Check and install new brake switch as required
P1627-16	Module Supply Voltage Out Of Range - Circuit voltage below threshold	NOTE: - Circuit VBR1 - VBR2 - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Vehicle battery failure • Charging system failure • Engine control module power or ground supply • Engine junction box failure • Power distribution failure • Engine control module failure failure	• Refer to the workshop manual and the battery care manual, inspect the vehicle battery and ensure it is fully charged and serviceable before performing further tests • Check the vehicle charging system performance to ensure the voltage regulation is correct • Using the manufacturer approved diagnostic system check datalogger signals, Control module voltage (0xF442). This DTC is set when the engine control module supply voltage is below the threshold value. Refer to the electrical circuit diagrams and check the four engine control module power ground circuits for high resistance or open circuits • Check the switched power supply feeds to the engine control module which come from the engine junction box though the engine management system relay. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P1627-17	Module Supply Voltage Out Of Range - Circuit voltage above threshold	NOTE: - Circuit VBR1 - VBR2 - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Vehicle battery failure • Charging system failure • Engine control module power or ground supply • Engine junction box failure • Power distribution failure	• Refer to the workshop manual and the battery care manual, inspect the vehicle battery and ensure it is fully charged and serviceable before performing further tests • Check the vehicle charging system performance to ensure the voltage regulation is correct • Using the manufacturer approved diagnostic system check datalogger signals, Control module voltage (0xF442). This DTC is set when the engine control module supply voltage is greater than the threshold value. Refer to the electrical circuit diagrams and check the four engine control module power ground circuits for high resistance or open circuits • Check the switched power supply feeds to the engine control module which come from the engine junction box though the engine management system relay. Repair harness as required. Clear DTC and retest
P162F-00	Starter Motor Disabled - Engine Crank Time Too Long - No sub type information	• Vehicle battery failure • Other starting related failures	• Refer to the workshop manual and the battery care manual, inspect the vehicle battery and ensure it is fully charged and serviceable before performing further tests • Using the manufacturer approved diagnostic system, check the engine control module, for related DTCs and refer to the relevant DTC index

P1631-00	Main Relay (power hold) - No sub type information	 NOTE: - Circuit PWRSTN - • Vehicle battery disconnected before engine management system relay has powered down • Relay control circuit failure • Engine management system high current relay failure • Central junction box failure	• This DTC is set when the engine management system high current relay contacts open early - Indicating a power hold failure. Check the vehicle battery has not been disconnected before the engine management system relay has powered down. Check the operation of the engine management system high current relay • Refer to the electrical circuit diagrams and check the engine management system high current relay supply and control circuits for open circuits, high resistance, short circuit to ground, short circuit to power, short circuit to other circuits. Repair harness as required. Clear DTC and retest • Check and install new relay as required • Check and install new central junction box as required
P1631-73	Main Relay (power hold) - Actuator stuck closed	 NOTE: - Circuit PWRSTN - • Engine management system high current relay failure • Relay control circuit failure	• This DTC is set when the engine management system high current relay contacts are detected stuck closed by the engine control module. Check the operation of the engine management system high current relay. Refer to the electrical circuit diagrams and check the engine management system high current relay supply and control circuits for open circuits, high resistance, short circuit to ground, short circuit to power, short circuit to other circuits. Repair harness as required. Clear DTC and retest • Check and install new relay as required
P165D-01	Grill Shutter "A" Control Circuit - General electrical failure	• Grill shutter actuator supply voltage falls outside the specified range • Grill shutter actuator internal circuit failure	• Refer to the electrical circuit diagrams and check the grill shutter actuator circuits for short circuit to ground, short circuit to power, open circuit, high resistance. Repair harness as required • Using the manufacturer approved diagnostic system, operate the grill shutter through the full operating range and check that the DTC does not reset • Check and install new grill shutter actuator as required
P165D-07	Grill Shutter "A" Control Circuit - Mechanical failures	• Grill shutter "A" actuator has become disconnected from the grill shutter • Linkage between the grill shutter "A" actuator and grill shutter has failed	• Check all vanes within the grill shutter are connected to the grill shutter actuator. Repair as required. Clear DTC and retest • Using the manufacturer approved diagnostic system, operate the grill shutter through the full operating range and check that the DTC does not reset • Check and install new grill shutter as required
P165D-13	Grill Shutter "A" Control Circuit - Circuit open	• Grill shutter "A" control circuit - Open circuit • Grill shutter actuator internal circuit failure	• Refer to the electrical circuit diagrams and check the grill shutter actuator control circuit for open circuit. Repair harness as required • Check and install new grill shutter actuator as required
P165D-4B	Grill Shutter "A" Control Circuit - Over temperature	• The grill shutter actuator internal circuits are overheated	• Check the grill shutter for damage, obstructions and blockages. Repair as required. Clear DTC and retest • Using the manufacturer approved diagnostic system, operate the grill shutter through the full operating range and check that the DTC does not reset • Check and install new grill shutter actuator as required
P165D-87	Grill Shutter "A" Control Circuit - Missing message	• The engine control module has not received the expected signal from the grill shutter "A" actuator • Grill shutter "A"	• Refer to the electrical circuit diagrams and check the grill shutter actuator control circuit for open circuit, high resistance. Repair harness as required. Clear DTC and retest • Check and install new grill shutter actuator

		control circuit - Open circuit • Grill shutter actuator internal circuit failure	as required
P165D-97	Grill Shutter "A" Control Circuit - Component or system operation obstructed or blocked	• Grill shutter damaged, obstructed or blocked • Grill shutter actuator has failed all calibration attempts	• Check the grill shutter for damage, obstructions and blockages. Repair as required. Clear DTC and retest • Using the manufacturer approved diagnostic system, operate the grill shutter through the full operating range and check that the DTC does not reset • Check and install new grill shutter actuator as required
P1695-00	CAN Link Injection Pump Control Module/Engine Control Module - No sub type information	• The engine control module internal powerstage is overheated	• Check engine control module for DTCs and refer to the relevant DTC index. Clear DTC and retest • Check the engine control module is sufficiently able to be cooled
P1703-00	Brake Switch Out Of Self Test Range - No sub type information	• Brake switch circuit, short circuit to ground, short circuit to power, high resistance, open circuit • Brake switch incorrect adjustment • Brake switch internal failure	• Refer to the electrical circuit diagrams and check the brake switch for short to ground, short circuit to power, high resistance, open circuit. Repair wiring harness as required. Clear DTC and retest • Check and adjust brake switch as required • Check and install new brake switch as required
P1712-00	Transmission Torque Reduction Request Signal - No sub type information	• Unintended torque request signal sent over CAN from transmission control module to engine control module. The engine control module recognizes it is unintended and applies a torque limit and sets the DTC	• Check transmission control module for related DTCs and refer to relevant DTC index, Clear DTC and retest
P1719-68	Engine Torque Signal - Event information	• Working limitation information • The DTC sets as a result of an engine torque limitation caused by an engine overheat situation	• Check engine control module for related DTCs and refer to relevant DTC index • Refer to the workshop manual and check the cooling system is functioning correctly
P2002-68	Diesel Particulate Filter Efficiency Below Threshold (Bank 1) - Event information	• Diesel particulate filter regeneration disabled by other DTCs logged	• Using the manufacturer approved diagnostic system, check for related DTCs and refer to the relevant DTC index. Carry out a diesel particulate filter regeneration
P2031-00	Exhaust Gas Temperature Sensor Circuit Bank 1 Sensor 2 - No sub type information	 NOTE: - Circuit CCCOT_A - • Exhaust gas temperature sensor post catalytic converter short circuit to ground • Exhaust gas temperature sensor post catalytic converter failure	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post catalytic converter circuit for short circuit to ground • Check and install new exhaust gas temperature sensor post catalytic converter as required
P2032-00	Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 2 - No sub type information	 NOTE: - Circuit PFIT - • Harness failure - Particulate filter inlet exhaust gas temperature sensor • Particulate filter inlet exhaust gas temperature sensor	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 2 Voltage (0x03C4), Exhaust Gas Temperature Bank 1 Sensor 2 (0x03F5). This DTC is set if the particulate filter inlet exhaust gas temperature sensor fails a diagnostic check due to the circuit voltage being less than the expected value. Refer to the electrical circuit diagrams and

		failure	check the signal circuit for open circuit, short circuit to power, short circuit to ground, high resistance. Check the ground circuit for open circuit, high resistance, short circuit to power. Repair harness as required • Check and install new exhaust gas temperature sensor as required
P2033-00	Exhaust Gas Temperature Sensor Circuit High Bank 1 Sensor 2 - No sub type information	 NOTE: - Circuit PFIT - • Harness failure - Particulate filter inlet exhaust gas temperature sensor • Particulate filter inlet exhaust gas temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 2 Voltage (0x03C4), Exhaust Gas Temperature Bank 1 Sensor 2 (0x03F5). This DTC is set if the particulate filter inlet exhaust gas temperature sensor fails a diagnostic check due to the circuit voltage being greater than the expected value. Refer to the electrical circuit diagrams and check the signal circuit for open circuit, short circuit to power, short circuit to ground, high resistance. Check the ground circuit for open circuit, high resistance, short circuit to power. Repair harness as required • Check and install new exhaust gas temperature sensor as required
P2080-00	Exhaust Gas Temperature Sensor Circuit Range/Performance Bank 1 Sensor 1 - No sub type information	 NOTE: - Circuit CCCIT_B - • Exhaust gas temperature sensor post turbocharger overheating • Exhaust gas temperature sensor post turbocharger circuit short circuit to ground	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 1 Voltage (0x03BF), Exhaust Gas Temperature Bank 2 Sensor 1 (0x03F7) • Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger circuit for short circuit to ground • Clear DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger - bank 2, sensor 1 as required
P2082-00	Exhaust Gas Temperature Sensor Circuit Range/Performance Bank 2 Sensor 1 - No sub type information	 NOTE: - Circuit STOT - • Exhaust gas temperature sensor post turbocharger short circuit short circuit to ground, open circuit, high resistance • Exhaust gas temperature sensor post turbocharger failure	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post turbocharger circuit for short circuit to ground, open circuit, high resistance • Clear the DTC and retest • Check and install new exhaust gas temperature sensor post turbocharger as required
P2084-00	Exhaust Gas Temperature Sensor Circuit Range/Performance Bank 1 Sensor 2 - No sub type information	 NOTE: - Circuit CCCOT_A - • Exhaust gas temperature sensor post catalytic converter overheating • Exhaust gas temperature sensor post catalytic converter circuit, short circuit to ground • Exhaust gas temperature sensor post catalytic converter failure	• Refer to the electrical circuit diagrams and check exhaust gas temperature sensor post catalytic converter circuit for short circuit to ground • Clear the DTC and retest • Check and install new exhaust gas temperature sensor post catalytic converter as required
P2121-1F	Throttle/Pedal Position Sensor/Switch D Circuit Range/Performance - Circuit intermittent	 NOTE: - Circuit APP_1 - • Harness failure - Accelerator pedal	• Using the manufacturer approved diagnostic system check datalogger signals, Accelerator Pedal Position D (0xF449), Pedal Position Sensor Voltage - Sensor 1 (0x0914). The accelerator pedal

		position sensor circuit • Accelerator pedal position sensor failure	position sensor consists of two potentiometer circuits feeding independent pedal demand signals to the engine control module. This DTC is set when the engine control module detects noise on the pedal demand 1 signal circuit. Refer to the electrical circuit diagrams and check the reference voltage and ground connections to the accelerator pedal position sensor. Check signal circuits for high resistance, open circuit, short circuit to power, short circuit to ground. Check all accelerator pedal position sensor circuits for intermittent failures. Repair harness as required. Clear DTC and retest • Check and install new accelerator pedal position sensor as required
P2122-00	Throttle/Pedal Position Sensor/Switch D Circuit Low - No sub type information	 NOTE: - Circuit APP_1 - • Harness failure - Accelerator pedal position sensor circuit • Accelerator pedal position sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Accelerator Pedal Position D (0xF449), Pedal Position Sensor Voltage - Sensor 1 (0x0914). The Accelerator Pedal Position sensor consists of two potentiometer circuits feeding independent pedal demand signals to the engine control module. This DTC is set when the engine control module detects the pedal demand 1 signal range is low. Refer to the electrical circuit diagrams and check the reference voltage and ground connections to the accelerator pedal position sensor. Check signal circuits for high resistance, open circuit, short circuit to power, short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new accelerator pedal position sensor as required
P2123-00	Throttle/Pedal Position Sensor/Switch D Circuit High - No sub type information	 NOTE: - Circuit APP_1 - • Harness failure - Accelerator pedal position sensor circuit • Accelerator pedal position sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Accelerator Pedal Position D (0xF449), Pedal Position Sensor Voltage - Sensor 1 (0x0914). The Accelerator Pedal Position sensor consists of two potentiometer circuits feeding independent pedal demand signals to the engine control module. This DTC is set when the engine control module detects the pedal demand 1 signal range is high. Refer to the electrical circuit diagrams and check the reference voltage and ground connections to the accelerator pedal position sensor. Check signal circuits for high resistance, open circuit, short circuit to power, short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new accelerator pedal position sensor as required
P2126-1F	Throttle/Pedal Position Sensor/Switch E Circuit Range/Performance - Circuit intermittent	 NOTE: - Circuit APP_2 - • Harness failure - Accelerator pedal position sensor circuit • Accelerator pedal position sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Accelerator Pedal Position E (0xF44A), Pedal Position Sensor Voltage - Sensor 2 (0x0915). The Accelerator Pedal Position sensor consists of two potentiometer circuits feeding independent pedal demand signals to the engine control module. This DTC is set when the engine control module detects noise on the pedal demand 2 signal circuit. Refer to the electrical circuit diagrams and check the reference voltage and ground connections to the accelerator pedal position sensor. Check signal circuits for high resistance, open circuit, short circuit to power, short circuit to ground. Check all accelerator pedal position sensor circuits for intermittent failures. Repair harness as required. Clear DTC and retest

			Check and install new accelerator pedal position sensor as required
P2127-00	Throttle/Pedal Position Sensor/Switch E Circuit Low - No sub type information	 NOTE: - Circuit APP_2 - • Harness failure - Accelerator pedal position sensor circuit • Accelerator pedal position sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Accelerator Pedal Position E (0xF44A), Pedal Position Sensor Voltage - Sensor 2 (0x0915). The Accelerator Pedal Position sensor consists of two potentiometer circuits feeding independent pedal demand signals to the engine control module. This DTC is set when the engine control module detects the pedal demand 2 signal range is low. Refer to the electrical circuit diagrams and check the reference voltage and ground connections to the accelerator pedal position sensor. Check signal circuits for high resistance, open circuits, short circuit to power, short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new accelerator pedal position sensor as required
P2128-00	Throttle/Pedal Position Sensor/Switch E Circuit High - No sub type information	 NOTE: - Circuit APP_2 - • Harness failure - Accelerator pedal position sensor circuit • Accelerator pedal position sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Accelerator Pedal Position E (0xF44A), Pedal Position Sensor Voltage - Sensor 2 (0x0915). The Accelerator Pedal Position sensor consists of two potentiometer circuits feeding independent pedal demand signals to the engine control module. This DTC is set when the engine control module detects the pedal demand 2 signal range is high. Refer to the electrical circuit diagrams and check the reference voltage and ground connections to the accelerator pedal position sensor. Check signal circuits for high resistance, open circuits, short circuit to power, short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new accelerator pedal position sensor as required
P2138-00	Throttle/Pedal Position Sensor/Switch D / E Voltage Correlation - No sub type information	• Accelerator pedal position sensor circuit short circuit to ground, short circuit to power, open circuit • Accelerator pedal position sensor failure	• Refer to the electrical circuit diagrams and check accelerator pedal position sensor 1 circuit for short circuit to ground, short circuit to power, open circuit. Refer to the electrical circuit diagrams and check accelerator pedal position sensor 2 circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check and install new accelerator pedal position sensor as required
P2138-64	Throttle/Pedal Position Sensor/Switch D / E Voltage Correlation - Signal plausibility failure	• Accelerator pedal position sensor circuit short circuit to ground, short circuit to power, open circuit • Accelerator pedal position sensor failure	• Refer to the electrical circuit diagrams and check accelerator pedal position sensor 1 circuit for short circuit to ground, short circuit to power, open circuit. Refer to the electrical circuit diagrams and check accelerator pedal position sensor 2 circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check and install new accelerator pedal position sensor as required
P2138-67	Throttle/Pedal Position Sensor/Switch D / E Voltage Correlation - Signal incorrect after event	• Accelerator pedal position sensor circuit short circuit to ground, short circuit to power, open circuit • Accelerator pedal position sensor failure	• Refer to the electrical circuit diagrams and check accelerator pedal position sensor 1 circuit for short circuit to ground, short circuit to power, open circuit. Refer to the electrical circuit diagrams and check accelerator pedal position sensor 2 circuit for short circuit to ground, short circuit to power, open circuit. Repair harness as required. Clear DTC and retest • Check and install new accelerator pedal position sensor as required

P213E-01	Fuel Injection System Fault - Forced Engine Shutdown - General electrical failure	• Quantity shut-off of the dual-mass flywheel	• Check for fuel / injector related DTCs and repair these first. Clear DTC and retest
P2141-00	Exhaust Gas Recirculation Throttle Control Circuit A Low - No sub type information	NOTE: - Circuit TPA_POS - TPA_NEG - • Harness failure - Throttle motor control circuit • Throttle motor failure	• This DTC is set when the engine control module detects a short circuit to ground on the throttle motor control circuit. Refer to the electrical circuit diagrams and check both the throttle plate actuator control circuits for short circuit to ground. Repair harness as required. Clear DTC and retest • Check and install new throttle motor control actuator as required
P2142-00	Exhaust Gas Recirculation Throttle Control Circuit A High - No sub type information	NOTE: - Circuit TPA_POS - TPA_NEG - • Harness failure - Throttle motor control circuit • Throttle motor failure	• This DTC is set when the engine control module detects a short circuit to power on the throttle motor control circuit. Refer to the electrical circuit diagrams and check both the Throttle Plate Actuator control circuits for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new throttle motor control actuator as required
P2177-00	System Too Lean Off Idle - Bank 1 - No sub type information	• Oxygen concentration implausibly high • Heated oxygen sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Heated oxygen sensor failure	• Check for excess fuel at exhaust manifold, downpipe, heated oxygen sensor • Check for fuel / injector related DTCs and repair these first. Clear DTC and retest • Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2178-00	System Too Rich Off Idle - Bank 1 - No sub type information	• Oxygen concentration implausibly low • Heated oxygen sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Heated oxygen sensor failure	• Check for air leaks at exhaust manifold, downpipe, heated oxygen sensor • Check for fuel / injector related DTCs and repair these first. Clear DTC and retest • Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2191-00	System Too Lean at Higher Load - Bank 1 - No sub type information	• Oxygen concentration implausibly high • Heated oxygen sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Heated oxygen sensor failure	• Check for excess fuel at exhaust manifold, downpipe, heated oxygen sensor • Check for fuel / injector related DTCs and repair these first. Clear DTC and retest • Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2192-00	System Too Rich at Higher Load - Bank 1 - No sub type information	• Oxygen concentration implausibly low • Heated oxygen sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Heated oxygen sensor failure	• Check for air leaks at exhaust manifold, downpipe, heated oxygen sensor • Check for fuel / injector related DTCs and repair these first. Clear DTC and retest • Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2195-00	O2 Sensor Signal biased/Stuck Lean - Bank 1, Sensor 1 - No sub type information	• Air leak at exhaust manifold, downpipe, heated oxygen sensor bank 1 • Heated oxygen sensor circuit short circuit to ground, short circuit to power, high	• Check for fuel / injector related DTCs and repair these first. Clear DTC and retest • Check for air leaks at exhaust manifold, downpipe, heated oxygen sensor • Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear

		resistance, open circuit • Heated oxygen sensor failure	DTC and retest • Check and install new heated oxygen sensor as required
P2196-00	O2 Sensor Signal biased/Stuck Rich - Bank 1, Sensor 1 - No sub type information	• Fuel injection system failure • Heated oxygen sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Heated oxygen sensor failure	• Check for fuel / injector related DTCs and repair these first. Clear DTC and retest • Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2226-62	Barometric Pressure Sensor A Circuit - Signal compare failure	• Differential pressure sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Differential pressure sensor failure • The engine control module has been submersed in water or mud • The engine control module has been sealed in a non approved covering • Differential pressure sensor failure • Engine control module failure	• Refer to the electrical circuit diagrams and check differential pressure sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Check the engine control module is clean and dry • Check the engine control module is not sealed by any non approved covering • Clear DTC and retest • Check and install new differential pressure sensor as required • Check and install new engine control module as required
P2228-00	Barometric Pressure Sensor A Circuit Low - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check engine control module power supply circuits for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check engine control module ground supply circuits for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P2229-00	Barometric Pressure Sensor A Circuit High - No sub type information	• Corrupt engine control module software flash • Engine control module power supply failure • Engine control module ground supply failure • Engine control module failure	• Using the manufacturer approved diagnostic system re-configure the engine control module • Refer to the electrical circuit diagrams and check engine control module power supply circuits for open circuit. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check engine control module ground supply circuits for open circuit. Repair harness as required. Clear DTC and retest • Check and install new engine control module as required
P2238-00	O2 Sensor Positive Current Control Circuit Low - Bank 1, Sensor 1 - No sub type information	• Heated oxygen sensor positive current control circuit short circuit to ground, high resistance, open circuit • Heated oxygen sensor failure	• Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2245-00	O2 Sensor Reference Voltage Circuit Low - Bank 1, Sensor 1 - No sub type information	NOTE: - Circuit LPV_A - • Harness failure - Heated oxygen sensor circuit • Oxygen sensor failure	• This DTC is set if the engine control module detects the bank 1, heated oxygen sensor 1 reference voltage is lower than expected. Refer to the electrical circuit diagrams and check the heated oxygen sensor circuits for open circuits, high resistance, short circuit to ground. Repair

			harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2246-00	O2 Sensor Reference Voltage Circuit High - Bank 1, Sensor 1 - No sub type information	NOTE: - Circuit LPV_A - • Harness failure - Heated oxygen sensor circuit • Oxygen sensor failure	• This DTC is set if the engine control module detects the bank 1, heated oxygen sensor 1 reference voltage is greater than expected. Refer to the electrical circuit diagrams and check the heated oxygen sensor circuits for open circuits, high resistance, short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2261-73	Turbocharger/Supercharger Bypass Valve "A" - Mechanical - Actuator stuck closed	• Boost air recirculation solenoid stuck shut during transition from mono turbo to bi-turbo mode	• This DTC is set when the engine control module detects that the turbocharger bypass valve is not operating. Refer to the workshop manual and inspect the boost air recirculation solenoid for sticking shut during transition from mono turbo to bi-turbo mode
P2263-21	Turbocharger/Supercharger Boost System Performance - Signal amplitude < minimum	• The engine control module measured a signal voltage below a specified range but not necessarily a short circuit to ground, gain low • Induction system air leak or blockage • Boost air system leak or blockage • Manifold absolute pressure sensor circuit short circuit to power, ground, open circuit • Manifold absolute pressure sensor failure • Variable geometry turbocharger actuator A sticking, failure • Turbocharger A failure	• Check induction system for leaks, blockages • Check boost air system for leaks, blockages. Check for related DTCs • Refer to the electrical circuit diagrams and check manifold absolute pressure sensor circuit for short circuit to power, ground, open circuit. Repair harness as required • Check and install new manifold absolute pressure sensor as required • Check turbocharger rod connection and oil seals • Check and install new variable geometry turbocharger actuator as required. Check install new turbocharger as required
P2263-22	Turbocharger/Supercharger Boost System Performance - Signal amplitude > maximum	• The engine control module measured a signal voltage above a specified range but not necessarily a short circuit to power, gain too high • Induction system air leak or blockage • Boost air system leak or blockage • Manifold absolute pressure sensor circuit short circuit to power, ground, open circuit • Manifold absolute pressure sensor failure • Variable geometry turbocharger actuator A sticking, failure • Turbocharger A failure	• Check induction system for leaks, blockages • Check boost air system for leaks, blockages. Check for related DTCs • Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine • Refer to the electrical circuit diagrams and check manifold absolute pressure sensor circuit for short circuit to power, ground, open circuit. Repair harness as required • Check and install new manifold absolute pressure sensor as required • Check turbocharger rod connection and oil seals • Check and install new variable geometry turbocharger actuator as required. Check install new turbocharger as required
P2264-00	Water in Fuel Sensor Circuit - No sub type information	NOTE: - Circuit WIF - • Fuel supply incorrect/contaminated • Harness failure - Water in fuel sensor circuit • Water in fuel sensor failure • Central junction box power distribution failure	• This DTC is set if the engine control module receives information indicating an implausible fuel level. Refer to the workshop manual and check the fuel system to ensure there is an adequate fuel level in the tank and the system is not leaking fuel or suffering from air ingress. Check the fuel for contamination by other fluids (petrol or water etc) • Refer to the electrical wiring diagrams and check the water in fuel sensor signal circuit between the sensor and the engine control module for high resistance, open circuit, short circuit to ground, short

			circuit to power, intermittent failures. Repair harness as required • Check and install new water in fuel sensor • Refer to the electrical wiring diagrams and check the water in fuel sensor power supply from the central junction box for high resistance, open circuit, short circuit to ground. Check the water in fuel sensor ground supply circuit for high resistance, open circuit, short circuit to power. Check the voltage supply from the central junction box, check and replace fuses as required. Replace central junction box if there is no voltage supply to the water in fuel sensor
P2269-68	Water in Fuel Condition - Event information	• Water in fuel • Water in fuel sensor circuit short circuit to power, open circuit • Water in fuel sensor failure	• Drain water from fuel filter housing. Clear DTC and wait 30 seconds and re-check DTC has cleared • Refer to the electrical circuit diagrams and check water in fuel sensor circuit for short circuit to power, open circuit. Repair harness as required • Check and install new water in fuel sensor as required
P226B-00	Turbocharger/Supercharger Boost Pressure Too High - Mechanical - No sub type information	• Error path indicating whether over boost shut down is active or not • This DTC is set when overboost shut down is active. This means that the vehicle has lost control of boost. The engine is shut down as a safety precaution. The engine control module checks for an overboost by system monitoring and also monitors vehicle acceleration, if in gear and engine acceleration at idle, if in neutral	• Check for turbocharging related DTCs and repair these first. Clear DTC and retest
P228C-00	• "Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too Low" - No sub type information	• Fuel pressure control valve, fuel leak from the high pressure side • Fuel injector stuck open / leaking • Blocked fuel filter • Low pressure fuel pipe leaking from the fuel tank fuel pump • Fuel supply system failure • Harness failure - Fuel rail pressure sensor A circuit high resistance • Fuel rail pressure sensor A failure • Fuel lift pump failure	• Check fuel pressure control valve for fuel leakage from the high pressure side • Check for fuel injector stuck open / leaking • Check for blocked fuel filter • Check for low pressure fuel pipe leakage from the fuel tank fuel pump • Using the manufacturer approved diagnostic system check datalogger signals, Fuel Rail Pressure Sensor (0x0324), Fuel Rail Pressure (0xF423). Check for related fuel system DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check fuel pump circuit for high resistance. Check fuel rail pressure sensor A circuit for high resistance • Check and install new fuel rail pressure sensor A as required • Check and install new fuel lift pump as required
P2297-00	O2 Sensor Out of Range During Deceleration Bank 1, Sensor 1 - No sub type information	• Heated oxygen sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Heated oxygen sensor failure	• Check for fuel / injector related DTCs and repair these first. Clear DTC and retest. Refer to the electrical circuit diagrams and check heated oxygen sensor for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2299-68	Brake Pedal Position/Accelerator Pedal	• Brake pedal switch - Circuit Brake_SW_1 -	• Refer to the electrical circuit diagrams and check brake pedal switch - Circuit

	Position Incompatible - Event information	Short circuit to ground, open circuit • Brake pedal switch - Circuit Brake_SW_2 - Short circuit to ground • Brake pedal switch incorrect adjustment • Brake pedal switch failure • Brake pedal pressed by driver at same time as accelerator pedal pressed	Brake_SW_1 - For short circuit to ground, open circuit. Repair harness as required. • Refer to the electrical circuit diagrams and check brake pedal switch - Circuit Brake_SW_2 - For short circuit to ground • Repair wiring harness as required, clear DTC. Start the engine press the brake pedal, using maximum travel for greater than 1 second taking care not to press the accelerator pedal. Check the system is operating correctly and the DTC does not return • Check and adjust brake switch as required • Check and install new brake pedal switch as required
P22C5-11	Turbocharger Compressor Outlet Valve Control Circuit / Open - Circuit short to ground	NOTE: - Circuit CSOV - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Turbocharger boost air solenoid circuit short circuit to ground	• Refer to the electrical circuit diagrams and check the turbocharger boost air solenoid circuit between the engine control module and the control valve for a short circuit to ground. Check power supply to the control valve. Repair harness as required. Clear DTC and retest
P22C5-12	Turbocharger Compressor Outlet Valve Control Circuit / Open - Circuit short to battery	NOTE: - Circuit CSOV - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Harness failure - Turbocharger boost air solenoid circuit short circuit to power • Turbocharger boost air solenoid failure	• Refer to the electrical circuit diagrams and check the turbocharger boost air solenoid circuit between the engine control module and the control valve for a short circuit to power. Check power supply to the control valve. Repair harness as required. Clear DTC and retest • Check and install new turbocharger boost air solenoid as required
P22C5-13	Turbocharger Compressor Outlet Valve Control Circuit / Open - Circuit open	NOTE: - Circuit CSOV - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Turbocharger boost air solenoid circuit open circuit • Turbocharger boost air solenoid failure	• Refer to the electrical circuit diagrams and check the turbocharger boost air solenoid circuit between the engine control module and the control valve for open circuit. Check power supply to the control valve. Repair harness as required. Clear DTC and retest • Check and install new turbocharger boost air solenoid as required
P22C5-4B	Turbocharger Compressor Outlet Valve Control Circuit / Open - Over temperature	• Harness failure - Turbocharger boost air solenoid circuit open circuit • Turbocharger boost air solenoid failure	• Refer to the electrical circuit diagrams and check the turbocharger boost air solenoid circuit between the engine control module and the control valve for open circuit. Check power supply to the control valve. Repair harness as required. Clear DTC and retest • Check and install new turbocharger boost air solenoid as required. Check and install

			new turbocharger boost air solenoid as required
P22CF-00	Turbocharger Turbine Inlet Valve Control Circuit / Open - No sub type information	NOTE: - Circuit TSOV - • Harness failure - Turbine intake solenoid circuit open circuit • Turbine intake solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0). Refer to the electrical circuit diagrams and check the turbine intake solenoid circuit between the engine control module and the control valve for open circuit. Check power supply to the control valve. Repair harness as required. Clear DTC and retest • Check and install new turbine intake solenoid as required
P22CF-16	Turbocharger Turbine Inlet Valve Control Circuit / Open - Circuit voltage below threshold	NOTE: - Circuit TSOV - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Turbine intake solenoid circuit failure • Turbine intake solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0). Refer to the electrical circuit diagrams and check the turbine intake solenoid circuit between the engine control module and the control valve for a high resistance, intermittent open circuit, short circuit to ground. Check power supply to the control valve. Repair harness as required. Clear DTC and retest • Check and install new turbine intake solenoid as required
P22CF-19	Turbocharger Turbine Inlet Valve Control Circuit / Open - Circuit current above threshold	• Harness failure - Turbine intake solenoid circuit failure • Turbine intake solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0). Refer to the electrical circuit diagrams and check the turbine intake valve control circuit for short circuit to ground. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • Check and install new turbine intake solenoid as required
P22CF-1D	Turbocharger Turbine Inlet Valve Control Circuit / Open - Circuit current out of range	NOTE: - Circuit TSOV - • Harness failure - Turbine intake solenoid circuit failure • Turbine intake solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0). Refer to the electrical circuit diagrams and check the turbine intake solenoid control circuit for short circuit to ground. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • Check and install new turbine intake solenoid as required
P22CF-4B	Turbocharger Turbine Inlet Valve Control Circuit / Open - Over temperature	• Harness failure - Turbine intake solenoid circuit failure • Turbine intake solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0). Refer to the electrical circuit diagrams and check the turbine intake valve control circuit for short circuit to ground. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • Check and install new turbine intake solenoid as required
P22CF-71	Turbocharger Turbine Inlet Valve Control Circuit / Open - Actuator stuck	• Turbine intake solenoid sticking closed • Turbine intake solenoid sticking open • Intake air system, blocked low pressure air intake. This failure mode can be caused by snow packing in the intake system. Symptoms often disappear after the vehicle has been	• If this DTC is logged with P22D3-77 & P00BC-00 suspect, turbine intake solenoid sticking closed • If this DTC is logged with P0235-94, P00BD-07, P22D2-77 & P1247-00 suspect, turbine intake solenoid sticking open • If this DTC is logged with P00BD-07, P22D2-77, P1247-00 & P0235-94 suspect, intake air system, blocked low pressure air intake • Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine

		warmed and heat soaked. Similar symptoms to seized primary turbo	
P22D0-00	Turbocharger Turbine Inlet Valve Control Circuit Low - No sub type information	 NOTE: - Circuit TSOV - • Harness failure - Turbine intake solenoid circuit failure • Turbine intake solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0). Refer to the electrical circuit diagrams and check the turbine intake solenoid control circuit for short circuit to ground. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • Check and install new turbine intake solenoid as required
P22D0-11	Turbocharger Turbine Inlet Valve Control Circuit Low - Circuit short to ground	 NOTE: - Circuit TSOV - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Turbine intake solenoid bank 2 circuit short circuit to ground • Turbine intake solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0). Refer to the electrical circuit diagrams and check the turbine intake solenoid control circuit on bank 2 for short circuit to ground. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • Check and install new turbine intake solenoid as required
P22D0-12	Turbocharger Turbine Inlet Valve Control Circuit Low - Circuit short to battery	 NOTE: - Circuit TSOV - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Harness failure - Turbine intake solenoid bank 2 circuit short circuit to power • Turbine intake solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0). Refer to the electrical circuit diagrams and check the turbine intake solenoid control circuit on bank 2 for short circuit to power. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • Check and install new turbine intake solenoid as required
P22D1-00	Turbocharger Turbine Inlet Valve Control Circuit High - No sub type information	 NOTE: - Circuit TSOV - • Harness failure - Turbine intake solenoid circuit short circuit to power • Turbine intake solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0). Refer to the electrical circuit diagrams and check the turbine intake solenoid control circuit for short circuit to power. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • Check and install new turbine intake solenoid as required
P22D2-77	Turbocharger Turbine Inlet Valve Stuck Open - Commanded position not reachable	• Turbine intake solenoid sticking open • Blocked low pressure air intake	• Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine • Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0) and Turbo Shut Off Valve Opening Position - Measured (0x03F1). Refer to the electrical circuit diagrams and check the turbine intake solenoid control circuit for short circuit to power. Check power supply to

			the solenoid. Repair harness as required. Clear DTC and retest • If this DTC is logged with P0235-94, P00BD-07, P1247-00 & P22CF-71, suspect turbine intake solenoid sticking open • If this DTC is logged with P1247-00, P0235-94, P00BD-07, & P22CF-71, suspect blocked low pressure air intake • Check and install new turbine intake solenoid as required
P22D3-77	Turbocharger Turbine Inlet Valve Stuck Closed - Commanded position not reachable	• Turbine intake solenoid sticking closed	• Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine • Using the manufacturer approved diagnostic system check datalogger signals, Turbo Shut Off Valve Opening Position - Commanded (0x03F0) and Turbo Shut Off Valve Opening Position - Measured (0x03F1). Refer to the electrical circuit diagrams and check the turbine intake solenoid control circuit for short circuit to power. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • If this DTC is logged with P00BC-00, & P22CF-71, suspect turbine intake solenoid sticking closed • Check and install new turbine intake solenoid as required
P22D4-13	Turbocharger Turbine Inlet Valve Position Sensor Circuit - Circuit open	NOTE: - Circuit TSVP - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Turbine intake valve position sensor circuit open circuit, high resistance	• Using the manufacturer approved diagnostic system perform the (Turbo, EGR and air path dynamic test) routine • Refer to the electrical circuit diagrams and check turbine intake valve position sensor circuit for open circuit, high resistance. Repair harness as required. Clear DTC and retest
P22D4-16	Turbocharger Turbine Inlet Valve Position Sensor Circuit - Circuit voltage below threshold	NOTE: - Circuit TSVP - • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Turbine intake valve position sensor circuit short circuit to ground	• Refer to the electrical circuit diagrams and check turbine intake valve position sensor circuit short circuit to ground. Repair harness as required. Clear DTC and retest
P22D4-17	Turbocharger Turbine Inlet Valve Position Sensor Circuit - Circuit voltage above threshold - Actuator stuck	NOTE: - Circuit TSVP - • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • This is the long term adaption limit diagnostic. It diagnoses that the adapted values for the actuator end stops is outside of tolerance. This could be caused by sensor drift over time • Turbine intake valve	• Refer to the electrical circuit diagrams and check turbine intake valve position sensor circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new turbine intake valve position sensor as required

		position sensor circuit short circuit to power • Turbine intake valve position sensor stuck	
P22D4-71	Turbocharger Turbine Inlet Valve Position Sensor Circuit - Actuator stuck	• This is the long term adaption limit diagnostic. It diagnoses that the adapted values for the actuator end stops is outside of tolerance. This could be caused by sensor drift over time • Turbine intake valve position sensor stuck	• Check and install new turbine intake valve position sensor as required
P22D4-92	Turbocharger Turbine Inlet Valve Position Sensor Circuit - Performance or incorrect operation	• This is the long term adaption limit diagnostic. It diagnoses that the adapted values for the actuator end stops is outside of tolerance. This could be caused by sensor drift over time • Turbine intake valve position sensor stuck	• Check and install new turbine intake valve position sensor as required
P22D5-92	Turbocharger Turbine Inlet Valve Position Sensor Circuit Range/Performance - Performance or incorrect operation	• This is the long term adaption limit diagnostic. It diagnoses that the adapted values for the actuator end stops is outside of tolerance. This could be caused by sensor drift over time • Turbine intake valve position sensor stuck	• Check and install new turbine intake valve position sensor as required
P22D6-11	Turbocharger Turbine Inlet Valve Position Sensor Circuit Low - Circuit short to ground	 NOTE: - Circuit TSVP - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Turbine intake valve position sensor circuit short circuit to ground	• Refer to the electrical circuit diagrams and check turbine intake valve position sensor circuit for short circuit to ground. Repair harness as required. Clear DTC and retest
P22D7-12	Turbocharger Turbine Inlet Valve Position Sensor Circuit High - Circuit short to battery	 NOTE: - Circuit TSVP - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Turbine intake valve position sensor circuit short circuit to power	• Refer to the electrical circuit diagrams and check turbine intake valve position sensor circuit for short circuit to power. Repair harness as required. Clear DTC and retest
P242A-00	Exhaust Gas Temperature Sensor Circuit Bank 1 Sensor 3 - No sub type	 NOTE: - Circuit PFOT -	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1

	information	Harness failure - Exhaust gas temperature sensor post DPF • Exhaust gas temperature sensor post DPF failure	Sensor 3 (0x03C8), Exhaust Gas Temperature Bank 1 Sensor 3 Voltage (0x03F6). This DTC is set if the exhaust gas temperature sensor post DPF fails a cold start diagnostic check by the engine control module. Refer to the electrical circuit diagrams and check the exhaust gas temperature sensor post DPF signal circuit for open circuit, short circuit to ground, short circuit to other circuits. Check the sensor ground circuit for open circuit, short circuit to power, high resistance. Repair harness as required • Check and install new exhaust gas temperature sensor post DPF as required
P242B-00	Exhaust Gas Temperature Sensor Circuit Range/Performance Bank 1 Sensor 3 - No sub type information	NOTE: - Circuit PFOT - • Exhaust gas temperature sensor post DPF overheating • Harness failure - Exhaust gas temperature sensor post DPF • Exhaust gas temperature sensor post DPF failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 3 (0x03C8), Exhaust Gas Temperature Bank 1 Sensor 3 Voltage (0x03F6). This DTC is set if the exhaust gas temperature sensor post DPF fails a cold start diagnostic check by the engine control module. Refer to the electrical circuit diagrams and check the exhaust gas temperature sensor post DPF signal circuit for open circuit, short circuit to ground, short circuit to other circuits. Check the sensor ground circuit for open circuit, short circuit to power, high resistance. Repair harness as required • Clear the DTC and retest • Check and install new exhaust gas temperature sensor post DPF as required
P242C-00	Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 3 - No sub type information	NOTE: - Circuit PFOT - • Harness failure - Exhaust gas temperature sensor post DPF • Exhaust gas temperature sensor post DPF failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 3 (0x03C8), Exhaust Gas Temperature Bank 1 Sensor 3 Voltage (0x03F6). This DTC is set if the exhaust gas temperature sensor post DPF signal voltage is less than the engine control module was expecting. Refer to the electrical circuit diagrams and check the exhaust gas temperature sensor post DPF signal circuit for open circuit, short circuit to ground, short circuit to other circuits. Check the sensor ground circuit for open circuit, short circuit to power, high resistance. Repair harness as required • Check and install new exhaust gas temperature sensor post DPF as required
P242D-00	Exhaust Gas Temperature Sensor Circuit High Bank 1 Sensor 3 - No sub type information	NOTE: - Circuit PFOT - • Exhaust gas temperature sensor post DPF circuit, short circuit to power, open circuit • Exhaust gas temperature sensor post DPF failure	• Using the manufacturer approved diagnostic system check datalogger signals, Exhaust Gas Temperature Bank 1 Sensor 3 (0x03C8), Exhaust Gas Temperature Bank 1 Sensor 3 Voltage (0x03F6) • Refer to the electrical circuit diagrams and check the exhaust gas temperature sensor post DPF circuit, for short circuit to power, open circuit • Check and install new exhaust gas temperature sensor post DPF as required
P242F-00	Diesel Particulate Filter Restriction - Ash Accumulation (Bank 1) - No sub type information	• Maximum ash load	NOTE: The setting value of this DTC is inhibited • Contact dealer technical support
P244A-00	Diesel Particulate Filter Differential Pressure Too Low(Bank 1) - No sub type information	• Diagnostic failure check for minimum pressure differential characteristics • Diesel particulate filter internal components	• Using the manufacturer approved diagnostic system, check for related DTCs and refer to the relevant DTC index • Clear DTC and re-test • Check and install new diesel particulate filter as required

		are missing or destroyed	
P244A-96	Diesel Particulate Filter Differential Pressure Too Low(Bank 1) - Component internal failure	• Destroyed particulate filter	• Refer to the relevant pinpoint test in section 309-00
P244B-68	Diesel Particulate Filter Differential Pressure Too High (Bank 1) - Event information	• Engine protection back pressure high • Sudden increases in differential pressure across the diesel particulate filter	NOTE: This DTC when logged on its own is advisory only and no further action should be taken • Using the manufacturer approved diagnostic system, check for related DTCs. If this DTC exists with any other diesel particulate filter differential pressure sensor DTCs, follow the advise given for that DTC
P244E-00	Exhaust Temperature Too Low For Particulate Filter Regeneration, Bank 2 - No sub type information	• Error path for not reaching the setpoint of the inner loop with maximal control variable	• Using the manufacturer approved diagnostic system check for related DTCs and refer to the relevant DTC index. Clear DTC and re-test. This DTC has been calibrated not to flag
P244F-00	Exhaust Temperature Too High For Particulate Filter Regeneration, Bank 2 - No sub type information	• Error path for not reaching the setpoint of the inner loop with minimal control variable	• Using the manufacturer approved diagnostic system check for related DTCs and refer to the relevant DTC index. Clear DTC and re-test. This DTC has been calibrated not to flag
P2452-23	Diesel Particulate Filter Pressure Sensor A Circuit - Signal stuck low	• Differential pressure sensor circuit, short circuit to ground • Diesel differential pressure sensor A circuit, hose line error	• Refer to the electrical circuit diagrams and check the differential pressure sensor circuit, for short circuit to ground • Using the manufacturer approved diagnostic system, check for related DTCs and refer to the relevant DTC index
P2452-29	Diesel Particulate Filter Pressure Sensor A Circuit - Signal invalid	• Diagnostic failure check for frozen differential pressure sensor	• Using the manufacturer approved diagnostic system check for related DTCs and refer to the relevant DTC index
P2452-95	Diesel Particulate Filter Pressure Sensor A Circuit - Incorrect assembly	NOTE: In cold climates differential pressure sensor hose lines or metal pipes may be frozen • Differential pressure sensor hoses connected incorrectly • Differential pressure sensor hoses crushed, blocked, split	NOTE: If a new diesel particulate filter pressure sensor or hose lines have been installed or incorrectly routed, or any pressure sensor circuit repairs carried out, the engine control module must learn and store the new diesel particulate filter pressure sensor offset value. The following conditions must be met to allow the diesel particulate filter pressure sensor offset value to be learnt and stored: Using the manufacturer approved diagnostic system, clear DTCs from engine control module, then monitor the datalogger signal 'sump oil temperature - measured' ensuring a minimum of 50 degrees C is achieved. Start engine, run above 500RPM for 2 minutes, then a further 30 seconds at idle. Ensure the engine cooling fan is not running. Set vehicle in park and set ignition status to off. Wait 30 seconds for the engine control module to power down, learn and store diesel particulate filter pressure sensor offset value. This process must be carried out six times, to allow a large negative offset value to adapt back to 0 Hpa • Using the manufacturer approved diagnostic system check datalogger signals, Particulate Filter Differential Pressure Sensor Voltage - Bank 1 (0x03DB). Refer to the workshop manual and check differential pressure sensor hoses are installed correctly • Check differential pressure sensor hoses for crushed, blockage, split
P2453-00	Diesel Particulate Filter Pressure Sensor A Circuit Range/Performance - No	NOTE: - Circuit DPS -	NOTE: If a new diesel particulate filter pressure sensor or hose lines have been installed

	sub type information	Harness failure - Differential pressure sensor • Differential pressure sensor failure	or incorrectly routed, or any pressure sensor circuit repairs carried out, the engine control module must learn and store the new diesel particulate filter pressure sensor offset value. The following conditions must be met to allow the diesel particulate filter pressure sensor offset value to be learnt and stored: Using the manufacturer approved diagnostic system, clear DTCs from engine control module, then monitor the datalogger signal 'sump oil temperature - measured' ensuring a minimum of 50 degrees C is achieved. Start engine, run above 500RPM for 2 minutes, then a further 30 seconds at idle. Ensure the engine cooling fan is not running. Set vehicle in park and set ignition status to off. Wait 30 seconds for the engine control module to power down, learn and store diesel particulate filter pressure sensor offset value. This process must be carried out six times, to allow a large negative offset value to adapt back to 0 Hpa • Using the manufacturer approved diagnostic system check datalogger signals, Particulate Filter Differential Pressure Sensor Voltage - Bank 1 (0x03DB). This DTC is set when the particulate pressure sensor fails a plausibility check. Refer to the electrical circuit diagrams and check the differential pressure sensor signal circuit for open circuit, short circuit to ground, short circuit to other circuits. Check the sensor ground circuit for open circuit, short circuit to power, high resistance. Check the sensor power supply circuit for open circuit, short circuit to ground, high resistance. Repair harness as required • Check and install new differential pressure sensor as required
P2453-16	Diesel Particulate Filter Pressure Sensor A Circuit Range/Performance - Circuit voltage below threshold	 NOTE: - Circuit DPS - • Diagnostic failure check for signal range check low in flow resistance • Harness failure - Differential pressure sensor • Differential pressure sensor failure	• Using the manufacturer approved diagnostic system check for related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system check datalogger signals, Particulate Filter Differential Pressure Sensor Voltage - Bank 1 (0x03DB). This DTC is set when the particulate pressure sensor fails a plausibility check. Refer to the electrical circuit diagrams and check the differential pressure sensor signal circuit for open circuit, short circuit to ground, short circuit to other circuits. Check the sensor ground circuit for open circuit, short circuit to power, high resistance. Check the sensor power supply circuit for open circuit, short circuit to ground, high resistance. Repair harness as required • Check and install new differential pressure sensor as required
P2453-17	Diesel Particulate Filter Pressure Sensor A Circuit Range/Performance - Circuit voltage above threshold	 NOTE: - Circuit DPS - • Diagnostic failure check for signal range check high in flow resistance • Harness failure - Differential pressure sensor • Differential pressure sensor failure	• Using the manufacturer approved diagnostic system check for related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system check datalogger signals, Particulate Filter Differential Pressure Sensor Voltage - Bank 1 (0x03DB). This DTC is set when the particulate pressure sensor fails a plausibility check. Refer to the electrical circuit diagrams and check the differential pressure sensor signal circuit for open circuit, short circuit to ground, short circuit to other circuits. Check the sensor ground circuit for open circuit, short circuit to power, high resistance. Check the sensor power supply circuit for open circuit, short circuit to ground, high

			resistance. Repair harness as required • Check and install new differential pressure sensor as required
P2454-00	Diesel Particulate Filter Pressure Sensor A Circuit Low - No sub type information	 NOTE: - Circuit DPS - • Harness failure - Differential pressure sensor • Differential pressure sensor crossed hose lines • Differential pressure sensor failure	 NOTE: If a new diesel particulate filter pressure sensor or hose lines have been installed or incorrectly routed, or any pressure sensor circuit repairs carried out, the engine control module must learn and store the new diesel particulate filter pressure sensor offset value. The following conditions must be met to allow the diesel particulate filter pressure sensor offset value to be learnt and stored: Using the manufacturer approved diagnostic system, clear DTCs from engine control module, then monitor the datalogger signal 'sump oil temperature - measured' ensuring a minimum of 50 degrees C is achieved. Start engine, run above 500rpm for 2 minutes, then a further 30 seconds at idle. Ensure the engine cooling fan is not running. Set vehicle in park and set ignition status to off. Wait 30 seconds for the engine control module to power down, learn and store diesel particulate filter pressure sensor offset value. This process must be carried out six times, to allow a large negative offset value to adapt back to 0 Hpa • Using the manufacturer approved diagnostic system check datalogger signals, Particulate Filter Differential Pressure Sensor Voltage - Bank 1 (0x03DB). This DTC is set when the particulate pressure sensor voltage is less than the threshold set in the engine control module diagnostic check. Refer to the electrical circuit diagrams and check the differential pressure sensor signal circuit for open circuit, short circuit to ground, short circuit to other circuits. Check the sensor ground circuit for open circuit, short circuit to power, high resistance. Check the sensor power supply circuit for open circuit, short circuit to ground, high resistance. Repair harness as required • Check differential pressure sensor hose lines are installed correctly • Check and install new differential pressure sensor as required
P2455-00	Diesel Particulate Filter Pressure Sensor A Circuit High - No sub type information	 NOTE: - Circuit DPS - • Harness failure - Differential pressure sensor • Differential pressure sensor failure • Exhaust back pressure is too high	 NOTE: If a new diesel particulate filter pressure sensor or hose lines have been installed or incorrectly routed, or any pressure sensor circuit repairs carried out, the engine control module must learn and store the new diesel particulate filter pressure sensor offset value. The following conditions must be met to allow the diesel particulate filter pressure sensor offset value to be learnt and stored: Using the manufacturer approved diagnostic system, clear DTCs from engine control module, then monitor the datalogger signal 'sump oil temperature - measured' ensuring a minimum of 50 degrees C is achieved. Start engine, run above 500RPM for 2 minutes, then a further 30 seconds at idle. Ensure the engine cooling fan is not running. Set vehicle in park and set ignition status to off. Wait 30 seconds for the engine control module to power down, learn and store diesel particulate filter pressure sensor offset value. This process must be carried out six times, to allow a large negative offset value to adapt back to 0 Hpa • Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Using the manufacturer approved

			diagnostic system check datalogger signals, Particulate Filter Differential Pressure Sensor Voltage - Bank 1 (0x03DB). This DTC is set when the particulate pressure sensor voltage is greater than the threshold set in the engine control module diagnostic check. Refer to the electrical circuit diagrams and check the differential pressure sensor signal circuit for open circuit, short circuit to power, short circuit to other circuits. Check the sensor ground circuit for open circuit, short circuit to power, high resistance. Check the sensor power supply circuit for open circuit, short circuit to ground, high resistance. Repair harness as required • Check and install new differential pressure sensor as required
P2456-00	Diesel Particulate Filter Pressure Sensor A Circuit Intermittent/Erratic - No sub type information	• Differential pressure sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • In cold climate or off road driving differential pressure sensor hoses crushed, blocked, split • Differential pressure sensor failure	NOTE: If a new diesel particulate filter pressure sensor or hose lines have been installed or incorrectly routed, or any pressure sensor circuit repairs carried out, the engine control module must learn and store the new diesel particulate filter pressure sensor offset value. The following conditions must be met to allow the diesel particulate filter pressure sensor offset value to be learnt and stored: Using the manufacturer approved diagnostic system, clear DTCs from engine control module, then monitor the datalogger signal 'sump oil temperature - measured' ensuring a minimum of 50 degrees C is achieved. Start engine, run above 500RPM for 2 minutes, then a further 30 seconds at idle. Ensure the engine cooling fan is not running. Set vehicle in park and set ignition status to off. Wait 30 seconds for the engine control module to power down, learn and store diesel particulate filter pressure sensor offset value. This process must be carried out six times, to allow a large negative offset value to adapt back to 0 Hpa • Refer to the electrical circuit diagrams and check differential pressure sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Inspect connectors for signs of water ingress, and pins for damage and/or corrosion • Check differential pressure sensor hoses for crushed, blocked, split • Check and replace diesel particulate filter differential pressure sensor as required
P2458-66	Diesel Particulate Filter Regeneration Duration (Bank 1) - Signal has too many transitions / events	• Permanent regeneration	NOTE: This code is enabled for JLR engineering detailed diagnostics only. No further action should be taken • Using the manufacturer approved diagnostic system, check for related DTCs and refer to the relevant DTC index
P2459-65	Diesel Particulate Filter Regeneration Frequency (Bank 1) - Signal has too few transitions / events	• Blocked regeneration • Customer driving routine does not allow the system to clean the particulate filter	NOTE: If DTC is P2459-65 or AMBER DPF FULL REFER TO HANDBOOK message is displayed with no other reported messages. No repair is required, if the vehicle is driven on a highway AS DIRECTED IN THE HANDBOOK then the light will be extinguished and the system self healed, nothing more than this is required • Refer to the diesel particulate filter regeneration procedure and carry out a diesel particulate filter regeneration • Advise customer of driving routine required to regenerate diesel particulate filter as stated in the vehicle handbook

P2459-66	Diesel Particulate Filter Regeneration Frequency (Bank 1) - Signal has too many transitions / events	• Regeneration frequency	NOTE: This code is enabled for JLR engineering detailed diagnostics only. No further action should be taken • Using the manufacturer approved diagnostic system, check for related DTCs and refer to the relevant DTC index
P245A-11	Exhaust Gas Recirculation Cooler Bypass Control Circuit - Circuit short to ground	NOTE: - Circuit EGRCBV - • The engine control module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected • Harness failure - Exhaust gas recirculation bypass solenoid circuit short circuit to ground	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Cooler Bypass Valve Duty Cycle (0x03C5). Refer to the electrical circuit diagrams and check the exhaust gas recirculation bypass solenoid circuit for short circuit to ground. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest
P245A-12	Exhaust Gas Recirculation Cooler Bypass Control Circuit - Circuit short to battery	NOTE: - Circuit EGRCBV - • The engine control module has detected a vehicle power measurement for a period longer than expected or has detected a vehicle power measurement when another value was expected • Harness failure - Exhaust gas recirculation bypass solenoid circuit short circuit to power • Exhaust gas recirculation bypass solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Cooler Bypass Valve Duty Cycle (0x03C5). Refer to the electrical circuit diagrams and check the exhaust gas recirculation bypass solenoid circuit for short circuit to power. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation bypass solenoid as required
P245A-13	Exhaust Gas Recirculation Cooler Bypass Control Circuit - Circuit open	NOTE: - Circuit EGRCBV - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Exhaust gas recirculation bypass solenoid circuit open circuit • Exhaust gas recirculation bypass solenoid failure	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Cooler Bypass Valve Duty Cycle (0x03C5). Refer to the electrical circuit diagrams and check the exhaust gas recirculation bypass solenoid circuit for open circuit. Check power supply to the solenoid. Repair harness as required. Clear DTC and retest • Check and install new exhaust gas recirculation bypass solenoid as required
P245B-19	Exhaust Gas Recirculation Cooler Bypass Control Circuit Range/Performance - Circuit current above threshold	• Harness failure - Exhaust gas recirculation bypass solenoid circuit short circuit to ground, high resistance • Exhaust gas recirculation bypass	• Using the manufacturer approved diagnostic system check datalogger signals, EGR Cooler Bypass Valve Duty Cycle (0x03C5). Refer to the electrical circuit diagrams and check the exhaust gas recirculation bypass solenoid circuit for short circuit to ground, high resistance. Repair harness as required.

		solenoid failure	Clear DTC and retest • Check and install new exhaust gas recirculation bypass solenoid as required
P2463-00	Diesel Particulate Filter Restriction - Soot Accumulation (Bank 1) - No sub type information	• Maximum soot mass	• Refer to the relevant pinpoint test in section 309-00
P246C-00	Diesel Particulate Filter Restriction - Forced Limited Power (Bank 1) - No sub type information	• Diagnostic failure check for maximum pressure differential characteristics	• Using the manufacturer approved diagnostic system check for related DTCs and refer to the relevant DTC index
P250A-36	Engine Oil Level Sensor Circuit - Signal frequency too low	 NOTE: - Circuit OTL - • The engine control module detected excessive duration for one cycle of the output across a specified sample size • Oil level and temperature sensor circuit short circuit to ground, high resistance, open circuit • Oil level and temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Oil Level - Measured (0x03E6), Engine Oil Volume - Calculated (0x03F2), Sump Oil Temperature - Measured (0x03F3). Refer to the electrical circuit diagrams and check the oil level and temperature sensor circuit for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new oil level and temperature sensor as required
P250A-37	Engine Oil Level Sensor Circuit - Signal frequency too high	 NOTE: - Circuit OTL - • The engine control module detected insufficient duration for one cycle of the output across a specified sample size • Oil level and temperature sensor circuit short circuit to power • Oil level and temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Oil Level - Measured (0x03E6), Engine Oil Volume - Calculated (0x03F2), Sump Oil Temperature - Measured (0x03F3). Refer to the electrical circuit diagrams and check the oil level and temperature sensor circuit for short circuit to power. Repair harness as required. Clear DTC and retest • Check and install new oil level and temperature sensor as required
P250A-38	Engine Oil Level Sensor Circuit - Signal frequency incorrect	 NOTE: - Circuit OTL - • Oil level and temperature sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Oil level and temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Oil Level - Measured (0x03E6), Engine Oil Volume - Calculated (0x03F2), Sump Oil Temperature - Measured (0x03F3). Refer to the electrical circuit diagrams and check the oil level and temperature sensor circuit for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new oil level and temperature sensor as required
P250A-47	Engine Oil Level Sensor Circuit - Watchdog / safety micro controller failure	• Oil level and temperature sensor circuit short circuit to ground, short circuit to power, high resistance, open circuit • Oil level and temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Oil Level - Measured (0x03E6), Engine Oil Volume - Calculated (0x03F2), Sump Oil Temperature - Measured (0x03F3). Refer to the electrical circuit diagrams and check the oil level and temperature sensor circuit for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new oil level and temperature sensor as required
P250A-92	Engine Oil Level Sensor Circuit - Performance or incorrect operation	• Oil level and temperature sensor circuit short circuit to	• Using the manufacturer approved diagnostic system check datalogger signals, Engine Oil Level - Measured

		ground, short circuit to power, high resistance, open circuit • Oil level and temperature sensor failure	(0x03E6), Engine Oil Volume - Calculated (0x03F2), Sump Oil Temperature - Measured (0x03F3). Refer to the electrical circuit diagrams and check the oil level and temperature sensor circuit for short circuit to ground, short circuit to power, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new oil level and temperature sensor as required
P2586-13	Turbocharger Boost Control Position Sensor B Circuit - Circuit open	 NOTE: - Circuit VGT_FB - • The engine control module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output • Harness failure - Variable geometry turbine vane actuator open circuit • Variable geometry turbine vane actuator failure	• Using the manufacturer approved diagnostic system check datalogger signal, Boost Pressure Actuator Bank 2 - Measured Position (0x0347). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator on bank 1 for open circuit. This circuit consists of three wires between the engine control module and the variable geometry turbocharger control module. The three sensor wires are a 5 volt sensor supply, a sensor ground and a signal line. Check signal line for open circuit and power and ground supply to sensor. Repair harness as required. Clear DTC and retest • Check and install new variable geometry turbocharger position sensor as required
P2586-32	Turbocharger Boost Control Position Sensor B Circuit - Signal low time < minimum	 NOTE: - Circuit VGT_FB - • Harness failure - Variable geometry turbine vane actuator circuit short circuit to ground, high resistance, open circuit • Variable geometry turbine vane actuator failure	• Using the manufacturer approved diagnostic system check datalogger signal, Boost Pressure Actuator Bank 2 - Measured Position (0x0347). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator on bank 1 for short circuit to ground, high resistance, open circuit. Repair harness as required. Clear DTC and retest • Check and install new variable geometry turbocharger position sensor as required
P2586-35	Turbocharger Boost Control Position Sensor B Circuit - Signal high time > maximum	 NOTE: - Circuit VGT_FB - • Harness failure - Variable geometry turbine vane actuator • Variable geometry turbine vane actuator failure	• Using the manufacturer approved diagnostic system check datalogger signal, Boost Pressure Actuator Bank 2 - Measured Position (0x0347). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator on bank 1 for open circuit, short circuit to power, short circuit to ground. Check the power and ground supply to the sensor. Repair harness as required. Clear DTC and retest • Check and install new variable geometry turbocharger position sensor as required
P2586-36	Turbocharger Boost Control Position Sensor B Circuit - Signal frequency too low	 NOTE: - Circuit VGT_FB - • The engine control module detected excessive duration for one cycle of the output across a specified sample size • Harness failure - Variable geometry turbine vane actuator • Variable geometry turbine vane actuator failure	• Using the manufacturer approved diagnostic system check datalogger signal, Boost Pressure Actuator Bank 2 - Measured Position (0x0347). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator on bank 1 for open circuit, short circuit to power, short circuit to ground. Check the power and ground supply to the sensor. Repair harness as required. Clear DTC and retest • Check and install new variable geometry turbocharger position sensor as required
P2586-37	Turbocharger Boost Control Position Sensor B Circuit - Signal frequency	 NOTE: - Circuit VGT_FB -	• Using the manufacturer approved diagnostic system check datalogger signal, Boost Pressure Actuator Bank 2 -

	too high	• The engine control module detected insufficient duration for one cycle of the output across a specified sample size • Harness failure - Variable geometry turbine vane actuator • Variable geometry turbine vane actuator failure	Measured Position (0x0347). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator on bank 1 for open circuit, short circuit to power, short circuit to ground. Check the power and ground supply to the sensor. Repair harness as required. Clear DTC and retest • Check and install new variable geometry turbocharger position sensor as required
P2587-92	Turbocharger Boost Control Position Sensor B Circuit Range/Performance - Performance or incorrect operation	• Harness failure - Variable geometry turbine vane actuator • Variable geometry turbine vane actuator failure	• Using the manufacturer approved diagnostic system check datalogger signal, Boost Pressure Actuator Bank 2 - Measured Position (0x0347). Refer to the electrical circuit diagrams and check the variable geometry turbine vane actuator on bank 1 for open circuit, short circuit to power, short circuit to ground. Check the power and ground supply to the sensor. Repair harness as required. Clear DTC and retest • Check and install new variable geometry turbocharger position sensor as required
P2588-00	Turbocharger Boost Control Position Sensor B Circuit Low - No sub type information	NOTE: - Circuit VGT_FB - • Harness failure - Variable geometry turbine vane actuator • Variable geometry turbine vane actuator circuit short circuit to ground • Variable geometry turbine vane actuator failure	• Using the manufacturer approved diagnostic system check datalogger signal, Boost Pressure Actuator Bank 2 - Measured Position (0x0347). This DTC is set when the engine control module detects a low circuit voltage on the signal line from the variable geometry turbine vane actuator. Check signal line for short circuit to ground. Check power and ground supply to sensor. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check variable geometry turbine vane actuator circuit for short circuit to ground • Check and install new variable geometry turbine vane actuator as required
P2589-00	Turbocharger Boost Control Position Sensor B Circuit High - No sub type information	NOTE: - Circuit VGT_FB - • Harness failure - Variable geometry turbine vane actuator • Variable geometry turbine vane actuator circuit short circuit to power • Variable geometry turbine vane actuator failure	• Using the manufacturer approved diagnostic system check datalogger signal, Boost Pressure Actuator Bank 2 - Measured Position (0x0347). This DTC is set when the engine control module detects a high circuit voltage on the signal line from the variable geometry turbine vane actuator. Check signal line for short circuit to power. Check power and ground supply to sensor. Repair harness as required. Clear DTC and retest • Refer to the electrical circuit diagrams and check variable geometry turbine vane actuator circuit for short circuit to power • Check and install new variable geometry turbine vane actuator as required
P268C-00	Cylinder 1 Injector Data Incompatible - No sub type information	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P268C-51	Cylinder 1 Injector Data Incompatible - Not programmed	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P268D-	Cylinder 2 Injector Data	• Injector calibration	• Using the manufacturer approved

00	Incompatible - No sub type information	data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	diagnostic system reprogram the injector codes
P268D-51	Cylinder 2 Injector Data Incompatible - Not programmed	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P268E-00	Cylinder 3 Injector Data Incompatible - No sub type information	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P268E-51	Cylinder 3 Injector Data Incompatible - Not programmed	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P268F-00	Cylinder 4 Injector Data Incompatible - No sub type information	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P268F-51	Cylinder 4 Injector Data Incompatible - Not programmed	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P2690-00	Cylinder 5 Injector Data Incompatible - No sub type information	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P2690-51	Cylinder 5 Injector Data Incompatible - Not programmed	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P2691-00	Cylinder 6 Injector Data Incompatible - No sub type information	• Injector calibration data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	• Using the manufacturer approved diagnostic system reprogram the injector codes
P2691-	Cylinder 6 Injector Data	• Injector calibration	• Using the manufacturer approved

51	Incompatible - Not programmed	data held in the engine control module is different to that read from the injector • Injector calibration data not stored / programmed	diagnostic system reprogram the injector codes
P2A00-16	O2 Circuit Range / Performance (Bank 1, Sensor 1) - Circuit voltage below threshold	 NOTE: - Circuit LPTR_A • The engine control module measured a voltage below a specified range but not necessarily a short circuit to ground • Harness failure - Heated oxygen sensor failure • Heated oxygen sensor failure	• This DTC is set when the engine control module detects the voltage on the trim resistor circuit of the heated oxygen sensor is less than the voltage threshold. This may be caused by the heated oxygen sensor being too hot to operate correctly. Refer to the workshop manual and check the exhaust system and heated oxygen sensor harness for sign of mechanical damage. Refer to the electrical circuit diagrams and check all the heated oxygen sensor circuits for open circuits, short circuit to power, short circuit to ground, short circuit to other circuits. Check all engine control module power and ground supplies. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2A00-17	O2 Circuit Range / Performance (Bank 1, Sensor 1) - Circuit voltage above threshold	 NOTE: - Circuit LPTR_A • The engine control module measured a voltage above a specified range but not necessarily a short circuit to power • Harness failure - Heated oxygen sensor failure • Heated oxygen sensor failure	• This DTC is set when the engine control module detects the voltage on the trim resistor circuit of the heated oxygen sensor is greater than the voltage threshold. This may be caused by the heated oxygen sensor being too hot to operate correctly. Refer to the workshop manual and check the exhaust system and heated oxygen sensor harness for sign of mechanical damage. Refer to the electrical circuit diagrams and check all the heated oxygen sensor circuits for open circuits, short circuit to power, short circuit to ground, short circuit to other circuits. Check all engine control module power and ground supplies. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
P2A00-26	O2 Circuit Range / Performance (Bank 1, Sensor 1) - Signal rate of change below threshold	 NOTE: - Circuit LPTR_A • Harness failure - Heated oxygen sensor failure • Heated oxygen sensor failure	• This DTC is set when the engine control module detects the voltage on the trim resistor circuit of the heated oxygen sensor is greater than the voltage threshold. This may be caused by the heated oxygen sensor being too hot to operate correctly. Refer to the workshop manual and check the exhaust system and heated oxygen sensor harness for sign of mechanical damage. Refer to the electrical circuit diagrams and check all the heated oxygen sensor circuits for open circuits, short circuit to power, short circuit to ground, short circuit to other circuits. Check all engine control module power and ground supplies. Repair harness as required. Clear DTC and retest • Check and install new heated oxygen sensor as required
U0001-00	High Speed CAN Communication Bus - No sub type information	• High speed CAN bus failure • High speed CAN bus circuit, short circuit to ground, short circuit to power, open circuit	• Using the manufacturer approved diagnostic system carry out network integrity test • Refer to the electrical circuit diagrams and check high speed CAN network for short circuit to ground, short circuit to power, open circuit
U0001-88	High Speed CAN Communication Bus - Bus off	• High speed CAN bus failure • High speed CAN bus circuit, short circuit to ground, short circuit	• Using the manufacturer approved diagnostic system carry out network integrity test • Refer to the electrical circuit diagrams and check high speed CAN network for short

		to power, open circuit	circuit to ground, short circuit to power, open circuit
U0101-00	Lost Communication with TCM - No sub type information	• The engine control module has not received the expected CAN signal from the transmission control module within the specified time interval • CAN harness link between engine control module and transmission control module network malfunction	• Using the manufacturer approved diagnostic system, check transmission control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check transmission control module power and ground circuits for open circuit. Check CAN harness between engine control module and transmission control module, repair as necessary
U0101-26	Lost Communication with TCM - Signal rate of change below threshold	• The engine control module has not received the expected CAN signal from the transmission control module within the specified time interval • CAN harness link between engine control module and transmission control module network malfunction	• Using the manufacturer approved diagnostic system, check transmission control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check transmission control module power and ground circuits for open circuit. Check CAN harness between engine control module and transmission control module, repair as necessary
U0102-00	Lost Communication with Transfer Case Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the transfer box control module within the specified time interval • CAN harness link between engine control module and transfer box control module network malfunction	• Using the manufacturer approved diagnostic system, check transfer box control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check transfer box control module power and ground circuits for open circuit. Check CAN harness between engine control module and transfer box control module, repair as necessary
U0103-00	Lost Communication With Gear Shift Control Module A - No sub type information	• The engine control module has not received the expected CAN signal from the transmission control switch within the specified time interval • CAN harness link between engine control module and transmission control switch network malfunction	• Using the manufacturer approved diagnostic system, check transmission control switch for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check transmission control switch power and ground circuits for open circuit. Check CAN harness between engine control module and transmission control switch, repair as necessary
U0104-00	Lost Communication With Cruise Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the speed control module within the specified time interval • CAN harness link between engine control module and speed control module network malfunction	• Using the manufacturer approved diagnostic system, check speed control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check speed control module power and ground circuits for open circuit. Check CAN harness between engine control module and speed control module, repair as necessary
U0120-00	Lost Communication with Starter/ Generator Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the anti-lock brake system control module within the specified time interval • CAN harness link	• Using the manufacturer approved diagnostic system, check anti-lock brake system control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check generator system control module power and ground circuits

		between engine control module and anti-lock brake system control module network malfunction	for open circuit. Check CAN harness between engine control module and anti-lock brake system control module, repair as necessary
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the anti-lock brake system control module within the specified time interval • CAN harness link between engine control module and anti-lock brake system control module network malfunction	• Using the manufacturer approved diagnostic system, check anti-lock brake system control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check anti-lock brake system control module power and ground circuits for open circuit. Check CAN harness between engine control module and anti-lock brake system control module, repair as necessary
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• The engine control module has not received the expected CAN signal from the steering angle sensor control module within the specified time interval • CAN harness link between engine control module and steering angle sensor control module network malfunction	• Using the manufacturer approved diagnostic system, check steering angle sensor control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check steering angle sensor control module power and ground circuits for open circuit. Check CAN harness between engine control module and steering angle sensor control module, repair as necessary
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the park brake control module within the specified time interval • CAN harness link between engine control module and park brake control module network malfunction	• Using the manufacturer approved diagnostic system, check park brake control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check park brake control module power and ground circuits for open circuit. Check CAN harness between engine control module and park brake control module, repair as necessary
U012A-00	Lost Communication with Chassis Control Module "A" - No sub type information	• The engine control module has not received the expected CAN signal from the integrated suspension control module within the specified time interval • CAN harness link between engine control module and integrated suspension control module network malfunction	• Using the manufacturer approved diagnostic system, check integrated suspension control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check integrated suspension control module power and ground circuits for open circuit • Check CAN harness between engine control module and integrated suspension control module, repair as necessary
U0131-00	Lost Communication With Power Steering Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the power steering control module within the specified time interval • CAN harness link between engine control module and power steering control module network malfunction	• Using the manufacturer approved diagnostic system, check power steering control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check power steering control module power and ground circuits for open circuit. Check CAN harness between engine control module and power steering control module, repair as necessary
U0133-00	Lost Communication With Active Roll Control Module	• The engine control module has not	• Using the manufacturer approved diagnostic system, check dynamic

	- No sub type information	received the expected CAN signal from the dynamic response control module within the specified time interval • CAN harness link between engine control module and dynamic response control module network malfunction	response control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check dynamic response control module power and ground circuits for open circuit. Check CAN harness between engine control module and dynamic response control module, repair as necessary
U0138-00	Lost Communication with All Terrain Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the terrain response switchpack within the specified time interval • CAN harness link between engine control module and terrain response switchpack network malfunction	• Using the manufacturer approved diagnostic system, check terrain response switchpack for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check terrain response switchpack power and ground circuits for open circuit. Check CAN harness between engine control module and terrain response switchpack, repair as necessary
U0140-00	Lost Communication With Body Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the central junction box within the specified time interval • CAN harness link between engine control module and central junction box network malfunction	• Using the manufacturer approved diagnostic system, check central junction box for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check central junction box power and ground circuits for open circuit. Check CAN harness between engine control module and central junction box, repair as necessary
U0146-00	Lost Communication With Gateway "A" - No sub type information	• The engine control module has not received the expected CAN signal from the gateway control module within the specified time interval • CAN harness link between engine control module and gateway control module network malfunction	• Using the manufacturer approved diagnostic system, check gateway control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check gateway control module power and ground circuits for open circuit • Check CAN harness between engine control module and gateway control module, repair as necessary
U0151-00	Lost Communication With Restraints Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the restraints control module within the specified time interval • CAN harness link between engine control module and restraints control module network malfunction	• Using the manufacturer approved diagnostic system, check restraints control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check restraints control module power and ground circuits for open circuit. Check CAN harness between engine control module and restraints control module, repair as necessary
U0151-08	Lost Communication With Restraints Control Module - Bus Signal / Message Failures	• The engine control module has not received the expected CAN signal from the restraints control module within the specified time interval • CAN harness link between engine control module and restraints control module network malfunction	• Using the manufacturer approved diagnostic system, check restraints control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check restraints control module power and ground circuits for open circuit. Check CAN harness between engine control module and restraints control module, repair as necessary

U0155-00	Lost Communication With Instrument Panel Cluster Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the instrument cluster within the specified time interval • CAN harness link between engine control module and instrument cluster network malfunction	• Using the manufacturer approved diagnostic system, check instrument cluster for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check instrument cluster power and ground circuits for open circuit. Check CAN harness between engine control module and instrument cluster, repair as necessary
U0159-00	Lost Communication With Parking Assist Control Module "A" - No sub type information	• The engine control module has not received the expected CAN signal from the park distance control module within the specified time interval • CAN harness link between engine control module and park distance control module network malfunction	• Using the manufacturer approved diagnostic system, check park distance control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check park distance control module power and ground circuits for open circuit • Check CAN harness between engine control module and park distance control module, repair as necessary
U0164-00	Lost Communication With HVAC Control Module - No sub type information	• Power distribution system failure - Fuse failure • CAN network failure • Automatic temperature control module failure	• This DTC is set if the engine control module loses communication with the automatic temperature control module. Check the automatic temperature control module for DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check the power supply and ground connections to the automatic temperature control module • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required • Check and install new automatic temperature control module
U0167-00	Lost Communication With Vehicle Immobilizer Control Module - No sub type information	• Engine control module identity transfer failed	• Check the electric steering column lock for DTCs and refer to the relevant DTC index. Refer to the electrical circuit diagrams and check the power supply and ground connections to the electric steering column lock. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required • Check and install new electric steering column lock
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• CAN network failure • Central junction box failure • Car configuration file incorrect	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair harness as required • Car configuration signal not received. Check central junction box for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system check and up-date the car configuration file as required
U0402-00	Invalid Data Received from TCM - No sub type information	• CAN network failure • Implausible CAN data received from transmission control module	• Check transmission control module for related DTCs and refer to relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair harness as required

U0402-83	Invalid Data Received from TCM - Value of signal protection calculation incorrect	• CAN network failure • Implausible CAN data received from transmission control module	• Check transmission control module for related DTCs and refer to relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair harness as required
U0404-68	Invalid Data Received from Gear Shift Control Module A - Event information	• CAN network failure • Implausible CAN data received from transmission control switch	• Check transmission control switch for related DTCs and refer to relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair harness as required
U0405-68	Invalid Data Received From Cruise Control Module - Event information	• Speed control system failure	• Check speed control module for related DTCs and refer to relevant DTC index • Refer to the electrical circuit diagrams and check the power supply and ground connections to the speed control module • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair harness as required • Check and install new speed control module
U0405-82	Invalid Data Received From Cruise Control Module - Alive/sequence counter incorrect/not updated	• Speed control system failure • CAN network failure • Harness failure - Speed control module power supply or ground failure	• Check speed control buttons are not jammed/contaminated/damaged. Check speed control module for related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair harness as required • Refer to the electrical circuit diagrams and check the power supply and ground connections to the speed control module • Check and install new speed control module
U0405-84	Invalid Data Received From Cruise Control Module - Signal below allowable range	• Speed control system failure	• Check speed control module for related DTCs and refer to relevant DTC index • Refer to the electrical circuit diagrams and check the power supply and ground connections to the speed control module • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair harness as required • Check and install new speed control module
U0405-86	Invalid Data Received From Cruise Control Module - Signal invalid	• Speed control system failure	• Check speed control buttons are not jammed/contaminated/damaged. Check speed control module for related DTCs and refer to the relevant DTC index
U0407-00	Invalid Data Received From Glow Plug Control Module - No sub type information	• This DTC is set when the glow plug control module does not match what is expected by the engine control module. Detection of the coding word is complete when 2 of 3 coding words match. This process is a one time operation and will be completed during assembly of the vehicle	• Check the correct glow plug control module is installed to the vehicle

U0407-81	Invalid Data Received From Glow Plug Control Module - Invalid serial data received	• Glow plug control system failure	• Refer to electrical circuit diagrams and check the power supply and ground connections to the glow plug control module. Check the diagnostic circuit between the engine control module and the glow plug control module for short circuit to power, short circuit to ground, open circuits. Clear the DTC and retest • Check and install new glow plug control module
U0415-68	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Event information	• Signal error for vehicle speed over CAN	• Using the manufacturer approved diagnostic system, check anti-lock brake system control module for DTCs and refer to the relevant DTC index
U0416-46	Invalid Data Received From Vehicle Dynamics Control Module - Calibration / parameter memory failure	• Anti-lock brake system failure	• Using the manufacturer approved diagnostic system, check anti-lock brake system control module for DTCs and refer to the relevant DTC index
U0416-68	Invalid Data Received From Vehicle Dynamics Control Module - Event information	• The engine control module has received the default brake pressure signal value over CAN from the anti-lock brake system control module for a specified time interval • Anti-lock brake system failure • CAN harness link between engine control module and anti-lock brake system control module network malfunction	• Using the manufacturer approved diagnostic system, check anti-lock brake system control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system carry out network integrity test. Refer to the electrical circuit diagrams and check anti-lock brake system control module power and ground circuits for open circuit. Check CAN harness between engine control module and anti-lock brake system control module, repair as necessary
U0416-92	Invalid Data Received From Vehicle Dynamics Control Module - Performance or incorrect operation	• Difference between anti-lock brake system speed signal value and instrument cluster speed value at low vehicle speeds	Check the anti-lock brake system control module for DTCs and refer to the relevant DTC index
U0422-00	Invalid Data Received From Body Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the central junction box within the specified time interval • CAN harness link between engine control module and central junction box network malfunction	• Using the manufacturer approved diagnostic system, check central junction box for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check central junction box power and ground circuits for open circuit • Check CAN harness between engine control module and central junction box, repair as necessary
U0424-00	Invalid Data Received From HVAC Control Module - No sub type information	• The engine control module has not received the expected CAN signal from the automatic temperature control module within the specified time interval • CAN harness link between engine control module and automatic temperature control module network malfunction	• Using the manufacturer approved diagnostic system, check automatic temperature control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check automatic temperature control module power and ground circuits for open circuit • Check CAN harness between engine control module and automatic temperature control module, repair as necessary
U0424-68	Invalid Data Received From HVAC Control Module - Event information	• Power distribution system failure - Fuse failure • CAN network failure • Automatic temperature control module failure	• This DTC is set if the engine control module loses communication with the automatic temperature control module. Check the automatic temperature control module for DTCs and refer to the relevant DTC index

			Refer to the electrical circuit diagrams and check the power supply and ground connections to the automatic temperature control module • Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required • Check and install new automatic temperature control module as required
U0426-00	Invalid Data Received From Vehicle Immobilizer Control Module - No sub type information	• Electric steering column lock has received an invalid identity response • Module substituted	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair harness as required. Using the manufacturer approved diagnostic system check and up-date the car configuration file as required • Ensure all modules installed in the vehicle which store vehicle identity are valid for this vehicle and are not substitutes from a donor vehicle
U0A1A-87	LIN Bus "A" - Missing message	• Generator LIN bus communication circuit failure	• Refer to the electrical circuit diagrams and check the generator LIN bus circuit, for short circuit to power, short circuit to ground, open circuit. Repair harness as required. Clear DTC and retest
U1A14-00	CAN Initialization Failure - No sub type information	• Harness failure - CAN circuit failure	• Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required
U2005-64	Vehicle Speed - Signal plausibility failure	• Anti-lock brake system failure	• This DTC is set when the engine control module has recognized a vehicle speed signal plausibility failure. Check the anti-lock brake system module for related DTCs and refer to the relevant DTC index. Check the instrument cluster for related DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required
U2005-84	Vehicle Speed - Below allowable range	• Anti-lock brake system failure	• This DTC is set when the engine control module has recognized a vehicle speed signal which is below the allowable range. Check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index. Check the instrument cluster for related DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required
U2005-85	Vehicle Speed - Above allowable range	• Anti-lock brake system failure	• This DTC is set when the engine control module has recognized a vehicle speed signal which is above the allowable range. Check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index. Check the instrument cluster for related DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required

U2108-00	Adaptive Cruise Control - No sub type information	• Adaptive speed control system failure - Error indicating adaptive speed control failure flag set	• Check adaptive speed control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required
U2108-24	Adaptive Cruise Control - Signal stuck high	• The engine control module measures a signal that remains high when transitions are expected • Adaptive speed control system failure - Adaptive speed control follow speed error	• Check adaptive speed control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required
U2108-64	Adaptive Cruise Control - Signal plausibility failure	• Adaptive speed control system failure - Adaptive speed control follow speed range error	• Check adaptive speed control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required
U2108-68	Adaptive Cruise Control - Event information	• Adaptive speed control system failure - Error indicating adaptive speed control follow speed check when stationary	• Check adaptive speed control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required
U2108-86	Adaptive Cruise Control - Signal invalid	• Adaptive speed control system failure - Error when invalid adaptive speed control resume requests are present	• Check adaptive speed control module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to electrical circuit diagrams and check CAN circuits if required. Repair wiring harness as required

General Information - Diagnostic Trouble Code (DTC) Index V8 5.0L Petrol/V8 S/C 5.0L Petrol, DTC: Engine Control Module (ECM)

Description and Operation

Engine Control Module (PCM) 5.0L V8

CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Engine Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Electronic Engine Controls (303-14B Electronic Engine Controls - V8 5.0L Petrol, Diagnosis and Testing).

DTC	Description	Possible Causes	Action
B10A2-31	Crash Input - No signal	NOTE: - Circuit SRS_SIGNAL - • Loss of communication between restraints control module and engine control module	• Refer to the electrical circuit diagrams and check restraints control module pulse width modulated SRS signal line circuit, hard wired connection between engine control module and restraints control module for short circuit to ground, short circuit to power, open circuit. Repair circuit as required, clear the DTC and retest
B10AC-81	Cruise Control Switch - Invalid serial data received	• The engine control module has received an invalid command from the steering wheel switch pack	• Clear the DTC and press all the steering wheel switches, re-check for DTCs. Refer to the electrical circuit diagrams and check the speed control switch circuit for open circuit, short circuit to power, short circuit to ground, disconnected • Check and install a new steering wheel module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B10AC-82	Cruise Control Switch - Alive / sequence counter incorrect / not updated	• Cruise buttons alive counter is not incrementing. Which suggests that the LIN bus is faulty • Steering wheel module is not connected • Steering wheel module failure	• Refer to the electrical circuit diagrams and check the speed control switch circuit for open circuit, short circuit to power, short circuit to ground, disconnected • Refer to the electrical circuit diagrams and check the LIN bus between steering wheel module

			and the CAN gateway • Check and install a new steering wheel module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B10AC-83	Cruise Control Switch - Value of signal protection calculation incorrect	• Cruise buttons checksum incorrect, incorrect cruise switches fitted to vehicle	• Check and install new cruise switches as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B10AC-96	Cruise Control Switch - Component internal failure	• Speed control switch circuit, open circuit, short circuit to power, short circuit to ground, disconnected • Speed control switch failure • Steering wheel module failure	• Check for related DTCs in other central junction boxes • Refer to the electrical circuit diagrams and check the speed control switch circuit for open circuit, short circuit to power, short circuit to ground, disconnected • Check and install a new speed control switch as required. Check and install a new steering wheel module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B10FF-68	Ignition Control - Event information	• Spark plug(s) fault • Wiring harness fault • Ignition coil(s) fault	• Refer to repair manual and check spark plug(s) for condition and security. Replace any defective components as required • Refer to electrical wiring diagrams and check ignition coil circuit for intermittent open circuit, short circuit to power, short circuit to ground • Check and install a new coil(s) as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B11DB-01	Battery Monitoring Module - General electrical failure	 NOTE: - Circuit BATTERY - • Charging system fault • Battery monitoring signal line circuit fault • Vehicle battery fault	• Refer to electrical wiring diagrams and check charging system for faults. Perform any repairs required • Refer to the electrical wiring diagrams and check the battery monitoring system module circuit for open circuit, short circuit to ground, short circuit to power • Refer to the workshop manual and the battery care manual, inspect the vehicle battery and ensure it is fully charged and serviceable before performing further tests
B11DB-87	Battery Monitoring Module - Missing message	 NOTE: - Circuit BATTERY - • Battery signal line circuit fault	• Refer to the electrical wiring diagrams and check the battery monitoring system module circuit for open circuit, short circuit to ground, short circuit to power • Refer to the electrical circuit diagrams and check the LIN circuit for short circuit to ground, short circuit to power, open circuit
B1206-68	Crash Occurred - Event information	 NOTE: - Circuit SRS_SIGNAL -	• Refer to the electrical circuit diagrams and check the engine control module to restraints

		• Engine control module has detected the vehicle has crashed - event information DTC only	control module circuit for short circuit to ground, short circuit to power, open circuit. Repair circuit as required, clear the DTC and retest
C0031-00	Left Front Wheel Speed Sensor - No sub type information	• Invalid data received from anti-lock braking system module - left front wheel speed signal fault	• Check anti-lock braking system module for related DTCs and refer to relevant DTC index
C0034-00	Right Front Wheel Speed Sensor - No sub type information	• Invalid data received from anti-lock braking system module - right front wheel speed signal fault	• Check anti-lock braking system module for related DTCs and refer to relevant DTC index
C0037-00	Left Rear Wheel Speed Sensor - No sub type information	• Invalid data received from anti-lock braking system module - left rear wheel speed signal fault	• Check anti-lock braking system module for related DTCs and refer to relevant DTC index
C003A-00	Right Rear Wheel Speed Sensor - No sub type information	• Invalid data received from anti-lock braking system module - right rear wheel speed signal fault	• Check anti-lock braking system module for related DTCs and refer to relevant DTC index
P0010-13	Intake (A) Camshaft Position Actuator (Bank 1) - Circuit open	NOTE: - Circuit VFS_IN_A - • Intake (A) camshaft position actuator (Bank 1) open circuit • Engine control module interface harness open circuit	• Refer to the electrical circuit diagrams and check intake (A) camshaft position actuator (Bank 1) circuit for open circuit • Refer to the electrical circuit diagrams and check engine control module interface harness for open circuit
P0011-00	Intake (A) Camshaft Position Timing - Over-Advanced (Bank 1) - No sub type information	NOTE: - Circuit VFS_IN_A - • Intake (A) camshaft position actuator (Bank 1) open circuit • Engine control module interface harness open circuit	• Refer to the electrical circuit diagrams and check intake (A) camshaft position actuator (Bank 1) circuit for open circuit • Refer to the electrical circuit diagrams and check engine control module interface harness for open circuit
P0013-13	Exhaust (B) Camshaft Position Actuator (Bank 1) - Circuit open	NOTE: - Circuit VFS_EX_A - • Exhaust (B) camshaft position actuator (Bank 1) open circuit • Engine control module interface harness open circuit	• Refer to the electrical circuit diagrams and check exhaust (B) camshaft position actuator (Bank 1) circuit for open circuit • Refer to the electrical circuit diagrams and check engine control module interface harness for open circuit
P0015-00	Exhaust (B) Camshaft Position Timing - Over-Retarded (Bank 1) - No sub type information	NOTE: - Circuit VFS_EX_A - • Exhaust (B) camshaft position actuator (Bank 1) open circuit, short circuit to ground, short circuit to power	• Check for related DTC P0365-00. Refer to the electrical circuit diagrams and check exhaust (B) camshaft position actuator (Bank 1) for open circuit, short circuit to ground, short circuit to power
P0016-00	Crankshaft Position - Camshaft Position Correlation - Bank 1 Sensor A - No sub type information	NOTE: - Circuit VFS_EX_A - • The relative positions of the crankshaft position sensor and cam timing plate teeth are not correct • Engine timing incorrect • Timing chain installed incorrectly • Variable valve timing forced fully advanced	• Check engine timing. Check camshaft sensor timing plate is installed correctly. Check timing chain is installed correctly
P0017-00	Crankshaft Position - Camshaft Position Correlation - Bank 1 Sensor B - No sub type information	NOTE: - Circuit VFS_EX_A - • The relative positions of the crankshaft position sensor and camshaft timing plate teeth are not correct	• Check for related DTC P0365-00. Check engine timing. Check camshaft sensor timing plate is installed correctly. Check timing chain is installed correctly • Refer to the electrical circuit diagrams and check exhaust (B)

		• Engine timing incorrect • Timing chain installed incorrectly • Variable valve timing forced fully advanced	camshaft position actuator (Bank 1) for open circuit, short circuit to ground, short circuit to power
P0018-00	Crankshaft Position - Camshaft Position Correlation - Bank 2 Sensor A - No sub type information	NOTE: - Circuit VFS_IN_B - • The relative positions of the crankshaft position sensor and camshaft timing plate teeth are not correct • Engine timing incorrect • Timing chain installed incorrectly • Variable valve timing forced fully advanced	• Check engine timing. Check camshaft sensor timing plate is installed correctly. Check timing chain is installed correctly
P0019-00	Crankshaft Position - Camshaft Position Correlation - Bank 2 Sensor B - No sub type information	NOTE: - Circuit VFS_EX_B - • The relative positions of the crankshaft position sensor and camshaft timing plate teeth are not correct • Engine timing incorrect • Timing chain installed incorrectly • Variable valve timing forced fully advanced	• Check engine timing. Check camshaft sensor timing plate is installed correctly. Check timing chain is installed correctly
P001A-13	Intake (A) Cam Profile Control Circuit (Bank 1) - Circuit open	NOTE: - Circuit CPS_A - • Camshaft profile switching solenoid bank 1 open circuit	• Refer to the electrical circuit diagrams and check camshaft profile switching solenoid bank 1 for open circuit
P001B-11	Intake (A) Cam Profile Control Circuit Low (Bank 1) - Circuit short to ground	NOTE: - Circuit CPS_A - • Camshaft profile switching solenoid bank 1 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check camshaft profile switching solenoid bank 1 circuit for short circuit to ground
P001C-12	Intake (A) Cam Profile Control Circuit High (Bank 1) - Circuit short to battery	NOTE: - Circuit CPS_A - • Camshaft profile switching solenoid bank 1 circuit short circuit to power	• Refer to the electrical circuit diagrams and check camshaft profile switching solenoid bank 1 circuit for short circuit to power
P001D-13	Intake (A) Cam Profile Control Circuit (Bank 2) - Circuit open	NOTE: - Circuit CPS_B - • Camshaft profile switching solenoid bank 2 open circuit	• Refer to the electrical circuit diagrams and check camshaft profile switching solenoid bank 2 for open circuit
P001E-11	Intake (A) Cam Profile Control Circuit Low (Bank 2) - Circuit short to ground	NOTE: - Circuit CPS_B - • Camshaft profile switching solenoid bank 2 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check camshaft profile switching solenoid bank 2 circuit for short circuit to ground
P001F-12	Intake (A) Cam Profile Control Circuit High (Bank 2) - Circuit short to battery	NOTE: - Circuit CPS_B - • Camshaft profile switching solenoid bank 2 circuit short circuit to power	• Refer to the electrical circuit diagrams and check camshaft profile switching solenoid bank 2 circuit for short circuit to power
P0020-13	Intake (A) Camshaft Position Actuator (Bank 2) - Circuit open	NOTE: - Circuit VFS_IN_B - • Intake valve solenoid 2 open circuit	• Refer to the electrical circuit diagrams and check intake valve solenoid 2 for open circuit
P0023-13	Exhaust (B) Camshaft Position Actuator (Bank 2)	NOTE: - Circuit VFS_EX_B -	• Refer to the electrical circuit diagrams and check exhaust (B)

	- Circuit open	• Exhaust (B) Camshaft Position actuator (Bank 2) circuit, open circuit	camshaft position actuator (Bank 2) circuit for open circuit
P0026-72	Intake Valve Control Solenoid Circuit Range/Performance (Bank 1) - Actuator stuck open	 NOTE: - Circuit VFS_IN_A - • Intake valve solenoid 1 angle less than target • Intake valve solenoid 1 slow or not operating	• Check operation of intake valve solenoid 1. Check and install a new intake valve solenoid 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0026-77	Intake Valve Control Solenoid Circuit Range/Performance (Bank 1) - Commanded position not reachable	 NOTE: - Circuit VFS_IN_A - • Intake valve solenoid 1 angle greater than target • Intake valve solenoid 1 not returning to target in time • Intake valve solenoid 1 stuck advanced	• Check operation of intake valve solenoid 1. Check and install a new intake valve solenoid 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0027-72	Exhaust Valve Control Solenoid Circuit Range/Performance (Bank 1) - Actuator stuck open	 NOTE: - Circuit VFS_EX_A - • Exhaust valve solenoid 1 angle less than target • Exhaust valve solenoid 1 slow or not operating	• Check operation of exhaust valve solenoid 1. Check and install a new exhaust valve solenoid 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0027-77	Exhaust Valve Control Solenoid Circuit Range/Performance (Bank 1) - Commanded position not reachable	 NOTE: - Circuit VFS_EX_A - • Exhaust valve solenoid 1 angle greater than target • Exhaust valve solenoid 1 not returning to target in time • Exhaust valve solenoid 1 stuck advanced	• Check operation of exhaust valve solenoid 1. Check and install a new exhaust valve solenoid 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0028-72	Intake Valve Control Solenoid Circuit Range/Performance (Bank 2) - Actuator stuck open	 NOTE: - Circuit VFS_IN_B - • Intake valve solenoid 2 angle less than target • Intake valve solenoid 2 slow or not operating	• Check operation of intake valve solenoid 2. Check and install a new intake valve solenoid 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0028-77	Intake Valve Control Solenoid Circuit Range/Performance (Bank 2) - Commanded position not reachable	 NOTE: - Circuit VFS_IN_B - • Intake valve solenoid 2 angle greater than target • Intake valve solenoid 2 not returning to target in time • Intake valve solenoid 2 stuck advanced	• Check operation of intake valve solenoid 2. Check and install a new intake valve solenoid 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0029-72	Exhaust Valve Control Solenoid Circuit Range/Performance (Bank 2) - Actuator stuck open	 NOTE: - Circuit VFS_EX_B - • Exhaust valve solenoid 2 angle less than target • Exhaust valve solenoid 2 slow or not operating	• Check operation of exhaust valve solenoid 2. Check and install a new exhaust valve solenoid 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0029-77	Exhaust Valve Control Solenoid Circuit Range/Performance (Bank 2) - Commanded position not reachable	 NOTE: - Circuit VFS_EX_B - • Exhaust valve solenoid 2 angle greater than target	• Check operation of exhaust valve solenoid 2. Check and install a new exhaust valve solenoid 2 as required. Refer to the warranty policy and procedures manual, or

		Exhaust valve solenoid 2 not returning to target in time • Exhaust valve solenoid 2 stuck advanced	determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0031-11	HO2S Heater Control Circuit Low (Bank 1, Sensor 1) - Circuit short to ground	NOTES:  - Circuit HTR_CTRL_A_UPSTREAM -  LR - Circuit UHEGO HEATER A - • Pre catalyst oxygen sensor-odd heater control circuit (Bank 1, Sensor 1) circuit short circuit to ground	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 1 (0x03A1) • Refer to the electrical circuit diagrams and check pre catalyst oxygen sensor-odd heater control circuit (Bank 1, Sensor 1) circuit for short circuit to ground
P0031-13	HO2S Heater Control Circuit Low (Bank 1, Sensor 1) - Circuit open	NOTES:  - Circuit HTR_CTRL_A_UPSTREAM -  LR - Circuit UHEGO HEATER A - • Pre catalyst oxygen sensor-odd heater control circuit (Bank 1, Sensor 1) circuit, open circuit	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 1 (0x03A1) • Refer to the electrical circuit diagrams and check pre catalyst oxygen sensor-odd heater control circuit (Bank 1, Sensor 1) circuit for open circuit
P0032-12	HO2S Heater Control Circuit High (Bank 1, Sensor 1) - Circuit short to battery	NOTES:  - Circuit HTR_CTRL_A_UPSTREAM -  LR - Circuit UHEGO HEATER A - • Pre catalyst oxygen sensor-odd heater control circuit (Bank 1, Sensor 1) circuit short circuit to power	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 1 (0x03A1) • Refer to the electrical circuit diagrams and check pre catalyst oxygen sensor-odd heater control circuit (Bank 1, Sensor 1) circuit for short circuit to power
P0036-00	HO2S Heater Control Circuit (Bank 1, Sensor 2) - No sub type information	 NOTE: - Circuit HTR_HEGO_A - • Catalyst oxygen sensor heater circuit control fuse failure • Post catalyst oxygen sensor-odd heater control circuit short circuit to ground, short circuit to power, open circuit • Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit • Catalyst oxygen sensor heater circuit control relay failure • Post catalyst oxygen sensor-odd failure	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 2 (0x03A2) • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor-odd sensor fuse for open circuit • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor-odd sensor circuit for short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit diagrams and check catalyst oxygen sensor heater circuit control relay circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new catalyst oxygen sensor heater control relay, as required. Check and install a new post catalyst oxygen sensor-odd as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P003C-00	A Camshaft Profile Control Performance /Stuck Off	 NOTE: - Circuit CPS_A -	• Check for the presence of oil at the camshaft profile switching

	(Bank 1) - No sub type information	• Oil supply blockage to camshaft profile switching solenoid • Catalyst oxygen sensor failure, giving false flag • Camshaft profile switching solenoid bank 1 circuit fault • Camshaft profile switching solenoid bank 1 fault	solenoid • Check for catalyst oxygen sensor related DTCs • Refer to the electrical circuit diagrams and check camshaft profile switching solenoid bank 1 circuit for short circuit to power, short circuit to ground, open circuit • Check and install a new camshaft profile switching solenoid bank 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component • Clear DTC and road test the vehicle. If fault remains contact dealer technical support before carrying out any further work
P003E-00	A Camshaft Profile Control Performance/ Stuck Off (Bank 2) - No sub type information	 NOTE: - Circuit CPS_B - • Oil supply blockage to camshaft profile switching solenoid • Catalyst oxygen sensor failure, giving false flag • Camshaft profile switching solenoid bank 2 circuit fault • Camshaft profile switching solenoid bank 2 fault	• Check for the presence of oil at the camshaft profile switching solenoid • Check for catalyst oxygen sensor related DTCs • Refer to the electrical circuit diagrams and check camshaft profile switching solenoid bank 2 circuit for short circuit to power, short circuit to ground, open circuit • Check and install a new camshaft profile switching solenoid bank 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component • Clear DTC and road test the vehicle. If fault remains contact dealer technical support before carrying out any further work
P0051-11	HO2S Heater Control Circuit Low (Bank 2, Sensor 1) - Circuit short to ground	NOTES:  - Circuit HTR_CTRL_B_UPSTREAM -  LR - Circuit UHEGO HEATER B - • Pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit short circuit to ground	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 2 Sensor 1 (0x03A4) • Refer to the electrical circuit diagrams and check pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit for short circuit to ground
P0051-13	HO2S Heater Control Circuit Low (Bank 2, Sensor 1) - Circuit open	NOTES:  - Circuit HTR_CTRL_B_UPSTREAM -  LR - Circuit UHEGO HEATER B - • Pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit, open circuit	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 2 Sensor 1 (0x03A4) • Refer to the electrical circuit diagrams and check pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit for open circuit
P0052-12	HO2S Heater Control Circuit High (Bank 2, Sensor 1) - Circuit short to battery	NOTES:  - Circuit HTR_CTRL_B_UPSTREAM -	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 2 Sensor 1 (0x03A4) • Refer to the electrical circuit

		 LR - Circuit UHEGO HEATER B - • Pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit short circuit to power	diagrams and check pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit for short circuit to power
P0054-00	HO2S Heater Resistance (Bank 1, Sensor 2) - No sub type information	NOTES:  - Circuit HTR_CTRL_A_UPSTREAM -  LR - Circuit UHEGO HEATER A - • Catalyst oxygen sensor heater circuit control fuse failure • Post catalyst oxygen sensor-odd heater control circuit short circuit to ground, short circuit to power, open circuit, high resistance • Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit • Catalyst oxygen sensor heater circuit control relay failure • Post catalyst oxygen sensor-odd failure	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 1 (0x03A1) • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor-odd sensor fuse for open circuit • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor-odd sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check catalyst oxygen sensor heater circuit control relay circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new catalyst oxygen sensor heater control relay, as required. Check and install a new post catalyst oxygen sensor-odd as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0056-00	HO2S Heater Control Circuit (Bank 2, Sensor 2) - No sub type information	 NOTE: - Circuit HTR_HEGO_B - • Post catalyst oxygen sensor-even heater control circuit short circuit to ground, short circuit to power, open circuit • Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit • Catalyst oxygen sensor heater circuit control relay failure • Post catalyst oxygen sensor-even failure	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 2 Sensor 2 (0x03A5) • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor-even sensor circuit for short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit diagrams and check catalyst oxygen sensor heater circuit control relay circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new catalyst oxygen sensor heater control relay, as required. Check and install a new post catalyst oxygen sensor-even, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0060-00	HO2S Heater Resistance (Bank 2, Sensor 2) - No sub type information	NOTES:  - Circuit HTR_CTRL_B_UPSTREAM -  LR - Circuit UHEGO HEATER B - • Catalyst oxygen sensor heater circuit control fuse failure	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 2 Sensor 2 (0x03A5) • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor-even sensor fuse for open circuit • Refer to the electrical circuit diagrams and check post catalyst

		• Post catalyst oxygen sensor-even heater control circuit short circuit to ground, short circuit to power, open circuit, high resistance • Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit • Catalyst oxygen sensor heater circuit control relay failure • Post catalyst oxygen sensor-even failure	oxygen sensor-even sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to the electrical circuit diagrams and check catalyst oxygen sensor heater circuit control relay circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new catalyst oxygen sensor heater control relay, as required. Check and install a new post catalyst oxygen sensor-even as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0069-29	MAP - Barometric Pressure Correlation - Signal invalid	• Manifold absolute pressure sensor failure • Engine control module failure	• Using the manufacturer approved diagnostic system check datalogger signal, Barometric Pressure Sensor Voltage (0x035A). Check for related manifold absolute pressure sensor DTCs • Refer to the electrical circuit diagrams and check manifold absolute pressure sensor circuit for short circuit to ground, short circuit to power, open circuit • Check and install new manifold absolute pressure sensor as required. Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0071-21	Ambient Air Temperature Sensor Range/Performance - Signal amplitude < minimum	NOTES:  Jaguar - Circuit AMBIENT_TEMP_SENSOR -  LR - Circuit TAMB TEMP - • Ambient air temperature sensor circuit short circuit to ground, short circuit to power, open circuit • Temperature and manifold absolute pressure sensor circuit short circuit to ground, short circuit to power, open circuit • Ambient air temperature sensor failure • Temperature and manifold absolute pressure sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Ambient Air Temperature Sensor Voltage (0x03BA) • Refer to the electrical circuit diagrams and check ambient air temperature sensor circuit for short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit diagrams and check temperature and manifold absolute pressure sensor circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new ambient air temperature sensor as required. Check and install a new temperature and manifold absolute pressure sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0071-22	Ambient Air Temperature Sensor Range/Performance - Signal amplitude > maximum	NOTES:  - Circuit AMBIENT_TEMP_SENSOR -  LR - Circuit TAMB TEMP -	• Using the manufacturer approved diagnostic system check datalogger signal, Ambient Air Temperature Sensor Voltage (0x03BA) • Refer to the electrical circuit diagrams and check ambient air temperature sensor circuit for

		• Ambient air temperature sensor circuit short circuit to ground, short circuit to power, open circuit • Temperature and manifold absolute pressure sensor circuit short circuit to ground, short circuit to power, open circuit • Ambient air temperature sensor failure • Temperature and manifold absolute pressure sensor failure	short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit diagrams and check temperature and manifold absolute pressure sensor circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new ambient air temperature sensor as required. Check and install a new temperature and manifold absolute pressure sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0072-00	Ambient Air Temperature Sensor Circuit Low - No sub type information	NOTES:  - Circuit AMBIENT_TEMP_SENSOR -  LR - Circuit TAMB TEMP - • Ambient air temperature sensor circuit short circuit to ground, open circuit, high resistance • Ambient air temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Ambient Air Temperature Sensor Voltage (0x03BA) • Refer to the electrical circuit diagrams and check ambient air temperature sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new ambient air temperature sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0073-00	Ambient Air Temperature Sensor Circuit High - No sub type information	NOTES:  - Circuit AMBIENT_TEMP_SENSOR -  LR - Circuit TAMB TEMP - • Ambient air temperature sensor ground circuit high resistance, open circuit • Ambient air temperature sensor signal circuit short circuit to power • Ambient air temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signals Ambient Air Temperature Sensor Voltage (0x03BA) • Refer to the electrical circuit diagrams and check ambient air temperature sensor circuit for short circuit to ground, high resistance, short circuit to power. Check connector terminals for corrosion or damage • Check and install a new ambient air temperature sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P007B-23	Charge Air Cooler Temperature Sensor Circuit Range/Performance (Bank 1) - Signal stuck low	 NOTE: - Circuit TMAP_TEMP_SENSOR - • Charge air cooler temperature sensor circuit poor / intermittent connection • Charge air cooler temperature sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Charge Air Temperature Voltage (0x03EE) • Refer to the electrical circuit diagrams and check charge air cooler temperature sensor circuit for poor, intermittent connection • Check and install a new charge air cooler temperature sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P007B-24	Charge Air Cooler Temperature Sensor Circuit Range/Performance	 NOTE: Jaguar circuit reference IC_COOLANT_PMP_CTRL &	• Inspect connectors for signs of water ingress, and pins for damage and/or corrosion

	(Bank 1) - Signal stuck high	BOOST_PRESS_SENSOR_TEMP_SIG. Land Rover circuit reference O_S_CACWPR & I_A_BTS • Connector is disconnected, connector pin is backed out, connector pin corrosion • Fuse failure • Temperature and manifold absolute pressure sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Temperature and manifold absolute pressure sensor failure • Air charge coolant pump and control circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Air charge coolant pump relay failure • Air charge coolant pump failure	Refer to electrical circuit diagrams and check for fuse failure, install new fuse as required • Refer to electrical circuit diagrams and check the temperature and manifold absolute pressure sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Check and install a new temperature and manifold absolute pressure sensor as required • Refer to electrical circuit diagrams and check the air charge coolant pump and control circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to electrical circuit diagrams and check the air charge coolant pump for open circuit, high resistance • Refer to the relevant section of the workshop manual and check the air charge coolant pump for correct operation. Check and install a new air charge coolant pump as required • Clear DTC and retest
P007B-29	Charge Air Cooler Temperature Sensor Circuit Range/Performance (Bank 1) - Signal invalid	NOTE: Jaguar circuit reference IC_COOLANT_PMP_CTRL & BOOST_PRESS_SENSOR_TEMP_SIG. Land Rover circuit reference O_S_CACWPR & I_A_BTS • Connector is disconnected, connector pin is backed out, connector pin corrosion • Fuse failure • Temperature and manifold absolute pressure sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Temperature and manifold absolute pressure sensor failure • Air charge coolant pump and control circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Air charge coolant pump relay failure • Air charge coolant pump failure	• Inspect connectors for signs of water ingress, and pins for damage and/or corrosion • Refer to electrical circuit diagrams and check for fuse failure, install new fuse as required • Refer to electrical circuit diagrams and check the temperature and manifold absolute pressure sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Check and install a new temperature and manifold absolute pressure sensor as required • Refer to electrical circuit diagrams and check the air charge coolant pump and control circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Refer to electrical circuit diagrams and check the air charge coolant pump for open circuit, high resistance • Refer to the relevant section of the workshop manual and check the air charge coolant pump for correct operation. Check and install a new air charge coolant pump as required • Clear DTC and retest
P007C-00	Charge Air Cooler Temperature Sensor Circuit Low (Bank 1) - No sub type information	NOTE: - Circuit TMAP_TEMP_SENSOR - • Charge air cooler temperature sensor (Bank 1) circuit short circuit to ground, open circuit, high resistance • Charge air cooler temperature sensor (Bank 1) failure	• Refer to the electrical circuit diagrams and check charge air cooler temperature sensor (Bank 1) circuit for short circuit to ground, open circuit, high resistance • Check and install a new charge air cooler temperature sensor (Bank 1) as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P007D-00	Charge Air Cooler Temperature Sensor	NOTE: - Circuit	• Refer to the electrical circuit diagrams and check charge air

	Circuit High (Bank 1) - No sub type information	TMAP_TEMP_SENSOR - • Charge air cooler temperature sensor (Bank 1) circuit short circuit to power, open circuit, high resistance • Charge air cooler temperature sensor (Bank 1) failure	cooler temperature sensor (Bank 1) circuit for short circuit to power, open circuit, high resistance • Check and install a new charge air cooler temperature sensor (Bank 1) as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0087-00	Fuel Rail/System Pressure - Too Low - No sub type information	 NOTE: - Circuit FUEL_HIGH_PRESS_SENSOR - • Fuel rail pressure sensor circuit short circuit to ground, open circuit, high resistance • Fuel rail pressure sensor failure • Fuel lines leaking or restricted • Fuel pump failure	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure Sensor - High Range Sensor Voltage (0x0377) • Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to ground, open circuit, high resistance • Check for fuel pump related DTCs. Check fuel lines for leakage or restriction • Check and install new fuel rail pressure sensor as required. Check and install a new fuel pump as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0088-00	Fuel Rail/System Pressure - Too High - No sub type information	 NOTE: - Circuit FUEL_HIGH_PRESS_SENSOR - • Fuel rail pressure sensor circuit short to each other, high resistance, short circuit to power • Fuel rail pressure sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure Sensor - High Range Sensor Voltage (0x0377) • Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short to each other, high resistance, short circuit to power • Check and install new fuel rail pressure sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P008A-00	Low Pressure Fuel System Pressure - Too Low - No sub type information	 NOTE: - Circuit LOW_PRESS_FUEL_PRESS_SENSOR - • Low pressure fuel sensor circuit failure, short circuit to ground, short circuit to power, open circuit • Fuel pump driver module circuit short circuit to ground, short circuit to power, open circuit • Low pressure fuel • Fuel pump driver module failure	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure - Low Range Sensor Voltage (0x0376) • Check fuel system for leakage • Refer to the electrical circuit diagrams and check low pressure fuel sensor circuit for short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit diagrams and check fuel pump driver module circuit short circuit to ground, short circuit to power, open circuit • Check and install a new low pressure fuel sensor as required. Check and install a new fuel pump driver module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new

			module/component
P008B-00	Low Pressure Fuel System Pressure - Too High - No sub type information	NOTE: - Circuit LOW_PRESS_FUEL_PRESS_SENSOR - • Low pressure fuel sensor circuit short circuit to ground, short circuit to power, open circuit • Fuel pump driver module circuit short circuit to ground, short circuit to power, open circuit • Blockage or restriction in low pressure fuel line • Low pressure fuel sensor failure • Fuel pump driver module failure	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure - Low Range Sensor Voltage (0x0376) • Refer to the electrical circuit diagrams and check low pressure fuel sensor circuit for short circuit to ground, short circuit to power, open circuit. Check for blockage or restriction in low pressure fuel line • Refer to the electrical circuit diagrams and check fuel pump driver module circuit short circuit to ground, short circuit to power, open circuit • Check and install a new low pressure fuel sensor as required. Check and install a new fuel pump driver module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P00AB-23	Intake Air Temperature Sensor 1 Circuit Range/Performance (Bank 2) - Signal stuck low	NOTE: - Circuit INLET_AIR_TEMP_SENSOR_B - • Intake air temperature sensor bank 2 circuit short circuit to ground, open circuit • Intake air temperature sensor bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signal, Intake Air Temperature Sensor Bank 2 (0x0312) • Refer to the electrical circuit diagrams and check intake air temperature sensor bank 2 circuit for short circuit to ground, open circuit • Check and install a new intake air temperature sensor bank 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P00AB-24	Intake Air Temperature Sensor 1 Circuit Range/Performance (Bank 2) - Signal stuck high	NOTE: - Circuit INLET_AIR_TEMP_SENSOR_B - • Intake air temperature sensor bank 2 circuit short circuit to power • Intake air temperature sensor bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signal, Intake Air Temperature Sensor Bank 2 (0x0312) • Refer to the electrical circuit diagrams and check intake air temperature sensor bank 2 circuit for short circuit to power • Check and install a new intake air temperature sensor bank 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P00AB-29	Intake Air Temperature Sensor 1 Circuit Range/Performance (Bank 2) - Signal invalid	NOTE: - Circuit INLET_AIR_TEMP_SENSOR_B - • Intake air temperature sensor bank 2 circuit short circuit to ground, open circuit, short circuit to power • Intake air temperature sensor bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signal, Intake Air Temperature Sensor Bank 2 (0x0312) • Refer to the electrical circuit diagrams and check intake air temperature sensor bank 2 circuit for open circuit, short circuit to ground, short circuit to power • Check and install a new intake air temperature sensor bank 2 as required. Refer to the warranty policy and procedures manual, or

			determine if any prior approval programme is in operation, prior to the installation of a new module/component
P00AC-00	Intake Air Temperature Sensor 1 Circuit Low (Bank 2) - No sub type information	 NOTE: - Circuit INLET_AIR_TEMP_SENSOR_B - • Intake air temperature sensor bank 2 sensing circuit short circuit to ground, high resistance, disconnected • Intake air temperature sensor bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signal, Intake Air Temperature Sensor Bank 2 (0x0312) • Refer to the electrical circuit diagrams and check intake air temperature sensor bank 2 circuit for short circuit to ground, open circuit, high resistance, disconnected connector • Check and install a new intake air temperature sensor bank 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P00AD-00	Intake Air Temperature Sensor 1 Circuit High (Bank 2) - No sub type information	 NOTE: - Circuit INLET_AIR_TEMP_SENSOR_B - • Intake air temperature sensor bank 2 sensing circuit short ground, short circuit to power, open circuit, high resistance • Intake air temperature sensor bank 2 failure	• Using the manufacturer approved diagnostic system check datalogger signal, Intake Air Temperature Sensor Bank 2 (0x0312) • Refer to the electrical circuit diagrams and check intake air temperature sensor bank 2 circuit for short ground, short circuit to power, open circuit, high resistance. Check for backed out or damaged connector pins • Check and install a new intake air temperature sensor bank 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P00C6-00	Fuel Rail Pressure Too Low - Engine Cranking - No sub type information	• No fuel at pump • Injector stuck open • Fuel pressure sensor signal stuck • Fuel pump failure	• Check fuel supply to both pumps (if engine runs then supply is not suspect). If engine does not run perform fuel prime routine. Use fuel pump diagnostic routine to determine if one pump has failed, if so replace pump. If a fuel injector is stuck open the exhaust will smell of fuel and fuelling adaptions may indicate rich shift. Perform checks for as DTC P0191-00 • Check and install a new fuel pump as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0101-00	Mass or Volume Air Flow A Circuit Range/Performance - No sub type information	• Intake air distribution and filtering components incorrectly installed • Leakage from intake air system • Blocked air cleaner element(s) • Blocked engine breather • Blockage in intake air system • Mass air flow sensor seal failure • Connector is disconnected, connector terminal is backed out, connector terminal corrosion • Mass air flow sensor circuit,	• Using the manufacturer approved smoke tester check intake air distribution and filtering components for leakage and correct installation • Check air cleaner element is free from restriction and in serviceable condition • Ensure the engine breather system is correctly installed and in serviceable condition • Check for mass air flow sensor seal integrity and correct installation

		short circuit to ground, short circuit to power, open circuit, high resistance • Carbon build-up on throttle blade • Blocked injectors • Blocked catalysts • Mass air flow sensor failure	Inspect connectors for signs of water ingress, and pins for damage and/or corrosion • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Make sure throttle blade is clean of carbon • Check for blocked injectors • Check for blocked catalysts • Clear the DTC and retest • Refer to the relevant section of workshop manual. Reset fuelling adaptions and carry out Powertrain Control Module (PCM) Long Drive Cycle Self-Test • Check and install new mass air flow sensor as required
P0102-00	Mass or Volume Air Flow A Circuit Low - No sub type information	• Fuse failure • Connector is disconnected, connector terminal is backed out, connector terminal corrosion • Mass air flow sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Mass air flow sensor failure	• Check for fuse failure • Inspect connectors for signs of water ingress, and pins for damage and/or corrosion • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Clear the DTC and retest • Refer to the relevant section of workshop manual. Reset fuelling adaptions and carry out Powertrain Control Module (PCM) Long Drive Cycle Self-Test • Check and install new mass air flow sensor as required
P0103-00	Mass or Volume Air Flow A Circuit High - No sub type information	• Connector is disconnected, connector terminal is backed out, connector terminal corrosion • Mass air flow sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Blocked air cleaner element(s) • Blockage in air intake system • Mass air flow sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Mass Air Flow Sensor, Bank 1 (0x0314) • Inspect connectors for signs of water ingress, and pins for damage and/or corrosion • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Check air cleaner element is free from restriction and in serviceable condition • Check air intake system for blockage • Clear the DTC and retest • Refer to the relevant section of workshop manual. Reset fuelling adaptions and carry out Powertrain Control Module (PCM) Long Drive Cycle Self-Test • Check and install new mass air flow sensor as required
P0106-00	Manifold Absolute Pressure/BARO Sensor Range/Performance - No sub type information	 NOTE: - Circuit MAP_SENSOR - • Blocked air cleaner element(s) • Intake manifold air leak • Manifold absolute pressure sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Engine breather leak • Carbon build up on throttle plate • Exhaust system blocked • Manifold absolute pressure sensor failure	• Check air cleaner element is free from restriction • Check for leak from air intake system, rectify as required • Refer to the electrical circuit diagrams and check manifold absolute pressure sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Ensure the engine breather system is correctly installed and in serviceable condition • Make sure throttle blade is clean of carbon

		BARO sensor failure	Check for blocked exhaust • Check and install a new manifold absolute pressure sensor as required. Check for related BARO sensor DTC P0069-29. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0107-00	Manifold Absolute Pressure/BARO Sensor Low - No sub type information	NOTE: - Circuit MAP_SENSOR - • Manifold absolute pressure sensor circuit short circuit to ground, open circuit, high resistance • Manifold absolute pressure sensor failure	• Refer to the electrical circuit diagrams and check manifold absolute pressure sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new manifold absolute pressure sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0108-00	Manifold Absolute Pressure/BARO Sensor High - No sub type information	NOTE: - Circuit MAP_SENSOR - • Manifold absolute pressure sensor circuit short circuit to power, open circuit, high resistance • Manifold absolute pressure sensor failure	• Refer to the electrical circuit diagrams and check manifold absolute pressure sensor circuit for short circuit to power, open circuit, high resistance • Check and install a new manifold absolute pressure sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P010B-00	Mass or Volume Air Flow B Circuit Range/Performance - No sub type information	• Intake air distribution and filtering components incorrectly installed • Leakage from intake air system • Blocked air cleaner element(s) • Blocked engine breather • Blockage in intake air system • Mass air flow sensor seal failure • Connector is disconnected, connector terminal is backed out, connector terminal corrosion • Mass air flow sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Carbon build-up on throttle blade • Blocked injectors • Blocked catalysts • Mass air flow sensor failure	• Using the manufacturer approved smoke tester check intake air distribution and filtering components for leakage and correct installation • Check air cleaner element is free from restriction and in serviceable condition • Ensure the engine breather system is correctly installed and in serviceable condition • Check for mass air flow sensor seal integrity and correct installation • Inspect connectors for signs of water ingress, and pins for damage and/or corrosion • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Make sure throttle blade is clean of carbon • Check for blocked injectors • Check for blocked catalysts • Clear the DTC and retest • Refer to the relevant section of workshop manual. Reset fuelling adaptions and carry out Powertrain Control Module (PCM) Long Drive Cycle Self-Test • Check and install new mass air flow sensor as required
P010C-00	Mass or Volume Air Flow B Circuit Low - No sub type information	• Fuse failure • Connector is disconnected, connector terminal is backed out, connector terminal corrosion	• Check for fuse failure • Inspect connectors for signs of water ingress, and pins for damage and/or corrosion • Refer to the electrical circuit

		Mass air flow sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Mass air flow sensor failure	diagrams and check mass air flow sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Clear the DTC and retest • Refer to the relevant section of workshop manual. Reset fuelling adaptions and carry out Powertrain Control Module (PCM) Long Drive Cycle Self-Test • Check and install new mass air flow sensor as required
P010D-00	Mass or Volume Air Flow B Circuit High - No sub type information	• Connector is disconnected, connector terminal is backed out, connector terminal corrosion • Mass air flow sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Blocked air cleaner element(s) • Blockage in air intake system • Mass air flow sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Mass Air Flow Sensor 2 Voltage (0x0503) • Inspect connectors for signs of water ingress, and pins for damage and/or corrosion • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Check air cleaner element is free from restriction and in serviceable condition • Check air intake system for blockage • Clear the DTC and retest • Refer to the relevant section of workshop manual. Reset fuelling adaptions and carry out Powertrain Control Module (PCM) Long Drive Cycle Self-Test • Check and install new mass air flow sensor as required
P010F-00	Mass or Volume Air Flow Sensor A/B Correlation - No sub type information	• Intake air distribution and filtering components incorrectly installed • Leakage from intake air system • Blocked air cleaner element(s) • Blocked engine breather • Blockage in intake air system • Mass air flow sensor seal failure • Connector is disconnected, connector terminal is backed out, connector terminal corrosion • Mass air flow sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance • Carbon build-up on throttle blade • Blocked injectors • Blocked catalysts • Mass air flow sensor failure	• Using the manufacturer approved smoke tester check intake air distribution and filtering components for leakage and correct installation • Check air cleaner element is free from restriction and in serviceable condition • Ensure the engine breather system is correctly installed and in serviceable condition • Check for mass air flow sensor seal integrity and correct installation • Inspect connectors for signs of water ingress, and pins for damage and/or corrosion • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Make sure throttle blade is clean of carbon • Check for blocked injectors • Check for blocked catalysts • Clear the DTC and retest • Refer to the relevant section of workshop manual. Reset fuelling adaptions and carry out Powertrain Control Module (PCM) Long Drive Cycle Self-Test • Check and install new mass air flow sensor as required
P0111-23	Intake Air Temperature Sensor 1 Circuit Range/Performance - Signal stuck low	 NOTE: - Circuit INLET_AIR_TEMP_SENSOR_A - • Intake air temperature sensor short circuit to ground, open	• Refer to the electrical circuit diagrams and check intake air temperature sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new intake air

		circuit, high resistance • Intake air temperature sensor failure	temperature sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0111-24	Intake Air Temperature Sensor 1 Circuit Range/Performance - Signal stuck high	 NOTE: - Circuit INLET_AIR_TEMP_SENSOR_A - • Intake air temperature sensor circuit short circuit to power, open circuit • Intake air temperature sensor failure	• Refer to the electrical circuit diagrams and check intake air temperature sensor circuit for short circuit to power, open circuit • Check and install a new intake air temperature sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0111-29	Intake Air Temperature Sensor 1 Circuit Range/Performance - Signal invalid	 NOTE: - Circuit INLET_AIR_TEMP_SENSOR_A - • Intake air temperature sensor circuit short circuit to ground, short circuit to power, open circuit • Intake air temperature sensor failure	• Refer to the electrical circuit diagrams and check intake air temperature sensor circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new intake air temperature sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0112-00	Intake Air Temperature Sensor 1 Circuit Low (Bank 1) - No sub type information	 NOTE: - Circuit INLET_AIR_TEMP_SENSOR_A - • Intake air temperature sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Intake air temperature sensor failure	• Refer to the electrical circuit diagrams and check intake air temperature sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Check and install a new intake air temperature sensor bank 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0113-00	Intake Air Temperature Sensor 1 Circuit High (Bank 1) - No sub type information	 NOTE: - Circuit INLET_AIR_TEMP_SENSOR_A - • Intake air temperature sensor circuit short circuit to power, open circuit, high resistance • Intake air temperature sensor failure	• Refer to the electrical circuit diagrams and check intake air temperature sensor circuit for short circuit to power, open circuit, high resistance • Check and install a new intake air temperature sensor bank 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0116-23	Engine Coolant Temperature Sensor 1 Circuit Range/Performance - Signal stuck low	 NOTE: - Circuit COOLANT_TEMP_SENSOR - • Battery reset carried out when the engine was warm/hot • Engine coolant temperature sensor 1 sensing circuit intermittent high resistance • Engine coolant temperature sensor 1 failure	• Using the manufacturer approved diagnostic system check datalogger signal, Engine Coolant Temperature Sensor Voltage (0x0357) • Check for related DTC P2610- 87. Start the engine and switch off. Clear DTC and re-test • Refer to the electrical circuit diagrams and check engine coolant temperature sensor 1 circuit for intermittent high resistance • Check and install a new engine coolant temperature sensor 1 as required. Refer to the warranty policy and procedures manual, or

			determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0116-24	Engine Coolant Temperature Sensor 1 Circuit Range/Performance - Signal stuck high	NOTE: - Circuit COOLANT_TEMP_SENSOR - • Engine coolant temperature sensor 1 sensing circuit intermittent high resistance • Engine coolant temperature sensor 1 failure • Battery reset carried out when the engine was warm/hot	• Using the manufacturer approved diagnostic system check datalogger signal, Engine Coolant Temperature Sensor Voltage (0x0357) • Check for related DTC P2610- 87. Start the engine and switch off. Clear DTC and re-test • Refer to the electrical circuit diagrams and check engine coolant temperature sensor 1 circuit for intermittent high resistance • Check and install a new engine coolant temperature sensor 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0116-29	Engine Coolant Temperature Sensor 1 Circuit Range/Performance - Signal invalid	NOTE: - Circuit COOLANT_TEMP_SENSOR - • Low coolant level • Engine coolant temperature sensor 1 sensing circuit - intermittent high resistance • Engine coolant temperature sensor 1 failure • Possible airlock in cooling system	• Fill cooling system to correct level and specification • Using the manufacturer approved diagnostic system check datalogger signal, Engine Coolant Temperature Sensor Voltage (0x0357) • Refer to the electrical circuit diagrams and check engine coolant temperature sensor 1 circuit for intermittent high resistance • Check and install new engine coolant temperature sensor 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component • Bleed cooling system
P0117-16	Engine Coolant Temperature Sensor 1 Circuit Low - Circuit voltage below threshold	NOTE: - Circuit COOLANT_TEMP_SENSOR - • Engine coolant temperature sensor 1 circuit short circuit to ground • Engine coolant temperature sensor 1 failure	• Using the manufacturer approved diagnostic system check datalogger signal, Engine Coolant Temperature Sensor Voltage (0x0357) • Refer to the electrical circuit diagrams and check engine coolant temperature sensor 1 circuit for short circuit to ground • Check and install a new Engine coolant temperature sensor 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0118-17	Engine Coolant Temperature Sensor 1 Circuit High - Circuit voltage above threshold	NOTE: - Circuit COOLANT_TEMP_SENSOR - • Engine coolant temperature sensor 1 circuit short circuit to power, open circuit, sensor disconnected • Engine coolant temperature sensor 1 failure	• Using the manufacturer approved diagnostic system check datalogger signal, Engine Coolant Temperature Sensor Voltage (0x0357) • Refer to the electrical circuit diagrams and check engine coolant temperature sensor 1 circuit for short circuit to power, open circuit, sensor disconnected • Check and install new engine coolant temperature sensor 1 as required. Refer to the warranty

			policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0121-00	Throttle/Pedal Position Sensor A Circuit Range/Performance - No sub type information	• Corrupt engine control module software flash • Engine control module power supply circuit open circuit, high resistance • Engine control module damage through water ingress, internal fault	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Refer to the electrical circuit diagrams and check engine control module power supply circuit for open circuit, high resistance • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0122-00	Throttle/Pedal Position Sensor A Circuit Low - No sub type information	 NOTE: - Circuit THROTTLE_POSITION_SENSOR_1 - • Throttle position sensor 1 circuit short circuit to ground, open circuit • Throttle position sensor 1 failure	• Refer to the electrical circuit diagrams and check throttle position sensor 1 circuit for short circuit to ground, open circuit • Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system. If DTC remains suspect the electronic throttle unit • Check and install a new electronic throttle unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0123-00	Throttle/Pedal Position Sensor A Circuit High - No sub type information	 NOTE: - Circuit THROTTLE_POSITION_SENSOR_1 - • Throttle position sensor 1 circuit short circuit to ground, short circuit to power, open circuit • Throttle position sensor 1 failure	• Refer to the electrical circuit diagrams and check throttle position sensor 1 circuit for short circuit to ground, short circuit to power, open circuit • Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system. If DTC remains suspect the electronic throttle unit • Check and install a new electronic throttle unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0125-00	Insufficient Coolant Temp For Closed Loop Fuel Control - No sub type information	• Coolant temperature sensor 1 circuit, open circuit, high resistance • Engine coolant temperature sensor 1 failure	• Refer to the electrical circuit diagrams and check engine coolant temperature sensor 1 circuit for open circuit, high resistance • Check and install a new engine coolant temperature sensor 1. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0126-26	Insufficient Coolant Temp For Stable Operation - Signal rate of change below threshold	• Thermostat stuck open • Coolant temperature coolant sensor circuit, short circuit to ground, short circuit to power, open circuit	• Refer to the electrical circuit diagrams and check engine coolant temperature sensor 1 circuit for short circuit to ground, short circuit to power, open circuit • Check for related coolant

			temperature coolant sensor faults. Check and install a new thermostat as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0128-00	Coolant Thermostat (Coolant Temp Below Thermostat Regulating Temperature) - No sub type information	• Thermostat stuck open • Cooling fans running continuously or at a high duty	• Check for related coolant temperature coolant sensor faults • Check cooling fans for correct operation. Repair as required • Check and install a new thermostat as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0131-00	O2 Circuit Low Voltage (Bank 1, Sensor 1) - No sub type information	• Pre-catalyst oxygen sensor odd disconnected • Pre-catalyst oxygen sensor odd variable circuit, short circuit to ground • Pre-catalyst oxygen sensor odd variable circuit, open circuit • Pre-catalyst oxygen sensor odd heater fault • Pre-catalyst oxygen sensor odd failure	• Check pre-catalyst oxygen sensor odd connector is connected • Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor odd variable circuit for short circuit to ground, open circuit • Check pre-catalyst oxygen sensor odd heater circuit • Check and install a new pre-catalyst oxygen sensor odd as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0131-1A	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 1) - Circuit resistance below threshold	NOTE: - Circuit UHEGO_A_VARIABLE - • Pre-catalyst oxygen sensor odd disconnected • Pre-catalyst oxygen sensor odd variable circuit, short circuit to ground • Pre-catalyst oxygen sensor odd variable circuit, open circuit • Pre-catalyst oxygen sensor odd heater fault • Pre-catalyst oxygen sensor odd failure	• Check pre-catalyst oxygen sensor odd connector is connected • Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor odd variable circuit for short circuit to ground, open circuit • Check pre-catalyst oxygen sensor odd heater circuit • Check and install a new pre-catalyst oxygen sensor odd as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0132-1B	O2 Sensor Circuit High Voltage (Bank 1 Sensor 1) - Circuit resistance above threshold	NOTE: - Circuit UHEGO_A_VARIABLE - • Pre-catalyst oxygen sensor odd disconnected • Pre-catalyst oxygen sensor odd variable circuit, short circuit to power • Pre-catalyst oxygen sensor odd variable circuit, open circuit • Pre-catalyst oxygen sensor odd heater fault • Pre-catalyst oxygen sensor odd failure	• Check pre-catalyst oxygen sensor odd connector is connected • Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor odd variable circuit for short circuit to power, open circuit • Check pre-catalyst oxygen sensor odd heater circuit • Check and install a new pre-catalyst oxygen sensor odd as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0132-00	O2 Circuit High Voltage (Bank 1, Sensor 1) - No sub type information	• Pre-catalyst oxygen sensor odd disconnected • Pre-catalyst oxygen sensor odd variable circuit, short circuit to	• Check pre-catalyst oxygen sensor odd connector is connected • Refer to the electrical circuit diagrams and check pre-catalyst

		power • Pre-catalyst oxygen sensor odd variable circuit, open circuit • Pre-catalyst oxygen sensor odd heater fault • Pre-catalyst oxygen sensor odd failure	oxygen sensor odd variable circuit for short circuit to power, open circuit • Check pre-catalyst oxygen sensor odd heater circuit • Check and install a new pre-catalyst oxygen sensor odd as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0133-00	O2 Circuit Slow Response (Bank 1, Sensor 1) - No sub type information	 NOTE: - Circuit UHEGO_A_VARIABLE - • Exhaust leak • Pre-catalyst oxygen sensor odd to engine control module wiring shield high resistance • Fuel control system fault • Pre-catalyst oxygen sensor odd failure	• Check pre-catalyst oxygen sensor odd is correctly installed in exhaust manifold • Check for and rectify any exhaust leak between cylinder head and catalytic converter • Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor odd to engine control module wiring shield for high resistance • Check fuel control system for failure • Check and install a new pre-catalyst oxygen sensor odd as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0134-00	O2 Circuit No Activity Detected (Bank 1, Sensor 1) - No sub type information	 NOTE: - Circuit UHEGO_A_VARIABLE - • Pre-catalyst oxygen sensor odd circuit short circuit to ground, short circuit to power, open circuit • Pre-catalyst oxygen sensor odd failure	• Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor odd circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new pre-catalyst oxygen sensor odd as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0137-00	O2 Circuit Low Voltage (Bank 1, Sensor 2) - No sub type information	 NOTE: - Circuit HEGO_SENSOR_A - • Post catalyst oxygen sensor - odd, sensing circuit short circuit to ground, high resistance, open circuit • Damaged or blocked catalyst • Air leak between catalyst and exhaust manifold • Post catalyst oxygen sensor - odd, failure	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - odd, sensing circuit for short circuit to ground, high resistance, open circuit • Check for damaged or blocked catalyst • Check for air leak between catalyst and exhaust manifold • Check and install new post catalyst oxygen sensor - odd, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0138-00	O2 Circuit High Voltage (Bank 1, Sensor 2) - No sub type information	 NOTE: - Circuit HEGO_SENSOR_A - • Post catalyst oxygen sensor - odd, sensing circuit short circuit to power • Post catalyst oxygen sensor - odd, tip damaged, blocked, poisoned • Catalyst blocked • Post catalyst oxygen sensor -	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - odd, sensing circuit for short circuit to power • Check post catalyst oxygen sensor - odd, tip for damage, blockage, poisoned, install a new sensor as required • Check for blocked catalyst • Check and install new catalyst as required. Check and install new post catalyst oxygen sensor - odd,

		odd, failure	as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0139-00	O2 Circuit Slow Response (Bank 1, Sensor 2) - No sub type information	 NOTE: - Circuit HEGO_SENSOR_A - • Excessive oil consumption • Post catalyst oxygen sensor - odd, tip damaged, blocked, poisoned	• Check for excessive oil consumption. Repair as required • Check for related DTCs. Check post catalyst oxygen sensor - odd, tip for damage, blockage, poisoned, install a new sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0140-00	O2 Circuit No Activity Detected (Bank 1, Sensor 2) - No sub type information	 NOTE: - Circuit HEGO_SENSOR_A - • Post catalyst oxygen sensor - odd, sensing circuit short circuit to ground, short circuit to power, high resistance, open circuit • Air leak between catalyst and exhaust manifold • Post catalyst oxygen sensor - odd, tip damaged, blocked, poisoned • Post catalyst oxygen sensor - odd, failure	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - odd, sensing circuit for short circuit to ground, short circuit to power, high resistance, open circuit • Check for air leak between catalyst and exhaust manifold • Check post catalyst oxygen sensor - odd, tip for damage, blockage, poisoned, install a new sensor as required • Check for excessive oil consumption. Repair as required • Check and install new post catalyst oxygen sensor - odd, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0141-00	O2 Heater Circuit (Bank 1, Sensor 2) - No sub type information	 NOTE: - Circuit HTR_HEGO_A - • Post catalyst oxygen sensor - odd, sensing circuit short circuit to ground, short circuit to power, high resistance, open circuit • Air leak between catalyst and exhaust manifold • Catalyst oxygen sensor heater circuit control relay failure • Post catalyst oxygen sensor - odd, failure	• Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 1 Sensor 2 (0x03A2) • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - odd, sensing circuit for short circuit to ground, short circuit to power, high resistance, open circuit • Check for air leak between catalyst and exhaust manifold • Refer to the electrical circuit diagrams and check catalyst oxygen sensor heater circuit control relay circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new catalyst oxygen sensor heater control relay, as required. Check and install new post catalyst oxygen sensor - odd, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0148-65	Fuel Delivery Error - Signal has too few transitions / events	• Injector(s) circuit, short circuit to ground, short circuit to power, high resistance • Injector(s) failure • Engine control module internal failure	• Check for related injector DTCs • Refer to the electrical circuit diagrams and check injector(s) circuit for, short circuit to ground, short circuit to power, high resistance

			Check and install a new injector(s) as required. Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0148-66	Fuel Delivery Error - Signal has too many transitions / events	• Injector(s) circuit, short circuit to ground, short circuit to power, high resistance • Injector(s) failure • Engine control module internal failure	• Check for related injector DTCs • Refer to the electrical circuit diagrams and check injector(s) circuit for, short circuit to ground, short circuit to power, high resistance • Check and install a new injector(s) as required. Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0149-32	Fuel Timing Error - Signal low time < minimum	• Injector(s) circuit, short circuit to ground, short circuit to power, high resistance • Injector(s) failure • Engine control module internal failure	• Check for related injector DTCs • Refer to the electrical circuit diagrams and check injector(s) circuit for, short circuit to ground, short circuit to power, high resistance • Check and install a new injector(s) as required. Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0149-35	Fuel Timing Error - Signal high time > maximum	• Injector(s) circuit, short circuit to ground, short circuit to power, high resistance • Injector(s) failure • Engine control module internal failure	• Check for related injector DTCs • Refer to the electrical circuit diagrams and check injector(s) circuit for, short circuit to ground, short circuit to power, high resistance • Check and install a new injector(s) as required. Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0151-1A	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 1) - Circuit resistance below threshold	 NOTE: - Circuit UHEGO_B_VARIABLE - • Pre-catalyst oxygen sensor - even circuit short circuit to ground • Pre-catalyst oxygen sensor - even failure	• Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor - even circuit for short circuit to ground • Check and install new pre catalyst oxygen sensor - even. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0152-1B	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 1) - Circuit resistance above threshold	 NOTE: - Circuit UHEGO_B_VARIABLE - • Pre-catalyst oxygen sensor - even circuit short circuit to power, disconnected • Pre-catalyst oxygen sensor - even failure	• Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor - even circuit for short circuit to power, disconnected • Check and install new pre catalyst oxygen sensor - even. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is

			in operation, prior to the installation of a new module/component
P0153-00	O2 Circuit Slow Response (Bank 2, Sensor 1) - No sub type information	 NOTE: - Circuit UHEGO_B_VARIABLE - • Exhaust leak • Pre-catalyst oxygen sensor even to engine control module wiring shield high resistance • Pre-catalyst oxygen sensor even to engine control module signal circuit short circuit to ground • Fuel control system fault • Pre-catalyst oxygen sensor even failure	• Check pre-catalyst oxygen sensor even is correctly installed in exhaust manifold • Check for and rectify any exhaust leak between cylinder head and catalytic converter • Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor even to engine control module wiring shield for high resistance • Refer to the electrical circuit diagrams and check Pre-catalyst oxygen sensor even to engine control module signal circuit for short circuit to ground • Check fuel control system for failure • Check and install a new pre-catalyst oxygen sensor even as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0154-00	O2 Circuit No Activity Detected (Bank 2, Sensor 1) - No sub type information	 NOTE: - Circuit UHEGO_B_VARIABLE - • Pre-catalyst oxygen sensor even to engine control module wiring shield high resistance • Pre-catalyst oxygen sensor even to engine control module signal circuit short circuit to ground, high resistance, open circuit • Pre-catalyst oxygen sensor even failure	• Check pre-catalyst oxygen sensor even is correctly installed in exhaust manifold • Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor even to engine control module wiring shield for high resistance • Refer to the electrical circuit diagrams and check pre-catalyst oxygen sensor even to engine control module signal circuit for short circuit to ground, high resistance, open circuit • Check and install a new pre-catalyst oxygen sensor even as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0157-00	O2 Circuit Low Voltage (Bank 2, Sensor 2) - No sub type information	 NOTE: - Circuit HEGO_SENSOR_B - • Post catalyst oxygen sensor - even, sensing circuit short circuit to ground, high resistance, open circuit • Air leak between catalyst and exhaust manifold • Post catalyst oxygen sensor - even, tip damaged, blocked, poisoned • Post catalyst oxygen sensor - even, failure	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - even, sensing circuit for short circuit to ground, high resistance, open circuit • Check for air leak between catalyst and exhaust manifold • Check post catalyst oxygen sensor - even, tip for damage, blockage, poisoned • Check and install new post catalyst oxygen sensor - even, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0158-00	O2 Circuit High Voltage (Bank 2, Sensor 2) - No sub type information	 NOTE: - Circuit HEGO_SENSOR_B - • Post catalyst oxygen sensor - even, sensing circuit short circuit to power	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - even, sensing circuit for short circuit to power • Check post catalyst oxygen sensor - even, tip for damage, blockage, poisoned

		• Post catalyst oxygen sensor - even, tip damaged, blocked, poisoned • Post catalyst oxygen sensor - even, failure	Check and install new post catalyst oxygen sensor - even, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0159-00	O2 Circuit Slow Response (Bank 2, Sensor 2) - No sub type information	NOTE: - Circuit HEGO_SENSOR_B - • Excessive oil consumption • Post catalyst oxygen sensor - even, tip damaged, blocked, poisoned • Post catalyst oxygen sensor - even, failure	• Check for excessive oil consumption, repair as required • Check post catalyst oxygen sensor - even, tip for damage, blockage, poisoned, install a new sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0160-00	O2 Circuit No Activity Detected (Bank 2, Sensor 2) - No sub type information	NOTE: - Circuit HEGO_SENSOR_B - • Post catalyst oxygen sensor - even, sensing circuit short circuit to ground, short circuit to power, high resistance, open circuit • Air leak between catalyst and exhaust manifold • Post catalyst oxygen sensor - even, tip damaged, blocked, poisoned • Post catalyst oxygen sensor - even, failure	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - even, sensing circuit for short circuit to ground, short circuit to power, high resistance, open circuit • Check for air leak between catalyst and exhaust manifold • Check post catalyst oxygen sensor - even, tip for damage, blockage, poisoned • Check and install new post catalyst oxygen sensor - even, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0161-00	O2 Heater Circuit (Bank 2, Sensor 2) - No sub type information	NOTE: - Circuit HTR_HEGO_B - • Post catalyst oxygen sensor - even, sensing circuit short circuit to ground, short circuit to power, high resistance, open circuit • Post catalyst oxygen sensor - even, sensing circuit fuse failure • Catalyst oxygen sensor heater circuit control relay failure • Post catalyst oxygen sensor - even, failure	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - even, sensing circuit for short circuit to ground, short circuit to power, high resistance, open circuit • Refer to the electrical circuit diagrams and check Post catalyst oxygen sensor - even, sensing circuit fuse, replace as required • Refer to the electrical circuit diagrams and check catalyst oxygen sensor heater circuit control relay circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new catalyst oxygen sensor heater control relay, as required. Check and install new post catalyst oxygen sensor - even, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0171-00	System Too Lean (Bank 1) - No sub type information	• Air leak upstream of MAF/IAT sensor bank 1 • MAF/IAT sensor bank 1 circuit failure • MAF/IAT sensor bank 1 failure • Pre-catalyst oxygen sensor odd circuit failure • Pre-catalyst oxygen sensor odd failure • Post-catalyst oxygen sensor odd circuit failure	• Refer to the electrical circuit diagrams and check MAF/IAT sensor circuit, for short circuit to ground, short circuit power, high resistance, open circuit • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - even, sensing circuit for short circuit to ground, short circuit power, high resistance, open circuit

		Post-catalyst oxygen sensor odd failure	Check for leak from air intake system • Check for additional MAF/IAT sensor bank 1 related DTCs and refer to relevant DTC index • Check for additional pre-catalyst oxygen sensor odd related DTCs and refer to relevant DTC index • Check for additional post-catalyst oxygen sensor odd related DTCs and refer to relevant DTC index
P0172-00	System Too Rich (Bank 1) - No sub type information	• Restricted air cleaner • Leaking fuel injector(s) • MAF/IAT sensor bank 1 failure • Pre-catalyst oxygen sensor odd circuit failure • Pre-catalyst oxygen sensor odd failure • Post-catalyst oxygen sensor odd circuit failure • Post-catalyst oxygen sensor odd failure	• Refer to the electrical circuit diagrams and check MAF/IAT sensor circuit, for short circuit to ground, short circuit power, high resistance, open circuit • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - even, sensing circuit for short circuit to ground, short circuit power, high resistance, open circuit • Check air cleaner element is free from restriction • Check for leaking injectors, install new injector(s) as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component • Check for additional MAF/IAT sensor bank 1 related DTCs and refer to relevant DTC index • Check for additional pre-catalyst oxygen sensor odd related DTCs and refer to relevant DTC index • Check for additional post-catalyst oxygen sensor odd related DTCs and refer to relevant DTC index
P0174-00	System Too Lean (Bank 2) - No sub type information	• Air leak upstream of MAF/IAT sensor bank 2 • MAF/IAT sensor bank 2 circuit failure • MAF/IAT sensor bank 2 failure • Pre-catalyst oxygen sensor even circuit failure • Pre-catalyst oxygen sensor even failure • Post-catalyst oxygen sensor even circuit failure • Post-catalyst oxygen sensor even failure	• Refer to the electrical circuit diagrams and check MAF/IAT sensor circuit, for short circuit to ground, short circuit power, high resistance, open circuit • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - even, sensing circuit for short circuit to ground, short circuit power, high resistance, open circuit • Check for leak from air intake system • Check for additional MAF/IAT sensor bank 2 related DTCs and refer to relevant DTC index • Check for additional pre-catalyst oxygen sensor even related DTCs and refer to relevant DTC index • Check for additional post-catalyst oxygen sensor even related DTCs and refer to relevant DTC index
P0175-00	System Too Rich (Bank 2) - No sub type information	• Restricted air cleaner • Leaking fuel injector(s) • MAF/IAT sensor bank 2 circuit failure • MAF/IAT sensor bank 2 failure • Pre-catalyst oxygen sensor even circuit failure • Pre-catalyst oxygen sensor even failure • Post-catalyst oxygen sensor even circuit failure • Post-catalyst oxygen sensor even failure	• Refer to the electrical circuit diagrams and check MAF/IAT sensor circuit, for short circuit to ground, short circuit power, high resistance, open circuit • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - even, sensing circuit for short circuit to ground, short circuit power, high resistance, open circuit • Check for leak from air intake system • Check for additional MAF/IAT

			sensor bank 2 related DTCs and refer to relevant DTC index • Check for additional pre-catalyst oxygen sensor even related DTCs and refer to relevant DTC index • Check for additional post-catalyst oxygen sensor even related DTCs and refer to relevant DTC index
P018B-29	Fuel Pressure Sensor B Circuit Range/Performance - Signal invalid	 NOTE: - Circuit LOW_PRESS_FUEL_PRESS_SENSOR - • Fuel Filter or fuel system restriction • Fuel system leak • Fuel pump pressure sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Fuel pump pressure sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure - Low Range Sensor Voltage (0x0376) • Check for related fuel pump DTCs • Check the fuel system for restrictions or blockages • Refer to the electrical circuit diagrams and check fuel pump pressure sensor circuit for short circuit to power, open circuit, high resistance • Check and install a new fuel pump pressure sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P018C-00	Fuel Pressure Sensor B Circuit Low - No sub type information	 NOTE: - Circuit LOW_PRESS_FUEL_PRESS_SENSOR - • Fuel pump pressure sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Fuel pump pressure sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure - Low Range Sensor Voltage (0x0376) • Refer to the electrical circuit diagrams and check fuel pump pressure sensor circuit for short circuit to power, short circuit to ground, open circuit, high resistance • Check and install a new fuel pump pressure sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P018D-00	Fuel Pressure Sensor B Circuit High - No sub type information	 NOTE: - Circuit LOW_PRESS_FUEL_PRESS_SENSOR - • Fuel pump pressure sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance • Fuel pump pressure sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure - Low Range Sensor Voltage (0x0376) • Refer to the electrical circuit diagrams and check fuel pump pressure sensor circuit for short circuit to power, short circuit to ground, open circuit, high resistance • Check and install a new fuel pump pressure sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0191-00	Fuel Rail Pressure Sensor A Circuit Range/Performance - No sub type information	 NOTE: - Circuit FUEL_HIGH_PRESS_SENSOR - • Fuel rail pressure sensor short circuit to ground, short circuit to power, open circuit, high resistance • Fuel rail pressure sensor A	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure Sensor - High Range Sensor Voltage (0x0377) • Refer to the electrical circuit diagrams and check fuel rail pressure sensor A circuit for short circuit to power, short circuit to

		failure	ground, high resistance, open circuit, terminal damage or corrosion • Check and install a new fuel rail pressure sensor A as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0192-00	Fuel Rail Pressure Sensor A Circuit Low - No sub type information	 NOTE: - Circuit FUEL_HIGH_PRESS_SENSOR - • Fuel rail pressure sensor short circuit to ground, short circuit to power, open circuit, high resistance • Fuel rail pressure sensor A failure	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure Sensor - High Range Sensor Voltage (0x0377) • Refer to the electrical circuit diagrams and check fuel rail pressure sensor A circuit for short circuit to power, short circuit to ground, high resistance, open circuit, terminal damage or corrosion • Check and install a new fuel rail pressure sensor A as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0193-00	Fuel Rail Pressure Sensor A Circuit High - No sub type information	 NOTE: - Circuit FUEL_HIGH_PRESS_SENSOR - • Fuel rail pressure sensor short circuit to ground, short circuit to power, open circuit, high resistance • Fuel rail pressure sensor A failure	• Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure Sensor - High Range Sensor Voltage (0x0377) • Refer to the electrical circuit diagrams and check fuel rail pressure sensor A circuit for short circuit to power, short circuit to ground, high resistance, open circuit, terminal damage or corrosion • Check and install a new fuel rail pressure sensor A as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0196-23	Engine Oil Temperature Sensor Range/Performance - Signal stuck low	 NOTE: - Circuit OIL_QUALITY_SENSOR - • Oil temperature - level sensor circuit short circuit to ground, high resistance • Oil temperature - level sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Sump Oil Temperature - Measured (0x03F3) • Refer to the electrical circuit diagrams and check oil temperature - level sensor circuit for short circuit to ground, intermittent high resistance • Check and install new oil temperature - level sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0196-24	Engine Oil Temperature Sensor Range/Performance - Signal stuck high	 NOTE: - Circuit OIL_QUALITY_SENSOR - • Oil temperature - level sensor circuit short circuit to power • Oil temperature - level sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Sump Oil Temperature - Measured (0x03F3) • Refer to the electrical circuit diagrams and check oil temperature - level sensor circuit for intermittent short circuit to

			power • Check and install new oil temperature - level sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0200-04	Injector Circuit - System internal failures	• Engine control module injector circuit power failure • Engine control module power supply open circuit • Engine control module ground supply open circuit	• Refer to the electrical circuit diagrams and check engine control module injector power circuit for open circuit • Refer to the electrical circuit diagrams and check the power and ground connections to the module • Check for misfire DTCs, if present suspect the engine control module
P0200-49	Injector Circuit - Internal electronic failure	• Engine control module failure	• Check for misfire DTCs, if present suspect the engine control module • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0200-4B	Injector Circuit - Over temperature	• Engine control module failure	• If combined with misfire codes for one or both injector sets, then no service rectification is proposed • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0201-13	Cylinder 1 Injector Circuit / Open - Circuit open	NOTE: - Circuit INJECTOR_1A - INJECTOR_1A_COMMON - • Fuel injector no.1 circuit open circuit • Injector disconnected • Injector high resistance	• Refer to the electrical circuit diagrams and check fuel injector no.1 circuit for open circuit, disconnected injector, high resistance
P0202-13	Cylinder 2 Injector Circuit / Open - Circuit open	NOTE: - Circuit INJECTOR_1B - INJECTOR_1B_COMMON - • Fuel injector no.2 circuit open circuit • Injector disconnected • Injector high resistance	• Refer to the electrical circuit diagrams and check fuel injector no.2 circuit for open circuit, disconnected injector, high resistance
P0203-13	Cylinder 3 Injector Circuit / Open - Circuit open	NOTE: - Circuit INJECTOR_2A - INJECTOR_2A_COMMON - • Fuel injector no.3 circuit open circuit • Injector disconnected • Injector high resistance	• Refer to the electrical circuit diagrams and check fuel injector no.3 circuit for open circuit, disconnected injector, high resistance
P0204-13	Cylinder 4 Injector Circuit / Open - Circuit open	NOTE: - Circuit INJECTOR_2B - INJECTOR_2B_COMMON - • Fuel injector no.4 circuit open circuit • Injector disconnected • Injector high resistance	• Refer to the electrical circuit diagrams and check fuel injector no.4 circuit for open circuit, disconnected injector, high resistance

P0205-13	Cylinder 5 Injector Circuit / Open - Circuit open	 NOTE: - Circuit INJECTOR_3A - INJECTOR_3A_COMMON - • Fuel injector no.5 circuit open circuit • Injector disconnected • Injector high resistance	Refer to the electrical circuit diagrams and check fuel injector no.5 circuit for open circuit, disconnected injector, high resistance
P0206-13	Cylinder 6 Injector Circuit / Open - Circuit open	 NOTE: - Circuit INJECTOR_3B - INJECTOR_3B_COMMON - • Fuel injector no.6 circuit open circuit • Injector disconnected • Injector high resistance	• Refer to the electrical circuit diagrams and check fuel injector no.6 circuit for open circuit, disconnected injector, high resistance
P0207-13	Cylinder 7 Injector Circuit / Open - Circuit open	 NOTE: - Circuit INJECTOR_4A - INJECTOR_4A_COMMON - • Fuel injector no.7 circuit open circuit • Injector disconnected • Injector high resistance	• Refer to the electrical circuit diagrams and check fuel injector no.7 circuit for open circuit, disconnected injector, high resistance
P0208-13	Cylinder 8 Injector Circuit / Open - Circuit open	 NOTE: - Circuit INJECTOR_4B - INJECTOR_4B_COMMON - • Fuel injector no.8 circuit open circuit • Injector disconnected • Injector high resistance	• Refer to the electrical circuit diagrams and check fuel injector no.8 circuit for open circuit, disconnected injector, high resistance
P0222-00	Throttle/Pedal Position Sensor/Switch B Circuit Low - No sub type information	 NOTE: - Circuit THROTTLE_POSITION_SENSOR_2 - • Throttle/pedal position sensor/switch B circuit open circuit, short circuit to ground • Throttle/pedal position sensor/switch B failure	• Refer to the electrical circuit diagrams and check throttle/pedal position sensor/switch B circuit for open circuit, short circuit to ground • Check and install a new throttle/pedal position sensor/switch B as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0223-00	Throttle/Pedal Position Sensor/Switch B Circuit High - No sub type information	 NOTE: - Circuit THROTTLE_POSITION_SENSOR_2 - • Throttle/pedal position sensor/switch B circuit open circuit, short circuit to power • Throttle/pedal position sensor/switch B failure	• Refer to the electrical circuit diagrams and check throttle/pedal position sensor/switch B circuit for open circuit, short circuit to power • Check and install a new throttle/pedal position sensor/switch B as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0231-23	Fuel Pump Secondary Circuit Low - Signal stuck low	 NOTE: - Circuit HIGH_PRESS_FUEL_PUMP_CTRL_2NEG - HIGH_PRESS_FUEL_PUMP_CTRL_2POS - • Fuel pump driver module signal circuit short circuit to ground, open circuit • Fuel pump driver module is not energized with the ignition on • Fuel pump driver module failure	• Check for related DTCs P0232-24 • Refer to the electrical circuit diagrams and check fuel pump driver module signal circuit for short circuit to ground, open circuit • Refer to the electrical circuit diagrams and check fuel pump driver module is energized with the ignition on. Repair as required • Check and install a new fuel pump driver module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is

			in operation, prior to the installation of a new module/component
P0232-24	Fuel Pump Secondary Circuit Low - Signal stuck high	NOTE: - Circuit HIGH_PRESS_FUEL_PUMP_CTRL_2NEG - HIGH_PRESS_FUEL_PUMP_CTRL_2POS - • Fuel pump driver module signal circuit short circuit to ground, open circuit • Fuel pump driver module is not energized with the ignition on • Fuel pump driver module failure	• Check for related DTCs P0231-23 • Refer to the electrical circuit diagrams and check fuel pump driver module signal circuit for short circuit to ground, open circuit • Refer to the electrical circuit diagrams and check fuel pump driver module is energized with the ignition on. Repair as required • Check and install a new fuel pump driver module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0236-00	Turbocharger/Supercharger Boost Sensor A Circuit Range/Performance - No sub type information	NOTE: - Circuit TMAP_PRESS_SENSOR - • Blocked air cleaner element(s) • Intake manifold air leak • Manifold absolute pressure sensor 2 circuit short circuit to ground, short circuit to power, open circuit, high resistance • Engine breather leak • Carbon build up on throttle plate • Exhaust system blocked • Manifold absolute pressure sensor 2 failure • BARO sensor failure	• Check air cleaner element is free from restriction • Check for leak from air intake system, rectify as required • Refer to the electrical circuit diagrams and check manifold absolute pressure sensor 2 circuit for short circuit to ground, short circuit to power, open circuit, high resistance • Ensure the engine breather system is correctly installed and in serviceable condition • Make sure throttle blade is clean of carbon • Check for blocked exhaust • Check for related BARO sensor DTC P0069-29 • Check and install a new manifold absolute pressure sensor 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0237-00	Turbocharger/Supercharger Boost Sensor A Circuit Low - No sub type information	NOTE: - Circuit TMAP_PRESS_SENSOR - • Manifold absolute pressure sensor 2 circuit short circuit to ground, open circuit, high resistance • Manifold absolute pressure sensor 2 failure	• Refer to the electrical circuit diagrams and check manifold absolute pressure sensor 2 circuit for short circuit to ground, open circuit, high resistance • Check and install a new manifold absolute pressure sensor 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0238-00	Turbocharger/Supercharger Boost Sensor A Circuit High - No sub type information	NOTE: - Circuit TMAP_PRESS_SENSOR - • Manifold absolute pressure sensor circuit 2 short circuit to power, open circuit, high resistance • Manifold absolute pressure sensor 2 failure	• Refer to the electrical circuit diagrams and check manifold absolute pressure sensor 2 circuit for short circuit to power, open circuit, high resistance • Check and install a new manifold absolute pressure sensor 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0251-13	Injection Pump Fuel Metering Control A - Circuit open	NOTE: - Circuit	• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for open

		HIGH_PRESS_FUEL_PUMP_CTRL_1NEG - HIGH_PRESS_FUEL_PUMP_CTRL_2NEG - • Fuel rail pressure sensor circuit, open circuit	circuit
P0253-11	Injection Pump Fuel Metering Control A Low - Circuit short to ground	NOTE: - Circuit HIGH_PRESS_FUEL_PUMP_CTRL_1NEG - HIGH_PRESS_FUEL_PUMP_CTRL_2NEG - • Fuel rail pressure sensor circuit, short circuit to ground	• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to ground
P0254-12	Injection Pump Fuel Metering Control A High - Circuit short to battery	NOTE: - Circuit HIGH_PRESS_FUEL_PUMP_CTRL_1NEG - HIGH_PRESS_FUEL_PUMP_CTRL_2NEG - • Fuel rail pressure sensor circuit, short circuit to power	• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to power
P0256-13	Injection Pump Fuel Metering Control B - Circuit open	NOTE: - Circuit HIGH_PRESS_FUEL_PUMP_CTRL_1NEG - HIGH_PRESS_FUEL_PUMP_CTRL_2NEG - • Fuel rail pressure sensor circuit, open circuit	• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for open circuit
P0258-11	Injection Pump Fuel Metering Control B Low - Circuit short to ground	NOTE: - Circuit HIGH_PRESS_FUEL_PUMP_CTRL_1NEG - HIGH_PRESS_FUEL_PUMP_CTRL_2NEG - • Fuel rail pressure sensor circuit, short circuit to ground	• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to ground
P0259-12	Injection Pump Fuel Metering Control B High - Circuit short to battery	NOTE: - Circuit HIGH_PRESS_FUEL_PUMP_CTRL_1NEG - HIGH_PRESS_FUEL_PUMP_CTRL_2NEG - • Fuel rail pressure sensor circuit, short circuit to power	• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to power
P025C-14	Fuel Pump Module Control Circuit Low - Circuit short to ground or open	NOTE: - Circuit FPDM control - • Fuel pump driver module control circuit, short circuit to ground, open circuit	• Refer to the electrical circuit diagrams and check fuel pump driver module circuit short circuit to ground, open circuit
P025D-12	Fuel Pump Module Control Circuit High - Circuit short to battery	NOTE: - Circuit FPDM control - • Fuel pump driver module control circuit, short circuit to power	• Refer to the electrical circuit diagrams and check fuel pump driver module circuit short circuit to power
P0261-11	Cylinder 1 Injector Circuit Low - Circuit short to ground	NOTE: - Circuit INJECTOR_1A - INJECTOR_1A_COMMON - • Fuel injector no.1 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check fuel injector no.1 circuit for short circuit to ground
P0261-	Cylinder 1 Injector Circuit		• Refer to the electrical circuit

12	Low - Circuit short to battery	NOTE: - Circuit INJECTOR_1A - INJECTOR_1A_COMMON - • Fuel injector no.1 circuit short circuit to power	diagrams and check fuel injector no.1 circuit for short circuit to power
P0262-01	Cylinder 1 Injector Circuit High - General electrical failure	NOTE: - Circuit INJECTOR_1A - INJECTOR_1A_COMMON - • Fuel injector no.1 circuit short circuit to ground, short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.1 circuit for short circuit to ground, short circuit to power
P0262-12	Cylinder 1 Injector Circuit High - Circuit short to battery	NOTE: - Circuit INJECTOR_1A - INJECTOR_1A_COMMON - • Fuel injector no.1 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.1 circuit for short circuit to power
P0264-11	Cylinder 2 Injector Circuit Low - Circuit short to ground	NOTE: - Circuit INJECTOR_1B - INJECTOR_1B_COMMON - • Fuel injector no.2 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check fuel injector no.2 circuit for short circuit to ground
P0264-12	Cylinder 2 Injector Circuit Low - Circuit short to battery	NOTE: - Circuit INJECTOR_1B - INJECTOR_1B_COMMON - • Fuel injector no.2 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.2 circuit for short circuit to power
P0265-01	Cylinder 2 Injector Circuit High - General electrical failure	NOTE: - Circuit INJECTOR_1B - INJECTOR_1B_COMMON - • Fuel injector no.2 circuit short circuit to ground, short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.2 circuit for short circuit to ground, short circuit to power
P0265-12	Cylinder 2 Injector Circuit High - Circuit short to battery	NOTE: - Circuit INJECTOR_1B - INJECTOR_1B_COMMON - • Fuel injector no.2 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.2 circuit for short circuit to power
P0267-11	Cylinder 3 Injector Circuit Low - Circuit short to ground	NOTE: - Circuit INJECTOR_2A - INJECTOR_2A_COMMON - • Fuel injector no.3 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check fuel injector no.3 circuit for short circuit to ground
P0267-12	Cylinder 3 Injector Circuit Low - Circuit short to battery	NOTE: - Circuit INJECTOR_2A - INJECTOR_2A_COMMON - • Fuel injector no.3 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.3 circuit for short circuit to power
P0268-01	Cylinder 3 Injector Circuit High - General electrical failure	NOTE: - Circuit INJECTOR_2A - INJECTOR_2A_COMMON - • Fuel injector no.3 circuit short circuit to ground, short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.3 circuit for short circuit to ground, short circuit to power
P0268-12	Cylinder 3 Injector Circuit High - Circuit short to battery	NOTE: - Circuit INJECTOR_2A - INJECTOR_2A_COMMON - • Fuel injector no.3 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.3 circuit for short circuit to power

P0270-11	Cylinder 4 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit INJECTOR_2B - INJECTOR_2B_COMMON - • Fuel injector no.4 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check fuel injector no.4 circuit for short circuit to ground
P0270-12	Cylinder 4 Injector Circuit Low - Circuit short to battery	 NOTE: - Circuit INJECTOR_2B - INJECTOR_2B_COMMON - • Fuel injector no.4 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.4 circuit for short circuit to power
P0271-01	Cylinder 4 Injector Circuit High - General electrical failure	 NOTE: - Circuit INJECTOR_2B - INJECTOR_2B_COMMON - • Fuel injector no.4 circuit short circuit to ground, short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.4 circuit for short circuit to ground, short circuit to power
P0271-12	Cylinder 4 Injector Circuit High - Circuit short to battery	 NOTE: - Circuit INJECTOR_2B - INJECTOR_2B_COMMON - • Fuel injector no.4 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.4 circuit for short circuit to power
P0273-11	Cylinder 5 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit INJECTOR_3A - INJECTOR_3A_COMMON - • Fuel injector no.5 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check fuel injector no.5 circuit for short circuit to ground
P0273-12	Cylinder 5 Injector Circuit Low - Circuit short to battery	 NOTE: - Circuit INJECTOR_3A - INJECTOR_3A_COMMON - • Fuel injector no.5 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.5 circuit for short circuit to power
P0274-01	Cylinder 5 Injector Circuit High - General electrical failure	 NOTE: - Circuit INJECTOR_3A - INJECTOR_3A_COMMON - • Fuel injector no.5 circuit short circuit to ground, short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.5 circuit for short circuit to ground, short circuit to power
P0274-12	Cylinder 5 Injector Circuit High - Circuit short to battery	 NOTE: - Circuit INJECTOR_3A - INJECTOR_3A_COMMON - • Fuel injector no.5 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.5 circuit for short circuit to power
P0276-11	Cylinder 6 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit INJECTOR_3B - INJECTOR_3B_COMMON - • Fuel injector no.6 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check fuel injector no.6 circuit for short circuit to ground
P0276-12	Cylinder 6 Injector Circuit Low - Circuit short to battery	 NOTE: - Circuit INJECTOR_3B - INJECTOR_3B_COMMON - • Fuel injector no.6 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.6 circuit for short circuit to power
P0277-01	Cylinder 6 Injector Circuit High - General electrical failure	 NOTE: - Circuit INJECTOR_3B - INJECTOR_3B_COMMON - • Fuel injector no.6 circuit short circuit to ground, short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.6 circuit for short circuit to ground, short circuit to power

P0277-12	Cylinder 6 Injector Circuit High - Circuit short to battery	 NOTE: - Circuit INJECTOR_3B - INJECTOR_3B_COMMON - • Fuel injector no.6 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.6 circuit for short circuit to power
P0279-11	Cylinder 7 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit INJECTOR_4A - INJECTOR_4A_COMMON - • Fuel injector no.7 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check fuel injector no.7 circuit for short circuit to ground
P0279-12	Cylinder 7 Injector Circuit Low - Circuit short to battery	 NOTE: - Circuit INJECTOR_4A - INJECTOR_4A_COMMON - • Fuel injector no.7 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.7 circuit for short circuit to power
P0280-01	Cylinder 7 Injector Circuit High - General electrical failure	 NOTE: - Circuit INJECTOR_4A - INJECTOR_4A_COMMON - • Fuel injector no.7 circuit short circuit to ground, short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.7 circuit for short circuit to ground, short circuit to power
P0280-12	Cylinder 7 Injector Circuit High - Circuit short to battery	 NOTE: - Circuit INJECTOR_4A - INJECTOR_4A_COMMON - • Fuel injector no.7 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.7 circuit for short circuit to power
P0282-11	Cylinder 8 Injector Circuit Low - Circuit short to ground	 NOTE: - Circuit INJECTOR_4B - INJECTOR_4B_COMMON - • Fuel injector no.8 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check fuel injector no.8 circuit for short circuit to ground
P0282-12	Cylinder 8 Injector Circuit Low - Circuit short to battery	 NOTE: - Circuit INJECTOR_4B - INJECTOR_4B_COMMON - • Fuel injector no.8 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.8 circuit for short circuit to power
P0283-01	Cylinder 8 Injector Circuit High - General electrical failure	 NOTE: - Circuit INJECTOR_4B - INJECTOR_4B_COMMON - • Fuel injector no.8 circuit short circuit to ground, short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.8 circuit for short circuit to ground, short circuit to power
P0283-12	Cylinder 8 Injector Circuit High - Circuit short to battery	 NOTE: - Circuit INJECTOR_4B - INJECTOR_4B_COMMON - • Fuel injector no.8 circuit short circuit to power	• Refer to the electrical circuit diagrams and check fuel injector no.8 circuit for short circuit to power
P02EE-01	Cylinder 1 Injector Circuit Range/Performance - General electrical failure	 NOTE: - Circuit INJECTOR_1A - INJECTOR_1A_COMMON - • Cylinder 1 injector low circuit short circuit to power • Cylinder 1 injector low circuit shorted to high circuit • Cylinder 1 injector failure	• Refer to the electrical circuit diagrams and check cylinder 1 injector circuit for short circuit to power, short circuit together • Check and install a new cylinder 1 injector as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P02EE-1C	Cylinder 1 Injector Circuit Range/Performance - Circuit voltage out of range	 NOTE: - Circuit INJECTOR_1A - INJECTOR_1A_COMMON -	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs

		• Engine control module failure	and refer to the relevant DTC index
P02EF-01	Cylinder 2 Injector Circuit Range/Performance - General electrical failure	NOTE: - Circuit INJECTOR_1B - INJECTOR_1B_COMMON - • Cylinder 2 injector low circuit short circuit to power • Cylinder 2 injector low circuit shorted to high circuit • Cylinder 2 injector failure	• Refer to the electrical circuit diagrams and check cylinder 2 injector circuit for short circuit to power, short circuit together • Check and install a new cylinder 2 injector as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P02EF-1C	Cylinder 2 Injector Circuit Range/Performance - Circuit voltage out of range	NOTE: - Circuit INJECTOR_1B - INJECTOR_1B_COMMON - • Engine control module failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index
P02F0-01	Cylinder 3 Injector Circuit Range/Performance - General electrical failure	NOTE: - Circuit INJECTOR_2A - INJECTOR_2A_COMMON - • Cylinder 3 injector low circuit short circuit to power • Cylinder 3 injector low circuit shorted to high circuit • Cylinder 3 injector failure	• Refer to the electrical circuit diagrams and check cylinder 3 injector circuit for short circuit to power, short circuit together • Check and install a new cylinder 3 injector as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P02F0-1C	Cylinder 3 Injector Circuit Range/Performance - Circuit voltage out of range	NOTE: - Circuit INJECTOR_2A - INJECTOR_2A_COMMON - • Engine control module failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index
P02F1-01	Cylinder 4 Injector Circuit Range/Performance - General electrical failure	NOTE: - Circuit INJECTOR_2B - INJECTOR_2B_COMMON - • Cylinder 4 injector low circuit short circuit to power • Cylinder 4 injector low circuit shorted to high circuit • Cylinder 4 injector failure	• Refer to the electrical circuit diagrams and check cylinder 4 injector circuit for short circuit to power, short circuit together • Check and install a new cylinder 4 injector as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P02F1-1C	Cylinder 4 Injector Circuit Range/Performance - Circuit voltage out of range	NOTE: - Circuit INJECTOR_2B - INJECTOR_2B_COMMON - • Engine control module failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index
P02F2-01	Cylinder 5 Injector Circuit Range/Performance - General electrical failure	NOTE: - Circuit INJECTOR_3A - INJECTOR_3A_COMMON - • Cylinder 5 injector low circuit short circuit to power • Cylinder 5 injector low circuit shorted to high circuit • Cylinder 5 injector failure	• Refer to the electrical circuit diagrams and check cylinder 5 injector circuit for short circuit to power, short circuit together • Check and install a new cylinder 5 injector as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P02F2-1C	Cylinder 5 Injector Circuit Range/Performance - Circuit voltage out of range	NOTE: - Circuit INJECTOR_3A - INJECTOR_3A_COMMON - • Engine control module failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index
P02F3-01	Cylinder 6 Injector Circuit Range/Performance - General electrical failure	NOTE: - Circuit INJECTOR_3B - INJECTOR_3B_COMMON - • Cylinder 6 injector low circuit	• Refer to the electrical circuit diagrams and check cylinder 6 injector circuit for short circuit to power, short circuit together • Check and install a new cylinder 6

		short circuit to power • Cylinder 6 injector low circuit shorted to high circuit • Cylinder 6 injector failure	injector as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P02F3-1C	Cylinder 6 Injector Circuit Range/Performance - Circuit voltage out of range	 NOTE: - Circuit INJECTOR_3B - INJECTOR_3B_COMMON - • Engine control module failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index
P02F4-01	Cylinder 7 Injector Circuit Range/Performance - General electrical failure	 NOTE: - Circuit INJECTOR_4A - INJECTOR_4A_COMMON - • Cylinder 7 injector low circuit short circuit to power • Cylinder 7 injector low circuit shorted to high circuit • Cylinder 7 injector failure	• Refer to the electrical circuit diagrams and check cylinder 7 injector circuit for short circuit to power, short circuit together • Check and install a new cylinder 7 injector as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P02F4-1C	Cylinder 7 Injector Circuit Range/Performance - Circuit voltage out of range	 NOTE: - Circuit INJECTOR_4A - INJECTOR_4A_COMMON - • Engine control module failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index
P02F5-01	Cylinder 8 Injector Circuit Range/Performance - General electrical failure	 NOTE: - Circuit INJECTOR_4B - INJECTOR_4B_COMMON - • Cylinder 8 injector low circuit short circuit to power • Cylinder 8 injector low circuit shorted to high circuit • Cylinder 8 injector failure	• Refer to the electrical circuit diagrams and check cylinder 8 injector circuit for short circuit to power, short circuit together • Check and install a new cylinder 8 injector as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P02F5-1C	Cylinder 8 Injector Circuit Range/Performance - Circuit voltage out of range	 NOTE: - Circuit INJECTOR_4B - INJECTOR_4B_COMMON - • Engine control module failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index
P0300-00	Random Misfire Detected - No sub type information	• Poor fuel quality • Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0301-	Cylinder 1 Misfire Detected	• Poor fuel quality	• Using the manufacturer approved

00	- No sub type information	Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0302-00	Cylinder 2 Misfire Detected - No sub type information	• Poor fuel quality • Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0303-00	Cylinder 3 Misfire Detected - No sub type information	• Poor fuel quality • Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system

			Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0304-00	Cylinder 4 Misfire Detected - No sub type information	• Poor fuel quality • Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0305-00	Cylinder 5 Misfire Detected - No sub type information	• Poor fuel quality • Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0306-00	Cylinder 6 Misfire Detected - No sub type information	• Poor fuel quality • Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required

		Camshaft position sensor failure	Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0307-00	Cylinder 7 Misfire Detected - No sub type information	• Poor fuel quality • Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0308-00	Cylinder 8 Misfire Detected - No sub type information	• Poor fuel quality • Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0313-	Misfire Detected With Low	• Poor fuel quality	• Using the manufacturer approved

00	Fuel - No sub type information	Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0316-00	Misfire Detected On Startup (First 1000 Revolutions) - No sub type information	• Poor fuel quality • Catalyst/exhaust system blockage • Spark plug(s) fouled or failed • Coil(s) failure • Injector(s) circuit short circuit to ground, short circuit to power, open circuit • Injector(s) failure • Fuel system excessively too lean or too rich • Camshaft position sensor failure	• Using the manufacturer approved diagnostic system, check engine control module, for related DTCs and refer to the relevant DTC index • Check the fuel system for blockages, repair as required • Check the catalyst/exhaust system for blockage, repair as required • Check and install a new spark plug(s) as required • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check injector(s) circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new injector(s) as required • Check for air leaks within the intake system • Check and install a new camshaft position sensor as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0327-00	Knock Sensor 1 Circuit Low (Bank1) - No sub type information	 NOTE: - Circuit KNOCK_SENSOR_1A_POS - • Poor sensor contact with the cylinder block • Knock sensor bank 1 front circuit short circuit to ground, open circuit • Knock sensor bank 1 front failure	• Ensure a good electrical contact with the cylinder block • Refer to the electrical circuit diagrams and check knock sensor bank 1 front circuit for short circuit to ground, open circuit • Check and install a new knock sensor bank 1 front as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0328-00	Knock Sensor 1 Circuit High (Bank 1) - No sub type information	 NOTE: - Circuit KNOCK_SENSOR_1A_POS - • Poor sensor contact with the cylinder block	• Ensure a good electrical contact with the cylinder block • Refer to the electrical circuit diagrams and check knock sensor bank 1 front circuit for short circuit to power, high resistance

		Knock sensor bank 1 front circuit high resistance, short circuit to power • Knock sensor bank 1 front failure	Check and install a new knock sensor bank 1 front as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P032C-00	Knock Sensor 3 Circuit Low (Bank1) - No sub type information	 NOTE: - Circuit KNOCK_SENSOR_2A_POS - • Poor sensor contact with the cylinder block • Knock sensor bank 2 front circuit short circuit to ground • Knock sensor bank 2 front failure	• Ensure a good electrical contact with the cylinder block • Refer to the electrical circuit diagrams and check knock sensor bank 2 front circuit for short circuit to ground • Check and install a new knock sensor bank 2 front as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P032D-00	Knock Sensor 3 Circuit High (Bank1) - No sub type information	 NOTE: - Circuit KNOCK_SENSOR_2A_POS - • Poor sensor contact with the cylinder block • Knock sensor bank 2 front circuit high resistance, short circuit to power • Knock sensor bank 2 front failure	• Ensure a good electrical contact with the cylinder block • Refer to the electrical circuit diagrams and check knock sensor bank 2 front circuit for short circuit to power, high resistance • Check and install a new knock sensor bank 2 front as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0332-00	Knock Sensor 2 Circuit Low (Bank2) - No sub type information	 NOTE: - Circuit KNOCK_SENSOR_1B_POS - • Poor sensor contact with the cylinder block • Knock sensor bank 1 rear circuit short circuit to ground, open circuit • Knock sensor bank 1 rear failure	• Ensure a good electrical contact with the cylinder block • Refer to the electrical circuit diagrams and check knock sensor bank 1 rear circuit for short circuit to ground, open circuit • Check and install a new knock sensor bank 1 rear as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0333-00	Knock Sensor 2 Circuit High (Bank 2) - No sub type information	 NOTE: - Circuit KNOCK_SENSOR_1B_POS - • Poor sensor contact with the cylinder block • Knock sensor bank 1 rear circuit short circuit to power • Knock sensor bank 1 rear failure	• Ensure a good electrical contact with the cylinder block • Refer to the electrical circuit diagrams and check knock sensor bank 1 rear circuit for short circuit to power • Check and install a new knock sensor bank 1 rear as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0335-02	Crankshaft Position Sensor A Circuit - General signal failure	 NOTE: - Circuit CRANK_SENSOR - • Crankshaft position sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Crankshaft position sensor failure	• Refer to the electrical circuit diagrams and check crankshaft position sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check and install new crankshaft position as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation

			of a new module/component
P0335-31	Crankshaft Position Sensor A Circuit - No signal	 NOTE: - Circuit CRANK_SENSOR - • Crankshaft position sensor circuit - short circuit to ground, short circuit to power, high resistance, disconnected • Crankshaft position sensor failure	• Refer to the electrical circuit diagrams and check crankshaft position sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check and install new crankshaft position as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0336-00	Crankshaft Position Sensor A Circuit Range/Performance - No sub type information	 NOTE: - Circuit CRANK_SENSOR - • Crankshaft position sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Crankshaft position sensor gap incorrect, foreign matter on sensor face, damaged teeth on rotor • Crankshaft position sensor failure	• Refer to the electrical circuit diagrams and check crankshaft position sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check crankshaft position sensor for damage and check air gap (check at 90° intervals, should be no greater than 4.5mm) • Check and install new crankshaft position as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P033C-00	Knock Sensor 4 Circuit Low (Bank 2) - No sub type information	 NOTE: - Circuit KNOCK_SENSOR_2B_POS - • Poor sensor contact with the cylinder block • Knock sensor bank 2 rear circuit short circuit to ground • Knock sensor bank 2 rear failure	• Ensure a good electrical contact with the cylinder block • Refer to the electrical circuit diagrams and check knock sensor bank 2 rear circuit for short circuit to ground • Check and install a new knock sensor bank 2 rear as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P033D-00	Knock Sensor 4 Circuit High (Bank 2) - No sub type information	 NOTE: - Circuit KNOCK_SENSOR_2B_POS - • Poor sensor contact with the cylinder block • Knock sensor bank 2 rear circuit high resistance, short circuit to power • Knock sensor bank 2 rear failure	• Ensure a good electrical contact with the cylinder block • Refer to the electrical circuit diagrams and check knock sensor bank 2 rear circuit for short circuit to power, high resistance • Check and install a new knock sensor bank 2 rear as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0340-02	Camshaft Position Sensor A Circuit (Bank 1 or single sensor) - General signal failure	 NOTE: - Circuit CAM_IN_SENSOR_A - • Camshaft position sensor bank 1 inlet sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Camshaft position sensor bank 1 inlet sensor gap incorrect, foreign matter on sensor face, damaged rotor • Camshaft position sensor bank 1 inlet sensor failure	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 1 inlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 1 inlet sensor for correct installation and damage • Check and install a new camshaft position sensor bank 1 inlet as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component

P0340-31	Camshaft Position Sensor A Circuit (Bank 1 or single sensor) - No signal	 NOTE: - Circuit CAM_IN_SENSOR_A - • Camshaft position sensor bank 1 inlet sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Camshaft position sensor bank 1 inlet sensor gap incorrect, foreign matter on sensor face, damaged rotor • Camshaft position sensor bank 1 inlet sensor failure	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 1 inlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 1 inlet sensor for correct installation and damage • Check and install a new camshaft position sensor bank 1 inlet as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0341-00	Camshaft Position Sensor A Circuit Range/Performance (Bank 1 or single sensor) - No sub type information	 NOTE: - Circuit CAM_IN_SENSOR_A - • Camshaft position sensor bank 1 inlet sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Camshaft position sensor bank 1 inlet sensor gap incorrect, foreign matter on sensor face, damaged rotor • Camshaft position sensor bank 1 inlet sensor failure	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 1 inlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 1 inlet sensor for correct installation and damage • Check and install a new camshaft position sensor bank 1 inlet as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0345-02	Camshaft Position Sensor A Circuit (Bank 2) - General signal failure	 NOTE: - Circuit CAM_IN_SENSOR_B - • Camshaft position sensor bank 2 inlet sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Camshaft position sensor bank 2 inlet sensor gap incorrect, foreign matter on sensor face, damaged rotor • Camshaft position sensor bank 2 inlet sensor failure	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 2 inlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 2 inlet sensor for correct installation and damage • Check and install a new camshaft position sensor bank 2 inlet as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0345-31	Camshaft Position Sensor A Circuit (Bank 2) - No signal	 NOTE: - Circuit CAM_IN_SENSOR_B - • Camshaft position sensor bank 2 inlet sensor circuit - short circuit to ground, short circuit to power, high resistance, disconnected • Camshaft position sensor bank 2 inlet sensor gap incorrect, foreign matter on sensor face, damaged rotor • Camshaft position sensor bank 2 inlet sensor failure	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 2 inlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 2 inlet sensor for correct installation and damage • Check and install a new camshaft position sensor bank 2 inlet as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0346-00	Camshaft Position Sensor A Circuit Range/Performance (Bank 2) - No sub type information	 NOTE: - Circuit CAM_IN_SENSOR_B - • Camshaft position sensor bank 2 inlet sensor circuit - short circuit to ground, short circuit	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 2 inlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 2 inlet sensor for correct

		to power, high resistance, disconnected • Camshaft position sensor bank 2 inlet sensor gap incorrect, foreign matter on sensor face, target rotor run-out • Camshaft position sensor bank 2 inlet sensor failure	installation and damage • Check target rotor for run out, repair as required • Check and install a new camshaft position sensor bank 2 inlet as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0351-13	Ignition Coil A Primary/Secondary Circuit - Circuit open	 NOTE: - Circuit IGNITION_1A - • Ignition coil 1 open circuit • Ignition coil 1 disconnected • Ignition coil high resistance	• Refer to the electrical circuit diagrams and check ignition coil 1 circuit for open circuit, disconnected ignition coil, high resistance
P0352-13	Ignition Coil B Primary/Secondary Circuit - Circuit open	 NOTE: - Circuit IGNITION_1B - • Ignition coil 2 open circuit • Ignition coil 2 disconnected • Ignition coil high resistance	• Refer to the electrical circuit diagrams and check ignition coil 2 circuit for open circuit, disconnected ignition coil, high resistance
P0353-13	Ignition Coil C Primary/Secondary Circuit - Circuit open	 NOTE: - Circuit IGNITION_2A - • Ignition coil 3 open circuit • Ignition coil 3 disconnected • Ignition coil high resistance	• Refer to the electrical circuit diagrams and check ignition coil 3 circuit for open circuit, disconnected ignition coil, high resistance
P0354-13	Ignition Coil D Primary/Secondary Circuit - Circuit open	 NOTE: - Circuit IGNITION_2B - • Ignition coil 4 open circuit • Ignition coil 4 disconnected • Ignition coil high resistance	• Refer to the electrical circuit diagrams and check ignition coil 4 circuit for open circuit, disconnected ignition coil, high resistance
P0355-13	Ignition Coil E Primary/Secondary Circuit - Circuit open	 NOTE: - Circuit IGNITION_3A - • Ignition coil 5 open circuit • Ignition coil 5 disconnected • Ignition coil high resistance	• Refer to the electrical circuit diagrams and check ignition coil 5 circuit for open circuit, disconnected ignition coil, high resistance
P0356-13	Ignition Coil F Primary/Secondary Circuit - Circuit open	 NOTE: - Circuit IGNITION_3B - • Ignition coil 6 open circuit • Ignition coil 6 disconnected • Ignition coil high resistance	• Refer to the electrical circuit diagrams and check ignition coil 6 circuit for open circuit, disconnected ignition coil, high resistance
P0357-13	Ignition Coil G Primary/Secondary Circuit - Circuit open	 NOTE: - Circuit IGNITION_4A - • Ignition coil 7 open circuit • Ignition coil 7 disconnected • Ignition coil high resistance	• Refer to the electrical circuit diagrams and check ignition coil 7 circuit for open circuit, disconnected ignition coil, high resistance
P0358-13	Ignition Coil H Primary/Secondary Circuit - Circuit open	 NOTE: - Circuit IGNITION_4B - • Ignition coil 8 open circuit • Ignition coil 8 disconnected • Ignition coil high resistance	• Refer to the electrical circuit diagrams and check ignition coil 8 circuit for open circuit, disconnected ignition coil, high resistance
P0365-02	Camshaft Position Sensor B Circuit (Bank 1) - General signal failure	 NOTE: - Circuit CAM_EX_SENSOR_A - • Camshaft position sensor bank 1 outlet sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Camshaft position sensor bank 1 outlet sensor gap incorrect,	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 1 outlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 1 outlet sensor for correct installation and damage • Check and install a new camshaft position sensor bank 1 outlet as

		foreign matter on sensor face, damaged rotor • Camshaft position sensor bank 1 outlet sensor failure	required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0366-00	Camshaft Position Sensor B Circuit Range/Performance (Bank 1) - No sub type information	 NOTE: - Circuit CAM_EX_SENSOR_A - • Camshaft position sensor bank 1 outlet sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Camshaft position sensor bank 1 outlet sensor gap incorrect, foreign matter on sensor face, target rotor run-out • Camshaft position sensor bank 1 outlet sensor failure	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 1 outlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 1 outlet sensor for correct installation and damage • Check target run-out, repair as required • Check and install a new camshaft position sensor bank 1 outlet as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0390-02	Camshaft Position Sensor B Circuit (Bank 2) - General signal failure	 NOTE: - Circuit CAM_EX_SENSOR_B - • Camshaft position sensor bank 2 outlet sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Camshaft position sensor bank 2 outlet sensor gap incorrect, foreign matter on sensor face, damaged rotor • Camshaft position sensor bank 2 outlet sensor failure	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 2 outlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 2 outlet sensor for correct installation and damage • Check and install a new camshaft position sensor bank 2 outlet as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0391-00	Camshaft Position Sensor B Circuit Range/Performance (Bank 2) - No sub type information	 NOTE: - Circuit CAM_EX_SENSOR_B - • Camshaft position sensor bank 2 outlet sensor circuit short circuit to ground, short circuit to power, high resistance, disconnected • Camshaft position sensor bank 2 outlet sensor gap incorrect, foreign matter on sensor face, damaged rotor, rotor run-out • Camshaft position sensor bank 2 outlet sensor failure	• Refer to the electrical circuit diagrams and check camshaft position sensor bank 2 outlet sensor circuit for short circuit to ground, short circuit to power, high resistance, disconnected • Check camshaft position sensor bank 2 outlet sensor for correct installation and damage • Check target rotor, repair as required • Check and install a new camshaft position sensor bank 2 outlet as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0420-00	Catalyst System Efficiency Below Threshold (Bank 1) - No sub type information	• Catalytic converter failure due to overheating damage caused by misfire and/or lean combustion • Catalytic converter failure due to poisoning caused by excessive oil consumption and/or contaminated fuel	• Using the manufacturer approved diagnostic system, check for misfire/lean combustion related DTCs and refer to the relevant DTC index • Check the oil and fuel condition/level • Check the catalytic converter for damage • Check and install a new catalytic converter bank 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the

			installation of a new module/component
P0430-00	Catalyst System Efficiency Below Threshold (Bank 2) - No sub type information	• Catalytic converter failure due to overheating damage caused by misfire and/or lean combustion • Catalytic converter failure due to poisoning caused by excessive oil consumption and/or contaminated fuel	• Using the manufacturer approved diagnostic system, check for misfire/lean combustion related DTCs and refer to the relevant DTC index • Check the oil and fuel condition/level • Check the catalytic converter for damage • Check and install a new catalytic converter bank 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0441-00	Evaporative Emission System Incorrect Purge Flow - No sub type information	 NOTE: - Circuit PURGE_VALVE - • Evaporative emission system hoses, pipes or connection failure • Purge control valve circuit short circuit to ground, short circuit to power, open circuit, high resistance • Purge control valve failure	• Check all evaporative emission system hoses, pipes and connection are serviceable, repair/replace as required • Refer to the electrical circuit diagrams and check purge control valve circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new purge control valve as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0442-00	Evaporative Emission System Leak Detected (small leak)- No sub type information	• Fuel filler cap not sealing/missing • Diagnostic module tank leakage connector not sealed • Purge valve dirty • Evaporative emission system leak • Fuel tank, filler neck leak • Diagnostic module tank leakage module failure	• Check fuel tank filler cap for sealing/missing. Check and install a new fuel tank filler cap as required • Check evaporative emission system for leak using appropriate smoke/leak tester • Carry out a purge valve self test to clean the purge valve • Check fuel tank and filler neck for leakage, replace as required • Check and install a new diagnostic module tank leakage module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0444-13	Evaporative Emission System Purge Control Valve Circuit Open - Circuit open	 NOTE: - Circuit PURGE_VALVE - • Purge control valve open circuit, high resistance, disconnected	• Refer to the electrical circuit diagrams and check purge control valve circuit for open circuit, disconnected purge valve, high resistance
P0447-00	Evaporative Emission System Vent Control Circuit Open - No sub type information	NOTES:  - Circuit COV -  LR - Circuit CHANGE OVER VALVE - • Diagnostic module tank leakage module circuit open circuit • Diagnostic module tank leakage module circuit fuse	• Refer to the electrical circuit diagrams and check diagnostic module tank leakage module circuit for open circuit • Check diagnostic module tank leakage module fuse and replace as required • Check and install a new diagnostic module tank leakage module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new

		• blown / not secure in holder • Diagnostic module tank leakage module failure	module/component
P0448-00	Evaporative Emission System Vent Control Circuit Shorted - No sub type information	NOTES:  - Circuit COV -  LR - Circuit CHANGE OVER VALVE - • Diagnostic module tank leakage module circuit, short circuit to ground, short circuit to power, open circuit • Diagnostic module tank leakage module failure	• Refer to the electrical circuit diagrams and check diagnostic module tank leakage module circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new diagnostic module tank leakage module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0456-00	Evaporative Emission System Leak Detected (very small leak) - No sub type information	• Fuel filler cap not sealing/missing • Diagnostic module tank leakage connector not sealed • Purge valve dirty • Evaporative emission system leak • Fuel tank, filler neck leak • Diagnostic module tank leakage module failure	• Check fuel tank filler cap for sealing/missing. Check and install a new fuel tank filler cap as required • Check evaporative emission system for leak using appropriate smoke/leak tester • Carry out a purge valve self test to clean the purge valve • Check fuel tank and filler neck for leakage, replace as required • Check and install a new diagnostic module tank leakage module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0458-11	Evaporative Emission System Purge Control Valve Circuit High - Circuit short to ground	 NOTE: - Circuit PURGE_VALVE - • Evaporative emission system purge control valve circuit short circuit to ground	• Refer to the electrical circuit diagrams and check evaporative emission system purge control valve circuit for short circuit to ground
P0459-12	Evaporative Emission System Purge Control Valve Circuit High - Circuit short to battery	 NOTE: - Circuit PURGE_VALVE - • Evaporative emission system purge control valve circuit short circuit to power	• Refer to the electrical circuit diagrams and check evaporative emission system purge control valve circuit for short circuit to power
P0461-29	Fuel Level Sensor A Circuit Range/Performance - Signal invalid	• Fuel level sensor circuit open circuit, short circuit to ground, short circuit to power • Fuel level sensor stuck • Fuel level sensor failure	• Refer to the electrical circuit diagrams and check fuel level sensor circuit for short circuit to ground, short circuit to power, open circuit • Check for stuck level sensor • Check and install a new fuel level sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0461-2F	Fuel Level Sensor A Circuit Range/Performance - Signal erratic	• Fuel level sensor circuit short circuit to ground, short circuit to power, open circuit • Fuel level sensor track damaged • Fuel level sensor failure	• Refer to the electrical circuit diagrams and check fuel level sensor circuit for short circuit to ground, short circuit to power, open circuit • Check level sensor track for damage • Check and install a new fuel level sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in

			operation, prior to the installation of a new module/component
P0480-13	Fan 1 Control Circuit - Circuit open	 NOTE: - Circuit VISCOUS FAN CTRL - • Viscous fan control circuit, open circuit	• Refer to the electrical circuit diagrams and check viscous fan control circuit for open circuit
P0483-00	Fan Performance - No sub type information	 NOTE: - Circuit VISCOUS FAN CTRL - • Viscous fan control circuit, short circuit to ground, short circuit to power, open circuit • Viscous fan unit hydraulic fluid leakage	• Refer to the electrical circuit diagrams and check viscous fan control circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new viscous fan unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0493-00	Fan Overspeed (clutch locked) - No sub type information	 NOTE: - Circuit VISCOUS FAN CTRL - • Viscous fan control circuit, short circuit to ground, short circuit to power, open circuit	• Refer to the electrical circuit diagrams and check viscous fan control circuit for short circuit to ground, short circuit to power, open circuit
P0500-81	Vehicle Speed Sensor A - Invalid serial data received	• Wheel speed sensor fault	• Check anti-lock braking system module for related DTCs and refer to relevant DTC index
P0500-82	Vehicle Speed Sensor A - Alive / sequence counter incorrect / not updated	• Anti-lock braking system module not on bus	• Check anti-lock braking system module and engine control module for related DTCs and refer to relevant DTC index • Refer to the electrical circuit diagrams and check anti-lock braking system module circuit for short circuit to ground, short circuit to power, open circuit
P0500-83	Vehicle Speed Sensor A - Value of signal protection calculation incorrect	• Incorrect level of anti-lock braking system module software • Incorrect level of engine control module software	• Clear DTC and re-test • Using the manufacturer approved diagnostic system check and install latest relevant level of software to the anti-lock braking system module • Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module
P0500-85	Vehicle Speed Sensor A - Signal above allowable range	• Anti-lock braking system module has reported a speed above 300 km/h	• Check anti-lock braking system module for related DTCs and refer to relevant DTC index
P0501-62	Vehicle Speed Sensor A Range/Performance - Signal compare failure	• Vehicle speed from the anti-lock braking system module does not match the calculated vehicle speed from the engine control module	• Check engine control module for related vehicle speed DTCs and refer to relevant DTC index • Check anti-lock braking system module and transmission control module for related DTCs and refer to relevant DTC index • Check the vehicle tire sizes are correct
P0504-00	Brake Switch A / B Correlation - No sub type information	• No brake pressure signal available from anti-lock braking module • Brake switch 1 and Brake switch 2 sense circuit short circuit to ground, short circuit to power, open circuit • Brake switch 1 failure	• Check Anti-Lock braking module for related DTCs and refer to relevant DTC index • Check for brake fluid leaks • Refer to the electrical circuit diagrams and check anti-lock braking system module circuit for short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit

			diagrams and check brake switch circuit for short circuit to ground, short circuit to power, open circuit • Check and install a new brake switch 1 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0504-64	Brake Switch A / B Correlation - Signal plausibility failure	 NOTE: - Circuit BRAKE_SW - BRAKE_SW_2 - • Brake fluid leak • Brake switch incorrectly installed/adjusted • Brake switch 1 sense circuit short circuit to Brake switch 2 sense • Brake switch failure	• Check for brake fluid leaks • Refer to the electrical circuit diagrams and check brake switch 1 circuit for short circuit to brake switch 2 • Check brake switch is correctly installed and adjusted • Check and install a new brake switch as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0506-00	Idle Air Control System RPM Lower Than Expected - No sub type information	• Air intake restriction • Front end accessory drive overload (defective/seized component)	• Ensure the air intake system is free from restriction • Check the front end accessory drive belt and components for failure, repair as required
P0506-24	Idle Air Control System RPM Lower Than Expected - Signal stuck high	• Air intake restriction • Air intake system air leak between MAF/IAT sensor and throttle • Intake air leak between throttle and manifold • Engine crankcase breather leak • Front end accessory drive overload (defective/seized component)	• Ensure the air intake system is free from restriction • Check for air leak between MAF/IAT sensor and throttle • Check for air leak between throttle and inlet manifold • Check for engine breather system leak • Check the front end accessory drive belt and components for failure
P0507-00	Idle Air Control System RPM Higher Than Expected - No sub type information	• Air intake system air leak between MAF/IAT sensor and throttle • Intake air leak between throttle and manifold • Engine crankcase breather leak	• Check for air leak between MAF/IAT sensor and throttle • Check for air leak between throttle and inlet manifold • Check for engine breather system leak
P0507-23	Idle Air Control System RPM Higher Than Expected - Signal stuck low	• Air intake restriction • Air intake system air leak between MAF/IAT sensor and throttle • Intake air leak between throttle and manifold • Engine crankcase breather leak	• Ensure the air intake system is free from restriction • Check for air leak between MAF/IAT sensor and throttle • Check for air leak between throttle and inlet manifold • Check for engine breather system leak
P050B-23	Cold Start Ignition Timing Performance - Signal stuck low	• Ignition coil(s)faulty • Ignition coils circuit noise • Engine control module failure	• Refer to the electrical circuit diagrams and check ignition coil circuit for short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit diagrams and check engine control module to ignition coil circuit for short circuit to power • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check ignition coils circuit for corrosion, high resistance • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new

			module/component
P050B-24	Cold Start Ignition Timing Performance - Signal stuck high	• Ignition coil(s)faulty • Ignition coils circuit noise • Engine control module failure	• Refer to the electrical circuit diagrams and check ignition coil circuit for short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit diagrams and check engine control module to ignition coil circuit for short circuit to power • Check and install a new coil(s) as required • Refer to the electrical circuit diagrams and check ignition coils circuit for corrosion, high resistance • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P050E-00	Cold Start Engine Exhaust Temperature Too Low - No sub type information	• Incorrect coolant temperature sensor installed • Coolant temperature sensor circuit short circuit to ground, open circuit • Coolant temperature sensor failure	• Check the correct coolant temperature sensor is installed • Refer to the electrical circuit diagrams and check coolant temperature sensor circuit for short circuit to ground, open circuit • Check and install a new coolant temperature sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0512-12	Starter Request Circuit - Circuit short to battery	NOTE: - Circuit CRANK_REQUEST - • Crank request circuit between engine control module and central junction box short circuit to power	• Refer to the electrical circuit diagrams and check crank request circuit between engine control module and central junction box for short circuit to power
P0512-14	Starter Request Circuit - Circuit short to ground or open	NOTE: - Circuit CRANK_REQUEST - • Crank request circuit between engine control module and central junction box short circuit to ground, open circuit	• Refer to the electrical circuit diagrams and check crank request circuit between engine control module and central junction box for short circuit to ground, open circuit
P0513-00	Incorrect Immobilizer Key - No sub type information	• Security key invalid • Controller area network data corruption • Low battery voltage	• Check for CAN network interference/engine control module related error • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Check the vehicle charging system for faults, repair as required
P0526-16	Fan Speed Sensor Circuit - Circuit voltage below threshold	NOTE: - Circuit VISCOUS FAN SPEED - • Viscous fan circuit, short circuit to ground, short circuit to power, open circuit	• Refer to the electrical circuit diagrams and check viscous fan circuit for short circuit to ground, short circuit to power, open circuit
P0526-17	Fan Speed Sensor Circuit - Circuit voltage above threshold	NOTE: - Circuit VISCOUS FAN SPEED -	• Refer to the electrical circuit diagrams and check viscous fan circuit for short circuit to ground, short circuit to power, open circuit

		Viscous fan circuit, short circuit to ground, short circuit to power, open circuit	
P052A-00	Cold Start Intake (A) Camshaft Position Timing Over-Advanced (Bank 1) - No sub type information	 NOTE: - Circuit CAM_IN_SENSOR_A - • Engine oil pressure too low • Intake valve solenoid 1 circuit short circuit to ground, open circuit, high resistance • Intake valve solenoid 1 failure • Timing chains stretched beyond allowable limits	• Check engine oil level and top up as required • Refer to the electrical circuit diagrams and check intake valve solenoid 1 sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new intake valve solenoid 1 sensor as required • Check service history /mileage • Check and install new timing chains as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P052B-00	Cold Start Intake (A) Camshaft Position Timing Over-Retarded (Bank 1) - No sub type information	 NOTE: - Circuit CAM_IN_SENSOR_A - • Engine oil pressure too low • Intake valve solenoid 1 circuit short circuit to ground, open circuit, high resistance • Intake valve solenoid 1 failure • Timing chains stretched beyond allowable limits	• Check engine oil level and top up as required • Refer to the electrical circuit diagrams and check intake valve solenoid 1 sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new intake valve solenoid 1 sensor as required • Check service history /mileage • Check and install new timing chains as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P052C-00	Cold Start Intake (A) Camshaft Position Timing Over-Advanced (Bank 2) - No sub type information	 NOTE: - Circuit CAM_IN_SENSOR_B - • Engine oil pressure too low • Intake valve solenoid 2 circuit short circuit to ground, open circuit, high resistance • Intake valve solenoid 2 failure • Timing chains stretched beyond allowable limits	• Check engine oil level and top up as required • Refer to the electrical circuit diagrams and check intake valve solenoid 2 sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new intake valve solenoid 2 sensor as required • Check service history /mileage • Check and install new timing chains as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P052D-00	Cold Start Intake (A) Camshaft Position Timing Over-Retarded (Bank 2) - No sub type information	 NOTE: - Circuit CAM_IN_SENSOR_B - • Engine oil pressure too low • Intake valve solenoid 2 circuit short circuit to ground, open circuit, high resistance • Intake valve solenoid 2 failure • Timing chains stretched beyond allowable limits	• Check engine oil level and top up as required • Refer to the electrical circuit diagrams and check intake valve solenoid 2 sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new intake valve solenoid 2 sensor as required • Check service history /mileage • Check and install new timing chains as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is

			in operation, prior to the installation of a new module/component
P054A-00	Cold Start Exhaust (B) Camshaft Position Timing Over-Advanced (Bank 1) - No sub type information	 NOTE: - Circuit CAM_EX_SENSOR_A - • Engine oil pressure too low • Exhaust valve solenoid 1 circuit short circuit to ground, open circuit, high resistance • Exhaust valve solenoid 1 failure • Timing chains stretched beyond allowable limits	• Check engine oil level and top up as required • Refer to the electrical circuit diagrams and check exhaust valve solenoid 1 sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new exhaust valve solenoid 1 sensor as required • Check service history /mileage • Check and install new timing chains as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P054B-00	Cold Start Exhaust (B) Camshaft Position Timing Over-Retarded (Bank 1) - No sub type information	 NOTE: - Circuit CAM_EX_SENSOR_A - • Engine oil pressure too low • Exhaust valve solenoid 1 circuit short circuit to ground, open circuit, high resistance • Exhaust valve solenoid 1 failure • Timing chains stretched beyond allowable limits	• Check engine oil level and top up as required • Refer to the electrical circuit diagrams and check exhaust valve solenoid 1 sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new exhaust valve solenoid 1 sensor as required • Check service history /mileage • Check and install new timing chains as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P054C-00	Cold Start Exhaust (B) Camshaft Position Timing Over-Advanced (Bank 2) - No sub type information	 NOTE: - Circuit CAM_EX_SENSOR_B - • Engine oil pressure too low • Exhaust valve solenoid 2 circuit short circuit to ground, open circuit, high resistance • Exhaust valve solenoid 2 failure • Timing chains stretched beyond allowable limits	• Check engine oil level and top up as required • Refer to the electrical circuit diagrams and check exhaust valve solenoid 2 sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new exhaust valve solenoid 2 sensor as required • Check service history /mileage • Check and install new timing chains as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P054D-00	Cold Start Exhaust (B) Camshaft Position Timing Over-Retarded (Bank 2) - No sub type information	 NOTE: - Circuit CAM_EX_SENSOR_B - • Engine oil pressure too low • Exhaust valve solenoid 2 circuit short circuit to ground, open circuit, high resistance • Exhaust valve solenoid 2 failure • Timing chains stretched beyond allowable limits	• Check engine oil level and top up as required • Refer to the electrical circuit diagrams and check exhaust valve solenoid 2 sensor circuit for short circuit to ground, open circuit, high resistance • Check and install a new exhaust valve solenoid 2 sensor as required • Check service history /mileage • Check and install new timing chains as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is

			in operation, prior to the installation of a new module/component
P0560-13	System Voltage - Circuit open	 NOTE: - Circuit BATTERY - • Engine control module power supply circuit, open circuit • Engine control module battery monitor disconnected	• Refer to the electrical circuit diagrams and check engine control module power supply circuit for open circuit • Refer to the electrical circuit diagrams and check engine control module battery monitor circuit for open circuit
P0562-00	System Voltage Low - No sub type information	 NOTE: - Circuit BATTERY - • Battery circuit high resistance • Generator circuit open circuit, high resistance • Generator failure	• Refer to the electrical circuit diagrams and check battery circuit for high resistance • Refer to the electrical circuit diagrams and check generator circuit for open circuit, high resistance • Check and install a new generator as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0563-00	System Voltage High - No sub type information	 NOTE: - Circuit BATTERY - • Battery circuit high resistance • Generator over charging	• Refer to the electrical circuit diagrams and check battery circuit for high resistance • Check and install a new generator as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0572-17	Brake Switch A Circuit Low - Circuit voltage above threshold	 NOTE: - Circuit BRAKE_SW - • Brake switch 2 sense circuit short circuit to ground • Brake switch incorrectly installed/adjusted • Customer is driving with foot resting on brake pedal • Brake switch 2 failure	• Refer to the electrical circuit diagrams and check brake switch 2 circuit for short circuit to ground • Check brake switch is correctly installed and adjusted • Ensure customer is not driving with foot resting on brake pedal • Check and install a new brake switch as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0573-16	Brake Switch A Circuit High - Circuit voltage below threshold	 NOTE: - Circuit BRAKE_SW - • Brake switch 1 sense circuit short circuit to ground • Brake switch 2 sense circuit open circuit • Brake switch incorrectly installed/adjusted • Customer is driving with foot resting on brake pedal • Brake switch 2 failure	• Refer to the electrical circuit diagrams and check brake switch 1 circuit for open circuit • Refer to the electrical circuit diagrams and check brake switch 2 circuit for open circuit • Check brake switch is correctly installed and adjusted • Ensure customer is not driving with foot resting on brake pedal • Check and install a new brake switch as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0578-00	Cruise Control Multi-Function Input A Circuit Stuck - No sub type information	• Speed control circuit, output signal stuck • Speed control switch stuck	• Refer to the electrical circuit diagrams and check speed control switch circuit for short circuit to ground • Check for stuck speed control switch, install a new switch pack as required. Refer to the warranty policy and procedures manual, or determine if any prior approval

			programme is in operation, prior to the installation of a new module/component
P057B-87	Brake Pedal Position Sensor Circuit Range/Performance - Missing message	• Brake pressure signal missing from anti-lock braking system control module	• Check the anti-lock braking system control module for related DTCs and refer to the relevant DTC index
P0590-00	Cruise Control Multi-Function Input B Circuit Stuck - No sub type information	• Active speed limiter switch stuck	• Check for active speed limiter DTCs within gear shift module • Check and install a new gear shift module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0600-49	Serial Communication Link - Internal electronic failure	• Corrupt engine control module software • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0601-43	Internal Control Module Memory Check Sum Error - Special memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0601-45	Internal Control Module Memory Check Sum Error - Program memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0604-42	Internal Control Module Random Access Memory (RAM) Error - General memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module

		through water ingress	• Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0604-43	Internal Control Module Random Access Memory (RAM) Error - Special memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0604-44	Internal Control Module Random Access Memory (RAM) Error - Data memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0605-00	Internal Control Module Read Only Memory (ROM) Error - No sub type information	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0605-29	Internal Control Module Read Only Memory (ROM) Error - Signal invalid	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for

			signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0605-42	Internal Control Module Read Only Memory (ROM) Error - General memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0605-44	Internal Control Module Read Only Memory (ROM) Error - Data memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0605-46	Internal Control Module Read Only Memory (ROM) Error - Calibration / parameter memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0605-48	Internal Control Module Read Only Memory (ROM) Error - Supervision software failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and

			procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0605-64	Internal Control Module Read Only Memory (ROM) Error - Signal plausibility failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-01	Control Module Processor - General electrical failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-04	Control Module Processor - System internal failures	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-05	Control Module Processor - System programming failures	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new

			module/component
P0606-41	Control Module Processor - General checksum failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-42	Control Module Processor - General memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-43	Control Module Processor - Special memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-44	Control Module Processor - Data memory failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-47	Control Module Processor - Watchdog / safety micro controller failure	• Corrupt engine control module software flash • Engine control module power	• Using the manufacturer approved diagnostic system check and install latest relevant level of

		supply fault • Engine control module damage through water ingress	software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-48	Control Module Processor - Supervision software failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-49	Control Module Processor - Internal electronic failure	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0607-00	Control Module Performance - No sub type information	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0610-43	Control Module Vehicle Options Error - Special memory failure	• Corrupt engine control module software flash • Corrupt rear junction box software flash • Corrupt central junction box software flash	• Clear the DTC and re-test • Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Re-configure the rear junction box

			using the manufacturer approved diagnostic system • Re-configure the central junction box using the manufacturer approved diagnostic system
P0615-13	Starter Relay Circuit - Circuit open	 NOTE: - Circuit STARTER_RELAY_NEG - • Starter relay control circuit open circuit • Starter relay failure	• Refer to the electrical circuit diagrams and check starter relay control circuit for open circuit • Check and install a new starter relay as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0616-11	Starter Relay Circuit Low - Circuit short to ground	 NOTE: - Circuit STARTER_RELAY_NEG - • Starter relay control circuit short circuit to ground • Starter relay failure	• Refer to the electrical circuit diagrams and check starter relay control circuit for short circuit to ground • Check and install a new starter relay as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0617-12	Starter Relay Circuit High - Circuit short to battery	 NOTE: - Circuit STARTER_RELAY_NEG - • Starter relay control circuit short circuit to power • Starter relay failure	• Refer to the electrical circuit diagrams and check starter relay control circuit for short circuit to power • Check and install a new starter relay as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P061A-00	Internal Control Module Torque Performance - No sub type information	• Manifold air flow sensor(s) failure • Electronic throttle unit failure	• Check for related DTCs • Check manifold air flow sensors are reading correctly • Check and install a new manifold air flow sensor(s) as required • Check throttle position sensors are reading the same position • Check throttle body is clear of any deposits • Check and install a new electronic throttle unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P061A-04	Internal Control Module Torque Performance - System internal failures	• Manifold air flow sensor(s) failure • Electronic throttle unit failure	• Check for related DTCs • Check manifold air flow sensors are reading correctly • Check and install a new manifold air flow sensor(s) as required • Check throttle position sensors are reading the same position • Check throttle body is clear of any deposits • Check and install a new electronic throttle unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P061A-29	Internal Control Module Torque Performance - Signal invalid	• Intake system air leak • Manifold air flow sensor(s) failure • Throttle position sensors are	• Check for related DTCs • Check intake air system for leaks • Check manifold air flow sensors are reading correctly

		reading incorrectly • Electronic throttle unit failure • Atmospheric pressure sensor failure	• Check and install a new air flow sensor(s) as required • Check throttle position sensors are reading the same position • Check throttle body is clear of any deposits • Check and install a new electronic throttle unit as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P061A-64	Internal Control Module Torque Performance - Signal plausibility failure	• Intake system air leak • Manifold air flow sensor(s) failure	• Check for related DTCs • Check intake air system for leaks and is correctly installed • Check manifold air flow sensors are reading correctly • Check and install a new manifold air flow sensor(s) as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P061B-62	Internal Control Module Torque Calculation Performance - Signal compare failure	• Intake system air leak • Engine breather system leak • Manifold air flow sensor failure • Electronic throttle unit failure • Throttle position sensors are reading incorrectly • Atmospheric pressure sensor failure	• Check intake air system for leaks • Check engine breather system for leaks • Check throttle position sensors are reading the same position • Check and install a new manifold air flow sensor as required • Check and install a new electronic throttle unit as required • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0620-01	Generator Control Circuit - General electrical failure	NOTE: - Circuit LIN_A - • Generator B+ or battery terminal disconnected/poor connection • Charging circuit short, open circuit • Generator failure	• Check for good/clean contact at generator B+ and battery terminal connectors • Refer to the electrical circuit diagrams and check charging circuit for short circuit, open circuit • Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system • If DTC remains, check and install a new generator as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0627-00	Fuel Pump A Control Circuit / Open - No sub type information	NOTE: - Circuit HIGH_PRESS_FUEL_PUMP_CTRL_1NEG • High pressure fuel pump 1 circuit to fuel pump driver module short circuit to ground, short circuit to power, open circuit, high resistance	• Refer to the electrical circuit diagrams and check high pressure fuel pump 1 circuit for short circuit to ground, short circuit to power, open circuit, high resistance
P062A-00	Fuel Pump A Control Circuit Range/Performance - No sub type information	• Invalid fuel pump duty requested by the engine control module	• Refer to the electrical circuit diagrams and check the fuel pump driver module circuit for short circuit to ground, short circuit to power, open circuit, high

			resistance
P0630-00	VIN Not Programmed or Incompatible - ECM/PCM - No sub type information	• Car configuration file to CAN VIN mismatch • New engine control module fitted and incorrectly configured • New central junction box fitted and incorrectly configured	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module, clear DTC and re-test • Re-configure the central junction box using the manufacturer approved diagnostic system, clear DTC and re-test
P0634-22	PCM / ECM/ TCM Internal Temperature Too High - Signal amplitude > maximum	• Engine control module internal temperature too high	• Clear the DTC. With the ignition off, wait 10 minutes and re-check DTC • Check the engine control module does not have additional external covering or obstructions which may cause overheating • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0634-4B	PCM / ECM / TCM Internal Temperature A Too High - Over temperature	• Engine control module internal temperature too high	• Clear the DTC. With the ignition off, wait 10 minutes and re-check DTC • Check the engine control module does not have additional external covering or obstructions which may cause overheating • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0642-00	Sensor Reference Voltage A Circuit Low - No sub type information	 NOTE: - Circuit SENSOR_5V_SUPPLY - • Short circuit to power of a 5V output pin, either in the harness, or a connector • Internal short circuit in a faulty component	• Refer to the electrical circuit diagrams and check 5V supply circuit for short circuit to ground open circuit, high resistance, terminal damage or corrosion • Check engine control module for sensor related DTCs and refer to the relevant DTC index
P0643-00	Sensor Reference Voltage A Circuit High - No sub type information	 NOTE: - Circuit SENSOR_5V_SUPPLY - • Short circuit to ground of a 5V output pin, either in the harness, or a connector • Internal short circuit in a faulty component	• Refer to the electrical circuit diagrams and check 5V supply circuit for short circuit to power open circuit, high resistance, terminal damage or corrosion • Check engine control module for sensor related DTCs and refer to the relevant DTC index
P0657-13	Actuator Supply Voltage A Circuit / Open - Circuit open	NOTES:  Jaguar - Circuit IMTV -  LR - Circuit MANIFOLD TUNING VALVE - • Intake manifold tuning solenoid circuit, open circuit	• Refer to the electrical circuit diagrams and check intake manifold tuning solenoid circuit for open circuit
P0658-11	Actuator Supply Voltage A Circuit Low - Circuit short to ground	NOTES:  Jaguar - Circuit IMTV -	• Refer to the electrical circuit diagrams and check intake manifold tuning solenoid circuit for short circuit to ground

		 LR - Circuit MANIFOLD TUNING VALVE - • Intake manifold tuning solenoid circuit, short circuit to ground	
P0659-12	Actuator Supply Voltage A Circuit High - Circuit short to battery	NOTES:  Jaguar - Circuit IMTV -  LR - Circuit MANIFOLD TUNING VALVE - • Intake manifold tuning solenoid circuit, short circuit to power	• Refer to the electrical circuit diagrams and check intake manifold tuning solenoid circuit for short circuit to power
P065B-16	Generator Control Circuit Range/Performance - Circuit voltage below threshold	 NOTE: - Circuit LIN_A - • Generator B+ or battery terminal disconnected/poor connection • Charging circuit short, open circuit • Generator failure • Battery failure	• Check for good/clean contact at generator B+ and battery terminal connectors • Refer to the electrical circuit diagrams and check charging circuit for short circuit, open circuit • Ensure the battery is in a fully charged and serviceable condition. Refer to the battery care manual and the relevant sections of the workshop manual • Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system. If DTC remains, check and install a new generator as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P065B-17	Generator Control Circuit Range/Performance - Circuit voltage above threshold	 NOTE: - Circuit LIN_A - • Charging circuit short circuit to power • Generator failure • Battery failure	• Check for good/clean contact at generator B+ and battery terminal connectors • Refer to the electrical circuit diagrams and check charging circuit for short circuit, open circuit • Ensure the battery is in a fully charged and serviceable condition. Refer to the battery care manual and the relevant sections of the workshop manual • Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system. If DTC remains, check and install a new generator as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P065C-00	Generator Mechanical Performance - No sub type information	 NOTE: - Circuit LIN_A - • Poor front end accessory belt tension • Generator pulley loose/failure • Generator failure	• Check front end accessory belt for condition/contamination and correct tension • Check generator pulley for failure • Clear DTC and repeat automated diagnostic procedure using manufacturer approved diagnostic system • If DTC remains check and install a new generator as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is

			in operation, prior to the installation of a new module/component
P0660-13	Intake Manifold Tuning Valve Control Circuit Low - Bank 1 - Circuit open	NOTES:  - Circuit IMTV -  LR - Circuit MANIFOLD TUNING VALVE - • Intake manifold tuning valve circuit open circuit	• Refer to the electrical circuit diagrams and check intake manifold tuning valve circuit for open circuit
P0661-11	Intake Manifold Tuning Valve Control Circuit Low - Bank 1 - Circuit short to ground	NOTES:  - Circuit IMTV -  LR - Circuit MANIFOLD TUNING VALVE - • Intake manifold tuning valve circuit short circuit to ground	• Refer to the electrical circuit diagrams and check intake manifold tuning valve circuit for short circuit to ground
P0662-12	Intake Manifold Tuning Valve Control Circuit Low - Bank 1 - Circuit short to battery	NOTES:  - Circuit IMTV -  LR - Circuit MANIFOLD TUNING VALVE - • Intake manifold tuning valve circuit short circuit to power	• Refer to the electrical circuit diagrams and check manifold tuning valve circuit for short circuit to power
P0668-00	PCM / ECM / TCM Internal Temperature Sensor A Circuit Low - No sub type information	• Engine control module internal temperature sensor failure	• Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0669-00	PCM / ECM / TCM Internal Temperature Sensor A Circuit High - No sub type information	• Engine control module internal temperature sensor failure	• Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0687-73	ECM/PCM Power Relay Control Circuit High - Actuator stuck closed	 NOTE: - Circuit EMS_MAIN_RLY - • Engine control module relay circuit short circuit to power • Engine control module relay failure	• Refer to the electrical circuit diagrams and check engine control module relay circuit for short circuit to power • Check and install a new engine control module relay as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0691-11	Fan 1 Control Circuit Low - Circuit short to ground	 NOTE: LR - Circuit VISCOUS FAN CTRL - • Viscous fan circuit, short circuit to ground • Viscous fan control module failure	• Refer to the electrical circuit diagrams and check viscous fan circuit for short circuit to ground • Check and install a new viscous fan as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation

			of a new module/component
P0692-12	Fan 1 Control Circuit High - Circuit short to battery	 NOTE: LR - Circuit VISCOUS FAN CTRL - • Viscous fan circuit, short circuit to power • Viscous fan control module failure	• Refer to the electrical circuit diagrams and check viscous fan circuit for short circuit to power • Check and install a new viscous fan as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0721-85	Output Shaft Speed Sensor Circuit Range/Performance - Signal above allowable range	• Transmission control module has reported a fault in the shaft speed signal	• Check transmission control module for related DTCs and refer to relevant DTC index
P0721-86	Output Shaft Speed Sensor Circuit Range/Performance - Signal invalid	• Transmission control module has taken to 8 seconds or longer to change range	• Check transmission control module for related DTCs and refer to relevant DTC index
P0724-17	Brake Switch B Circuit High - Circuit voltage above threshold	 NOTE: - Circuit BRAKE_SW - • Brake switch 1 sense circuit short circuit to power • Brake switch incorrectly installed/adjusted • Customer is driving with foot resting on brake pedal • Brake switch 1 failure	• Refer to the electrical circuit diagrams and check brake switch 1 circuit for short circuit to power • Check brake switch is correctly installed and adjusted • Ensure customer is not driving with foot resting on brake pedal • Check and install a new brake switch as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0850-86	Park / Neutral Switch Input Circuit - Signal invalid	 NOTE: - Circuit PN_SW - • Intermittent fault on Park/Neutral signal from gear shift module • CAN network failure between gear shift module and engine control module	• Check gear shift module for related DTCs and refer to relevant DTC index • Refer to the electrical circuit diagrams and check Park/Neutral switch input circuit for short circuit to ground, short circuit to power, open circuit • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
P0850-8F	Park / Neutral Switch Input Circuit - Erratic	 NOTE: - Circuit PN_SW - • Intermittent fault on Park/Neutral signal from gear shift module • CAN network failure between gear shift module and engine control module	• Check gear shift module for related DTCs and refer to relevant DTC index • Refer to the electrical circuit diagrams and check Park/Neutral switch input circuit for short circuit to ground, short circuit to power, open circuit • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
P0851-14	Park / Neutral Switch Input Circuit Low - Circuit short to ground or open	 NOTE: - Circuit PN_SW - • Park/Neutral switch input circuit short circuit to ground, open circuit	• Refer to the electrical circuit diagrams and check park/neutral switch input circuit for short circuit to ground, open circuit
P0852-12	Park / Neutral Switch Input Circuit Low - Circuit short to battery	 NOTE: - Circuit PN_SW - • Park/Neutral switch input circuit short circuit to power	• Refer to the electrical circuit diagrams and check park/neutral switch input circuit for short circuit to power
P0A1A-87	Generator Control Module - Missing message	 NOTE: - Circuit LIN_A - • Generator to engine control module LIN circuit open circuit	• Check for good/clean contact at generator and engine control module LIN circuit connectors/pins • Refer to the electrical circuit diagrams and check generator circuit for open circuit

			• Check for engine control module hardware DTCs and refer to relevant DTC index • Clear DTCs and repeat automated diagnostic procedure using the manufacturer approved diagnostic system
P0A1A-88	Generator Control Module - Bus off	 NOTE: - Circuit LIN_A - • Generator to engine control module LIN circuit open circuit	• Check for good/clean contact at generator and engine control module LIN circuit connectors/pins • Refer to the electrical circuit diagrams and check generator circuit for open circuit • Check for engine control module hardware DTCs and refer to relevant DTC index • Clear DTCs and repeat automated diagnostic procedure using the manufacturer approved diagnostic system
P0A3B-00	Generator Over Temperature - No sub type information	• Cooling fan not operating • Coolant level low	• Check for correct cooling fan operation • Check coolant level. Clear DTC and re-test
P0A3B-68	Generator Over Temperature - Event information	• Cooling fan not operating • Coolant level low	• Check for correct cooling fan operation • Check coolant level. Clear DTC and re-test
P115D-00	Mass Air Flow Circuit Offset - No sub type information	 NOTE: - Circuit MAF_SENSOR_A - MAF_SENSOR_B - •  NOTE: Customer likely to report hesitation. Air cleaner blocked • Air intake leak • Engine breather blocked • Air intake blockage • Carbon build up on throttle blade • Mass air flow sensor circuit, high resistance • Blocked catalyst(s) • Mass air flow sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Mass Air Flow Sensor 2 Voltage (0x0503) • Check air cleaner for blockage • Check air intake system for leaks • Check engine breather system for blockages • Check for carbon build up on throttle blade • Check for related mass air flow DTCs P0102 or P0103 • Refer to the electrical circuit diagrams and check mass air flow sensor circuit for high resistance • Check and install a new mass air flow sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P1315-00	Persistent Misfire - No sub type information	• Engine control module to ignition coil primary circuit fault (cylinder misfire detected DTC also flagged) • Fuel injector circuit fault(s) (injector DTCs also flagged) • Fuel delivery pressure low • Spark plug failure/fouled/incorrect gap • Ignition coil failure • Cylinder compression low • Exhaust system blockage	• Check for cylinder mis-fire, ignition and injector DTCs and refer to the DTC index • Refer to the electrical circuit diagrams and check ignition coil circuit for short circuit to ground, short circuit to power, open circuit • Check for fuel system failure • Check and install a new spark plug(s) as required • Check and install a new ignition coil as required • Carry out cylinder compression tests • Check exhaust system for blockage • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P1316-00	Injector Driver Module Codes Detected - No sub	• Engine control module to ignition coil primary circuit	• Check for cylinder mis-fire, ignition and injector DTCs and

	type information	fault (cylinder misfire detected DTC also flagged) • Fuel injector circuit fault(s) (injector DTCs also flagged) • Fuel delivery pressure low • Spark plug failure/fouled/incorrect gap • Ignition coil failure • Cylinder compression low • Exhaust system blockage	refer to the DTC index • Refer to the electrical circuit diagrams and check ignition coil circuit for short circuit to ground, short circuit to power, open circuit • Check for fuel system failure • Check and install a new spark plug(s) as required • Check and install a new ignition coil as required • Carry out cylinder compression tests • Check exhaust system for blockage • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P1593-64	Cruise Control Monitor Fault - Signal plausibility failure	• Speed control monitor fault. The engine control module performs a independent check of the cruise status	• Using the manufacturer approved diagnostic system check and up-date the car configuration file as required. Clear the DTC and retest. If the problem persists, contact dealer technical support
P1603-00	EEPROM Malfunction - No sub type information	• Corrupt engine control module software flash • Engine control module power supply fault • Engine control module damage through water ingress	• Using the manufacturer approved diagnostic system check and install latest relevant level of software to the engine control module • Refer to the electrical circuit diagrams and check engine control module power supply circuit for open circuit • Check engine control module for signs of water ingress • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2088-11	A Camshaft Position Actuator Control Circuit Low Bank 1 - Circuit short to ground	 NOTE: - Circuit VFS_IN_A - • Intake valve solenoid 1 short circuit to ground	• Refer to the electrical circuit diagrams and check intake valve solenoid 1 for short circuit to ground
P2089-12	A Camshaft Position Actuator Control Circuit High Bank 1 - Circuit short to battery	 NOTE: - Circuit VFS_IN_A - • Intake valve solenoid 1 short circuit to power	• Refer to the electrical circuit diagrams and check intake valve solenoid 1 for short circuit to power
P2090-11	B Camshaft Position Actuator Control Circuit Low Bank 1 - Circuit short to ground	 NOTE: - Circuit VFS_EX_A - • Exhaust valve solenoid 1 short circuit to ground	• Refer to the electrical circuit diagrams and check exhaust valve solenoid 1 for short circuit to ground
P2091-12	B Camshaft Position Actuator Control Circuit High Bank 1 - Circuit short to battery	 NOTE: - Circuit VFS_EX_A - • Exhaust valve solenoid 1 short circuit to power	• Refer to the electrical circuit diagrams and check exhaust valve solenoid 1 for short circuit to power
P2092-11	A Camshaft Position Actuator Control Circuit Low Bank 2 - Circuit short to ground	 NOTE: - Circuit VFS_IN_B - • Intake valve solenoid 2 short circuit to ground	• Refer to the electrical circuit diagrams and check intake valve solenoid 2 for short circuit to ground
P2093-12	A Camshaft Position Actuator Control Circuit	 NOTE: - Circuit VFS_IN_B -	• Refer to the electrical circuit diagrams and check intake valve

	High Bank 2 - Circuit short to battery	• Intake valve solenoid 2 short circuit to power	solenoid 2 for short circuit to power
P2094-11	B Camshaft Position Actuator Control Circuit Low Bank 2 - Circuit short to ground	NOTE: - Circuit VFS_EX_B - • Exhaust valve solenoid 2 short circuit to ground	• Refer to the electrical circuit diagrams and check exhaust valve solenoid 2 for short circuit to ground
P2095-12	B Camshaft Position Actuator Control Circuit High Bank 2 - Circuit short to battery	NOTE: - Circuit VFS_EX_B - • Exhaust valve solenoid 2 short circuit to power	• Refer to the electrical circuit diagrams and check exhaust valve solenoid 2 for short circuit to power
P2096-00	Post Catalyst Fuel Trim System Too Lean Bank 1 - No sub type information	NOTE: - Circuit HEGO_SENSOR_A - • Post catalyst oxygen sensor odd, sensing circuit short circuit to ground, high resistance, open circuit • Air leak between catalyst and exhaust manifold • Air leak between the two oxygen sensors • Post catalyst oxygen sensor odd, failure	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - odd, sensing circuit for short circuit to ground, high resistance, open circuit • Check for air leak between catalyst and exhaust manifold • Check for air leak between the two oxygen sensors • Check and install new post catalyst oxygen sensor odd, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2097-00	Post Catalyst Fuel Trim System Too Rich Bank 1 - No sub type information	NOTE: - Circuit HEGO_SENSOR_A - • Post catalyst oxygen sensor odd, sensing circuit short circuit to ground, high resistance, open circuit • Air leak between catalyst and exhaust manifold • Air leak between the two oxygen sensors • Post catalyst oxygen sensor odd, failure	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor - odd, sensing circuit for short circuit to ground, high resistance, open circuit • Check for air leak between catalyst and exhaust manifold • Check for air leak between the two oxygen sensors • Check and install new post catalyst oxygen sensor odd, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2098-00	Post Catalyst Fuel Trim System Too Lean Bank 2 - No sub type information	NOTE: - Circuit HEGO_SENSOR_B - • Post catalyst oxygen sensor even, sensing circuit short circuit to ground, high resistance, open circuit • Air leak between catalyst and exhaust manifold • Air leak between the two oxygen sensors • Post catalyst oxygen sensor even, failure	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor even, sensing circuit for short circuit to ground, high resistance, open circuit • Check for air leak between catalyst and exhaust manifold • Check for air leak between the two oxygen sensors • Check and install new post catalyst oxygen sensor even, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2099-00	Post Catalyst Fuel Trim System Too Rich Bank 2 - No sub type information	NOTE: - Circuit HEGO_SENSOR_B - • Post catalyst oxygen sensor even, sensing circuit short circuit to ground, high resistance, open circuit • Air leak between catalyst and exhaust manifold	• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor even, sensing circuit for short circuit to ground, high resistance, open circuit • Check for air leak between catalyst and exhaust manifold • Check for air leak between the two oxygen sensors • Check and install new post

		Air leak between the two oxygen sensors • Post catalyst oxygen sensor even, failure	catalyst oxygen sensor even, as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2105-00	Throttle Actuator Control System - Forced Engine Shutdown - No sub type information	 NOTE: - Circuit THROTTLE_MOTOR_NEG - THROTTLE_MOTOR_POS - • Engine speed or torque limitation has been activated as a result of engine control module, throttle pedal position sensor, or torque faults	• Check for any DTCs relating to engine control module, throttle pedal position sensor, or torque faults and refer to the DTC index
P2118-19	Throttle Actuator Control Motor Current Range/Performance - Circuit current above threshold	 NOTE: - Circuit THROTTLE_MOTOR_NEG - THROTTLE_MOTOR_POS - • Throttle motor control circuit short circuit to ground, short circuit to power, high resistance • Engine control module ground circuit fault • Carbon build-up on throttle blade • Electronic throttle unit failure	• Refer to the electrical circuit diagrams and check electronic throttle unit circuit for short circuit to ground, short circuit to power, high resistance • Refer to the electrical circuit diagrams and check engine control module ground circuit for faults • Make sure throttle blade is clean of carbon • Check the system is operating correctly and the DTC does not return • Check and install a new electronic throttle unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2119-00	Throttle Actuator Control Throttle Body Range/Performance - No sub type information	 NOTE: - Circuit THROTTLE_MOTOR_NEG - THROTTLE_MOTOR_POS - • Carbon build-up on throttle blade • Engine control module ground circuit fault • Electronic throttle unit return spring faulty • Electronic throttle unit limp home spring faulty	• Make sure throttle blade is clean of carbon • Refer to the electrical circuit diagrams and check engine control module ground circuit for faults • Check the system is operating correctly and the DTC does not return • Check and install a new electronic throttle unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2119-29	Throttle Actuator Control Throttle Body Range/Performance - Signal invalid	 NOTE: - Circuit THROTTLE_MOTOR_NEG - THROTTLE_MOTOR_POS - • Stuck / sticking throttle blade • Electronic throttle unit failure	• Ensure throttle blade is free of any carbon build-up / other obstructions • Check the system is operating correctly and the DTC does not return • Check and install a new electronic throttle unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2119-64	Throttle Actuator Control Throttle Body Range/Performance - Signal plausibility failure	 NOTE: - Circuit THROTTLE_MOTOR_NEG - THROTTLE_MOTOR_POS - • Stuck / sticking throttle blade • Electronic throttle unit failure	• Ensure throttle blade is free of any carbon build-up / other obstructions • Check the system is operating correctly and the DTC does not return • Check and install a new electronic

			throttle unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2122-00	Throttle/Pedal Position Sensor/Switch D Circuit Low - No sub type information	 NOTE: - Circuit THROTTLE_POSITION_SENSOR_1 - • Accelerator pedal position sensor 1 circuit short circuit to ground, open circuit • Accelerator pedal position sensor 1, VREF circuit open circuit • Accelerator pedal position sensor 1 failure	• Refer to the electrical circuit diagrams and check accelerator pedal unit, accelerator pedal position sensor 1 circuit for short circuit to ground, open circuit • Check accelerator pedal unit, VREF circuit for open circuit • Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system • If DTC remains, check and install a new accelerator pedal unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2123-00	Throttle/Pedal Position Sensor/Switch D Circuit High - No sub type information	 NOTE: - Circuit THROTTLE_POSITION_SENSOR_1 - • Accelerator pedal position sensor 1 circuit short circuit to power • Accelerator pedal position sensor 1, VREF circuit open circuit • Accelerator pedal position sensor 1 failure	• Refer to the electrical circuit diagrams and check accelerator pedal unit, accelerator pedal position sensor 1 circuit for short circuit to power • Check accelerator pedal unit, VREF circuit for open circuit • Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system • If DTC remains, check and install a new accelerator pedal unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2127-00	Throttle/Pedal Position Sensor/Switch E Circuit Low - No sub type information	 NOTE: - Circuit THROTTLE_POSITION_SENSOR_2 - • Accelerator pedal position sensor 2 circuit short circuit to ground, open circuit • Accelerator pedal position sensor 2, VREF circuit open circuit • Accelerator pedal position sensor 2 failure	• Refer to the electrical circuit diagrams and check accelerator pedal unit, accelerator pedal position sensor 2 circuit for short circuit to ground, open circuit • Check accelerator pedal unit, VREF circuit for open circuit • Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system • If DTC remains, check and install a new accelerator pedal unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2128-00	Throttle/Pedal Position Sensor/Switch E Circuit High - No sub type information	 NOTE: - Circuit THROTTLE_POSITION_SENSOR_2 - • Accelerator pedal position sensor 2 circuit short circuit to power • Accelerator pedal position sensor 2, VREF circuit open circuit • Accelerator pedal position sensor 2 failure	• Refer to the electrical circuit diagrams and check accelerator pedal unit, accelerator pedal position sensor 2 circuit for short circuit to power • Check accelerator pedal unit, VREF circuit for open circuit • Clear DTC and repeat automated diagnostic procedure using the manufacturer approved diagnostic system • If DTC remains, check and install

			a new accelerator pedal unit as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2135-00	Throttle/Pedal Position Sensor/Switch A / B Voltage Correlation - No sub type information	• Throttle pedal position sensor circuit 1 and 2 short circuit to ground, short circuit to power, open circuit	Refer to the electrical circuit diagrams and check throttle pedal position sensor circuit 1 and 2 for short circuit to ground, short circuit to power, open circuit
P2135-09	Throttle/Pedal Position Sensor/Switch A / B Voltage Correlation - Component Failures	• Throttle pedal position sensor circuit 1 and 2 short circuit to ground, short circuit to power, open circuit	Refer to the electrical circuit diagrams and check throttle pedal position sensor circuit 1 and 2 for short circuit to ground, short circuit to power, open circuit
P2138-64	Throttle/Pedal Position Sensor/Switch D / E Voltage Correlation - No sub type information	• Accelerator pedal position sensor circuit 1 and 2 short circuit to ground, short circuit to power, open circuit	Refer to the electrical circuit diagrams and check accelerator pedal position sensor circuit 1 and 2 for short circuit to ground, short circuit to power, open circuit
P2169-13	Exhaust Pressure Regulator Vent Solenoid Control Circuit / Open - Circuit open	NOTE: Jaguar - Circuit ACTIVE_EXT_VALVE - • Active exhaust solenoid valve circuit open circuit	• Refer to the electrical circuit diagrams and check active exhaust solenoid valve circuit for open circuit
P2170-11	Exhaust Pressure Regulator Vent Solenoid Control Circuit Low - Circuit short to ground	NOTE: Jaguar - Circuit ACTIVE_EXT_VALVE - • Active exhaust solenoid valve circuit short circuit to ground	• Refer to the electrical circuit diagrams and check active exhaust solenoid valve circuit for short circuit to ground
P2171-12	Exhaust Pressure Regulator Vent Solenoid Control Circuit high - Circuit short to battery	NOTE: Jaguar - Circuit ACTIVE_EXT_VALVE - • Active exhaust solenoid valve circuit short circuit to power	• Refer to the electrical circuit diagrams and check active exhaust solenoid valve circuit for short circuit to power
P2183-23	Engine Coolant Temperature Sensor 2 Circuit Range/Performance - Signal stuck low	NOTE: - Circuit COOLANT_TEMP_SENSOR_2 - • Engine coolant temperature sensor 2 circuit high resistance, open circuit • Engine coolant temperature sensor 2 failure	• Refer to the electrical circuit diagrams and check engine coolant temperature sensor 2 circuit for high resistance, open circuit • Check and install a new engine coolant temperature sensor 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2183-24	Engine Coolant Temperature Sensor 2 Circuit Range/Performance - Signal stuck high	NOTE: - Circuit COOLANT_TEMP_SENSOR_2 - • Engine coolant temperature sensor 2 circuit short circuit to power • Engine coolant temperature sensor 2 failure	• Refer to the electrical circuit diagrams and check engine coolant temperature sensor 2 circuit for short circuit to power • Check and install a new engine coolant temperature sensor 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2183-29	Engine Coolant Temperature Sensor 2 Circuit Range/Performance - Signal invalid	NOTE: - Circuit COOLANT_TEMP_SENSOR_2 - • Engine coolant temperature sensor 2 circuit high resistance, open circuit, short circuit to ground, short circuit to power • Engine coolant temperature	• Refer to the electrical circuit diagrams and check engine coolant temperature sensor 2 circuit for high resistance, open circuit, short circuit to ground, short circuit to power • Check and install a new engine coolant temperature sensor 2 as required. Refer to the warranty

		sensor 2 failure	policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2184-16	Engine Coolant Temperature Sensor 2 Circuit Low - Circuit voltage below threshold	 NOTE: - Circuit COOLANT_TEMP_SENSOR_2 - • Engine coolant temperature sensor 2 circuit high resistance, open circuit, short circuit to ground • Engine coolant temperature sensor 2 failure	• Refer to the electrical circuit diagrams and check engine coolant temperature sensor 2 circuit for high resistance, open circuit, short circuit to ground • Check and install a new engine coolant temperature sensor 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2185-17	Engine Coolant Temperature Sensor 2 Circuit High - Circuit voltage above threshold	 NOTE: - Circuit COOLANT_TEMP_SENSOR_2 - • Ignition turned on with an ambient temperature of below -40c • Engine coolant temperature sensor 2 circuit short circuit to power • Engine coolant temperature sensor 2 failure	• Clear the DTC and re-test • Refer to the electrical circuit diagrams and check engine coolant temperature sensor 2 circuit for short circuit to power • Check and install a new engine coolant temperature sensor 2 as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P219A-00	Bank 1 Air-Fuel Ratio Imbalance - No sub type information	 NOTE: Post catalyst oxygen sensor-odd & Pre catalyst oxygen sensor-odd • Other oxygen sensor related DTCs • Air leak in the exhaust system between post catalyst oxygen sensor-odd and catalyst • Air leak in the exhaust system between catalyst and exhaust manifold flange • Air leak in the exhaust system between pre catalyst oxygen sensor-odd and post catalyst oxygen sensor-odd • Air leak around pre catalyst oxygen sensor-odd • Air leaks within the intake system • Air leak around fuel injector(s) bank 1 • Air leak around spark plug(s) bank 1 • Low fuel pressure, fuel injector(s) leak, fuel system leak bank 1 • camshaft position actuator sticking • Airpath blockage between throttle butterfly and inlet poppet valve • Post catalyst oxygen sensor-odd failure • Cylinder head gasket failure	• Using the manufacturer approved diagnostic system check the engine control module for oxygen sensor related DTCs and refer to the relevant DTC index. Record any available freeze frame data • Check for air leaks in the exhaust system between post catalyst oxygen sensor-odd and catalyst • Check for air leaks in the exhaust system between catalyst and exhaust manifold flange • Check for air leaks in the exhaust system between pre catalyst oxygen sensor-odd and post catalyst oxygen sensor-odd • Check for air leaks around pre catalyst oxygen sensor-odd • Check for air leaks within the intake system • Check for air leak around fuel injector(s) bank 1 • Check for air leak around spark plug(s) bank 1 • Check for low fuel pressure, fuel injector(s) leak, fuel system leak bank 1 • Check for camshaft position actuator sticking • Check for airpath blockage between throttle butterfly and inlet poppet valve • Carry out cylinder compression check. Record the results • Check and install a post catalyst oxygen sensor-odd as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component • Using the manufacturer approved diagnostic system clear DTC and retest

P219B-00	Bank 2 Air-Fuel Ratio Imbalance - No sub type information	 NOTE: Post catalyst oxygen sensor-even & Pre catalyst oxygen sensor-even • Other oxygen sensor related DTCs • Air leak in the exhaust system between post catalyst oxygen sensor-even and catalyst • Air leak in the exhaust system between catalyst and exhaust manifold flange • Air leak in the exhaust system between pre catalyst oxygen sensor-even and post catalyst oxygen sensor-even • Air leak around pre catalyst oxygen sensor-even • Air leaks within the intake system • Air leak around fuel injector(s) bank 2 • Air leak around spark plug(s) bank 2 • Low fuel pressure, fuel injector(s) leak, fuel system leak bank 2 • camshaft position actuator sticking • Airpath blockage between throttle butterfly and inlet poppet valve • Post catalyst oxygen sensor-even failure • Cylinder head gasket failure	Using the manufacturer approved diagnostic system check the engine control module for oxygen sensor related DTCs and refer to the relevant DTC index. Record any available freeze frame data • Check for air leaks in the exhaust system between post catalyst oxygen sensor-even and catalyst • Check for air leaks in the exhaust system between catalyst and exhaust manifold flange • Check for air leaks in the exhaust system between pre catalyst oxygen sensor-even and post catalyst oxygen sensor-even • Check for air leaks around pre catalyst oxygen sensor-even • Check for air leaks within the intake system • Check for air leak around fuel injector(s) bank 2 • Check for air leak around spark plug(s) bank 2 • Check for low fuel pressure, fuel injector(s) leak, fuel system leak bank 2 • Check for camshaft position actuator sticking • Check for airpath blockage between throttle butterfly and inlet poppet valve • Carry out cylinder compression check. Record the results • Check and install a post catalyst oxygen sensor-even as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component • Using the manufacturer approved diagnostic system clear DTC and retest
P2228-00	Barometric Pressure Circuit Low - No sub type information	• Barometric pressure sensor failure(internal engine control module failure)	• Using the manufacturer approved diagnostic system check datalogger signal, Barometric Pressure Sensor Voltage (0x035A) • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2229-00	Barometric Pressure Circuit Low - No sub type information	• Barometric pressure sensor failure(internal engine control module failure)	• Using the manufacturer approved diagnostic system check datalogger signal, Barometric Pressure Sensor Voltage (0x035A) • Check and install a new engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2279-00	Intake Air System Leak - No sub type information	• Part load breather pipe disconnected • Brake vacuum pipe disconnected • Excessive intake air leak	• Check for related DTCs • Check part load breather pipe for leaks or disconnected • Check brake vacuum pipe for leaks or disconnected • Check intake air system for leaks
P2300-	Ignition Coil A Primary		• Refer to the electrical circuit

11	Control Circuit Low - Circuit short to ground	NOTE: - Circuit IGNITION_1A - • Ignition coil 1 circuit short circuit to ground	diagrams and check ignition coil 1 circuit for short circuit to ground
P2301-12	Ignition Coil A Primary Control Circuit High - Circuit short to battery	NOTE: - Circuit IGNITION_1A - • Ignition coil 1 circuit short circuit to power	• Refer to the electrical circuit diagrams and check ignition coil 1 circuit for short circuit to power
P2303-11	Ignition Coil B Primary Control Circuit Low - Circuit short to ground	NOTE: - Circuit IGNITION_1B - • Ignition coil 2 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check ignition coil 2 circuit for short circuit to ground
P2304-12	Ignition Coil B Primary Control Circuit High - Circuit short to battery	NOTE: - Circuit IGNITION_1B - • Ignition coil 2 circuit short circuit to power	• Refer to the electrical circuit diagrams and check ignition coil 2 circuit for short circuit to power
P2306-11	Ignition Coil C Primary Control Circuit Low - Circuit short to ground	NOTE: - Circuit IGNITION_2A - • Ignition coil 3 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check ignition coil 3 circuit for short circuit to ground
P2307-12	Ignition Coil C Primary Control Circuit High - Circuit short to battery	NOTE: - Circuit IGNITION_2A - • Ignition coil 3 circuit short circuit to power	• Refer to the electrical circuit diagrams and check ignition coil 3 circuit for short circuit to power
P2309-11	Ignition Coil D Primary Control Circuit Low - Circuit short to ground	NOTE: - Circuit IGNITION_2B - • Ignition coil 4 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check ignition coil 4 circuit for short circuit to ground
P2310-12	Ignition Coil D Primary Control Circuit High - Circuit short to battery	NOTE: - Circuit IGNITION_2B - • Ignition coil 4 circuit short circuit to power	• Refer to the electrical circuit diagrams and check ignition coil 4 circuit for short circuit to power
P2312-11	Ignition Coil E Primary Control Circuit Low - Circuit short to ground	NOTE: - Circuit IGNITION_3A - • Ignition coil 5 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check ignition coil 5 circuit for short circuit to ground
P2313-12	Ignition Coil E Primary Control Circuit High - Circuit short to battery	NOTE: - Circuit IGNITION_3A - • Ignition coil 5 circuit short circuit to power	• Refer to the electrical circuit diagrams and check ignition coil 5 circuit for short circuit to power
P2315-11	Ignition Coil F Primary Control Circuit Low - Circuit short to ground	NOTE: - Circuit IGNITION_3B - • Ignition coil 6 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check ignition coil 6 circuit for short circuit to ground
P2316-12	Ignition Coil F Primary Control Circuit High - Circuit short to battery	NOTE: - Circuit IGNITION_3B - • Ignition coil 6 circuit short circuit to power	• Refer to the electrical circuit diagrams and check ignition coil 6 circuit for short circuit to power
P2318-11	Ignition Coil G Primary Control Circuit Low - Circuit short to ground	NOTE: - Circuit IGNITION_4A - • Ignition coil 7 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check ignition coil 7 circuit for short circuit to ground
P2319-12	Ignition Coil G Primary Control Circuit High -	NOTE: - Circuit IGNITION_4A -	• Refer to the electrical circuit diagrams and check ignition coil 7

	Circuit short to battery	• Ignition coil 7 circuit short circuit to power	circuit for short circuit to power
P2321-11	Ignition Coil H Primary Control Circuit Low - Circuit short to ground	NOTE: - Circuit IGNITION_4B - • Ignition coil 8 circuit short circuit to ground	• Refer to the electrical circuit diagrams and check ignition coil 8 circuit for short circuit to ground
P2322-12	Ignition Coil H Primary Control Circuit High - Circuit short to battery	NOTE: - Circuit IGNITION_4B - • Ignition coil 8 circuit short circuit to power	• Refer to the electrical circuit diagrams and check ignition coil 8 circuit for short circuit to power
P2401-00	Evaporative Emission System Leak Detection Pump Control Circuit Low - No sub type information	NOTE: - Circuit FUEL_LEAK_PUMP - • Diagnostic module tank leakage fuse failure • Diagnostic module tank leakage circuit short circuit to ground, open circuit • Diagnostic module tank leakage failure	• Check diagnostic module tank leakage fuse for failure and security in holder • Refer to the electrical circuit diagrams and check diagnostic module tank leakage circuit for short circuit to ground, open circuit • Check and install a new diagnostic module tank leakage as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2402-00	Evaporative Emission System Leak Detection Pump Control Circuit High - No sub type information	NOTE: - Circuit FUEL_LEAK_PUMP - • Diagnostic module tank leakage circuit short circuit to power • Diagnostic module tank leakage failure	• Refer to the electrical circuit diagrams and check diagnostic module tank leakage circuit for short circuit to power • Check and install a new diagnostic module tank leakage as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2404-29	Evaporative Emission System Leak Detection Pump Sense Circuit Range/Performance - Signal invalid	NOTE: - Circuit FUEL_LEAK_PUMP - • Diagnostic module tank leakage failure	• Check and install a new diagnostic module tank leakage as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2404-2F	Evaporative Emission System Leak Detection Pump Sense Circuit Range/Performance - Signal erratic	NOTE: - Circuit FUEL_LEAK_PUMP - • Diagnostic module tank leakage failure	• Check and install a new diagnostic module tank leakage as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2405-00	Evaporative Emission System Leak Detection Pump Sense Circuit Low - No sub type information	NOTE: - Circuit FUEL_LEAK_PUMP - • Diagnostic module tank leakage circuit short circuit to ground, high resistance, open circuit • Diagnostic module tank leakage failure	• Refer to the electrical circuit diagrams and check diagnostic module tank leakage circuit for short circuit to ground, high resistance, open circuit • Check and install a new diagnostic module tank leakage as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2406-00	Evaporative Emission System Leak Detection Pump Sense Circuit High -	NOTE: - Circuit	• Check for blockage in the Blockage in diagnostic module tank leakage ventilation pipe

	No sub type information	FUEL_LEAK_PUMP - • Blockage in diagnostic module tank leakage ventilation pipe • Diagnostic module tank leakage circuit, open circuit	• Check and install a new diagnostic module tank leakage as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P240A-00	Evaporative Emission System Leak Detection Pump Heater Circuit / Open - No sub type information	 NOTE: - Circuit PUMP_HEATER_CONTROL - • Diagnostic module tank leakage circuit, open circuit	• Refer to the electrical circuit diagrams and check diagnostic module tank leakage heater circuit for open circuit
P240B-00	Evaporative Emission System Leak Detection Pump Heater Circuit Low - No sub type information	 NOTE: - Circuit PUMP_HEATER_CONTROL - • Diagnostic module tank leakage heater circuit short circuit to ground, high resistance	• Refer to the electrical circuit diagrams and check diagnostic module tank leakage heater circuit for short circuit to ground, high resistance
P240C-00	Evaporative Emission System Leak Detection Pump Heater Circuit High - No sub type information	 NOTE: - Circuit PUMP_HEATER_CONTROL - • Diagnostic module tank leakage heater circuit short circuit to power	• Refer to the electrical circuit diagrams and check diagnostic module tank leakage heater circuit for short circuit to power
P2450-00	Evaporative Emission Control System Switching Valve Performance/Stuck Open - No sub type information	NOTES:  - Circuit COV -  LR - Circuit CHANGE OVER VALVE - • Diagnostic module tank leakage failure	• Check and install a new diagnostic module tank leakage as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2451-00	Evaporative Emission Control System Switching Valve Performance/Stuck Closed - No sub type information	NOTES:  - Circuit COV -  LR - Circuit CHANGE OVER VALVE - • Diagnostic module tank leakage failure	• Check and install a new diagnostic module tank leakage as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P250C-23	Engine Oil Level Sensor Circuit Low - Signal stuck low	 NOTE: - Circuit OIL_QUALITY_SENSOR - • Oil temperature level sensor circuit short circuit to ground • Oil temperature level sensor failure	• Using the manufacturer approved diagnostic system check datalogger signal, Sump Oil Temperature - Measured (0x03F3) • Refer to the electrical circuit diagrams and check oil temperature level sensor circuit for short circuit to ground • Check and install a new oil temperature level sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P250D-24	Engine Oil Level Sensor Circuit High - Signal stuck high	 NOTE: - Circuit OIL_QUALITY_SENSOR - • Oil temperature level sensor	• Using the manufacturer approved diagnostic system check datalogger signal, Sump Oil Temperature - Measured (0x03F3) • Refer to the electrical circuit

		circuit short circuit to power • Oil temperature level sensor failure	diagrams and check oil temperature level sensor circuit for short circuit to power • Check and install a new oil temperature level sensor as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2544-64	Torque Management Request Input Signal A - Signal plausibility failure	• Inappropriate request from anti-lock braking system	• Check for related DTCs within anti-lock braking system module and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
P2544-92	Torque Management Request Input Signal A - Performance or incorrect operation	• Inappropriate request from anti-lock braking system	• Check for related DTCs within anti-lock braking system module and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
P2600-13	Coolant Pump A Control Circuit / Open - Circuit open	 NOTE: XF - Circuit IC_COOLANT_PMP_CTRL - XK - Circuit INT_WATERPUMP_RLY - • Coolant pump A control circuit open circuit	• Refer to the electrical circuit diagrams and check coolant pump A control circuit for open circuit
P2601-00	Coolant Pump Control Circuit Range/Performance - No sub type information	 NOTE: XF - Circuit IC_COOLANT_PMP_CTRL - XK - Circuit INT_WATERPUMP_RLY - • Coolant level low • Blocked cooling system • Coolant pump A control circuit open circuit • Coolant pump A failure	• Check coolant level and top up as required • Check the cooling system for blockages or trapped hoses • Refer to the electrical circuit diagrams and check coolant pump A control circuit for open circuit • Check and install a new coolant pump A as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P2602-11	Coolant Pump A Control Circuit Low - Circuit short to ground	 NOTE: XF - Circuit IC_COOLANT_PMP_CTRL - XK - Circuit INT_WATERPUMP_RLY - • Coolant pump A control circuit short circuit to ground	• Refer to the electrical circuit diagrams and check coolant pump A control circuit for short circuit to ground
P2603-12	Coolant Pump A Control Circuit High - Circuit short to battery	 NOTE: XF - Circuit IC_COOLANT_PMP_CTRL - XK - Circuit INT_WATERPUMP_RLY - • Coolant pump A control circuit short circuit to power	• Refer to the electrical circuit diagrams and check coolant pump A control circuit for short circuit to power
P2610-00	ECM/PCM Internal Engine Off Timer Performance - No sub type information	• Instrument cluster fault • Central junction box fault • CAN network error	• Check for DTCs related to any of the components listed and refer to relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
P2610-84	ECM/PCM Engine Off Timer Performance - Signal below allowable range	• Instrument cluster fault • Central junction box fault • Engine coolant temperature sensor fault • Ambient temperature sensor fault • Low battery voltage	• Check for DTCs related to any of the components listed and refer to relevant DTC index • Refer to the electrical circuit diagrams and check engine coolant temperature sensor circuit for short circuit to ground, short

		• CAN network error	circuit to power, open circuit • Refer to the electrical circuit diagrams and check ambient air temperature sensor circuit for short circuit to ground, short circuit to power, open circuit • Check the battery voltage, repair as required • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
P2610-85	ECM/PCM Engine Off Timer Performance - Signal above allowable range	• Instrument cluster fault • Central junction box fault • Engine coolant temperature sensor fault • Ambient temperature sensor fault • Low battery voltage • CAN network error	• Check for DTCs related to any of the components listed and refer to relevant DTC index • Refer to the electrical circuit diagrams and check engine coolant temperature sensor circuit for short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit diagrams and check ambient air temperature sensor circuit for short circuit to ground, short circuit to power, open circuit • Check the battery voltage, repair as required • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
P2610-87	ECM/PCM Internal Engine Off Timer Performance - Missing message	• Instrument cluster fault • Central junction box fault • Engine coolant temperature sensor fault • Ambient temperature sensor fault • CAN network error	• Check for DTCs related to any of the components listed, and refer to relevant DTC index • Refer to the electrical circuit diagrams and check engine coolant temperature sensor circuit for short circuit to ground, short circuit to power, open circuit • Refer to the electrical circuit diagrams and check ambient air temperature sensor circuit for short circuit to ground, short circuit to power, open circuit • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
P2772-64	Four Wheel Drive (4WD) Low Switch Circuit Range/Performance - Signal plausibility failure	• Missing data in the car configuration file • Vehicle speed related failure • Gearbox output shaft speed related failure	• Using the manufacturer approved diagnostic system check and up-date the car configuration file as required. Clear the diagnostic trouble code and retest • Using the manufacturer approved diagnostic system check for vehicle speed related DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system check for gearbox output shaft speed related DTCs and refer to the relevant DTC index • Clear the diagnostic trouble code and re-test
U0001-88	High Speed CAN Communication Bus - Bus off	 NOTE: - Circuit HS_CAN_NEG - HS_CAN_POS - • High speed CAN bus circuit, short circuit to ground • High speed CAN bus circuit, short circuit to power • High speed CAN bus, open circuit	• Refer to the electrical circuit diagrams and check CAN network for short circuit to ground, short circuit to power, open circuit • Using the manufacturer approved diagnostic system, carry out network integrity test
U0101-00	Lost Communication with TCM - No sub type information	• CAN link engine control module/transmission control module network malfunction • Transmission control module	• Using the manufacturer approved diagnostic system, check transmission control module for DTCs and refer to the relevant

		failure	DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check transmission control module power and ground circuit for open circuit • Check CAN harness to transmission control module, repair as necessary
U0102-00	Lost Communication with Transfer Case Control Module - No sub type information	• CAN harness link between engine control module and transfer box control module network malfunction	• Using the manufacturer approved diagnostic system, check transfer box control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check transfer box control module power and ground circuits for open circuit • Check CAN harness between engine control module and transfer box control module, repair as necessary
U0104-00	Lost Communication With Cruise Control Module - No sub type information	• Vehicle configured for speed control, but speed control module is not installed • CAN Link engine control module/speed control module network malfunction • Speed control module power or ground circuit, open circuit	• Check vehicle has correct speed control module installed • Using the manufacturer approved diagnostic system, check speed control module, anti-lock braking system module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check speed control module power and ground circuit for open circuit • Check CAN harness to speed control module, repair as necessary
U0121-00	Lost Communication With Anti-lock Braking System (ABS) Control Module - No sub type information	• CAN Link engine control module/anti-lock braking system module network malfunction • Anti-lock braking system module power or ground circuit, open circuit	• Using the manufacturer approved diagnostic system, check anti-lock braking system module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check anti-lock braking system module power and ground circuit for open circuit • Check CAN harness to anti-lock braking system module, repair as necessary
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	• CAN harness link between engine control module and steering angle sensor network malfunction	• Using the manufacturer approved diagnostic system, steering angle sensor for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check steering angle sensor power and ground circuits for open circuit • Check CAN harness between engine control module and steering angle sensor, repair as necessary
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	• CAN Link engine control module/electronic parking brake signal missing network	• Refer to the electrical circuit diagrams and check power and ground supplies to electronic

		malfunction	parking brake • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0132-00	Lost Communication with Suspension Control Module A - No sub type information	• CAN link/suspension control module network malfunction	• Refer to the electrical circuit diagrams and check power and ground supplies to suspension control module • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0133-00	Lost Communication With Active Roll Control Module - No sub type information	• CAN harness link between engine control module and active roll control module network malfunction	• Using the manufacturer approved diagnostic system, check active roll control module for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check active roll control module power and ground circuits for open circuit • Check CAN harness between engine control module and active roll control module, repair as necessary
U0138-00	Lost Communication with All Terrain Control Module - No sub type information	• CAN harness link between engine control module and center console switch pack network malfunction	• Using the manufacturer approved diagnostic system, check center console switch pack for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check center console switch pack power and ground circuits for open circuit • Check CAN harness between engine control module and center console switch pack, repair as necessary
U0140-00	Lost Communication With Body Control Module - No sub type information	• CAN harness link between engine control module and central junction box network malfunction	• Using the manufacturer approved diagnostic system, check central junction box for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check central junction box power and ground circuits for open circuit • Check CAN harness between engine control module and central junction box, repair as necessary
U0151-00	Lost Communication with Restraints Control Module - No sub type information	• Lost communication with restraints control module over CAN or hardwired link	• Refer to the electrical circuit diagrams and check power and ground supplies to restraints control module • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0151-87	Lost Communication with Restraints Control Module - Missing message	• Lost communication due to restraints control module fault	• Check restraints control module for associated DTCs and refer to relevant DTC index • Refer to the electrical circuit diagrams and check power and ground supplies to restraints control module • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0155-00	Lost Communication with Instrument Panel Cluster	• CAN link between engine control module and instrument	• Refer to the electrical circuit diagrams and check power and

	(IPC) - No sub type information	cluster fault	ground supplies to instrument cluster • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0167-00	Lost Communication with Vehicle Immobilizer Control Module - No sub type information	• Security challenge response timeout • Battery fault	• Refer to the electrical circuit diagrams and check power and ground supplies to the electric steering column lock • Check for related CAN DTCs and refer to the relevant DTC index • Ensure the battery is in a fully charged and serviceable condition. Refer to the battery care manual and the relevant sections of the workshop manual • Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0300-00	Internal Control Module Software Incompatibility - No sub type information	• Engine control module has incorrect software installed • The engine control module is in expulsion mode. An incorrect specification engine control module has been installed to the vehicle	• Check and install the correct engine control module software • Check and install the correct engine control module as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U0402-00	Invalid Data Received From Transmission Control Module - No sub type information	• Transmission engine control module request corruption	• Using the manufacturer approved diagnostic system, check transmission control module, for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check high speed CAN bus circuit for short circuit, open circuit
U0402-08	Invalid Data Received from TCM - Bus signal / message failures	• Transmission engine control module request corruption • High speed CAN bus circuit failure, short, open circuit	• Using the manufacturer approved diagnostic system, check transmission control module, for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check high speed CAN bus circuit for short circuit, open circuit
U0402-64	Invalid Data Received from TCM - Signal plausibility failure	• Transmission to engine control module request corruption • High speed CAN bus signal corruption	• Using the manufacturer approved diagnostic system, check transmission control module, for DTCs and refer to the relevant DTC index • Using the manufacturer approved diagnostic system, complete a CAN network integrity test • Refer to the electrical circuit diagrams and check high speed CAN bus circuit for short circuit, open circuit
U0402-82	Invalid Data Received from TCM - Alive / sequence counter incorrect / not updated	• Transmission control module shaft-speed faults	• Using the manufacturer approved diagnostic system, check transmission control module, for DTCs and refer to the relevant DTC index
U0402-83	Invalid Data Received from TCM - Value of signal protection calculation incorrect	• Transmission control module shaft-speed faults	• Using the manufacturer approved diagnostic system, check transmission control module, for DTCs and refer to the relevant

			DTC index
U0415-00	Invalid Data Received From Anti-lock Braking System (ABS) Control Module - No sub type information	• Electronic throttle unit, throttle position sensor 1 failure • Electronic throttle unit, throttle position sensor 2 failure • Electronic throttle unit harness short, open circuit	• Using the manufacturer approved diagnostic system, check for electronic throttle unit DTCs repair as necessary • Refer to the electrical circuit diagrams and check electronic unit harness for short circuit, open circuit • Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U0415-64	Invalid Data Received From Anti-lock Braking System (ABS) Control Module - Signal plausibility failure	• Invalid request from anti-lock braking system • Torque up request higher than expected from anti-lock braking system	• Using the manufacturer approved diagnostic system, check anti-lock braking system, for DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check high speed CAN bus circuit for short circuit, open circuit
U0415-67	Invalid Data Received From Anti-lock Braking System (ABS) Control Module - Signal incorrect after event	• Torque up request higher than expected from anti-lock braking system	• Using the manufacturer approved diagnostic system, check anti-lock braking system, for DTCs and refer to the relevant DTC index • Refer to the electrical circuit diagrams and check high speed CAN bus circuit for short circuit, open circuit
U0426-00	Invalid Data Received From Vehicle Immobilizer Control Module - No sub type information	• Security code mis-match • This DTC will be logged if the encrypted data exchange does not match between engine control module and the instrument cluster or central junction box	• Check CAN network between engine control module, instrument cluster and central junction box • Refer to the electrical circuit diagrams and check power and ground circuit to engine control module and instrument cluster • Check correct engine control module and instrument cluster installed • Re-synchronise ID by re-configuring the engine control module and instrument cluster as new modules
U0447-81	Invalid Data Received From Gateway "A" - Invalid serial data received	• The LIN to high speed CAN gateway has informed the engine control module of a failure	• This DTC has been inhibited in the engine control module, as the LIN bus flag is set during normal operation

Identification Codes - Identification Codes

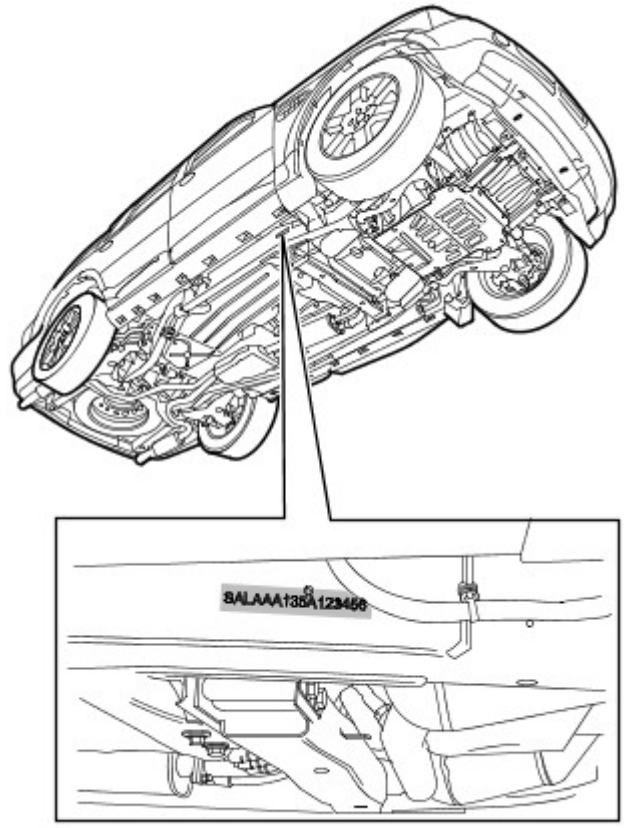
Description and Operation

VIN Number

The VIN number will be found in three locations:

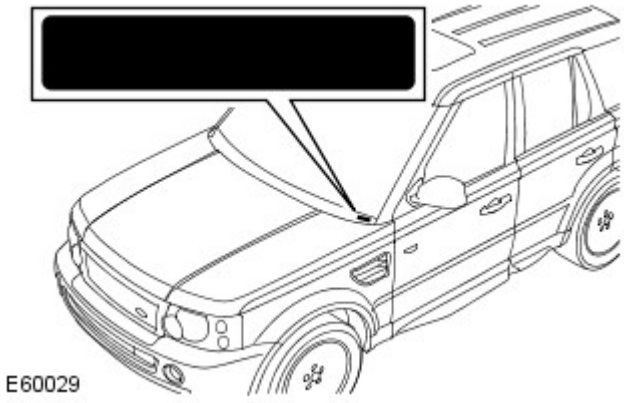
- **1.** Stamped on the side of the RH longitudinal member, rearward of the body front mounting.
- **2.** At the bottom of the windshield glass on the LH side of the vehicle and visible from the outside.
- **3. UK, Europe and ROW - Not NAS/Canada -**On the VIN plate attached to the bonnet locking platform.
- **4. NAS/Canada -** On the Tire Data/Specification label attached to the front of the LH B-pillar.

Longitudinal Member VIN



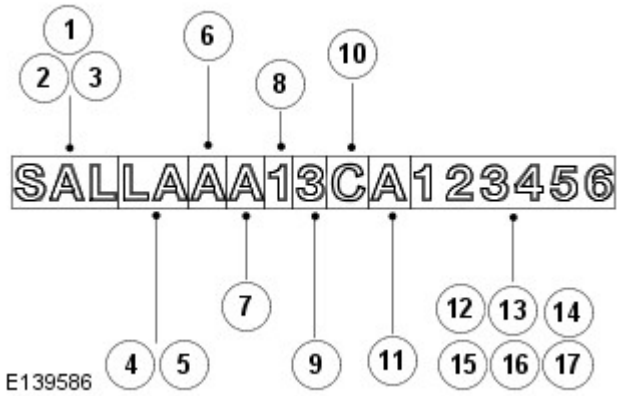
E60028

Windscreen VIN



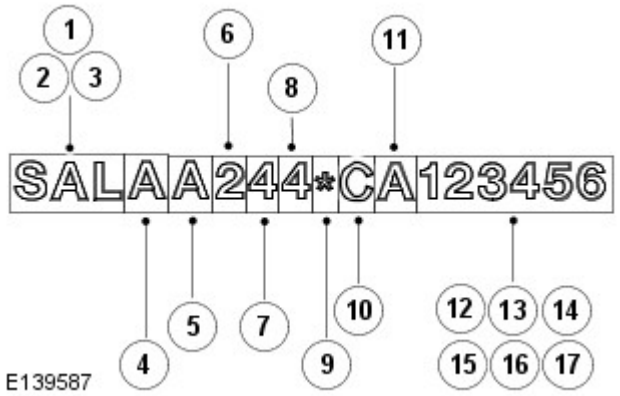
E60029

VIN number - UK, EU and ROW



VIN Position	Character	Identifies
1 - 3 - World identifier	SAL	Jaguar Land Rover Limited
4,5 - Vehicle type	LS	Range Rover Sport
6 - Class	A	Standard
6 - Class	J	Japan
7 - Body style	A	4 Door
8 - Engine	D	508PN - V8 5.0 NA Petrol
8 - Engine	E	508PS - V8 5.0 SC Petrol
8 - Engine	F	306DT - V6 3.0 High power diesel
8 - Engine	G	306DT - V6 3.0 High power diesel with cDPF
8 - Engine	M	306DT - V6 3.0 Low power diesel with cDPF
9- Steering and transmission	3	RHD - 6 Speed automatic
9- Steering and transmission	4	LHD - 6 Speed automatic
9- Steering and transmission	5	RHD - 8 Speed automatic
9- Steering and transmission	6	LHD - 8 Speed automatic
10- Model year	C	2012
11 - Plant	A	Solihull
12 - 17 - Serial number	1 2 3 4 5 6	Unique six digit serial number

VIN number - NAS and Canada

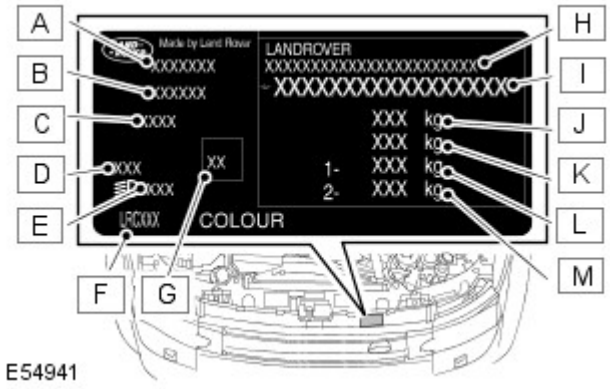


NOTE: # Manual belts with driver and passenger frontal air bags and side inflatable restraint (1st and second row).

VIN Position	Character	Identifies
1 - 3 - World identifier	SAL	Jaguar Land Rover Limited
4 - Make / Model	S	Land Rover-Range Rover Sport
5 - Class / Nas restarint system type	D	TL "SE" 5 seats #
5 - Class / Nas restarint system type	F	TL "HSE" 5 seats #
5 - Class / Nas restarint system type	K	TL "LUX" 5 seats #
5 - Class / Nas restarint system type	H	TL "SC" 5 seats #
5 - Class / Nas restarint system type	N	China
5 - Class / Nas restarint system type	P	Autobiography #
6 - Body style	2	4 Door Station Wagon
7 - Engine	D	508PN - V8 5.0 NA Petrol
7 - Engine	E	508PS - V8 5.0 SC Petrol
7 - Engine	F	306DT - V6 3.0 High power diesel
7 - Engine	G	306DT - V6 3.0 High power diesel with cDPF
8- Steering and transmission	4	LHD Automatic - 6 Speed
8- Steering and transmission	6	LHD Automatic - 8 Speed

9- Check digit	*	
10- Model year	C	2012
11 - Plant	A	Solihull
12 - 17 - Serial number	1 2 3 4 5 6	Unique six digit serial number

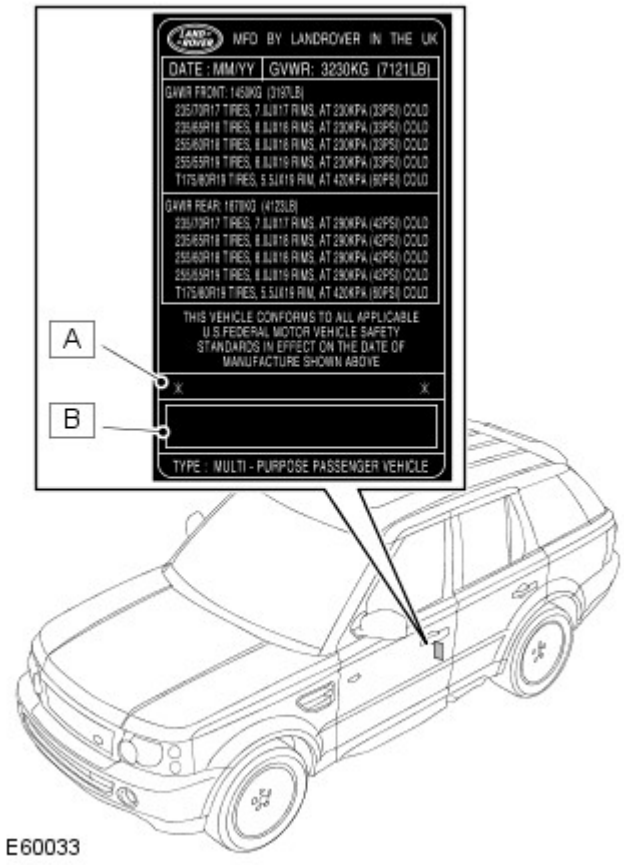
Bonnet locking platform VIN plate - Not NAS/Canada



The VIN plate contains the following information:

- **A -** Reserved
- **B -** Engine Description
- **C -** Country
- **D -** Diesel Indicator
- **E -** Reserved
- **F -** Headlamp Code/initial aim value - If shown
- **G -** Colour code/group
- **H -** Type/Approval Number - If shown
- **I -** VIN Number
- **J -** Gross Vehicle Weight
- **K -** Gross Train Weight
- **L -** Front Axle Weight
- **M -** Rear Axle Weight

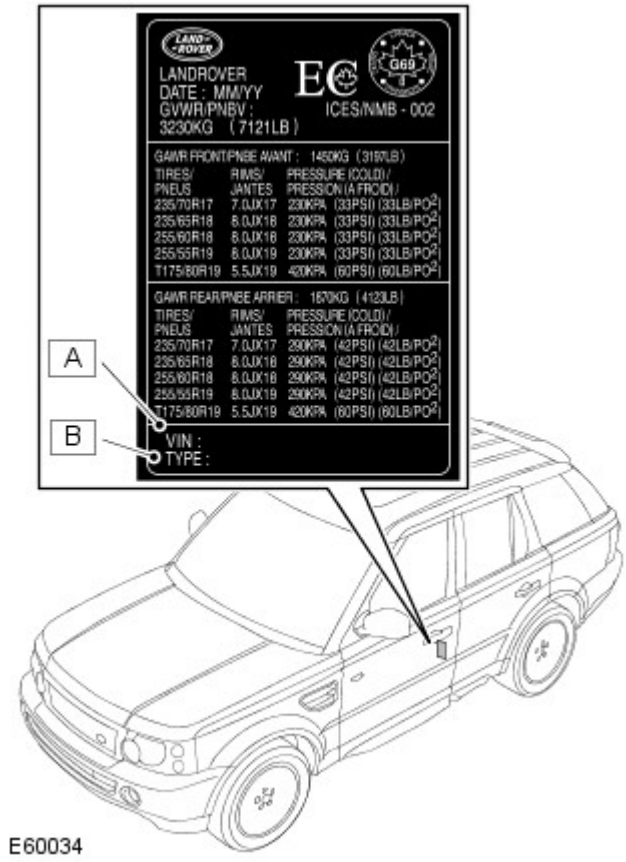
VIN/Certification/Tire Data Label - NAS only



The Certification Label contains the following VIN information:

- **A -** Vehicle VIN Number
- **B -** Bar code identification

VIN/Tire Pressure Specification Label - Canada only

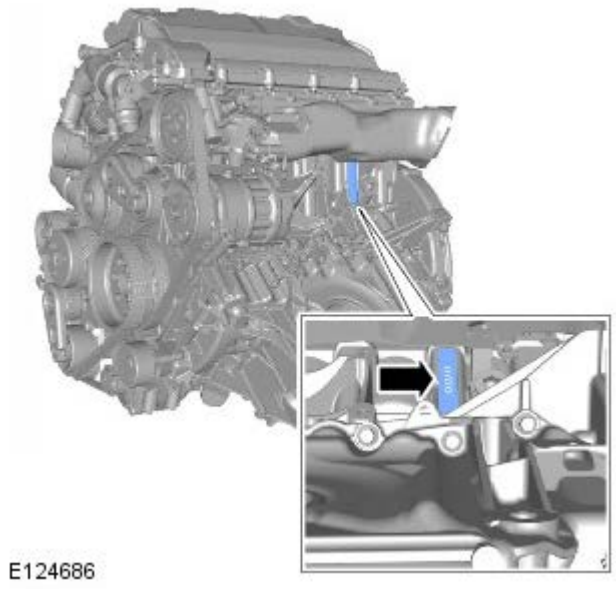


The Tire Pressure Certification Label contains the following VIN information:

- **A -** Vehicle VIN Number
- **B -** Vehicle Type

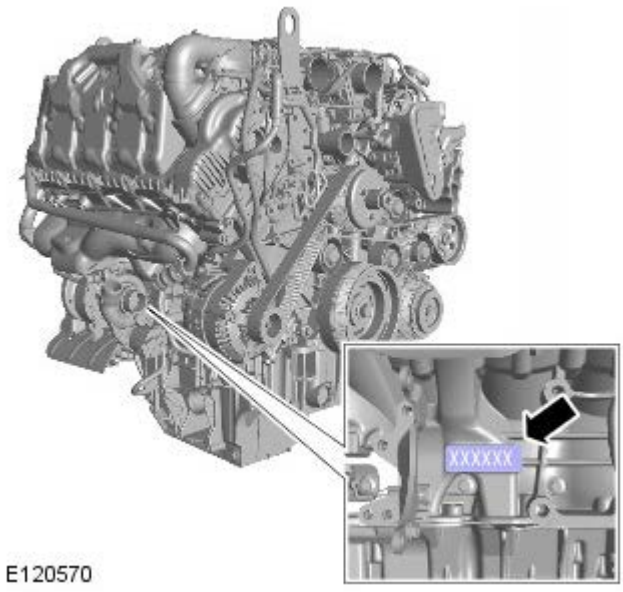
Unit/Assembly Serial Number Locations

5.0 Litre SC and 5.0 Litre NA V8 Petrol Engine Serial Number



The 5.0 Litre SC and 5.0 Litre NA V8 Petrol Engine Serial Number is stamped on the LH side of the cylinder block.

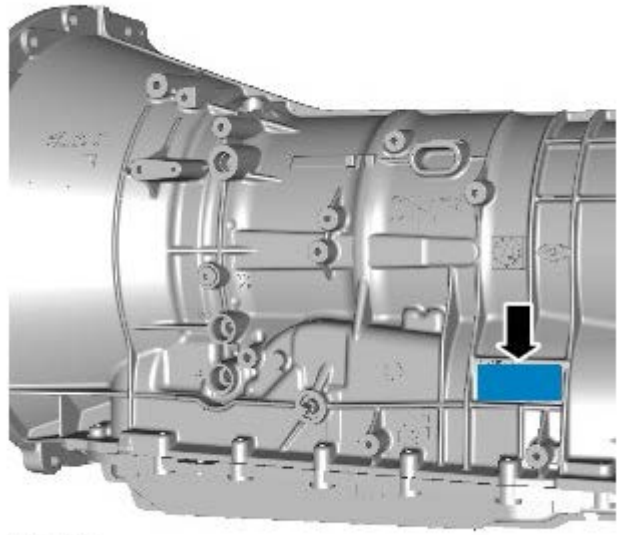
3.0 litre V6 Diesel Engine Serial Number



E120570

The 3.0 Litre V6 Diesel Engine Serial Number is stamped on the RH side of the cylinder block.

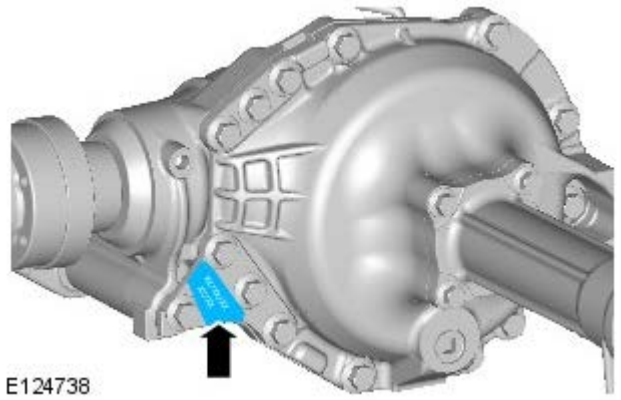
Automatic Transmission serial Number



E120916

The transmission serial number is on a plate attached to the LH side of the transmission casing.

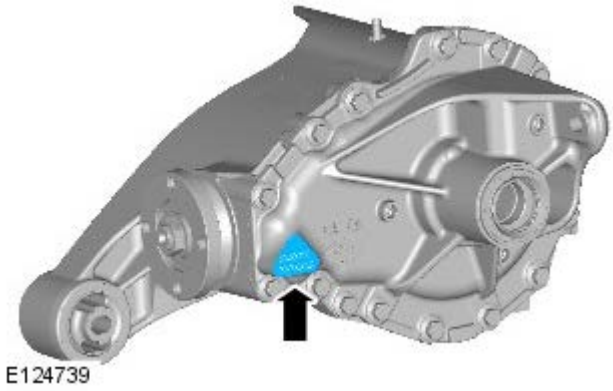
Front Differential Serial Number



E124738

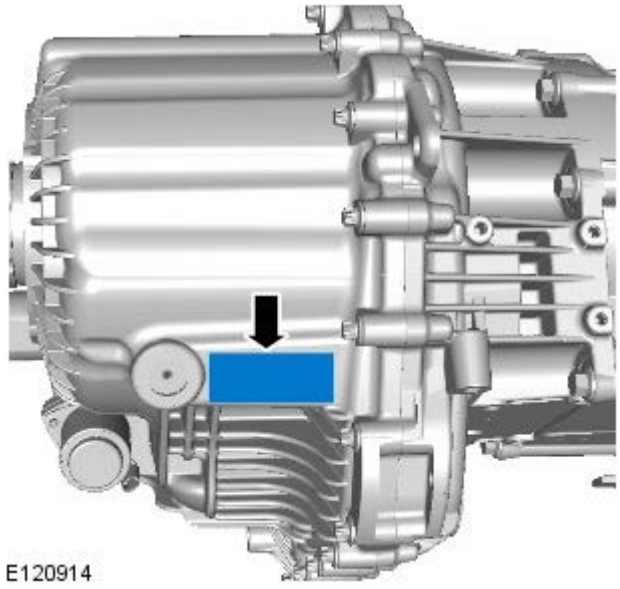
The Front Differential Serial Number is stamped on the underside of the differential casing and is located above the removable cross member.

Rear Differential Serial Number


E124739

The Rear Differential Serial Number is stamped on the underside of the differential casing adjacent to the front mounting.

Transfer Case Serial Number


E120914

The Transfer Case serial number is stamped on the RH side of the transfer case and may also be on a bar coded self-adhesive label attached to the case.

Jacking and Lifting - Jacking
Description and Operation

General

WARNING: The following instructions must be adhered to before raising the vehicle off the ground:

- Position vehicle on a solid, level surface.
- Apply the parking brake.
- Select 'P' - PARK on automatic transmission selector and 'H' High on transfer case.

WARNING: If the drive shaft(s) are to be disconnected, it will be necessary to raise all four wheels off the ground in order that the shaft(s) can be rotated. DO NOT use the customer jack and ensure that the vehicle is adequately supported on axle stands. With the vehicle raised, it will be necessary to release the park brake and select Neutral - 'N' in the main transmission to enable the drive shaft(s) to be rotated

CAUTIONS:

To avoid damage to the underbody components of the vehicle, the following instructions must be adhered to:

Do not position jacks or axle stands under the following components:

- Body structure other than any approved jacking or lifting points
- Bumpers
- Fuel lines
- Fuel tank
- Brake lines
- Front or rear suspension arms
- Steering linkage
- Transfer case
- Front or rear differential units
- Transmission
- Engine oil pan - See note below

NOTE: For certain repair operations, it may be necessary to support the engine under the oil pan. In this case, a block of hardwood or a rubber pad must be positioned on the jack lifting pad to protect the oil pan.

Vehicle jack

The jack provided with the vehicle is only intended for use in an emergency such as changing a tire. DO NOT use the jack for any other purpose. Refer to the Owner's Handbook for the vehicle jack location points and jacking procedures.

WARNING: Never work under a vehicle supported solely by the vehicle jack.

Hydraulic jack

A hydraulic jack with a minimum lifting capacity of 1500 kg, (3,300 lbs) must be used.

WARNINGS:

Do not commence work on the underside of the vehicle until suitable axle stands have been placed in the correct position.

Always chock the wheels when jacking. The parking brake may be ineffective when the wheel(s) are off the ground.

Raising and Supporting the Vehicle

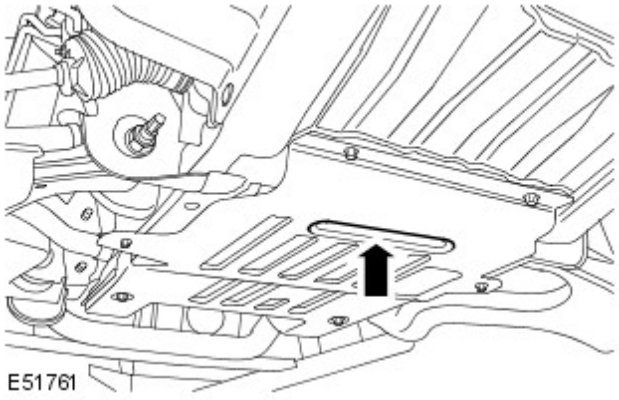
To assist in raising the vehicle, jacking points are provided as shown in the following illustrations.

Raising the Front of the Vehicle

Apply the parking brake.

Select 'P' - PARK on automatic transmission selector.

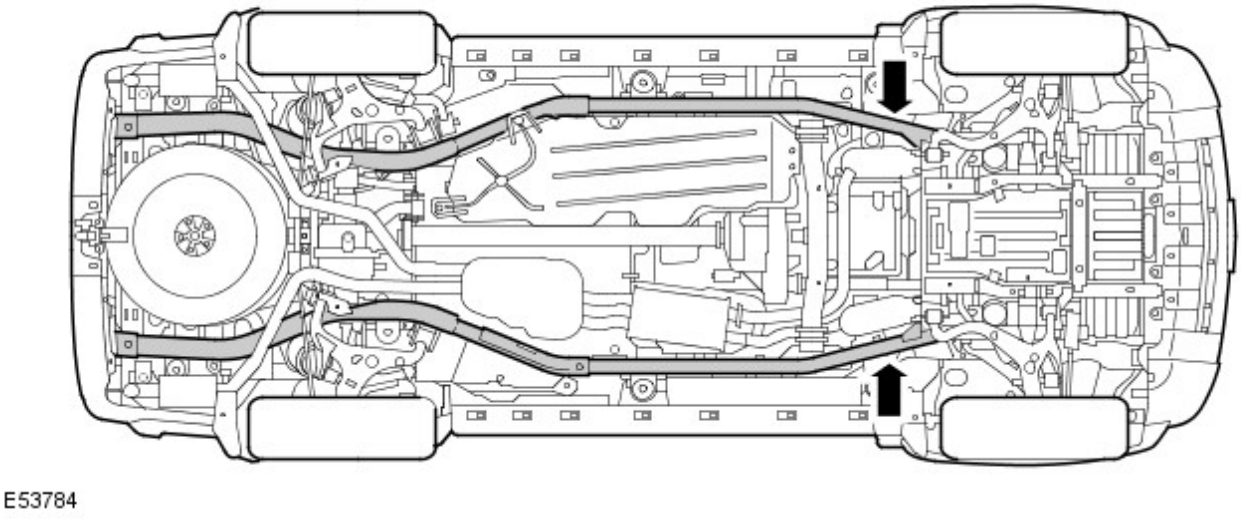
WARNING: Always chock the rear wheels when jacking the front of the vehicle.



Position the lifting pad of the hydraulic jack in the centre of the recess in the engine undershield.

NOTE: If the engine undershield has been removed, position the jack lifting pad in the centre of the front cross beam.

With the vehicle raised to the desired height, position axle stands at positions shown.



CAUTION: Position suitable material between axle stands and longitudinal members to prevent damage to the longitudinal members.

Carefully lower jack until vehicle rests on axle stands.

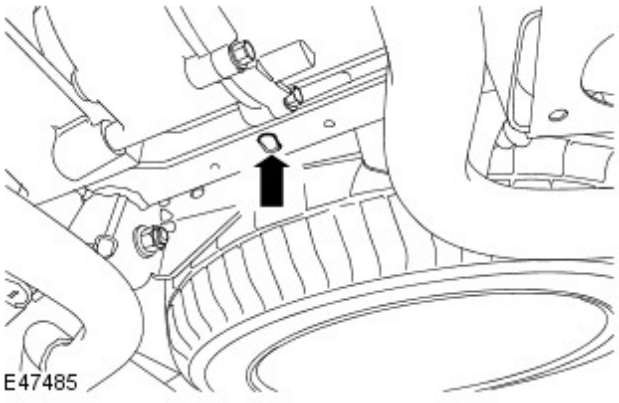
WARNING: Before commencing work on the underside of the vehicle, ensure that axle stands are correctly positioned and vehicle is securely supported.

Reverse procedure when removing vehicle from stands.

Raising the Rear of the Vehicle

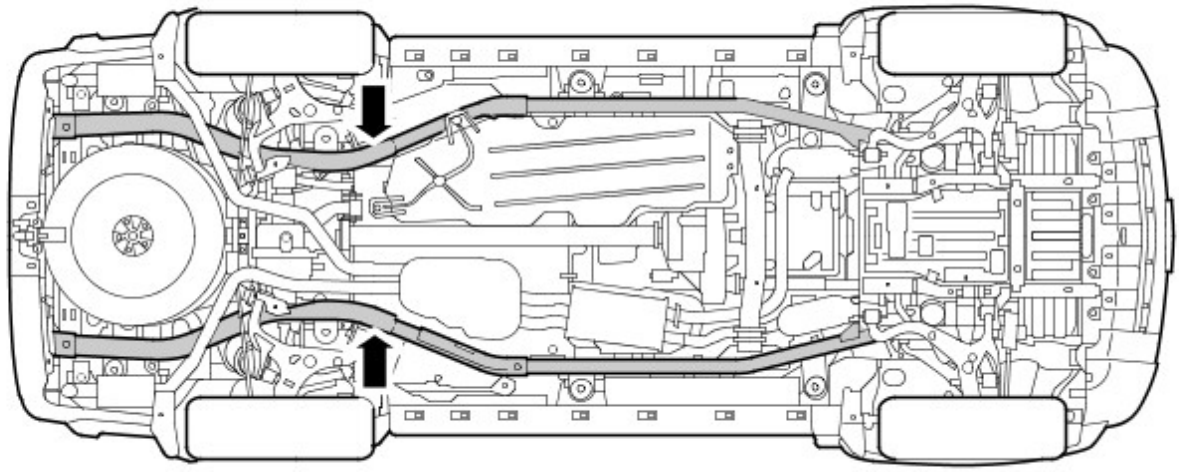
Select 'P' - PARK on automatic transmission selector.

WARNING: Always chock the front wheels when jacking the rear of the vehicle.



Position the lifting pad of the hydraulic jack under the centre of the rear cross member as shown.

CAUTION: Take care that the lifting pad of the jack is of a suitable size to avoid damaging the heat shield. It is not advisable to use a spacer block between the lifting pad and the rear cross member as this may result in some vehicle instability.



With vehicle raised to desired height, position axle stands at positions shown.

CAUTION: Position suitable material between axle stands and longitudinal members to prevent damage to the longitudinal members.

Carefully lower jack until vehicle rests on axle stands.

WARNING: Before commencing work on underside of vehicle, ensure that axle stands are correctly positioned and vehicle is securely supported.

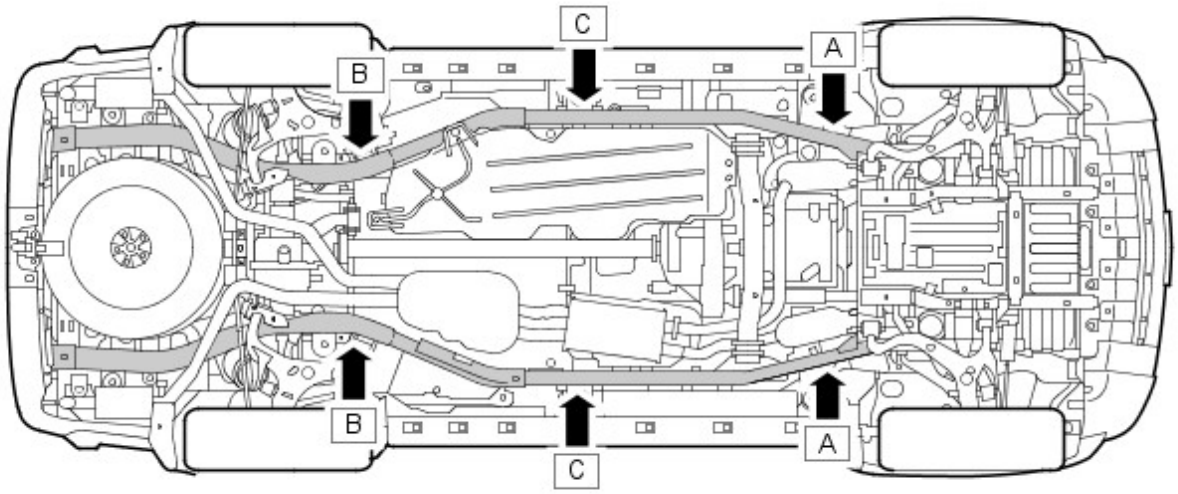
Reverse procedure when removing vehicle from stands.

Raising Vehicle - One Wheel/side

Apply the parking brake.

Select 'P' - PARK on automatic transmission selector.

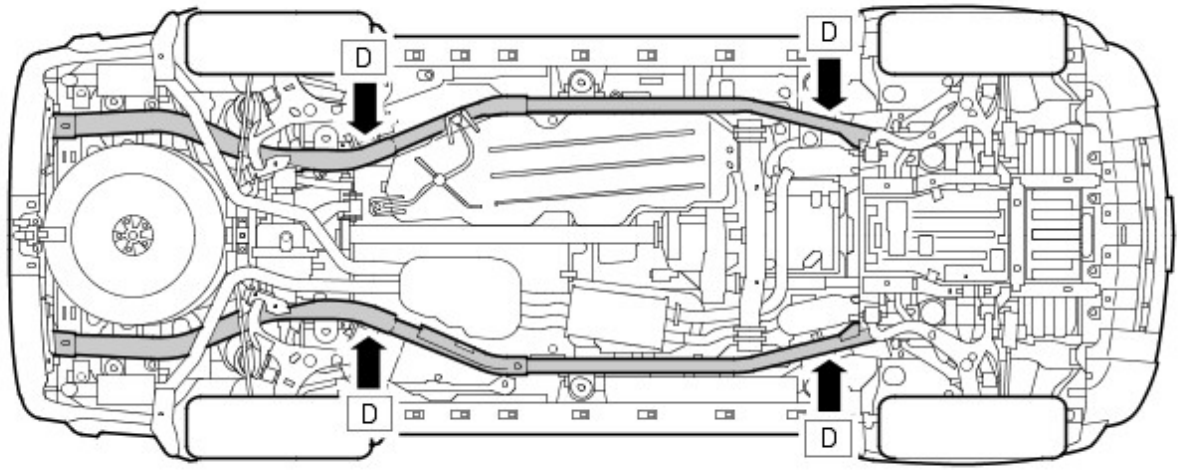
WARNING: Always chock the wheels which are not to be raised.



E47487

- **One front wheel** - position lifting pad of hydraulic jack beneath longitudinal member on the side to be raised at Point 'A'
- **One rear wheel** - position lifting pad of jack beneath longitudinal member on the side to be raised at Point 'B'
- **Front and rear wheels - ONE SIDE** - position lifting pad of jack beneath longitudinal member on the side to be raised at Point 'C'

NOTE: Point 'C' is in line with number 3 body mounting.



E47488

With vehicle at desired height, position axle stand(s) beneath longitudinal members and adjacent to the lifting pad of the jack at appropriate point(s) D.

CAUTION: Position suitable material between axle stands and longitudinal members to prevent damage to the longitudinal members.

Carefully lower jack until vehicle rests on axle stands.

WARNING: Before commencing work on underside of vehicle, ensure that axle stands are correctly positioned and vehicle is securely supported.

Reverse procedure when removing vehicle from stands.

Jacking and Lifting - Lifting
Description and Operation

Vehicle on Wheels - Four Post Ramp

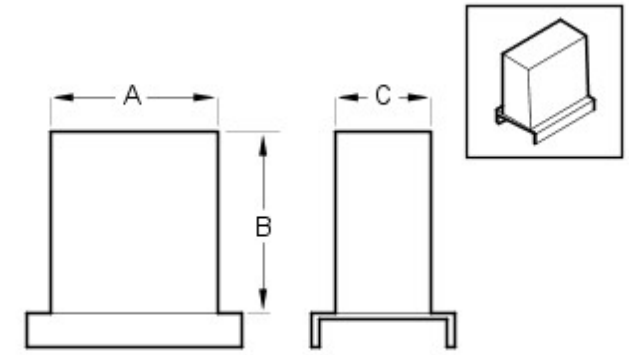
WARNING: If the drive shaft(s) are to be disconnected, it will be necessary to raise all four wheels off the ramp in order that the shaft(s) can be rotated. If the wheel free facility is not to be used, raise the vehicle off the ramp using suitable equipment. With the vehicle raised, position axle stands in the positions shown for the front and rear support blocks - see illustration in Jacking. With the axle stands positioned, release the parking brake and select NEUTRAL 'N' in the transmission.

WARNING: Do not push the vehicle backwards and forwards along the ramp in order to gain access to the drive shaft fixings.

Position the vehicle on the ramp with the front and rear of the vehicle equidistant from the ends of the ramp. Chock the wheels, select NEUTRAL in the transmission and where practicable, apply the parking brake.

Wheel Free Lift - Four Post Ramp

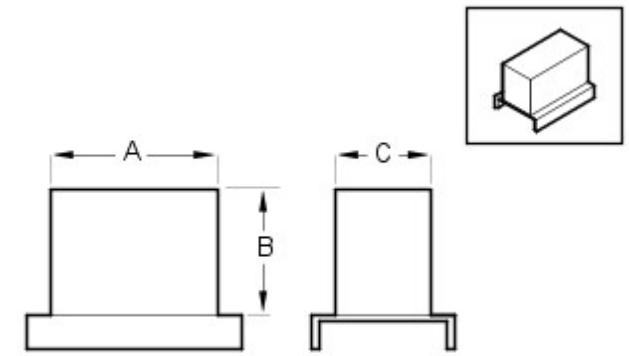
NOTE: To enable the vehicle to be supported correctly on the wheel free longitudinals, it will be necessary to produce 2 off each of the support blocks to the dimensions given in the accompanying illustrations. The supporting part of each block must be manufactured from suitable hardwood or metal and the 'U' shaped base of each block must be manufactured from metal. Note that it is essential to ensure that the 'U' shaped base of each block is wide enough to fit over the wheel free longitudinals.



E48763

Front Support Block Dimensions

- **'A'** = 127.0 mm (5.0 in)
- **'B'** = 146.0 mm (5.75 in)
- **'C'** = 89.0 mm (3.5 in)



E48764

Rear support block dimensions

- **'A'** = 152.0 mm (6.0 in)
- **'B'** = 101.0 mm (4.0 in)
- **'C'** = 76.0 mm (3.0 in)

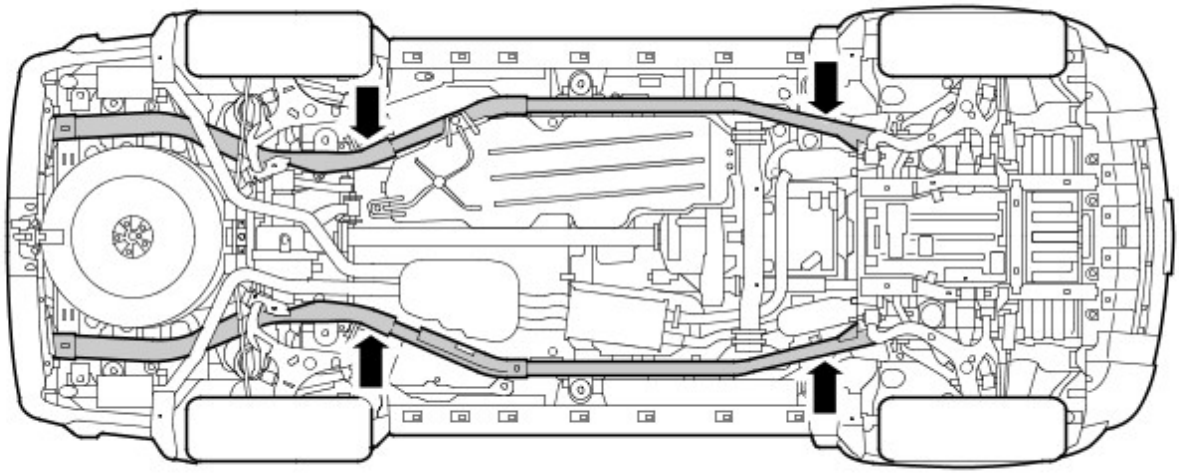
Raising and Supporting the Vehicle

1. Position vehicle on ramp.

2. Position suspension in 'off-road' height.

3. Apply parking brake.

4. Raise ramp to desired height.



E47489

5. Align the wheel free longitudinals beneath the body frame longitudinals and position the support blocks beneath the longitudinals in the positions shown.

CAUTION: Ensure that the front and rear support blocks are correctly oriented to front and rear of vehicle.

6. Engage wheel free and lower ramp slowly until weight of vehicle rests on support blocks and road wheels are just clear of ramp.

7. Ensure that the vehicle is correctly supported on all four support blocks, that blocks are still correctly positioned and are in full contact with the body frame longitudinals.

8. Lower the ramp.

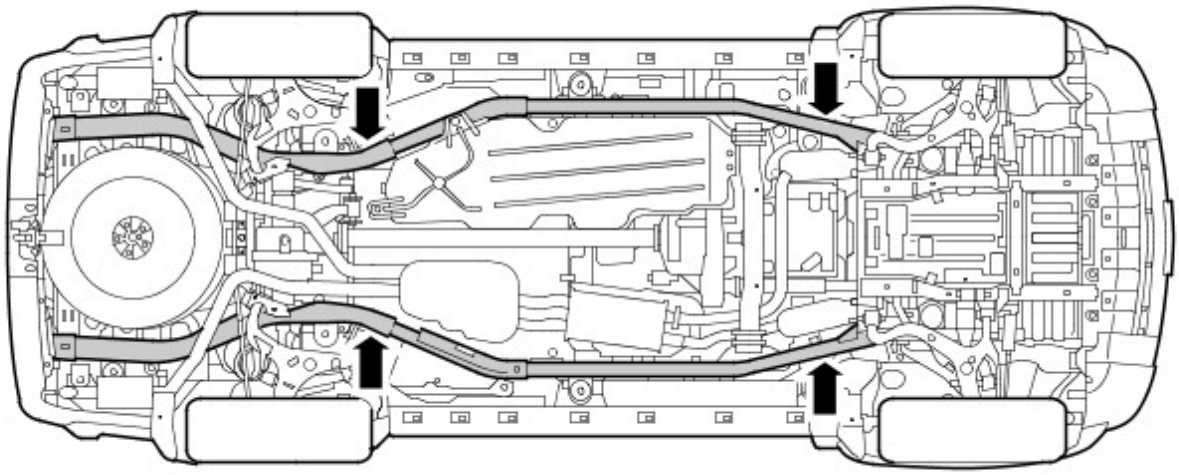
WARNING: Make sure that the vehicle is stable before commencing work.

NOTE: Return the suspension to 'normal ride height' when the vehicle is removed from the ramp.

Two Post Lift

CAUTION: If the drive shaft(s) are to be removed, release the parking brake and select NEUTRAL 'N' in the transmission in order that the shaft(s) can be rotated when the vehicle is raised to the desired height.

1. Position the vehicle with the centre of the lift pillars aligned approximately with the front of the driver/passenger seat cushions.



E47489

2. Extend the lifting arms and position the pad of each lifting arm beneath the body frame longitudinal lifting points.

3. Raise the vehicle until the wheels are just clear of the ground and check that the pads of each lifting arm are still correctly positioned.

4. Raise the vehicle to the desired height.

5. Ensure that vehicle is correctly supported on all four lifting pads, that pads are still correctly positioned and are in full contact with the body frame longitudinals.

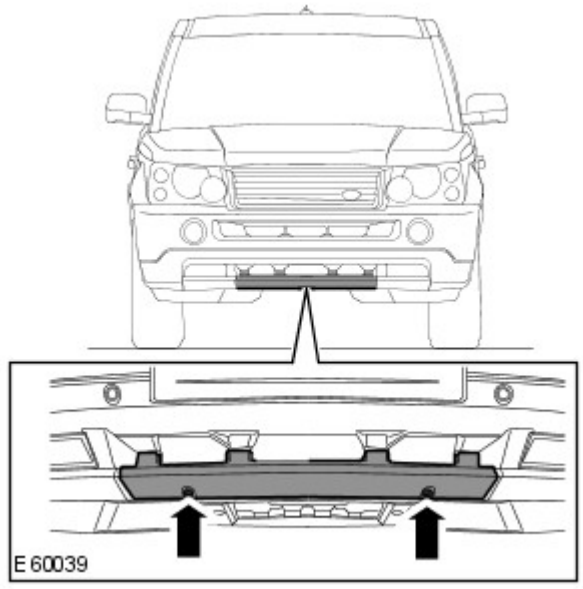
 WARNING: Make sure that the vehicle is stable before commencing work.

Jacking and Lifting - Vehicle Recovery

Description and Operation

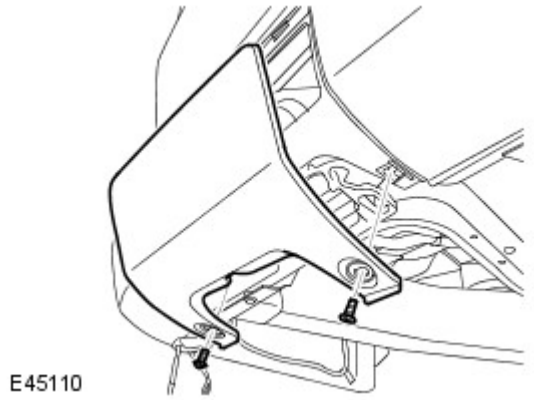
Towing/Lashing eyes

CAUTION: The single towing/lashing eyes at the front and rear of the vehicle are designed for vehicle recovery purposes only and MUST not be used to tow a trailer or caravan.



The front towing/lashing eye is accessible after releasing the 2 toggle fasteners securing the towing eye access panel and removing the panel.

CAUTION: Ensure that during towing, the towing attachment does not contact the bumper.



The rear towing/lashing eye 'A' is accessible after releasing the 2 fasteners securing the access panel to the bumper and removing the panel.

CAUTION: This towing/lashing eye should only be used for towing another vehicle or for recovery purposes to enable this vehicle to be positioned in order that the front towing eye may be used for recovery/towing.

4 Wheel Towing

CAUTIONS:

Suspended towing of this vehicle MUST NOT be attempted, if 4 wheel towing is not possible, vehicle must be recovered on a suitable trailer.

The vehicle may be towed for a maximum of 3 hours or 90 miles (150 km) at a maximum speed of 30 mph (50 km/h), these limits MUST NOT be exceeded.

The following procedures must be followed to ensure that the vehicle is towed in a safe condition and damage to the vehicle transmission system is prevented.

1. Remove the front towing/lashing eye access panel.

2. Secure the towing attachment from the recovery vehicle to the towing/lashing eye.

CAUTION: Ensure that the towing attachment will not contact the front bumper during towing.

3. Apply the parking brake.

4. Insert ignition key and turn the ignition switch to position 'II'.

CAUTION: If 'N' - Neutral cannot be selected, front and rear propeller shafts must be removed before vehicle is towed.

6. Apply the footbrake and move the selector lever to the 'N' Neutral position.

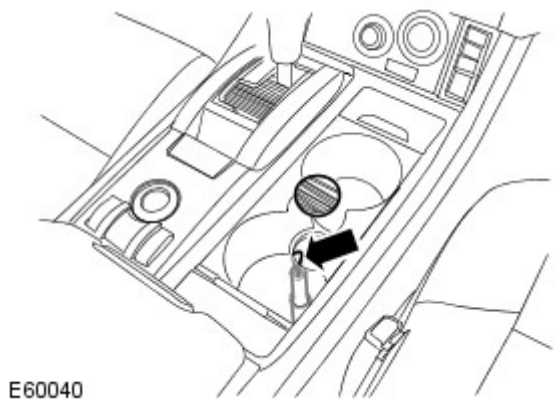
NOTE: If electrical power is not available, use the manual interlock release tab on the selector lever to move the selector lever to the Neutral position.

7. Select 'H' - HIGH on the transfer case.

CAUTION: If electrical power is not available, and 'H' - HIGH cannot be selected, the vehicle may not be towed but must be recovered on a suitable trailer. If, however, transfer case was in 'H' - HIGH when electrical power was lost, vehicle may still be towed.

8. Release the parking brake.

NOTE: If electrical power is not available, it will be necessary to release the parking brake manually using the following procedures:



NOTE: Left hand drive illustrated, right hand drive on opposite side of centre console.

9. Lift out the cup holder inserts from the centre console

10. Remove the access panel from the centre console.

11. Locate the electric parking brake release cable, insert a suitable tool through the cable eye and pull the cable upwards to release the parking brake.

CAUTION: The electric parking brake will not function until electrical power is restored. It will, therefore, be necessary to chock the wheels when vehicle is at a standstill.

WARNING: Do not release the parking brake until towing is about to commence. Whilst towing, do not attempt to remove the ignition key and do not turn the key to any position other than 'II'. With the engine switched off, the power assisted steering system and brake booster will be inoperative thereby resulting in an increase in the effort required to turn the steering wheel and apply the brakes.

CAUTION: The vehicle tow connections should only be used in normal road conditions, 'snatch' recovery must be avoided.

On completion of 4 wheel towing

1. Apply the parking brake or if electrical power is not available, securely chock the wheels.

2. Detach towing equipment from towing/lashing eyes.

3. Fit the towing eye access panel and secure the toggle fasteners.

Transporting by trailer

 CAUTION: Use the towing/lashing eyes at the front and rear of the vehicle, DO NOT secure lashing hooks or restraints to any other part of the vehicle.

Position the vehicle, apply the parking brake and select 'N' - Neutral on the automatic transmission selector lever

 CAUTION: If electrical power is not available and the parking brake is released, it will not be possible to re-apply the parking brake. It will, therefore be necessary to select 'P' Park and ensure that the vehicle wheels are adequately chocked to prevent vehicle movement.

Maintenance Schedules - Maintenance Schedules - Gasoline Engines

Description and Operation

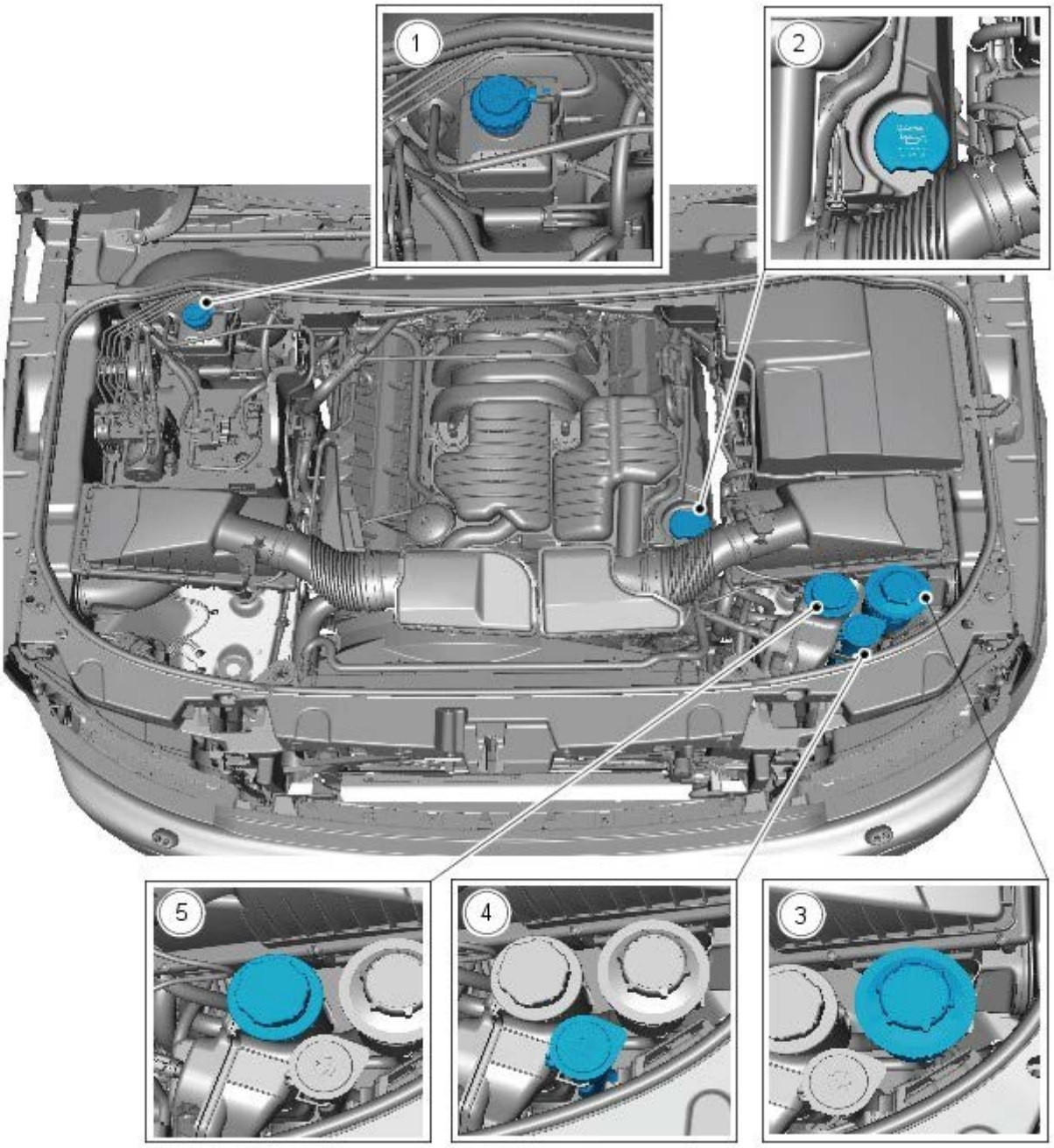
NOTE: **Some variation in the illustrations may occur, but the essential information is always correct.**

Torque Specifications

Description	Nm	lb-ft
Seat frame fixing Torx screws	40	30
Seat belt fixing Torx screws	40	30
Road wheel nuts	140	103

CAUTION: Unless stated otherwise, the following operations must be carried out at every service interval. Note that the 'A' and 'B' Service Intervals listed on the 'Maintenance Check Sheet' for vehicles operating under arduous conditions, vary from those specified for vehicles operating under normal conditions. Reference must therefore, always be made to the 'Arduous Conditions Maintenance Check Sheet' for vehicles operating under these conditions.

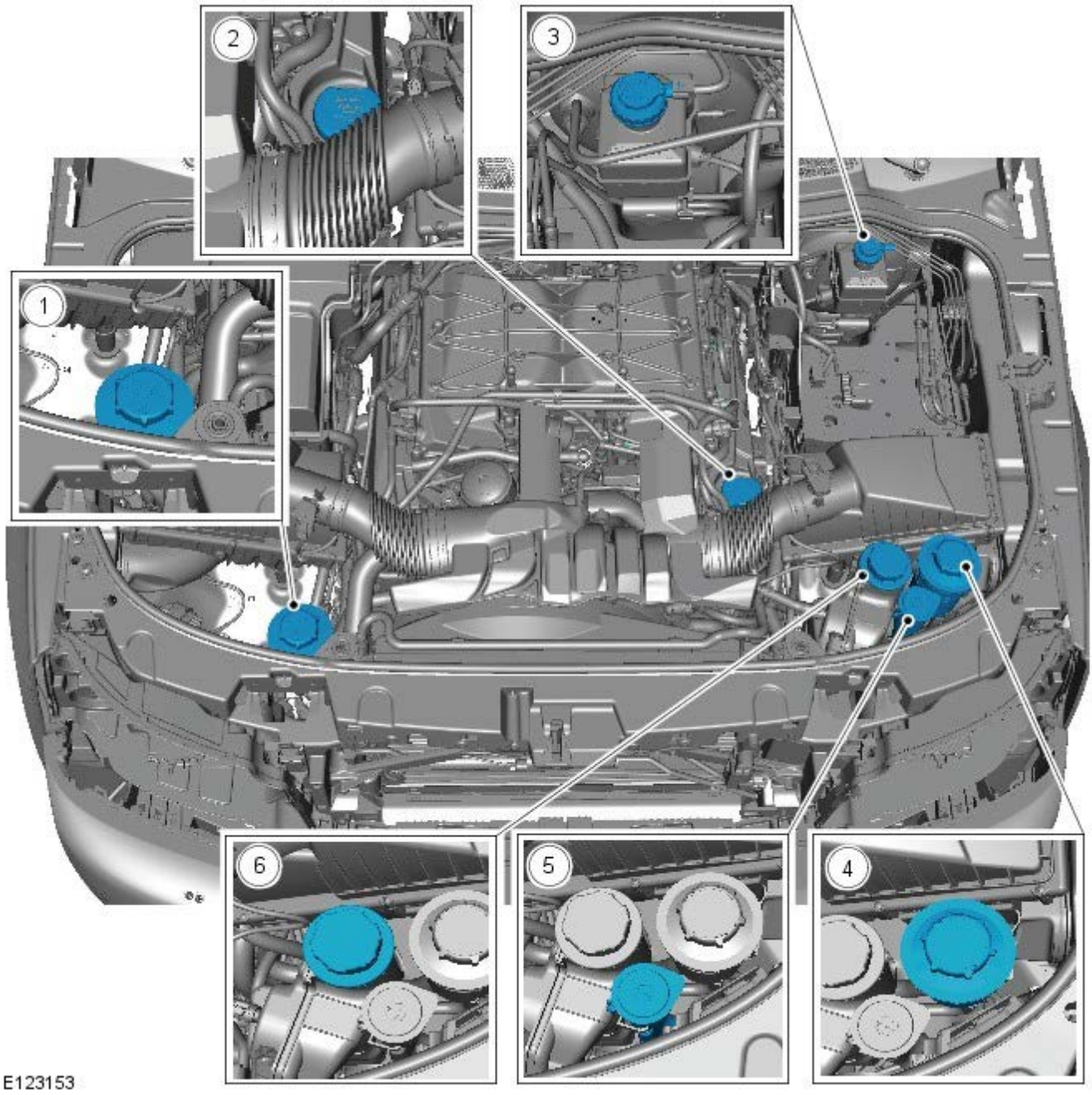
Underbonnet View - 5.0 Litre without supercharger



E123152

- **1.** Brake fluid reservoir (LH drive illustrated - RH drive on opposite side)
- **2.** Engine oil filler cap
- **3.** Power steering fluid reservoir
- **4.** Windshield washer reservoir
- **5.** Coolant expansion tank

Underbonnet View - 5.0 Litre with supercharger

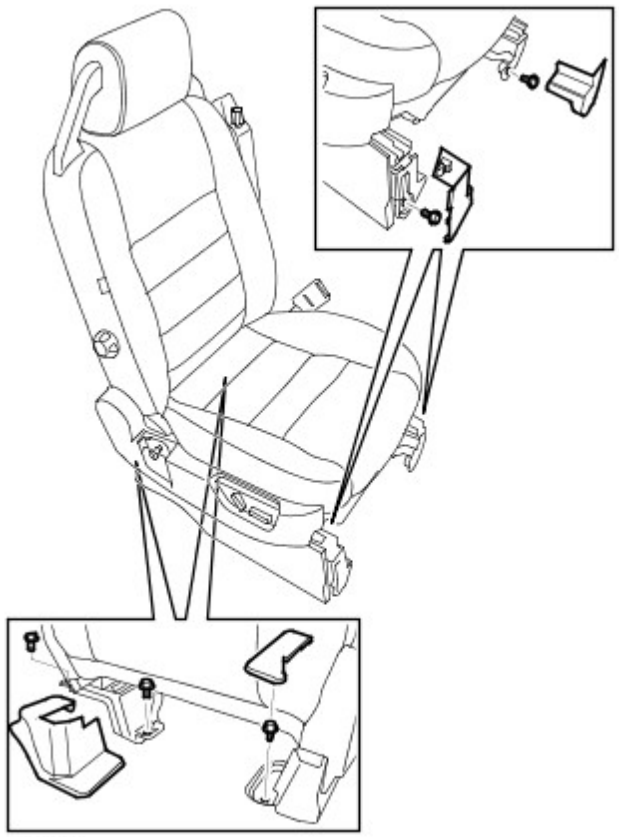


- **1.** Dynamic response fluid reservoir
- **2.** Engine oil filler cap
- **3.** Brake fluid reservoir (RH drive illustrated - LH drive on opposite side)
- **4.** Power steering fluid reservoir
- **5.** Windshield washer reservoir
- **6.** Coolant expansion tank

Maintenance Operations

Seats and Safety Belts

Front seat frame fixings - Every 2 years or 30,000 miles (48,000 km)

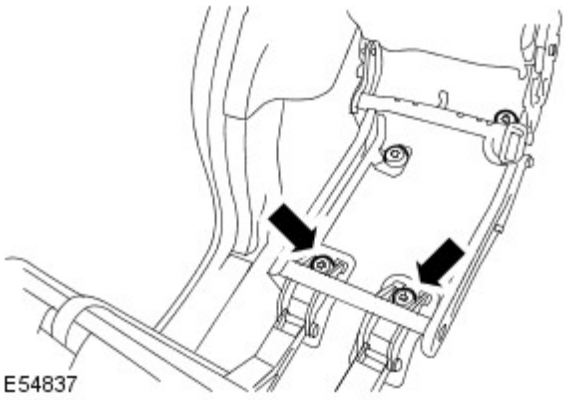


1. Carefully remove the trim panels covering the seat frame fixing Torx screws.

2. Check that the front seat frame fixing Torx screws are secure and that the seat frames show no signs of movement.

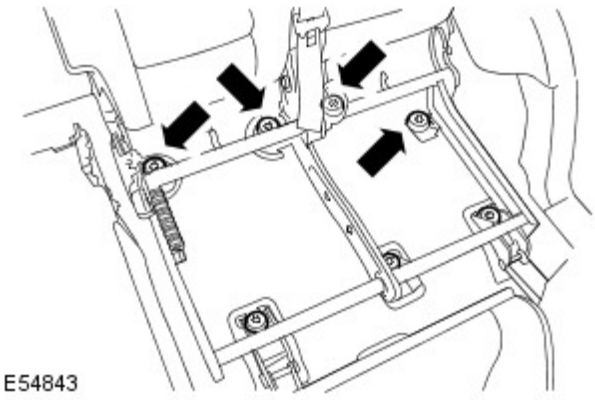
3.Install the trim panels on completion.

Rear seat frame front fixings - Every 2 years or 30,000 miles (48,000 km)



4. Check that the rear seat frame front fixings are secure and that the seat frames show no signs of movement.

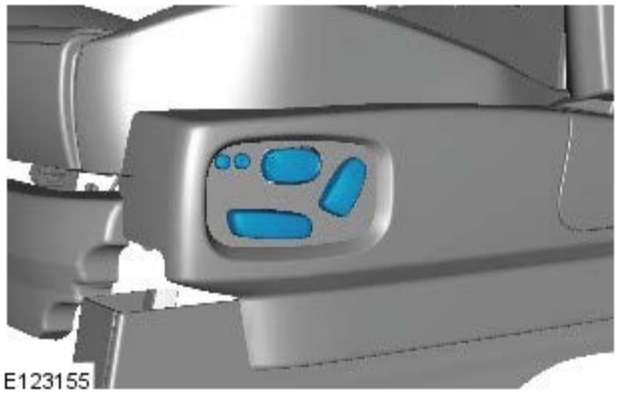
Rear seat frame rear fixings - Every 2 years or 30,000 miles (48,000 km)



5. Fold the seat cushions forwards and check that the rear seat frame rear fixings are secure and that the seat frames show no signs of movement.

6. Fold the seat cushions back on completion.

Front seat controls



7. Check operation of all seat controls.

Safety belts - Every 2 years or 30,000 miles (48,000 km)

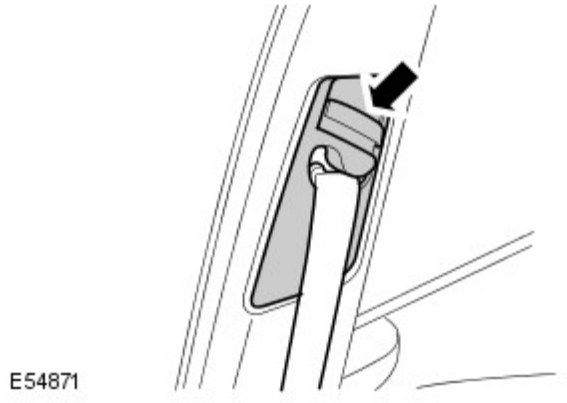
CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out every 1 year or 15,000 miles (24,000 km)**

8. Fully extend each safety belt and check that it returns unassisted; repeat for all belts.

9. Check entire length of safety belt webbing for signs of fraying or damage; repeat for all belts.

10. Connect each safety belt to the correct buckle, check safety belt buckle and tongue are secure; check that buckle releases tongue correctly.

11. Check all safety belt and buckle mountings and fixings for security.



12. Check front safety belt height adjusters for correct operation.

Lamps, Horns and Warning Indicators

1. Check side, head, fog, reversing and tail lamps for correct operation.

2. Check operation of headlamp automatic levelling system - if installed.

3. Check turn signals and hazard warning lamps for correct operation.

4. Check brake (stop) lamps for correct operation.

5. Check all exterior lamp lenses for clarity and condition; pay particular attention to headlamp and fog lamp lenses for stone chips or damage.

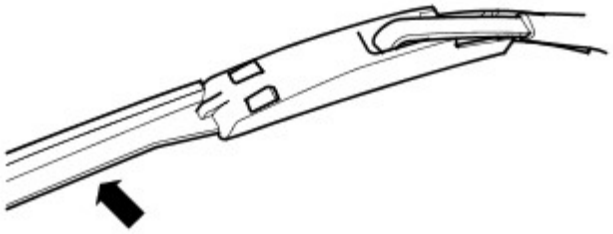
6. Check horn for loud, clear sound.

7. Switch on headlamps and check that side/headlamp reminder warning sounds when door is opened.

8. Check operation of interior courtesy lamps.

9. Check operation of all instrument pack warning and indicator lamps.

Washers and Wipers



E54838

1. Check all wiper blades for condition and signs of splits or damage.

2. Check security of wiper arms.

3. Operate front and rear screen washers, check that jets are clear and correctly aimed.

4. Operate front and rear wipers at all speeds and check for smooth, smear free operation.

Check High/Low Gear Engagement

1. Select LOW range gear, drive vehicle forwards 3 to 4 vehicle lengths, stop vehicle and select HIGH range gear - gears must engage smoothly.

Pollen Filter

1. Replace pollen filter.
For additional information, refer to: Pollen Filter (412-01 Air Distribution and Filtering, Removal and Installation).

Corrosion/Cosmetic Inspection

1. Carry out the annual corrosion/cosmetic inspection using the Annual Corrosion Inspection Sheet.

Wheels and Tires

1. Check that tires comply with manufacturer's specification.
For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Description and Operation).

2. Check/adjust tire pressures including spare.
For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Description and Operation).

3. Vehicle fitted with Uni-directional tires: Mark the wheel to stud relationship of each road wheel and note location of each road wheel to its respective hub.

4. Loosen road wheel nuts. Raise vehicle to a wheel free condition.
For additional information, refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

5. Remove the road wheels.

6. Visually check tires for condition, lumps or bulges. Check tread depth across the width of the tire and around the circumference; make sure that remaining tread depth does not contravene local legislative requirements.

NOTE: Do not install wheels at this stage.

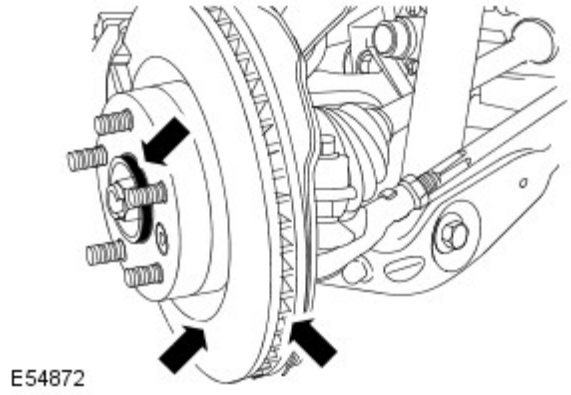
Braking System

CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out every 3 months or 3,750 miles (6,000 km)**

1. Inspect front brake pads for wear.
For additional information, refer to: Specifications (206-03 Front Disc Brake, Specifications).

2. Inspect rear brake pads for wear.
For additional information, refer to: Specifications (206-04 Rear Disc Brake, Specifications).

3. Check brake calipers for signs of fluid leaks.



4. Check brake discs for condition.

5. Check all brake booster and brake system pipes and hoses for condition, chafing and leaks.

6. Clean road wheel hub spigots and apply grease, Land Rover Part Number RYL 105020 to the wheel mating surface of each spigot.

7. Vehicles fitted with Uni-directional tires: Install road wheels on their respective hubs ensuring that stud to wheel relationship is maintained.

8. Vehicles fitted with NON uni-directional tires: Install wheels on the opposite side of the vehicle but make sure that they are on the same axle as they were originally installed.

9. Install road wheel nuts and tighten to 140 Nm (103 lb-ft).

CAUTION: **When vehicles are operating under arduous conditions, the following service item must be carried out every 2 years or 30,000 miles (48,000 km).**

10. Every 3 years or 45,000 miles (72,000 km): Replace brake fluid.
For additional information, refer to: Brake System Bleeding - Vehicles With: Standard Brakes (206-00 Brake System - General Information, General Procedures) /
Brake System Bleeding - Vehicles With: High Performance Brakes (206-00 Brake System - General Information, General Procedures).

11. Every 6 years or 90,000 miles (144,000 km): Replace all flexible brake hoses.

Electric Parking Brake

CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out every 3 months or 3,750 miles (6,000 km)**

1. Check the adjustment of the electric parking brake.
For additional information, refer to: Parking Brake Shoe and Lining Adjustment (206-05 Parking Brake and Actuation, General Procedures).

2. Vehicles operating under arduous conditions: Check the condition of the electric parking brake system.

Road Wheel Speed Sensors

CAUTION: **When vehicles are operating under arduous conditions, the following service item must be carried out every 3 months or 3,750 miles (6,000 km).**

1. Inspect the road wheel speed sensor harnesses for damage.

Radiator and Cooling Fan

1. Vehicles operating under arduous conditions: Visually check radiator for external obstructions, check cooling fan blades for damage.

Air Suspension

1. Every 5 years or 75,000 miles (120,000 km) - Vehicles operating under arduous conditions: Replace air suspension compressor filter.
For additional information, refer to: Air Suspension Air Filter (204-05 Vehicle Dynamic Suspension, Removal and Installation).

Door Locks and Hinges

1. Check operation of all door locks, bonnet lock and fuel filler flap.

2. Lubricate all door check straps, bonnet catch and fuel filler flap catch.

Cooling System

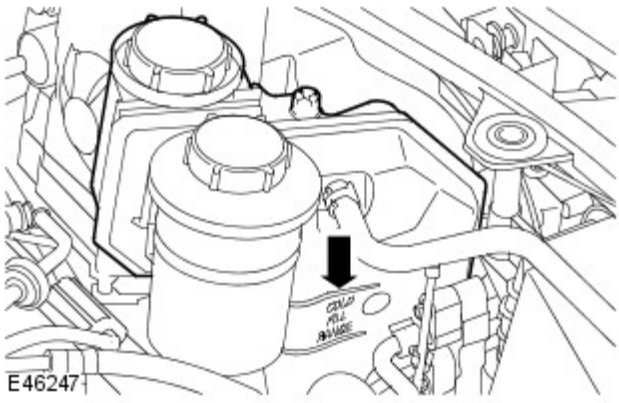
1. Check specific gravity of coolant using a hydrometer.

NOTE: A suitable hydrometer is available from the Equipment Programme under Part Number 511 3302 001 00.

2. Top-up cooling system if necessary.
For additional information, refer to: Specifications (303-03B Engine Cooling - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Specifications).

CAUTION: **Anti-freeze concentration must be maintained at 50%.**

Cooling system - Check/Top-up



WARNING: **Since injury such as scalding could be caused by escaping steam or coolant, do not remove the filler cap from the coolant expansion tank whilst the system is hot.**

CAUTION: **Engine coolant will damage the paint finished surfaces. If coolant is spilled, immediately remove the coolant and wash the area with water.**

1. Check the level of coolant in the expansion tank. With the engine cold, the coolant level must be to the **'UPPER LEVEL'** indicator mark above the **'COLD FILL RANGE'** text on the side of the expansion tank. Ignore any coolant which may be visible in the top section of the tank.

2. If topping-up is required, remove expansion tank filler cap and top-up coolant level to the **'UPPER LEVEL'** indicator mark.
For additional information, refer to: Specifications (303-03B Engine Cooling - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Specifications).

CAUTION: **Always top-up with a 50% mixture of anti-freeze and water.**

3.Install expansion tank filler cap, tighten cap until ratchet is heard to 'click'.

Coolant - Replace

1. Every 10 years or 150,000 miles (240,000 km): Replace the coolant.
For additional information, refer to: Cooling System Draining, Filling and Bleeding - V8 S/C 5.0L Petrol (303-03B Engine Cooling - V8 5.0L Petrol/V8 S/C 5.0L Petrol, General Procedures) /
Cooling System Draining, Filling and Bleeding - V8 5.0L Petrol (303-03B Engine Cooling - V8 5.0L Petrol/V8 S/C 5.0L Petrol, General Procedures).

Ignition System

2. Every 3 years or 45,000 miles (72,000 km) - Vehicles operating under arduous conditions: Replace spark plugs.
For additional information, refer to: Spark Plugs - V8 5.0L Petrol (303-07B Engine Ignition - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Removal and Installation) /
Spark Plugs - V8 S/C 5.0L Petrol (303-07B Engine Ignition - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Removal and Installation).

5. Every 7 years or 105,000 miles (168,000 km): Replace spark plugs.
For additional information, refer to: Spark Plugs - V8 5.0L Petrol (303-07B Engine Ignition - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Removal and Installation) /
Spark Plugs - V8 S/C 5.0L Petrol (303-07B Engine Ignition - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Removal and Installation).

Air Filtering

CAUTION: **When vehicles are operating under arduous conditions, the following service item must be carried out every 12 months or 15,000 miles (24,000 km).**

1. Every 4 years or 60,000 miles (96,000 km) - vehicles without supercharger: Replace the air filter element.
For additional information, refer to: Air Cleaner Element (303-12B Intake Air Distribution and Filtering - V8 5.0L Petrol, Removal and Installation).

2. Every 5 years or 75,000 miles (120,000 km) - vehicles with supercharger: Replace the air filter element.
For additional information, refer to: Air Cleaner Element (303-12B Intake Air Distribution and Filtering - V8 5.0L Petrol, Removal and Installation).

Ancillary Drive Belt

1. Check the condition of the ancillary drive belt.

2. Remove all traces of mud and dirt from the drive belt and pulleys.

3. Check the drive belt for signs of splitting and wear.

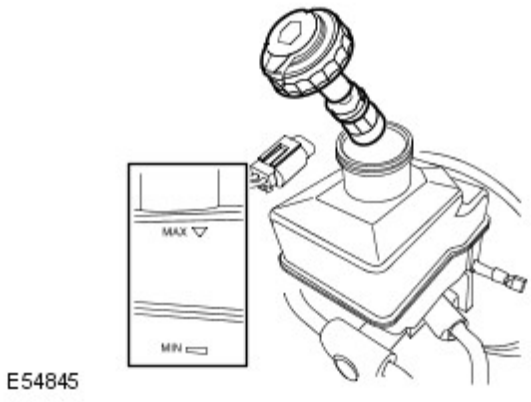
CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out every 5 years or 75,000 miles (120,000 km).**

4. Every 7 years or 105,000 miles (168,000 km) - vehicles with supercharger installed: Replace the supercharger belt.
For additional information, refer to: Supercharger Belt (303-05C Accessory Drive - V8 S/C 5.0L Petrol, Removal and Installation).

5. Every 10 years or 150,000 miles (240,000 km): Replace the ancillary drive belt.
For additional information, refer to: Accessory Drive Belt (303-05B Accessory Drive - V8 5.0L Petrol, Removal and Installation) /
Accessory Drive Belt (303-05C Accessory Drive - V8 S/C 5.0L Petrol, Removal and Installation).

Fluid Levels

Brake fluid reservoir



1. Remove the brake fluid reservoir cover.

2. Check the fluid level in the brake fluid reservoir, the level must be to the **'MAX'** mark on the reservoir; top-up if necessary.

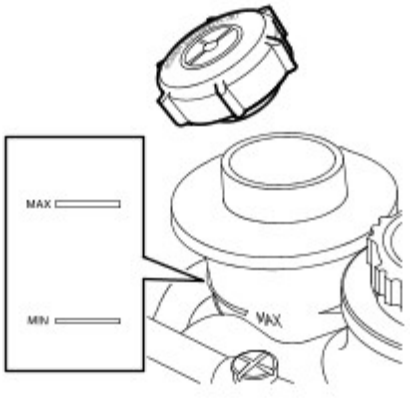
3. Clean the area around the reservoir filler cap, remove cap.

4. If necessary, top-up using the recommended fluid to the **'MAX'** mark on the reservoir.
For additional information, refer to: Specifications (206-00 Brake System - General Information, Specifications).

5. Install the reservoir filler cap.

6. Install the brake fluid reservoir cover.

Power steering fluid reservoir



CAUTION: **To prevent over filling, check/top-up the system with the engine switched off and the system cold. Make sure that the steering wheel is in the straight ahead position, do not turn the steering wheel prior to checking the fluid level.**

1. Check that the fluid level is to the mid-way mark between the **'MAX'** and **'MIN'** marks on the fluid reservoir, top-up if necessary.

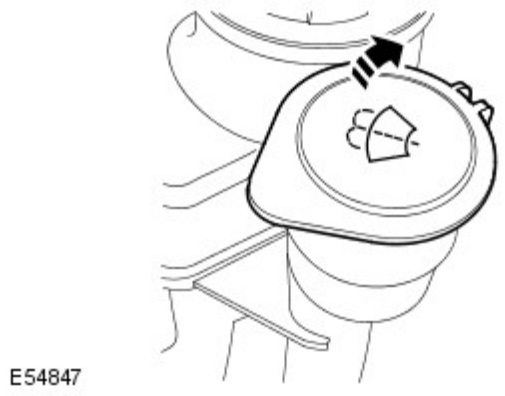
2. Clean the area around the reservoir filler cap, remove cap.

3. If necessary, top-up using the recommended fluid to the mid-way mark on the reservoir.
For additional information, refer to: Specifications (211-02 Power Steering, Specifications).

CAUTION: **Do not fill reservoir above the 'MAX' mark.**

4. Install the reservoir filler cap.

Windshield washer reservoir



1. Remove the windshield washer reservoir filler cap.

2. Top-up the reservoir using a mixture of an approved windshield washer fluid and water until the level is to the bottom of the gauze filter in the reservoir filler neck.

3. Install the reservoir filler cap.

Dynamic Response reservoir

1. Check that the fluid level is to the mid-way mark between the **'MAX'** and **'MIN'** marks on the fluid reservoir, top-up if necessary.

2. Clean the area around the reservoir filler cap, remove cap.

3. If necessary, top-up using the recommended fluid to the mid-way mark on the reservoir.

Engine Oil and Filter

CAUTIONS:

Rest of World Vehicles - Not UK and Europe: The following service items must be carried out every 6 months or 7,500 miles (12,000 km).

When vehicles are operating under arduous conditions, the following service items must be carried out every 3 months or 3,750 miles (6,000 km).

1. Renew engine oil and filter.

For additional information, refer to: Engine Oil Draining and Filling (303-01B Engine - V8 5.0L Petrol, General Procedures).

Automatic Transmission

1. Every 10 years or 150,000 miles (240,000 km): Renew automatic transmission fluid. For additional information, refer to:

Specifications (307-01B, Specifications),
Transmission Fluid Drain and Refill (307-01A Automatic Transmission/Transaxle - TDV6 3.0L Diesel /V8 5.0L Petrol/V8 S/C 5.0L Petrol, Vehicles With: 6HP28 6-Speed Automatic Transmission, General Procedures).

Transfer Case

1. Every 5 years or 75,000 miles (120,000 km): Renew transfer case oil.
For additional information, refer to: Specifications (308-07B Transfer Case, Specifications) / Transfer Case Draining and Filling (308-07B Transfer Case, General Procedures).

Differential Assemblies

1. Every 10 years or 150,000 miles (240,000 km): Renew front differential oil.
For additional information, refer to: Specifications (205-03 Front Drive Axle/Differential, Specifications) / Differential Draining and Filling (205-03 Front Drive Axle/Differential, General Procedures).

2. Every 5 years or 75,000 miles (120,000 km): Renew rear 'Electronic Torque Managed (ETM)' differential oil.
For additional information, refer to: Specifications (205-02 Rear Drive Axle/Differential, Specifications) / Differential Draining and Filling (205-03 Front Drive Axle/Differential, General Procedures).

3. Every 10 years or 150,000 miles (240,000 km): Renew rear 'OPEN' differential oil.
For additional information, refer to: Specifications (205-02 Rear Drive Axle/Differential, Specifications) / Differential Draining and Filling (205-02 Rear Drive Axle/Differential, General Procedures).

Suspension and Body Mountings

1. Check for free play in all suspension and body mounting rubbers.

2. Check condition of suspension rubber boots and gaiters.

3.Lift the vehicle so that front wheels are clear of ground/ramp to enable insertion of a suitable lever (e.g. a 1200mm long steel tube). Check the lower ball joints for free play by placing the lever between the ground/ramp and the tire, and lifting the wheel assembly with the lever. A second person will be required to check simultaneously for any ball joint lift. If free play (knock) is noted in the ball joint, replacement is required.

Removable Tow Bar

1. Check condition of removable tow bar.
For additional information, refer to: Tow Bar Mounting Check (502-02 Full Frame and Body Mounting, General Procedures).

Fuel System

1. Check fuel system pipes, hoses and unions for chafing, leaks and corrosion.

Electrical Harnesses

1. Check all electrical harnesses for chafing.

Oil/Fluid Leaks

1. Check for oil/fluid leaks.

Exhaust System

1. Check exhaust system for leaks, security and damage.

Power Steering

1. Check power steering rod ball joint fixings, gaiters and condition of ball joints and dust covers.

2. Check power steering pipes, hoses and unions for chafing, leaks and corrosion.

Fault Lamp(s)

1. If fault lamp(s) are illuminated, test the associated system using approved Land Rover diagnositc equipment and report findings.

Road Test

1. Carry out road test of vehicle.
For additional information, refer to: Road/Roller Testing (100-00 General Information, Description and Operation).

General

1. Endorse Service Record.

2. Report any unusual features of vehicle condition and any additional work required.

Additional Items That May Require Attention

It is recommended that:

1. Every 6 years: All brake fluid hydraulic seals are replaced.

 NOTE: This is in addition to the maintenance requirement that flexible brake hoses MUST be replaced at this service interval.

2. After 50 miles (80 km) continuous use in severe off-road conditions i.e. wading, deep mud and abrasive grit/slurry: The electric parking brake should be cleaned and inspected.

3. After 50 miles (80 km) continuous use in severe off-road conditions i.e. wading, deep mud and abrasive grit/slurry: The ancillary drive belt should be cleaned and inspected.

4. Vehicles with air suspension: Vehicles used extensively in arduous or off road conditions will require the compressor air inlet filter to be renewed more frequently.

5. Vehicles used in dusty or field conditions or deep wading: More frequent attention to the air cleaner will be required.

Maintenance Schedules - Maintenance Schedules - Diesel Engines

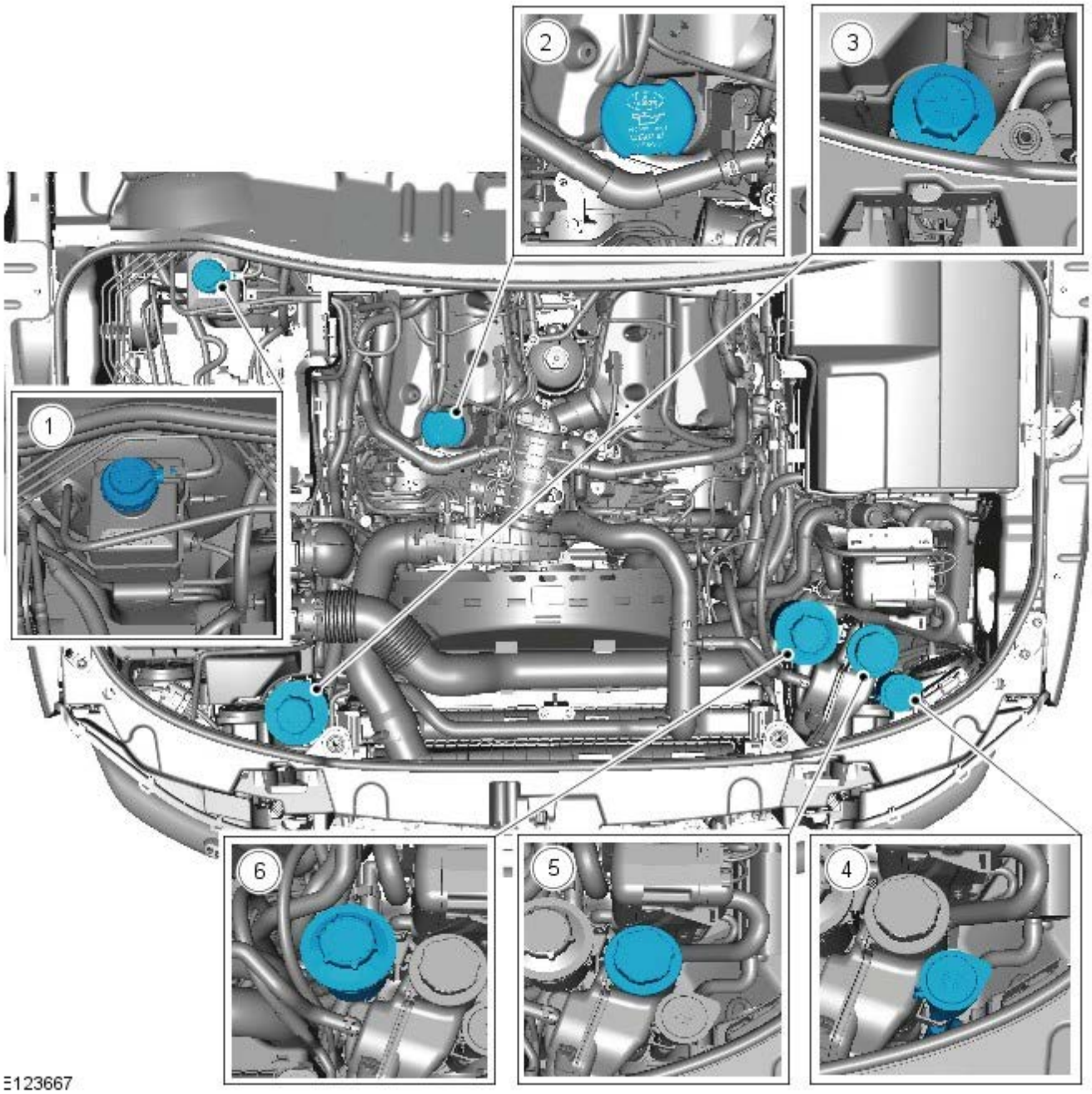
Description and Operation

Torque Specifications

Description	Nm	lb-ft
Seat frame fixing Torx screws	40	30
Seat belt fixing Torx screws	40	30
Road wheel nuts	140	103

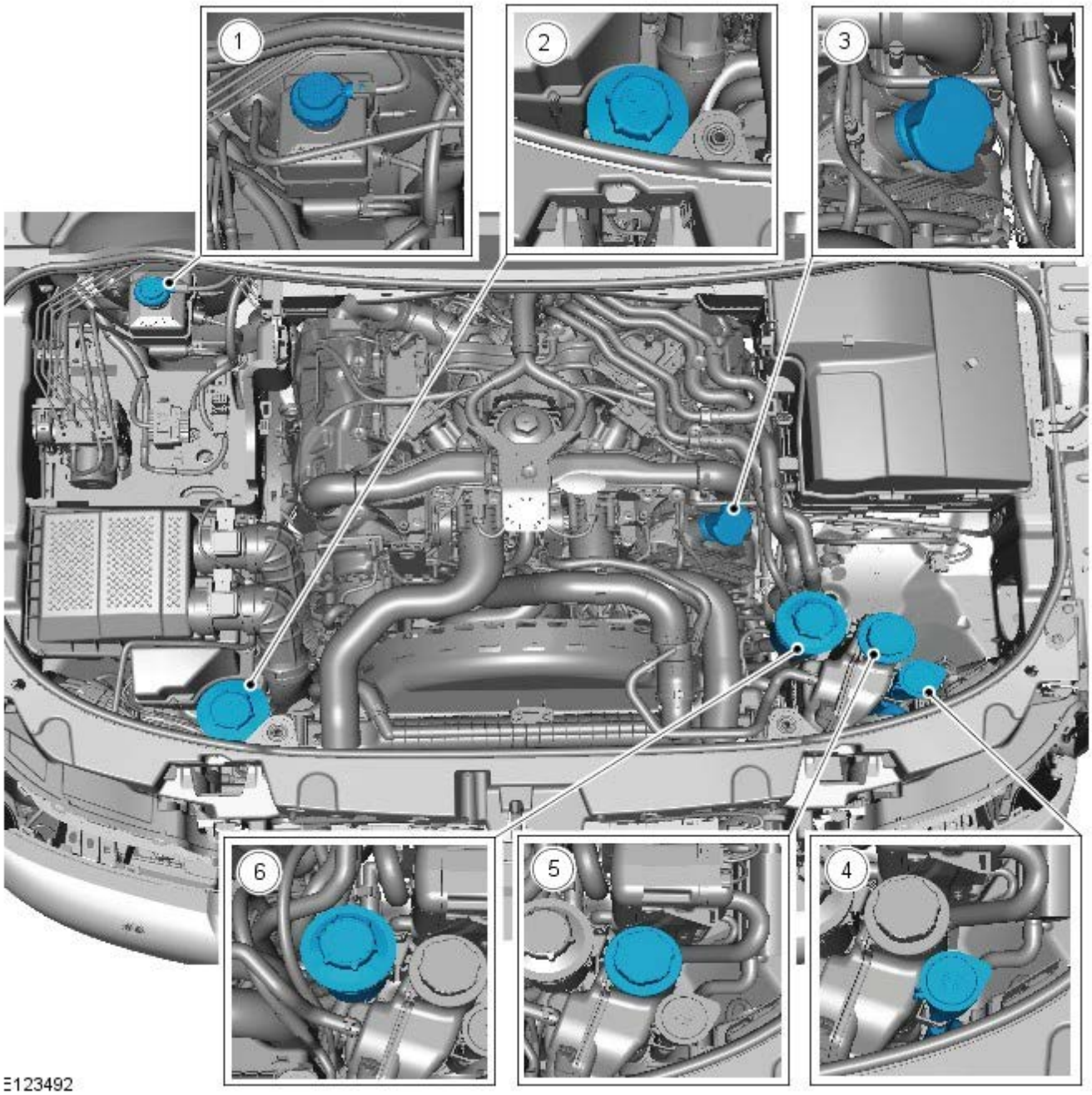
CAUTION: Unless stated otherwise, the following operations must be carried out at every service interval. Note that the A and B Services listed on the Maintenance Check Sheet, applicable to vehicles operating under arduous conditions, vary both in period and mileage (kilometres) to the intervals specified for those vehicles operating under normal conditions. Reference must therefore, always be made to the 'Arduous Conditions Maintenance Check Sheet' for vehicles operating under these conditions.

Underbonnet View - 3.0 Litre



- **1.** Brake fluid reservoir (RH drive illustrated - LH drive on opposite side)
- **2.** Engine oil filler cap
- **3.** Dynamic response fluid reservoir
- **4.** Windshield washer reservoir
- **5.** Coolant expansion tank
- **6.** Power steering fluid reservoir

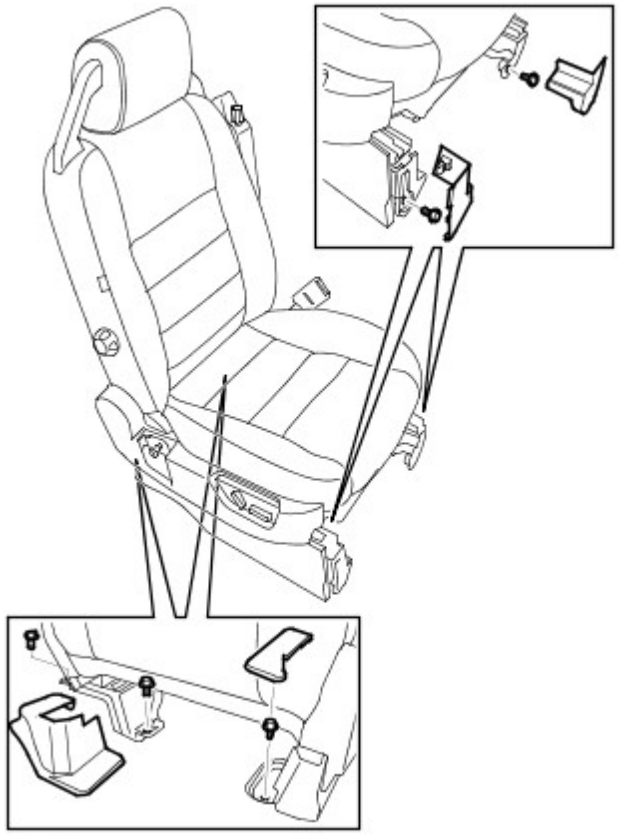
Underbonnet View - 3.6 Litre



- **1.** Brake fluid reservoir (RH drive illustrated - LH drive on opposite side)
- **2.** Dynamic response fluid reservoir
- **3.** Engine oil filler cap
- **4.** Windshield washer reservoir
- **5.** Coolant expansion tank
- **6.** Power steering fluid reservoir

Maintenance Operations

Seats and Safety Belts

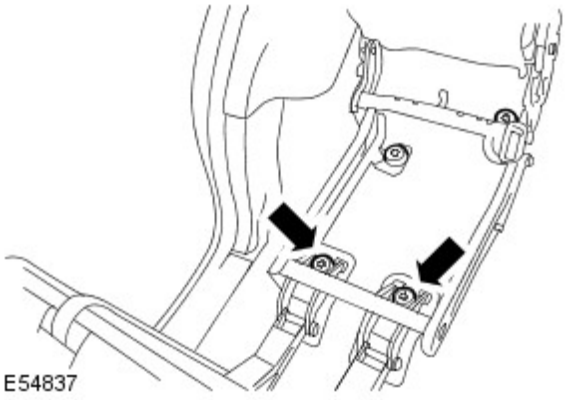


Front seat frame fixings - Every 2 years or 30,000 miles (48,000 km) - vehicles with 3.6L diesel. Or 32,000 miles (52,000 km) - vehicles with 3.0L diesel

1. Carefully remove the trim panels covering the seat frame fixing Torx screws.

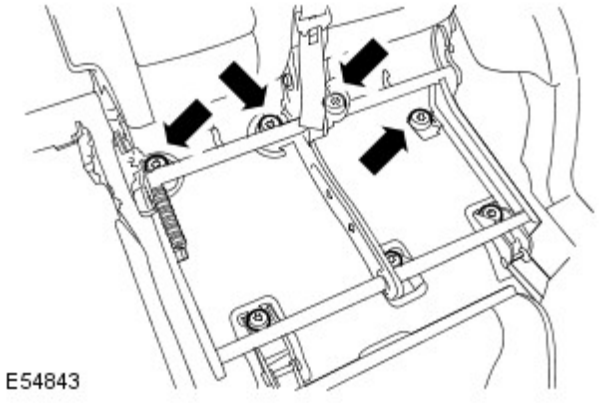
2. Check that the front seat frame fixing Torx screws are secure and that the seat frames show no signs of movement.

3. Reinstall the trim panels on completion.



Front seat frame fixings - Every 2 years or 30,000 miles (48,000 km) - vehicles with 3.6L diesel. Or 32,000 miles (52,000 km) - vehicles with 3.0L diesel

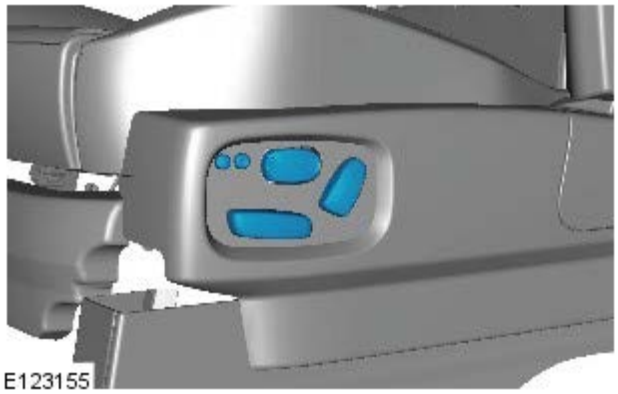
4. Check that the rear seat frame front fixings are secure and that the seat frames show no signs of movement.



Front seat frame fixings - Every 2 years or 30,000 miles (48,000 km) - vehicles with 3.6L diesel. Or 32,000 miles (52,000 km) - vehicles with 3.0L diesel

5. Fold the seat cushions forwards and check that the rear seat frame rear fixings are secure and that the seat frames show no signs of movement.

6. Fold the seat cushions back on completion.



Front seat controls

7. Check operation of all seat controls.

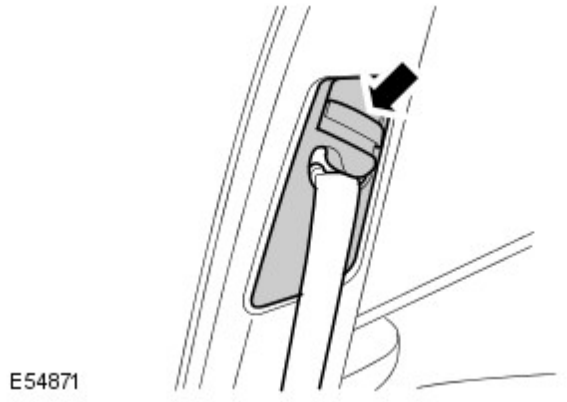
Safety belts - Every 2 years or 30,000 miles (48,000 km) - vehicles with 3.6L diesel. Or 32,000 miles (52,000 km) - vehicles with 3.0L diesel

8. Fully extend each safety belt and check that it returns unassisted; repeat for all belts.

9. Check entire length of safety belt webbing for signs of fraying or damage; repeat for all belts.

10. Connect each safety belt to the correct buckle, check safety belt buckle and tongue are secure; check that buckle releases tongue correctly.

11. Check all safety belt and buckle mountings and fixings for security.



12. Check front safety belt height adjusters for correct operation.

Lamps, Horns and Warning Indicators

1. Check side, head, fog, reversing and tail lamps for correct operation.

2. Check operation of headlamp automatic levelling system - if installed.

3. Check turn signals and hazard warning lamps for correct operation.

4. Check brake (stop) lamps for correct operation.

5. Check all exterior lamp lenses for clarity and condition; pay particular attention to headlamp and fog lamp lenses for stone chips or damage.

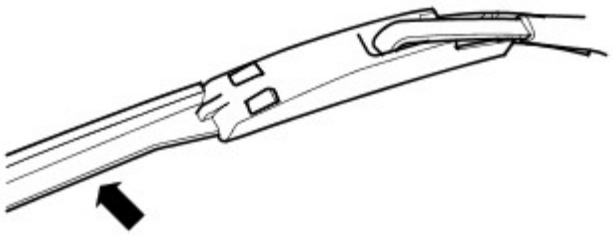
6. Check horn for loud, clear sound.

7. Switch on headlamps and check that side/headlamp reminder warning sounds when door is opened.

8. Check operation of interior courtesy lamps.

9. Check operation of all instrument pack warning and indicator lamps.

Washers and Wipers



E54838

1. Check all wiper blades for condition and signs of splits or damage.

2. Check security of wiper arms.

3. Operate front and rear screen washers, check that jets are clear and correctly aimed.

4. Operate front and rear wipers at all speeds and check for smooth, smear free operation.

Check High/Low Gear Engagement

1. Select LOW range gear, drive vehicle forwards 3 to 4 vehicle lengths, stop vehicle and select HIGH range gear - gears must engage smoothly.

Pollen Filter

1. Replace pollen filter.
For additional information, refer to: Pollen Filter (412-01 Air Distribution and Filtering, Removal and Installation).

Corrosion/Cosmetic Inspection

1. Carry out the annual corrosion/cosmetic inspection using the Annual Corrosion Inspection Sheet.

Wheels and Tires

1. Check that tires comply with manufacturer's specification.
For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Description and Operation).

2. Check/adjust tire pressures including spare.
For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Description and Operation).

3. Vehicles fitted with Uni-directional tires: Mark the wheel to stud relationship of each road wheel and note location of each road wheel to its respective hub.

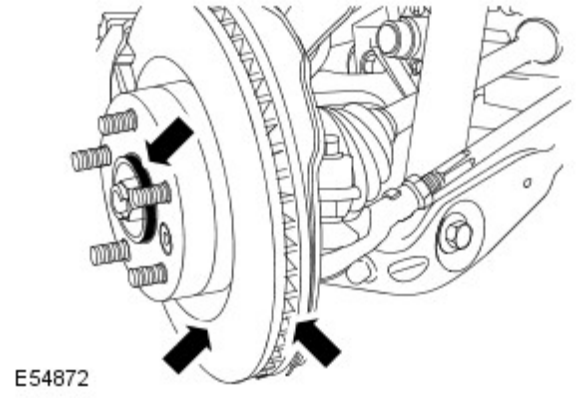
4. Loosen road wheel nuts. Raise vehicle to a wheel free condition.
For additional information, refer to: Lifting (100-02 Jacking and Lifting, Description and Operation).

5. Remove the road wheels.

6. Visually check tires for condition, lumps or bulges. Check tread depth across the width of the tire and around the circumference; make sure that remaining tread depth does not contravene local legislative requirements.

NOTE: Do not install wheels at this stage.

Braking System



CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out:**

- **Every 3 months or 3,750 miles (6,000 km) - vehicles with 3.6L diesel**
- **Every 3 months or 4,000 miles (6,500 km) - vehicles with 3.0L diesel**

1. Inspect front brake pads for wear.
For additional information, refer to: Specifications (206-03 Front Disc Brake, Specifications).

2. Inspect rear brake pads for wear.
For additional information, refer to: Specifications (206-04 Rear Disc Brake, Specifications).

3. Check brake calipers for signs of fluid leaks.

4. Check brake discs for condition.

5. Check all brake booster and brake system pipes and hoses for condition, chafing and leaks.

6. Clean road wheel hub spigots and apply grease, Land Rover Part Number RYL 105020 to the wheel mating surface of each spigot.

7. Vehicles fitted with Uni-directional tires: Install road wheels to their respective hubs ensuring that stud to wheel relationship is maintained.

8. Vehicles fitted with NON uni-directional tires: Install wheels on the opposite side of the vehicle but make sure that they are on the same axle as they were originally fitted.

9. Install road wheel nuts and tighten to 140 Nm (103 lb-ft).

CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out:**

- **Every 2 years or 30,000 miles (48,000 km) - vehicles with 2.7L diesel**
- **Every 2 years or 32,000 miles (52,000 km) - vehicles with 3.0L diesel**

10. Every 3 years or 45,000 miles (72,000 km) - vehicles with 3.6L diesel. Or 48.000 miles (77,000 km) - vehicles with 3.0L diesel: : Replace brake fluid.
For additional information, refer to: Brake System Bleeding - Vehicles With: High Performance Brakes (206-00 Brake System - General Information, General Procedures) /
Brake System Bleeding - Vehicles With: Standard Brakes (206-00 Brake System - General Information, General Procedures).

11. Every 6 years or 90,000 miles (144,000 km) - vehicles with 3.6L diesel. Or 96,000 miles (156,000 km) - vehicles with 3.0L diesel: Replace all flexible brake hoses.

Electric Parking Brake

CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out:**

- **Every 3 months or 3,750 miles (6,000 km) - vehicles with 3.6L diesel**
- **Every 3 months or 4,000 miles (6,500 km) - vehicles with 3.0L diesel**

1. Check the adjustment of the electric parking brake.
For additional information, refer to: Parking Brake Shoe and Lining Adjustment (206-05 Parking Brake and Actuation, General Procedures).

2. Vehicles operating under arduous conditions: Check the condition of the electric parking brake system.

Road Wheel Speed Sensors

CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out:**

- **Every 3 months or 3,750 miles (6,000 km) - vehicles with 3.6L diesel**
- **Every 3 months or 4,000 miles (6,500 km) - vehicles with 3.0L diesel**

1. Inspect the road wheel speed sensor harnesses for damage.

Fuel Filter Element

CAUTIONS:

 **When vehicles are operating under arduous conditions, the following service item must be carried out:**

- **Every 12 months or 15,000 miles (24,000 km) - vehicles with 3.6L diesel**
- **Every 12 months or 16,000 miles (26,000 km) - vehicles with 3.0L diesel**

 **China and India markets only: The following service item must be carried out:**

- **Every 6 months or 7,500 miles (12,000 km) - vehicles with 3.6L diesel**
- **Every 6 months or 8,000 miles (13,000 km) - vehicles with 3.0L diesel**

1. Every 2 years or 30,000 miles (48,000 km) - vehicles with 3.6L diesel. Or 32,000 miles (52,000 km) - vehicles with 3.0L diesel: Replace fuel filter element.
For additional information, refer to: Fuel Filter (310-01A, Removal and Installation) / Fuel Filter Element (310-01A Fuel Tank and Lines - TDV6 3.0L Diesel, Removal and Installation).

Fuel Sedimentor

 CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out:**

- **Every 3 months or 3,750 miles (6,000 km) - vehicles with 3.6L diesel**
- **Every 3 months or 4,000 miles (6,500 km) - vehicles with 3.0L diesel**

1. Drain the fuel sedimentor.

Radiator/intercooler and Cooling Fan

 CAUTION: **Vehicles operating under arduous conditions:**

1. Visually check the radiator/intercooler for external obstructions, check cooling fan blades for damage.

2. Remove any debris from the intercooler using a low pressure hose.

Air Suspension

1. Every 5 years or 75,000 miles (120,000 km) - vehicles with 3.6L diesel. Or 80,000 miles (129,000 km) - vehicles with 3.0L diesel - On vehicles operating under arduous conditions: Replace the air suspension compressor filter.
For additional information, refer to: Air Suspension Air Filter (204-05 Vehicle Dynamic Suspension, Removal and Installation).

Door Locks and Hinges

1. Check operation of all door locks, bonnet lock and fuel filler flap.

2. Lubricate all door check straps, bonnet catch and fuel filler flap catch.

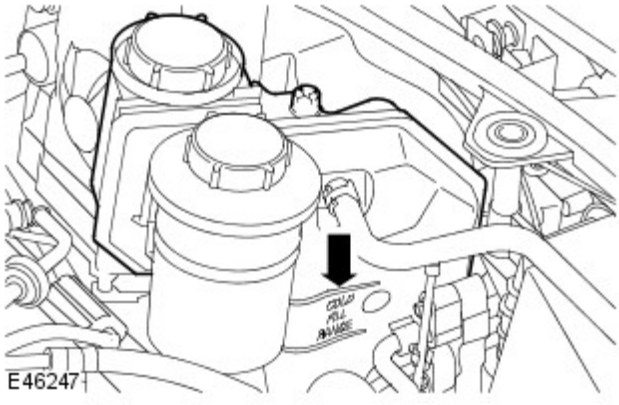
Cooling System

1. Check specific gravity of coolant using a hydrometer.

 NOTE: A suitable hydrometer is available from the Equipment Programme under Part Number 511 3302 001 00.

2. Top-up cooling system if necessary.
For additional information, refer to: Specifications (303-03A Engine Cooling - TDV6 3.0L Diesel, Specifications) / Specifications (303-03B, Specifications).

 CAUTION: **Anti-freeze concentration must be maintained at 50%.**



Cooling system - Check/Top-up

WARNING: **Since injury such as scalding could be caused by escaping steam or coolant, do not remove the filler cap from the coolant expansion tank whilst the system is hot.**

CAUTION: **Engine coolant will damage the paint finished surfaces. If coolant is spilled, immediately remove the coolant and wash the area with water.**

1. Check the level of coolant in the expansion tank. With the engine cold, the coolant level must be to the**'UPPER LEVEL'** indicator mark above the **'COLD FILL RANGE'** text on the side of the expansion tank. Ignore any coolant which may be visible in the top section of the tank.

2. If topping-up is required, remove expansion tank filler cap and top-up coolant level to the **'UPPER LEVEL'** indicator mark.
For additional information, refer to: Specifications (303-03A Engine Cooling - TDV6 3.0L Diesel, Specifications) / Specifications (303-03B, Specifications).

CAUTION: **Always top-up with a 50% mixture of anti-freeze and water.**

3. Install expansion tank filler cap, tighten cap until ratchet is heard to 'click'.

Coolant - Replace

1. Every 10 years or 150,000 miles (240,000 km) - vehicles with 3.6L diesel. Or 160,000 miles (258,000 km) - vehicles with 3.0L diesel: Replace the coolant.
For additional information, refer to: Cooling System Draining, Filling and Bleeding (303-03A Engine Cooling - TDV6 3.0L Diesel, General Procedures) /
Cooling System Draining and Vacuum Filling (303-03B, General Procedures).

Air Filtering

CAUTION: **When vehicles are operating under arduous conditions, the following service item must be carried out:**

- **Every 12 months or 15,000 miles (24,000 km) - vehicles with 3.6L diesel**
- **Every 12 months or 16,000 miles (26,000 km) - vehicles with 3.0L diesel**

1. Every 3 years or 45,000 miles (72,000 km) - vehicles with 3.6L diesel. Or 48,000 miles (77,000 km) - vehicles with 3.0L diesel: Replace the air cleaner element.
For additional information, refer to: Air Cleaner Element (303-12A Intake Air Distribution and Filtering - TDV6 3.0L Diesel, Removal and Installation) /
Air Cleaner Element (303-12B, Removal and Installation).

Ancillary Drive Belt

1. Check the condition of the ancillary drive belt.

2. Remove all traces of mud and dirt from the drive belt and pulleys.

3. Check the drive belt for signs of splitting and wear.

CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out:**

- **Every 5 years or 75,000 miles (120,000 km) - vehicles with 3.6L diesel**
- **Every 5 years or 80,000 miles (129,000 km) - vehicles with 3.0L diesel**

4. Every 10 years or 150,000 miles (241,000 km) - vehicles with 3.6L diesel. Or 160,000 miles (258,000 km) - vehicles with 3.0L diesel: Replace the ancillary drive belt.
For additional information, refer to: Accessory Drive Belt (303-05A Accessory Drive - TDV6 3.0L Diesel, Removal and Installation) /

Accessory Drive Belt (303-05B, Removal and Installation).

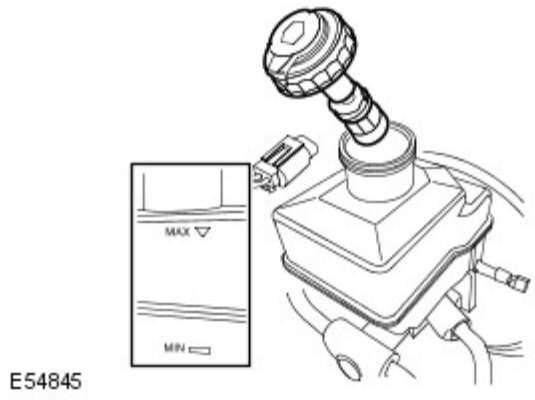
Camshaft Timing Belt and Rear End Accessory Drive (READ) Belt

CAUTION: **When vehicles are operating under arduous conditions, the following service items must be carried out every 4 years or 56,000 miles (90,000 km) - vehicles with 3.0L diesel:**

1. Every 7 years or 112,000 miles (180,000 km) - vehicles with 3.0L diesel: Replace camshaft timing belt.
For additional information, refer to: Timing Belt (303-01A Engine - TDV6 3.0L Diesel, Removal and Installation).
Replace READ belt.
For additional information, refer to: Rear End Accessory Drive (READ) (303-05A Accessory Drive - TDV6 3.0L Diesel, Removal and Installation).

Fluid Levels

Brake/clutch fluid reservoir



1. Remove the brake/clutch fluid reservoir cover.

2. Check the fluid level in the brake/clutch fluid reservoir, the level must be to the **'MAX'** mark on the reservoir; top-up if necessary.

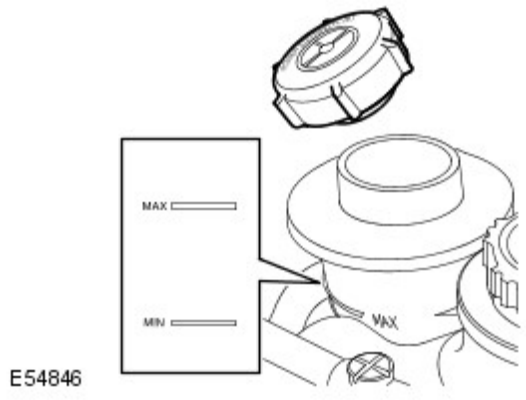
3. Clean the area around the reservoir filler cap, remove the cap.

4. If necessary, top-up using the recommended fluid to the **'MAX'** mark on the reservoir.
For additional information, refer to: Specifications (206-00 Brake System - General Information, Specifications).

5. Install the reservoir filler cap.

6. Install the brake/clutch fluid reservoir cover.

Power steering fluid reservoir



CAUTION: To prevent over filling, check/top-up the system with the engine switched off and the system cold. Make sure that the steering wheel is in the straight ahead position, do not turn the steering wheel prior to checking the fluid level.

1. Check that the fluid level is to the mid-way mark between the **'MAX'** and **'MIN'** marks on the fluid reservoir, top-up if necessary.

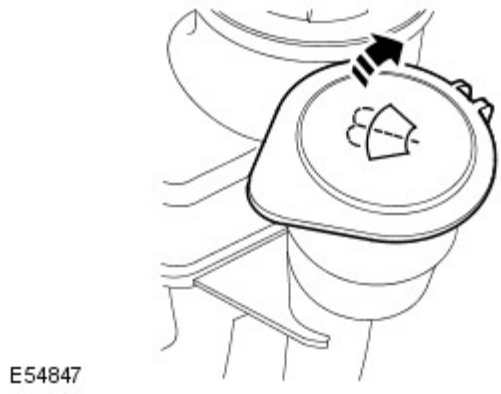
2. Clean the area around the reservoir filler cap, remove the cap.

3. If necessary, top-up using the recommended fluid to the mid-way mark on the reservoir.
For additional information, refer to: Specifications (211-02 Power Steering, Specifications).

CAUTION: **Do not fill reservoir above the 'MAX' mark.**

4. Refit the reservoir filler cap.

Windshield washer reservoir



1. Remove the windshield washer reservoir filler cap.

2. Top-up the reservoir using a mixture of an approved windshield washer fluid and water until the level is to the bottom of the gauze filter in the reservoir filler neck.

3. Install the reservoir filler cap.

Dynamic Response reservoir

1. Check that the fluid level is to the mid-way mark between the **'MAX'**and **'MIN'**marks on the fluid reservoir, top up if necessary.

2. Clean the area around the reservoir filler cap, remove the cap.

3. If necessary, top-up using the recommended fluid.

Engine Oil and Filter

CAUTIONS:

When vehicles are operating under arduous conditions, the following service items must be carried out:

- **Every 3 months or 3,750 miles (6,000 km) - vehicles with 3.6L diesel**
- **Every 3 months or 4,000 miles (6,500 km) - vehicles with 3.0L diesel**

Rest of World Vehicles - Not UK and Europe: The following service items must be carried out:

- **Every 6 months or 7,500 miles (12,000 km) - vehicles with 3.6L diesel**
- **Every 6 months or 8,000 miles (13,000 km) - vehicles with 3.0L diesel**

1. Renew engine oil and filter.
For additional information, refer to: Engine Oil Draining and Filling (303-01A Engine - TDV6 3.0L Diesel, General Procedures) /
Engine Oil Draining and Filling (303-01B, General Procedures).

Automatic Transmission

1. Every 10 years or 150,000 miles (241,000 km) - vehicles with 3.6L diesel: Renew automatic transmission fluid.
For additional information, refer to: Specifications (307-01A, Specifications) /
Transmission Fluid Drain and Refill (307-01 Automatic Transmission/Transaxle - 3.6L (TdV8) Diesel, General Procedures).

1. Every 9 years or 144,000 miles (232,000 km) - vehicles with 3.0L diesel: Renew automatic transmission fluid.
For additional information, refer to: Specifications (307-01B, Specifications) /
Transmission Fluid Drain and Refill (307-01A Automatic Transmission/Transaxle - TDV6 3.0L Diesel /V8 5.0L Petrol/V8 S/C 5.0L Petrol, Vehicles With: 6HP28 6-Speed Automatic Transmission, General Procedures).

Transfer Case

1. Every 5 years or 75,000 miles (120,000 km) - vehicles with 3.6L diesel. Or 80,000 miles (129,000 km) - vehicles with 3.0L diesel: Renew transfer case oil.
For additional information, refer to: Specifications (308-07B Transfer Case, Specifications) /
Transfer Case Draining and Filling (308-07B Transfer Case, General Procedures).

Differential Assemblies

1. Every 10 years or 150,000 miles (241,000 km) - vehicles with 3.6L diesel. Or 160,000 miles (258,000

km) - vehicles with 3.0L diesel: Renew front differential oil.
For additional information, refer to: Specifications (205-03 Front Drive Axle/Differential, Specifications) / Differential Draining and Filling (205-03 Front Drive Axle/Differential, General Procedures).

2.Every 5 years or 75,000 miles (120,000 km) - vehicles with 3.6L diesel. Or 80,000 miles (129,000 km) - vehicles with 3.0L diesel: Renew rear 'Electronic Torque Managed (ETM)' differential oil.
For additional information, refer to: Specifications (205-02 Rear Drive Axle/Differential, Specifications) / Differential Draining and Filling (205-02 Rear Drive Axle/Differential, General Procedures).

3. Every 10 years or 150,000 miles (241,000 km) - vehicles with 3.6L diesel. Or 160,000 miles (258,000 km) - vehicles with 3.0L diesel: Renew rear 'OPEN' differential oil.
For additional information, refer to: Specifications (205-02 Rear Drive Axle/Differential, Specifications) / Differential Draining and Filling (205-02 Rear Drive Axle/Differential, General Procedures).

Suspension and Body Mountings

1. Check for free play in all suspension and body mounting rubbers.

2. Check condition of suspension rubber boots and gaiters.

3.Lift the vehicle so that front wheels are clear of ground/ramp to enable insertion of a suitable lever (e.g. a 1200mm long steel tube). Check the lower ball joints for free play by placing the lever between the ground/ramp and the tire, and lifting the wheel assembly with the lever. A second person will be required to check simultaneously for any ball joint lift. If free play (knock) is noted in the ball joint, replacement is required.

Removable Tow Bar

1. Check condition of removable tow bar.
For additional information, refer to: Tow Bar Mounting Check (502-02 Full Frame and Body Mounting, General Procedures).

Fuel System

1. Check fuel system pipes, hoses and unions for chafing, leaks and corrosion.

Electrical Harnesses

1. Check all electrical harnesses for chafing.

Oil/Fluid Leaks

1. Check for oil/fluid leaks.

Exhaust System

1. Check exhaust system for leaks, security and damage.

Power Steering

1. Check power steering rod ball joint fixings, gaiters and condition of ball joints and dust covers.

2. Check power steering pipes, hoses and unions for chafing, leaks and corrosion.

Clutch

1. Check clutch pipes and unions for chafing, leaks and corrosion.

Fault Lamp(s)

1. If fault lamp(s) are illuminated, test the associated system using approved Land Rover diagnostic equipment and report findings.

Road Test

1. Carry out road test of vehicle.
For additional information, refer to: Road/Roller Testing (100-00 General Information, Description and Operation).

General

1. Endorse Service Record.

2. Report any unusual features of vehicle condition and any additional work required.

Additional Items That May Require Attention

It is recommended that:

1. Every 6 years: All brake fluid hydraulic seals are replaced.

 NOTE: This is in addition to the maintenance requirement that flexible brake hoses MUST be replaced at this service interval.

2. After 50 miles (80 km) continuous use in severe off-road conditions i.e. wading, deep mud and abrasive grit/slurry: The electric parking brake should be cleaned and inspected.

3. After 50 miles (80 km) continuous use in severe off-road conditions i.e. wading, deep mud and abrasive grit/slurry: The ancillary drive belt should be cleaned and inspected.

4. Vehicles fitted with air suspension: Vehicles used extensively in arduous or off road conditions will require the compressor air inlet filter to be renewed more frequently.

5. Vehicles used in dusty or field conditions or deep wading: More frequent attention to the air cleaner will be required.

6. Vehicles used in areas where fuel quality is poor: Where vehicles are used in these areas, the fuel sedimentor may require draining at more frequent intervals.

Vehicle Transportation Aids and Vehicle Storage - New Vehicle Storage

Description and Operation

INTRODUCTION

Standards

Vehicles may require storage for varying periods of time before the customer takes delivery. It is essential that a new Land Rover vehicle is stored correctly, in order to ensure total customer satisfaction after the car is removed from storage and prepared for sale.

This document establishes the MINIMUM STANDARDS required of franchise holders and appointed vehicle storage companies by Land Rover for the storage of new vehicles, and may only be deviated from with the Company's agreement. Any concerns should be discussed with your Franchise Regional Manager.

This information should be used in conjunction with the relevant Pre-Delivery Inspection (PDI) information.

AREAS OF RESPONSIBILITY

Preventative Measures

Adequate preventative measures must be taken to ensure that each vehicle in stock is maintained in peak condition.

ARRIVAL

It is your responsibility to notify delivery companies immediately of any losses and/or transit damage identified on receipt of the vehicle.

Where applicable, Vehicle Condition Reports (VCR's) must be endorsed accordingly, otherwise it is unlikely that the transit insurance company will accept any claims for missing items or damage rectification.

STORAGE

Correct preparation of vehicles for storage is essential. The majority of new vehicles leaving Land Rover are provided with the appropriate protection for transit. It is your responsibility to ensure that a vehicle storage department, or specialist company, is sufficiently equipped to undertake the storage requirements endorsed in this publication. **Whilst vehicles are in storage, any deterioration or damage sustained is the sole responsibility of the storage operator and must NOT be made the subject of a warranty claim.**

DISPATCH

When removing vehicles from storage, you are responsible for procedures that ensure they are in a safe and roadworthy condition.

VEHICLE STORAGE

VEHICLE IDENTIFICATION UPON ARRIVAL

1. **A New Vehicle Storage History Sheet must be raised for every new vehicle upon arrival and should remain inside the vehicle until despatch. This must contain a record of the vehicle condition and any rectification work carried out during the storage period (see Storage History Sheet).**
2. Vehicles must be checked for correct specification and/or shortages. Where this is incorrect the required parts should be procured through normal channels and costs claimed back via the DDW system using the appropriate shortage or misbuild program code.
    - Claims for rectifying incorrect specification items and/or shortages must be made in accordance with the conditions detailed in Section C of the Warranty Policy and Procedures Manual.
    - **NOTE**: All missing items should be recorded on the New Vehicle Storage History Sheet and countersigned by an authorized person.
3. Vehicles must be inspected for transit damage.
    - Delivery damage is not the responsibility of Land Rover and must not be made the subject of a warranty claim. It is the responsibility of the Dealer/Retailer or vehicle storage company to identify any such damage at the time of the new vehicle receipt and to ensure that the full details are recorded on the Delivery Receipt. Claims for rectification of such damage must be directed to the Delivery Company.
    - Failure to notify the Delivery Company of damage details at the time of vehicle delivery will result in claims for subsequent rectification being rejected.
    - Warranty claims for damage repairs may only be submitted where Land Rover's responsibility is clearly indicated. Examples falling into this category are paintwork damage during the fitment of trim or outward facing dents on the door skin.
    - Warranty claims will not be accepted for any transit damage repaired or identified after the vehicle has been placed into service.
4. A label should be suitably affixed to the inside of the windshield indicating the date of vehicle arrival. Labels must not be stuck directly to the windshield but placed in a transparent licence holder, or alternatively stuck to a piece of cling film and attached to the inside of the windshield. This will avoid damage to the windshield when removing labels.
5. Ignition and door keys must be suitably labelled and when the vehicle is locked, they must be held in a suitably identified and secure office. All key numbers must be recorded on the New Vehicle Storage History Sheet. All keys, including spares, must be removed from the vehicle during storage for security reasons.

VEHICLE INSPECTION

The entire vehicle exterior must be inspected and, if necessary, washed thoroughly, including the underside and wheel arches, to remove all dirt and mud deposits.

Any defects found during inspection must be rectified before the vehicle is stored.

Ensure that bumper and body side protectors are correctly located.

There are two main methods of vehicle storage:

1. Collective storage of several vehicles in an open compound.
2. Collective storage of a small number of vehicles, normally at the dealership/retailer and possibly under cover.

IDEALLY ALL VEHICLES SHOULD BE STORED IN A WELL VENTILATED AND TEMPERATURE-CONTROLLED BUILDING.

However, it is recognised that the majority of all vehicle storage is done in an open compound. Therefore, the following site requirements must be observed and should be authorised with your Regional Manager.

1. The site should have a well-drained hard standing surface, preferably concrete or tarmac, which is free from undergrowth.
2. The site and driveways must be kept clean and clear of any obstruction at all times.
3. The site must be enclosed by a secure intruder-proof perimeter fence and the gates securely locked. The site should be under daily surveillance, with unauthorised access prevented at all times.
4. The site should be located away from areas subject to industrial fallout, sea spray or wind-blown dust and sand. Where fallout conditions are unavoidable it will be necessary to monitor the exterior condition of all cars and wash as necessary. Heavy contamination may require vehicles to have the transit protection coating removed and problems arising from the contamination rectified. Once the transit coating has been removed, the vehicle must not be returned to outdoor storage unless it is fully covered to provide the necessary protection against deterioration.
5. Mains water, tyre inflation and battery charging facilities must be available on site.
6. Hedges, shrubs and trees adjacent to the site should be kept trimmed and clear of parked vehicles.
7. Vehicles must not be parked under trees, overhead cables or other overhanging structures as bird droppings or other types of contamination could occur.

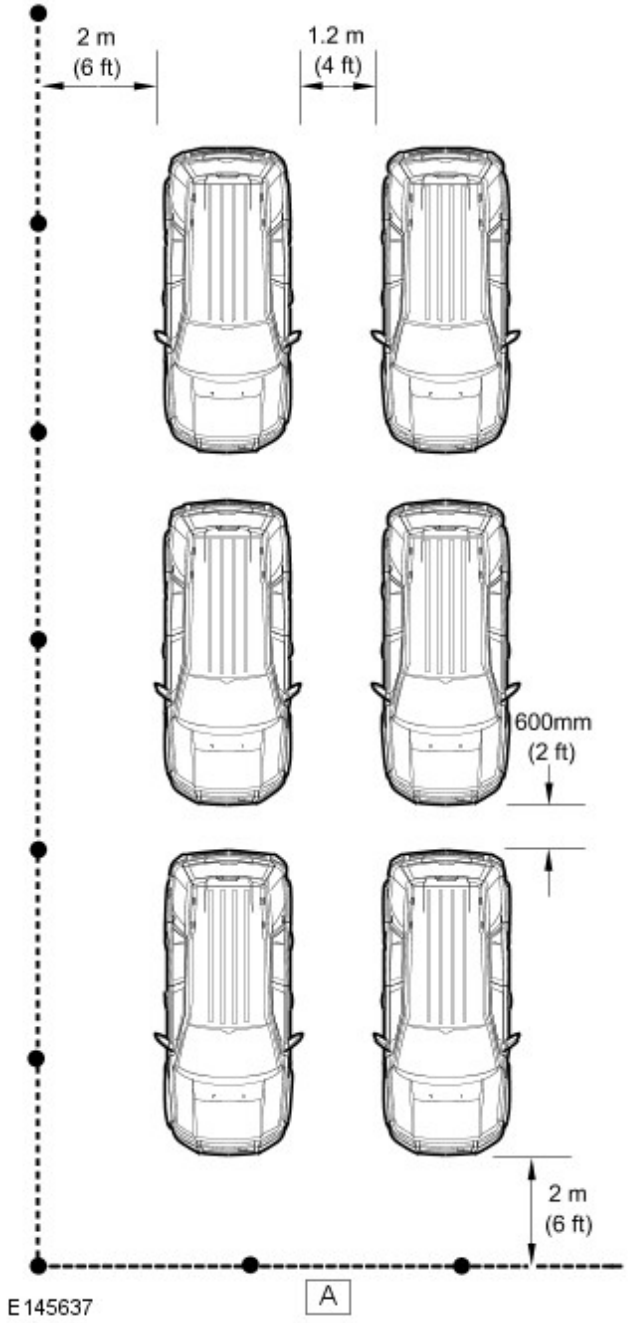
VEHICLE PARKING

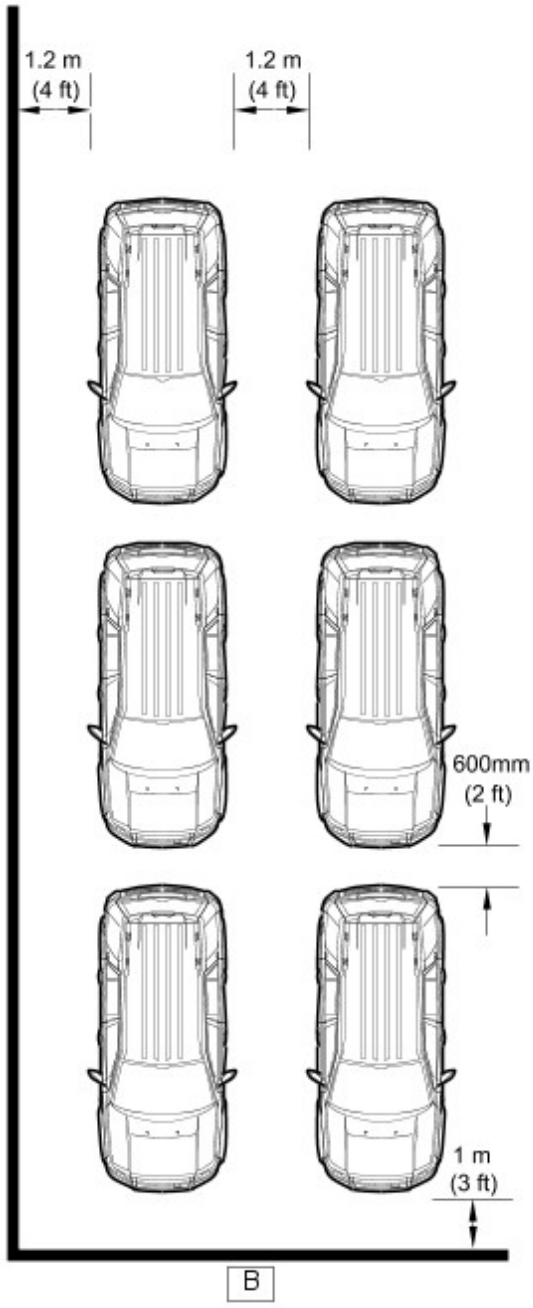
Vehicles must be parked tidily with a minimum of 600 mm (2 feet) between bumpers, front and rear.

There must be a full doors width clearance between the driver’s door and any adjacent vehicle or obstruction.

Vehicles must be parked at least 1.2 metres (4 feet) away from any interior wall or, for outside storage, at least 2 metres (6 feet) away from any perimeter fence.

Vehicles must be moved on a first-in-first-out basis, subject to specification.





Item	Part Number	Description
A	-	Storage Outside
B	-	Storage Inside

FACILITIES AND EQUIPMENT

Car wash facilities.

Tyre inflation equipment with calibrated gauge 0 - 4.05 bar (0 - 60lbf/in²).

All equipment used must be functionally capable of meeting the compliance requirements. Please refer to the approved equipment document.

Jacking equipment.

Wheel brace.

The following materials must be available and must meet Land Rover specifications:

- Engine oil.
- Transmission fluid.
- Brake fluid.
- Distilled water.
- Windscreen washer fluid.
- Anti-freeze.

Access to trailer/recovery vehicle (Vehicles should not be towed).

Comprehensive filing system for vehicle records.

NOTE: Tools supplied with the vehicle must not be used for any rectification work prior to the prospective purchaser.

OPERATIONS REQUIRED DURING STORAGE PERIOD

REFERENCE CHART

The following chart gives a quick reference to the requirements necessary during the time a vehicle is in storage. A detailed explanation of each operation is provided on subsequent pages.

If a vehicle remains in storage after 150 days from receipt of vehicle, a new form must be started.

OPERATION	UPON RECEIPT	30 days from receipt	60 days from receipt	90 days from receipt	120 days from receipt	150 days from receipt
1. IDENTIFICATION	X	.	.	.	.	.
2. INSPECTION	X	X	X	X	X	X
3. BATTERIES	X	X	X	X	X	X
4. COOLING SYSTEM	X	X	X	X	X	X
5. ENGINE	X	X	X	X	X	X
6. AIR CONDITIONING	X	X	X	X	X	X
7. TIRES	X	X	X	X	X	X
8. PARKING BRAKE	X	X	X	X	X	X
9. DOORS, WINDOWS AND VEHICLE INTERIOR	X	.	.	X	.	.
10. WINDSHIELD WIPER BLADES	X	.	.	X	.	.
11. PAINTWORK	.					
All markets	REMOVE 'WRAPGUARD' AFTER 180 DAYS					

STORAGE OPERATIONS

BATTERIES

To make sure the correct standard of battery care, please see the ‘Battery Care Requirements for New Vehicles (Dealer and Retailer).

For requirements for receipt of a new vehicle, new vehicle storage and replacement batteries please see the battery care requirements for new vehicles (dealer and service)

Place a label on the vehicle (or on New Vehicle Storage History Sheet) to indicate when a recharge will be required. The battery condition should be checked prior to starting and/or moving the vehicle.
For additional information, refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

The storage, handling and charging of batteries is not dangerous provided that the relevant battery manufacturers’ recommendations are followed. However, a suitable storage and charging facility must be available and should be in accordance with local legal requirements.

HYBRID ELECTRIC VEHICLE (HEV) BATTERY PACK

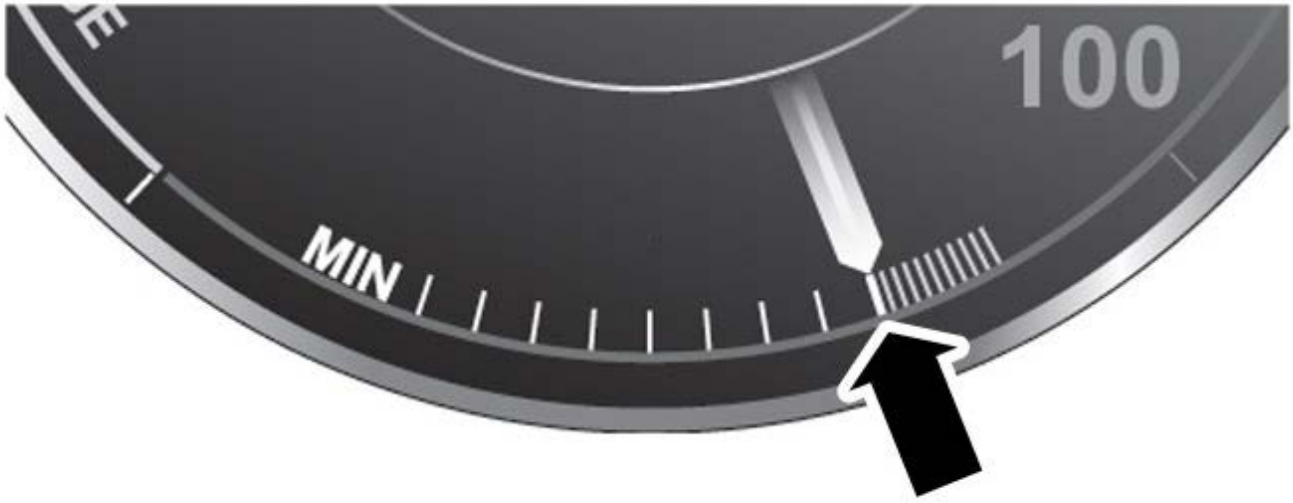
CAUTION: Always keep the high voltage battery charged, failure to do so may cause damage to the battery.

NOTE: In extreme cold climate conditions (circa -30°C), store the vehicle in a warmer area to protect it from the environment.

If the vehicle is not used for 30 days or more, it is essential that the high voltage battery is charged. For longer storage periods, charge the high voltage battery every 30 days.

Charge the HEV battery pack as follows:

- Start the vehicle (using the engine Start/Stop button and brake pedal sequence).
- To view the Tachometer, open the instrument cluster menu, then select Instrument Display, Hybrid Content and Reduced Hybrid Display.
- Raise the engine to approximately 1500 rpm.
- When the battery charge level has reached the position indicated in the following graphic, the vehicle may be switched off.



E161503

COOLING SYSTEM

It is ESSENTIAL to maintain the concentration of anti-freeze at the factory-fill condition. Failure to do so may cause oxidisation of the cooling system leading to corrosion of the engine and heater.

The coolant mixture specification is 50% plain water and 50% Land Rover anti-freeze, Coolant and Corrosion Inhibitor for frost protection down to -36°C (-33°F).

Coolant specific gravity must be checked monthly using a high quality hydrometer with an appropriate range. At a coolant temperature of 15°C (60°F), the correct specific gravity reading is 1.074. If the coolant is above or below this temperature, the following corrections will enable accurate specific gravity readings to be taken:

- For higher temperatures: add 0.004 to the specific gravity for each 5°C (10°F).
- For lower temperatures: deduct 0.004 from the specific gravity for each 5°C (10°F).

If the specific gravity is correct but the cooling system requires additional coolant, mix anti-freeze and water to the correct proportions and to the correct volume, then add to the system. Examine for leaks from the radiator and hoses and rectify as necessary.

If the check shows that the coolant contains less than the required anti-freeze content, proceed as follows:

1. Carefully examine the radiator and all hoses for leaks and security of hose clamps.
2. Remove the header tank pressure cap and drain the cooling system as instructed in the relevant service manual.
3. Mix anti-freeze and water in the correct proportions and to the correct volume.
4. Close the drain plug and add the coolant until the level in the header tank is steady at ‘MAX’.

WARNING: DO NOT REMOVE THE HEADER TANK PRESSURE CAP WHILE THE ENGINE IS HOT.

CAUTION: DO NOT use radiator anti-freeze solution in the windshield washer equipment or paint work will be damaged.

ENGINE OIL LEVEL

Where fitted, remove the dipstick and check the engine oil level. If necessary, top up with the approved grade of engine oil.

On vehicles with an electronic oil level and temperature sensor, check the engine oil level using the procedures described in the applicable Workshop Manual.

ENGINE AND AIR CONDITIONING SYSTEM

If the vehicle is stored for 30 days or more, the engine and air conditioning system should be operated using the following process:

- Set the ignition to power mode 6
- Ensure the air conditioning system is switched off
- Start the engine and run for 1 minutes at idle
- Raise the engine speed to 2000 RPM for 5 minutes
- Return the engine speed to idle
- Set the air conditioning temperature to 22° and the fan blower speed to 75% of the maximum blower speed
- Switch on the air conditioning system
- Ensure all the instrument panel air ducts are open
- Run the air conditioning system for minimum of 5 continuous minutes with the engine at idle

TIRES

For storage purposes, tires on fitted wheels must be inflated to and maintained at a maximum pressure of 3.60 bar (52 lbf/in2).

 NOTE: Wheels must be rotated through 90 degrees in the forward direction monthly, to ensure that the tread is rotated evenly during the storage period.

The spare wheel tire pressure must be maintained at the appropriate pressure specified in the Owners Handbook.

Tire condition should be inspected and defective tires replaced prior to removal from storage.

Guidance for Rotation of Tires

To ensure tires are rotated through a minimum of 90 degrees, apply a chalk mark on a front wheel tire wall at the current centre contact point with the road surface. Move the car forwards until the chalk mark is at the horizontal position. This process can be applied to a single car or to a row of vehicles and should ensure that all four wheels on each vehicle is rotated by 90 degrees.

PARKING BRAKE

Vehicles with Manual Park Brake

The parking brake must NOT remain ‘on’ during storage.

After parking:

- Manual transmission vehicles: select first or reverse gear and release the parking brake
- Automatic transmission vehicles: select ‘P’ and release the parking brake.

Vehicles with Electric Park Brake (EPB)

For vehicles with EPB, the park brake will remain locked onto the brake disc during storage. Refer to the Workshop Manual, General Procedures, Parking Brake and Actuation for EPB release procedure.

 NOTE: For all vehicles with an Electronic Parking Brake (EPB), on manual transmission vehicles, first or reverse gear must be selected before releasing the EPB. On automatic transmission vehicles 'Park' (P) must be selected before releasing the EPB.

Where possible the EPB must not remain on during storage. If, for any reason, it is not possible to perform the release procedure, the operation of the EPB must be checked/monitored monthly during the road wheel rotation procedure.

AIR SUSPENSION (IF FITTED)

During storage the air suspension system should be left in the transit mode. No other checks are necessary during storage for this system.

DOORS, WINDOWS AND VEHICLE INTERIOR

Doors, windows, bonnet, boot lid and fuel filler flap must be closed and locked to prevent water and moisture ingress. A check should be done each month for any signs of water ingress into the cars interior and luggage compartment. Any water ingress points should be rectified immediately.

WINDSHIELD WIPER BLADES

Depending on the model, where possible move the wiper arms and blades away from the windshield and leave in the extended position.

PAINTWORK

Paintwork can be damaged if the protective coating remains on the vehicle for an extended period of time. In markets with high levels of ultraviolet light (tropical or semi-tropical conditions), the protective coating MUST be removed after six months. For all other markets the protective coating MUST be removed after nine months.

If storage is subsequently continued, the vehicle must be kept under cover and should be washed regularly (at least every month).

REMOVAL FROM STORAGE

PROCEDURES

Before removal from storage area, all fluid levels including coolant, hydraulic fluids and lubricating oils must be checked and replenished where necessary. Where a substantial loss has occurred the cause must be traced prior to moving the vehicle.

The New Vehicle Storage History Sheet must be checked and safety related faults rectified before the vehicle is moved from the storage site. These checks are essential to ensure that the vehicle is safe to drive.

Tires must be adjusted to the pressures recommended in the relevant service manual or owners handbook.

Reconnect the battery negative terminal (when applicable).

Check the operation of the lighting and signalling equipment.

TRANSIT PROTECTION COATING (WHERE FITTED)

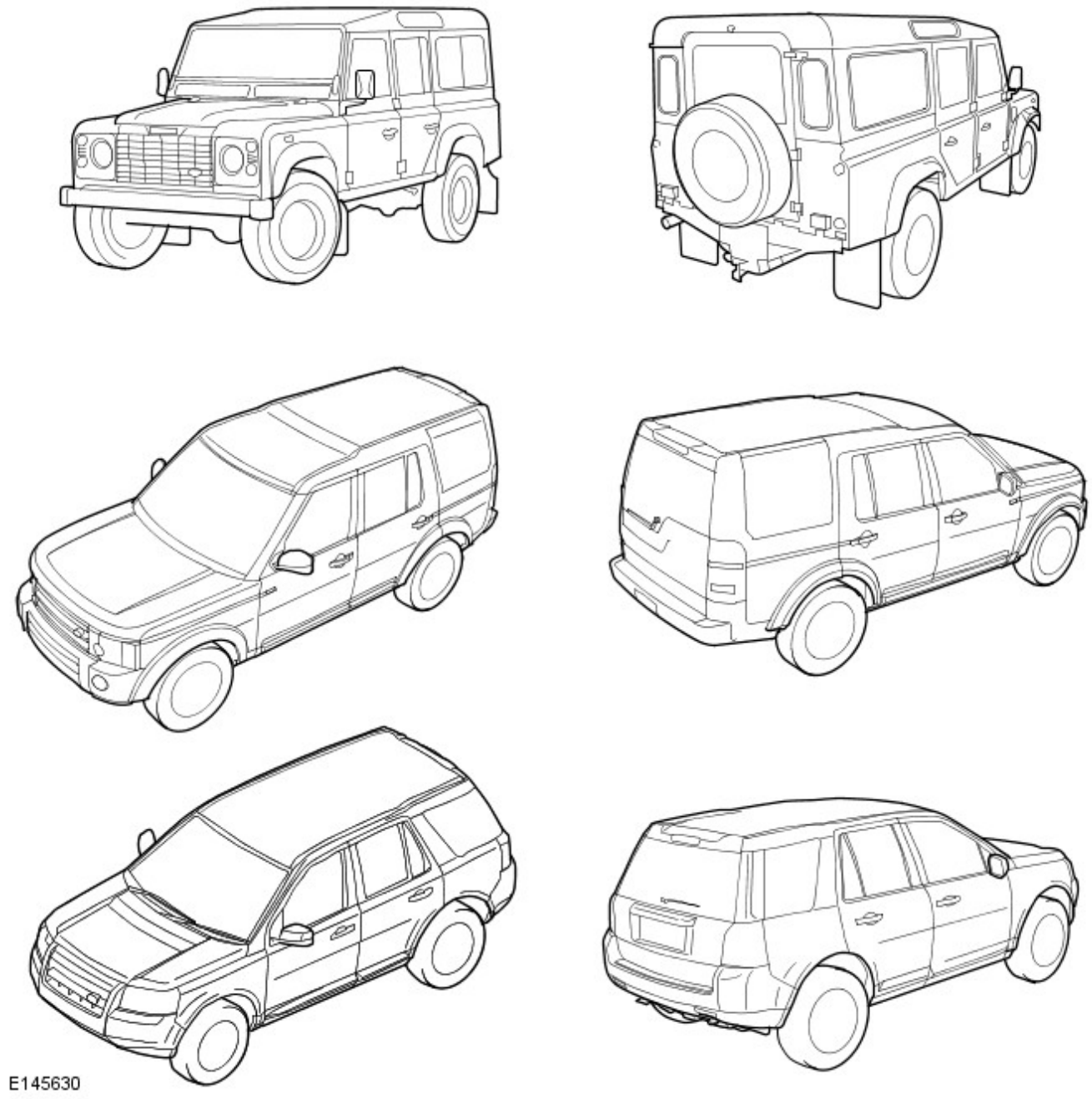
REMOVAL OF TRANSIT PROTECTION COATING

During storage, the protective coating will collect airborne dirt and grit. Great care must be taken when removing the transit coating so that damage to the paint film and exterior trim is avoided.

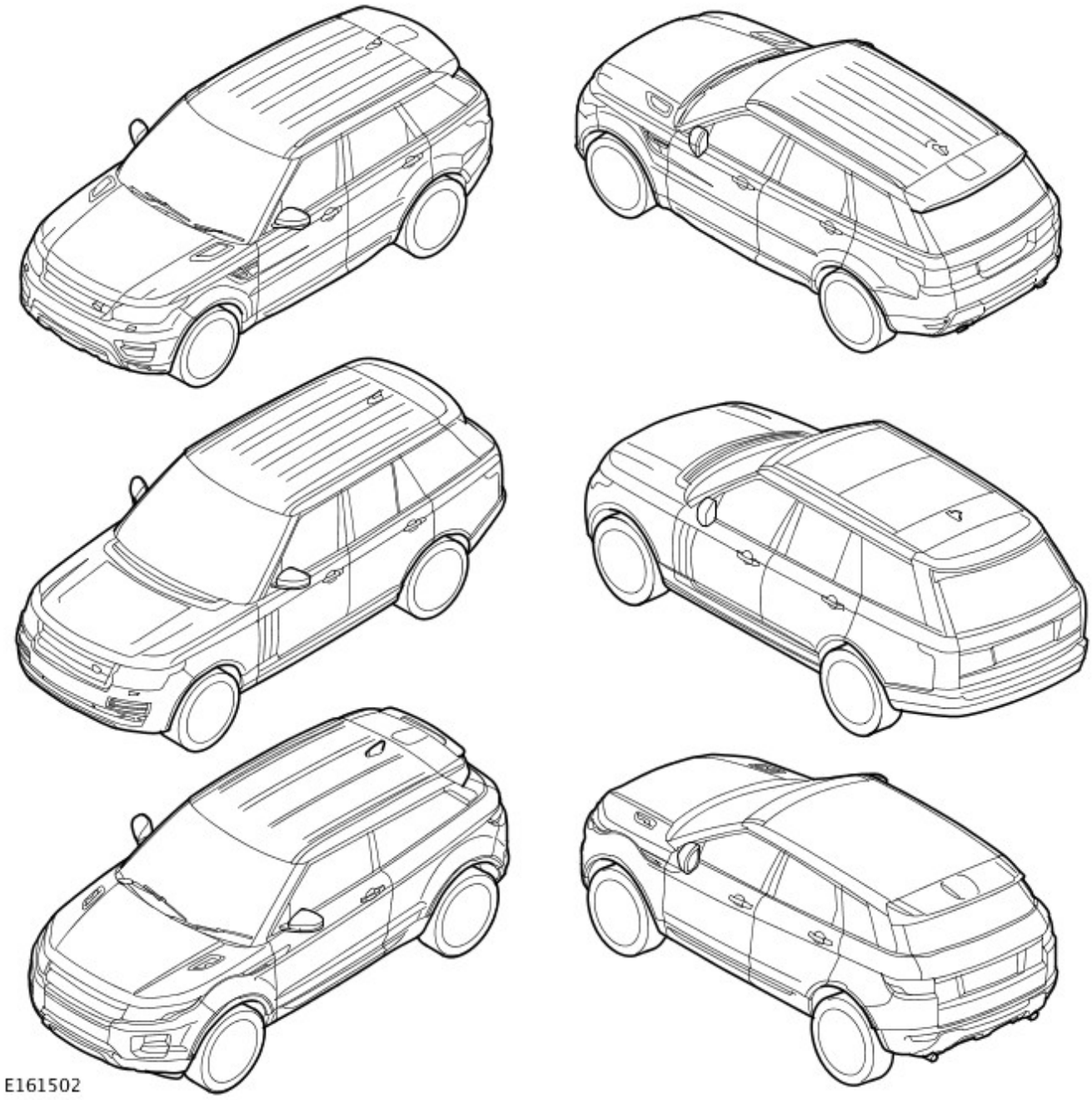
Removal of the transit protection coating should be carried out in accordance with the procedure detailed in the Pre-Delivery Inspection (PDI) information.

When the vehicle is dispatched from the storage area, remove the New Vehicle Storage History Sheet and file in the vehicle records.

STORAGE HISTORY SHEET



STORAGE HISTORY SHEET (Continued)



E161502

Published: 05-Dec-2012

Vehicle Transportation Aids and Vehicle Storage - New Vehicle Storage Form

Description and Operation

Before carrying out any battery assessments. refer to the battery care requirements.
For additional information, refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

 NOTE: If the vehicle has been started within the previous 24 hours the surface charge must be removed prior to any battery assessment

This form is to be used to record the battery condition for vehicles and parts by the dealer / retailer prior to handover to the customer. If the vehicle is kept in storage longer than 150 days, a new form must be started.

For AGM batteries Midtronics EXP 1080 / GR1 tester must be used.

Follow the instructions on the Midtronics EXP 1080 / GR1 tester to assess battery condition.

TESTER RESULTS	ACTION
GOOD BATTERY	Return to service.
GOOD RE-CHARGE	Fully charge battery and return to service.
CHARGE AND RE-TEST	Fully charge battery. Remove surface charge. Re-test battery. If same result replace battery.
REPLACE BATTERY OR BAD CELL BATTERY	Verify surface charge removed. Disconnect battery from vehicle and re-test. If result repeats after surface charge removal, replace battery. **DO NOT RECHARGE**.
UNABLE TO DO TEST	Disconnect battery from vehicle and re-test.

		Voltage	Date	Signature
Vehicle Arrival				
Initial battery voltage and date of reading taken	Midtronics Code			
	Battery Voltage			
	Recharge Details (if any)			
	Post Charge Voltage			
30 days from initial battery reading	Midtronics Code			
	Battery Voltage			
	Recharge Details (if any)			
	Post Charge Voltage			
60 days from initial battery reading	Midtronics Code			
	Battery Voltage			
	Recharge Details (if any)			
	Post Charge Voltage			
90 days from initial battery reading	Midtronics Code			
	Battery Voltage			
	Recharge Details (if any)			
	Post Charge Voltage			
120 days from initial battery reading	Midtronics Code			
	Battery Voltage			
	Recharge Details (if any)			
	Post Charge Voltage			
150 days from initial battery reading	Midtronics Code			
	Battery Voltage			
	Recharge Details (if any)			
	Post Charge Voltage			
Pre Delivery Inspection (PDI)	Midtronics Code			
	Battery Voltage			
	Recharge Details (if any)			
	Post Charge Voltage			
Customer Handover	The battery voltage **MUST** be 12.55 volts or above			

Please make sure that any transit relays are refitted and / or the vehicle is put into transportation mode if the vehicle is stored

Transit relay removal / vehicle placed in normal mode should only be completed a maximum of 72 hours prior to handover to customer

STORAGE HISTORY SHEET

MODEL:	COLOR:	ARRIVAL DATE:
KEY NUMBER:		
VIN:		

OPERATIONS	IDENTIFICATION	INSPECTION	COOLING SYSTEM	ENGINE	TIRES	PARKING BRAKE - OFF	DOORS, WINDOWS AND VEHICLE INTERIOR
UPON RECEIPT	.	.	.	.	.	.	.
30 DAYS	.	.	.	.	.	.	.
60 DAYS	.	.	.	.	.	.	.
90 DAYS	.	.	.	.	.	.	.
120 DAYS	.	.	.	.	.	.	.
150 DAYS	.	.	.	.	.	.	.

OPERATIONS	WINDSHIELD WIPER BLADES	PAINTWORK	COMMENTS ON VEHICLE CONDITION	INSPECTORS SIGNATURE AND DATE
UPON RECEIPT	.	.	NOTE: RECORD ANY VEHICLE BODY DAMAGE ON SILHOUETTES THAT FOLLOW	.
30 DAYS	.	.	.	.
60 DAYS	.	.	.	.
90 DAYS	.	.	.	.
120 DAYS	.	.	.	.
150 DAYS	.	.	.	.

Pre-Delivery Inspection Manual - Preliminary

Description and Operation

1. Transportation: Make sure that the vehicle has arrived with the transportation seals intact. Remove and discard the transportation seals.

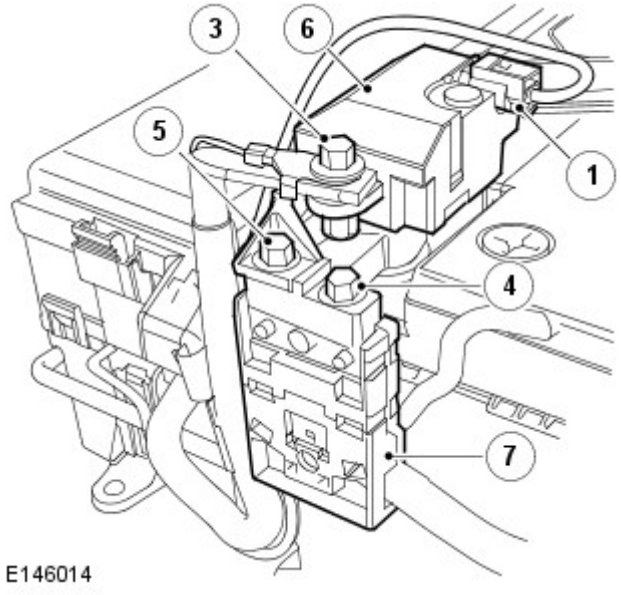
1.1 During production of the vehicle, a transportation relay is fitted to the battery positive terminal. This is to minimize battery drain during vehicle storage and delivery. To start the vehicle when a transit relay is fitted, press the hazard warning switch. This activates the transit relay to power-up and allow the engine to be started. If the ignition is turned on but the engine is not started the vehicle will return to transport mode after 15 seconds. After parking the vehicle in a work bay, remove the keys.

1.2 Check the integrity of factory fitted door and tailgate closure seals. Should a seal be broken or missing, make sure the tool kit and spare wheel are present. Also check that no internal damage to trim has occurred.

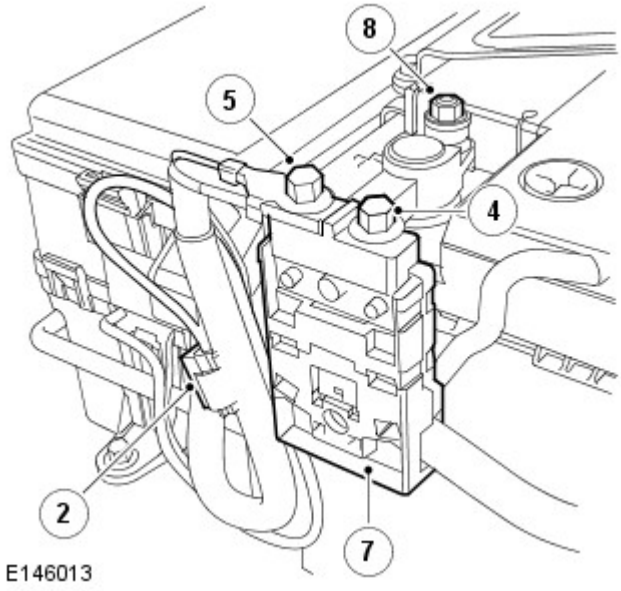
1.3 Remove door and tailgate closure seals.

1.4 Open bonnet for access.

2. Vehicle Transportation Relay: A transit relay is fitted to the battery. This allows the vehicle to be driven when necessary, but isolates the vehicle during transit and storage to prevent the battery becoming discharged.



E146014



E146013

2.1 To remove the transit relay:

2.1.1 Disconnect the battery negative lead from the battery negative terminal.

2.1.2 Disconnect the electrical connector (**1**) from the transit relay. Secure the electrical connector to the stowage position (**2**) provided on the main wiring harness.

2.1.3 Remove the bolt (**3**), that secures the battery positive cables to the top of the transit relay. Discard this bolt.

2.1.4 Remove the two bolts (**4**), and (**5**), that secure the transit relay to the mega-fuse assembly (**7**). Discard the

transit relay (**6**).

2.1.5 Replace the bolts (**4**), and (**5**), to the mega-fuse (**7**). Make sure that all the positive leads removed from the top of the transit relay (**6**), are reconnected to the top of the mega-fuse (**7**). Tighten the bolts finger tight at this point.

2.1.6 Loosen the battery positive terminal pinch bolt (**8**), twist the mega-fuse clockwise until it stops hard against the battery.

2.1.7 Torque the bolts (**4**), and (**5**), to 12 Nm (9 lb.ft).

2.1.8 Twist the mega-fuse back to the straight position, and torque the battery positive terminal pinch bolt (**8**), to 6 Nm (4 lb.ft).

2.1.9 Reconnect the battery negative terminal, and torque to 6 Nm (4 lb.ft). Make sure this is carried out in one clean connection, this will avoid creating electrical 'spikes' in the system.

2.1.10 After the transit relay has been removed and the battery re-connected, a Battery Monitor System (BMS), reset will need to be carried out using the Integrated Diagnostic System, (IDS).

 NOTE: Information regarding the BMS reset can be found in the Battery Care Manual on GTR.

CAUTIONS:

 Damage to battery. The battery terminal posts have a rotational torque threshold of 9 Nm (6 lb.ft). Extreme care MUST be observed when torquing the bolts (4), and (5), to 12 Nm (9 lb.ft).

 Damage to equipment. Failure to remove the transit relay before carrying out the PDI checks may result in damage to the IDS equipment.

 Damage to vehicle. Do not disconnect the battery while the ignition is switched on:

- Electrical modules will not be allowed to shut down correctly and will result in fault codes being stored and spurious faults being induced.
- Permanent damage to the instrument cluster may also result if the battery is disconnected with the ignition switched on.

3. Battery Care Requirements

Make sure the correct standard of battery care is applied to the battery,
For additional information, refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

NOTES:

 All equipment used must be functionally capable of meeting the compliance requirements.

 The vehicle may need to be taken out of transit mode to carry out the preconditions.

3.1. Carry out the battery test process shown below.

It is recommended that this test is conducted at least 24 hours after the vehicle engine has been run or the battery charged to avoid the need of surface charge removal. If time constraints make this unacceptable then the surface charge must be removed.

Surface Charge Removal

A vehicle which has had its battery charged or been driven in a 24 hour period before the test, must have its surface charge removed.

- Turn on the ignition but do not start the vehicle
- Switch on the headlamps on high beam for a minimum 3 minutes
- Switch off the headlamps
- Wait a minimum of 5 minutes before recording test results for any battery measurements

Battery Test

The battery may be tested either on a bench or on the vehicle.

The battery condition must be checked in accordance with the battery test process utilizing an appropriate tester as outlined in **the equipment section (Section 5)**
For additional information, refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

 NOTE: The midtronics code must be recorded on the form.

Any actions must be carried out in accordance with the table shown in the **determining battery condition section**

(Section 6)
For additional information, refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
. The details must be recorded on the New Vehicle Storage Form which is part of the new vehicle storage document.

For additional information, refer to: New Vehicle Storage Form (100-11 Vehicle Transportation Aids and Vehicle Storage, Description and Operation).

CAUTION: DO NOT connect the tester to any other circuit or chassis point other than the battery negative terminal.

3.2. If the battery is disconnected again after conducting the PDI, certain vehicle electrical systems that are calibrated during the PDI will lose the calibration and will require resetting again once the battery is reconnected. This may include the PDI application and Market configurations shown in section 11.

3.3. The battery must be tested to determine that the battery is in good condition, and there is sufficient charge to carry out the PDI. Certain electrical systems require a precise voltage to operate correctly.

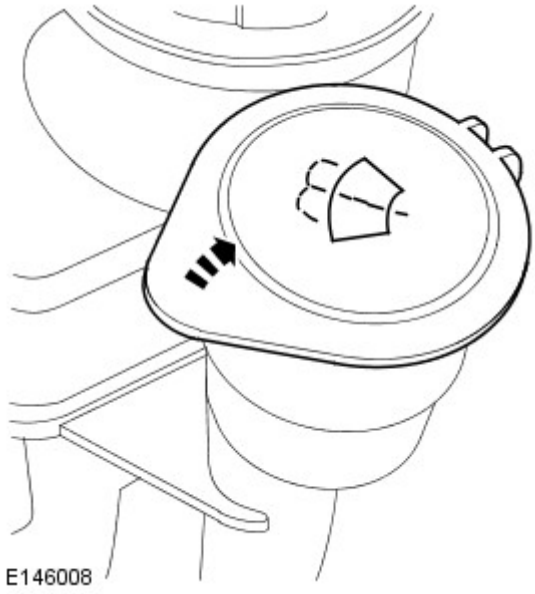
- Check the battery positive terminal cable and BMS clamp pinch bolts are tightened to 6 Nm.

NOTE: It is imperative, to make sure correct vehicle functionality, that the battery terminal is pushed fully home and is tightened to the specified torque figure.

- Connect the Land Rover recommended battery tester to the battery.
- Check and record on the PDI check sheet, the battery condition as indicated by the Land Rover recommended battery tester.

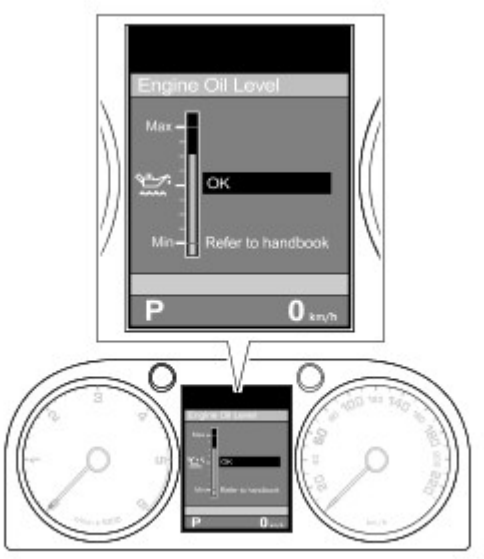
NOTE: The voltage check must be carried out before connecting the diagnostic equipment. Failure to do this may result in vehicle configuration failure.

3.4. Check security of battery carrier clamp and that it is tightened to a torque of 5 Nm (4 lb.ft).



4. Check/top-up the level in the windscreen washer reservoir. Top-up the reservoir using a mixture of an approved windscreen washer fluid and water until the level is to the bottom of the gauze filter in the reservoir filler neck.

5. Check/top-up all under-hood fluid levels. Investigate cause of any low level readings.



E146011

5.1 Vehicles with 5.0L petrol and 3.0L diesel engines: The engine must be switched off and allowed to stand for a period of at least 10 minutes for petrol engines, and 20 minutes for diesel engines, before checking the oil level. Checking the oil level soon after the engine has been run will provide a false low level reading, which may result in overfilling. To allow for the actual oil level to be verified, a service mode exists to give access to live oil readings. In order to have a correct reading, the following conditions must be met:

- The vehicle MUST be parked on a level area of ground. The sensor installation is very sensitive to vehicle tilt in the fore-aft direction: 0.5 degree vehicle tilt corresponds to an up to 0.5 liter measurement error.
- The gear selector must be in the 'PARK' (P) position and the hood must be open.
- A minimum time of **10 minutes for petrol engines**, and **20 minutes for diesel engines**, MUST be allowed to pass after running the engine. This drain-down time is to allow the oil to return to the sump.

NOTE: If the Oil Level Display on the Message Center displays: 'not available', not enough time has elapsed to allow the oil to drain back into the sump.

To access service mode, the following procedure should be followed:

1 With the ignition 'ON', engine not running, use the controls on the steering wheel, select on the Message Center: Service Menu > Oil Level Display

2 Press the cruise control CANCEL button twice within 2 seconds.

3 The instrument pack display will revert back to the normal display in the trip computer.

4 Using the controls on the steering wheel, access the Oil Level Display again.

Messages to the right of the guage will advise of any action that may need to be taken. If the oil level is below the required operating range, a message advising how much oil to add will be displayed; i.e., 'Add 0.5 liters'. If necessary, add the recommended quantity of oil then re-check the level.

CAUTION: Serious damage to the engine and components will result from overfilling engine with oil. When filling the engine with oil, make sure any spilt oil is immediately cleaned from the engine, components or bodywork.

5 With the ignition 'ON', engine not running, remove the oil filler cap.

NOTE: Petrol Engines: SAE 5W-20 meeting Land Rover specification WSS M2C925-A (Castrol SLX Professional OE 5W-20).

Diesel Engines: SAE 5W-30 meeting Land Rover specification WSS M2C934-B (Castrol SLX Professional OE 5W-20).

6 If the oil level is within the required operating range, the message 'Level OK' will be displayed.

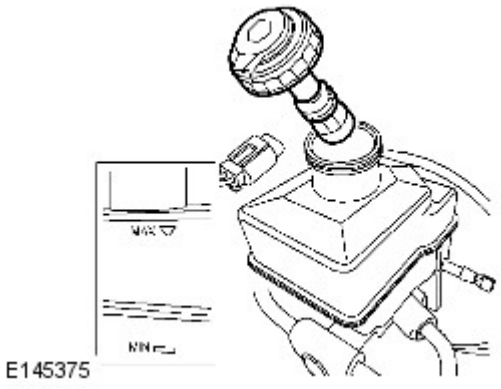
7 If indicated by the Message Center oil level display, add the appropriate quantity of oil (as advised). Wait 5 minutes to let the oil level stabilise and re-check the level.

8 Clean up any oil spilt during the top-up process.

9 Install the oil filler cap.

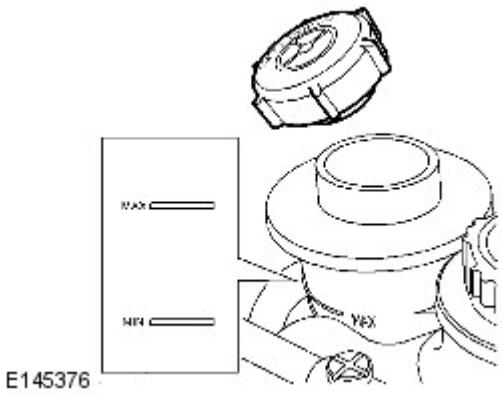
CAUTION: The ignition must be left on during the top-up, so that the electronic dipstick can register and display the new oil level. This enables an accurate level recheck.

NOTE: Investigate the cause of any low fluid levels.



5.2 Remove the auxiliary battery box cover. Check the fluid level in the brake/clutch fluid reservoir. The level must be to the 'MAX' mark on the reservoir, top-up if necessary. Top-up the fluid level using Shell Donax YB DOT4 ESL brake/ clutch fluid to the 'MAX' mark on the reservoir. Install the auxiliary battery box cover.

NOTE: Investigate the cause of any low fluid levels.

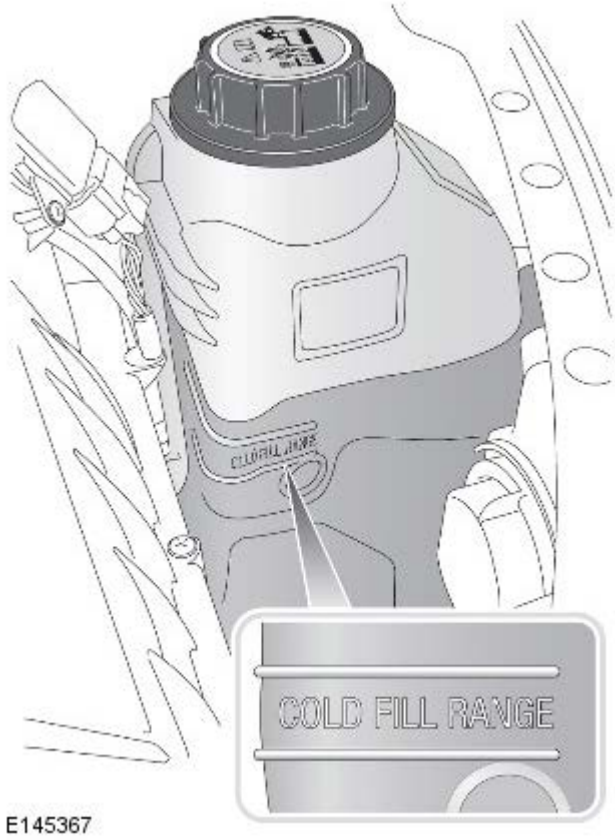


5.3 Check that the power steering fluid level is midway between the 'MAX' and 'MIN' marks on the fluid reservoir, top-up if necessary. Top-up the fluid level using Texaco cold climate fluid 14315.

NOTE: Investigate the cause of any low fluid levels.

5.4 If installed: Check that the dynamic response fluid level is mid-way between the 'MAX' and 'MIN' marks on the fluid reservoir, top-up if necessary. Top-up the fluid level using Texaco cold climate fluid 14315.

NOTE: Investigate the cause of any low fluid levels.



5.5 Check the coolant level in the expansion tank. With the engine cold, the coolant level must be to the upper level of the cold fill range indicator mark, above the text on the side of the expansion tank. Ignore any coolant which may be visible in the top section of the tank.

5.6 Top-up the coolant to the upper level mark on the tank using a 50% mixture of water and Havoline Extended Life Coolant (XLC) or any ethylene glycol based anti-freeze containing no methanol with only Organic Acid Technology (OAT) corrosion inhibitors. Install the expansion tank filler cap, tighten the cap until the ratchet is heard to 'click'.

NOTES:

Anti-freeze concentration MUST be maintained at 50%.

Investigate the cause of any low fluid levels.

5.7 Check/record the specific gravity of the coolant using a hydrometer. The specific gravity of the coolant at 20oC (68oF) must be 1.068:

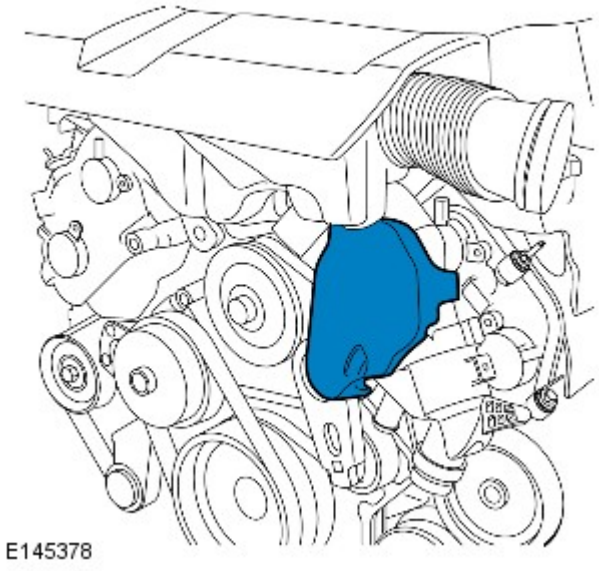
- Loosen the expansion tank filler cap to relieve pressure in the cooling system.
- Tighten the expansion tank filler cap.
- Remove the expansion tank bleed screw.
- Extract enough coolant to enable the gravity to be checked.
- Install the expansion tank bleed screw.
- Top-up the coolant.

WARNING: Risk of injury. Since injury such as scalding could be caused by escaping steam or coolant, do not remove, or loosen, the filler cap from the coolant expansion tank while the system is hot.

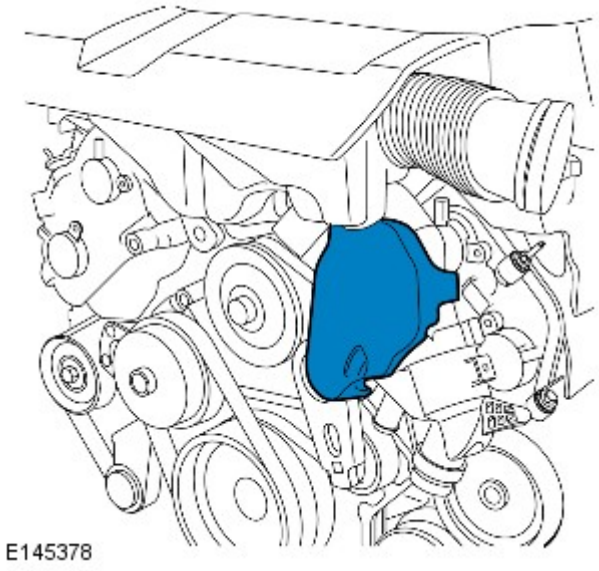
NOTE: A suitable hydrometer is available from the Equipment Program, Part Number FT 2030.

6. Make sure that the cold air deflector has been fitted on vehicles with 5.0L normally aspirated and supercharged engines, that operate in severe cold markets: **(Russia and Nordic countries)**.

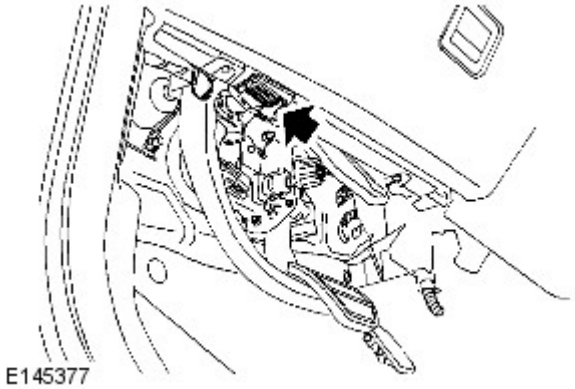
Normally Aspirated



Supercharger



6.1 The cold air deflector should be secured to both of the multi-stage thermostat (MST) hoses and visually flat to the front of the engine. If necessary, push on the center of the deflector to firmly seat between both MST hoses. Make sure the deflector is retained, and is flat to the front of the engine.



7. Connect the approved Land Rover battery power supply, then connect the Land Rover approved diagnostic equipment to the vehicle diagnostic socket. Insert IDS disk 127 (with the latest patch) or later.

NOTE: To charge the battery, connect the positive booster cable to the positive terminal on the battery. The negative booster cable MUST be connected to a suitable earth point on the vehicle. The earth point should be at least 0.5 meters, (20 inches) away from the battery and as far away as possible from any fuel pipes, brake pipes and moving parts.

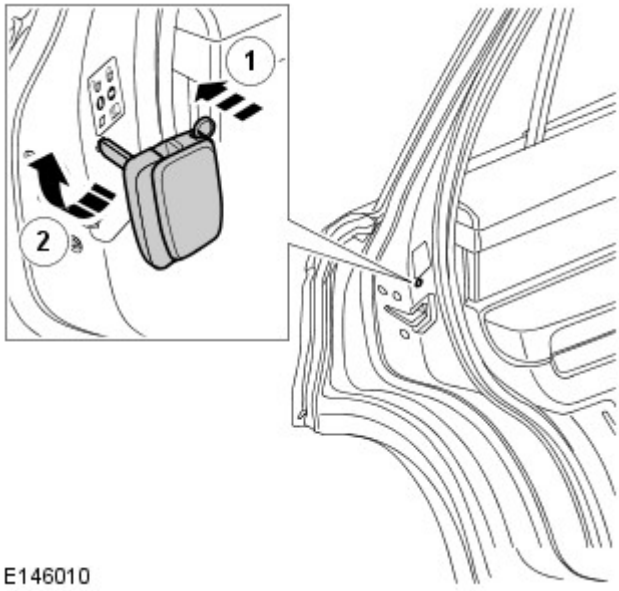
CAUTION: Damage to vehicle. Failure to charge the battery in this manner will cause the BMS, to NOT register the charge increase. This can cause certain systems to be inhibited during the first few days of driving while the BMS recalibrates.

8. Using the diagnostic equipment, run the PDI application:

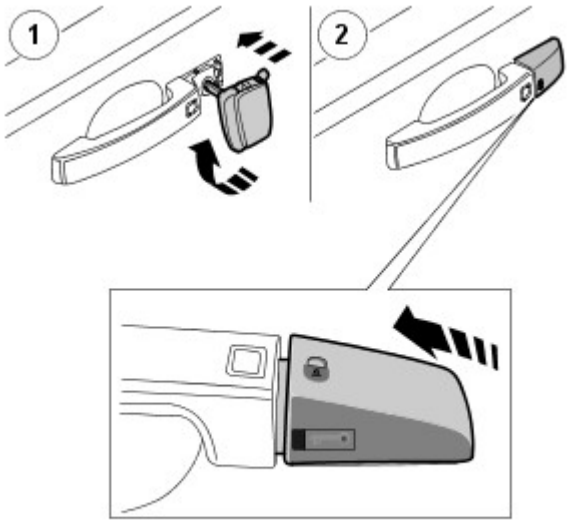
- Switch the ignition ON.
- Enter VIN and vehicle details into diagnostic equipment.
- Select the correct model year.
- Select 'Vehicle Configuration' icon.
- Select 'Special Applications'.
- Select the 'Pre-delivery Inspection' Application.
- Follow the on-screen instructions. This will take the vehicle out of transit mode, sets the Service Interval Announcer (SIA), on petrol models 'flight recorder' data, and the EMS adaption values.

9. Using the diagnostic equipment, clear any fault codes:

- Select 'Diagnostic Trouble Code Monitor' icon.
- Confirm vehicle features.
- Select 'Diagnostic Trouble Code Monitor' icon.
- Select 'Complete Vehicle' to clear fault codes.



E146010



E146012

10. Check the doors, door locks and child safety locks for correct operation. Install the door lock cover.

10.1 Check operation of the internal 'master lock' and 'unlock switch' on the door pad.

10.2 Check the hood release and safety catch for correct operation.

10.3 Check the operation of every button on both the supplied key fobs, to make sure the expected functionality is carried out as indicated by each buttons legend.

To check the Passive Entry system, perform the following additional tests:

- Make sure both Smart Keys are taken at least 3 meters away from the vehicle.
- Lock the vehicle by pressing the lock button on one of the Smart Keys. Make sure that the locking process has been completed as evidenced by the door mirrors folding in.
- Wait 5 seconds.
- Take one Smart Key and bring it within close proximity (1 meter), of the drivers door, pull the door handle and make sure the vehicle unlocks.
- Close the drivers door and press the exterior lock button on the drivers door handle, whilst keeping the Smart Key in close proximity of the drivers door.
- Make sure the locking process has been completed as evidenced by the door mirrors folding in.
- Remove the Smart Key to at least 3 meters from the vehicle.
- Take the second Smart Key and bring it within close proximity (1 meter), of the drivers door, pull the door handle and make sure the vehicle unlocks.
- Enter the vehicle, place the first Smart Key on the center console and press both the start button and the brake pedal simultaneously. Repeat this process for the second Smart Key.
- If the vehicle starts with both Smart Keys, the Passive Entry and both Smart Keys are operating correctly.



E146009

10.4 Check for correct operation of the vehicle alarm system:

- Make sure all doors, windows and sunroofs are closed.
- Press the lock button on the Smart Key once. This will ‘superlock’ the vehicle (interior and exterior vehicle protection). Check that the indicator triple flashes for 10 seconds then continues to single flash.
- Press the unlock button and make sure the alarm has been disarmed.
- Press the lock button twice within three seconds. This will activate the perimetric alarm but **NOT** the interior space protection.
- Check that the indicator double flashes for 10 seconds, then continues to single flash.
- Press the unlock button and make sure the alarm has been disarmed.

NOTE: To carry out this procedure in the correct manner the battery charger should be removed.

Pre-Delivery Inspection Manual - Vehicle Interior

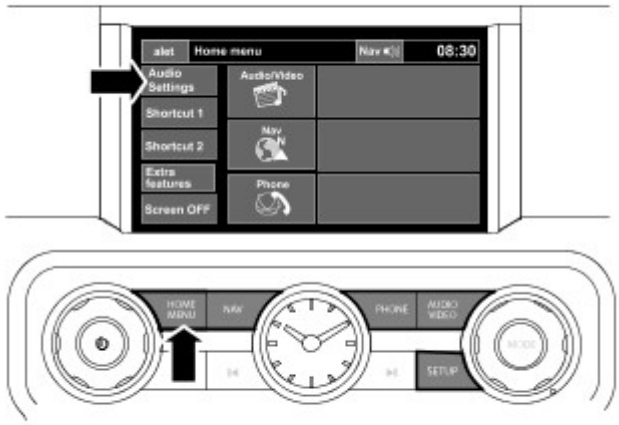
Description and Operation

NOTE: The battery charger should be reconnected whilst carring out the sections 11- 23 of this PDI manual.

To charge the battery, connect the positive booster cable to the positive terminal on the battery. The negative booster cable MUST be connected to a suitable earth point on the vehicle. The earth point should be at least 0.5 meters, (20 inches) away from the battery and as far away as possible from any fuel pipes, brake pipes and moving parts.

CAUTION: Damage to vehicle. Failure to charge the battery in this manner will cause the BMS, to NOT register the charge increase. This can cause certain systems to be inhibited during the first few days of driving while the BMS recalibrates.

11. Touchscreen Audio System: Using the Touch Screen Display (TSD), set the clock, date, voice language and the Satellite Navigation, specific to the Market unless otherwise instructed on the Customer Configurations Sheet.



E146002

11.1 Clock Setting - With the vehicle ignition system switched on in convenience mode and the TSD switched on, select the HOME MENU by pressing the hard button on the left side of the audio controls:

1. Touch the **Audio settings** soft-button.
2. At the settings menu, touch the **Clock adjust** soft-button.
3. Touch the arrow up or arrow down softbuttons to adjust the hours or minutes.
4. Touch the **12/24** soft-buttons to set the hours for the 12 or 24 hour clock display. With the 12 hour display selected, am/pm is also displayed as appropriate.
5. Touch the **Set** soft-button to confirm the clock settings.
6. Return to the **Home menu** screen by touching the arrow soft-button at the top left of the screen, or press the **HOME MENU** hard-button on the audio controls.

NOTE: The displayed clock time will not be set and displayed correctly until the Set soft-button is touched. If the Set soft-button is not touched the clock will not be reset on exiting the Clock adjust screen.

11.2 Date Setting - With the vehicle ignition system switched on in convenience mode and the TSD switched on, select the **HOME MENU** by pressing the hard button on the left side of the audio controls:

1. Touch the **Audio settings** soft-button.
2. At the settings menu, touch the **Clock adjust** soft-button.
3. Touch the **Date** soft-button then touch the **arrow up** or **arrow down** soft-buttons to adjust the days or months.
4. Touch the **dd/mm** or **mm/dd** soft-buttons to set the date format setting.
5. Touch **Set** to confirm the date settings.
6. Return to the **Home menu** screen by touching the arrow soft-button at the top left of the screen, or press the **HOME MENU** hard-button on the audio controls.

NOTE: The displayed date will not be set and displayed correctly until the Set soft-button is touched. If the Set soft-button is not touched the date will not be reset on exiting the Clock Adjust screen.

11.3 Language Setting - With the vehicle ignition system switched on in convenience mode and the TSD switched on, select the HOME MENU by pressing the hard button on the left side of the audio controls:

1. Touch the **Audio settings** soft-button.

2. At the settings menu, touch the **Language** softbutton. Select and change the specified language on the customer configurations sheet.
3. Set the voice language (if option is available).
4. Set the system voice feedback, Male or Female (if option is available).
5. Return to the **Home menu** screen by touching the arrow soft-button at the top left of the screen, or press the **HOME MENU** hard-button on the audio controls.

12. Navigation system - Check the Navigation screen, make sure that the correct country map has been uploaded onto the Navigation hard drive. To set the Naviagtion search area the following must be done:

- Select ‘Navigation’.
- Select ‘Enter destination’.
- Select ‘More’.
- Select ‘Search area’.
- Then select the local country or state specific to the Market unless otherwise instructed on the Customer Configurations Sheet.

13. Bluetooth® - Using a Bluetooth® capable phone:

1 Switch the ignition ON and make sure that the Touch Screen is active.

2 From the **Home menu**, select **Phone**.

3 A menu will appear. If no phone is connected, select **Search new**, otherwise select **Change phone** and then select **Search new**.

4

NOTE: There are two ways of pairing the Bluetooth® device and the vehicle. Detailed below is pairing to the vehicle, the other method is using the vehicle 'Vehicle to device' to pair to the device. If you use the 'Vehicle to device' method, follow the instructions on screen. Select Device to vehicle option. The vehicles Bluetooth® system is discoverable for only 3 minutes.

5 Using the mobile phone, search for Bluetooth® devices. On some phones, this is referred to as new paired device. See your phone’s operating instructions for further information.

6 When the vehicle’s Bluetooth® system is discovered, begin the pairing process and follow the on-screen instructions.

7 When requested, enter the Land Rover Bluetooth® access pin (2121) into the phone and vehicle system.

8 Once your phone is paired it may automatically connect to the vehicle system. If not, use the device list shown on the touch screen or use the mobile phone.

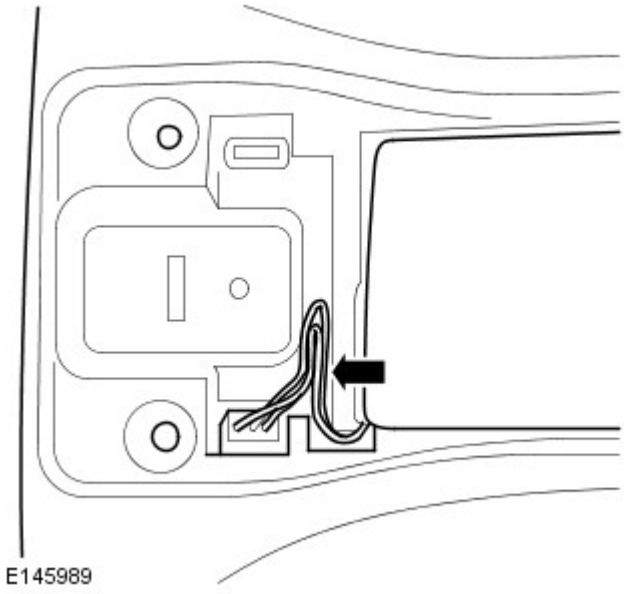
NOTE: Make sure that the device is enabled for Bluetooth®

When the customer configures a Bluetooth® phone, this will overwrite the last configured phone.

14. Rear Seat Entertainment - The Rear Seat Entertainment headphones will be in the transit items bag and the Touchscreen Remote Control (TsRC) will be in the docking station. The following **MUST** be carried out:

- Fit 2 AAA batteries to each set of headphones.
- Place the headphones in the rear door cards - one in each side.
- Fit and connect the battery into the TsRC by first removing the rear battery cover. Make the electrical connection and locate the battery into position.

CAUTION: Ensure that the battery wires are located as in the graphic below. Incorrect positioning of the wires will not allow the battery cover to fit flush. This in turn will not allow the TsRC to dock correctly.



E145989

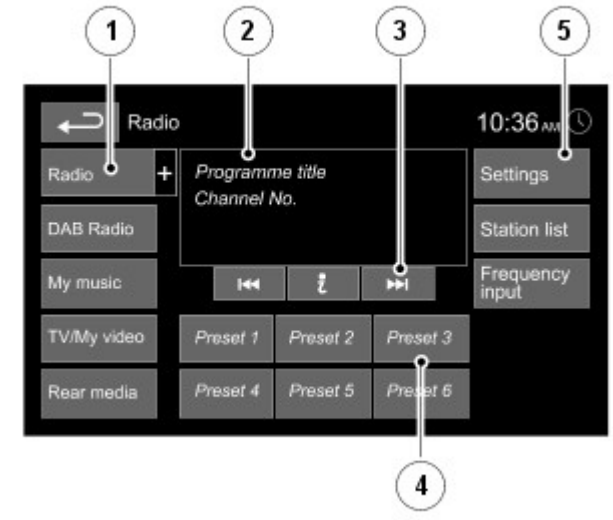
- Replace and re-secure the battery cover. Locate the 2 black rubber bungs over the battery cover screw heads and push in to secure.
- Dock the TsRC unit into the docking station. Observe until at least 2 charge segments are illuminated.

NOTE: The TsRC is docked by locating its bottom edge onto the locating pins in the docking station, then pushing down on the 'raised blip' on the top centre of the TsRC. A positive lock will be denoted by a 'click' from the TsRC and docking connector.

15. Satellite navigation - Check operation of the system:

- Driving the vehicle will automatically establish global position.
- If global position has not been established, the navigation screen will display a 'GPS' icon with a line through it. Make sure no obstructions, such as tall buildings or trees, are close-by.

16. Set the Radio and DAB, specific to the Market unless otherwise instructed on the Customer Configurations Sheet.

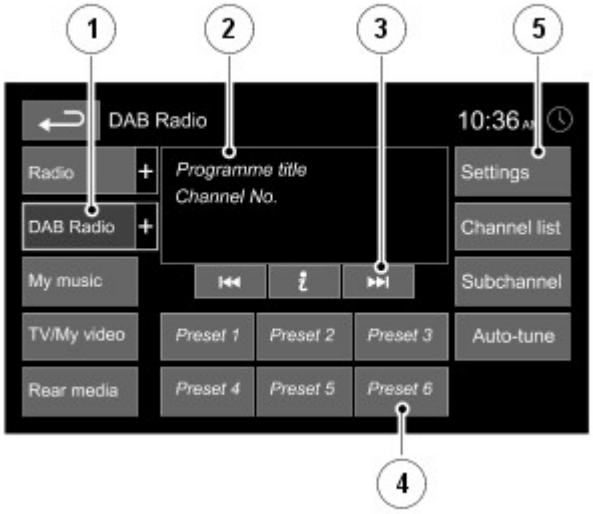


E145990

17. Radio system - With the vehicle ignition system switched on in convenience mode and the TSD switched on, select the **HOME MENU** by pressing the hard button on the left side of the audio controls:

1. Touch the **Audio settings** soft-button.
2. At the **Radio** menu, set 6 radio stations for each wavelength as specified on the customer configuration sheet. Touch the **Radio** (1) soft button to select a waveband.
3. Short touch the **Auto Seek** soft-button (3) to search for the next chosen radio station (Shown in the display (2).
4. Touch and hold the **Preset** soft button (4) to store the current station on the chosen preset (the radio will mute while the station is stored then beep to confirm).
5. Repeat these steps until all wavelengths have 6 preset radio stations.
6. Touch the **Settings** soft-button (5) to activate/ deactivate the RDS, Traffic, News, AF and Reg functions; according to the Market unless otherwise specified on the 'New Vehicle Configurations Options' sheet.
7. Return to the **Home menu** screen by pressing the arrow soft-button at the top left of the screen, or, press the **HOME MENU** hard-button on the audio controls.

CAUTION: Due to radio reception constrains, it may be necessary to set the radio presets outside of the workshop.

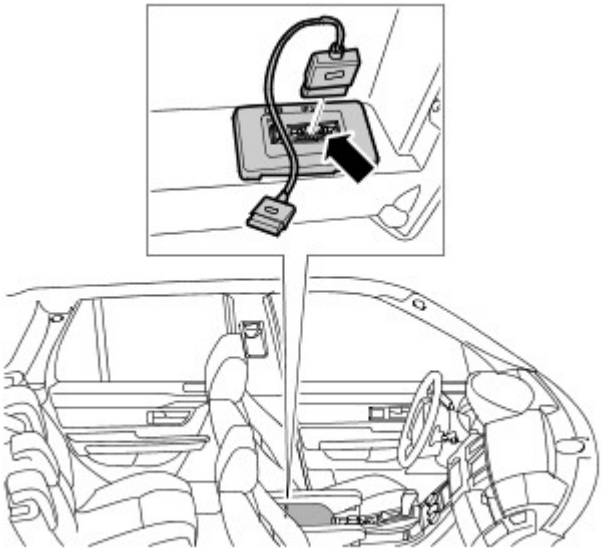


E145991

18. DAB Radio system - With the vehicle ignition system switched on in convenience mode and the TSD switched on, select the HOME MENU by pressing the hard button on the left side of the audio controls:

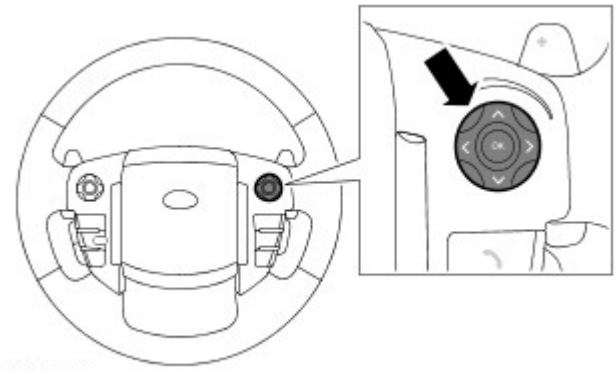
1. Touch the **Audio settings** soft-button.
2. At the **DAB Radio** menu, set 6 radio stations for each DAB band (DAB 1, 2, or 3) as specified on the customer configuration sheet. Touch the **DAB Radio** (1) soft button to select a DAB band.
3. Short touch the **Auto Seek** soft-button (3) to search for the next chosen DAB radio station (Shown in the display (2)).
4. Touch and hold the **Preset** soft button (4) to store the current station on the chosen preset (the DAB radio will mute while the station is stored).
5. Repeat these steps until all DAB bands have 6 preset radio stations.
6. Touch the **Settings** soft-button (5) to activate/ deactivate the FM Traffic, Announcements, Link DAB (auto search when signal strength drops), DAB format (DAB regions) and DAB country functions; according to the Market unless otherwise specified on the 'New Vehicle Configurations Options' sheet.
7. Return to the **Home menu** screen by pressing the arrow soft-button at the top left of the screen, or, press the **HOME MENU** hard-button on the audio controls.

CAUTION: Due to radio reception constrains, it may be necessary to set the radio presets outside of the workshop.



E146003

19. If requested on the 'New Vehicle Configurations Options' sheet place the iPod™ lead into the centre console glove compartment.

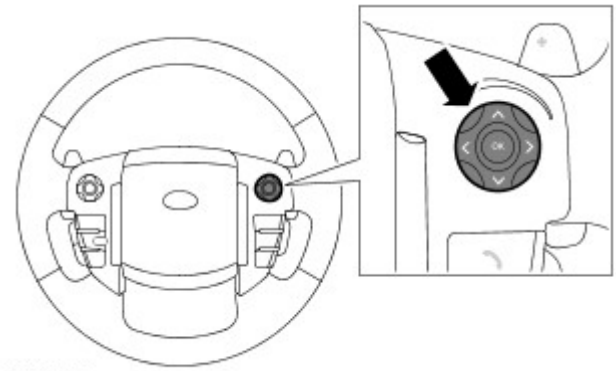


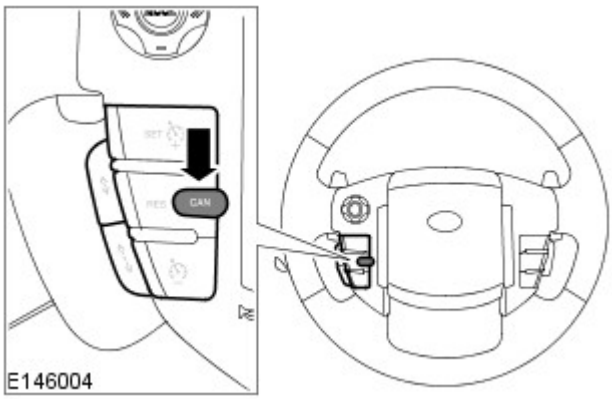
20. The automatic headlamp system has an additional feature called HBA (High Beam Assist). The 'Hand of Traffic' must be set in the Message Center and the feature enabled to make sure of correct operation of the system. To set the HBA the following steps must be followed in order:

- With the ignition 'ON', engine not running, use the controls on the steering wheel to select on the instrument cluster menu:
- Main Menu > Vehicle Set-up > High Beam Assist.
- Configure the 'Hand of Traffic' setting by selecting the appropriate Drive on Left (of road) or Drive on Right (of road) to Market condition.
- 'Enable' the feature by setting Activate Assist.
- Carry out a visual check to make sure that there are no stickers, or labels, directly in view of the HBA camera sensor.

NOTE: The HBA feature can be enabled (or disabled) by selecting (or de-selecting) Activate Assist.

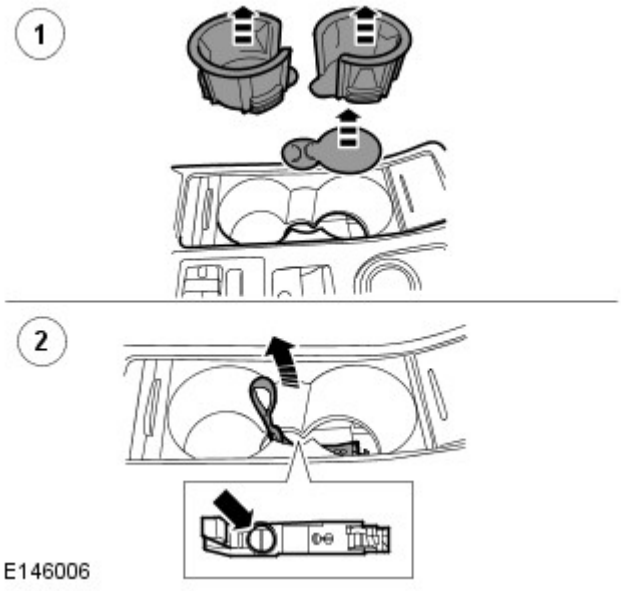
Enabling or disabling HBA will not affect previous 'Hand of Traffic' settings.





21. Vehicles with 5.0L petrol and 3.0L diesel engines: Reset the oil level indicator. To reset the oil level indicator the following steps must be followed in order:

- With the ignition 'ON', engine not running, use the controls on the steering wheel to select on the instrument cluster menu: Service Menu > Oil Level Display.
- Press the cruise control CANCEL button twice within 2 seconds.
- The instrument pack display will revert to the normal display in the trip computer.
- Using the controls on the steering wheel, access the Oil Level Display again.
- Press and hold the cruise control CANCEL button for 10 seconds to reset the oil level indicator.
- The trip menu display will revert to the normal display mode on the Message Center.
- Turn the ignition OFF.



22. Emergency Park Release System diesel vehicles only - The Drive Selector is now incorporated in the automatic transmission.

- In the event of a vehicle transmission failure, a mechanical means of selecting neutral is now available. An Emergency Park Release (EPR) provides this functionality.
- In an emergency, the EPR hand lever can be operated to release the park pawl within the transmission. The park pawl will not be allowed to re-engage until the hand lever is locked down in the closed position.
- The EPR lever is exposed while in transit. Actuation of the EPR requires the operator to be seated in the driver's seat with the foot brake applied. Turn the locking device 90 degrees anti-clockwise and lift using the pull strap.
- Ensure that the EPR lever locking device is locked down securely, then fit the finisher panel and cup holders. The cup holders are despatched in the glovebox.

23. Remove battery charger: Disconnect the approved battery charger/power supply from the vehicle.

24. Make sure that the interior of the vehicle is undamaged. Refer to the **Cosmetic Standards Manual** on **Topix**.

Pre-Delivery Inspection Manual - Vehicle Exterior

Description and Operation

25. Check operation of fuel flap and lock.

26. Inspect the road wheels and tires for damage. Check the wheel retaining nuts for correct torque, 140 Nm (103 lb.ft).

27. The vehicle is delivered with the tire pressures set higher than the normal operating pressures. Set the tire pressures to 2.0 bar (29psi) for the road test.

CAUTION: When the tire pressures are reduced from the high transit / storage pressure to the road test pressures, the final pressure will rise. The initial high drop in pressure from transit / storage pressure to normal pressure will cause the tire pressure to rise after 2 minutes, giving incorrect tire pressures by up to 0.4 bar (6psi).

Initially drop each tire pressure to approximately 0.1-0.3 bar (2-4psi) below the recommended pressure and then inflate the tires to the desired pressure.

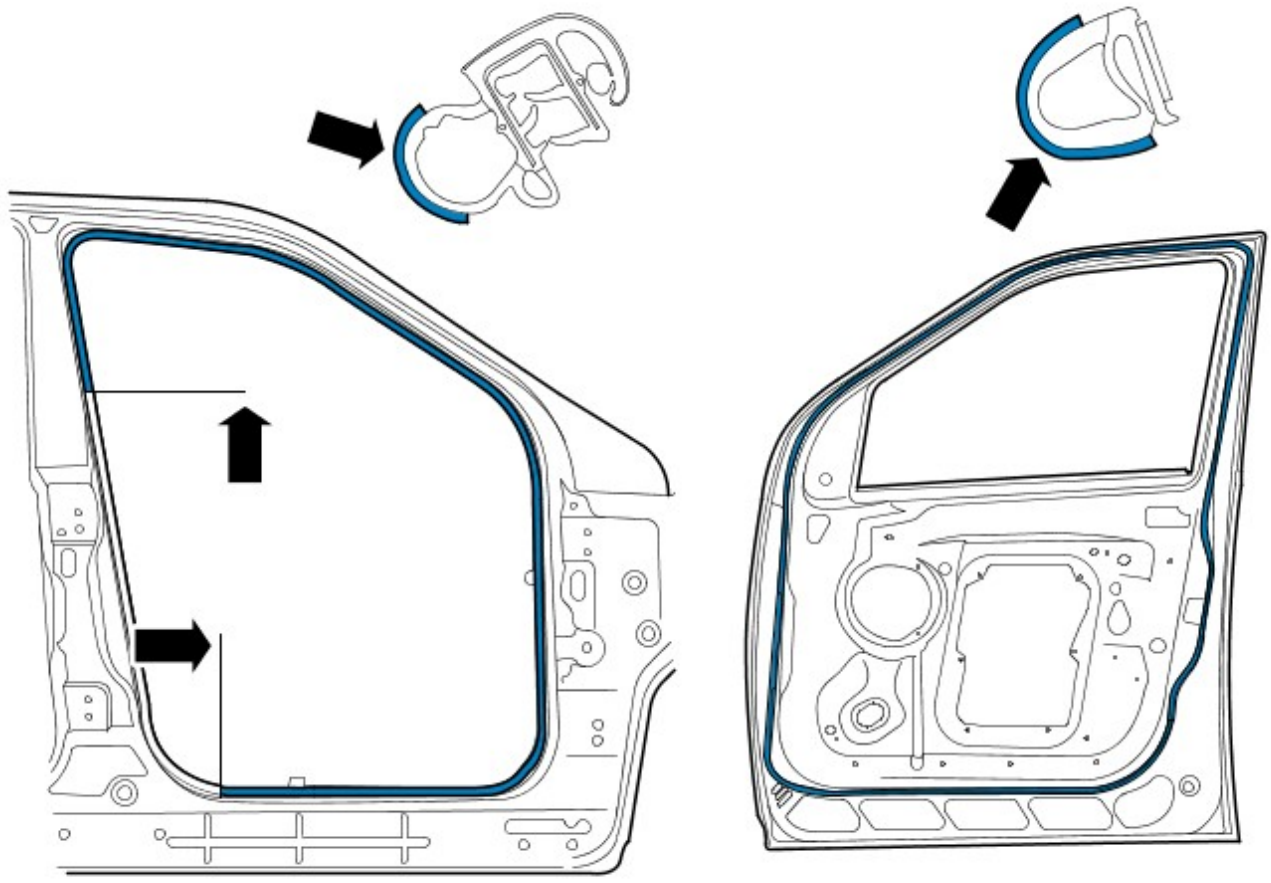
CAUTION: **If the vehicle is returned to storage after the PDI, the tire pressures must be raised to 3.60 bar (52psi).**

28. Remove all internal and external transit protection. Stow the rear outer seat belts in the stowage clips.

29. Check that the vehicle exterior is clean and undamaged. Refer to the 'Cosmetics Standards Manual' on TOPIx, for further details.

30. Apply lubricant to the door seals on vehicles that operate in severe cold markets: **(Russia and Nordic countries)**.

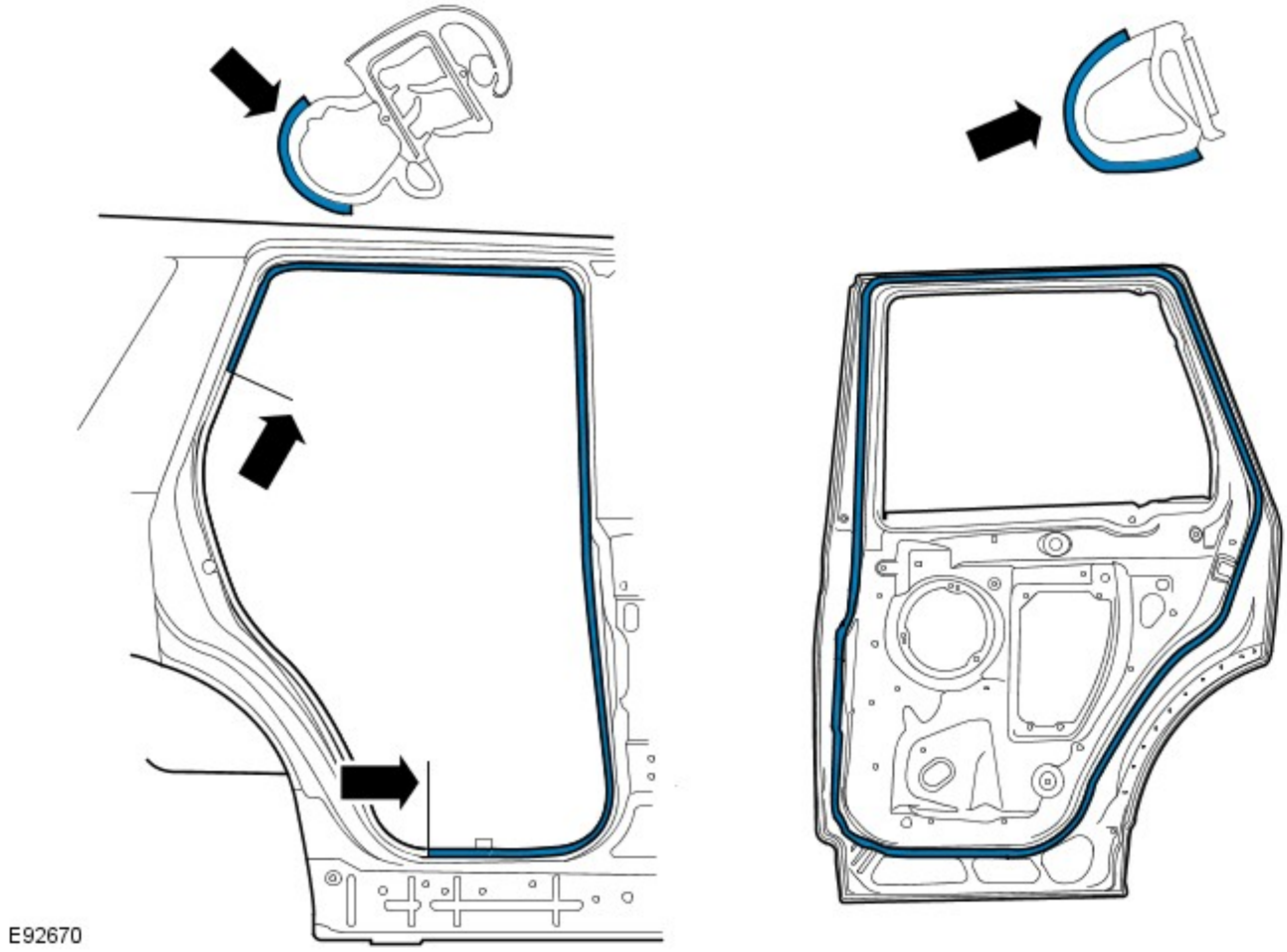
Front door seals



E92669

30.1 Vehicles operated in severe cold markets (Russia and Nordic countries): Apply the Carboflo pen, Land Rover Part No. CYK500010 to the primary and secondary front door seals as illustrated above.

Rear door seals



30.2 Vehicles operated in severe cold markets (Russia and Nordic countries): Apply the Carboflo pen, Land Rover Part No. CYK500010 to the primary and secondary rear door seals as illustrated above

Pre-Delivery Inspection Manual - Road Test

Description and Operation

NOTE: Before driving the vehicle, check the operation of:

- Lights, indicators, wipers, wash/wipe and hazard warning.
- Seats and seat belts.
- Fascia switches.
- Electric park brake.

31. Make sure that the automatic transmission starter isolator, operates in all gears with the exception of 'P' - Park and 'N' - Neutral.

32. Check for the correct operation of all the driver controls and systems. Including the Terrain Response indicators, wheel direction/ differential locking indicators and the low tire pressure monitoring system, if fitted.

32.1 Start vehicle and check operation of:

CAUTION: Make sure the climate control is set in the off position.

- Starter/Inhibitor switch.
- Electric mirrors, including power fold.

32.2 During the road test, make sure the transfer box range change functionality is tested by using the following method.

- With engine running and parking brake applied, select neutral on automatic gearbox.
- Request range change for low gear with switch - wait until change is complete.
- Request range change into high gear with switch - wait until change is complete.
- Repeat 5 times.
- Make sure high range is left selected.
- Press the fascia mounted Tyre Pressure Monitor button to calibrate the tyre pressure ECU, if fitted.

32.3 Make sure the correct operation of the shift interlock (where applicable).

CAUTION: Risk of injury. Apply the parking brake, chock the wheels and make sure that all personnel are clear of the vehicle before carrying out the above procedure.

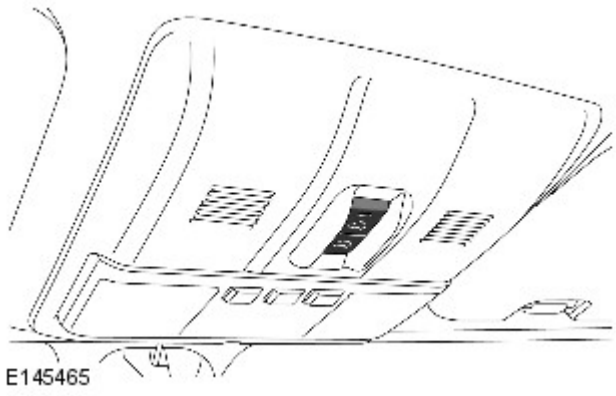


32.4 Check the electric windows for correct operation. Open and close all the windows fully. Check that the rear window isolation switch is operational.

32.5 If the battery is disconnected, becomes discharged or the power supply is interrupted, the one-touch ‘window up’ operation is disabled until the window position is reset.

To reset the window position:

- Close the window fully.
- Release the switch, the pull up and hold for one second.
- Repeat the procedure on each window.



32.6 Check the sunroof for correct operation. Make sure both sunroof open/close and sunroof tilt are fully operational.

32.7 Check operation of the air conditioning (A/C) system.

- When the vehicle is at operating temperature, set the heater control to 22ºC and run the fan speed at 75%.
- Switch on the A/C system and run for 5 minutes.

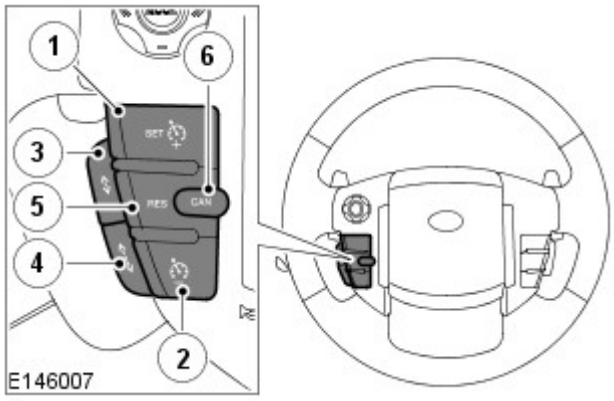
32.8 Check for correct operation of the cruise control or adaptive cruise control (ACC) system.

WARNING: Damage to vehicle. Adaptive cruise control is not a collision warning or avoidance system.

Risk of injury. It is the driver's responsibility to stay alert, drive safely and be in control of the vehicle at all times.

Only use cruise control when conditions are favourable, e.g. on straight, dry, open roads with light traffic.

32.9 The cruise control and ACC system are operated by switches mounted on the steering wheel. The driver can also intervene at any time by use of the brake or accelerator pedals. The Forward Alert function can be manually turned on or off in the Message Centre. Using the Message Centre steering wheel controls select: **Vehicle Set-up** and then **Forward Alert** from the menu; using the **OK** button will turn the function on or off.



32.10 Controls - all cruise control switches are located on the steering wheel switch-pack:

1. SET + : Set the speed (+) or increase.
2. SET - : Set the speed (-) or decrease.
3. GAP: Gap decrease (ACC only).
4. GAP: Gap increase (ACC only).
5. RESUME: Resume set speed.
6. CANCEL: Cancels without erasing memorised speed.

32.11 Setting a speed:

- Accelerate as normal until required speed is reached.
- Press the 'SET' button (**1**). The vehicle speed will be stored in the memory and cruise control should be engaged.
- The message centre will display the selected speed - 'SETSPEED 80KM/H 50MPH'.



32.12 Checking the ACC gap: After the ignition is switched on a default gap will be automatically selected (setting No 3). There are 4 gaps available to select.

- After selecting cruise control, check that the vehicle slows when a vehicle ahead is detected by the system.

WARNING: If the adaptive cruise control system predicts that its maximum braking level will not be sufficient, then an audible warning will sound while the system continues to brake. 'DRIVER INTERVENE' will also be displayed on the message centre.

- When a vehicle ahead is detected the vehicle will be in 'follow mode'.

WARNING: When in 'follow mode' the vehicle will not decelerate automatically to a stop, nor will the vehicle always decelerate quickly enough to avoid a collision without driver intervention.

- Check that when in 'follow mode' a warning light in the instrument pack is illuminated and the message centre displays 'CRUISE GAP'.

32.13 Altering the cruise gap to the vehicle ahead:

- Press, the top part of the switch (**3**) to decrease the gap, and the bottom part of the switch (**4**) to increase the gap.
- Check 'follow mode' functions correctly.

32.14 Check the operation of the 'Forward Alert' system. Make sure that the ACC system is disengaged: this will allow the GAP buttons to be used to adjust the Forward Alert.

Switch on 'Forward Alert'

- Set the 'Forward Alert' gap.
- Using the GAP increase button (**4**), on the steering wheel switch-pack, select the largest gap available.

Check that when a vehicle is detected close ahead, an audible warning sounds and the message centre displays: 'FORWARD ALERT'.

This is easiest to achieve by following a lead vehicle as it slows down.

WARNING: The 'Forward Alert' system DOES NOT provide vehicle braking.

NOTE: The 'Forward Alert' system provides warnings if a vehicle is detected close ahead.



32.15 Set the 'Forward Alert' gap:

- Using the GAP decrease button (**3**), on the steering wheel switch-pack, select the smallest gap available.

32.16 Switch OFF the Forward Alert system so that the customer receives the vehicle set in this condition.

33. Check for any unusual noises from the power train, suspension or braking systems.

34. Check for any squeaks or rattles from the vehicle interior.

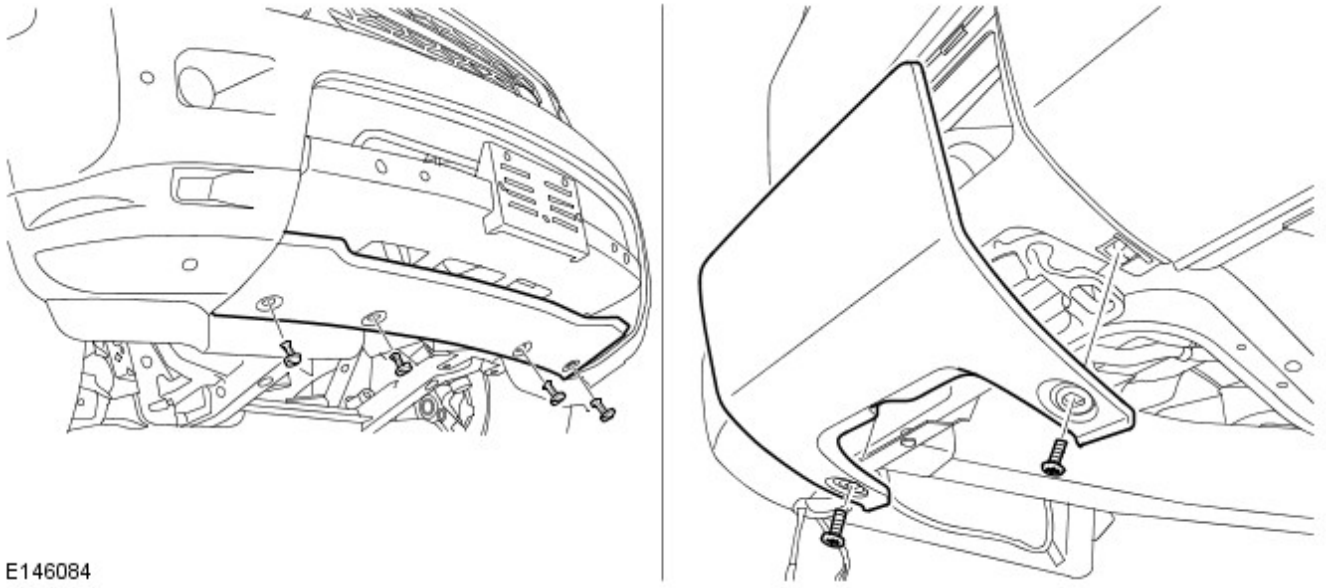
35. Check the operation of the satellite navigation system (if fitted).

Pre-Delivery Inspection Manual - Quality Assurance Checks

Description and Operation

36. On completion of road test:

- Position the vehicle on lift.
- Raise the vehicle on lift.
- Visually check beneath the vehicle for leaks from the powertrain components.
- Lower the vehicle.



E146084

37. Install the front towing eye cover, secure with the 4 toggle fasteners. Install the rear towing eye cover, tighten the fixings.

38. Check the register of Service Action Bulletins - make sure a fault free delivery to the customer.

39. If fault lamp(s) are illuminated, interrogate that system using IDS, report findings and clear faults.

40. Retain copy of this schedule in the Customer/ Vehicle History file.

41. Make sure the vehicle details are included in the Service Portfolio and endorse with the dealer stamp.

42. Record locking wheel nut code and place in Customer/Vehicle History file, (If applicable).

43. Record the Bluetooth code and place in Customer/Vehicle History file, (If applicable).

44. Make sure vehicle literature pack and security item contents are correct.

45. Place vehicle literature pack, mats and security items in the vehicle, (If applicable).

46. Make sure the tire pressures are set to the correct pressure.

46.1 For vehicles that will be delivered to the customer: Set all tire pressures (including spare) with the tires cold to the recommended tire pressures for 'normal' conditions (up to 100mph [160kph]). The recommended tire pressures are provided on a label attached to the 'B' pillar.

46.2 For vehicles being returned to storage: Set all tire pressures with the tires cold to 3.6 bar (52psi).

47. Valet vehicle prior to customer release.

48. Attach correct type approval labels to the handsets (where applicable).

NOTE: A vehicle must not be left without a transportation switch/relay installed for longer than two days, prior to customer handover.

If the transit relay has been refitted prior to release to customer; step 2 will need to be repeated, to remove the transit relay. Step 9 will need to be repeated, using the necessary diagnostic equipment, to clear DTC's.

Showroom Preparation - Showroom Preparation

Description and Operation

 NOTE: The information given in this document is subject to change for different model years.

Prior to the vehicle being placed into the showroom, the following components must be removed.

Function	Fuse	Rating	Location
Starter motor (All variants)	14E	40amp	Engine junction box (EJB)
Horn	25E	15amp	EJB
Wipers	29E	30amp	EJB
Washers	43P & 38P	15amp	Central junction box (CJB)
Power washers	7E	30amp	EJB