Published: 11-May-2011

# General Information - About This Manual

Description and Operation

## Introduction

This manual covers diagnosis and testing and repair procedures.

It is structured into groups and sections, with specific system sections collected together under their relevant group.

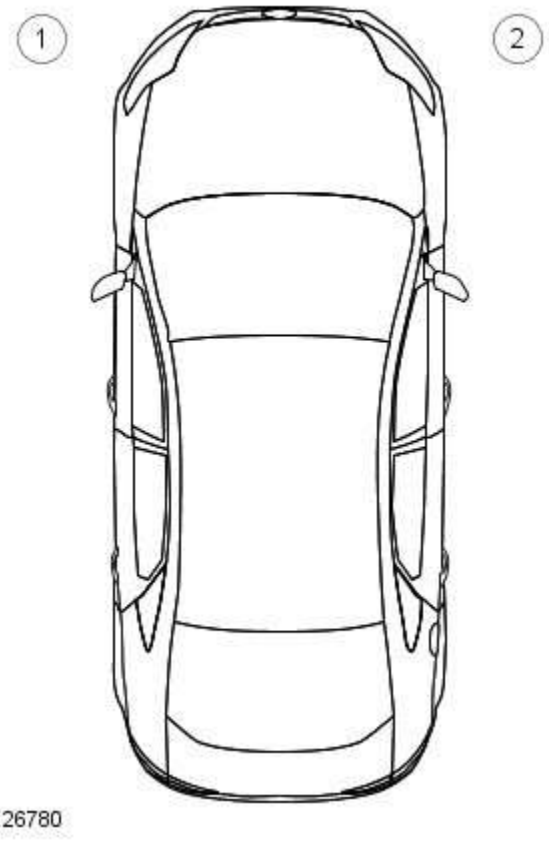
A group covers a specific portion of the vehicle. The manual is divided into five groups, General Information, Chassis, Powertrain, Electrical and Body and Paint. The number of the group is the first number of a section number.

Within Etis, the navigation tree will list the groups. After selecting a group the navigation tree will then list the sections within that group. Each section has a contents list detailing Specifications, Description and Operation, Diagnosis and Testing, General Procedures, Disassembly and Assembly, Removal and Installation.

### References to LH (left-hand) and RH (right-hand)

All LH and RH references to the vehicle are taken from a position sitting in the driver seat looking forward.

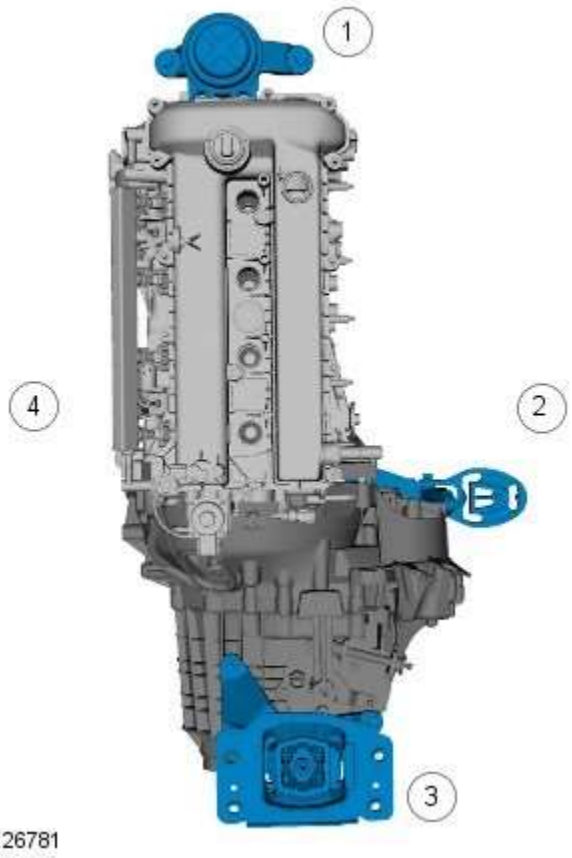
**Vehicle LH and RH definition**




| Item | Part Number | Description |
|---|---|---|
| 1 | - | LH |
| 2 | - | RH |

All LH and RH references to the engine are taken from a position at the flywheel looking towards the crankshaft front pulley.

**Powertrain LH and RH definition**




| Item | | Description |
|---|---|---|
| 1 | | front |
| 2 | | right |
| 3 | | rear |
| 4 | | left |

## How to use Repair Procedures

This manual has been written in a format that is designed to meet the needs of technicians worldwide. It provides general descriptions for accomplishing repair work with tested and effective techniques.

### 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) Repair Procedur

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.

**Reuse of fasteners and seals and gaskets**

The following list details the general policy for the reuse of fasteners and seals and gaskets.

**Types of self-locking nuts and bolts**

NOTE: There are more types of self-locking fasteners available than shown in following illustration.


E126782

| Item | | Description |
|---|---|---|
| 1 | | Completely coated self-locking bolt |
| 2 | | Partially coated self-locking bolt |
| 3 | | Self-locking bolt with a locking washer |
| 4 | | Self-locking nut with a plastic locking insert |
| 5 | | Self-locking nut with thread deformation (3 dents) |
| 6 | | Self-locking nut with thread deformation (squeeze of thread to oval shape) |
| 7 | | Self-locking nut with integrated locking ring |

- All types of seals and gaskets must be discarded and new seals and gaskets installed unless otherwise stated within the procedure.
- Nuts and bolts with a chemical coating for locking and/or sealing and/or antiseize must be discarded unless the procedure advises to reapply the coating with a specified material.
- Nuts and bolts with a mechanical locking such as thread inserts, thread deformation or locking washers must be discarded and new nuts and bolts installed unless otherwise stated within the procedure.

- Torque to yield bolts must be discarded and new torque to yield bolts installed unless otherwise stated within the procedure, recognizable by a tightening torque with more than one stage together with a torque angle.

**Specification data**

Specification procedures will only contain technical data that is not already part of a repair procedure.

**Sequence of tasks**

If components must be removed or installed in a specific sequence, the sequence will be identified numerically in a graphic and the corresponding text will be numbered accordingly.

**Special Tools, Equipment, Materials and Torque Figures**

Special tools will be shown with the tool numbers in the illustration. The special tool numbers, general equipment, materials and torque figures used for the procedure step will be shown in the text column.

**TAS Graphics**

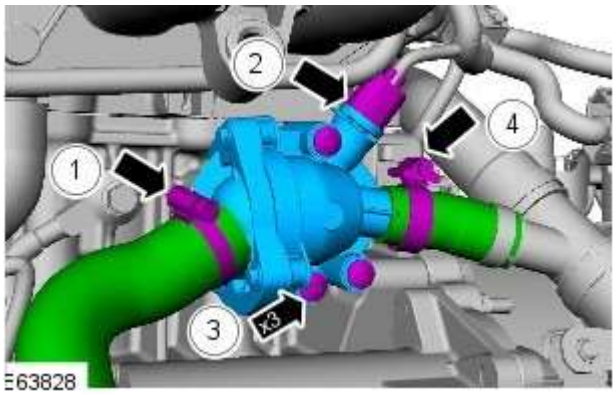
Colors used in the graphic are as follows:

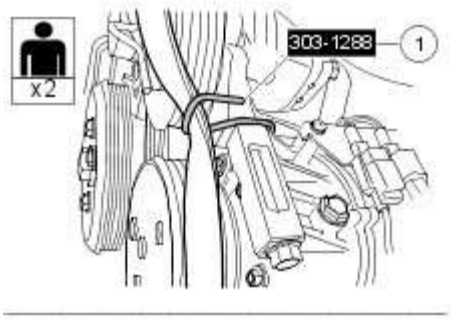
- Blue - Component to be removed/installed or disassembled/assembled.
- Green and Brown - Additional components that need to be removed/installed or disassembled/assembled prior to the target component.
- Yellow - Component that is touched or affected in a way but remains in the vehicle. It may be detached, attached, moved, modified, checked, adjusted etc.
- Magenta - Electrical connectors and fasteners such as nuts, bolts, clamps and clips.
- Pale Blue - Special tool(s) and general equipment.

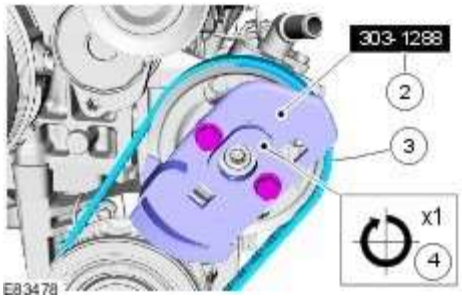
One illustration may have multiple steps assigned to it.

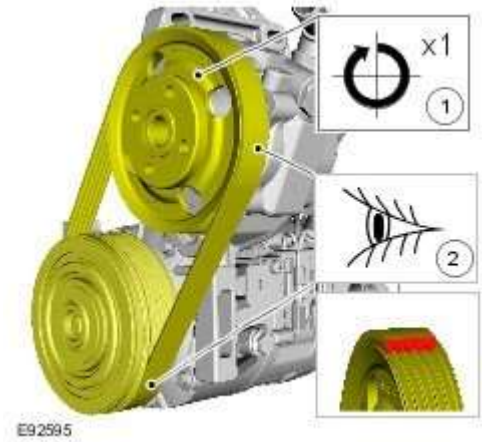
Numbered pointers are used to indicate the number of electrical connectors and fasteners such as nuts, bolts, clamps and clips.

Items in the illustration can be transparent or use cutouts to show hidden details.



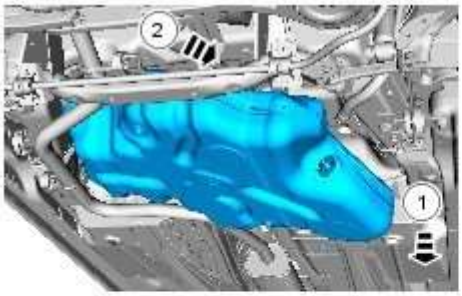




**TAS Symbols**

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.
For additional information, refer to: Symbols Glossary (100-00 General Information, Description and Operation).

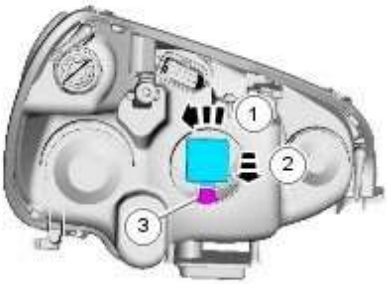
Prohibition symbols advise on prohibited actions to either avoid damage or health and safety related risks. These symbols are




4.

E85026

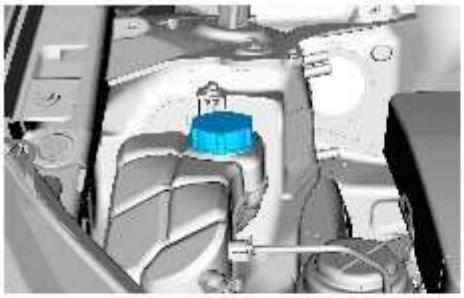
Health and Safety symbols recommend the use of particular protection equipment to avoid or at least reduce the risk or severity of possible injuries.




2.

E85027

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



3. 

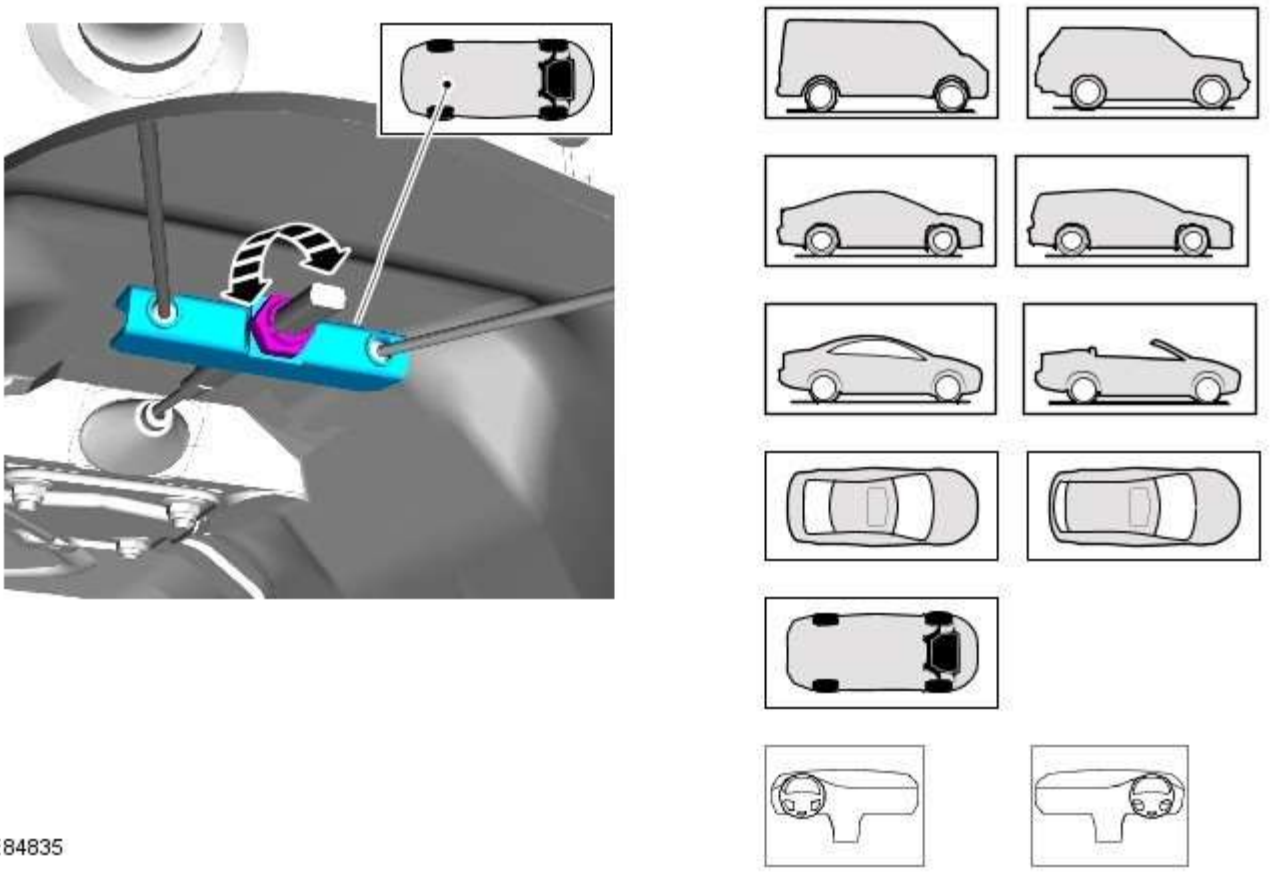
E85028

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



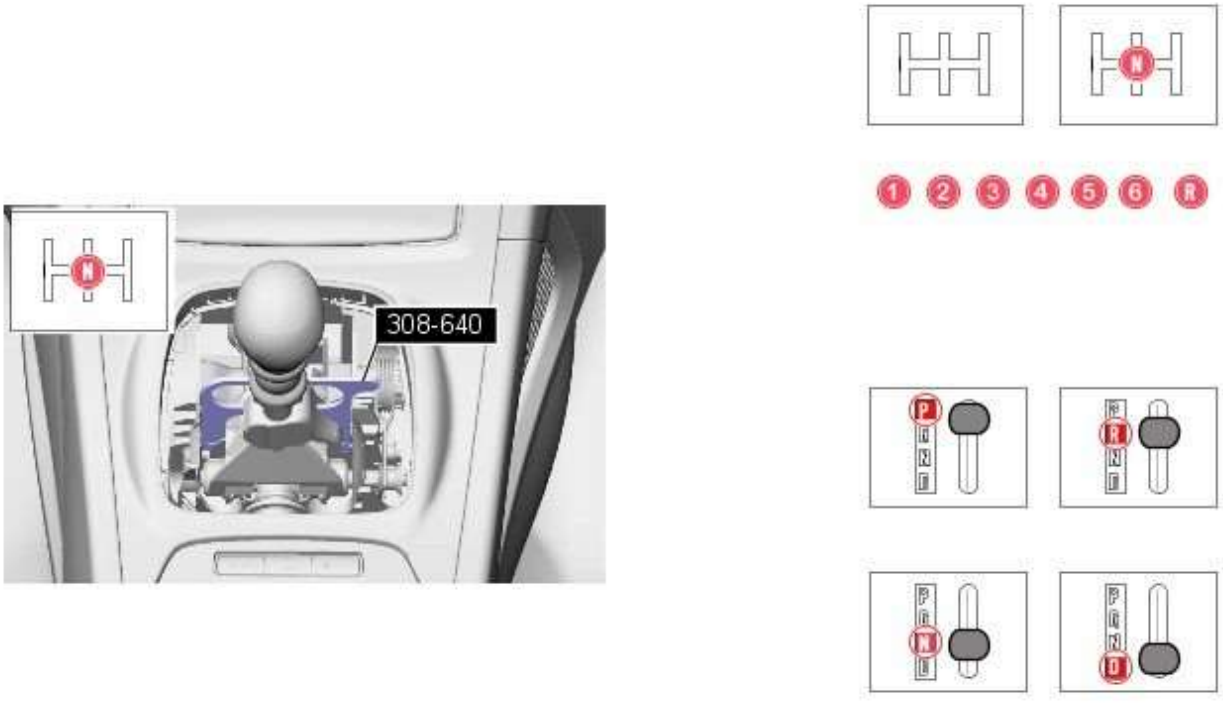
E84834

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



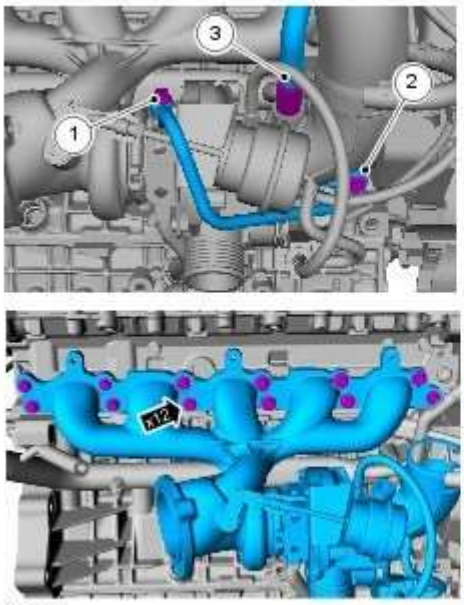
E84835

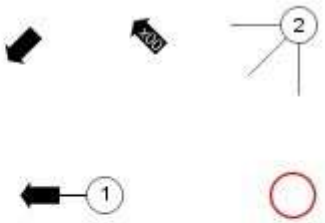
Gearshift lever or selector lever position symbols are used to show which gearshift lever or selector lever position is to be set.




E84836

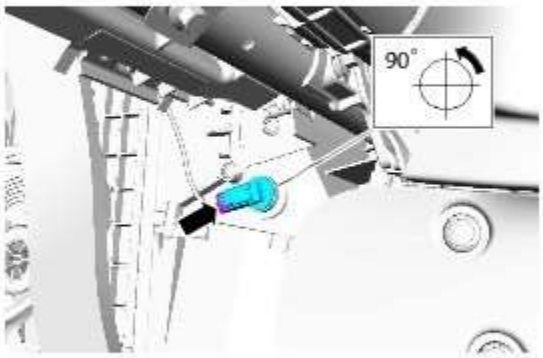
Pointer symbols are used to draw attention to components and give special instructions such as a required sequence or number of components. The number of components is reflected by the value inside the luty arrow. A sequence number is located inside the circle. Numbers inside circles are also used to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

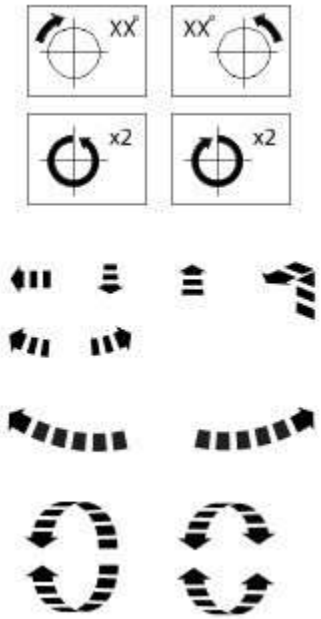



E84837

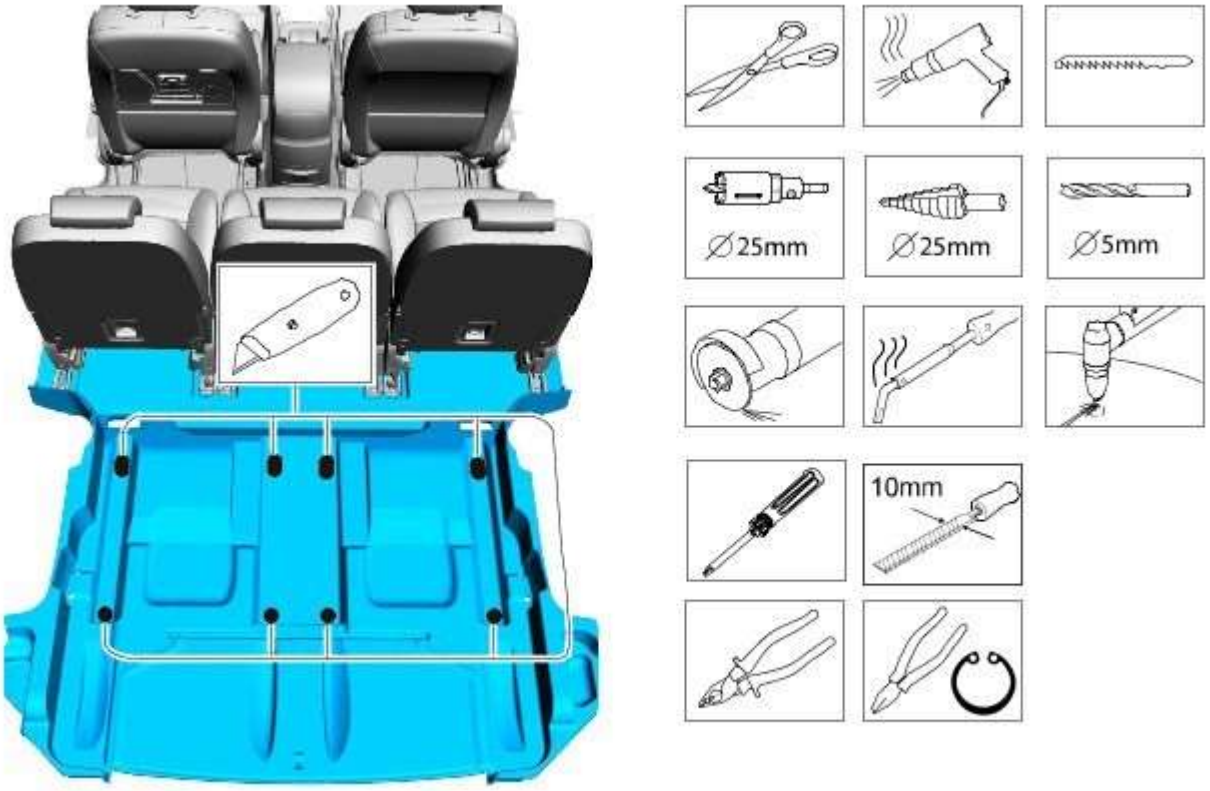
Movement arrows are used to show three dimensional or rotational movements. These movements can include specific values inside the symbol if required.



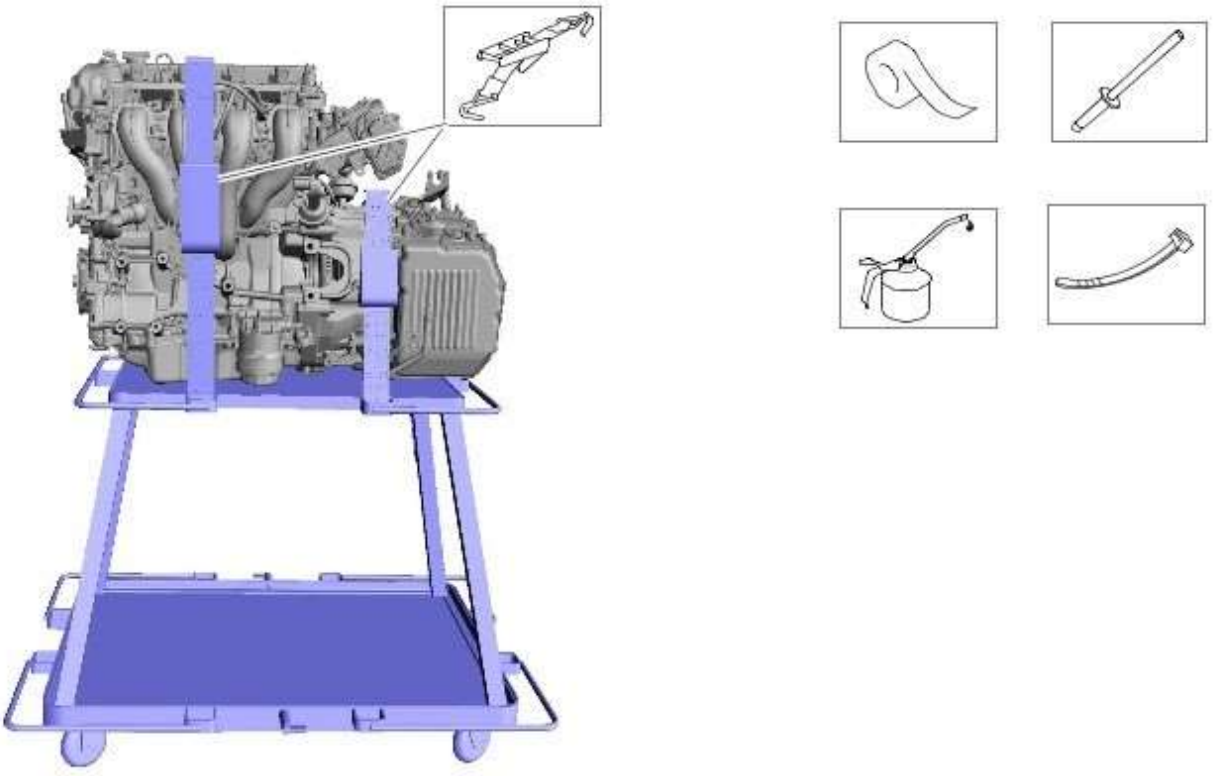

E84838

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



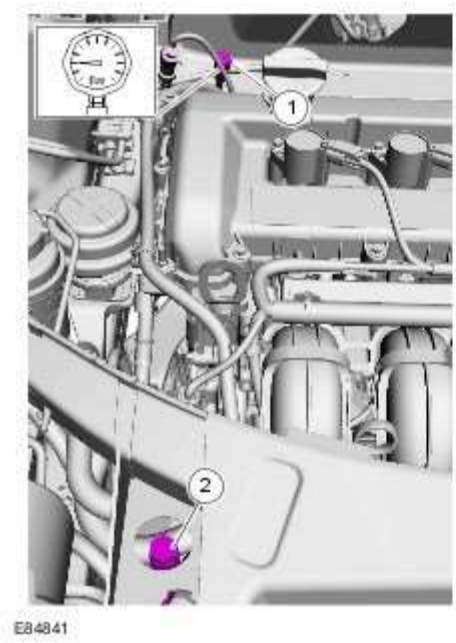

E84839

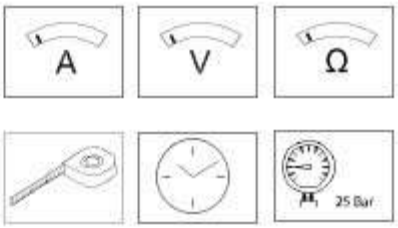
The following graphic illustrates a set of symbols that are used to provide detailed information on where to apply a material.



E84840

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




## How to use Diagnosis and Testing procedures

### Inspection and Verification

Visual Inspection Charts, Symptom Charts and other information charts (such as diagnostic routines) or supplement test procedures with technical specifications will navigate the user to a specific test procedure.

### Symptom Chart

The symptom chart indicates symptoms, sources and actions to address a condition.

### Pinpoint Tests

For electrical systems, pinpoint test steps are used to identify the source of a concern in a logical, step-by-step manner. Pinpoint tests have two columns: CONDITIONS and DETAILS/RESULTS/ACTIONS.

The CONDITIONS column is used exclusively for graphics and icons (with or without captions) and the DETAILS/RESULTS /ACTIONS column provides direction to another test step or specific corrective actions.

The boxed numbers indicate the order in which the described action is to be carried out.

### Component Tests

A component test is used when a component is tested in multiple pinpoint tests, or if a procedure is too complicated to be formatted within a single page of the pinpoint test.

### Graphics

Test graphics show the measurement or test to be carried out in a test step.

A representative tester graphic is used for voltmeters and ohmmeters.

If multiple measurements are made in a single graphic, the test leads are drawn with a solid line until the test lead splits to indicate the multiple measurements, at which point dashed lines are used.

Breakout box type testers are represented by a double circle test pin. Test pins are labeled with the pin number.

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# General Information - Application and Use of Specifications

Description and Operation

## Torque Specifications

Torque specifications are shown in the torque specifications chart located at the front of the relevant section.

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# General Information - Battery and Battery Charging Health and Safety Precautions

Description and Operation

WARNINGS:

 Batteries contain sulphuric acid, avoid contact with skin, eyes or clothing. Wear safety goggles when working near the battery to protect against possible splashing of the acid solution.

 EYE CONTACT: If acid comes into contact with the eyes, flush immediately with plenty of running water for a minimum of 15 minutes. Seek immediate medical attention.

 SKIN CONTACT: If acid comes into contact with the skin, flush immediately with plenty of running water for a minimum of 15 minutes. Seek immediate medical attention.

 SWALLOWED: If acid is swallowed, rinse the mouth with plenty of water and then drink plenty of water or milk. Do not induce vomiting. Seek immediate medical attention.

 Batteries normally produce explosive gases. Do not allow naked flames, sparks or lighted substances to come near the battery.

 When charging the battery shield your face and wear safety goggles. Provide adequate ventilation.

 CAUTION: Boost charging with excessive current or voltage above 16 volts will damage the battery.

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# General Information - Brake System Health and Safety Precautions

Description and Operation

WARNINGS:

 EYE CONTACT: Brake fluid contains polyglycol ethers and polyglycols. Avoid contact with the eyes. Wash hands thoroughly after handling. If brake fluid comes into contact with the eyes, flush the eyes with plenty of cold running water for 15 minutes. Seek medical attention for any persistent eye irritation or abnormality.

 SWALLOWED: Brake fluid contains polyglycol ethers and polyglycols. If swallowed, drink plenty of water. Seek immediate medical attention.

 INHALED: Dust from friction materials can be harmful if inhaled.

 Only use new specified brake fluid from airtight containers.

 CAUTION: If brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

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# General Information - Diesel Fuel System 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.

 Provide adequate ventilation when working on fuel systems.

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

 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: 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.

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

 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.

 Make sure that non-plated tools are used.

 Tools must be cleaned using a new brush and fresh suitable evaporative cleaning agent.

 Make sure to use a steel topped workbench covered with clean, lint-free, non-flocking material.

 Make sure that all parts removed from the vehicle are placed on the lint-free, non-flocking material.

 Make sure that any protective clothing worn is clean and made from lint-free, non-flocking material.

 Make sure to wear non-powdered latex type gloves.

 Make sure to protect all electrical components and connectors with lint-free non-flocking material before using the suitable evaporative cleaning agent.

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

Published: 28-Dec-2012

# General Information - General Service Information

Description and Operation

## Repairs and Replacements

When service parts are required, it is essential that only genuine Jaguar/Daimler replacements are used.

Attention is drawn to the following points concerning repairs and the installation of replacement parts and accessories:

- Safety features embodied in the vehicle may be impaired if other than genuine parts are installed. In certain territories, legislation prohibits the installation of parts which are not produced to the vehicle manufacturer's specification.
- Torque wrench setting figures given in this manual must be strictly adhered to. Locking devices, where specified, must be installed. If the efficiency of a locking device is impaired during removal it must be renewed.
- Owners purchasing accessories while travelling abroad should make sure that the accessory and its installed location on the vehicle conform to mandatory requirements existing in their country of origin.
- The vehicle warranty may be invalidated by the installation of other than genuine Jaguar/Daimler parts. All Jaguar/Daimler replacements have the full backing of the factory warranty.
- Jaguar/Daimler dealers are obliged to supply only genuine service parts.

## Vehicle Specifications

Purchasers are advised that the specification details set out in this manual apply to a range of vehicles and not to any specific one. For the specification of a particular vehicle, purchasers should consult their dealer.

The Manufacturer reserves the right to vary the specifications, with or without notice, and at such times and in such manner as the Manufacturer thinks fit. Major as well as minor changes may be involved, in accordance with the Manufacturer's policy of continuous improvement.

Whilst every effort is made to make sure the accuracy of the particulars contained in this manual, neither the Manufacturer nor the Dealer, by whom the manual is supplied, shall in any circumstances be held liable for any inaccuracy or the consequences thereof.

## Service Repair Operation Numbering

A master index of numbered operations has been compiled for universal application to all vehicles manufactured by Jaguar Land Rover Limited.

Each operation is allocated a number from the master index and cross-refers with an identical number in the Repair Operation Times schedule. The number consists of six digits arranged in three pairs.

Each maintenance procedure in this manual is described in the sequence necessary to complete the operation in the minimum time, as specified in the Repair Operation Times schedule.

## References to Bank-1 and Bank-2

References to Bank-1 and Bank-2 are made with regard to the engine. When viewed from the flywheel the right-hand bank will be Bank-1 and the left-hand bank will be Bank-2.

## Special Tools

Any special tools and equipment required to perform a maintenance procedure, are shown at the beginning of each procedure. When possible, illustrations are given to assist in identifying the tool needed.

## Disconnecting/Connecting the Battery

Always stop the engine before disconnecting the battery negative lead and make sure the battery positive lead is isolated i.e. wrapped in a suitable cloth.

 WARNING: Radio code saving devices must not be used when conducting work on Air Bag or Fuel systems. It must be noted that, when using these devices, the vehicle electrical system is still live albeit with a reduced current flow.

 NOTE: Before disconnecting the battery make sure that the radio receiver/cassette player/mini disc player and compact disc player keycodes are known and, that no data is required from the Engine Control Module (ECM) as battery disconnection will erase any fault codes and idle/drive values held in the Keep Alive Memory (KAM).

Always disconnect the battery before commencing repair operations which require:

- The vehicle to be jacked up
- Work on the engine
- Work underneath the vehicle
- Arc welding

Alternatively a Radio Code Saver may be used, when not working on the Air Bag or Fuel systems. With the battery

disconnected, a Radio Code Saver will allow sufficient current to pass to maintain the radio receiver/cassette player/mini disc player and compact disc player memory, operate the clock and supply the door operated interior lights while isolating the battery in the event of a short circuit.

## Reconnecting the Battery

WARNING: If the battery has been on bench charge the cells may be giving off explosive hydrogen gas. Avoid creating sparks, and if in doubt cover the vent plugs or covers with a damp cloth.

Always make sure that all electrical systems are switched OFF before reconnecting the battery to avoid causing sparks or damage to sensitive electrical equipment.

Always reconnect the battery positive lead first and the negative last, ensuring that there is a good electrical contact and the battery terminals are secure.

Restart the clock (where installed) and set it to the correct time.

Enter the radio receiver/cassette player/mini disc player and compact disc player keycodes and preset' frequencies, if known.

Following reconnection of the battery, the engine should be allowed to idle until it has reached normal operating temperature as the stored idle and drive values contained within the ECM have been lost. Allow the vehicle to idle for a further three minutes. Drive the vehicle at constant speeds of approximately 48 km/h (30 mph), 64 km/h (40 mph), 80 km/h (50 mph), 96 km/h (60 mph) and 112 km/h (70 mph) for three minutes each. This will allow the ECM to relearn idle and drive values, and may cause driveability concerns if the procedure is not carried out.

## Connecting a Slave Battery Using Jump Leads

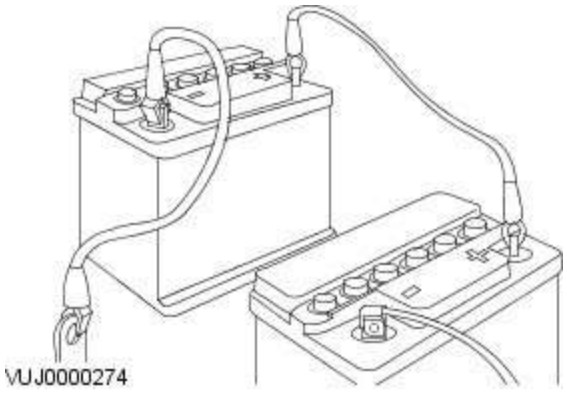
WARNING: If the slave battery has recently been charged and is gassing, cover the vent plugs or covers with a damp cloth to reduce the risk of explosion should arcing occur when connecting the jump leads.

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 circuits are switched off. This can cause arcing when the jump leads are connected.

Whilst 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. In such an instance the discharged battery must be recharged immediately after jump starting to avoid permanent damage.

- Always make sure that the jump leads are adequate for the task. Heavy duty cables must be used.
- 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 jump leads. This reduces the risk of sparks occurring when the final connection is made.




WARNING: Make sure that the ends of the jump leads do not touch each other or ground against the vehicle body at any time while the leads are attached to the battery. A fully charged battery, if shorted through jump leads, can discharge at a rate well above 1000 amps causing violent arcing and very rapid heating of the jump leads and terminals, and can even cause the battery to explode.

Always connect the jump leads in the following sequence.

- Slave battery positive first then vehicle battery positive.
- Slave battery negative next and then vehicle ground at least, 300 mm (12 in) from the battery terminal e.g. engine lifting bracket.

Always reduce the engine speed to idle before disconnecting the jump leads.

Before removing the jump leads, switch on the heater blower (high) or the heated rear screen, to reduce the voltage peak when the leads are removed.

Always disconnect the jump leads in the reverse order to the connecting sequence and take great care not to short the ends of the leads.

Do not rely on the generator to restore a discharged battery. For a generator to recharge a battery, it would take in excess of 8 hours continuous driving with no additional loads placed on the battery.

## Component Cleaning

To prevent ingress of dirt, accumulations of loose dirt and greasy deposits should be removed before disconnecting or dismantling components or assemblies.

Components should be thoroughly cleaned before inspection prior to reassembly.

Cleaning Methods:

- Dry Cleaning
- Removal of loose dirt with soft or wire brushes
- Scraping dirt off with a piece of metal or wood
- Wiping off with a rag

 CAUTION: Compressed air is sometimes wet so use with caution, especially on hydraulic systems.

- Blowing dirt off with compressed air (Eye protection should be worn when using this method)
- Removal of dry dust using vacuum equipment. This method should always be used to remove friction lining material dust (asbestos particles)
- Steam Cleaning

## Calibration of Essential Measuring Equipment

 WARNING: Failure to comply may result in personal injury or damage to components.

It is of fundamental importance that certain essential equipment e.g. torque wrenches, multimeters, exhaust gas analysers, rolling roads etc., are regularly calibrated in accordance with the manufacturers instructions.

## Use of Control Modules

Control modules may only be used on the vehicle to which they were originally installed. Do not attempt to use or test a control module on any other vehicle.

## Functional Test

On completion of a maintenance procedure, a thorough test should be carried out, to ensure the relevant vehicle systems are working correctly.

## Preparation

Before disassembly, clean the surrounding area as thoroughly as possible. When components have been removed, blank off any exposed openings using grease-proof paper and masking tape. Immediately seal fuel, oil and hydraulic lines when separated, using plastic caps or plugs, to prevent loss of fluid and the entry of dirt. Close the open ends of oil ways, exposed by component removal, with tapered hardwood plugs or readily visible plastic plugs. Immediately a component is removed, place it in a suitable container; use a separate container for each component and its associated parts. Before dismantling a component, clean it thoroughly with a recommended cleaning agent; check that the agent will not damage any of the materials within the component. Clean the bench and obtain marking materials, labels, containers and locking wire before dismantling a component.

## Dismantling

Observe scrupulous cleanliness when dismantling components, particularly when parts of the brake, fuel or hydraulic systems are being worked on. A particle of dirt or a fragment of cloth could cause a dangerous malfunction if trapped in these systems. Clean all tapped holes, crevices, oil ways and fluid passages with compressed air.

 WARNING: Do not permit compressed air to enter an open wound. Always use eye protection when using compressed air.

Make sure that any O-rings used for sealing are correctly reinstalled or renewed if disturbed. Mark mating parts to make sure that they are replaced as dismantled. Whenever possible use marking materials which avoid the possibilities of causing distortion or the initiation of cracks, which could occur if a center punch or scriber were used. Wire together mating parts where necessary to prevent accidental interchange (e.g roller bearing components). Tie labels on to all parts to be renewed and to parts requiring further inspection before being passed for reassembly. Place labelled parts and other parts for rebuild in separate containers. Do not discard a part which is due for renewal until it has been compared with the new part, to make sure

that the correct part has been obtained.

## Inspection

Before inspecting a component for wear or performing a dimensional check, make sure that it is absolutely clean; a slight smear of grease can conceal an incipient failure. When a component is to be checked dimensionally against figures quoted for it, use the correct equipment (surface plates, micrometers, dial gauges etc.) in serviceable condition. The use of makeshift equipment can be dangerous. Reject a component if its dimensions are outside the limits quoted, or if damage is apparent. A component may be reinstalled if its critical dimension is exactly to the limit size and it is otherwise satisfactory. Use Plastigauge 12 Type PG-1 for checking bearing surface clearance, e.g. big end bearing shell to crank journal. Instructions for the use of Plastigauge and a scale giving bearing clearances in steps of 0,0025 mm (0.0001 in) are supplied with the package.

## On-Board Diagnostics (OBD)

This vehicle uses programmed electronic control systems to provide engine management and emission regulation, automatic transmission operation and anti-lock braking control. These control systems are integral with the On-Board Diagnostics (OBD) facility that is used in conjunction with either the Jaguar approved diagnostic system or the more restricted scan tools.

The OBD information in this manual provides diagnostic and rectification procedures for emission related electrical and mechanical systems. The information is intended to facilitate fault diagnosis and the subsequent rectification of the vehicle without recourse to the Jaguar approved diagnostic system.

The diagnosis and testing sections within the manual cover:

- System principles of operation with links to the relevant Description and Operation sections
- Self tests (where appropriate)
- Inspection and Verification - manual checks, symptom and Diagnostic Trouble Code (DTC) driven diagnostic charts with actions required to rectify concerns
- Component tests (where appropriate)

## Circuit Diagrams

To understand the relationship between the vehicle electrical system and the system circuit diagrams, Refer to the Electrical Guide.

In the interest of clarity, single lines may represent multiple wires. Refer to the color code (1st alpha) followed by the wire reference (numeric/alpha/numeric) to trace origin and destination.

e.g. BW 647B002. BW (black with white trace) 647 (wire reference) B002 (stage from origin).

## Glossary of Terms

This glossary of terms is intended to cover mainly emissions-related (to SAE J 1930) terminology, and other abbreviations that may be used in this manual.

The required term may be looked-up in the left-hand column, and subsequent columns give the standard acronym, unit or abbreviation, and definition.

| Term(s) | Acronym/Unit /Abbreviation | Definition |
|---|---|---|
| Air Conditioning | A/C | |
| Accelerator Pedal Position | APP | Is a multitrack sensor which inputs the drivers demand into the engine control module (ECM) |
| After Bottom Dead Center | ABDC | Event occurring after bottom dead center |
| After Top Dead Center | ATDC | Event occurring after top dead center |
| Anti-lock Brake System | ABS | System which prevents wheel lock-up under braking by sensing lack of rotation of a wheel(s) and diverting fluid pressure away from it (them) |
| Alternating Current | ac | |
| Amplitude Modulation | AM | |
| Automatic Temperature Control | ATC | |
| Automatic Transmission Fluid | ATF | |
| Ampere | A | SI unit of current |
| Ampere hour | Ah | |
| Barometric Pressure | BARO | Pressure of surrounding air at any given temperature and altitude |
| Battery positive voltage | B+ | The positive voltage from a battery or any circuit connected directly to it |
| Before Bottom Dead Center | BBDC | Event occurring before bottom dead center |
| Before Top Dead Center | BTDC | Event occurring before top dead center |
| Bottom Dead Center | BDC | Lowest point of piston travel in a reciprocating engine |
| Battery Junction Box | BJB | |
| Brake Pedal Position | BPP | |
| Brake Horsepower | BHP | Effective horsepower developed by an engine or motor, as measured by a brake applied to its output shaft |
| British Standard | BS | Standard specification issued by the British Standards Institution |
| Brake Traction Control System | BTCS | |

| Term(s) | Acronym/Unit /Abbreviation | Definition |
|---|---|---|
| Bus | Topology of a communication network | |
| Coast Clutch Solenoid | CCS | |
| Camshaft Position | CMP | Indicates camshaft position |
| Carbon dioxide | $CO^2$ | Colorless gas with a density of approximately 1.5 times that of air |
| Carbon monoxide | CO | Poisonous gas produced as the result of incomplete combustion |
| Chlorofluorocarbon | CFC | |
| Catalytic converter | | In-line exhaust system device used to reduce the level of engine exhaust emissions |
| Celsius | C | SI term for the Centigrade scale, with freezing point at zero and boiling point at 100 degrees |
| Compact Disc | CD | |
| Cylinder Head Temperature Sensor | CHT Sensor | A sensor for measuring the temperature of the cylinder head |
| Central Junction Box | CJB | |
| Crankshaft Position | CKP | Indicates crankshaft position |
| Clutch Pedal Position | CPP | Indicates clutch pedal position |
| Controller Area Network | CAN | A communication system which allows control modules to be linked together |
| Constant Velocity | CV | |
| Cubic centimeter | $cm^3$ | |
| Central Security Module | CSM | Electronic module to support security system functionality |
| Data Link Connector | DLC | Connector providing access and/or control of the vehicle information, operating conditions, and diagnostic information |
| Driver Door Module | DDM | Electronic module to support driver door functionality |
| Driver Seat Module | DSM | Electronic module to support driver seat functionality |
| Daytime Running Lamps | DRL | |
| Deutsche Institut fur Normung | DIN | German standards regulation body |
| Diagnostic Trouble Code | DTC | An alpha/numeric identifier for a fault condition identified by the On-Board Diagnostic (OBD) system |
| Direct current | dc | Current which flows in one direction only, though it may have appreciable pulsations in its magnitude |
| Domestic Data Bus | D2B | |
| Digital Versatile Disc | DVD | |
| Electronic Automatic Temperature Control | EATC | |
| Exhaust Gas Recirculation | EGR | |
| Exhaust Gas Recirculation Temperature Sensor | EGRT | Sensing EGR function based on temperature change |
| Electronic Brake Force Distribution | EBD | |
| Engine Control Module | ECM | Electronic module to support engine functionality |
| Electronic Crash Sensor | ECS | Sensor to measure severity of impact |
| Engine Coolant Temperature | ECT | |
| Engine Oil Pressure | EOP | |
| European On-Board Diagnostic | EOBD | |
| Electronic Pressure Control | EPC | |
| Electrically Erasable Programmable Read-Only Memory | EEPROM | |
| Erasable Programmable Read-Only Memory | EPROM | |
| Evaporative Emission | EVAP | System designed to prevent fuel vapor from escaping into the atmosphere. Typically includes a charcoal filled canister to absorb fuel vapor |
| Flash Electrically Erasable Programmable Read-Only Memory | FEEPROM | |
| Front Electronic Module | FEM | |
| Flash Erasable Programmable Read-Only Memory | FEPROM | |
| Frequency Modulation | FM | |
| Fuel Pump Driver Module | FPDM | |
| Fuel Rail Pressure | FRP | |
| Generic Electronic Module | GEM | |
| Ground | GND | Electrical conductor used as a common return for an electrical circuit or circuits, and with a relative zero potential |
| Global Positioning System | GPS | |
| Global System for Mobile Communication | GSM | |
| Gross Vehicle Weight | GVW | |
| Heated Oxygen Sensor | HO2S | Electrically heated oxygen sensor which induces fuelling corrections |

| Term(s) | Acronym/Unit /Abbreviation | Definition |
|---|---|---|
| Hydrofluorocarbon | HFC | |
| High tension | HT | |
| Hydrocarbon | HC | |
| Idle Air Control | IAC | Stepper motor driven device which varies the volume of air by-passing the throttle to maintain the programmed idle speed |
| Intake Air Temperature | IAT | Temperature of intake air |
| Inertia Fuel Shut-off | IFS | An inertia system that shuts off the fuel supply when activated by pre-determined force limits brought about by (e.g.) collision |
| Input Shaft Speed | ISS | Indicates input shaft speed |
| Key On, Engine Off | KOEO | |
| Key On, Engine Running | KOER | |
| Kilogram (mass) | kg | |
| Kilogram (force) | kgf | |
| Kilogram force per square centimeter | $kgf/cm^2$ | |
| Kilometer | km | |
| Kilometer per hour | km/h | |
| Kilopascal | kPa | |
| Kilovolt | kV | |
| Knock Sensor | KS | Sensor which detects the onset of detonation, and signals the ECM to retard the ignition |
| Liquid Crystal Display | LCD | Optical digital display system, to which applied voltage varies the way the crystals reflect light, thereby modifying the display |
| Lighting Control Module | LCM | |
| Light Emitting Diode | LED | |
| Low Tension | LT | Primary circuit of the ignition system, linking the battery to the primary winding in the ignition coil |
| Left-Hand | LH | |
| Left-Hand Drive | LHD | |
| Mass Air Flow | MAF | System which provides information on the mass flow rate of the intake air to the engine |
| Manifold Absolute Pressure | MAP | Absolute pressure of the intake manifold air |
| Manifold Absolute Pressure and Temperature | MAPT | |
| Malfunction Indicator Lamp | MIL | A required on-board indicator to alert the driver of an emission related malfunction |
| Meter (measurement) | m | |
| Metric (screw thread, e.g. M8) | M | |
| Farad | F | Unit of electrical capacitance |
| Millimeter | mm | |
| Millimeter of mercury | mmHg | |
| Millisecond | ms | |
| Model year | MY | |
| Newton | N | SI unit of force. 1 N = 0.2248 pounds force |
| Newton Meter | Nm | SI unit of torque. Must not be confused with nm (nanometer) |
| Negative Temperature Coefficient | NTC | |
| Naturally aspirated | N/A | Fuelling system using intake air at atmospheric pressure; not supercharged or turbocharged |
| Noise, Vibration and Harshness | NVH | |
| North American Specification | NAS | Vehicles for sale in the USA and Canadian markets |
| On-Board Diagnostic | OBD | A system that monitors some or all computer input and output control signals. Signal(s) outside the pre-determined limits imply a fault in the system or a related system |
| Oxides of Nitrogen | Nox | |
| Oxygen Sensor | O2S | A sensor which detects oxygen content in the exhaust gases |
| On-board Refuelling Vapour Recovery | ORVR | |
| Output State Control | OSC | |
| Output Shaft Speed | OSS | |
| Passenger Air Bag Deactivation | PAD | |
| Pulsed Secondary Air Injection | PAIR | |
| Passive Anti-Theft System | PATS | |
| Positive Crankcase Ventilation | PCV | |
| Parameter Identification | PID | An index number referring to a parameter within a module without knowledge of its storage location |
| Park/Neutral Position | PNP | |
| Pulse Width Modulation | PWM | |
| Programmable Electronic Control Units System | PECUS | Process whereby a common ECM is programmed on the production line to suit the market requirements of a particular vehicle |

| Term(s) | Acronym/Unit /Abbreviation | Definition |
|---|---|---|
| Programmable Read-only Memory | PROM | ROM with some provision for setting the stored data after manufacture |
| Portable Support Electronics | PSE | |
| Power Steering Pressure | PSP | |
| Polytetrafluoroethylene | PTFE | |
| Random Access Memory | RAM | Fast access memory store which is accessible for entry or extraction of data |
| Read Only Memory | ROM | Fast access memory in which data is fixed and may not be changed |
| Restraints Control Module | RCM | Electronic module to support functionality of the Supplemental Restraints System |
| Radio Data System | RDS | |
| Rear Electronic Module | REM | |
| Remote Keyless Entry | RKE | |
| Right-hand | RH | |
| Right-hand drive | RHD | |
| Research Octane Number | RON | |
| Rear Seat Module | RSM | Electronic module to support functionality of rear seats |
| Supercharger | SC | An intake system which utilizes a supercharger (mechanically driven device that pressurizes intake air, thereby increasing density of charge air and the consequent power output from a given displacement) |
| Serial Communications Link | SCL | |
| Standard Corporate Protocol | SCP | A high-speed, serial communications system linking all body system control modules. Control messages and data are passed between modules at up to 786 messages per second |
| Supplemental Restraints System | SRS | |
| Shift Solenoid | SS | Controls shifting in an automatic transmission |
| Seat Control Module | SCM | Module controlling the seat motor systems (not electric raise/lower-only seats) |
| Secondary Air Injection | AIR | System used for a period of time each time the engine is started, unless certain temperature criteria are met. Pumps air directly into the exhaust system which generates extra heat and reduces the time taken for the catalytic converters to reach operating temperature |
| Service Repair Operation (number) | SRO | Number generated by Jaguar Methods & Techniques system which relates to the time allowed to complete a repair operation. Further information on the system can be found in the separate Jaguar Publications (for each model range) entitled 'Repair Operation Times' |
| Society of Automotive Engineers | SAE | |
| Timing/Coast Clutch Solenoid | T/CCS | |
| Torque Converter Clutch | TCC | |
| Transmission Control Indicator Lamp | TCIL | |
| Throttle Position | TP | |
| Top Dead Center | TDC | |
| Transmission Control Module | TCM | Controls the shifting pattern of the (automatic) transmission |
| Transmission Control Switch | TCS | Modifies the operation of electronically controlled transmissions |
| Transmission Fluid Temperature | TFT | Indicates temperature of transmission fluid |
| Transmission Range | TR | The range in which the transmission is operating |
| Turbine Shaft Speed | TSS | Indicates rotational speed of transmission output shaft or turbine shaft |
| Variable Assist Power Steering | VAPS | |
| Variable Camshaft Timing | VCT | A system by which the relationship of the crankshaft and camshaft may be altered during engine running |
| Vehicle Identification Number | VIN | Number assigned to the vehicle by the manufacturer, primarily for licensing and identification purposes |
| Vehicle Speed Sensor | VSS | Sensor which provides vehicle speed information |
| Worldwide Diagnostic System | WDS | Jaguar approved diagnostic system |
| Wide Open Throttle | WOT | Full throttle position |

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# General Information - Health and Safety Precautions

Description and Operation

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 in the following list either in their own right or as an ingredient in a sealer or adhesive.

## Acids and Alkalis

See also Battery Acids.

e.g. caustic soda, sulphuric acid.

Used in batteries and cleaning materials.

Irritant and corrosive to the skin, eyes, nose and throat. Cause burns. 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.

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

Display Eye Hazard sign.

## Air Bags

See also Fire, Chemical Materials - General

Highly flammable, explosive – observe No Smoking policy.

Used as a part of the Supplemental Restraint System (SRS), mounted in various positions around the vehicle.

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

The gas generant used in air bags is Sodium Azide. This material is hermetically sealed in the 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 gas generant.

- Wash affected areas thoroughly with water
- Seek medical assistance if necessary

 WARNING: To avoid accidental deployment and possible personal injury, the backup power supply must be depleted before repairing or replacing any SRS components. To deplete the backup power supply energy, disconnect the battery negative cable and wait for one minute. Failure to follow this instruction may result in personal injury.

 NOTE: The storage, transportation, disposal and/or recycling of air bag modules must be carried out in accordance with all applicable federal, state and local regulations including, but not limited to, those governing building and fire codes, environmental protection, occupational health and safety and transportation.

Air Bags - Do's

- Do store in an air bag safe when not installed to the vehicle.
- 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 you hands after handling deployed air bags
- Do wear safety glasses when carrying out repairs to the SRS or when handling an air bag module
- Only carry out a system test with the air bag modules fully installed
- Do inspect the condition of the impact sensor mounting bracket and sensor flylead if the vehicle has been involved in an impact. Replace if damaged, even if there has been no deployment.

Air Bags - Do Nots

- 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 handle a deployed device or gas generator for at least 20 minutes
- Do not probe air bag module electrical connectors or any other SRS component

## Air Conditioning Refrigerant

See also Chlorofluorocarbon, Chemical Materials

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 and should not be rubbed. SEEK MEDICAL ASSISTANCE IF NECESSARY.

Air Conditioning Refrigerant - Do Nots

- 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 i.e. R12 (Freon) and R134a

## Antifreeze

See also Fire, Solvents.

e.g. isopropanol, ethylene glycol, methanol.

Highly flammable, flammable, combustible.

Used in vehicle coolant systems, brake air pressure systems, screenwash solutions.

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

Antifreeze may be absorbed through the skin in toxic or harmful quantities. Antifreeze, if swallowed can be fatal and medical attention should be sought immediately.

These products must not be used in any cooling or industrial water system which is connected or linked to general, food preparation or drinking water supplies.

## Asbestos

Used in brake and clutch linings, transmission brake bands and gaskets. Jaguar original production and replacement items are asbestos free.

See also Warning Symbols on Vehicles at the end of this subsection.

Breathing asbestos dust may cause lung damage or, in some cases, cancer.

The use of drum cleaning units, vacuum cleaning or damp wiping is preferred.

Asbestos dust waste should be dampened, placed in a sealed container and marked to make sure safe disposal. If any cutting or drilling is attempted on materials containing asbestos the item should be dampened and only hand tools or low speed power tools used.

## Battery Acids

See also Acids and Alkalis.

Gases released during charging are explosive. Never use naked flames or allow sparks near charging or recently charged batteries.

Ensure adequate ventilation.

## Brake and Clutch Linings and Pads

See Asbestos.

## Brake Fluids (Polyalkylene Glycols)

See also Fire.

Splashes to the skin and eyes may cause irritation. Avoid skin and eye contact as far as possible. Vapor inhalation hazards do not arise at ambient temperatures because of the very low vapor pressure.

## Brazing

See Welding.

## Chemical Materials

See also Legal Aspects.

Chemical materials such as solvents, sealers, adhesives, paints, resin foams, battery acids, antifreeze, brake fluids, fuels, oils and grease 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 practical 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, and the breathing in of vapors, aerosols, dusts or fumes
- Do wash before breaks, before eating, smoking, drinking or using toilet facilities when handling chemical materials
- Do keep work areas clean, uncluttered and free from spills
- Do store chemical materials according to national and local regulations
- Do keep chemical materials out of the reach of children

Chemical Materials - Do Nots

- Do not mix chemical materials except under the manufacturer's 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 e.g. when people are inside a vehicle
- Do not apply heat or flame to chemical materials except under the manufacturer's 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, pits etc.
- Do not transfer chemical materials to unlabeled 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. Brief exposure to high concentrations of fumes can be toxic or harmful

## Chlorofluorocarbons (CFC)

There is concern in the scientific community that CFCs and Halons are depleting the upper ozone layer which filters out harmful ultraviolet radiation. Decreased filtration of ultraviolet radiation may result in increases in skin cancer, cataracts and immune system suppression in humans, as well as decreased productivity of crops and aquatic systems.

CFCs are used primarily as refrigerants in vehicle air conditioning systems and as aerosol propellants. Halons are used as fire extinguishants.

Jaguar supports worldwide elimination of CFC usage and it is recommended that Company subsidiaries and affiliates should phase out CFC usage as soon as acceptable substitutes are commercially available.

## Clutch Fluids

See Brake fluids.

## Clutch Linings and Pads

See Asbestos.

## Corrosion Protection Materials

See also Solvents, Fire.

Highly flammable, flammable – observe No Smoking policy.

These materials are varied and the manufacturer's instructions should be followed. They may contain solvents, resins, petroleum products etc. Skin and eye contact should be avoided. They should only be sprayed in conditions of adequate ventilation and not in confined spaces.

## Cutting

See Welding.

## Dewaxing

See Solvents and Fuels (Kerosene).

## Dusts

Powder, dusts or clouds 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/or sources of ignition.

## Electric Shock

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

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

Ensure that flexes, cables, plugs and sockets are not frayed, kinked, cut, cracked or otherwise damaged.

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

Ensure 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.

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

Ensure 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 push or drag the victim from the source of electricity using dry non-conductive material
- Commence resuscitation if trained to do so
- SUMMON MEDICAL ASSISTANCE

## Engine Oils

See Lubricants and Grease.

## 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.

## Gasolene (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.

## Fibre Insulation

See also Dusts.

Used in noise and sound 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

See also Welding, Foams, Legal Aspects.

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.

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

Ensure, 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.

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

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

## Fluoroelastomer

See Viton.

## Foams - Polyurethane

See also Fire.

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

Follow manufacturer's instructions.

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 vapor/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 conducted with extraction ventilation.

## Freon

See Air Conditioning Refrigerant.

## Fuels

See also, Fire, Legal Aspects, Chemicals and Solvents.

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 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. Aspiration of liquid into the lungs e.g. through vomiting, is a very serious hazard.

Gasoline dries the skin and can cause irritation and dermatitis on prolonged or repeated contact. Liquid in the eye causes severe pain.

Motor gasoline may contain appreciable quantities of benzene, which is toxic upon inhalation, and the concentration of gasoline 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.

Ensure there is adequate ventilation when handling and using gasoline. Great care must be taken to avoid the serious consequences of inhalation in the event of vapor build up arising from spillages in confined spaces.

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

Gasoline should not be used as a cleaning agent. It must not be siphoned by mouth. See First Aid.

## Gas - oil (Diesel Fuel)

See warnings and cautions in relevant manual sections.

Combustible.

Gross or prolonged skin contact with high boiling point gas oils may also cause serious skin disorders including skin cancer.

## 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.

## Gas Cylinders

See also Fire.

Gases such as oxygen, acetylene, argon and propane are normally stored in cylinders at pressures of up to 13.790 kPa, (2000 lb/in$^2$) 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 (e.g. 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 to avoid sources of ignition.

Only trained personnel should undertake work involving gas cylinders.

## Gases

See Gas Cylinders.

## Gaskets (Fluoroelastomer)

See Viton.

## 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 over – load 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, working with asbestos-based materials or using spraying equipment.

Ensure adequate ventilation to control dusts, mists and fumes.

## High Pressure Air, Lubrication and Oil Test Equipment

See also Lubricants and Greases.

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

Never direct a high pressure nozzle, e.g. diesel injector, at the skin as the fluid may penetrate to the under - lying tissue etc., and cause serious injury.

## Halon

See CFCs.

## Legal Aspects

Many laws and regulations make requirements relating to health and safety in the use and disposal of materials and equipment in workshops. Some of these laws which apply in the UK are listed. Similar laws exist for other territories:

- The Factories Act (1961)

- The Asbestos Regulations (1969)
- Highly Flammable Liquids and Liquified Petroleum Gases Regulations (1972)
- Control of Pollution Act (1974)
- Health and Safety at Work Act (1974)
- The Classification, Packaging and Labelling of Dangerous Substances Regulations (1978, 1981, 1983, 1984)
- Control of Lead at Work Regulations (1980)
- Control of Substances Hazardous to Health (COSHH) Regulations (1989)
- Abrasive Wheels Regulations (1970)
- Reporting of injuries, diseases and dangerous occurrences regulations 1985 (RIDDOR)

Workshops should be familiar, in detail, with these and associated laws and regulations.

Consult the local factory inspectorate if in any doubt.

## 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 mineral oil will result in the removal of natural oils 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.

There are publications describing the problems and advising on precautionary measures. For the UK a typical Health and Safety Executive publication is: SHW 397: Cautionary Notice: Effects of mineral oil on the skin.

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 clothing 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 enable easier removal of dirty oil and grease from the skin
- Wash with soap and water to make sure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin 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 practical, degrease components prior to handling
- Where there is a risk of eye contact, eye protection should be worn, for example, goggles or face shields; in addition an eye wash facility should be provided

Environmental Precautions

Burning used engine oil in small space heaters or boilers can be recommended only for units of approved design. In the UK the heating system must meet the requirements of HM Inspectorate of Pollution for small burners of less than 0.4 MW. If in doubt check with the appropriate local authority and/or manufacturer of approved appliances.

Dispose of used oil and used oil filters through authorized waste disposal contractors or licensed waste disposal sites, or to the waste oil reclamation trade, batteries should also be disposed off under similar arrangements. If in doubt, contact the relevant local authority for advice on disposal facilities.

It is illegal to pour used oil, antifreeze and automatic transmission fluid on to the ground, down sewers, drains, or into water courses.

## Noise

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

## Noise Insulation Materials

See Foams, Fibre Insulation.

## 0-Rings (Fluoroelastomer)

See Viton.

## Paints

See also body and paint manual.

See also Solvents, Chemical Materials.

Highly flammable, flammable - observe No Smoking policy

## Pressurized Equipment

See High Pressure Air, Lubrication and Oil Test Equipment.

## Solder

Solders are a mixture 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 etc. 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

See also Chemical Materials, Fuels (Kerosene), Fire.

e.g. acetone, white spirit, toluene, xylene, trichloroethane.

Used in cleaning and de-waxing materials, paints, plastics, resins, thinners etc.

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 to 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 (e.g. 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.

Ensure 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, e.g. paints, adhesive, 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 manufacturer's instructions.

## Sound Insulation

See Fibre Insulation, Foams.

## 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 e.g. suspended engine, etc.

Always make sure that lifting equipment such as jacks, hoists, axle stands, slings, etc., are adequate and suitable for the job, in good condition and regularly maintained.

## Transmission Brake Bands

See Asbestos.

## Underseal

See Corrosion Protection.

## Viton

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

Viton is a fluoroelastomer, that is a synthetic rubber type which contains Fluorine. It is commonly used for 'O' rings, gaskets and seals of all types. 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 400º 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 body.

'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 and assume that 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 neutralize 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

See also Fire, Electric Shock, Gas Cylinders.

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

Resistance Welding (Spot 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 ultraviolet 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.

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 ultraviolet 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.

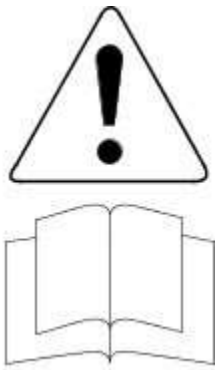
SPECIAL PRECAUTIONS MUST BE TAKEN BEFORE ANY WELDING OR CUTTING TAKES PLACE ON VESSELS WHICH HAVE CONTAINED COMBUSTIBLE MATERIALS, E.G. BOILING OR STEAMING OUT OF FUEL TANKS.

## Warning Symbols on Vehicles

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

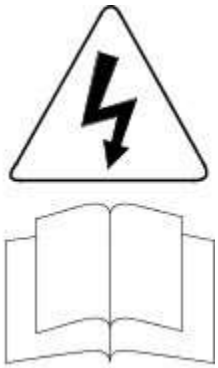
These decals must not be removed. The warnings are for the attention of owners/operators and persons carrying out service or repair operations on the vehicle.

The most commonly found decals are reproduced below together with an explanation of the warnings.



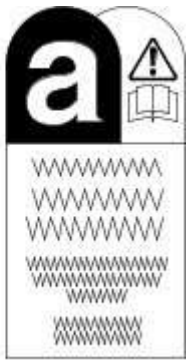
VUJ0000269

1. Components or assemblies displaying the warning triangle and open book symbol advise consultation of the relevant section of the owners handbook before touching or attempting adjustments of any kind.



VUJ0000270

2. Components or assemblies displaying the warning triangle with the electrified arrow and open book symbol give warning of inherent high voltages. Never touch these with the engine running or the ignition switched on. See Electric Shock in this subsection.



VUJ0000271

3. Jaguar vehicles and replacement parts which contain asbestos are identified by this symbol. See Asbestos in this subsection.

VUJ0000272

4. Components or assemblies displaying this symbol give warning that the component contains a corrosive substance. See Acids and Alkalis in this subsection.

VUJ0000273

5. Vehicles displaying the caution circle with a deleted lighted match symbol, caution against the use of naked lights or flames within the immediate vicinity due to the presence of highly flammable or explosive liquids or vapors. See Fire in this subsection.


VUJ0002037

6. All vehicles with the passenger air bag installed from the factory have a warning sticker attached to the instrument panel, prohibiting the use of rear facing child seats in the front seating position. Failure to follow this instruction may result in personal injury.

## White Spirit

See Solvents.

## Safety Precautions

WARNINGS:

Working on the fuel system results in fuel and fuel vapor being present in the atmosphere. Fuel vapor is extremely flammable, hence great care must be taken whilst working on the fuel system. Adhere strictly to the following precautions:

- Do not smoke in the work area
- Display 'no smoking' signs around the area
- Disconnect the battery before working on the fuel system
- Do not connect/disconnect electrical circuits, use electrical equipment or other tools or engage in working practices which in any way may result in the production of sparks
- Ensure that a $CO^2$ fire extinguisher is close at hand
- Ensure that dry sand is available to soak up any fuel spillage
- Empty fuel using suitable fire proof equipment into an authorized explosion proof container

- Do not empty fuel while working in a workshop or a pit
- Ensure that working area is well ventilated
- Ensure that any work on the fuel system is only carried out by experienced and well qualified maintenance personnel
- Ensure that fume extraction equipment is used where appropriate

 Fume extraction equipment must be in operation when solvents are used e.g. Trichloroethane, white spirit, sbp3, methylene chloride, perchlorethylene. Do not smoke in the vicinity of volatile degreasing agents.

Whenever possible, use a ramp or pit whilst working beneath a vehicle, in preference to jacking. Position chocks at the wheels as well as applying the parking brake. Never rely on a jack alone to support a vehicle. Use axle stands, or blocks carefully placed at the jacking points, to provide a rigid location. Check that any lifting equipment used has adequate capacity and is fully serviceable. Ensure that a suitable form of fire extinguisher is conveniently located. When using electrical tools and equipment, inspect the power lead for damage and check that it is properly earthed. Disconnect the earth (grounded) terminal of the vehicle battery. Do not disconnect any pipes of the air conditioning refrigeration system unless you are trained and instructed to do so. A refrigerant is used which can cause blindness if allowed to come into contact with the eyes. Ensure that adequate ventilation is provided when volatile degreasing agents are being used.

Adhere strictly to handling and safety instructions given on containers and labels. Keep oils and solvents away from naked flames and other sources of ignition. Do not apply heat in an attempt to free seized nuts or fittings; as well as causing damage to protective coatings, there is a risk of damage from stray heat to electronic equipment and brake lines. Do not leave tools, equipment, spilt oil etc. around the work area. Wear protective overalls and use barrier cream when necessary.

## Environmental Protection

In some countries it is illegal to pour used oil onto the ground, down sewers or drains, or into water courses. The burning of used engine oil in small space heaters or boilers is not recommended unless emission control equipment is installed. Dispose of used oil through authorized waste disposal contractors, to licensed waste disposal sites or to the waste oil reclamation trade. If in doubt, contact the Local Authority for advice on disposal facilities.

Published: 08-Dec-2012

# General Information - How To Use This Manual

Description and Operation

## Workshop Manual Organization

This manual covers descriptive, diagnostic (including OBD), and repair aspects to service the vehicle effectively.

The manual is arranged in sections, each section dealing with a specific part of a vehicle system. For example, Section 412-03 [Air Conditioning] covers air conditioning, which is part of the climate control system.

The first digit of the section number indicates the group (in the above example this being Electrical). There are five groups:

- General Information.
- Chassis.
- Powertrain.
- Electrical. Body
- and Paint.

The second and third digits of the section number indicate the vehicle system (12 in the above example being Climate Control).

The last two digits of the section number indicate the part of the system covered by the section (03 in the example denotes Air Conditioning).

Published: 11-May-2011

# 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.

Published: 11-May-2011

# 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.

Published: 11-May-2011

# General Information - Solvents, Sealants and Adhesives

Description and Operation

 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 regarding storage, handling and application.

The Solvents, Sealers and Adhesives subsection refers to some commonly used chemicals and materials, hazards associated with their use, and safety measures to be taken.

## Adhesives and Sealers

Highly flammable, flammable, combustible – observe No Smoking policy.

Generally should be stored in No Smoking' areas. Cleanliness and tidiness in use should be observed e.g. disposable paper covering benches; should be dispensed from applicators where possible; containers, including secondary containers, should be labelled appropriately.

## Solvent - based Adhesives/Sealers - See Solvents

Follow manufacturer's instructions.

## Water - based Adhesives/Sealers

Those based on polymer emulsions and rubber latexes 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 e.g. 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.

## Anaerobic, Cyanoacrylate (Super - glues) and other Acrylic Adhesives

Many are irritant, sensitizing or harmful to the skin and/or 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 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.

## 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 vapor 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 exhaust ventilated booths removing vapors and spray droplets from the breathing zone.

Wear appropriate gloves, eye and respiratory protection.

Published: 04-Jul-2014

# General Information - Standard Workshop Practices

Description and Operation

## Protecting the Vehicle

Always install covers to protect the fenders before commencing work in the engine compartment. Always install the interior protection kit, wear clean overalls and wash hands or wear gloves before working inside the vehicle. Avoid spilling hydraulic fluid, antifreeze or battery acid on the paintwork. In the event of spillage, wash off with water immediately. Use polythene sheets in the luggage compartment to protect carpets. Always use the recommended service tool, or a satisfactory equivalent, where specified. Protect temporarily exposed screw threads by replacing nuts or installing caps.

## Vehicle in Workshop

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

- The parking brake is applied or the wheels are securely chocked to prevent the vehicle moving forwards or backwards
- If the engine is to be run, there is adequate ventilation, or an extraction hose to remove exhaust fumes is installed
- There is adequate room to jack up 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
- The battery is disconnected if working on the engine, underneath the vehicle, or if the vehicle is jacked up

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, ensure a suitable fire extinguisher is readily available.

## 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.

## 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

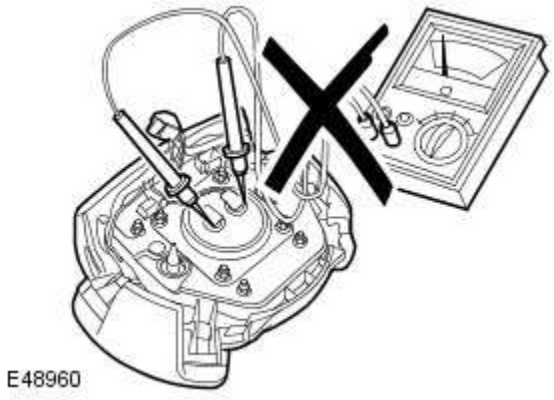
be replaced as soon as possible to make sure full SRS protection.

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 :

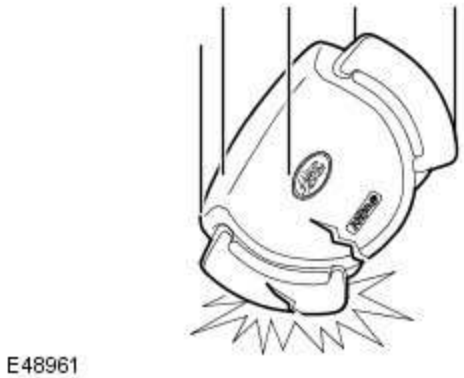
WARNING: Never use a multimeter or other general purpose equipment on SRS components. Use only approved JLR diagnostic equipment to diagnose system faults.


E48960

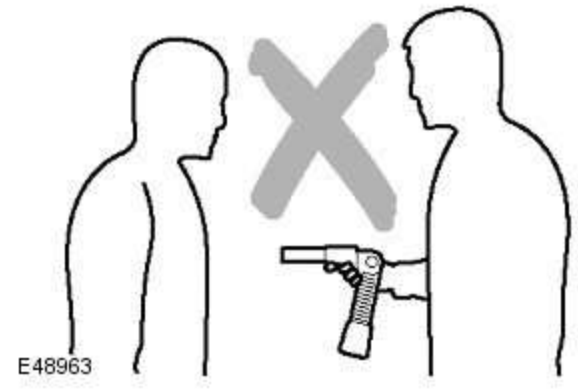
WARNING: Do not use electrical test equipment on the SRS harness while it is connected to any of the SRS components, it may cause accidental deployment and injury.

**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.

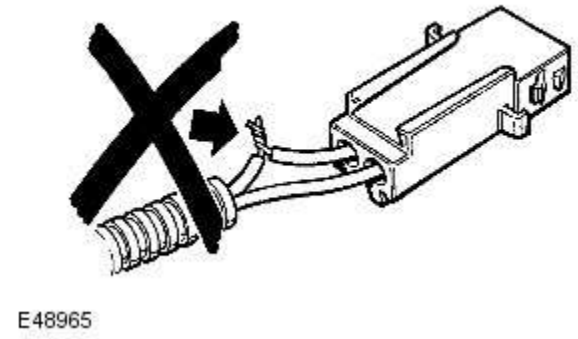
Airbag modules and seat belt pre-tensioners are classed as explosive devices. For overnight and longer term storage, they must be stored in a secure steel cabinet which has been approved as suitable for the purpose and has been registered with the local authority.

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.

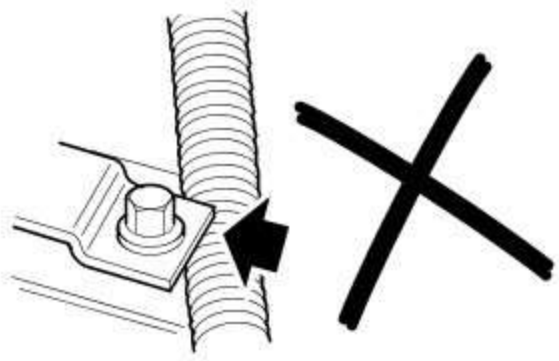
**SRS harness and connectors**

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



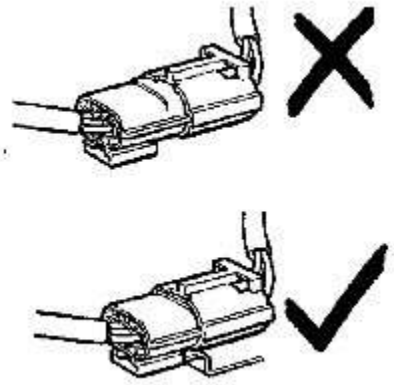

- Never attempt to modify, splice or repair SRS wiring.
- Never install electrical equipment such as a mobile telephone, two-way radio or in-car entertainment system in such a way that it could generate electrical interference in the airbag harness. Seek specialist advice when installing such equipment.

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

Published: 11-May-2011

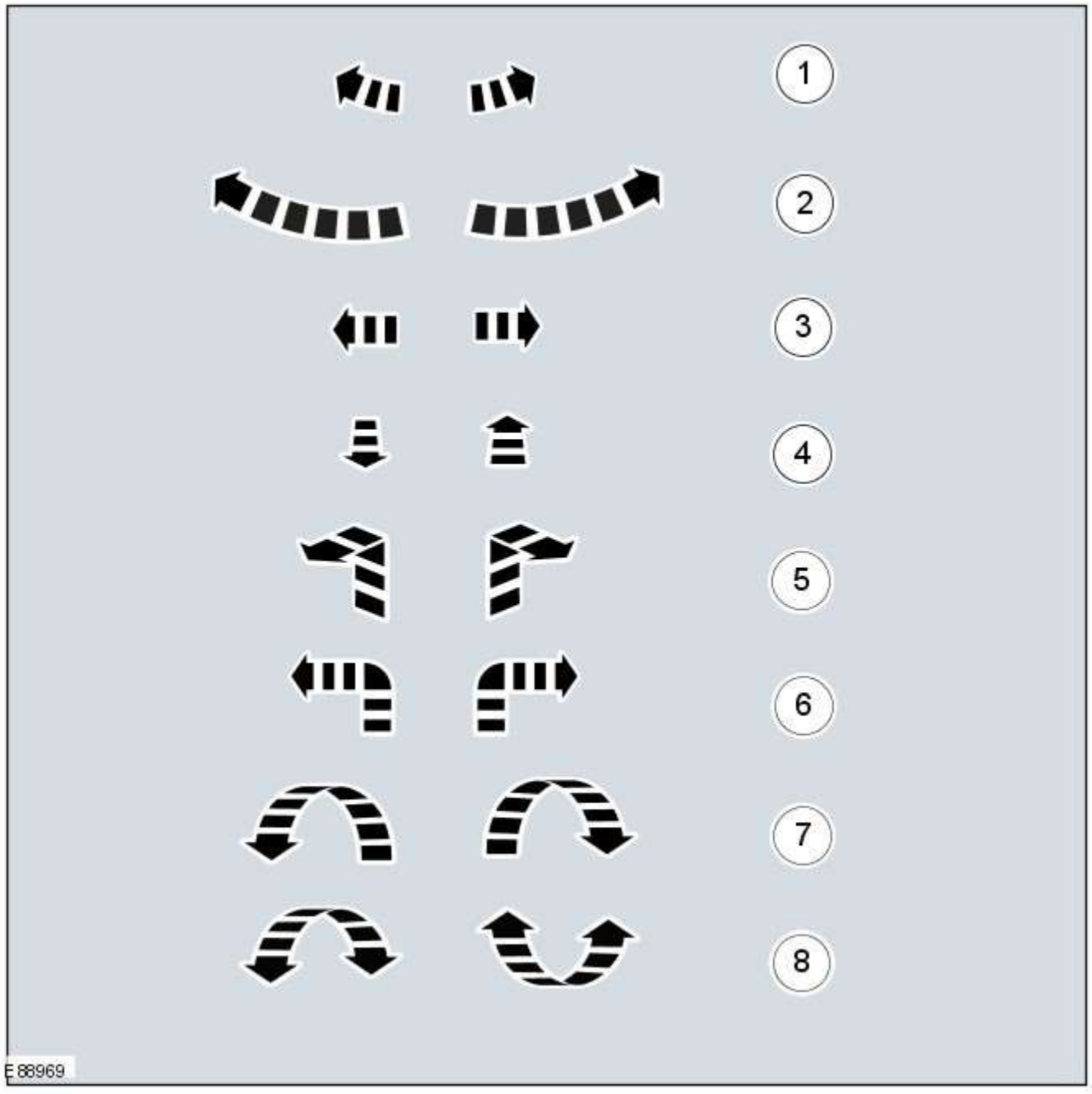
# General Information - Symbols Glossary

Description and Operation

Symbols are used inside the graphics and in the text area to enhance the information display.

**Movement Symbols**

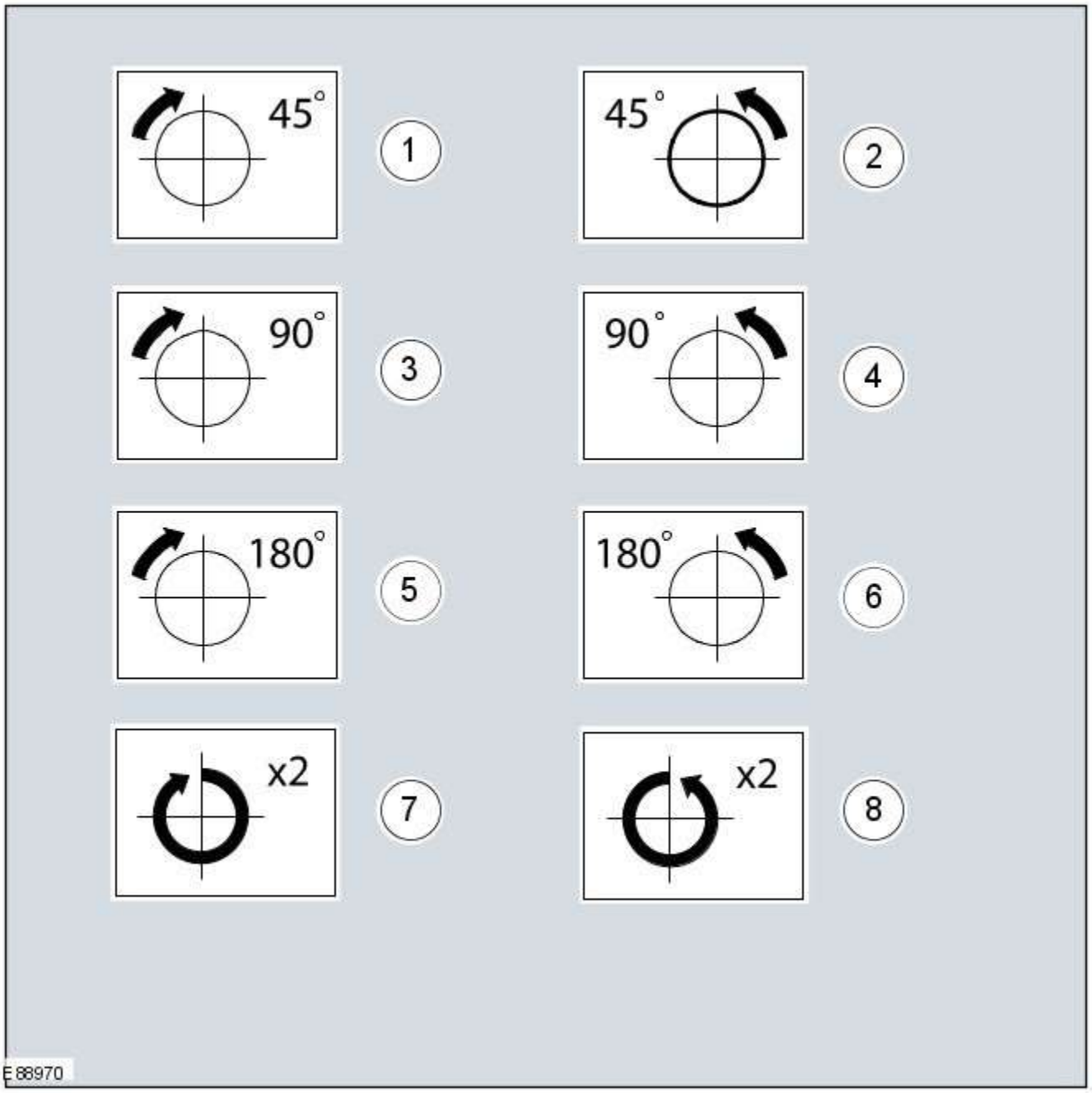
Movement symbols provide detailed information to a required component movement. These component movements can be rotational or 1-3 dimensional movements.




| Item | Part Number | Description |
|---|---|---|
| 1 | - | Minor component movement clockwise/counterclockwise |
| 2 | - | Major component movement clockwise/counterclockwise |
| 3 | - | Component movement to the left/right/up/down |
| 4 | - | Component movement towards/away |
| 5 | - | 3 dimensional component movement |
| 6 | - | 2 dimensional component movement |
| 7 | | 3 dimensional component rotation |
| 8 | | 3 dimensional component cycling |

**Turn Symbols**

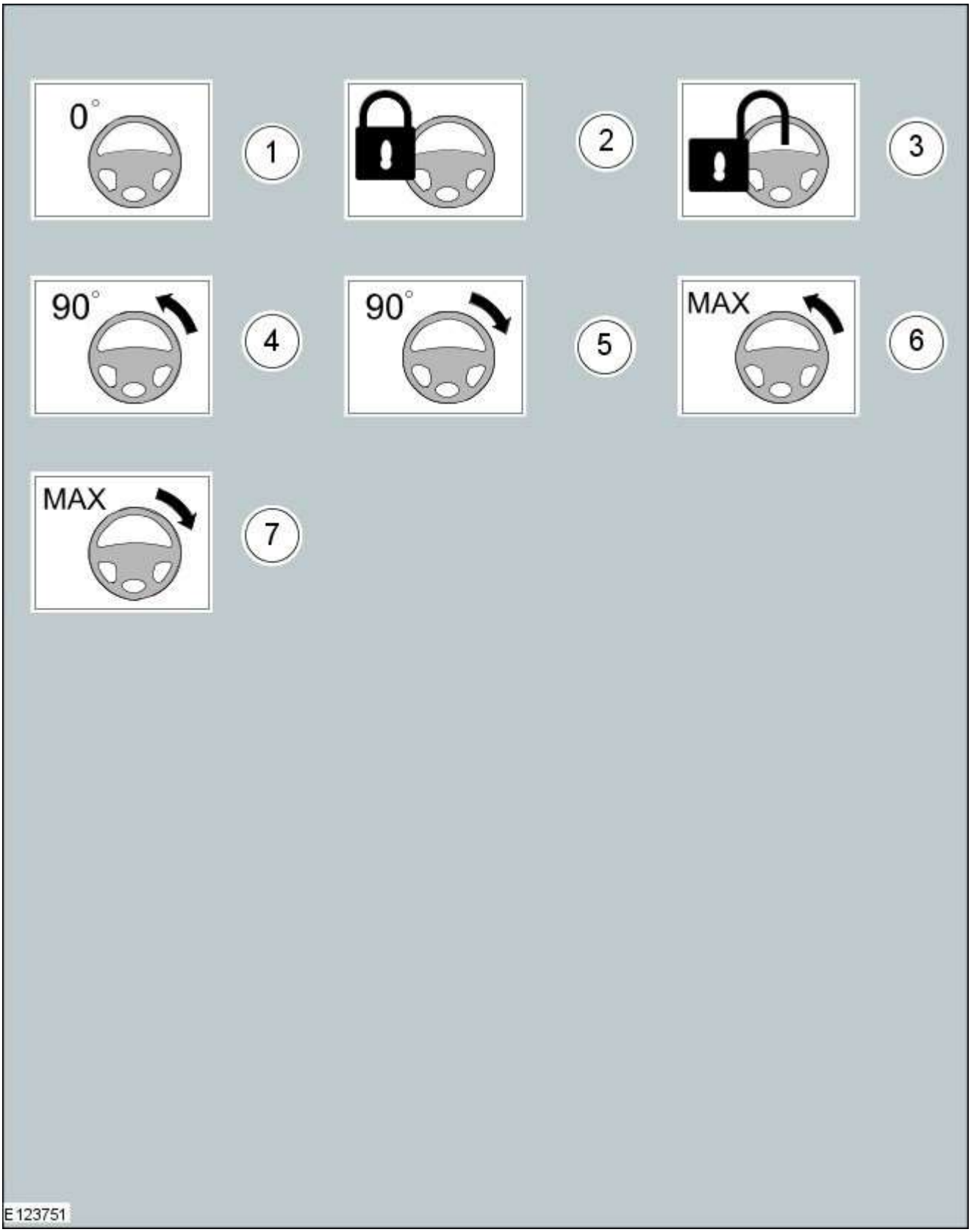
Turn symbols are used to provide further information on the direction or angle of component turns.




| Item | | Description |
|---|---|---|
| 1 | | Turn the component clockwise through 45° |
| 2 | | Turn the component counterclockwise through 45° |
| 3 | | Turn the component clockwise through 90° |
| 4 | | Turn the component counterclockwise through 90° |
| 5 | | Turn the component clockwise through 180° |
| 6 | | Turn the component counterclockwise through 180° |
| 7 | | Turn the component clockwise through 2 complete turns |
| 8 | | Turn the component counterclockwise through 2 complete turns |

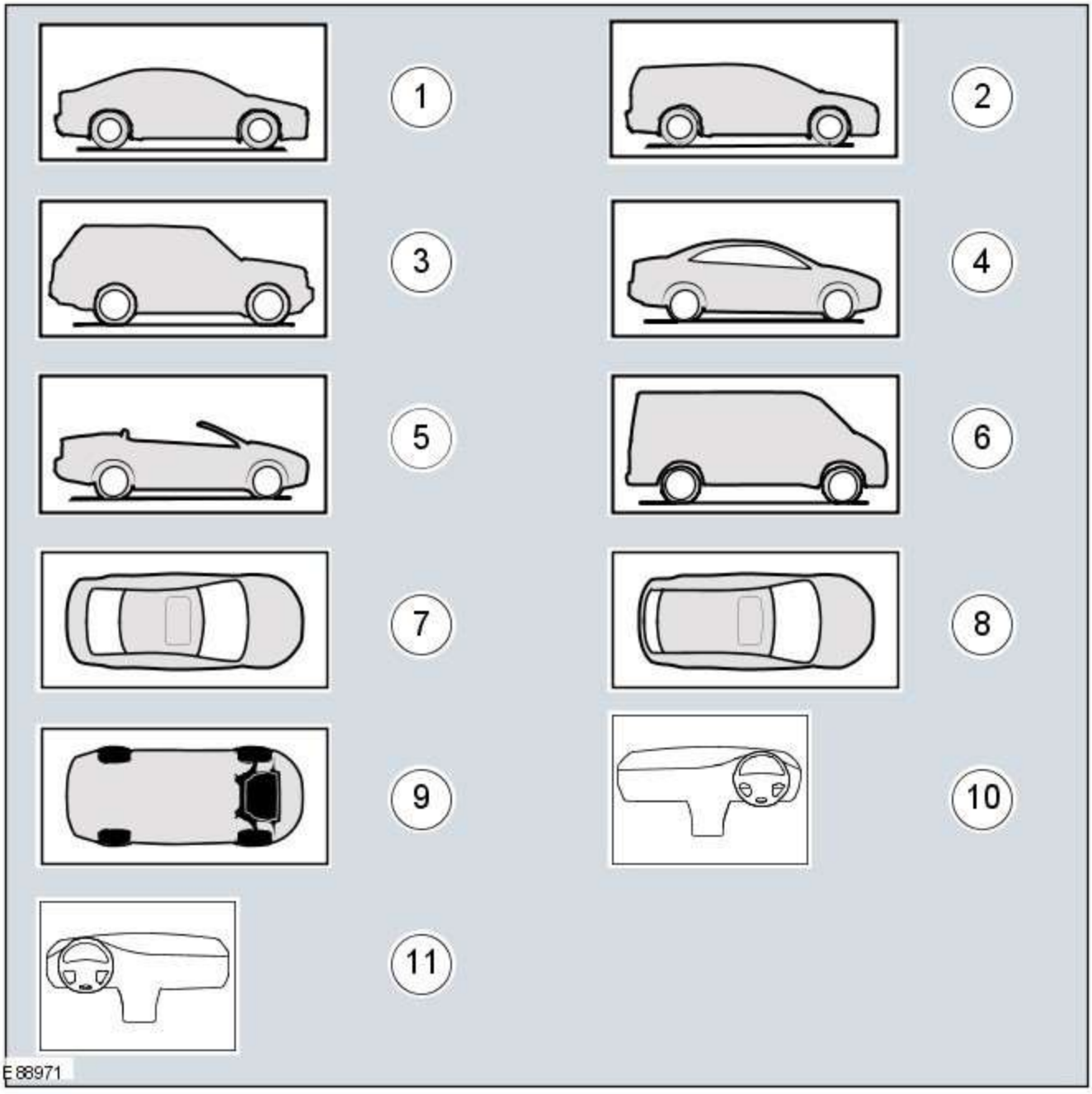
**Steering Wheel Symbols**

Steering wheel symbols are used to provide further information to a required steering wheel position or steering column lock status.




| Item | | Description |
|---|---|---|
| 1 | | Steering wheel in straight ahead position |
| 2 | | Steering column lock locked |
| 3 | | Steering column lock unlocked |

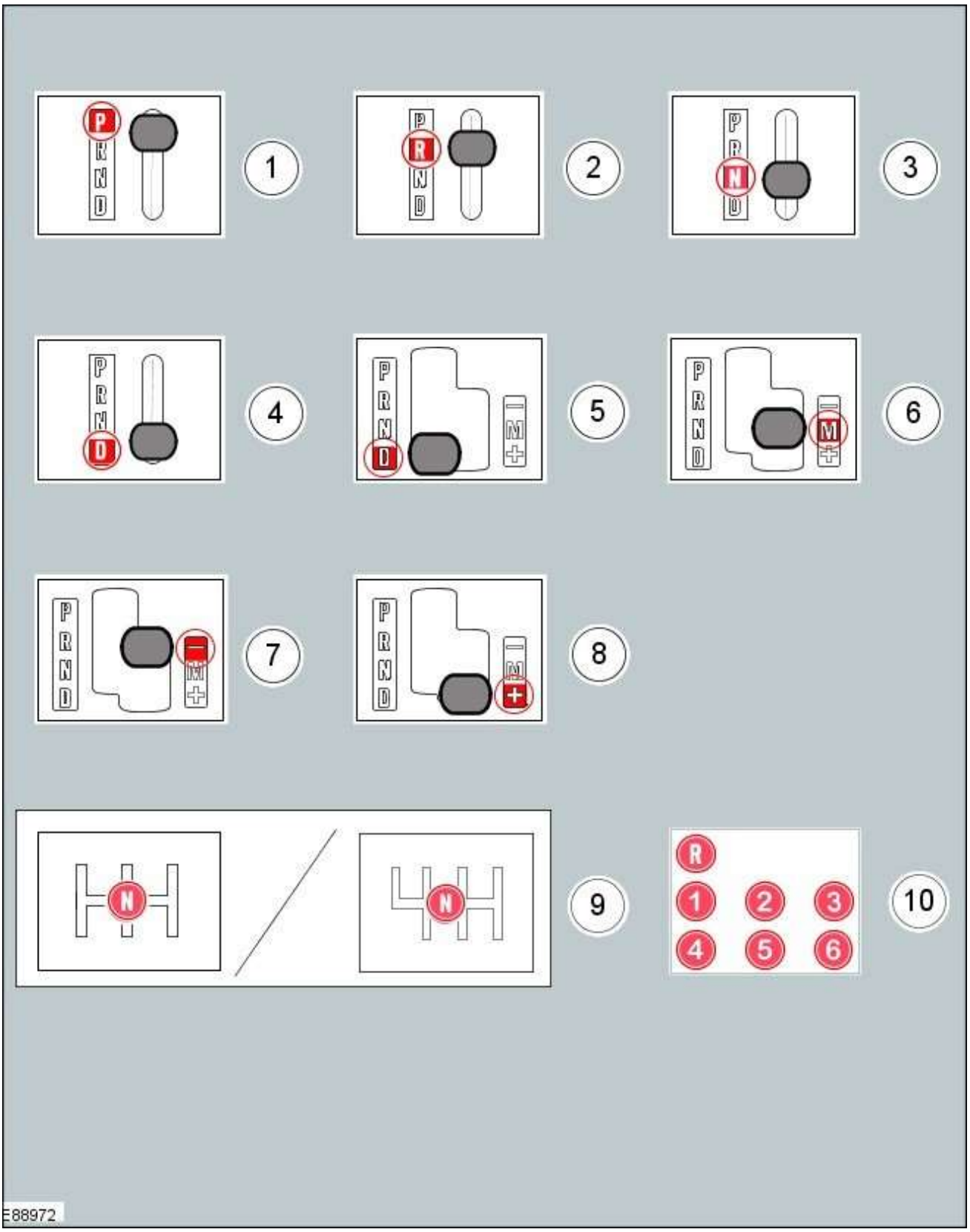
| | | |
|---|---|---|
| 4 | | Turn the steering wheel to the 90° left position |
| 5 | | Turn the steering wheel to the 90° right position |
| 6 | | Turn the steering wheel to the left-hand end position |
| 7 | | Turn the steering wheel to the right-hand end position |




| Item | | Description |
|---|---|---|
| 1 | | 3, 4, 5-door body style |
| 2 | | Wagon body style |
| 3 | | Sports utility vehicle body style |
| 4 | | Coupe body style |
| 5 | | Convertible body style |
| 6 | | Van body style |
| 7 | | 3, 4, 5-door body style - Top View |
| 8 | | Wagon body style - Top View |
| 9 | | Underview |
| 10 | | Right-hand drive (RHD) vehicle |
| 11 | | Left-hand drive (LHD) vehicle |

**Gearshift lever and selector lever position symbols**

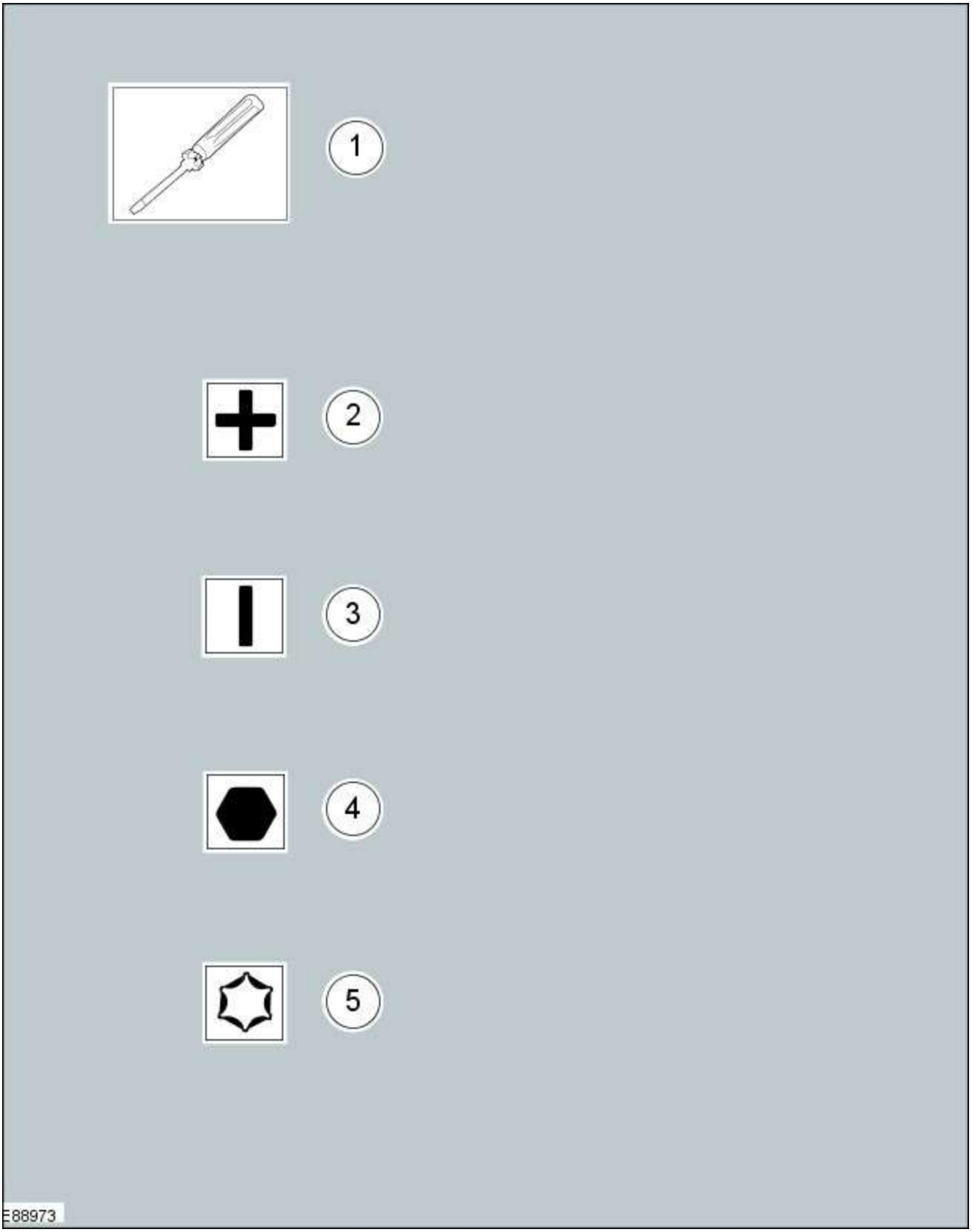
Gearshift lever and selector lever position symbols are used to show the lever position that is required to be selected to carry out a procedure step.



| Item | | Description |
|---|---|---|
| 1 | | Set the selector lever to the park (P) position |
| 2 | | Set the selector lever to the reverse ®) position |
| 3 | | Set the selector lever to the neutral (N) position |
| 4 | | Set the selector lever to the drive (D) position |
| 5 | | Set the selector lever with manual shift pattern to the park (D) position |
| 6 | | Set the selector lever with manual shift pattern to the manual (M) position |
| 7 | | Set the selector lever with manual shift pattern to the shift down (-) position |
| 8 | | Set the selector lever with manual shift pattern to the shift up (+) position |
| 9 | | Set the gearshift lever to the neutral (N) position |
| 10 | | Further gearshift lever positions that may appear in illustrations |

**Screwdriver symbols**

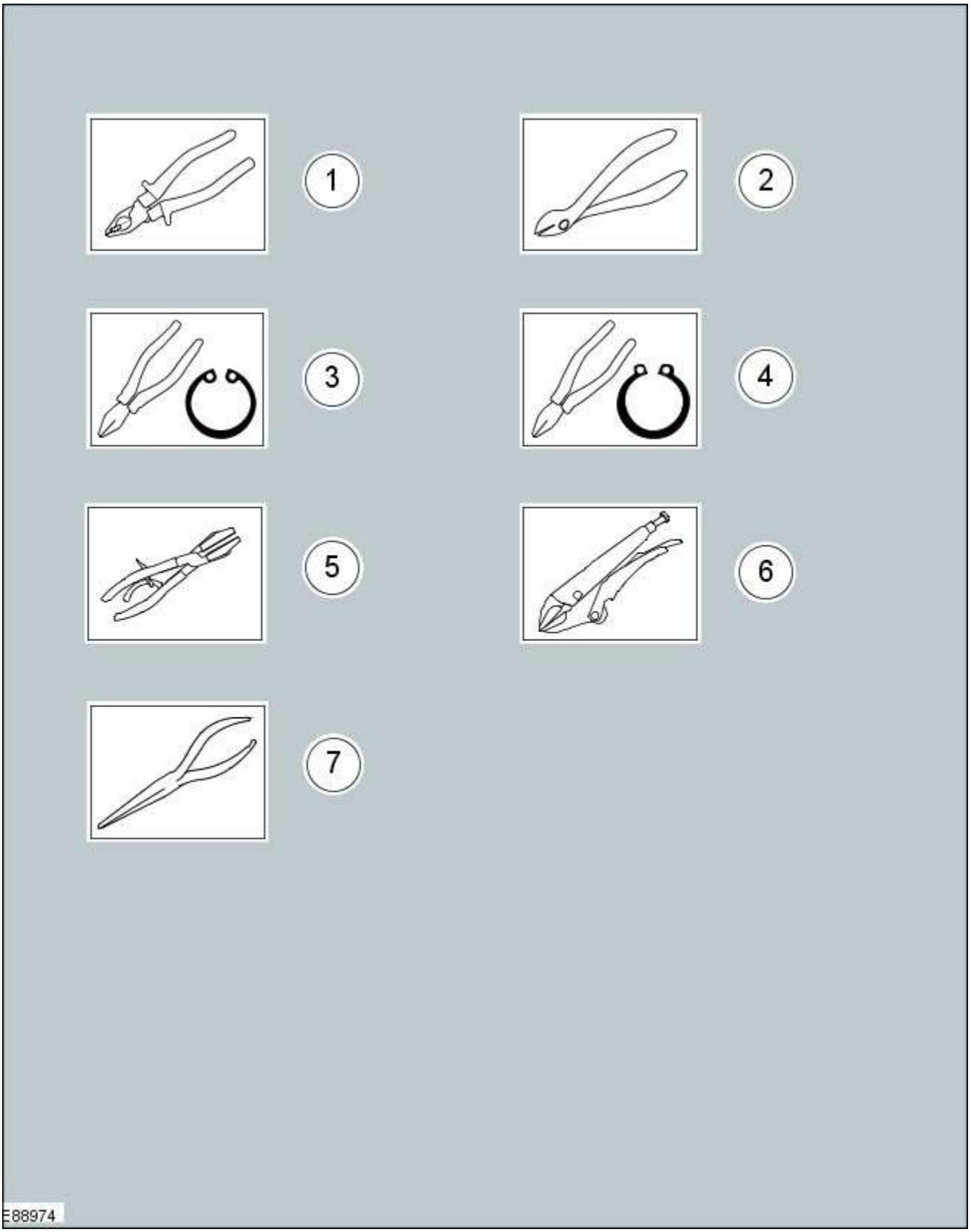
The screwdriver symbols are used to show which screwdriver bit is recommended to carry out a procedure step.




| Item | | Description |
|---|---|---|
| 1 | | Screwdriver |
| 2 | | Cross bladed screwdriver |
| 3 | | Flat bladed screwdriver |
| 4 | | Hexagonal screwdriver |
| 5 | | TORX screwdriver |

**Pliers symbols**

The pliers symbols are used to show which pliers is recommended to carry out a procedure step.

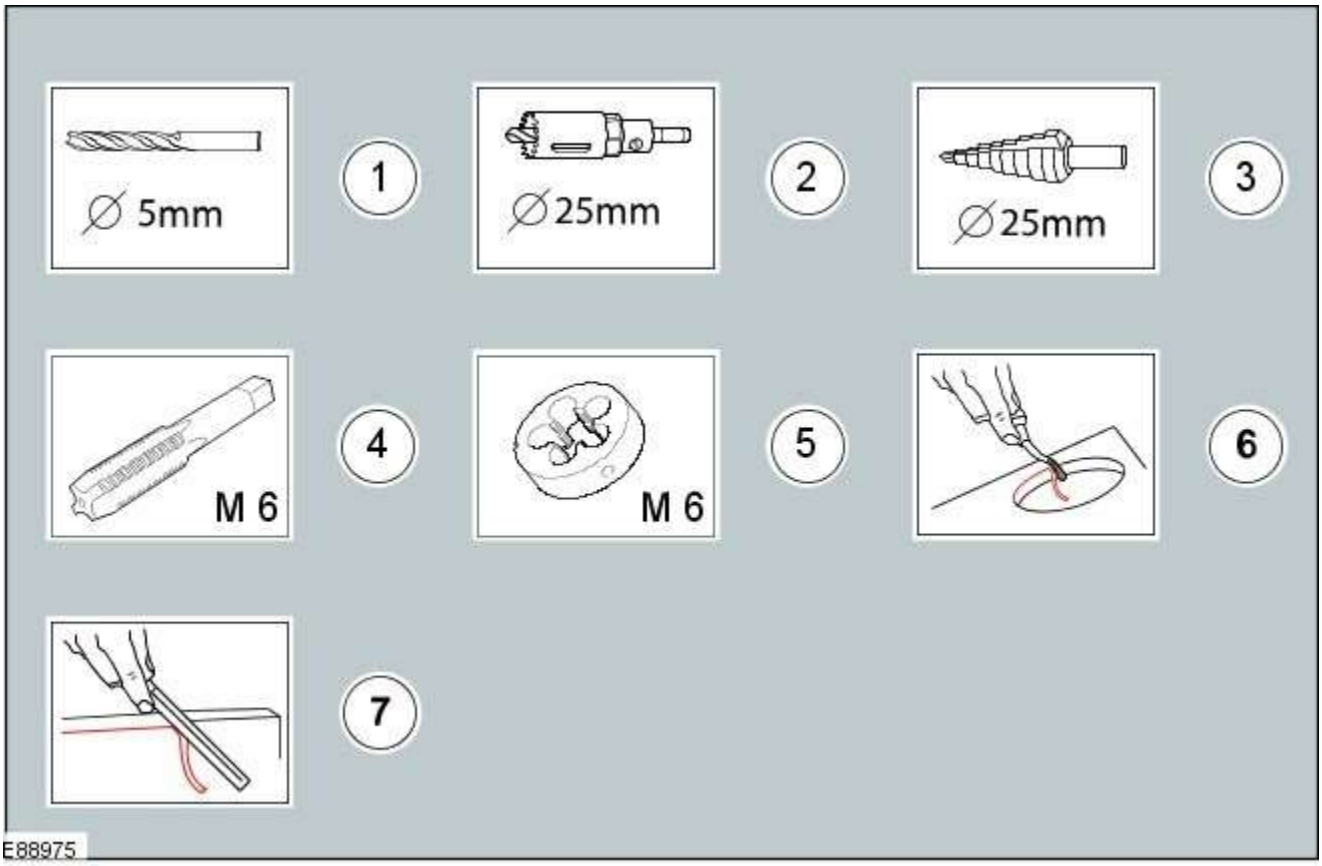



| Item | | Description |
|---|---|---|
| 1 | | Combination pliers |
| 2 | | Side cutter pliers |

| | | |
|---|---|---|
| 3 | | Securing ring pliers - inner |
| 4 | | Securing ring pliers - outer |
| 5 | | Hose clamp pliers |
| 6 | | Locking pliers |
| 7 | | Long nose pliers |

**Drill symbols**

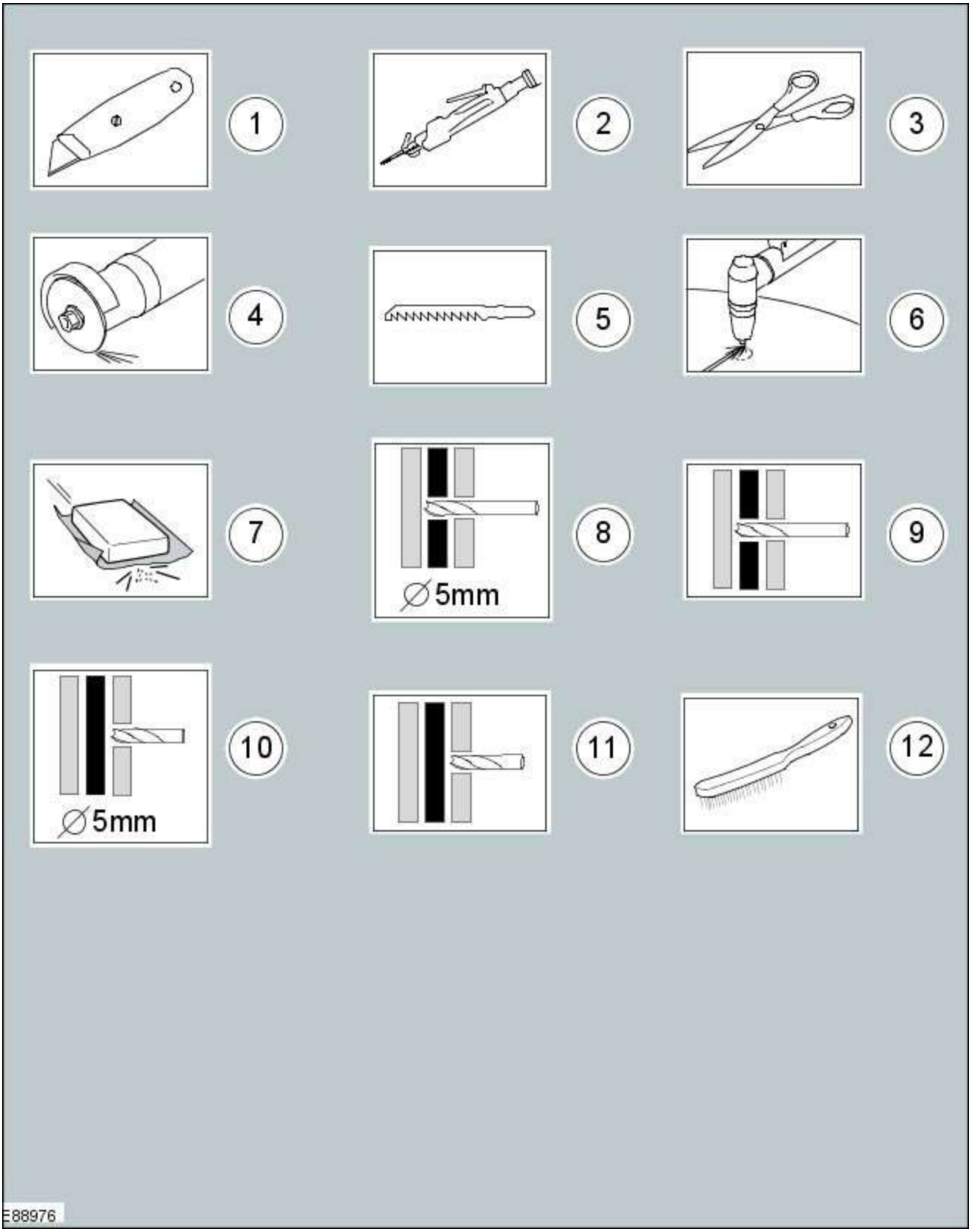
The drill symbols are used to show which type and size of drill bit is recommended to carry out a procedure step.




| Item | | Description |
|---|---|---|
| 1 | | Drill bit with a specified diameter |
| 2 | | Hole saw with a specified diameter |
| 3 | | Stepped drill bit with a specified diameter |
| 4 | | Tap with a specified diameter |
| 5 | | Die with a specified diameter |
| 6 | | Scraper for circular holes |
| 7 | | Scraper for straight edges |

**Cutting tool symbols**

The cutting tool symbols are used to show which type of cutting tool is recommended to carry out a procedure step.

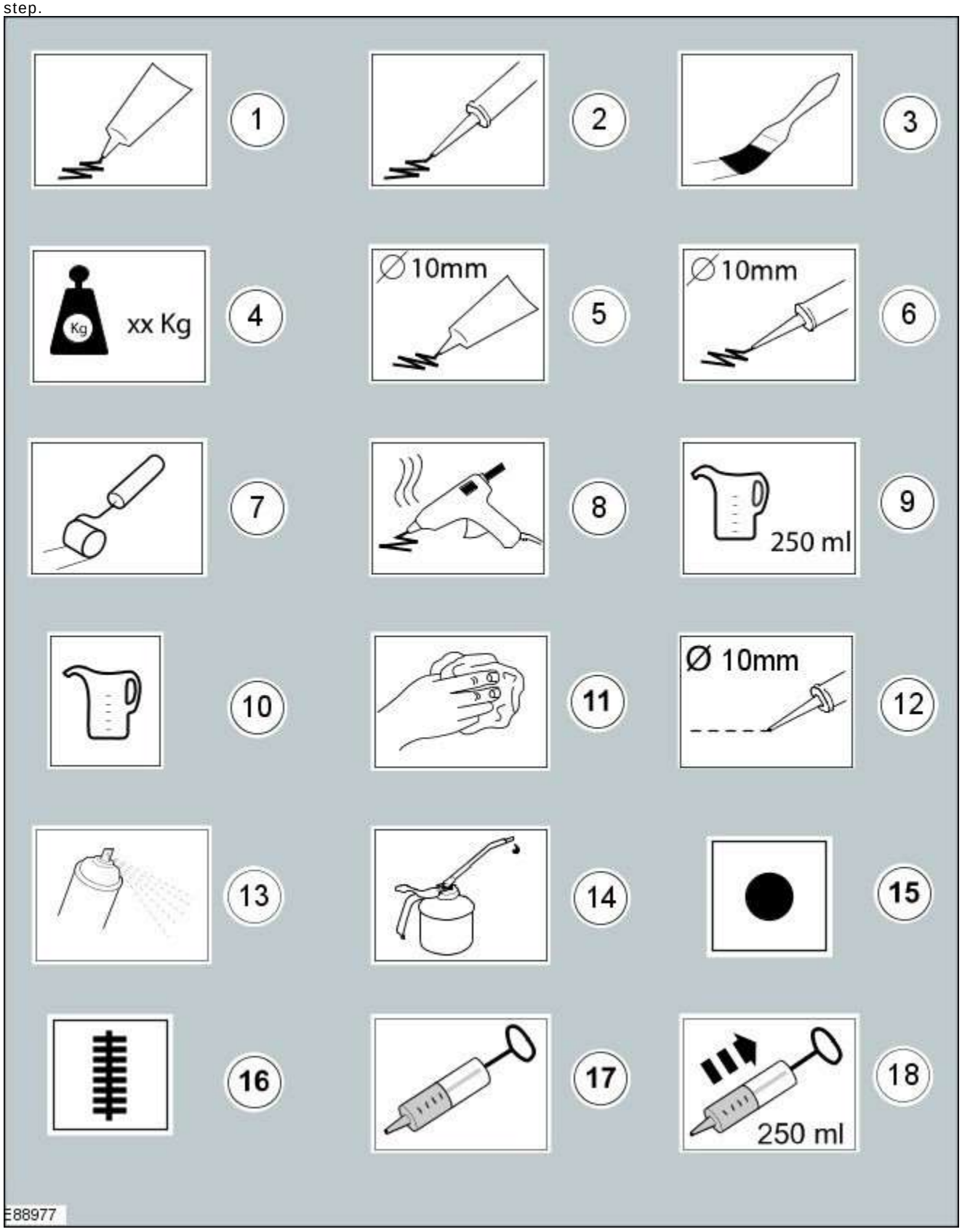



| Item | | Description |
|---|---|---|
| 1 | | Cutting knife |
| 2 | | Air body saw |
| 3 | | Scissors |
| 4 | | Grinder |
| 5 | | Jig saw |

| | | |
|---|---|---|
| 6 | | Plasma cutter |
| 7 | | Sanding Paper |
| 8 | | Drill through the shown number of body panel layers with a specified diameter |
| 9 | | Drill through the shown number of body panel layers with a suitable diameter |
| 10 | | Drill through 1 body panel layer with a specified diameter |
| 11 | | Drill through 1 body panel layer with a suitable diameter |
| 12 | | Wire brush |

**Apply Chemical or load symbols**

The apply chemical or load symbols are used to show where to apply which type of chemical or load to carry out a procedure step.

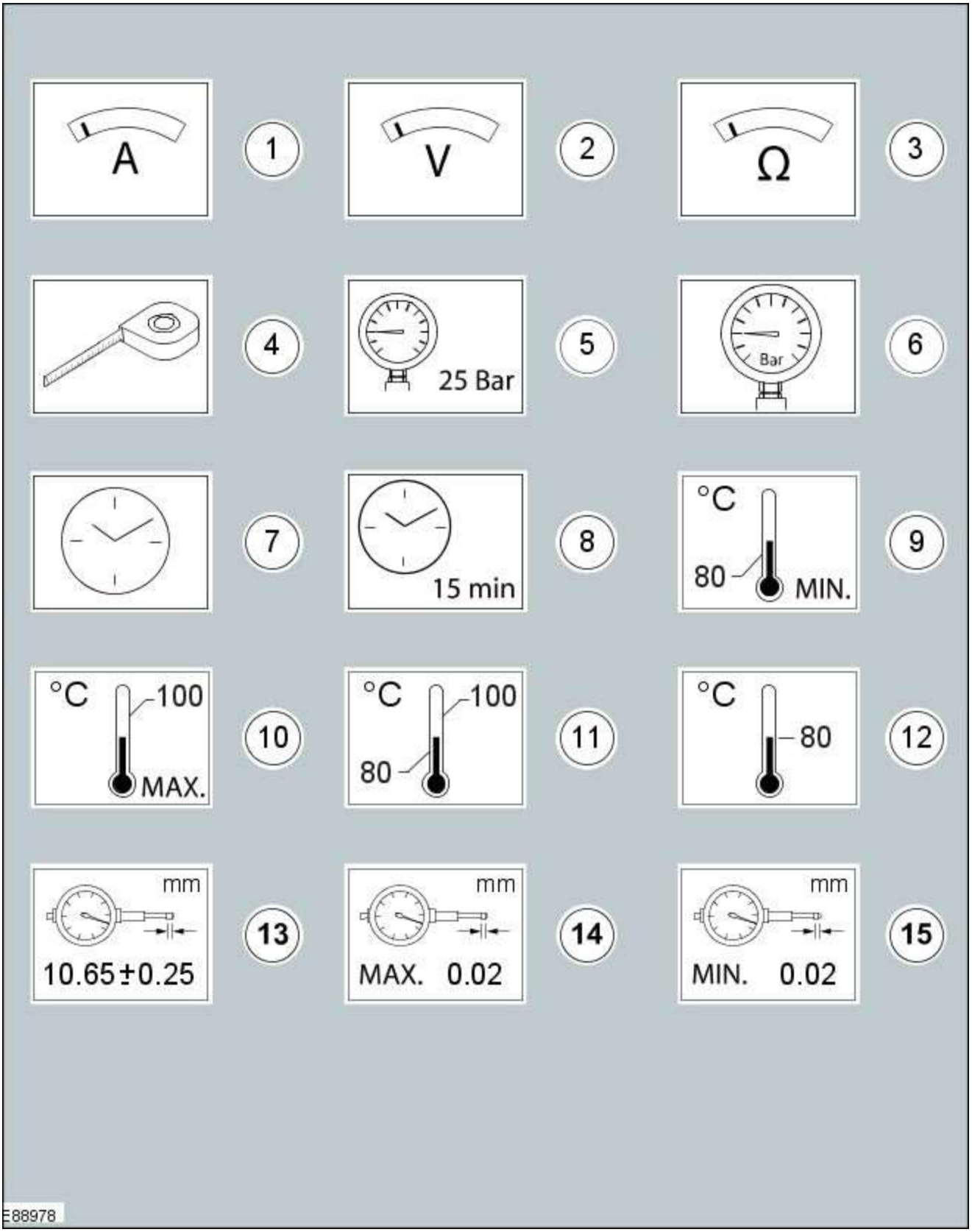



| Item | | Description |
|---|---|---|
| 1 | | Apply a bead from the specified tube |
| 2 | | Apply a bead from the specified cartridge |
| 3 | | Apply the specified chemical with a brush |
| 4 | | Apply the specified load to the specified component |
| 5 | | Apply a bead with a specific diameter from the specified tube |

| | | |
|---|---|---|
| 6 | | Apply a bead with a specific diameter from the specified cartridge |
| 7 | | Apply the specified chemical with a roller |
| 8 | | Apply hot glue to the specified component |
| 9 | | Apply the specified amount of fluid from the fluid can |
| 10 | | Apply fluid from the fluid can |
| 11 | | Clean the specified component with the specified material |
| 12 | | Apply a broken bead from the specified tube |
| 13 | | Apply the specified chemical from a spray can |
| 14 | | Apply the specified lubricant to the specified component |
| 15 | | Apply spot welds to the specified component |
| 16 | | Apply a continuous weld to the specified component |
| 17 | | Handle the fluid using a syringe |
| 18 | | Extract the specified amount of fluid using a syringe |

**Measurement symbols**

The measurement symbols are used to show where to measure which type of measurement to carry out a procedure step.

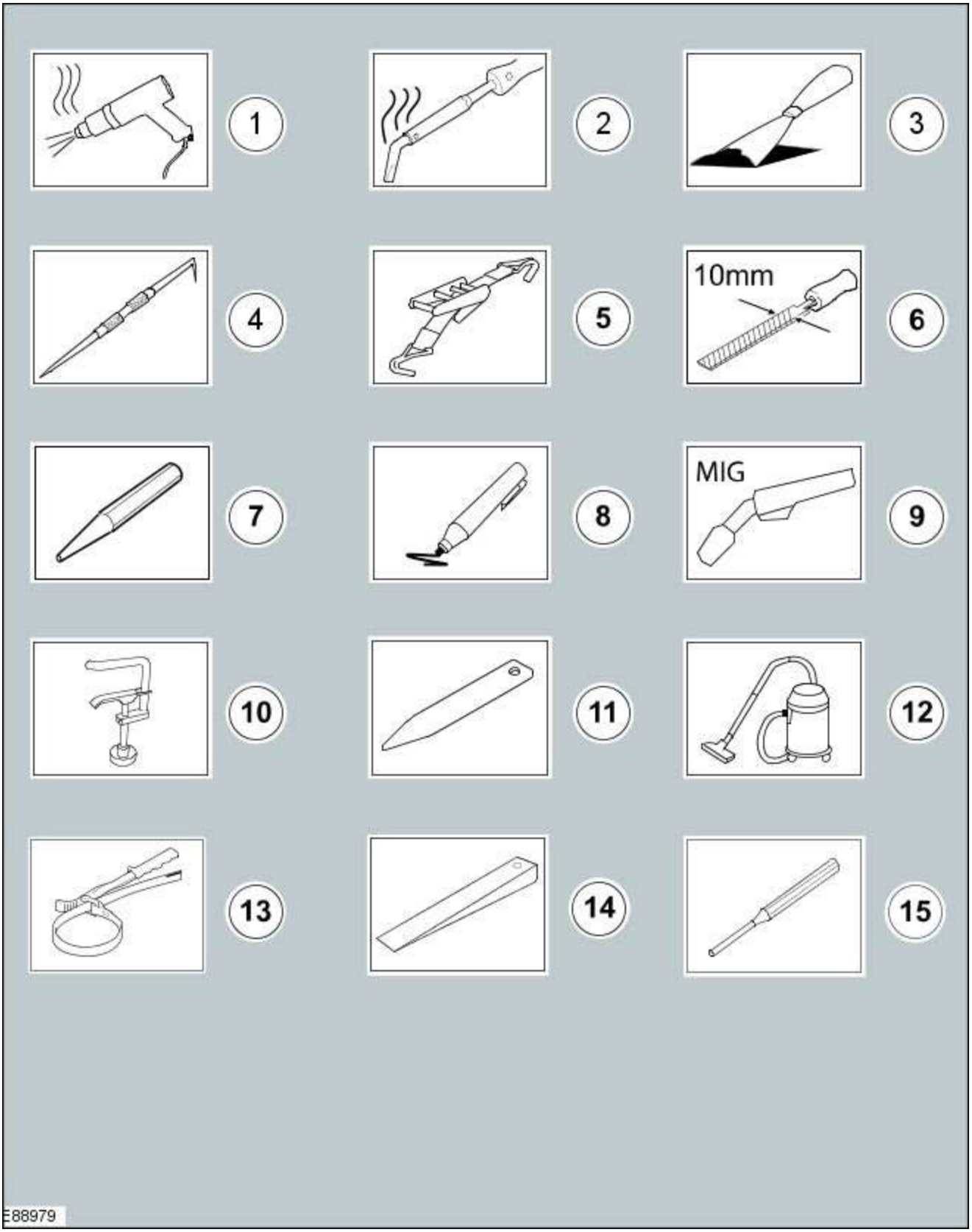



| Item | | Description |
|---|---|---|
| 1 | | Measure the current using a digital multimeter |
| 2 | | Measure the voltage using a digital multimeter |
| 3 | | Measure the resistance using a digital multimeter |
| 4 | | Measure the length/distance |
| 5 | | Check that the specified pressure is available using a suitable pressure gauge |

| | | |
|---|---|---|
| 6 | | Measure the pressure at the specified port using a suitable pressure gauge |
| 7 | | Measure the time using a suitable stopwatch |
| 8 | | Wait for the specified period of time |
| 9 | | The specified task requires the specified minimum temperature |
| 10 | | The specified task requires the specified maximum temperature not to be exceeded |
| 11 | | The specified task requires the specified temperature range |
| 12 | | The specified task requires the specified temperature |
| 13 | | Measure and check for the specified value using a dial indicator gauge |
| 14 | | Measure and check for the specified MAX value using a dial indicator gauge |
| 15 | | Measure and check for the specified MIN value using a dial indicator gauge |

**General equipment symbols**

The general equipment symbols are used to show where to use which type of general equipment to carry out a procedure step.

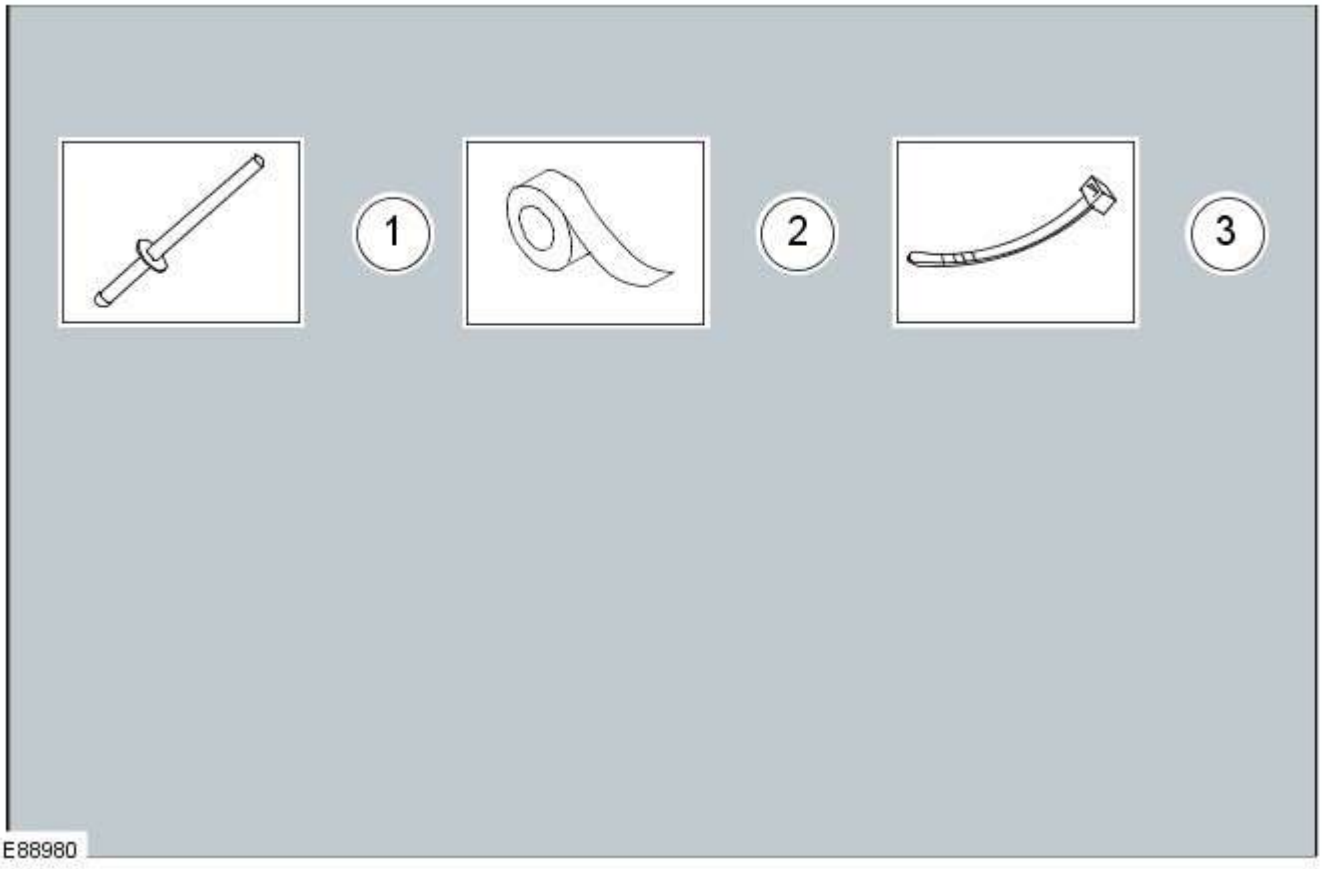



| Item | | Description |
|---|---|---|
| 1 | | Hot air gun |
| 2 | | Soldering iron |
| 3 | | Scraper |
| 4 | | Scriber |
| 5 | | Securing strap |

| | | |
|---|---|---|
| 6 | | File with a specified size |
| 7 | | Center punch |
| 8 | | Marker |
| 9 | | Metal inert gas (MIG) welding equipment |
| 10 | | Hose clamp |
| 11 | | Interior trim remover |
| 12 | | Vacuum cleaner |
| 13 | | Strap wrench |
| 14 | | Wedge |
| 15 | | Pin Punch |

**Material symbols**

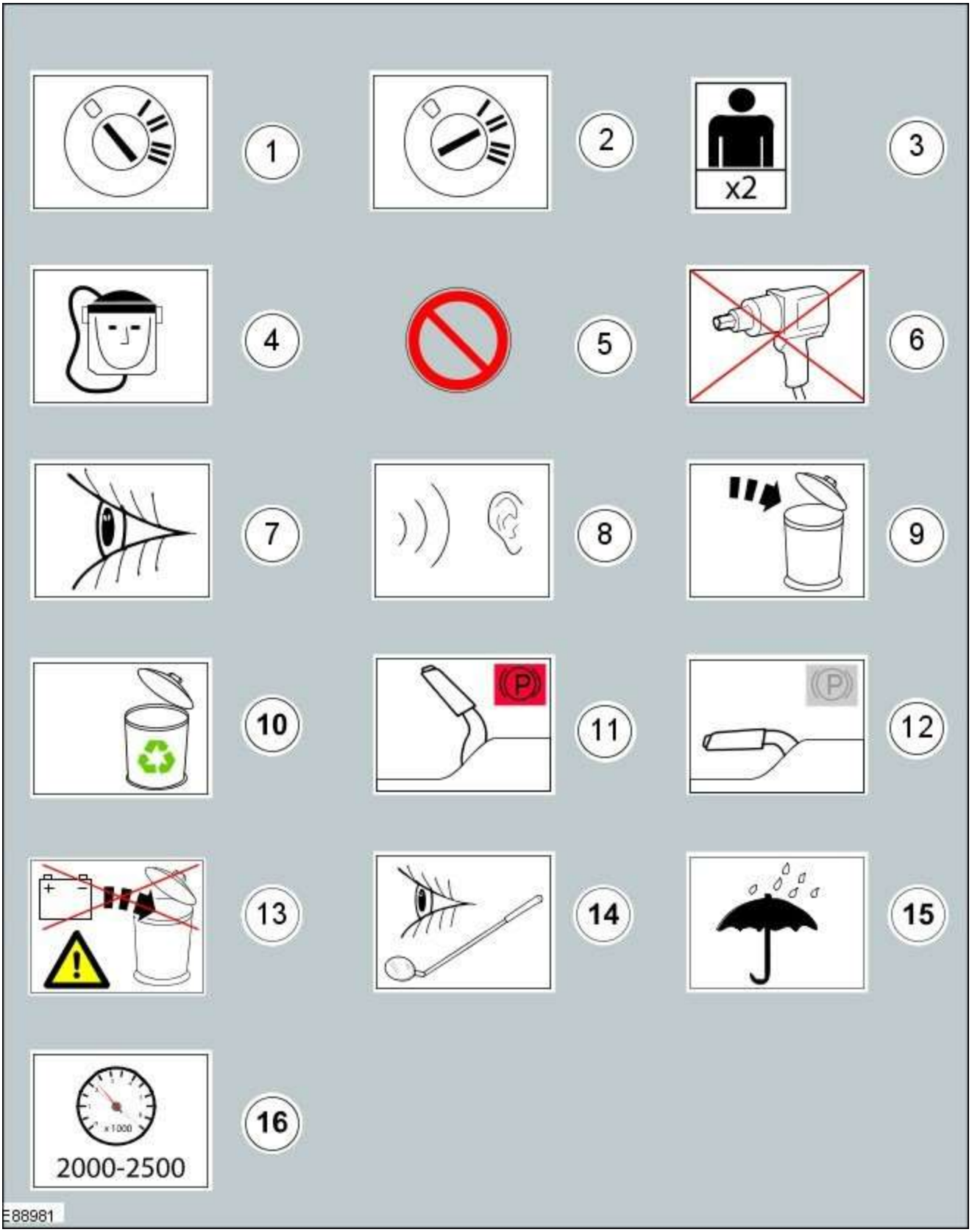
The material symbols are used to show where to use which type of material to carry out a procedure step.




| Item | | Description |
|---|---|---|
| 1 | | Remove/Install the specified blind rivet |
| 2 | | Apply tape to the specified component/area |
| 3 | | Remove/Install the specified cable tie |

**Miscellaneous symbols**

These symbols provide further information that is required to carry out a procedure step.

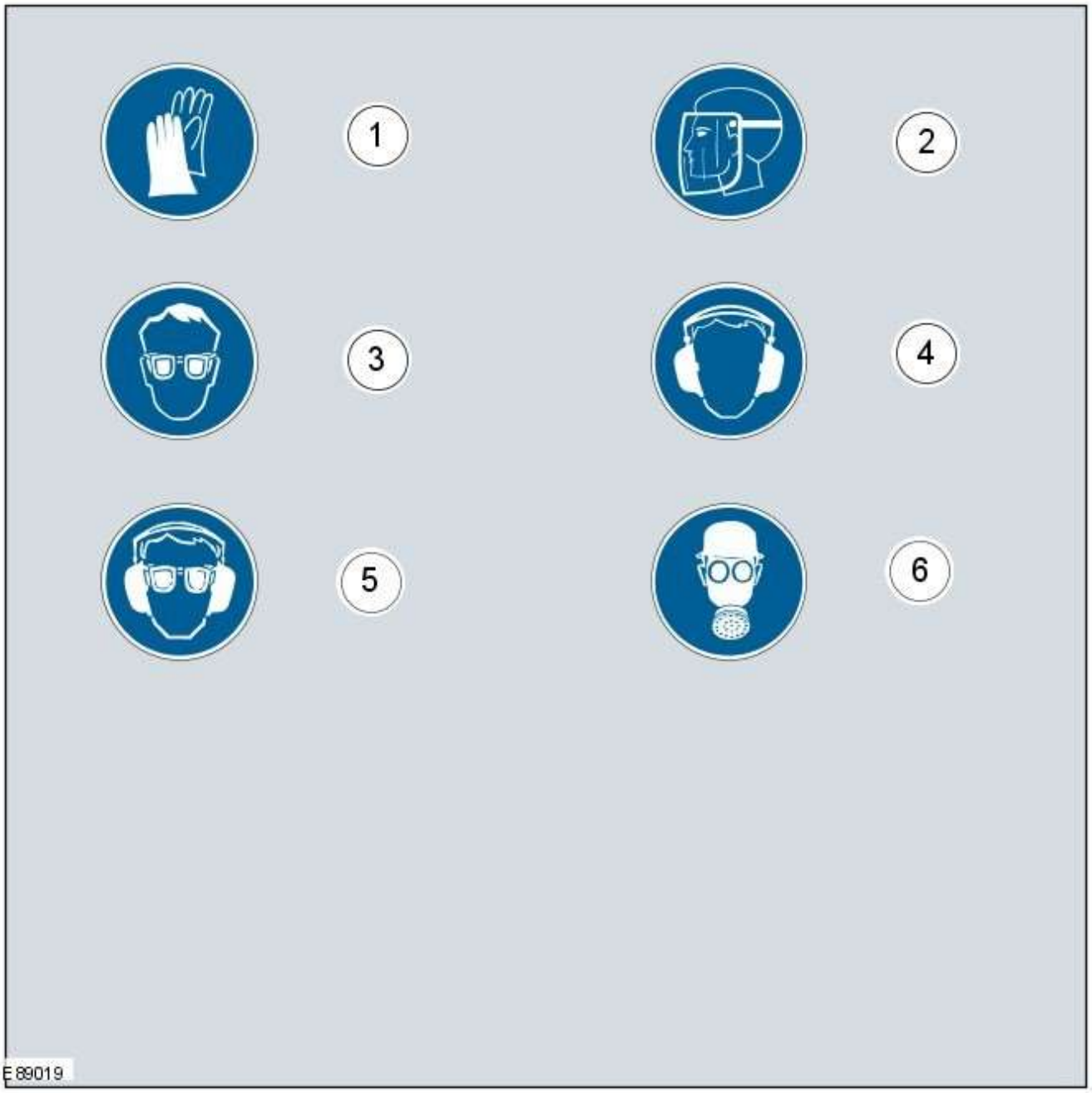



| Item | | Description |
|---|---|---|
| 1 | | Set the ignition switch to the 0 position |
| 2 | | Set the ignition switch to the II position |
| 3 | | The procedure step requires the aid of the specified number of supporting technicians |
| 4 | | Self contained breathing apparatus |
| 5 | | General prohibition used in combination with another symbol |

| | | |
|---|---|---|
| 6 | | Do not use power tools |
| 7 | | Visual check |
| 8 | | Noise check |
| 9 | | Dispose the specified component |
| 10 | | Replaced by item 9 (Dispose the specified component) |
| 11 | | Set the engine speed to the specified value |
| 12 | | Fully apply the parking brake lever |
| 13 | | Fully release the parking brake lever |
| 14 | | Do not dispose of batteries into the waste bin |
| 15 | | Visual check using a mirror |
| 16 | | Area/component must be dry |

**Mandatory Protective equipment - Health and safety symbols**

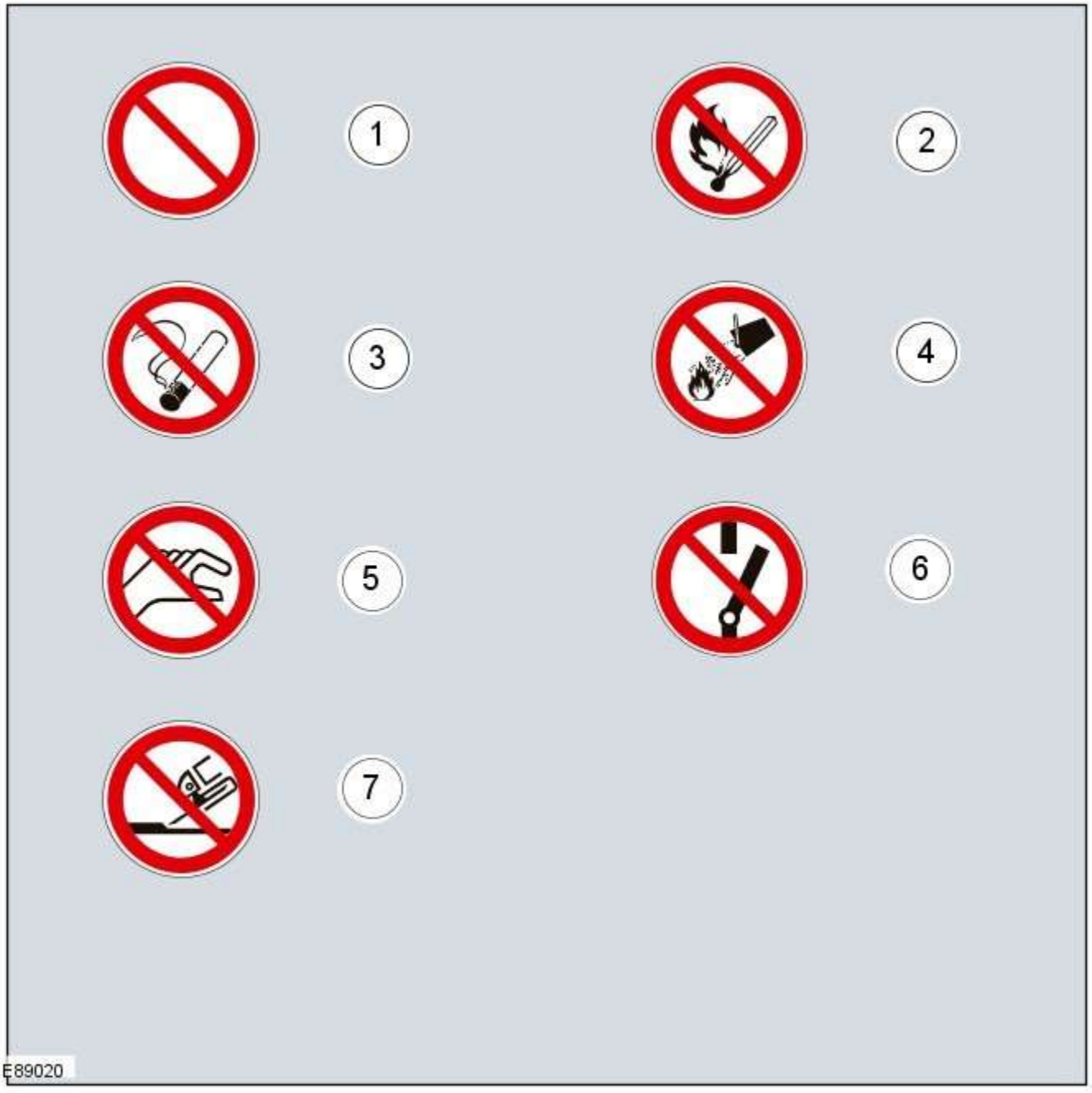
The protective equipment symbols advise to use a mandatory protective equipment to avoid or at least reduce possible health and safety risks.



| Item | | Description |
|---|---|---|
| 1 | | Wear protective gloves |
| 2 | | Wear face guard |
| 3 | | Wear safety goggles |
| 4 | | Wear ear protectors |
| 5 | | Wear safety goggles and ear protectors |
| 6 | | Wear a respirator |

**Prohibition - Health and safety symbols and component damage**

The prohibition symbols are used to prohibit the specified actions to avoid or at least reduce possible component damage and health and safety risks.

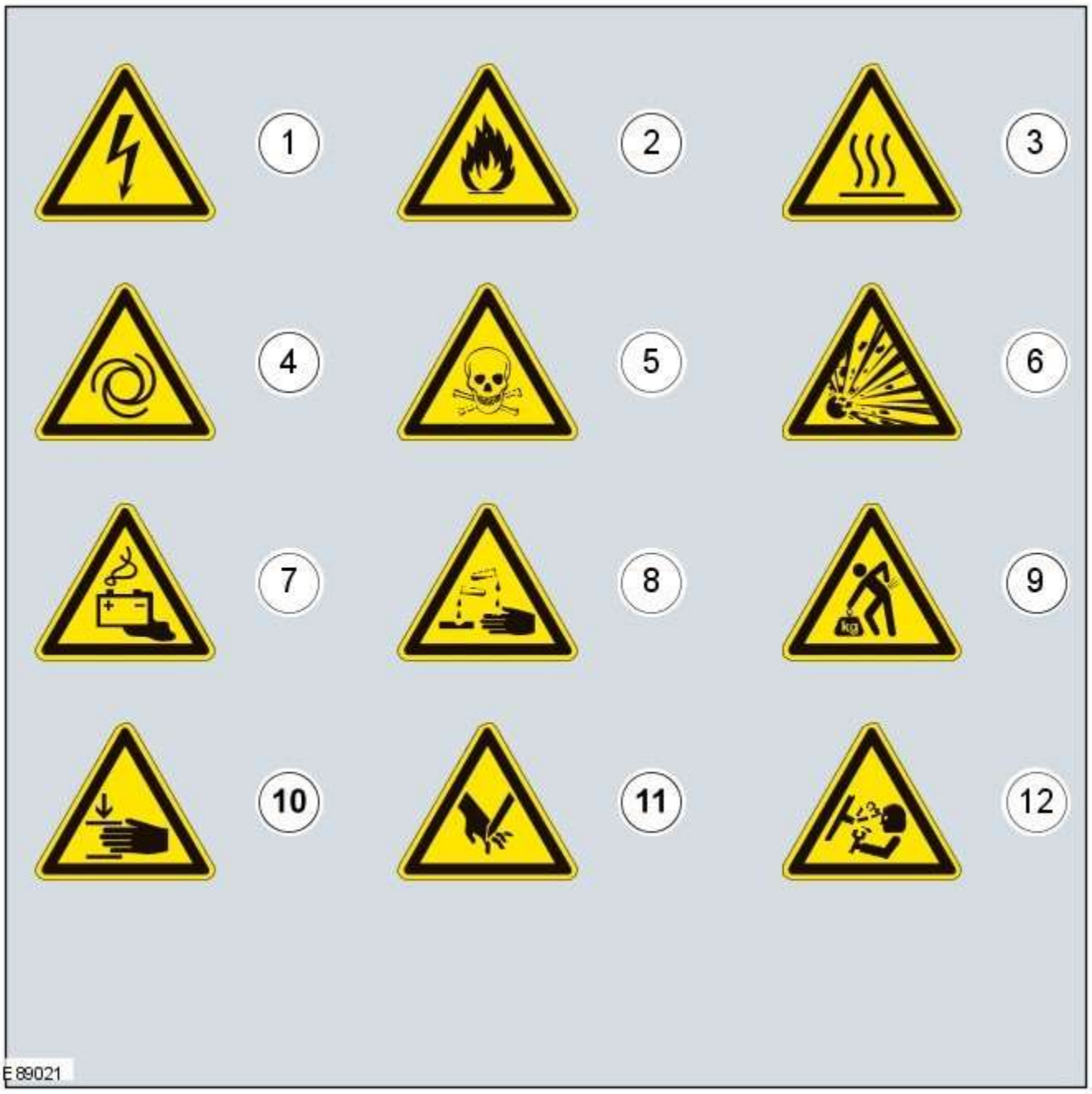



| Item | | Description |
|---|---|---|
| 1 | | General prohibition symbol |
| 2 | | No naked flames |
| 3 | | No smoking |
| 4 | | No water |
| 5 | | Do not touch |

| | | |
|---|---|---|
| 6 | | Do not switch |
| 7 | | No grinding |

**Warning symbols - Health and safety and component damage**

The warning symbols are used to advise on hazardous conditions to avoid or at least reduce possible component damage and health and safety risks.

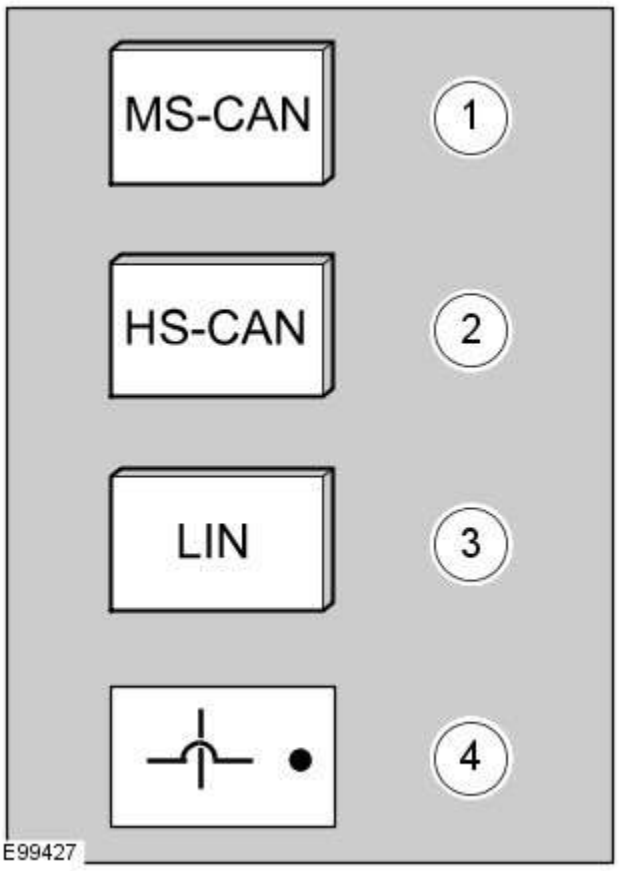



| Item | | Description |
|---|---|---|
| 1 | | Hazardous voltage/Electrical shock/Electrocution |
| 2 | | Fire Hazard/Highly flammable |
| 3 | | Burn hazard/Hot surface |
| 4 | | Automatic start-up |
| 5 | | Toxic |
| 6 | | Explosive material |
| 7 | | Battery hazard |
| 8 | | Corrosive material |
| 9 | | Lifting hazard |

| | | |
|---|---|---|
| 10 | | Hand crush/Force from above |
| 11 | | Cutting of fingers or hand |
| 12 | | Pressure hazard |

**Control Diagram symbols - Description and Operation procedures**

These symbols provide further information on the type of connectivity, direction of flow or type of data bus of a system.




| Item | | Description |
|---|---|---|
| 1 | | Mid-speed Controller Area Network (CAN) |
| 2 | | High-speed Controller Area Network (CAN) |
| 3 | | Local Interconnect Network (LIN) |
| 4 | | Wires crossing not connected |

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# General Information - Supplemental Restraint System (SRS) Health and Safety Precautions

Description and Operation

WARNINGS:

 Only qualified technicians are allowed to work on pyrotechnic components.

 INHALED: Exposure to pyrotechnic residue may cause low blood pressure, severe headache, irritation of mucous membranes, fainting, shortness of breath or rapid pulse. Move a victim to fresh air. Seek immediate medical attention.

 EYE CONTACT: Exposure to unburned pyrotechnic residue may cause irritation, burning and etching of the eyes. Flush immediately with plenty of cold running water for at least 15 minutes. Seek immediate medical attention.

 EYE CONTACT: Exposure to burned pyrotechnic residue may cause irritation, burning and etching of the eyes. Flush immediately with diluted boric acid solution. Seek immediate medical attention.

 SKIN CONTACT: Unburned pyrotechnic residue may be rapidly absorbed through the skin in toxic quantities. Wash immediately with plenty of soap and water. Seek medical attention.

 SKIN CONTACT: Burned pyrotechnic residue may be rapidly absorbed through the skin in toxic quantities. Wash with plenty of water. Do not use soap. Seek medical attention.

 SWALLOWED: Unburned pyrotechnic residue is extremely toxic. If conscious drink plenty of water then induce vomiting. Seek immediate medical attention. If unconscious, or in convulsions do not attempt to induce vomiting or give anything by mouth. Seek immediate medical attention.

 SWALLOWED: Burned pyrotechnic residue is extremely toxic. Drink plenty of water and seek immediate medical attention.

 The deployment key must only be accessible to authorized personnel.

 Make sure that the deployment key remains removed from the deployment equipment except during deployment.

 If permenantly disabling or enabling the passenger air bag a new seat belt for vehicles without or with a passenger air bag must be installed.

 Undeployed pyrotechnic components must not be deployed in the vehicle.

 Pyrotechnic components must be deployed following local regulations.

 Check thoroughly that no loose objects can be spread during the deployment of pyrotechnic components.

 Pyrotechnic components must be transported following local regulations.

 Never carry out any electrical measurement on disconnected, undeployed pyrotechnic components.

 Pyrotechnic components must not be disassembled.

 Pyrotechnic components are not interchangeable between vehicles.

 Always carry a live air bag module away from the body with the air bag or trim cover pointing upwards.

 Live air bag modules must be placed in a suitable cage when removed from the vehicle. The air bag or trim cover must be facing upwards.

 Do not install a rearward facing child safety seat to the passenger seat with an activated passenger air bag.

CAUTIONS:

 Pyrotechnic components must not be subjected to temperatures higher than 110°C.

 Never install aftermarket accessories to the vehicle on or adjacent to the supplemental restraint system module.

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# General Information - Road/Roller Testing

Description and Operation

Road or roller 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 is given in this section.

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 checks, 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 roller 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
- 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

 CAUTION: 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
- The transmission selector lever is in Park
- All instrument gauges (except fuel gauge) read zero

With the ignition switched on, check:

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

## On Road or Roller Test Check:

 CAUTION: If 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.

- Initial gear engagement is smooth
- Parking brake control operates smoothly and the parking brake releases quickly and completely
- Transmission takes up the drive smoothly, without judder
- The engine power output is satisfactory, full power is achieved, acceleration is smooth and pedal operation 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, including power steering, 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
- Speedometer, oil pressure warning lamp, coolant temperature gauge and tachometer register the correct readings or operate correctly
- Switches and controls operate smoothly and positively, warning lamps 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
- Brake operation and efficiency

## Brake Testing

 WARNING: When brake testing, avoid breathing the smoke or fumes from hot brakes, this may contain asbestos dust which is hazardous to health, see Health and Safety Precautions.

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 or linings/drums until the components have bedded-in. New brake friction components will not reach full efficiency until the bedding-in process is complete.

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 hot, or appreciably hotter than the others, indicates that the brake is 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, axle etc., which might indicate over tightness or lack of lubrication

Published: 11-May-2011

# General Information - Window Glass Health and Safety Precautions

Description and Operation

WARNINGS:

 Cured polyurethane (PU) adhesive can degrade if subjected to high temperatures. Isocyanide compounds can be released when grinding or welding in close proximity to cured PU adhesive.

 SKIN CONTACT: Prolonged exposure to polyurethane (PU) adhesive may cause skin irritation. If PU adhesive comes into contact with the skin, remove any contaminated clothing. Immediately wash the skin with soap and water. Seek medical attention for any persistent skin irritation or abnormality.

 EYE CONTACT: Polyurethane (PU) adhesive may cause severe irritation or damage. If PU adhesive comes into contact with the eyes, immediately flush eyes with plenty of running water for at least 15 minutes. Seek immediate medical attention.

 SWALLOWED: If polyurethane (PU) adhesive is swallowed, flush the mouth thoroughly. Do not induce vomiting. Provide rest, warmth and fresh air. Seek immediate medical attention.

 INHALED: Persons having a respiratory allergy may have an allergic reaction when handling polyurethane (PU) adhesive.

 INHALED: Polyurethane (PU) adhesive can cause asthma like symptoms. Isocyanate vapor from primer or PU adhesive can cause allergies in the respiratory tract.

 INHALED: If polyurethane (PU) adhesive fumes are inhaled, move victim to fresh air. Provide oxygen if necessary. If breathing stops, provide artificial respiration. Keep a victim warm and at rest. Seek immediate medical attention.

CAUTIONS:

 Make sure that the direct glazing for bonded glass cutting blades are changed where the cutting depth changes to avoid damage to the body and trim panels.

 During the curing period of the PU adhesive, the door windows must be left open to avoid a build up of pressure when the doors are opened and closed.

Published: 17-Apr-2014

# General Information - Diagnostic Trouble Code (DTC) Index DTC: Adaptive Damping Module (SUMB)

Description and Operation

## Adaptive Damping 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, 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

he table below lists all diagnostic trouble codes (DTCs) that could be logged in the adaptive damping 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 |
|---|---|---|---|
| C101D-12 | Left Front vertical acceleration sensor - Short to power | • Left Front vertical acceleration sensor circuit short to power | • Refer to the electrical circuit diagrams and check left front vertical acceleration sensor circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system |
| C101D-14 | Left Front vertical acceleration sensor - Short to ground, open circuit | • Left Front vertical acceleration sensor circuit short to ground, open circuit<br>• Vertical acceleration sensor fault | • Refer to the electrical circuit diagrams and check front vertical acceleration sensor circuit for short to ground, open circuit. If no fault found on wiring suspect sensor. Replace sensor, clear DTC and retest the system |
| C101D-22 | Left Front vertical acceleration sensor - Signal amplitude > maximum | • Left front vertical acceleration sensor insecurely mounted<br>• Left front vertical acceleration sensor signal circuit short to another circuit<br>• Left front vertical acceleration sensor | • 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 sensor/incorrectly fitted sensor. Check the sensor is correctly mounted, secure or replace sensor as required. Refer to the new module/component installation note at the top of the DTC Index, clear DTC and retest system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | internal fault | |
| C101D-26 | Left Front vertical acceleration sensor - Signal rate of change below threshold | • Left front vertical acceleration sensor signal circuit short to another circuit<br>• Left front vertical acceleration sensor internal fault | • Refer to the electrical circuit diagrams and check Left Front Vertical Accelerometer signal circuit for faults, if circuit is correct suspect faulty sensor, refer to the new module/component installation note at the top of the DTC Index. Replace the sensor, clear the DTC and retest the system |
| C101D-78 | Left Front vertical acceleration sensor - Alignment or adjustment incorrect | • Left front vertical acceleration sensor bracket bent<br>• Left front vertical acceleration sensor damaged | • Check Left Front Vertical Accelerometer for location and security, if correct suspect faulty Accelerometer, refer to the new module installation note at the top of the DTC Index. Replace the sensor/bracket as required, clear the DTC and retest the system |
| C101E-12 | Right Front vertical acceleration sensor - Short to power | • Right Front vertical acceleration sensor circuit short to power | • Refer to the electrical circuit diagrams and check right front vertical acceleration sensor circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system |
| C101E-14 | Right Front vertical acceleration sensor - Short to ground, open circuit | • Right Front vertical acceleration sensor circuit short to ground, open circuit<br>• Vertical acceleration sensor fault | • Refer to the electrical circuit diagrams and check right front vertical acceleration sensor circuit for short to ground, open circuit. If no fault found on wiring suspect sensor. Replace sensor, clear DTC and retest the system |
| C101E-22 | Right Front vertical acceleration sensor - Signal amplitude > maximum | • Right front vertical acceleration sensor insecurely mounted<br>• Right front vertical acceleration sensor signal circuit short to another circuit<br>• Right front vertical acceleration sensor 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 sensor/incorrectly fitted sensor. Check the sensor is correctly mounted, secure or replace sensor as required. Refer to the new module/component installation note at the top of the DTC Index, clear DTC and retest system |
| C101E-26 | Right Front vertical acceleration sensor - Signal rate of change below threshold | • Right front vertical acceleration sensor signal circuit short to another circuit<br>• Right front vertical acceleration sensor internal fault | • Refer to the electrical circuit diagrams and check Right Front Vertical Accelerometer signal circuit for faults, if circuit is correct suspect faulty sensor, refer to the new module/component installation note at the top of the DTC Index. Replace the sensor, clear the DTC and retest the system |
| C101E-78 | Right Front vertical acceleration sensor - Alignment or adjustment incorrect | • Right front vertical acceleration sensor bracket bent<br>• Right front vertical acceleration sensor damaged | • Check Right Front Vertical Accelerometer for location and security, if correct suspect faulty Accelerometer, refer to the new module installation note at the top of the DTC Index. Replace the sensor/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 control module whilst driving | • Refer to the electrical circuit diagrams and check power and ground circuits to Adaptive Damping Control Module for intermittent or poor connection. Repair wiring circuits as required, clear DTC and retest the system |
| C1030-12 | Left Rear vertical acceleration sensor - Short to power | • Left Rear vertical acceleration sensor circuit short to power | • Refer to the electrical circuit diagrams and check left Rear vertical acceleration sensor circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C1030-14 | Left Rear vertical acceleration sensor - Short to ground, open circuit | • Left rear vertical acceleration sensor circuit short to ground, open circuit<br>• Vertical acceleration sensor fault | • Refer to the electrical circuit diagrams and check left Rear vertical acceleration sensor circuit for short to ground, open circuit. If no fault found on wiring suspect sensor. Replace sensor, clear DTC and retest the system |
| C1030-22 | Left Rear vertical acceleration sensor - Signal amplitude > maximum | • Left Rear vertical acceleration sensor insecurely mounted<br>• Left Rear vertical acceleration sensor signal circuit short to another circuit<br>• Left Rear vertical acceleration sensor internal fault | • With vehicle parked on a level surface, read Left 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 sensor/incorrectly fitted sensor. Check the sensor is correctly mounted, secure or replace sensor as required. Refer to the new module/component installation note at the top of the DTC Index, clear DTC and retest system |
| C1030-26 | Left Rear vertical acceleration sensor - Signal rate of change below threshold | • Left Rear vertical acceleration sensor signal circuit short to another circuit<br>• Left Rear vertical acceleration sensor internal fault | • Refer to the electrical circuit diagrams and check Left Rear Vertical Accelerometer signal circuit for faults, if circuit is correct suspect faulty sensor, refer to the new module/component installation note at the top of the DTC Index. Replace the sensor, clear the DTC and retest the system |
| C1030-78 | Left Rear vertical acceleration sensor - Alignment or adjustment incorrect | • Left Rear vertical acceleration sensor bracket bent<br>• Left Rear vertical acceleration sensor damaged | • Check Left Rear Vertical Accelerometer for location and security, if correct suspect faulty Accelerometer, refer to the new module installation note at the top of the DTC Index. Replace the sensor/bracket as required, clear the DTC and retest the system |
| C1A03-12 | Left Front Height Sensor - Circuit short to power | • Height sensor circuit shorted to another cable<br>• Height sensor internal fault | • Refer to the electrical circuit diagrams and check Front Left Height Sensor circuit for short to power, If circuit correct suspect Sensor internal fault, replace as required |
| C1A03-14 | Left Front Height Sensor - Circuit short to ground or open | • Wiring to sensor (signal) open circuit<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• 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 Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 | • Height sensor linkage not connected<br>• Height sensor or bracket loose<br>• Height sensor bracket bent<br>• Incorrect height calibration<br>• Height sensor linkage toggled<br>• Height sensor water ingress<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• Height sensor | • Inspect for damage or loose fixings. 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. Confirm that the correct height sensor part number is fitted, 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 found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | electrical fault<br>• Height sensor linkage bent<br>• Incorrect height sensor fitted | 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 rebound 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 replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket 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 relevant section of the workshop manual for the calibration procedure |
| C1A03-22 | Left Front Height Sensor - Signal amplitude > maximum | • Height sensor linkage not connected<br>• Height sensor or bracket loose<br>• Height sensor bracket bent<br>• Incorrect height calibration<br>• Height sensor linkage toggled<br>• Height sensor water ingress<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• Height sensor electrical fault<br>• Height sensor linkage bent<br>• Incorrect height sensor fitted | • Inspect for damage or loose fixings. 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. Confirm that the correct height sensor part number is fitted, 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 found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 rebound 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 replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket 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 relevant section of the workshop manual for the calibration procedure |
| C1A03-76 | Left Front Height Sensor - Wrong mounting position | • Incorrect height calibration | • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system |
| C1A03-78 | Left Front Height Sensor - Alignment or adjustment incorrect | • Incorrect height calibration | • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C1A04-12 | Right Front Height Sensor - Circuit short to power | • Height sensor circuit shorted to another cable<br>• Height sensor internal fault | • Refer to the electrical circuit diagrams and check Front Right Height Sensor circuit for short to power, If circuit correct suspect Sensor internal fault, replace as required |
| C1A04-14 | Right Front Height Sensor - Circuit short to ground or open | • Wiring to sensor (signal) open circuit<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• 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 Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 | • Height sensor linkage not connected<br>• Height sensor or bracket loose<br>• Height sensor bracket bent<br>• Incorrect height calibration<br>• Height sensor linkage toggled<br>• Height sensor water ingress<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• Height sensor electrical fault<br>• Height sensor linkage bent<br>• Incorrect height sensor fitted | • Inspect for damage or loose fixings. 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. Confirm that the correct height sensor part number is fitted, 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 found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 rebound 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 replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket 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 relevant section of the workshop manual for the calibration procedure |
| C1A04-22 | Right Front Height Sensor - Signal amplitude > maximum | • Height sensor linkage not connected<br>• Height sensor or bracket loose<br>• Height sensor bracket bent<br>• Incorrect height calibration<br>• Height sensor linkage toggled<br>• Height sensor water ingress<br>• Wiring to height | • Inspect for damage or loose fixings. 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. Confirm that the correct height sensor part number is fitted, 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 found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• Height sensor electrical fault<br>• Height sensor linkage bent<br>• Incorrect height sensor fitted | height sensor connector (sensor not connected), with respect to vehicle body. • 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 rebound 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 replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket 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 relevant section of the workshop manual for the calibration procedure |
| C1A04-76 | Right Front Height Sensor - Wrong mounting position | • Incorrect height calibration | • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system |
| C1A04-78 | Right Front Height Sensor - Alignment or adjustment incorrect | • Incorrect height calibration | • 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 power | • Height sensor circuit shorted to another cable<br>• Height sensor internal fault | • Refer to the electrical circuit diagrams and check Rear Left Height Sensor circuit for short to power, If circuit correct suspect Sensor internal fault, replace as required |
| C1A05-14 | Left Rear Height Sensor - Circuit short to ground or open | • Wiring to sensor (signal) open circuit<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• 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 Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 |
| C1A05-21 | Left Rear Height Sensor - Signal amplitude < minimum | • Height sensor linkage not connected<br>• Height sensor or bracket loose<br>• Height sensor bracket bent<br>• Incorrect height calibration<br>• Height sensor linkage toggled<br>• Height sensor water ingress<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other | • Inspect for damage or loose fixings. 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. Confirm that the correct height sensor part number is fitted, 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 found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | cable<br>• Height sensor electrical fault<br>• Height sensor linkage bent<br>• Incorrect height sensor fitted | 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 rebound 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 replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket 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 relevant section of the workshop manual for the calibration procedure |
| C1A05-22 | Left Rear Height Sensor - Signal amplitude > maximum | • Height sensor linkage not connected<br>• Height sensor or bracket loose<br>• Height sensor bracket bent<br>• Incorrect height calibration<br>• Height sensor linkage toggled<br>• Height sensor water ingress<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• Height sensor electrical fault<br>• Height sensor linkage bent<br>• Incorrect height sensor fitted | • Inspect for damage or loose fixings. 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. Confirm that the correct height sensor part number is fitted, 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 found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 rebound 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 replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket 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 relevant section of the workshop manual for the calibration procedure |
| C1A05-76 | Left Rear Height Sensor - Wrong mounting position | • Incorrect height calibration | • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system |
| C1A05-78 | Left Rear Height Sensor - Alignment or adjustment incorrect | • Incorrect height calibration | • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C1A06-12 | Right Rear Height Sensor - Circuit short to power | • Height sensor circuit shorted to another cable<br>• Height sensor internal fault | • Refer to the electrical circuit diagrams and check Rear Right Height Sensor circuit for short to power, If circuit correct suspect Sensor internal fault, replace as required |
| C1A06-14 | Right Rear Height Sensor - Circuit short to ground or open | • Wiring to sensor (signal) open circuit<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• 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 Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 | • Height sensor linkage not connected<br>• Height sensor or bracket loose<br>• Height sensor bracket bent<br>• Incorrect height calibration<br>• Height sensor linkage toggled<br>• Height sensor water ingress<br>• Wiring to height sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• Height sensor electrical fault<br>• Height sensor linkage bent<br>• Incorrect height sensor fitted | • Inspect for damage or loose fixings. 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. Confirm that the correct height sensor part number is fitted, 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 found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within height sensor connector (sensor not connected), with respect to vehicle body. • 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 rebound 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 replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket 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 relevant section of the workshop manual for the calibration procedure |
| C1A06-22 | Right Rear Height Sensor - Signal amplitude > maximum | • Height sensor linkage not connected<br>• Height sensor or bracket loose<br>• Height sensor bracket bent<br>• Incorrect height calibration<br>• Height sensor linkage toggled<br>• Height sensor water ingress<br>• Wiring to height | • Inspect for damage or loose fixings. 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. Confirm that the correct height sensor part number is fitted, 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 found, disconnect harness at Control Module. A: Check for short circuits between any of the 3 terminals and vehicle ground. B: Check for electrical continuity between the two connectors for each of the 3 terminals. Reconnect electrical connector at Control Module only. C: Check voltages at terminals within |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | sensor partial short to ground<br>• Wiring to height sensor short to other cable<br>• Height sensor electrical fault<br>• Height sensor linkage bent<br>• Incorrect height sensor fitted | height sensor connector (sensor not connected), with respect to vehicle body. • 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 rebound 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 replace sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will clamp to a voltage of ~0.15v or ~4.85v, depending on position of sensor lever. This is normal. When investigation is complete, refit height sensor link to upper arm. If any fixings to the height sensor body or mounting bracket 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 relevant section of the workshop manual for the calibration procedure |
| C1A06-76 | Right Rear Height Sensor - Wrong mounting position | • Incorrect height calibration | • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system |
| C1A06-78 | Right Rear Height Sensor - Alignment or adjustment incorrect | • Incorrect height calibration | • Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system |
| C110C-01 | Left Front Damper Solenoid - General electrical failure | • Left front damper solenoid circuit fault | • Refer to the electrical circuit diagrams and check Front Left damper solenoid circuit for faults, If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index |
| C110C-18 | 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. Damper solenoid circuit should lie in range of 2 to 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. Damper solenoid circuit should lie in range of 2 to 3.5 ohms |
| C110C-14 | Left Front Damper Solenoid - Short to ground, open circuit | • Left front damper solenoid circuit - short to ground, open circuit<br>• Left front damper failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left front damper solenoid circuit for short to ground, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect |
| C110C-1D | Left Front Damper Solenoid - Circuit current out of range | • Left front damper solenoid circuit - short to ground/power, open circuit<br>• Left front damper failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left front damper solenoid circuit for short to ground, power, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect |
| C110C-64 | Left Front Damper Solenoid - Signal plausibility failure | • Front Left Damper Solenoid Measured Current control loop failed<br>• Front Left Damper Solenoid open circuit | • Refer to the electrical circuit diagrams and check Front Left Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C110D-01 | Right Front Damper Solenoid - General electrical failure | • Right front damper solenoid circuit fault | • Refer to the electrical circuit diagrams and check Front Right damper solenoid circuit for faults, If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index |
| C110D-18 | 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. Damper solenoid circuit should lie in range of 2 to 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. Damper solenoid circuit should lie in range of 2 to 3.5 ohms |
| C110D-14 | Right Front Damper Solenoid - Short to ground, open circuit | • Right front damper solenoid circuit - short to ground, open circuit<br>• Right front damper failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check Right front damper solenoid circuit for short to ground, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect |
| C110D-1D | Right Front Damper Solenoid - Circuit current out of range | • Right front damper solenoid circuit - short to ground/power, open circuit<br>• Right front damper failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check Right front damper solenoid circuit for short to ground, power, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect |
| C110D-64 | Right Front Damper Solenoid - Signal plausibility failure | • Front Right Damper Solenoid Measured Current control loop failed<br>• 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 | • Left Rear damper solenoid circuit fault | • Refer to the electrical circuit diagrams and check Rear Left damper solenoid circuit for faults, If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index |
| C110E-18 | 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. Damper solenoid circuit should lie in range of 2 to 3.5 ohms |
| C110E-19 | Left Rear Damper Solenoid - Circuit current above threshold | • Rear Left Damper Solenoid circuit current above threshold | • Refer to the electrical circuit diagrams and check Rear Left Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms |
| C110E-14 | Left Rear Damper Solenoid - Short to ground, open circuit | • Left Rear damper solenoid circuit - short to ground, open circuit<br>• Left Rear damper failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left Rear damper solenoid circuit for short to ground, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect |
| C110E-1D | Left Rear Damper Solenoid - Circuit current out of range | • Left Rear damper solenoid circuit - short to ground/power, open circuit<br>• Left Rear damper failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left Rear damper solenoid circuit for short to ground, power, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect |
| C110E-64 | Left Rear Damper Solenoid - Signal | • Rear Left Damper Solenoid Measured Current control loop | • Refer to the electrical circuit diagrams and check Rear Left Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | plausibility failure | failed<br>• Rear Left Damper Solenoid open circuit | |
| C110F-01 | Right Rear Damper Solenoid - General Electrical Failure | • Right Rear damper solenoid circuit fault | • Refer to the electrical circuit diagrams and check Rear Right damper solenoid circuit for faults, If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index |
| C110F-18 | 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. Damper solenoid circuit should lie in range of 2 to 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. Damper solenoid circuit should lie in range of 2 to 3.5 ohms |
| C110F-14 | Right Rear Damper Solenoid - Short to ground, open circuit | • Right Rear damper solenoid circuit - short to ground, open circuit<br>• Right Rear damper failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check Right Rear damper solenoid circuit for short to ground, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect |
| C110F-1D | Right Rear Damper Solenoid - Circuit current out of range | • Right Rear damper solenoid circuit - short to ground/power, open circuit<br>• Right Rear damper failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check Right Rear damper solenoid circuit for short to ground, power, open circuit. Check and install a new damper as required. Refer to the warranty policy and procedures manual if a module/component is suspect |
| C110F-64 | Right Rear Damper Solenoid - Signal plausibility failure | • Rear Right Damper Solenoid Measured Current control loop failed<br>• Rear Right Damper Solenoid open circuit | • Refer to the electrical circuit diagrams and check Rear Right Damper Solenoid circuit resistance. Damper solenoid circuit should lie in range of 2 to 3.5 ohms |
| C1B14-1C | Sensor Supply Voltage A - Out of range | • Left Front Height Sensor or Right Front Height Sensor or Left Rear Height Sensor or Right Rear Height Sensor supply partial short to other circuit or ground<br>• Left Front Height Sensor or Right Front Height Sensor or Left Rear Height Sensor or Right Rear Height Sensor internal failure<br>• Internal control module failure | • Refer to the electrical circuit diagrams and check sensor supply for circuit fault. Check all height sensors. Check module sensor supply output voltage measured voltage should be between 4.995 volts and 4.85 volts |
| C1B15-1C | Sensor Supply Voltage B - Out of range | • Left Front Vertical Acceleration Sensor or Right Front Vertical Acceleration Sensor or Left Rear Vertical Acceleration Sensor or Right Rear Vertical Acceleration Sensor supply partial short to other circuit or ground. Left Front Vertical Acceleration Sensor or Right Front Vertical Acceleration | • Refer to the electrical circuit diagrams and check sensor supply for circuit fault. Check all Vertical Acceleration Sensors. Check control module sensor supply output voltage Measured voltage should be between 4.995 volts and 4.85 volts |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | Sensor or Left Rear Vertical Acceleration Sensor or Right Rear Vertical Acceleration Sensor supply partial short to other circuit or ground<br>• Left Front Vertical Acceleration Sensor or Right Front Vertical Acceleration Sensor or Left Rear Vertical Acceleration Sensor or Right Rear Vertical Acceleration Sensor internal failure<br>• Internal control module failure | |
| U0001-88 | High speed CAN communication bus - Bus off | • Lost Communication With Engine Control Module (ECM) (CAN Bus circuit fault) | • Check Engine Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus circuit for faults, check CAN circuits for open circuits or shorts to power, ground or other circuits |
| U0100-00 | Lost Communication With ECM/PCM A - No sub type information | • Missing message from ECM | • Check Engine Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus for circuit fault |
| U0101-00 | Lost Communication with TCM - No sub type information | • Lost Communication with Transmission control module (TCM) (CAN Bus circuit fault) | • Check Transmission Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus for circuit fault |
| U0103-00 | Lost Communication With Gear Shift Control Module A - No sub type information | • Lost Communication With Gear Shift Module (GSM) (CAN Bus circuit fault) | • Check Gear Shift Module for stored DTCs. Refer to the electrical circuit diagrams and check Can Bus for circuit faults |
| U0121-00 | Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information | • Lost Communication With Anti-Lock Brake System (ABS) Control Module (CAN Bus circuit fault) | • Check Anti lock Brake System Control Module for stored DTCs. Refer to the electrical circuit diagrams and check Can Bus circuit to Anti lock Brake System Control Module for circuit faults |
| U0132-00 | Lost Communication With Suspension Control Module A - No sub type information | • Lost Communication With Air Suspension Control Module (CAN Bus circuit fault | • Check Air Suspension Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus circuit to Air Suspension Control Module for circuit faults |
| U0136-00 | Lost Communication With Differential Control Module - Rear - No sub type information | • Lost Communication With Rear Differential Control Module (CAN Bus circuit fault) | • Check Rear Differential Control Module for stored DTCs. Refer to the electrical circuit diagrams and check Can Bus circuit to Rear Differential Control Module for circuit faults |
| U0140-00 | Lost Communication With Body Control Module - No sub type information | • Lost Communication With Body Control Module (Front Smart Junction Box) (CAN Bus circuit fault) | • Check Body Control Module for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus circuit to Body Control Module for faults |
| U0142-00 | Lost Communication With Body Control Module B - No sub type information | • Lost Communication with rear smart junction box (CAN Bus circuit fault) | • Check Rear Smart Junction Box for stored DTCs. Refer to the electrical circuit diagrams and check Can Bus circuit to Rear Smart Junction Box for faults |
| U0155-00 | Lost Communication With Instrument Panel Cluster | • Lost Communication With Instrument Panel Cluster (IPC) Control | • Check Instrument Panel Cluster for stored DTCs. Refer to the electrical circuit diagrams and check CAN Bus to Instrument Panel Cluster for circuit fault |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | (IPC) Control Module - No sub type information | Module (CAN bus circuit fault) | |
| U0300-00 | Internal control module software incompatibility - No sub type information | • CAN master configuration ID incorrect | • Check Front Smart Junction Box vehicle configuration file, check part number of adaptive damping control module |
| U0401-68 | Invalid Data Received from ECM/PCM A - Event information | • Invalid Data Received from Engine Control Module | • Check Engine Control Module for DTCs. Refer to the relevant DTC index |
| U0402-68 | Invalid Data Received from TCM - Event information | • Invalid Data Received from Transmission control module | • Check for Transmission Control Module DTCs. Refer to relevant DTC index |
| U0404-68 | Invalid Data Received from Gear Shift Control Module A - Event information | • Invalid data received from gear shift control module | • Check Gear Shift Control Module for DTCs. Refer to the relevant DTC index |
| U0415-68 | Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Event information | • Invalid Data Received From Anti-Lock Brake System (ABS) Control Module | • Check for Anti lock Brake System DTCs. Refer to the relevant DTC index |
| U0421-68 | Invalid Data Received from Suspension Control Module A - Event information | • Invalid Data Received From Air Suspension Control Module | • Check Air Suspension Control Module for stored DTCs. Refer to the relevant DTC index |
| U0422-68 | Invalid Data Received From Body Control Module - Event information | • Invalid Data Received From Body Control Module (Front Smart Junction Box) | • Check Body Control Module (Front Smart Junction Box) for stored DTCs. Refer to the relevant DTC index |
| U0437-68 | Invalid Data Received From Differential Control Module - Rear - Event information | • Invalid Data Received From Rear Differential Control Module | • Check Rear Differential Control Module for stored DTCs. Refer to the relevant DTC index |
| U0443-68 | Invalid Data Received From Body Control Module B - Event information | • Invalid Data Received From body control module B (Rear Smart Junction Box) | • Check rear smart junction box for DTCs and refer to relevant DTC index |
| U1A14-00 | CAN initialization failure - No sub type information | • CAN network harness short, disconnected | • Refer to circuit diagrams and check CAN Bus circuit for fault (short to power, ground or open circuit) |
| U2100-00 | Initial Configuration Not Complete - No sub type information | • Car Configuration Data not loaded (New Body Control Module (Front Smart Junction Box) fitted to vehicle and not initialized)<br>• Internal Body Control Module (Front Smart Junction Box) failure | • Install car config to Front Smart Junction Box. Clear DTC and retest systems |
| U2101-00 | Control Module Configuration Incompatible - No sub type information | • Car Configuration Data transmitted over CAN does not match adaptive damping control module internal config | • Carry out the new module software installation procedure |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U3000-01 | Control module - General Electrical Failure | • General electrical failure | • Check integrity of electrical connectors and pins to module. Check damper negative circuits for short to Ground. Refer to the new module installation note at the top of the DTC Index. Install a new Adaptive Damping Control Module |
| U3000-04 | Control Module - System Internal Failure | • Module Internal failure | • Refer to the electrical wiring diagrams and check all damper solenoid circuits for short to power. If no harness faults are found suspect adaptive damping control module. Install a new module, refer to new module installation note at top of DTC Index |
| U3000-43 | Control Module - Special memory failure | • Module Internal failure | • Suspect Adaptive Damping Control Module internal failure. Install a new module, refer to the new module/component installation note at the top of the DTC Index |
| U3000-45 | Control Module - Program memory failure | • Module Internal failure | • Refer to the electrical circuit diagrams and check power and ground circuit for fault. Clear DTC turn off ignition, wait 1 minute. Turn on ignition, check for DTCs. If DTC returns suspect Adaptive Damping Control Module internal failure. Install a new module, refer to the new module/component installation note at the top of the DTC Index |
| U3000-47 | Control Module - Watchdog / safety Micro controller failure | • Module Internal Failure | • If this DTC is logged contact your local in-market support |
| U3000-52 | Control Module - Not activated | • Adaptive Damping Control Module has been replaced and not programmed | • Install the latest software / Carry out the new-module (software) install procedure |
| U3000-54 | Control Module - Missing calibration | • Adaptive damping control module has been replaced and no software is installed | • Install the latest software / Carry out the new-module (software) install procedure |
| U3003-1C | Battery voltage - Circuit voltage out of range | • Circuit voltage out of range (Supply Voltage at adaptive damping control module < 10.5v or Supply Voltage at adaptive damping control module > 18v for 30s) | • 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 control module for faults, including intermittent high resistance |
| U3003-62 | Battery Voltage - Signal compare failure | • High Resistance Connections<br>• Adaptive Damping 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 control module for faults, including intermittent high resistance |

Published: 17-Apr-2014

# General Information - Diagnostic Trouble Code (DTC) Index DTC: Anti-Lock Braking System (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, 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 anti-lock braking system module, for additional diagnosis and testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Anti-Lock Control - Stability Assist (206-09 Anti-Lock Control - Stability Assist, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C0021-09 | Brake Booster Performance - Component Failures | • No vacuum available from engine due to split/leaking hose etc<br>• Brake booster servo has failed due to lack of vacuum | • Check integrity of brake booster vacuum hose. Check and install a new brake booster as required |
| C0030-38 | Left Front Tone Wheel - Signal frequency incorrect | • Left front magnetic pulse ring damaged/contaminated<br>• Incorrect component installed<br>• Sensor internal fault | • Check the left front magnetic pulse ring for damage or contamination. Clean or replace as required. If no damage/contamination found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph for more than 10 seconds |
| C0031-12 | Left Front Wheel Speed Sensor - Short to battery | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to power. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | module/component is suspect |
| C0031-14 | Left Front Wheel Speed Sensor - Circuit short to ground or open | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0031-25 | Left Front Wheel Speed Sensor - Signal shape/waveform failure | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for partial or intermittently grounded signal circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0031-2F | Left Front Wheel Speed Sensor - Signal erratic | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0031-31 | Left Front Wheel Speed Sensor - No signal | • Electrical wiring harness fault<br>• Magnetic pulse ring de-magnetised or damaged<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for open circuit or high resistance. Check connectors for damage or corrosion. Check the wheel speed sensor for correct location and contamination. Check the magnetic pulse wheel for contamination, damage or de-magnetisation. Clean or replace the sensor or wheel bearing as required. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0031-62 | Left Front Wheel Speed Sensor - Signal compare failure | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0031-64 | Left Front Wheel Speed Sensor - Signal plausibility failure | • Incorrect wheels/tyres installed<br>• Electrical wiring harness fault<br>• EMC influences on left front wheel speed sensor and supply line<br>• Magnetic pulse wheel damaged/contaminated, de-magnetised<br>• Sensor internal fault | • Check the correct wheels and tyres are installed. Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, or ground. Check for EMC influences on the speed sensor and circuits. Check magnetic pulse wheel for damage/contamination and de-magnetisation. Repair Wiring harness, install a new sensor or wheel bearing as required. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0032-11 | Left Front wheel Speed Sensor Supply - Circuit short to ground | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to ground. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C0033-38 | Right Front Tone Wheel - Signal frequency incorrect | • Right front magnetic pulse ring damaged/contaminated<br>• Incorrect component installed<br>• Sensor internal fault | • Check the right front magnetic pulse ring for damage or contamination. Clean or replace as required. If no damage/contamination found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph for more than 10 seconds |
| C0034-12 | Right Front Wheel Speed Sensor - Short to battery | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to power. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0034-14 | Right Front Wheel Speed Sensor - Circuit short to ground or open | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0034-25 | Right Front Wheel Speed Sensor - Signal shape/waveform failure | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for partial or intermittently grounded signal circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0034-2F | Right Front Wheel Speed Sensor - Signal erratic | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0034-31 | Right Front Wheel Speed Sensor - No signal | • Electrical wiring harness fault<br>• Magnetic pulse ring de-magnetised or damaged<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for open circuit or high resistance. Check connectors for damage or corrosion. Check the wheel speed sensor for correct location and contamination. Check the magnetic pulse wheel for contamination, damage or de-magnetisation. Clean or replace the sensor or wheel bearing as required. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0034-62 | Right Front Wheel Speed Sensor - Signal compare failure | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0034-64 | Right Front Wheel Speed Sensor - Signal plausibility failure | • Incorrect wheels/tyres installed<br>• Electrical wiring harness fault<br>• EMC influences on right front | • Check the correct wheels and tyres are installed. Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, or ground. Check for EMC influences on the speed sensor and circuits. Check magnetic pulse |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | wheel speed sensor and supply line<br>• Magnetic pulse wheel damaged/contaminated, de-magnetised<br>• Sensor internal fault | wheel for damage/contamination and de-magnetisation. Repair wiring harness, install a new sensor or wheel bearing as required. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0035-11 | Right Front Wheel Speed Sensor Supply - Circuit short to ground | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to ground. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0036-38 | Left Rear Tone Wheel - Signal frequency incorrect | • Left rear magnetic pulse ring damaged/contaminated<br>• Incorrect component installed<br>• Sensor internal fault | • Check the left rear magnetic pulse ring for damage or contamination. Clean or replace as required. If no damage/contamination found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph for more than 10 seconds |
| C0037-12 | Left Rear Wheel Speed Sensor - Short to battery | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to power. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0037-14 | Left Rear Wheel Speed Sensor - Circuit short to ground or open | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0037-25 | Left Rear Wheel Speed Sensor - Signal shape/waveform failure | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for partial or intermittently grounded signal circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0037-2F | Left Rear Wheel Speed Sensor - Signal erratic | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0037-31 | Left Rear Wheel Speed Sensor - No signal | • Electrical wiring harness fault<br>• Magnetic pulse ring de-magnetised or damaged<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for open circuit or high resistance. Check connectors for damage or corrosion. Check the wheel speed sensor for correct location and contamination. Check the magnetic pulse wheel for contamination, damage or de-magnetisation. Clean or replace the sensor or wheel bearing as required. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C0037-62 | Left Rear Wheel Speed Sensor - Signal compare failure | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C0037-64 | Left Rear Wheel Speed Sensor - Signal plausibility failure | • Incorrect wheels/tyres installed<br>• Electrical wiring harness fault<br>• EMC influences on left rear wheel speed sensor and supply line<br>• Magnetic pulse wheel damaged/contaminated, de-magnetised<br>• Sensor internal fault | • Check the correct wheels and tyres are installed. Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, or ground. Check for EMC influences on the speed sensor and circuits. Check magnetic pulse wheel for damage/contamination and de-magnetisation. Repair Wiring harness, install a new sensor or wheel bearing as required. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0038-11 | Left Rear Wheel Speed Sensor Supply - Circuit short to ground | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to ground. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C0039-38 | Right Rear Tone Wheel - Signal frequency incorrect | • Right rear magnetic pulse ring damaged/contaminated<br>• Incorrect component installed<br>• Sensor internal fault | • Check the right rear magnetic pulse ring for damage or contamination. Clean or replace as required. . If no damage/contamination found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph for more than 10 seconds |
| C003A-12 | Right Rear Wheel Speed Sensor - Short to battery | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to power. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C003A-14 | Right Rear Wheel Speed Sensor - Circuit short to ground or open | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for short to ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C003A-25 | Right Rear Wheel Speed Sensor - Signal shape/waveform failure | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for partial or intermittently grounded signal circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |
| C003A-2F | Right Rear Wheel Speed Sensor - Signal erratic | • Electrical wiring harness fault<br>• Sensor internal fault | • Refer to the electrical circuit diagrams and check the wheel speed sensor circuit for intermittent short to power, ground or open circuit. Repair harness as required. If no harness fault found, suspect wheel speed sensor. Refer to the Warranty Policy and Procedures manual if a module/component is suspect. To validate the repair and extinguish the lamps, the vehicle needs to be driven above 9mph/15kph |

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

Description and Operation

## Audio Amplifier Module (AAM)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Audio Amplifier Module (AAM). 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 |
|---|---|---|---|
| B1A01-11 | Speaker #1 - Circuit short to ground | • Front left tweeter or mid-range speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check front left tweeter speaker circuit for short to ground |
| B1A01-12 | Speaker #1 - Circuit short to battery | • Front left tweeter or mid-range speaker circuit - Short to power | • Refer to electrical circuit diagrams and check front left tweeter speaker circuit for short to power |
| B1A01-13 | Speaker #1 - Circuit open | • Front left tweeter or mid-range speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check front left tweeter speaker circuit for open circuit |
| B1A01-1A | Speaker #1 - Circuit resistance below threshold | • Front left tweeter or mid-range speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A01-49 | Speaker #1 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A02-11 | Speaker #2 - Circuit short to ground | • Front right tweeter or mid-range speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check front right tweeter speaker circuit for short to ground |
| B1A02-12 | Speaker #2 - Circuit short to battery | • Front right tweeter or mid-range speaker circuit - Short to power | • Refer to electrical circuit diagrams and check front right tweeter speaker circuit for short to power |
| B1A02-13 | Speaker #2 - Circuit open | • Front right tweeter or mid-range speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check front right tweeter speaker circuit for open circuit |
| B1A02-1A | Speaker #2 - Circuit resistance below threshold | • Front right tweeter or mid-range speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A02-49 | Speaker #2 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A03-11 | Speaker #3 - Circuit short to ground | • Front left woofer speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check front left woofer speaker circuit for short to ground |
| B1A03-12 | Speaker #3 - Circuit short to battery | • Front left woofer speaker circuit - Short to power | • Refer to electrical circuit diagrams and check front left woofer speaker circuit for short to power |
| B1A03-13 | Speaker #3 - Circuit open | • Front left woofer speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check front left woofer speaker circuit for open circuit |
| B1A03-1A | Speaker #3 - Circuit resistance below threshold | • Front left woofer speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A03-49 | Speaker #3 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A04-11 | Speaker #4 - Circuit short to ground | • Front right woofer speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check front right woofer speaker circuit for short to ground |
| B1A04-12 | Speaker #4 - Circuit short to battery | • Front right woofer speaker circuit - Short to power | • Refer to electrical circuit diagrams and check front right woofer speaker circuit for short to power |
| B1A04-13 | Speaker #4 - Circuit open | • Front right woofer speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check front right woofer speaker circuit for open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A04-1A | Speaker #4 - Circuit resistance below threshold | • Front right woofer speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A04-49 | Speaker #4 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A05-11 | Speaker #5 - Circuit short to ground | • Rear left speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check rear left speaker circuit for short to ground |
| B1A05-12 | Speaker #5 - Circuit short to battery | • Rear left speaker circuit - Short to power | • Refer to electrical circuit diagrams and check rear left speaker circuit for short to power |
| B1A05-13 | Speaker #5 - Circuit open | • Rear left speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check rear left speaker circuit for open circuit |
| B1A05-1A | Speaker #5 - Circuit resistance below threshold | • Rear left speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A05-49 | Speaker #5 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A06-11 | Speaker #6 - Circuit short to ground | • Rear right speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check rear right speaker circuit for short to ground |
| B1A06-12 | Speaker #6 - Circuit short to battery | • Rear right speaker circuit - Short to power | • Refer to electrical circuit diagrams and check rear right speaker circuit for short to power |
| B1A06-13 | Speaker #6 - Circuit open | • Rear right speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check rear right speaker circuit for open circuit |
| B1A06-1A | Speaker #6 - Circuit resistance below threshold | • Rear right speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A06-49 | Speaker #6 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A07-11 | Speaker #7 - Circuit short to ground | • Rear left surround speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check rear left surround speaker circuit for short to ground |
| B1A07-12 | Speaker #7 - Circuit short to battery | • Rear left surround speaker circuit - Short to power | • Refer to electrical circuit diagrams and check rear left surround speaker circuit for short to power |
| B1A07-13 | Speaker #7 - Circuit open | • Rear left surround speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check rear left surround speaker circuit for open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A07-1A | Speaker #7 - Circuit resistance below threshold | • Rear left surround speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A07-49 | Speaker #7 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A08-11 | Speaker #8 - Circuit short to ground | • Rear right surround speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check rear right surround speaker circuit for short to ground |
| B1A08-12 | Speaker #8 - Circuit short to battery | • Rear right surround speaker circuit - Short to power | • Refer to electrical circuit diagrams and check rear right surround speaker circuit for short to power |
| B1A08-13 | Speaker #8 - Circuit open | • Rear right surround speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check rear right surround speaker circuit for open circuit |
| B1A08-1A | Speaker #8 - Circuit resistance below threshold | • Rear right surround speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A08-49 | Speaker #8 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A09-11 | Speaker #9 - Circuit short to ground | • Center speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check center speaker circuit for short to ground |
| B1A09-12 | Speaker #9 - Circuit short to battery | • Center speaker circuit - Short to power | • Refer to electrical circuit diagrams and check center speaker circuit for short to power |
| B1A09-13 | Speaker #9 - Circuit open | • Center speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check center speaker circuit for open circuit |
| B1A09-1A | Speaker #9 - Circuit resistance below threshold | • Center speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A09-49 | Speaker #9 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A10-11 | Speaker #10 - Circuit short to ground | • Left subwoofer speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check left subwoofer speaker circuit for short to ground |
| B1A10-12 | Speaker #10 - Circuit short to battery | • Left subwoofer speaker circuit - Short to power | • Refer to electrical circuit diagrams and check left subwoofer speaker circuit for short to power |
| B1A10-13 | Speaker #10 - Circuit open | • Left subwoofer speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check left subwoofer speaker circuit for open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A10-1A | Speaker #10 - Circuit resistance below threshold | • Left subwoofer speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A10-49 | Speaker #10 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A11-11 | Speaker #11 - Circuit short to ground | • Right subwoofer speaker circuit - Short to ground | • Refer to electrical circuit diagrams and check right subwoofer speaker circuit for short to ground |
| B1A11-12 | Speaker #11 - Circuit short to battery | • Right subwoofer speaker circuit - Short to power | • Refer to electrical circuit diagrams and check right subwoofer speaker circuit for short to power |
| B1A11-13 | Speaker #11 - Circuit open | • Right subwoofer speaker circuit - Open circuit | • Refer to electrical circuit diagrams and check right subwoofer speaker circuit for open circuit |
| B1A11-1A | Speaker #11 - Circuit resistance below threshold | • Right subwoofer speaker circuit - Resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A11-49 | Speaker #11 - Internal electronic failure | • Internal electronic failure | • Suspect the audio amplifier module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U2003-98 | Fibre Optic Communication Bus - Component or system over temperature | • Component or system over temperature | • Clear DTC and allow system to cool, monitor for re-occurrence of DTC |
| U3000-05 | Control module - System programming failures | • Software incompatibility<br>• The version of the Local Configuration file does not match that expected | • Re-configure the audio amplifier as an existing control module, using the manufacturer approved diagnostic system |
| U3000-42 | Control module - General memory failure | • General memory failure | • Re-configure the audio amplifier as an existing control module, using the manufacturer approved diagnostic system. Clear DTC, cycle ignition and read DTCs. If DTC returns, suspect audio amplifier module and install a new module. Refer to the new module/component installation note at the top of the DTC Index |
| U3000-44 | Control module - Data memory failure | • Data memory failure | • Re-configure the audio amplifier as an existing control module, using the manufacturer approved diagnostic system. Clear DTC, cycle ignition and read DTCs. If DTC returns, suspect audio amplifier module and install a new module. Refer to the new module/component installation note at the top of the DTC Index |
| U3000-55 | Control Module - Not configured | • Incorrect car configuration data received | • Check/up-date Car Configuration File using manufacturer approved diagnostic system |
| U3000-87 | Control Module - Missing message | • Missing message | • Check CJB for DTCs and refer to DTC Index. Check information and entertainment module for Car Configuration File and MOST network DTCs and refer to relevant DTC Index. Carry out MOST/CAN network tests using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U3003-16 | Battery Voltage - Circuit voltage below threshold | • Circuit voltage below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U3003-17 | Battery Voltage - Circuit voltage above threshold | • Circuit voltage above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Blind Spot Monitoring System Module (SODL/SODR)

Description and Operation

## Blind Spot Monitoring System Module (SODL/SODR)

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, 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.

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 Blind Spot Monitoring System Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Warning Devices (413-09 Warning Devices, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B11C9-11 | Driver Display Status LED - Circuit short to ground | • Circuit short to ground | • Refer to the electrical circuit diagrams and check driver display status LED circuit for short to ground |
| B11C9-15 | Driver Display Status LED - Circuit short to battery or open | • Circuit short to power or open circuit | • Refer to the electrical circuit diagrams and check driver display status LED circuit for short to ground |
| B11D6-11 | Driver Display Alert LED - Circuit short to ground | • Circuit short to ground | • Refer to the electrical circuit diagrams and check driver display status LED circuit for short to ground |
| B11D6-15 | Driver Display Alert LED - Circuit short to battery or open | • Circuit short to power or open circuit | • Refer to the electrical circuit diagrams and check driver display status LED circuit for short to ground |
| U0010-00 | Medium Speed CAN Communication Bus - 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | the CAN network |
| 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 Blind Spot Monitoring System 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 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 Instrument Cluster and Blind Spot Monitoring System Module |
| U0232-00 | Lost Communication With Blind Spot Monitoring System Module - Left - No sub type information | • CAN bus circuit fault<br>• Harness fault between left side mirror and left side module | • 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 left Blind Spot Monitoring System Module and the right Blind Spot Monitoring System Module<br>• Refer to the electrical circuit diagrams and check the left side harness between the left side mirror and left hand module |
| U0233-00 | Lost Communication With Blind Spot Monitoring System Module - Right - No sub type information | • CAN bus circuit fault<br>• Harness fault between right side mirror and right side module | • 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 left Blind Spot Monitoring System Module and the right Blind Spot Monitoring System Module<br>• Refer to the electrical circuit diagrams and check the right side harness between the right side mirror and right hand module |
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • No sub type information | • Check Central Junction Box for related DTCs and refer to the relevant DTC Index. Check Restraints Control Module for related DTCs and refer to DTC Index. Check correct components are installed and that the latest software version is installed |
| U0415-68 | Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - event information | • Event information | • Using the manufacturer approved diagnostic system check the central junction box and the anti-lock brake system (ABS) control module for related DTCs and refer to the relevant DTC Index |
| 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 |
| 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 Control module | • Check/amend Car Configuration File using manufacturer approved diagnostic system |
| U3000-44 | Control Module - Data memory failure | • Control module data memory failure | • Refer to the electrical circuit diagrams and check the power and ground circuits to the component. Refer to the warranty policy and procedures manual if a module is suspect |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U3000-47 | Control Module - Watchdog/safety microcontroller failure | • Control module internal watchdog/safety MicroController failure | • Refer to the electrical circuit diagrams and check the power and ground circuits to the component. Refer to the warranty policy and procedures manual if a module is suspect |
| U3000-49 | Control Module - Internal electronic failure | • Control module internal electronic failure (internal error) | • Clear DTC, cycle ignition and retest. If fault persists, refer to the electrical circuit diagrams and check the power and ground circuits to the component. Repair as required, clear DTC and retest<br>• If fault persists, check and install a new blindspot monitoring control module as required. Refer to the warranty policy and procedures manual if a module is suspect |
| U3003-62 | Battery Voltage - Signal compare failure | • Mis-match in battery voltage, between Central Junction Box and Blind Spot Monitoring System module, of 2 volts or more | • Check the module connector for security and integrity. Refer to the electrical circuit diagrams and check the Control module supply voltage. Check vehicle battery voltage and state of charge. Check the power signal line to the module |

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# 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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Central Junction Box (CJB). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B00D5-11 | Restraint System Passenger Disable Indicator - Circuit short to ground | • PAD lamp supply circuit - short to ground | • Refer to the electrical circuit diagrams and check PAD lamp supply circuit for short to ground |
| B00D5-12 | Restraint System Passenger Disable Indicator - Circuit short to battery | • PAD lamp supply circuit - short to power | • Refer to the electrical circuit diagrams and check PAD lamp supply circuit for short to power |
| B00D5-13 | Restraint System Passenger Disable Indicator - Circuit open | • PAD lamp supply circuit - open circuit | • Refer to the electrical circuit diagrams and check PAD lamp supply circuit for open circuit |
| B1009-51 | Ignition Authorisation - Not programmed | • Faulty instrument cluster<br>• Target SID re-synchronisation error following programming<br>• CAN fault | • Check ignition, power and ground supplies to CJB and instrument cluster. Re-synchronize ID by re-configuring the instrument cluster as a new module. Check CAN communications between instrument cluster and tester |
| B1009-62 | Ignition Authorisation - Signal compare failure | • Low speed CAN fault<br>• CJB fault<br>• Instrument cluster fault<br>• Incorrect module installed (CJB/Instrument cluster)<br>• Target SID synchronisation | • Check CAN communications between CJB and instrument cluster. Check ignition, power and ground supplies to CJB and instrument cluster. Confirm correct module is installed. Re-synchronise ID by re-configuring the instrument cluster as a new module. Check CAN |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | error following re-programming<br>• Noise/EMC related error | network for interference/EMC related issues |
| B1009-63 | Ignition Authorisation - Circuit/component protection time-out | • CJB fault<br>• Low speed CAN fault<br>• Instrument cluster fault<br>• Low battery voltage <9V | • Check Power and Ground supplies to CJB and instrument cluster. Check CAN communications between CJB and instrument cluster. Check battery is in fully charged and serviceable condition, refer to the battery care manual |
| B1009-64 | Ignition Authorisation - Signal plausibility failure | • CJB fault<br>• Low speed CAN fault<br>• Instrument cluster fault | • Check power and ground supplies to CJB and instrument cluster. Check CAN communications between CJB and instrument cluster |
| B102B-67 | Passive Key - Signal incorrect after event | • CJB fault<br>• Low speed CAN fault<br>• Remote Keyless Entry (RKE) module fault<br>• Write target SID synchronisation error following re-programming | • Check power and ground supplies to CJB and RKE module. Check CAN communications between CJB and RKE module. Re-synchronise ID by re-configuring the RKE module as a new module |
| B102B-87 | Passive Key - Missing message | • CJB fault<br>• Low speed CAN fault<br>• RKE module fault<br>• Key fob battery low/battery contact issue<br>• Interference from other RF signal<br>• EMC/noise<br>• Receiver fault<br>• Receiver not programmed correctly<br>• Serial communications fault (between receiver and RKE module)<br>• Key fault<br>• Passive antenna fault<br>• Confirm placement of key within vehicle | • Check power and ground supplies to CJB, RKE module and receiver. Check CAN communications between CJB and instrument cluster. Check key fob battery. Confirm vehicle surroundings, move vehicle. Check CAN network for interference/EMC related issues. Disconnect battery, then re-connect - confirm operation by re-programming keys. Check serial circuit between receiver and RKE module. Confirm spare key works. Refer to the electrical circuit diagrams and test circuits to all 3 antennas. Check whereabouts of key |
| B1084-13 | Boot/Trunk Motor Close Switch - Circuit open | • Trunk latch open signal circuit - open circuit | • Refer to the electrical circuit diagrams and check trunk latch open signal circuit for open circuit |
| B1087-83 | LIN Bus "A" - Value of signal protection calculation incorrect | • Checksum of the received LIN frame from battery backed sounder, roof header console, and/or rain/light sensor is incorrect | • Check operation of rain/light sensor by covering sensor or applying water to screen, install a new sensor as required |
| B1087-88 | LIN Bus "A" - Bus off | • Bus off. Battery backed sounder, roof header console, and/or rain/light sensor LIN circuit - short to ground, power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check battery backed sounder, roof header console, and rain/light sensor LIN circuit for short to ground, power |
| B108A-11 | Start Button - Circuit short to ground | • Start/Stop switch analogue input circuits 1 or 2 - short to ground | • Refer to the electrical circuit diagrams and check Start/Stop switch analogue input circuits 1 and 2 for short to ground |
| B108A-12 | Start Button - Circuit short to battery | • Start/Stop switch analogue input circuits 1 or 2 - short to power | • Refer to the electrical circuit diagrams and check Start/Stop switch analogue input circuits 1 and 2 for short to power |
| B1095-12 | Wiper On/Off Relay - Circuit short to battery | • Wiper On/Off relay control circuit - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check wiper On/Off relay control circuit for |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | short to power |
| B1095-14 | Wiper On/Off Relay - Circuit short to ground or open | • Wiper On/Off relay control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check wiper On/Off relay control circuit for short to ground, open circuit |
| B1096-12 | Wiper High/Low Relay - Circuit short to battery | • Wiper Fast/Slow relay control circuit - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check wiper Fast/Slow relay control circuit for short to power |
| B1096-14 | Wiper High/Low Relay - Circuit short to ground or open | • Wiper Fast/Slow relay control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check wiper Fast/Slow relay control circuit for short to ground, open circuit |
| B1097-12 | Heated Windshield Relay - Circuit short to battery | • Heated windshield relay control circuit - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check heated windshield relay control circuit for short to power |
| B1097-14 | Heated Windshield Relay - Circuit short to ground or open | • Heated windshield relay control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check heated windshield relay control circuit for short to ground, open circuit |
| B10A6-12 | Main Light Switch - Circuit short to battery | • Master light switch signal from roof header console circuit - short to power | • Refer to the electrical circuit diagrams and check master light switch signal from roof header console circuit for short to power |
| B10A6-23 | Main Light Switch - Signal stuck low | • Master light switch signal from roof header console signal stuck low. Switch is read as ON for too long a time | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check master light switch signal from roof header console for short to ground |
| B10AD-09 | Rain Sensor - Component failures | • Component failures | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Suspect the rain/light sensor, check and install a new sensor as required |
| B10AD-11 | Rain Sensor - Circuit short to ground | • Rain/light sensor power circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check rain/light sensor power circuit for short to ground |
| B10AD-96 | Rain Sensor - Component internal failure | • Component internal failure | • Suspect the rain/light sensor, check and install a new sensor as required |
| B10E5-11 | PCM Wake-up Signal - Circuit short to ground | • ECM wake-up signal circuit - short to ground | • Refer to the electrical circuit diagrams and check ECM wake-up signal circuit for short to ground |
| B10E5-12 | PCM Wake-up Signal - Circuit short to battery | • ECM wake-up signal circuit - short to power | • Refer to the electrical circuit diagrams and check ECM wake-up signal circuit for short to power |
| B10E5-13 | PCM Wake-up Signal - Circuit open | • ECM wake-up signal circuit - open circuit | • Refer to the electrical circuit diagrams and check ECM wake-up signal circuit for open circuit |
| B10F1-11 | Key In Switch - Circuit short to ground | • Keyless vehicle module, key IN status circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check keyless vehicle module, key IN status circuit for short to ground |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B10F1-12 | Key In Switch - Circuit short to battery | • Keyless vehicle module, key IN status circuit - short to power | • Refer to the electrical circuit diagrams and check keyless vehicle module, key IN status circuit for short to power |
| B10F1-13 | Key In Switch - Circuit open | • Keyless vehicle module, key IN status circuit - open circuit | • Refer to the electrical circuit diagrams and check keyless vehicle module, key IN status circuit for open circuit |
| B10F2-11 | Sunroof Control - Circuit short to ground | • Sunroof enable signal circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check sunroof enable signal circuit for short to ground |
| B10F2-12 | Sunroof Control - Circuit short to battery | • Sunroof enable signal circuit - short to power | • Refer to the electrical circuit diagrams and check sunroof enable signal circuit for short to power |
| B10F2-13 | Sunroof Control - Circuit open | • Sunroof enable signal circuit - open circuit | • Refer to the electrical circuit diagrams and check sunroof enable signal circuit for open circuit |
| B10F3-11 | Left Front Position Light - Circuit short to ground | • Left front side lamps circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left front side lamps circuit for short to ground |
| B10F3-15 | Left Front Position Light - Circuit short to battery or open | • Left front side lamps circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left front side lamps circuit for short to power, open circuit |
| B10F4-11 | Right Front Position Light - Circuit short to ground | • Right front side lamps circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check right front side lamps circuit for short to ground |
| B10F4-15 | Right Front Position Light - Circuit short to battery or open | • Right front side lamps circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check right front side lamps circuit for short to power, open circuit |
| B10F8-12 | Accessory socket 'A' relay - Circuit short to battery | • Accessory socket 'A' relay control circuit - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check accessory socket 'A' relay control circuit for short to power |
| B10F8-14 | Accessory socket 'A' relay - Circuit short to ground or open | • Accessory socket 'A' relay control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check accessory socket 'A' relay control circuit for short to ground, open circuit |
| B10F9-12 | Accessory socket 'B' relay - Circuit short to battery | • Front powerpoint, trailer tow connector, road pricing connector, sunblind power supply circuits - short to power | • Refer to the electrical circuit diagrams and check front powerpoint, trailer tow connector, road pricing connector, sunblind power supply circuits for short to power |
| B10F9-14 | Accessory socket 'B' relay - Circuit short to ground or open | • Front powerpoint, trailer tow connector, road pricing connector, sunblind power supply circuits - short to ground, open circuit | • Refer to the electrical circuit diagrams and check front powerpoint, trailer tow connector, road pricing connector, sunblind power supply circuits for short to ground, open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B10F9-93 | Accessory socket 'B' relay - No operation | • Front powerpoint, trailer tow connector, road pricing connector, sunblind power supply circuits - short to power, ground, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check front powerpoint, trailer tow connector, road pricing connector, sunblind power supply circuits for short to power, ground, open circuit |
| B10FA-93 | Delayed Power Off relay - No operation | • ADRC ECM, roof header console lamp, glove box lamp , RH/LH footwell lamps, JAG Sense glove box module, RH/LH sunvisor lamps, rear dome lamps switched power circuits - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check ADRC ECM, roof header console lamp, glove box lamp , RH/LH footwell lamps, JAG Sense glove box module, RH/LH sunvisor lamps, rear dome lamps switched power circuits for short to power, open circuit |
| B10FF-11 | Ignition control - Circuit short to ground | • ECM and FPDB ignition control circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check ECM and FPDB ignition control circuit for short to ground |
| B10FF-13 | Ignition control - Circuit open | • ECM and FPDB ignition control circuit - open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check ECM and FPDB ignition control circuit for open circuit |
| B1100-11 | O2 sensor heater relay - Circuit short to ground | • FPDB O2 sensor heater relay control circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check FPDB O2 sensor heater relay control circuit for short to ground |
| B113D-12 | Sunroof Global Open/Close Control - Circuit short to battery | • Roof opening panel global open/close control circuit - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check roof opening panel global open/close control circuit for short to power |
| B113D-14 | Sunroof Global Open/Close Control - Circuit short to ground or open | • Roof opening panel global open/close control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check roof opening panel global open/close control circuit for short to ground, open circuit |
| B1140-11 | Engine Crank Authorisation - Circuit short to ground | • Engine crank authorisation signal circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check engine crank authorisation signal circuit for short to ground |
| B1142-11 | Ignition Status 1 - Circuit short to ground | • Ignition supply 1 circuits - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check all ignition supply 1 circuits for short to ground |
| B1143-11 | Ignition Status 2 - Circuit short to ground | • Ignition supply 2 circuits - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check all ignition supply 2 circuits for short to ground |
| B1144-11 | Heated Steering Wheel Supply - Circuit short to ground | • Heated steering wheel supply circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check heated steering wheel supply circuit for short to ground |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1145-11 | Glovebox Locking Motor - Circuit short to ground | • Glovebox latch locking motor circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check glovebox latch locking motor circuit for short to ground |
| B1145-12 | Glovebox Locking Motor - Circuit short to battery | • Glovebox latch locking motor control circuit - short to power | • Refer to the electrical circuit diagrams and check glovebox latch locking motor control circuit for short to power |
| B1145-13 | Glovebox Locking Motor - Circuit open | • Glovebox latch locking motor control circuit - open circuit | • Refer to the electrical circuit diagrams and check glovebox latch locking motor control circuit for open circuit |
| B1146-12 | Passive sounder Supply - Circuit short to battery | • Security passive sounder control circuit - short to power | • Refer to the electrical circuit diagrams and check security passive sounder control circuit for short to power |
| B1146-14 | Passive sounder Supply - Circuit short to ground or open | • Security passive sounder control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check security passive sounder control circuit for short to ground, open circuit |
| B1158-11 | Front Passenger Seat Heater Sensor - Circuit short to ground | • Front passenger seat heater sensor circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check front passenger seat heater sensor circuit for short to ground |
| B1158-13 | Front Passenger Seat Heater Sensor - Circuit open | • Front passenger seat heater sensor circuit - open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check front passenger seat heater sensor circuit for open circuit |
| B1159-11 | Driver Seat Heater Sensor - Circuit short to ground | • Driver seat heater sensor circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat heater sensor circuit for short to ground |
| B1159-13 | Driver Seat Heater Sensor - Circuit open | • Driver seat heater sensor circuit - open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat heater sensor circuit for open circuit |
| B115A-11 | Front Passenger Seat Heater - Circuit short to ground | • Front passenger seat heater supply circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check front passenger seat heater supply circuit for short to ground |
| B115A-15 | Front Passenger Seat Heater - Circuit short to battery or open | • Front passenger seat heater supply circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check front passenger seat heater supply circuit for short to power, open circuit |
| B115B-11 | Driver Seat Heater - Circuit short to ground | • Driver seat heater supply circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat heater supply circuit for short to ground |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B115B-15 | Driver Seat Heater - Circuit short to battery or open | • Driver seat heater supply circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat heater supply circuit for short to power, open circuit |
| B1175-13 | Driver Door Ajar Switch - Circuit open | • Driver door ajar switch signal circuit - open circuit | • Refer to the electrical circuit diagrams and check driver door ajar switch signal circuit for open circuit |
| B1176-13 | Passenger Door Ajar Switch - Circuit open | • Passenger door ajar switch signal circuit - open circuit | • Refer to the electrical circuit diagrams and check passenger door ajar switch signal circuit for open circuit |
| B1177-12 | Screenwash Level Switch - Circuit short to battery | • Screenwash level switch signal circuit - short to power | • Refer to the electrical circuit diagrams and check screenwash level switch signal circuit for short to power |
| B11C0-13 | Driver Side Rear Door Ajar Switch - Circuit open | • Left rear door ajar switch signal circuit - open circuit | • Refer to the electrical circuit diagrams and check left rear door ajar switch signal circuit for open circuit |
| B11C1-13 | Passenger Side Rear Door Ajar Switch - Circuit open | • Right rear door ajar switch signal circuit - open circuit | • Refer to the electrical circuit diagrams and check right rear door ajar switch signal circuit for open circuit |
| B1222-23 | Master Lock/Unlock Switch - Signal stuck low | • Master lock or unlock switch digital input circuit - signal stuck low | • Refer to the electrical circuit diagrams and check master lock and unlock switch digital input circuits for short to ground, open circuit |
| B1237-11 | Gear Shift Module Early Wake-up - Circuit short to ground | • Transmission shift module wake-up control circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check transmission shift module wake-up control circuit for short to ground |
| B1237-12 | Gear Shift Module Early Wake-up - Circuit short to battery | • Transmission shift module wake-up control circuit - short to power | • Refer to the electrical circuit diagrams and check transmission shift module wake-up control circuit for short to power |
| B1237-13 | Gear Shift Module Early Wake-up - Circuit open | • Transmission shift module wake-up control circuit - open circuit | • Refer to the electrical circuit diagrams and check transmission shift module wake-up control circuit for open circuit |
| B123E-13 | Crank Enable - Circuit open | • OK to crank signal circuit - open circuit | • Refer to the electrical circuit diagrams and check OK to crank signal circuit for open circuit |
| B1A85-96 | Ambient Light Sensor - Component internal failure | • Light sensor internal electronic failure | • Check and install a new sensor as required |
| B1C45-13 | Front Wiper Park Position Switch - Circuit open | • Windshield wiper motor park switch signal circuit - open circuit | • Refer to the electrical circuit diagrams and check windshield wiper motor park switch signal circuit for open circuit |
| B1C45-23 | Front Wiper Park Position Switch - Signal stuck low | • Signal stuck low | • Refer to the electrical circuit diagrams and check front wiper park position switch input circuit for short, open circuit |
| B1C78-12 | Powerwash Relay - Circuit short to battery | • Powerwash relay control circuit - short to power | • Refer to the electrical circuit diagrams and check powerwash relay control circuit for short to power |
| B1C78-14 | Powerwash Relay - Circuit short to ground or open | • Powerwash relay control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check powerwash relay control circuit for short to ground, open circuit |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Climate Control Module (HVAC)

Description and Operation

## Climate 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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Climate Control Module. For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Climate Control System (412-00 Climate Control System - General Information, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B105A-01 | Cabin Temperature Sensor Fan - General electrical failure | • Aspirator motor diagnostic circuit - short to ground, open circuit<br>• Aspirator fan component failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check aspirator motor diagnostic circuit for short to ground, open circuit |
| B1081-00 | Left Temperature Damper Motor - No sub type information | • Left hand blend stepper motor internal or external fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1081-49 | Left Temperature Damper Motor - Internal electronic failure | • Left hand blend stepper motor internal electronic failure | • Suspect the left hand blend stepper motor. Check and install a new stepper motor as required, refer to the new module/component installation note at the top of the DTC Index |
| B1082-00 | Right Temperature Damper Motor - No sub type information | • Right hand blend stepper motor internal or external fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1082-49 | Right Temperature Damper Motor - Internal electronic failure | • Right hand blend stepper motor internal electronic failure | • Suspect the right hand blend stepper motor. Check and install a new stepper motor as required, refer to the new module/component installation note at the top of the DTC Index |
| B1083-01 | Recirculation Damper Motor - General electrical failure | • RECIRC servo motor circuits - short to ground, power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check RECIRC servo motor circuit for short to ground, power, open circuit |
| B1085-00 | Defroster Damper Motor - No sub type information | • Defrost stepper motor internal or external fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1085-49 | Defroster Damper Motor - Internal electronic failure | • Defrost stepper motor internal electronic failure | • Suspect the defrost stepper motor. Check and install a new stepper motor as required, refer to the new module/component installation note at the top of the DTC Index |
| B1086-00 | Air Distribution Damper Motor - No sub type information | • Panel/foot stepper motor internal or external fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1086-49 | Air Distribution Damper Motor - Internal electronic failure | • Panel/foot stepper motor internal electronic failure | • Suspect the panel/foot stepper motor. Check and install a new stepper motor as required, refer to the new module/component installation note at the top of the DTC Index |
| B1087-88 | LIN Bus "A" - Bus off | • LIN Bus power #1 circuit - open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check LIN Bus power #1 circuit for open circuit |
| B1088-88 | LIN Bus "B" - Bus off | • LIN Bus power #2 circuit - open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check LIN Bus power #2 circuit for open circuit |
| B11ED-68 | Electric Heater Control Module - Event information | • Event information. Electric heater - invalid communication message | • Clear DTC. With engine coolant temperature low, set climate temperature to high and re-test. If DTC remains in isolation suspect the PTC heater, check and install a new heater as required, refer to the new module/component installation note at the top of the DTC Index. If additional LIN related DTCs are logged refer to the Actions for these DTCs |
| B11ED-87 | Electric Heater Control Module - Missing message | • Electric heater - missing communication message | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B11ED-96 | Electric Heater Control Module - Component internal failure | • Component internal failure | • Suspect the PTC heater, check and install a new heater as required, refer to the new module/component installation note at the top of the DTC Index |
| B11ED-98 | Electric Heater Control Module - Component or system over temperature | • Component or system over temperature | • Clear DTC. With engine coolant temperature low, set climate temperature to high and re-test. If DTC remains suspect the PTC heater, check and install a new heater as required, refer to the new module/component installation note at the top of the DTC Index |
| B11EE-01 | A/C Compressor - General electrical failure | • Air conditioning compressor clutch solenoid circuits - short to ground, power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check air conditioning compressor clutch solenoid circuits for short to ground, power, open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B11F0-11 | Air Intake Damper Position Sensor - Circuit short to ground | • RECIRC servo motor air intake feedback and 5 volt supply circuits - short to ground | • Refer to the electrical circuit diagrams and check RECIRC servo motor air intake feedback and 5 volt supply circuits for short to ground |
| B11F0-15 | Air Intake Damper Position Sensor - Circuit short to battery or open | • RECIRC servo motor air intake feedback and ground circuits - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check RECIRC servo motor air intake feedback and ground circuits for short to power, open circuit |
| B11F8-00 | Left Outer Vent - No sub type information | • Left outer IP vent actuator internal or external fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B11F8-49 | Left Outer Vent - Internal electronic failure | • Left outer IP vent actuator internal electronic failure | • Suspect the left outer IP vent actuator. Check and install a new actuator as required, refer to the new module/component installation note at the top of the DTC Index |
| B11F9-00 | Left Inner Vent - No sub type information | • Left inner IP vent actuator internal or external fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B11F9-49 | Left Inner Vent - Internal electronic failure | • Left inner IP vent actuator internal electronic failure | • Suspect the left inner IP vent actuator. Check and install a new actuator as required, refer to the new module/component installation note at the top of the DTC Index |
| B11FA-00 | Right Inner Vent - No sub type information | • Right inner IP vent actuator internal or external fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B11FA-49 | Right Inner Vent - Internal electronic failure | • Right inner IP vent actuator internal electronic failure | • Suspect the right inner IP vent actuator. Check and install a new actuator as required, refer to the new module/component installation note at the top of the DTC Index |
| B11FB-00 | Right Outer Vent - No sub type information | • Right outer IP vent actuator internal or external fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B11FB-49 | Right Outer Vent - Internal electronic failure | • Right outer IP vent actuator internal electronic failure | • Suspect the right outer IP vent actuator. Check and install a new actuator as required, refer to the new module/component installation note at the top of the DTC Index |
| B11FF-84 | A/C Refrigerant Pressure - Signal below allowable range | • Signal below allowable range. A/C System Refrigerant Pressure too low | • This DTC can be logged by the system due to low ambient temperature soak (below 3°C) reducing the pressure in the refrigerant gas system. If the cabin temperature logged along with the DTC at the time is below 10°C this could indicate low temperature. If the air conditioning performance is satisfactory and the in-cabin temperature is below 10°C then it is likely that the system contains a suitable amount of gas and the DTC is being recorded as an effect of the low ambient temperature. If this is not the case carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check air conditioning pressure sensor circuits for short, open circuit. Check for correct charge weight |
| B11FF-85 | A/C Refrigerant Pressure - Signal above allowable range | • Signal above allowable range. A/C System Refrigerant pressure too high | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check air conditioning pressure sensor circuits for short, open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A59-11 | Sensor 5 Volt Supply - Circuit short to ground | • Air conditioning pressure sensor or RECIRC servo motor 5 volt supply circuits - short to ground | • Refer to the electrical circuit diagrams and check air conditioning pressure sensor and RECIRC servo motor 5 volt supply circuits for short to ground |
| B1A59-13 | Sensor 5 Volt Supply - Circuit open | • Air conditioning pressure sensor 5 volt supply circuits - open circuit | • Refer to the electrical circuit diagrams and check air conditioning pressure sensor 5 volt supply circuit for open circuit |
| B1A60-11 | Pollution Sensor - Hydrocarbon - Circuit short to ground | • Pollution sensor hydrocarbon input circuit - short to ground | • Refer to the electrical circuit diagrams and check pollution sensor hydrocarbon input circuit for short to ground |
| B1A61-11 | Cabin Temperature Sensor - Circuit short to ground | • In car temperature sensor circuit - short to ground | • Refer to the electrical circuit diagrams and check In car temperature sensor circuit for short to ground |
| B1A61-15 | Cabin Temperature Sensor - Circuit short to battery or open | • In car temperature sensor circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check In car temperature sensor circuit for short to power, open circuit |
| B1A63-11 | Right Solar Sensor - Circuit short to ground | • Right sun load sensor signal circuit - short to ground | • Refer to the electrical circuit diagrams and check right sun load sensor signal circuit for short to ground |
| B1A64-11 | Left Solar Sensor - Circuit short to ground | • Left sun load sensor signal circuit - short to ground | • Refer to the electrical circuit diagrams and check left sun load sensor signal circuit for short to ground |
| B1A67-13 | Sensor Ground - Circuit open | • Sensor ground circuits - open circuit | • Refer to the electrical circuit diagrams and check sensor ground circuits for open circuit |
| B1A69-01 | Humidity Sensor - General electrical failure | • Humidity sensor PWM input circuit - short to ground, power, open circuit<br>• Sensor component failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check humidity sensor PWM input circuit for short to ground, power, open circuit. Check and install a new sensor as required |
| B1B62-11 | Pollution Sensor - NOx - Circuit short to ground | • Pollution sensor NOx input circuit - short to ground | • Refer to the electrical circuit diagrams and check pollution sensor NOx input circuit for short to ground |
| B1B71-11 | Evaporator Temperature Sensor - Circuit short to ground | • Evaporator temperature sensor signal circuit - short to ground | • Refer to the electrical circuit diagrams and check evaporator temperature sensor signal circuit for short to ground |
| B1B71-15 | Evaporator Temperature Sensor - Circuit short to battery or open | • Evaporator temperature sensor signal circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check evaporator temperature sensor signal circuit for short to power, open circuit |
| B1B72-11 | LIN Bus #1 Power Supply Circuit - Circuit short to ground | • Stepper motor circuit LIN Bus #1 power supply - short to ground | • Refer to the electrical circuit diagrams and check stepper motor circuit LIN Bus #1 power supply for short to ground |
| C1B14-13 | Sensor Supply Voltage A - Circuit open | • RECIRC servo motor 5 volt supply circuit - open circuit | • Refer to the electrical circuit diagrams and check RECIRC servo motor 5 volt supply circuit for open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C1B15-13 | Sensor Supply Voltage B - Circuit open | • RECIRC servo motor and EVAP sensor ground circuits - open circuit | • Refer to the electrical circuit diagrams and check RECIRC servo motor and EVAP sensor ground circuits for open circuit |
| P0530-11 | A/C Refrigerant Pressure Sensor A Circuit - Circuit short to ground | • Air conditioning pressure sensor signal circuit - short to ground | • Refer to the electrical circuit diagrams and check air conditioning pressure sensor signal circuit for short to ground |
| P0530-15 | A/C Refrigerant Pressure Sensor A Circuit - Circuit short to battery or open | • Air conditioning pressure sensor signal circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check air conditioning pressure sensor signal circuit for short to power, open circuit |
| U0010-88 | Medium Speed CAN Communication Bus - Bus off | • Bus off | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • Invalid configuration message is received | • Re-configure the RJB using the manufacturer approved diagnostic system. Clear the DTC and retest. If the DTC is still logged suspect the climate control module, refer to the new module/component installation note at the top of the DTC Index |
| U1A14-49 | CAN Initialisation Failure - Internal electronic failure | • Internal electronic failure | • Suspect the climate control module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-55 | Control Module - Not configured | • Incorrect car configuration data received | • Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the climate control module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-87 | Control Module - Missing message | • Missing message | • Re-configure the RJB using the manufacturer approved diagnostic system. Check climate control module for DTCs and refer to the DTC Index. Carry out CAN network integrity tests using the manufacturer approved diagnostic system. If DTC remains suspect the climate control module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3002-81 | Vehicle Identification Number - Invalid serial data received | • Vehicle/component mis-match. Corrupt VIN data being transmitted, module previously installed to other vehicle | • Check and install original/new module as required, refer to the new module/component installation note at the top of the DTC Index |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Digital Audio Broadcast Module (DABM)

Description and Operation

## Digital Audio Broadcast Module (DABM)

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, 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 on the digital audio broadcast 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 Causes | Action |
|---|---|---|---|
| B11A4-11 | L-Band Antenna - Circuit short to ground | • Digital audio broadcast L-band antenna circuit - short circuit to ground | • Refer to electrical circuit diagrams and check digital audio broadcast L-band antenna circuit for short circuit to ground |
| B11A4-15 | L-Band Antenna - Circuit short to battery or open | • Digital audio broadcast L-band antenna circuit - short circuit to power, open circuit, high resistance | • Refer to electrical circuit diagrams and check digital audio broadcast L-band antenna circuit for short circuit to power, open circuit, high resistance |
| B11A5-11 | Band 3 Antenna - Circuit short to ground | • Digital audio broadcast band 3 antenna circuit - short circuit to ground | • Refer to electrical circuit diagrams and check digital audio broadcast band 3 antenna circuit for short circuit to ground |
| B11A5-15 | Band 3 Antenna - Circuit short to battery or open | • Digital audio broadcast band 3 antenna circuit - short circuit to power, open circuit, high resistance | • Refer to electrical circuit diagrams and check digital audio broadcast band 3 antenna circuit for short circuit to power, open circuit, high resistance |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Driver Door Module/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, 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

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<br>• Switch pressed for longer than 20 seconds<br>• Switch circuit short circuit to power or ground<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| 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-15 | Passenger Door Double Locking Motor - Circuit short to battery or open | • Short to power or open circuit | • Refer to the electrical circuit diagrams and test 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 | • Rear driver door double locking motor circuit short circuit to ground | • Refer to the electrical circuit diagrams and check the circuit |
| B10ED-15 | Rear Door Driver Side Double Locking Motor - Circuit short to battery or open | • Rear driver door double locking motor circuit short circuit to power or open circuit | • Refer to the electrical circuit diagrams and check the circuit |
| B10EE-11 | Rear Door Passenger Side Double Locking Motor - Circuit short to ground | • Rear passenger door double locking motor circuit short circuit to ground | • Refer to the electrical circuit diagrams and check the circuit |
| B10EE-15 | Rear Door Passenger Side Double Locking Motor - Circuit short to battery or open | • Rear passenger door double locking motor circuit short circuit to power or open circuit | • Refer to the electrical circuit diagrams and check the 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 | • Rear driver door central locking motor circuit short circuit to ground | • Refer to the electrical circuit diagrams and check the circuit |
| B110A-15 | Rear Door Driver Side Central Locking Motor - Circuit short to battery or open | • Rear driver door central locking motor circuit short circuit to power or open circuit | • Refer to the electrical circuit diagrams and check the circuit |
| B110B-11 | Rear Door Passenger Side Central Locking Motor - Circuit short to ground | • Rear passenger door central locking motor circuit short circuit to ground | • Refer to the electrical circuit diagrams and check the circuit |
| B110B-15 | Rear Door Passenger Side Central Locking Motor - Circuit short to battery or open | • Rear passenger door central locking motor circuit short circuit to power or open circuit | • Refer to the electrical circuit diagrams and check the 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| 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 Power - Circuit short to battery or open | • Short to power or open circuit | • Refer to the electrical circuit diagrams and test right mirror heater output circuit for short to 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. Refer to the warranty policy and procedures manual if a module is suspect |
| B117C-73 | Rear Power Window Up - Actuator stuck closed | • Door module internal relay sticking closed | • Renew the relevant rear door module. Refer to the warranty policy and procedures manual if a module is suspect |
| 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. Refer to the warranty policy and procedures manual if a module is suspect |
| B117D-73 | Rear Power Window Down - Actuator stuck closed | • Door module internal relay sticking closed | • Renew the relevant rear door module. Refer to the warranty policy and procedures manual if a module is suspect |
| 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B117E-72 | Front Power Window Up - Actuator stuck open | • Door module internal relay sticking open | • Renew the relevant front door module. Refer to the warranty policy and procedures manual if a module is suspect |
| B117E-73 | Front Power Window Up - Actuator stuck closed | • Door module internal relay sticking closed | • Renew the relevant front door module. Refer to the warranty policy and procedures manual if a module is suspect |
| 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. Refer to the warranty policy and procedures manual if a module is suspect |
| B117F-73 | Front Power Window Down - Actuator stuck closed | • Door module internal relay sticking closed | • Renew the relevant front door module. Refer to the warranty policy and procedures manual if a module is suspect |
| B1189-29 | Front Window Position Sensor - Signal invalid | • Missing signal from hall sensor 1 or 2<br>• Sensor circuit fault<br>• 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<br>• Sensor circuit fault<br>• 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<br>• Mirror motor failure | • Refer to the electrical circuit diagrams and check the mirror fold circuit between the drivers 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<br>• Mirror motor failure | • Refer to the electrical circuit diagrams and check the mirror fold circuit between the drivers door module and the mirror assembly. Repair as necessary |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B11F7-11 | Passenger Folding Mirror Motor - Circuit short to ground | • Passenger folding mirror motor circuit short circuit to ground<br>• 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<br>• 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 | • Value of signal protection calculation incorrect | • Refer to the electrical circuit diagrams and check the LIN Bus circuit between the rear door control unit and the Driver Door Module. Check the connectors for integrity and security. Clear the DTC and retest. If the problem persists, renew the rear door control module |
| B1A98-86 | LIN Bus Circuit #1 - Signal invalid | • Signal invalid | • Refer to the electrical circuit diagrams and check the LIN Bus circuit between the rear door control unit and the Driver Door Module. Check the connectors for integrity and security. Clear the DTC and retest. If the problem persists, renew the rear door control module |
| B1A98-87 | LIN Bus Circuit #1 - Missing message | • Missing message | • Refer to the electrical circuit diagrams and check the LIN Bus circuit between the rear door control unit and the Driver Door Module. Check the connectors for integrity and security. Clear the DTC and retest. If the problem persists, renew the rear door control module |
| B1C09-11 | Driver Left/Right Mirror Motor Circuit - Circuit short to ground | • Driver mirror adjustment motor circuit short circuit to ground<br>• Mirror left/right motor failure | • Refer to the electrical circuit diagrams and check the mirror motor circuit between the drivers 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<br>• Mirror left/right motor failure | • Refer to the electrical circuit diagrams and check the mirror motor circuit between the drivers 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<br>• Mirror motor failure | • Refer to the electrical circuit diagrams and check the mirror motor circuit between the drivers 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<br>• Mirror motor failure | • Refer to the electrical circuit diagrams and check the mirror motor circuit between the drivers 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<br>• 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<br>• 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<br>• 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 |

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

Description and Operation

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

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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/Passenger Seat Module (DSM/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 |
|---|---|---|---|
| B105F-11 | Seat Cushion Extension Motor Output - Circuit short to ground | • Driver seat cushion extension motor circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat cushion extension motor circuit for short to ground |
| B105F-15 | Seat Cushion Extension Motor Output - Circuit short to battery or open | • Driver seat cushion extension motor circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat cushion extension motor circuit for short to power, open circuit |
| B1060-11 | Seat Headrest Motor Output - Circuit short to ground | • Driver seat headrest motor circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat headrest motor circuit for short to ground |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1060-15 | Seat Headrest Motor Output - Circuit short to battery or open | • Driver seat headrest motor circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat headrest motor circuit for short to power, open circuit |
| B1063-31 | Seat Cushion Extension Motor Speed/Position Sensor - No signal | • Harness/connector problem<br>• No signal from sensor<br>• Sensor/motor malfunction | • Check the seat wiring harness/connectors for security/integrity<br>• Refer to the electrical circuit diagrams and check the seat cushion motor sensor circuit. Repair circuit as required. Clear DTC and retest |
| B1064-31 | Seat Headrest Motor Speed/Position Sensor - No signal | • Harness/connector problem<br>• No signal from sensor<br>• Sensor/motor malfunction | • Check the seat wiring harness/connectors for security/integrity<br>• Refer to the electrical circuit diagrams and check the seat headrest motor sensor circuit. Repair circuit as required. Clear DTC and retest |
| B1065-24 | Cushion extend switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and cushion extend circuit for short to ground |
| B1066-24 | Cushion retract switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and cushion retract circuit for short to ground |
| B106D-24 | Headrest up switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and headrest up circuit for short to ground |
| B106E-24 | Headrest down switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and headrest down circuit for short to ground |
| B1A98-83 | LIN Bus Circuit #1 - Value of signal protection calculation incorrect | • Value of signal protection calculation incorrect | • Check LIN network for interference/EMC related issues |
| B1A98-86 | LIN Bus Circuit #1 - Signal invalid | • LIN bus Header error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check LIN network for interference/EMC related issues |
| B1A98-87 | LIN Bus Circuit #1 - Missing message | • Slave node communication missing. LIN bus circuit - short to ground, power, open circuit (ECU Types 7 & 8) | • Refer to electrical circuit diagrams and test LIN Bus between seat switch pack and control module for short to ground, power, open circuit, check power and ground supplies to switch pack |
| B1A98-88 | LIN Bus Circuit #1 - Bus off | • Bus off | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and test LIN Bus between seat switch pack and control module for short to ground or power |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1B86-11 | Seat Height Motor Relay - Circuit short to ground | • Driver seat parallel height motor circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat parallel height motor circuit for short to ground |
| B1B86-15 | Seat Height Motor Relay - Circuit short to battery or open | • Driver seat parallel height motor circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat parallel height motor circuit for short to power, open circuit |
| B1B87-31 | Seat Height Motor Speed/Position Sensor - No signal | • Harness/connector problem<br>• No signal from sensor<br>• Sensor/motor malfunction | • Check the seat wiring harness/connectors for security/integrity<br>• Refer to the electrical circuit diagrams and check the seat height motor sensor circuit. Repair circuit as required. Clear DTC and retest |
| B1B88-11 | Seat Slide Motor Relay - Circuit short to ground | • Driver seat slide motor circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat slide motor circuit for short to ground |
| B1B88-15 | Seat Slide Motor Relay - Circuit short to battery or open | • Driver seat slide motor circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat slide motor circuit for short to power, open circuit |
| B1B89-31 | Seat Slide Motor Speed/Position Sensor - No signal | • Harness/connector problem<br>• No signal from sensor<br>• Sensor/motor malfunction | • Check the seat wiring harness/connectors for security/integrity<br>• Refer to the electrical circuit diagrams and check the seat slide motor speed sensor circuit. Repair circuit as required. Clear DTC and retest |
| B1B90-11 | Seat Tilt Motor Relay - Circuit short to ground | • Driver seat tilt motor circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat tilt motor circuit for short to ground |
| B1B90-15 | Seat Tilt Motor Relay - Circuit short to battery or open | • Driver seat tilt motor circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat tilt motor circuit for short to power, open circuit |
| B1B91-31 | Seat Tilt Motor Speed/Position Sensor - No signal | • Harness/connector problem<br>• No signal from sensor<br>• Sensor/motor malfunction | • Check the seat wiring harness/connectors for security/integrity<br>• Refer to the electrical circuit diagrams and check the seat tilt motor speed sensor circuit. Repair circuit as required. Clear DTC and retest |
| B1B92-11 | Seat Recline Motor Relay - Circuit short to ground | • Driver seat recline motor circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat recline motor circuit for short to ground |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1B92-15 | Seat Recline Motor Relay - Circuit short to battery or open | • Driver seat recline motor circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check driver seat recline motor circuit for short to power, open circuit |
| B1B93-31 | Seat Recline Motor Speed/Position Sensor - No signal | • Harness/connector problem<br>• No signal from sensor<br>• Sensor/motor malfunction | • Check the seat wiring harness/connectors for security/integrity<br>• Refer to the electrical circuit diagrams and check the seat recline motor speed sensor circuit. Repair circuit as required. Clear DTC and retest |
| B1B94-24 | Seat Height Up Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and seat height up circuit for short to ground |
| B1B95-24 | Seat Height Down Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and seat height down circuit for short to ground |
| B1B96-24 | Seat Slide Forward Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and seat slide forward circuit for short to ground |
| B1B97-24 | Seat Slide Backward Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and seat slide backward circuit for short to ground |
| B1B98-24 | Seat Tilt Up Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and seat tilt up circuit for short to ground |
| B1B99-24 | Seat Tilt Down Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and seat tilt down circuit for short to ground |
| B1C00-24 | Seat Recline Up Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and seat recline up circuit for short to ground |
| B1C01-24 | Seat Recline Down Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit and check seat recline down circuit for short to ground |
| B1C02-24 | Memory Store Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1C03-24 | Memory #1 Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit |
| B1C04-24 | Memory #2 Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit |
| B1C05-24 | Memory #3 Switch - Signal stuck high | • Signal stuck high | • Check for a stuck switch. Refer to the electrical circuit diagrams and check driver seat switch pack to seat module LIN circuit for short, open circuit |
| U0010-88 | Medium speed Can communication Bus - Bus off | • Bus off | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check CAN network to climate controlled seat module for short, open circuit |
| U0140-00 | Lost communication with CJB - No sub type information | • Lost communication with CJB | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check CJB for related DTCs and refer to the relevant DTC Index |
| U0142-00 | Lost communication with RJB - No sub type information | • Lost communication with RJB | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check RJB for related DTCs and refer to the relevant DTC Index |
| U0155-00 | Lost communications with instrument cluster - No sub type information | • Lost communications with instrument cluster | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check CAN network to climate controlled seat module and instrument cluster for short, open circuit |
| U0199-00 | Lost communication with Driver Door Module (DDM) - No sub type information | • Lost communication with DDM | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U0300-00 | Internal control module software incompatibility - No sub type information | • Invalid configuration message is received | • Re-configure the RJB using the manufacturer approved diagnostic system. Clear the DTC and retest. If the DTC is still logged suspect the DSM/PSM, refer to the new module installation note at the top of the DTC Index |
| U1A14-49 | CAN Initialisation failure - Internal electronic failure | • Internal electronic failure | • Install a new DSM, refer to the new module installation note at the top of the DTC Index |
| U1A4C-68 | Build/end of line mode active - Event information | • Manufacturing mode has not been removed | • Place DSM in to customer mode using manufacturer approved diagnostic system |
| U3000-49 | Control module - Internal electronic failure | • Internal electronic failure | • Install a new DSM, refer to the new module installation note at the top of the DTC Index |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U3000-55 | Stored vehicle configuration data does not match - Not configured | • Incorrect car configuration data received | • Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the DSM, refer to the new module installation note at the top of the DTC Index |
| U3000-87 | Control Module - Missing message | • Missing message | • Re-configure the RJB using the manufacturer approved diagnostic system. Check DSM for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system |
| U3001-46 | Control module improper shutdown - Calibration/parameter memory failure | • Calibration/parameter memory failure | • Check for DTCs that could indicate power failure to the module and refer to the DTC Index |
| U3002-81 | Vehicle Identification Number (VIN) - Invalid serial data received | • Vehicle/component mis-match. Corrupt VIN data being transmitted, module previously installed to other vehicle | • Install original module, check for DTCs and refer to relevant DTC Index |
| U3003-16 | Battery Voltage - Circuit voltage below threshold | • Circuit voltage below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U3003-17 | Battery Voltage - Circuit voltage above threshold | • Circuit voltage above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Electric Parking Brake (PBM)

Description and Operation

## Electric Parking Brake (PBM)

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, 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 SSM's which may be valid for the specific customer complaint and carry out the recommendations as needed.

The table below lists all diagnostic trouble codes (DTCs) that could be logged in the electric parking brake module, for additional diagnosis and testing information refer to the relevant diagnosis and testing section.
For additional information, refer to: Parking Brake (206-05 Parking Brake and Actuation, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P1536-62 | Parking Brake Switch Circuit - Signal compare failure | • Wiring harness fault<br>• Switch internal fault | • All signals from the switch are active at the same time. Refer to the electrical circuit diagrams and check all the switch apply, release and return circuits for short circuit or open circuit. Repair wiring harness as required<br>• If no fault with wiring harness suspect switch has an internal fault. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| P1536-66 | Parking Brake Switch Circuit - Signal has too many transitions / events | • System abuse<br>• Wiring harness fault<br>• Switch internal fault | NOTE: The Electric Parking Brake system will be locked out if the module receives more then 30 apply/release requests within 1 minute.<br>• Cycle the ignition to clear the fault mode. Clear the DTC and test the system<br>• Refer to the electrical circuit diagrams and check all the switch apply, release and return circuits for intermittent short circuit or open circuit. Repair wiring harness as required<br>• If there are no wiring faults and the DTC resets |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | suspect the switch. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| P1571-64 | Brake Switch - Signal plausibility failure | • Wiring harness fault<br>• Brake pedal switch fault | • The signal from the hardwired brake pedal switch does not agree with the brake status message broadcast on CAN. Refer to the electrical circuit diagrams and check the brake pedal switch circuits for short circuit or open circuit. Repair wiring harness as required<br>• If there are no wiring harness faults suspect switch. Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| C1127-31 | Position Sensor - No Signal | • Parking brake motor hall effect position sensor power circuit fault<br>• Parking brake motor hall effect position sensor ground circuit fault<br>• Parking brake motor hall effect position sensor signal circuit fault<br>• Mechanical fault with sensor/actuator | • Inspect mechanical linkages for faults/damage. Repair as required. Refer to the electrical circuit diagrams and check parking brake motor hall effect position sensor circuits for short, open circuit. Check and install a new sensor actuator as required |
| C1129-39 | Actuator engage - Incorrect has too few pulses | • Motor engage current reached before full apply travel distance<br>• Service brake adjustment incorrect after brake lining replacement<br>• Brake cables broken, seized, trapped.<br>• Caliper malfunction | • Carry out parking brake calibration procedure. check for mechanical failure of parking brake system |
| C1129-3A | Actuator engage - Incorrect has too many pulses | • Motor engage current not reached or travelled too far upon apply<br>• Service brake adjustment incorrect after brake lining replacement<br>• Brake cables broken, seized, trapped<br>• Caliper malfunction | • Carry out parking brake calibration procedure. check for mechanical failure of parking brake system |
| C112A-39 | Actuator disengage - Incorrect has too few pulses | • Intermittent motor or circuit - open circuit<br>• Actuator malfunction | • Check for additional motor or circuit DTCs and refer to DTC index. check for mechanical failure of parking brake |
| C1D00-11 | Park brake apply switch - Circuit short to ground | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault - short to ground<br>• Switch fault | • Refer to electrical circuit diagrams and check the switch primary and secondary apply circuits for short to ground. Repair circuit faults or install a new switch as required |
| C1D00-15 | Park brake apply switch circuit - Circuit short to battery or open | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault - short to power or open circuit<br>• Switch fault | • Refer to electrical circuit diagrams and check the switch primary and secondary apply circuits for short to power or open circuit. Repair circuit faults or install a new switch as required |
| C1D00-1C | Park brake apply switch - Voltage out of range | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault - low resistance to ground<br>• Switch fault | • Refer to the electrical circuit diagrams and test primary parking brake apply switch circuits for short to ground<br>• Check and install a new switch as required |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C1D00-62 | Park brake apply switch - Signal compare failure | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault<br>• Switch fault | • Apply switch active then release switch active, refer to electrical circuit diagrams and check apply/release switch circuits<br>• Check and install a new switch as required |
| C1D00-64 | Park brake apply switch - Signal plausibility failure | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault - primary or secondary apply circuit<br>• Switch fault | • Refer to the electrical circuit diagrams and test parking brake primary and secondary apply circuits<br>• Check and install a new switch as required |
| C1D01-11 | Park brake release switch - Circuit short to ground | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault - short to ground<br>• Switch fault | • Refer to the electrical circuit diagrams and test park brake primary and secondary circuit for short to ground<br>• Check and install a new switch as required |
| C1D01-15 | Park brake release switch - Circuit short to battery or open | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault - open circuit<br>• Harness fault - short to power<br>• Switch fault | • Refer to the electrical circuit diagrams and test parking brake primary and secondary release circuits for open circuits or short to power<br>• Check and install a new switch as required |
| C1D01-1C | Park brake release switch - Voltage out of range | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault - low resistance to ground<br>• Switch fault | • Refer to electrical circuit diagrams and test park brake switch primary and secondary switch circuits for low resistance to ground<br>• Check and install a new switch as required |
| C1D01-62 | Park brake release switch - Signal compare failure | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault<br>• Switch fault | • Release switch active then apply switch active. Refer to electrical circuit diagrams and check switch circuits for open circuits or shorts. Repair circuit or replace switch as required |
| C1D01-64 | Park brake release switch - Signal plausibility failure | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault<br>• Switch fault | • Primary and secondary release switch inputs signals do not match. Check connectors for damaged pins, Refer to electrical circuit diagrams and check switch circuits for open circuits or shorts. Repair circuit or replace switch as required |
| B1142-64 | Ignition Status 1 - Signal plausibility failure | • The hard wired ignition status signal does not agree with CAN messages. Ignition power supply is detected open circuit when ignition status is set to 'ON' | • Refer to electrical circuit diagrams and check parking brake module ignition power supply for short to ground, open circuit |
| U0001-87 | High Speed CAN communication bus - Missing message | • CAN Bus circuit fault<br>• Power distribution 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 |
| U0001-88 | High speed CAN communication Bus - Bus off | • CAN Bus circuit fault<br>• Power distribution 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 |
| U0100-00 | Lost Communication with ECM/PCM A - No sub type information | • Engine control module / system fault<br>• Wiring harness fault | • Check the Engine Control Module for related DTCs and refer to the relevant DTC index<br>• Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network |
| U0103-00 | Lost communication With Gear Shift Module A - No sub type information | • Gear shift control module / system fault<br>• Wiring harness fault | • Check the Gear Shift Control Module for related DTCs and refer to the relevant DTC index<br>• 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 |
| U0104-00 | Lost communication With Cruise Control Module A - No sub type information | • Speed control module / system fault<br>• Wiring harness fault | • Check the Speed Control Module for related DTCs and refer to the relevant DTC index<br>• 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 |
| U0121-00 | Lost communication with Anti-Lock Braking System (ABS) Control Module - No sub type information | • Anti-Lock Braking System control module / system fault<br>• Wiring harness fault | • Check the Anti-Lock Braking System Control Module for related DTCs and refer to the relevant DTC index<br>• 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 |
| U0155-00 | Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information | • Instrument Cluster / system fault<br>• Wiring harness fault | • Check the Instrument Cluster for related DTCs and refer to the relevant DTC index<br>• 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 |
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • Car configuration file stored in Park Brake Module does not match the master car configuration file<br>• Master car configuration file not being transmitted by master control module | • Check all control modules for related DTCs and refer to the relevant DTC index<br>• Check the components installed on the vehicle were installed by the factory or a dealer<br>• Install the original components or a new one as required |
| U0401-00 | Invalid Data Received From ECM/PCM - No sub type information | • Invalid message from the Engine Control Module | • Check the Engine Control Module for related DTCs and refer to the relevant DTC index |
| U0404-00 | Invalid Data Received From Gear Shift Control Module A - No sub type information | • Invalid message from the gear shift control module | • Check the Gear Shift Control Module for related 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 | • Invalid message from the anti-lock Braking system module | NOTE: This DTC may be stored even though no fault condition is present and should be ignored unless the customer has reported a electronic park brake concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis<br>• Check the Anti-Lock Braking System Control Module for related DTCs and refer to the relevant DTC index |
| U0422-00 | Invalid data received from Central Junction Box - No sub type information | • Invalid message from the Central Junction Box | • Check the Central Junction Box for related DTCs and refer to the relevant DTC index |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U0423-00 | Invalid Data Received From Instrument Panel Control Module - No sub type information | • Invalid message from the instrument panel control module | • Check the Instrument Cluster for related DTCs and refer to the relevant DTC index |
| U0433-64 | Invalid Data Received From Cruise Control Front Distance Range Sensor - Signal plausibility failure | • Incorrect apply request from the speed control module when the conditions were not correct | NOTE: The Park Brake Module has received a request to apply the parkbrake from the Adaptive Speed Control module but the conditions were not correct for the apply to take place. E.g. the vehicle was moving. The module will ignore the request but this DTC is logged for safety reference<br>• Check the Speed Control Module for related DTCs and refer to the relevant DTC index |
| U2001-68 | Reduced System Function - Event information | • Invalid or missing message from Anti-Lock Braking System with ignition OFF and vehicle speed > 3Kph | NOTE: There has been invalid or missing data detected from the Anti-Lock Brake System Control Module. This DTC may be logged if the ignition is switched off with the vehicle still moving. This DTC will never be recorded as confirmed and is stored for historical analysis only<br>• Check the Speed Control Module for related DTCs and refer to the relevant DTC index |
| U2005-64 | Vehicle Speed - Signal implausibility failure | • Implausible speed message from the Anti-Lock Braking System control module | NOTE: Implausible speed is defined as passing from high speed dynamic mode to static mode without passing through low speed dynamic mode<br>• Check the Anti-Lock Braking System Control Module for related DTCs and refer to the relevant DTC index |
| U200D-4B | Control Module Output Power A - Over temperature | • Actuator FET circuit over current / over temperature | • Refer to electrical wiring diagrams and check the actuator circuit for low resistance. Repair circuit faults or install a new actuator as required |
| U2011-11 | Motor - Circuit short to ground | • Electric park brake motor output short to ground | • Refer to electrical wiring diagrams and check the actuator circuit for short to ground. Repair circuit faults or install a new actuator as required |
| U2011-12 | Motor - Circuit short to battery | • Electric park brake motor output short to power | • Refer to electrical wiring diagrams and check the actuator circuit for short to power. Repair circuit faults or install a new actuator as required |
| U2011-13 | Motor - Circuit open | • Electric park brake motor output open circuit | • Refer to electrical wiring diagrams and check the actuator circuit for open circuit. Repair circuit faults or install a new actuator as required |
| U3000-47 | Control Module - Watchdog/safety micro controller failure | • Defective ECU | • Lost communication with secondary micro processor, check power and ground connections to module. Clear DTC, perform battery reset and retest system. If DTC reoccurs suspect the Parking Brake control module<br>• Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| U3002-81 | Vehicle Identification Number (VIN) - Invalid serial number | • The Park Brake Module has previously been installed to another vehicle | • Check and install the original, or a new Park Brake Module<br>• Refer to the Warranty Policy and Procedures manual if a module/component is suspect |
| U3003-62 | Battery Voltage - Signal compare failure | • Power distribution fault<br>• Wiring harness fault | • There is a difference of more than 2 volts between the power supply to the parking brake module and the battery voltage value broadcast on CAN. Check other control modules for battery voltage related DTCs. Refer to the electrical circuit diagrams and check the power and ground |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | supply circuits to the Park Brake Module. Repair wiring as required, clear the DTC and retest the system |
| U3006-16 | Control Module Input Power A - Circuit voltage below threshold | • ECU logic voltage is high (over 18 volts for 40mS)<br>• Wiring harness fault<br>• Charging system fault | • Refer to electrical circuit diagrams, check power supplies and ground connections to the park brake control module. Check battery voltage and charging system. Repair wiring harness or charging system as required, clear DTC, perform battery reset. Retest system |
| U3006-17 | Control Module Input Power A - Circuit voltage above threshold | • ECU logic voltage is low (below 8 volts for 2000mS)<br>• Wiring harness fault<br>• Charging system fault | • Refer to electrical circuit diagrams, check power supplies and ground connections to the park brake control module. Check battery voltage and charging system. Repair wiring harness or charging system as required, clear DTC, perform battery reset. Retest system |
| U3007-14 | Control Module Input Power B - Circuit short to ground or open | • Connector fault - bent, loose or corroded pin(s)<br>• Harness fault | • Refer to electrical circuit diagrams, check Park Brake Module high power feed circuit for open circuits or short to ground. Repair wiring harness as required, clear DTC |

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# General Information - Diagnostic Trouble Code (DTC) Index V8 S/C 5.0L Petrol, DTC: Engine Control Module (ECM)

Description and Operation

## Engine Control Module (PCM) 5.0L SC V8 - AJ133

WARNING: Fuel injector voltage will reach 65 Volts during operation and have a high current requirement.

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, 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 five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give additional information read by the manufacturer-approved diagnostic system).

When performing electrical 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.

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 electronic 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 (303-14 Electronic Engine Controls - V8 S/C 5.0L Petrol, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B10A2-31 | Crash Input - No signal | NOTE: - Circuit SRS_SIGNAL -<br>• 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<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | 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<br>• Steering wheel module is not connected<br>• 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<br>• Refer to the electrical circuit diagrams and check the LIN bus between steering wheel module and the CAN gateway<br>• 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<br>• Speed control switch failure<br>• Steering wheel module failure | • Check for related DTCs in other central junction boxes<br>• 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<br>• 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<br>• Wiring harness fault<br>• Ignition coil(s) fault | • Refer to repair manual and check spark plug(s) for condition and security. Replace any defective components as required<br>• Refer to electrical wiring diagrams and check ignition coil circuit for intermittent open circuit, short circuit to power, short circuit to ground<br>• 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 -<br>• Charging system fault Battery<br>• monitoring signal line circuit fault<br>• Vehicle battery fault | • Refer to electrical wiring diagrams and check charging system for faults. Perform any repairs required<br>• 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<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B11DB-87 | Battery Monitoring Module - Missing message |  NOTE: - Circuit BATTERY -<br>• 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<br>• 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 -<br>• Engine control module has detected the vehicle has crashed - event information DTC only | • Refer to the electrical circuit diagrams and check the engine control module to restraints 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 -<br>• Intake (A) camshaft position actuator (Bank 1) open circuit<br>• 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<br>• 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 -<br>• Intake (A) camshaft position actuator (Bank 1) open circuit<br>• 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<br>• 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 -<br>• Exhaust (B) camshaft position actuator (Bank 1) open circuit<br>• 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<br>• 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 -<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0016-00 | Crankshaft Position - Camshaft Position Correlation - Bank 1 Sensor A - No sub type information | NOTE: - Circuit VFS_EX_A -<br>• The relative positions of the crankshaft position sensor and cam timing plate teeth are not correct<br>• Engine timing incorrect<br>• Timing chain installed incorrectly<br>• 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 -<br>• The relative positions of the crankshaft position sensor and camshaft timing plate teeth are not correct<br>• Engine timing incorrect<br>• Timing chain installed incorrectly<br>• Variable valve timing forced fully advanced | • Check for related DTC P0365-00. Check engine timing. Check camshaft sensor timing plate is installed correctly. Check timing chain is installed correctly<br>• 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 |
| P0018-00 | Crankshaft Position - Camshaft Position Correlation - Bank 2 Sensor A - No sub type information | NOTE: - Circuit VFS_IN_B -<br>• The relative positions of the crankshaft position sensor and camshaft timing plate teeth are not correct<br>• Engine timing incorrect<br>• Timing chain installed incorrectly<br>• 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 -<br>• The relative positions of the crankshaft position sensor and camshaft timing plate teeth are not correct<br>• Engine timing incorrect<br>• Timing chain installed incorrectly<br>• Variable valve timing forced fully advanced | • Check engine timing. Check camshaft sensor timing plate is installed correctly. Check timing chain is installed correctly |
| P0020-13 | Intake (A) Camshaft Position Actuator (Bank 2) - Circuit open | NOTE: - Circuit VFS_IN_B -<br>• 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) - Circuit open | NOTE: - Circuit VFS_EX_B -<br>• Exhaust (B) Camshaft Position actuator (Bank 2) circuit, open circuit | • Refer to the electrical circuit diagrams and check exhaust (B) 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 -<br>• Intake valve solenoid 1 angle less than target<br>• 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 -<br>• Intake valve solenoid 1 angle greater than target<br>• Intake valve solenoid 1 not returning to target in time | • 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | • Intake valve solenoid 1 stuck advanced | a new module/component |
| P0027-72 | Exhaust Valve Control Solenoid Circuit Range/Performance (Bank 1) - Actuator stuck open | NOTE: - Circuit VFS_EX_A -<br>• Exhaust valve solenoid 1 angle less than target<br>• 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 -<br>• Exhaust valve solenoid 1 angle greater than target<br>• Exhaust valve solenoid 1 not returning to target in time<br>• 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 -<br>• Intake valve solenoid 2 angle less than target<br>• 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 -<br>• Intake valve solenoid 2 angle greater than target<br>• Intake valve solenoid 2 not returning to target in time<br>• 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 -<br>• Exhaust valve solenoid 2 angle less than target<br>• 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 -<br>• Exhaust valve solenoid 2 angle greater than target<br>• Exhaust valve solenoid 2 not returning to target in time<br>• Exhaust valve solenoid 2 stuck advanced | • 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 |
| P0031-11 | HO2S Heater Control Circuit Low (Bank 1, Sensor 1) - Circuit short to ground | NOTES:<br>- Circuit HTR_CTRL_A_UPSTREAM -<br>LR - Circuit UHEGO HEATER A -<br>• 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)<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0031-13 | HO2S Heater Control Circuit Low (Bank 1, Sensor 1) - Circuit open | NOTES:<br>  - Circuit HTR_CTRL_A_UPSTREAM -<br>  LR - Circuit UHEGO HEATER A -<br>• 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)<br>• 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:<br>  - Circuit HTR_CTRL_A_UPSTREAM -<br>  LR - Circuit UHEGO HEATER A -<br>• 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)<br>• 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 -<br>• Catalyst oxygen sensor heater circuit control fuse failure<br>• Post catalyst oxygen sensor-odd heater control circuit short circuit to ground, short circuit to power, open circuit<br>• Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit<br>• Catalyst oxygen sensor heater circuit control relay failure<br>• 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)<br>• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor-odd sensor fuse for open circuit<br>• 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<br>• 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<br>• 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 |
| P0051-11 | HO2S Heater Control Circuit Low (Bank 2, Sensor 1) - Circuit short to ground | NOTES:<br>  - Circuit HTR_CTRL_B_UPSTREAM -<br>  LR - Circuit UHEGO HEATER B -<br>• 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)<br>• 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:<br>  - Circuit HTR_CTRL_B_UPSTREAM -<br>  LR - Circuit UHEGO HEATER B - | • Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 2 Sensor 1 (0x03A4)<br>• Refer to the electrical circuit diagrams and check pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit for |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | • Pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit, open circuit | open circuit |
| P0052-12 | HO2S Heater Control Circuit High (Bank 2, Sensor 1) - Circuit short to battery | NOTES:<br>  - Circuit HTR_CTRL_B_UPSTREAM -<br>  LR - Circuit UHEGO HEATER B -<br>• Pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit short circuit to power | • Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 2 Sensor 1 (0x03A4)<br>• 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 power |
| P0054-00 | HO2S Heater Resistance (Bank 1, Sensor 2) - No sub type information | NOTES:<br>  - Circuit HTR_CTRL_A_UPSTREAM -<br>  LR - Circuit UHEGO HEATER A -<br>• Catalyst oxygen sensor heater circuit control fuse failure<br>• Post catalyst oxygen sensor-odd heater control circuit short circuit to ground, short circuit to power, open circuit, high resistance<br>• Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit<br>• Catalyst oxygen sensor heater circuit control relay failure<br>• 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)<br>• Refer to the electrical circuit diagrams and check post catalyst oxygen sensor-odd sensor fuse for open circuit<br>• 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<br>• 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<br>• 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 -<br>• Post catalyst oxygen sensor-even heater control circuit short circuit to ground, short circuit to power, open circuit<br>• Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit<br>• Catalyst oxygen sensor heater circuit control relay failure<br>• 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)<br>• 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<br>• 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<br>• 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:<br>  - Circuit HTR_CTRL_B_UPSTREAM - | • Using the manufacturer approved diagnostic system check datalogger signal, Oxygen Sensor (O2S) Heater Duty Cycle Bank 2 Sensor 2 (0x03A5) |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | LR - Circuit UHEGO HEATER B -<br>• Catalyst oxygen sensor heater circuit control fuse failure<br>• Post catalyst oxygen sensor-even heater control circuit short circuit to ground, short circuit to power, open circuit, high resistance<br>• Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit<br>• Catalyst oxygen sensor heater circuit control relay failure<br>• Post catalyst oxygen sensor-even failure | • Refer to the electrical circuit diagrams and check post catalyst oxygen sensor-even sensor fuse for open circuit<br>• 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, high resistance<br>• 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<br>• 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<br>• 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<br>• Refer to the electrical circuit diagrams and check manifold absolute pressure sensor circuit for short circuit to ground, short circuit to power, open circuit<br>• 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:<br>Jaguar - Circuit AMBIENT_TEMP_SENSOR -<br>LR - Circuit TAMB TEMP -<br>• Ambient air temperature sensor circuit short circuit to ground, short circuit to power, open circuit<br>• Temperature and manifold absolute pressure sensor circuit short circuit to ground, short circuit to power, open circuit<br>• Ambient air temperature sensor failure<br>• Temperature and manifold absolute pressure sensor failure | • Using the manufacturer approved diagnostic system check datalogger signal, Ambient Air Temperature Sensor Voltage (0x03BA)<br>• Refer to the electrical circuit diagrams and check ambient air temperature sensor circuit for short circuit to ground, short circuit to power, open circuit<br>• 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<br>• 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:<br>- Circuit AMBIENT_TEMP_SENSOR - | • Using the manufacturer approved diagnostic system check datalogger signal, Ambient Air Temperature Sensor Voltage (0x03BA)<br>• Refer to the electrical circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | LR - Circuit TAMB TEMP -<br>• Ambient air temperature sensor circuit short circuit to ground, short circuit to power, open circuit<br>• Temperature and manifold absolute pressure sensor circuit short circuit to ground, short circuit to power, open circuit<br>• Ambient air temperature sensor failure<br>• Temperature and manifold absolute pressure sensor failure | diagrams and check ambient air temperature sensor circuit for short circuit to ground, short circuit to power, open circuit<br>• 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<br>• 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:<br>- Circuit AMBIENT_TEMP_SENSOR -<br>LR - Circuit TAMB TEMP -<br>• Ambient air temperature sensor circuit short circuit to ground, open circuit, high resistance<br>• Ambient air temperature sensor failure | • Using the manufacturer approved diagnostic system check datalogger signal, Ambient Air Temperature Sensor Voltage (0x03BA)<br>• Refer to the electrical circuit diagrams and check ambient air temperature sensor circuit for short circuit to ground, open circuit, high resistance<br>• 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:<br>- Circuit AMBIENT_TEMP_SENSOR -<br>LR - Circuit TAMB TEMP -<br>• Ambient air temperature sensor ground circuit high resistance, open circuit<br>• Ambient air temperature sensor signal circuit short circuit to power<br>• Ambient air temperature sensor failure | • Using the manufacturer approved diagnostic system check datalogger signals Ambient Air Temperature Sensor Voltage (0x03BA)<br>• 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<br>• 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 -<br>• Charge air cooler temperature sensor circuit poor / intermittent connection<br>• Charge air cooler temperature sensor failure | • Using the manufacturer approved diagnostic system check datalogger signal, Charge Air Temperature Voltage (0x03EE)<br>• Refer to the electrical circuit diagrams and check charge air cooler temperature sensor circuit for poor, intermittent connection<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P007B-24 | Charge Air Cooler Temperature Sensor Circuit Range/Performance (Bank 1) - Signal stuck high | NOTE: Jaguar circuit reference IC_COOLANT_PMP_CTRL & BOOST_PRESS_SENSOR_TEMP_SIG. Land Rover circuit reference O_S_CACWPR & I_A_BTS<br>• Connector is disconnected, connector pin is backed out, connector pin corrosion<br>• Fuse failure<br>• Temperature and manifold absolute pressure sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance<br>• Temperature and manifold absolute pressure sensor failure<br>• Air charge coolant pump and control circuit, short circuit to ground, short circuit to power, open circuit, high resistance<br>• Air charge coolant pump relay failure<br>• Air charge coolant pump failure | • Inspect connectors for signs of water ingress, and pins for damage and/or corrosion<br>• Refer to electrical circuit diagrams and check for fuse failure, install new fuse as required<br>• 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<br>• Check and install a new temperature and manifold absolute pressure sensor as required<br>• 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<br>• Refer to electrical circuit diagrams and check the air charge coolant pump for open circuit, high resistance<br>• 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<br>• 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<br>• Connector is disconnected, connector pin is backed out, connector pin corrosion<br>• Fuse failure<br>• Temperature and manifold absolute pressure sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance<br>• Temperature and manifold absolute pressure sensor failure<br>• Air charge coolant pump and control circuit, short circuit to ground, short circuit to power, open circuit, high resistance<br>• Air charge coolant pump relay failure<br>• Air charge coolant pump failure | • Inspect connectors for signs of water ingress, and pins for damage and/or corrosion<br>• Refer to electrical circuit diagrams and check for fuse failure, install new fuse as required<br>• 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<br>• Check and install a new temperature and manifold absolute pressure sensor as required<br>• 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<br>• Refer to electrical circuit diagrams and check the air charge coolant pump for open circuit, high resistance<br>• 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<br>• Clear DTC and retest |
| P007C-00 | Charge Air Cooler Temperature Sensor Circuit Low (Bank 1) - No sub type information | NOTE: - Circuit TMAP_TEMP_SENSOR -<br>• Charge air cooler temperature sensor (Bank 1) circuit short circuit to ground, open circuit, high resistance<br>• 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<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P007D-00 | Charge Air Cooler Temperature Sensor Circuit High (Bank 1) - No sub type information | NOTE: - Circuit TMAP_TEMP_SENSOR -<br>• Charge air cooler temperature sensor (Bank 1) circuit short circuit to power, open circuit, high resistance<br>• 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 power, open circuit, high resistance<br>• 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 -<br>• Fuel rail pressure sensor circuit short circuit to ground, open circuit, high resistance<br>• Fuel rail pressure sensor failure<br>• Fuel lines leaking or restricted<br>• Fuel pump failure | • Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure Sensor - High Range Sensor Voltage (0x0377)<br>• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short circuit to ground, open circuit, high resistance<br>• Check for fuel pump related DTCs. Check fuel lines for leakage or restriction<br>• 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 -<br>• Fuel rail pressure sensor circuit short to each other, high resistance, short circuit to power<br>• Fuel rail pressure sensor failure | • Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure Sensor - High Range Sensor Voltage (0x0377)<br>• Refer to the electrical circuit diagrams and check fuel rail pressure sensor circuit for short to each other, high resistance, short circuit to power<br>• 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 -<br>• Low pressure fuel sensor circuit failure, short circuit to ground, short circuit to power, open circuit<br>• Fuel pump driver module circuit short circuit to ground, short circuit to power, open circuit<br>• Low pressure fuel<br>• Fuel pump driver module failure | • Using the manufacturer approved diagnostic system check datalogger signal, Fuel Rail Pressure - Low Range Sensor Voltage (0x0376)<br>• Check fuel system for leakage<br>• Refer to the electrical circuit diagrams and check low pressure fuel sensor circuit for short circuit to ground, short circuit to power, open circuit<br>• Refer to the electrical circuit diagrams and check fuel pump driver module circuit short circuit to ground, short circuit to power, open circuit<br>• 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 |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Front Seat Climate Control Module (DCSM)

Description and Operation

## Front Seat Climate Control Module (DCSM)

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, 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 seat climate control module, for additional diagnosis and testing information refer to the relevant diagnosis and testing section.
For additional information, refer to: Seats (501-10 Seating, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B10B9-13 | Blower Control - Circuit open | • Connectors disconnected or connector pin damage<br>• Seat blower left circuit - Open circuit<br>• Blower motor assembly - Short circuit to ground<br>• Front seat climate control module failure | • Check for any disconnected connectors or damaged connector pins<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_FANS_RTN, Circuit reference LH_FANS_PWR - For open circuit. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B10B9-4B | Blower Control - Over temperature | • Mechanical restriction in blower motor assembly<br>• Seat blower left circuit - Short circuit to ground<br>• Blower motor assembly - Short circuit to ground<br>• Front seat climate control module failure | • Check for mechanical restriction or debris in seat blower<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_FANS_RTN, Circuit reference LH_FANS_PWR - For short circuit to ground. Repair circuit as required, clear DTC and retest |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | • Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1157-13 | Blower Control "B" - Circuit open | • Connectors disconnected or connector pin damage<br>• Seat blower right circuit - Open circuit<br>• Blower motor assembly - Open circuit<br>• Front seat climate control module failure | • Check for any disconnected connectors or damaged connector pins<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_FANS_RTN, Circuit reference RH_FANS_PWR - For open circuit. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1157-4B | Blower Control "B" - Over temperature | • Mechanical restriction in blower motor assembly<br>• Seat blower right circuit - Short circuit to ground<br>• Blower motor assembly - Short circuit to ground<br>• Front seat climate control module failure | • Check for mechanical restriction or debris in seat blower<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_FANS_RTN, Circuit reference RH_FANS_PWR - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B120E-13 | Right Thermal Electric Device Control - Circuit open | • Connectors disconnected or connector pin damage<br>• Seat backrest thermal electric device right circuit - Open circuit<br>• Seat cushion thermal electric device right circuit - Open circuit<br>• Front seat climate control module failure | • Check for any disconnected connectors or damaged connector pins<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_SEAT_BACK_TED+, Circuit reference RH_SEAT_BACK_TED- - For open circuit. Repair circuit as required, clear DTC and retest<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_CUSHION_TED+, Circuit reference RH_CUSHION_TED- - For open circuit. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B120E-19 | Right Thermal Electric Device Control - Circuit current above threshold | • Seat backrest thermal electric device right circuit - Short circuit to ground<br>• Seat cushion thermal electric device right circuit - Short circuit to ground<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_SEAT_BACK_TED+, Circuit reference RH_SEAT_BACK_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_CUSHION_TED+, Circuit reference RH_CUSHION_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | tests associated with this DTC using the manufacturer approved diagnostic system |
| B120E-4B | Right Thermal Electric Device Control - Over temperature | • Restriction in thermal electric device air path<br>• Seat backrest thermal electric device right circuit - Short circuit to ground<br>• Seat cushion thermal electric device right circuit - Short circuit to ground<br>• Front seat climate control module failure | • Check for blockage or restriction in thermal electric device air path<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_SEAT_BACK_TED+, Circuit reference RH_SEAT_BACK_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_CUSHION_TED+, Circuit reference RH_CUSHION_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B120F-98 | Left Seat Cushion - Component or system over temperature | • Blocked or restricted thermal electric device fan exhaust vent<br>• Restricted thermal electric device fan movement | • Check for blockage or restriction in thermal electric device fan exhaust vent<br>• Check for restricted thermal electric device fan movement<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1223-13 | Right Seat Cushion Temperature Sensor - Circuit open | • Connectors disconnected or connector pin damage<br>• Seat cushion temperature sensor right circuit - Open circuit<br>• Front seat climate control module failure | • Check for any disconnected connectors or damaged connector pins<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_CUSHION_SENSOR, Circuit reference RH_CUSHION_SENSOR_RTN - For open circuit. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1224-13 | Left Thermal Electric Device Control - Circuit open | • Connectors disconnected or connector pin damage<br>• Seat backrest thermal electric device left circuit - Open circuit<br>• Seat cushion thermal electric device left circuit - Open circuit<br>• Front seat climate control module failure | • Check for any disconnected connectors or damaged connector pins<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_SEAT_BACK_TED+, Circuit reference LH_SEAT_BACK_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_CUSHION_TED+, Circuit reference LH_CUSHION_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1224-19 | Left Thermal Electric Device Control - Circuit current above threshold | • Seat backrest thermal electric device left circuit - Short circuit to ground<br>• Seat cushion thermal electric device left circuit - Short circuit to ground<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_SEAT_BACK_TED+, Circuit reference LH_SEAT_BACK_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_CUSHION_TED+, Circuit reference LH_CUSHION_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1224-4B | Left Thermal Electric Device Control - Over temperature | • Restriction in thermal electric device air path<br>• Seat backrest thermal electric device left circuit - Short circuit to ground<br>• Seat cushion thermal electric device left circuit - Short circuit to ground<br>• Front seat climate control module failure | • Check for blockage or restriction in thermal electric device air path<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_SEAT_BACK_TED+, Circuit reference LH_SEAT_BACK_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_CUSHION_TED+, Circuit reference LH_CUSHION_TED- - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1225-13 | Right Seat Back Temperature Sensor - Circuit open | • Connectors disconnected or connector pin damage<br>• Seat backrest temperature sensor right circuit - Open circuit<br>• Front seat climate control module failure | • Check for any disconnected connectors or damaged connector pins<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_SEAT_BACK_SENSOR, Circuit reference RH_SEAT_BACK_SENSOR_RTN - For open circuit. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1229-13 | Left Seat Back Temperature Sensor - Circuit open | • Connectors disconnected or connector pin damage<br>• Seat backrest temperature sensor left circuit - Open circuit<br>• Front seat climate control module failure | • Check for any disconnected connectors or damaged connector pins<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_SEAT_BACK_SENSOR, Circuit reference LH_SEAT_BACK_SENSOR_RTN - For open circuit. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B122A-11 | Right Seat Cushion Blower Speed Sensor - Circuit short to ground | • Seat cushion blower speed right circuit - Short circuit to ground<br>• Blower motor assembly - Short circuit to ground<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_CUSHION_FAN_SPEED - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B122A-12 | Right Seat Cushion Blower Speed Sensor - Circuit short to battery | • Seat cushion blower speed right circuit - Short circuit to power<br>• Blower motor assembly - Short circuit to power<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_CUSHION_FAN_SPEED - For short circuit to power. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B122B-11 | Right Seat Back Blower Speed Sensor - Circuit short to ground | • Seat backrest blower speed right circuit - Short circuit to ground<br>• Blower motor assembly - Short circuit to ground<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_SEAT_BACK_FAN_SPEED - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B122B-12 | Right Seat Back Blower Speed Sensor - Circuit short to battery | • Seat backrest blower speed right circuit - Short circuit to power<br>• Blower motor assembly - Short circuit to power<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference RH_SEAT_BACK_FAN_SPEED - For short circuit to power. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B122C-11 | Left Seat Cushion Blower Speed Sensor - Circuit short to ground | • Seat cushion blower speed left circuit - Short circuit to ground<br>• Blower motor assembly - Short circuit to ground<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_CUSHION_FAN_SPEED - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B122C-12 | Left Seat Cushion Blower Speed Sensor - Circuit short to battery | • Seat cushion blower speed left circuit - Short circuit to power<br>• Blower motor assembly - Short circuit to power<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_CUSHION_FAN_SPEED - For short circuit to power. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B122D-11 | Left Seat Back Blower Speed Sensor - Circuit short to ground | • Seat backrest blower speed left circuit - Short circuit to ground<br>• Blower motor assembly - Short circuit to ground<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_SEAT_BACK_FAN_SPEED - For short circuit to ground. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B122D-12 | Left Seat Back Blower Speed Sensor - Circuit short to battery | • Seat backrest blower speed left circuit - Short circuit to power<br>• Blower motor assembly - Short circuit to power<br>• Front seat climate control module failure | • Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_SEAT_BACK_FAN_SPEED - For short circuit to power. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B122E-98 | Right Seat Cushion - Component or system over temperature | • Blocked or restricted thermal electric device fan exhaust vent<br>• Restricted thermal electric device fan movement | • Check for blockage or restriction in thermal electric device fan exhaust vent<br>• Check for restricted thermal electric device fan movement<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B122F-98 | Right Seat Back - Component or system over temperature | • Blocked or restricted thermal electric device fan exhaust vent<br>• Restricted thermal electric device fan movement | • Check for blockage or restriction in thermal electric device fan exhaust vent<br>• Check for restricted thermal electric device fan movement<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1230-98 | Left Seat Back - Component or system over temperature | • Blocked or restricted thermal electric device fan exhaust vent<br>• Restricted thermal electric device fan movement | • Check for blockage or restriction in thermal electric device fan exhaust vent<br>• Check for restricted thermal electric device fan movement<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1231-7A | Right Seat - Fluid leak or seal failure | • Seat backrest assembly - Air path leaking<br>• Seat cushion assembly - Air path leaking<br>• Seat assembly damaged | • Check for blockage or restriction in seat backrest/seat cushion thermal electric device fan ducts<br>• Check seat backrest/seat cushion thermal electric device fan exhaust vent is clear<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1232-7A | Left Seat - Fluid leak or seal failure | • Seat backrest assembly - Air path leaking<br>• Seat cushion assembly - Air path leaking<br>• Seat assembly damaged | • Check for blockage or restriction in seat backrest/seat cushion thermal electric device fan ducts<br>• Check seat backrest/seat cushion thermal electric device fan exhaust vent is clear<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1235-13 | Left Seat Cushion Temperature Sensor - Circuit open | • Connectors disconnected or connector pin damage<br>• Seat cushion temperature sensor left circuit - Open circuit<br>• Front seat climate control module failure | • Check for any disconnected connectors or damaged connector pins<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm the fault is present<br>• Refer to the electrical circuit diagrams and check the front seat climate control module - Circuit reference LH_CUSHION_SENSOR, Circuit reference LH_CUSHION_SENSOR_RTN - For open circuit. Repair circuit as required, clear DTC and retest<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Alternatively, carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U0010-88 | Medium Speed CAN Communication Bus - Bus off | • Medium speed CAN communication - Bus off | • Refer to the electrical circuit diagrams and check the power and ground connections to the module<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification |
| U0140-00 | Lost Communication With Body Control Module - No sub type information | • Lost communication with central junction box | NOTE: This DTC may be stored even though no fault condition is present and should be ignored unless the customer has reported a climate seat concern. Clear the DTC and retest. Verify the customer concern prior to diagnosis<br>• Refer to the electrical circuit diagrams and check the power and ground connections to the module<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• Refer to the electrical circuit diagrams and check the CAN network between the front seat climate control module and central junction box<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification |
| U0142-00 | Lost Communication With Body Control Module "B" - No sub type information | • Lost communication with rear junction box | • Refer to the electrical circuit diagrams and check the power and ground connections to the module<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• Refer to the electrical circuit diagrams and check the CAN network between the front seat climate control module and rear junction box<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U0155-00 | Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information | • Lost communication with instrument cluster | • Refer to the electrical circuit diagrams and check the power and ground connections to the module<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• Refer to the electrical circuit diagrams and check the CAN network between the front seat climate control module and instrument cluster<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification |
| U0156-00 | Lost Communication With Information Center "A" - No sub type information | • Lost communication with rear seat entertainment control module | • Refer to the electrical circuit diagrams and check the power and ground connections to the module<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• Refer to the electrical circuit diagrams and check the CAN network between the front seat climate control module and rear seat entertainment control module<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification |
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • Software stored in front seat climate control module is not compatible with master configuration | • Check the front seat climate control module is configured correctly<br>• Reconfigure the front seat climate control module using the manufacturer approved diagnostic system. Clear the DTC and retest the system<br>• Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification |
| U0401-00 | Invalid Data Received From ECM/PCM - No sub type information | • The engine control module has transmitted engine speed quality factor CAN signal at a specific value for a greater than expected time period | • Check the engine control module for related DTCs and refer to the relevant DTC index<br>• On software levels previous to 8X23-14B663-AE clear the DTC and take no further action if the system is operating correctly |
| U2101-00 | Control module Configuration Incompatible - No sub type information | • Compatible central car configuration file not received by front seat climate control module | • Using the manufacturer approved diagnostic system check and update the car configuration file as required. Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification. Clear the DTC and retest |
| U3000-04 | Control Module - System internal failures | • Front seat climate control module - Internal failure | • Check and install new front seat climate control module as required. Carry out on demand self test using manufacturer approved diagnostic system to confirm rectification |
| U3003-62 | Battery Voltage - Signal compare failure | • Wiring harness fault<br>• Battery internal failure<br>• Charging system fault | • Refer to the electrical circuit diagrams and check the power and ground connections to the front seat climate control module and the central junction box<br>• Refer to the battery care manual and verify that the vehicle battery is fully charged and serviceable before continuing with further diagnostic tests<br>• Check the vehicle charging system |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Headlamp Control Module (HCM)

Description and Operation

## Headlamp Leveling Control Module (HLCM)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Headlamp Leveling Control Module (HLCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Headlamps (417-01 Exterior Lighting, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1041-04 | Leveling Control - System internal failures | • Module internal failure | • Suspect Headlamp Leveling Module internal fault. Replace as required, refer to the new module/component installation note at the top of the DTC Index |
| B1041-54 | Leveling Control - Missing calibration | NOTE: This DTC will normally be logged when a new module has been installed.<br>• Leveling sensor calibration routine not carried out | NOTE: Sensor calibration routine must be carried out with the vehicle unladen.<br>• Calibrate the Headlamp Leveling Sensors using the manufacturer approved diagnostic system, carry the out routine 'Headlamp Control Module System Calibration' from the 'Module programming and configuration - Setup and Configuration - Lighting' |
| B10AE-11 | Headlamp Leveling Motor - Circuit short to ground | • Headlamp Leveling Motor Control Circuit - short to ground | • 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 Leveling Motor Control Circuit - short to power | • Refer to the electrical circuit diagrams and check Headlamp Leveling Motor Control Circuit for short to power |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B10AE-64 | Headlamp Leveling Motor - Signal plausibility failure | • Signal plausibility failure voltage out of range | • Refer to the electrical circuit diagrams and check the Headlamp Leveling Motor circuits for failure. Disconnect one headlamp connector, clear DTC and re-test. If DTC cleared, suspect Headlamp Leveling Module or circuits to the disconnected side. If DTC remains, reconnect first headlamp and disconnect second, clear DTC and re-test. If DTC cleared, suspect Headlamp Leveling Module or circuits to the disconnected side. 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 Leveling Sensor 5 volt supply circuit short to ground | • Refer to electrical circuit diagrams and check Headlamp Leveling Sensor 5 volt supply circuit for short to ground |
| B1A59-12 | Sensor 5 Volt Supply - General electrical failure | • Headlamp Leveling Sensor 5 volt supply circuit short to power | • Refer to electrical circuit diagrams and check Headlamp Leveling Sensor 5 volt supply circuit for short to power |
| C1A04-11 | Right Front Height Sensor - Circuit short to ground | • Right front Height Sensor circuit short to ground | • Refer to the electrical circuit diagrams, and check Right Front Height Sensor circuit for short to ground |
| C1A04-15 | Right Front Height Sensor - Circuit short to battery or open | • Right front Height Sensor circuit short to power or open circuit | • Check Right Front Height Sensor connector for security. Refer to the electrical circuit diagrams, and check Right Front Height Sensor circuit for short to power or open circuit |
| C1A04-64 | Right Front Height Sensor - Signal plausibility failure | • Sensor (PWM) Signal out of range | NOTE: This DTC may be logged if the vehicles wheels have been raised from the floor<br>• Check the location, security and mechanical operation of the Height Sensor. Refer to the electrical circuit diagrams, and check Right Front Height Sensor signal circuit for fault |
| C1A06-11 | Right Rear Height Sensor - Circuit short to ground | • Right rear Height Sensor circuit short to ground | • Refer to the electrical circuit diagrams, and check Right Rear Height Sensor circuit for short to ground |
| C1A06-15 | Right Rear Height Sensor - Circuit short to battery or open | • Right rear Height Sensor circuit short to power or open circuit | • Check Right Rear Height Sensor connector for security. Refer to the electrical circuit diagrams, and check Right Rear Height Sensor circuit for short to power or open circuit |
| C1A06-64 | Right Rear Height Sensor - Signal plausibility failure | • Sensor (PWM) Signal out of range | NOTE: This DTC may be logged if the vehicles wheels have been raised from the floor<br>• Check the location, security and mechanical operation of the Height Sensor. Refer to the electrical circuit diagrams, and check Right Rear Height Sensor signal circuit for fault |
| U0001-88 | High Speed CAN Communication Bus - Bus off | • CAN Bus Off<br>• CAN Bus Circuit fault | • Check other modules for stored DTCs. Carry out the CAN Network Integrity test using the manufacturer approved diagnostic system |
| U0101-00 | Lost Communication with TCM - No sub type information | • Lost communication with the Transmission Control Module<br>• CAN network fault | • Check the Transmission Control Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Transmission Control Module |
| U0121-00 | Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information | • Lost communication with the Anti-lock Brake System Module<br>• CAN network fault | • Check the Anti-lock Brake System Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Anti-lock Brake System Module |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • Car Configuration File (CCF) information incompatible to Headlamp Leveling Module | • Check/amend the Car Configuration File (CCF) using the manufacturer approved diagnostic system. Confirm the latest Strategy and Calibration software is installed in the Headlamp Leveling Module, using the manufacturer approved diagnostic system update the Headlamp Leveling Module software as required. If DTC returns suspect an internal fault with the Headlamp Leveling Module Replace as required, refer to the new module/component installation note at the top of the DTC Index |
| U0415-00 | Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - No sub type information |  NOTE: Steering angle sensor not calibrated<br>• Invalid data received from ABS module |  NOTE: The steering wheel center (straight ahead) position is recalculated each ignition cycle<br>• Clear the DTC then cycle the ignition state to off then on. Carry out a short road test to calibrate the Steering Wheel Angle Sensor. If DTC returns, check the Anti-lock Brake System Module for related DTCs and refer to relevant DTC Index |
| U2100-00 | Initial Configuration Not Complete - No sub type information | • Car Configuration File (CCF) information not received completely |  NOTE: The Car Configuration File (CCF) parameters required are (Vehicle type)(Headlamp type)(Gearbox type) and (Dayrunning light)<br>• Check/amend Car Configuration File (CCF) as required using the manufacturer approved diagnostic system. Using the manufacturer approved diagnostic system, clear the stored DTC then cycle the Ignition State to off, wait 30 seconds. Return the Ignition state to on and check for stored DTCs, if the DTC returns check other modules for related stored DTCs. If no other modules have related DTCs confirm the security and condition of the Headlamp Leveling Module circuit connections. If no other DTCs are stored and the circuit is correct suspect an internal fault with the Headlamp Leveling Module Replace as required, refer to the new module/component installation note at the top of the DTC Index |
| U2101-00 | Control Module Configuration Incompatible - No sub type information | • Car Configuration File (CCF) information incompatible to Headlamp Leveling Module |  NOTE: The Car Configuration File (CCF) parameters required are (Vehicle type)(Headlamp type)(Gearbox type) and (Dayrunning light)<br>• Check/amend Car Configuration File (CCF) as required using the manufacturer approved diagnostic system |
| U3002-81 | Vehicle Identification Number - Invalid serial data received | • The stored Vehicle Identification Number is not the same as the Central Broadcast Vehicle Identification Number<br>• The Headlamp Leveling Module has previously been installed to another vehicle | • Check the correct Headlamp Leveling Module is installed to vehicle specification. Refit original or replace the module as required. Refer to the new module/component installation note at the top of the DTC Index |
| U3003-16 | Battery Voltage - Circuit voltage below threshold | • The power supply to the Module has been below 9 Volts for more than 1000 milliseconds | • Suspect Battery or Charging fault. Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section. Clear the DTC, cycle ignition state to off then on, if DTC returns refer to the electrical circuit diagrams and check power and ground circuit to the Headlamp Leveling Module |
| U3003-17 | Battery Voltage - Circuit voltage above threshold | • The power supply to the Module has been above 16 Volts for more than 1000 milliseconds | • Suspect Charging fault. Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U3003-62 | Battery Voltage - Signal compare failure | • Difference in battery voltage, of 2 volts or more, between the central broadcast voltage (via CAN Bus) and Headlamp Leveling Module | • Check other modules for related stored DTCs. Refer to the electrical circuit diagrams and check power and ground voltages at the Headlamp Leveling Module |
| U0428-00 | Invalid Data Received From Steering Angle Sensor Module - No sub type information |  NOTE: Steering Angle Sensor not calibrated<br>• Invalid Data Received from the Steering Angle Sensor Module | • Check the Steering Angle Sensor Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Transmission Control Module |
| U0402-00 | Invalid Data Received From Transmission Control Module - No sub type information | • Invalid Data Received from the Transmission Control Module<br>• Transmission component fault | • Check the Transmission Control Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Transmission Control Module |
| U0126-00 | Lost Communication With Steering Angle Sensor Module - No sub type information | • Lost communication with the Steering Angle Sensor Module<br>• CAN network fault | • Check the Steering Angle Sensor Module for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Steering Angle Sensor |
| U0142-00 | Lost Communication With Body Control Module "B" - No sub type information | • Lost communication with the Auxiliary Junction Box<br>• CAN network fault | • Check the Auxiliary Junction Box for stored DTCs. Using the manufacturer approved diagnostic system, complete the CAN Network Integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Leveling Module and the Auxiliary Junction Box |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Instrument Cluster (IPC)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Instrument Cluster (IC). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1008-11 | Wiper Mode Switch - Circuit short to ground | • Master wiper switch circuit - short to ground | • Refer to the electrical circuit diagrams and check master wiper switch circuit for short to ground |
| B1008-15 | Wiper Mode Switch - Circuit short to battery or open | • Master wiper switch circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check master wiper switch circuit for short to power, open circuit |
| B1009-51 | Ignition Authorisation - Not programmed | • Instrument cluster power and ground supply circuits - short, open circuit<br>• Target SID synchronization error following re-programming<br>• CAN fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check instrument cluster power and ground supply circuits for short, open circuit. Perform the Immobilisation application from the Set-up menu using the manufacturer approved diagnostic system. Check CAN communications between instrument cluster and tester |
| B1009-62 | Ignition Authorisation - Signal compare failure | • LS CAN fault<br>• CJB ignition, power and ground supply circuits - short, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check CAN communications between CJB and instrument cluster. Refer to the |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | • Instrument cluster power and ground supply circuits - short, open circuit<br>• Incorrect CJB or instrument cluster installed<br>• Target SID synchronization error following re-programming<br>• Noise/EMC related error | electrical circuit diagrams and check CJB ignition, power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check correct CJB and instrument cluster installed. Perform the Immobilisation application from the Set-up menu using the manufacturer approved diagnostic system. Check CAN network for interference/EMC related issues |
| B1009-87 | Ignition Authorisation - Missing message | • CJB ignition, power and ground supply circuits - short, open circuit<br>• LS CAN fault<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Low battery voltage <9 volts | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check CJB ignition, power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check CAN communications between CJB and instrument cluster. Check battery is in serviceable condition and fully charged |
| B100A-62 | Fuel Pump Authorisation - Signal compare failure | • LS CAN fault<br>• RJB power and ground supply circuits - short, open circuit<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Incorrect RJB or instrument cluster installed<br>• Target SID synchronization error following re-programming<br>• Noise/EMC related error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check CAN communications between RJB and instrument cluster. Refer to the electrical circuit diagrams and check RJB power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check correct RJB and instrument cluster installed. Perform the Immobilisation application from the Set-up menu using the manufacturer approved diagnostic system. Check CAN network for interference/EMC related issues |
| B100A-64 | Fuel Pump Authorisation - Signal plausibility failure | • Target SID synchronization error following re-programming<br>• RJB power and ground supply circuits - short, open circuit<br>• LS CAN fault | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Perform the Immobilisation application from the Set-up menu using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check RJB power and ground supply circuits for short, open circuit. Check CAN communications between RJB and instrument cluster |
| B100A-87 | Fuel Pump Authorisation - Missing message | • RJB power and ground supply circuits - short, open circuit<br>• LS CAN fault<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Low battery voltage <9 volts | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check RJB power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check CAN communications between RJB and instrument cluster. Check battery is in serviceable condition and fully charged |
| B100B-67 | Column Lock Ground Authorisation - Signal incorrect after event | • Algorithm based failure-signal is incorrect after the event<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• LS CAN fault<br>• RJB power and ground supply circuits - short, open circuit<br>• Vehicle speed present when attempting to power ESCL<br>• Engine speed present when attempting to power ESCL<br>• PowerMode status > 4 when attempting to perform lock action | • If a non start issue has not been identified, clear the DTC and check vehicle starts correctly. If a non start issue has been identified run the manufacturers approved diagnostic system Start Authorisation Application. Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check RJB power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check CAN communications between RJB and instrument cluster. Check for invalid vehicle speed signal from ABS/instrument cluster gateway. Check for invalid engine speed signal from ECM/instrument cluster gateway. Check for invalid signal from CJB |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B100B-87 | Column Lock Ground Authorisation - Missing message | • Instrument cluster power and ground supply circuits - short, open circuit<br>• LS CAN fault<br>• RJB power and ground supply circuits - short, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check RJB power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check CAN communications between RJB and instrument cluster |
| B100C-67 | Column Lock Supply Authorisation - Signal incorrect after event | • Instrument cluster power and ground supply circuits - short, open circuit<br>• LS CAN fault<br>• CJB power and ground supply circuits - short, open circuit<br>• Vehicle speed present when attempting to power ESCL<br>• Engine speed present when attempting to power ESCL<br>• PowerMode status > 4 when attempting to perform lock action | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check CJB power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check CAN communications between CJB and instrument cluster. Check for invalid vehicle speed signal from ABS/instrument cluster gateway. Check for invalid engine speed signal from ECM/instrument cluster gateway. Check for invalid signal from CJB |
| B100C-87 | Column Lock Supply Authorisation - Missing message | • Instrument cluster power and ground supply circuits - short, open circuit<br>• LS CAN fault<br>• CJB power and ground supply circuits - short, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check CJB power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check CAN communications between CJB and instrument cluster |
| B100D-62 | Column Lock Authorisation - Signal compare failure | • CAN fault<br>• ESCL power and ground supply circuits - short, open circuit<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Incorrect ESCL or instrument cluster installed<br>• Target SID synchronization error following re-programming<br>• Noise/EMC related error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check CAN communication between Electronic Steering Column Lock and instrument cluster. Refer to the electrical circuit diagrams and check Electronic Steering Column Lock power and ground supply circuits for short, open circuit and Instrument cluster power and ground supply circuits for short, open circuit. Check correct Electronic Steering Column Lock and instrument cluster installed. Perform the Immobilisation application from the Set-up menu using the manufacturer approved diagnostic system. Check CAN network for interference/EMC related issues |
| B100D-64 | Column Lock Authorisation - Signal plausibility failure | • Algorithm based failure-signal plausibility failure<br>• CAN fault<br>• ESCL power and ground supply circuits - short, open circuit<br>• Instrument cluster power and ground supply circuits - short, open circuit | • If the customer has not reported a non start issue, clear the DTC and check vehicle starts correctly. If a non start issue has been reported run the manufacturers approved diagnostic system Start Authorisation Application and follow the actions required for this DTC. Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check CAN communication between Electronic Steering Column Lock and instrument cluster (check transmission out speed, vehicle speed, engine speed, gear position and powermode signals to Electronic Steering Column Lock). Refer to the electrical circuit diagrams and check Electronic Steering Column Lock power and ground supply circuits for short, open circuit and Instrument cluster power and ground supply circuits for short, open circuit |
| B100D-87 | Column Lock Authorisation - Missing message - Missing message | • Missing message<br>• CAN fault<br>• No response from electric steering column lock control module, instrument cluster, central junction box | • Clear DTC, repeatedly lock and unlock car using the key fob and retest. Check for related DTCs and refer to the relevant DTC index<br>• If the fault is cleared, notify the customer that the steering column lock may fail to unlock if the vehicle is parked with a high steering angle or |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | • Battery voltage at electric steering column lock control module too low<br>• Electric steering column lock control module, instrument cluster, central junction box fault | with the road wheel against a curb. If the column lock is failing to disengage, the customer may be able to rectify this by rotating the steering wheel while pressing the engine start button<br>• If fault persists, complete a CAN network integrity test using the manufacturers approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and check CAN circuits between the central junction box, the instrument cluster and the electronic steering column lock. Refer to the electrical circuit diagrams and check the central junction box, the instrument cluster and the electronic steering column lock power and ground supply circuits for short circuit to ground, short circuit to power, open circuit, high resistance. Repair circuit(s) as required. Clear DTC, perform an on demand self-test and retest<br>• If fault persists, check that the vehicle battery supply voltage is between 9-16 volts. Rectify as required |
| B100D-96 | Column Lock Authorisation - Component internal failure | • Battery voltage at electric steering column lock control module too low<br>• Torque load on steering column<br>• CAN fault<br>• Electric steering column lock control module - Internal failure | • Clear DTC, repeatedly lock and unlock car using the key fob and retest<br>• If fault persists, check that the vehicle battery supply voltage is between 9-16 volts. Rectify as required<br>• Ensure 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). Clear DTC, repeatedly lock and unlock car using the key fob and retest<br>• If fault persists, complete a CAN network integrity test using the manufacturers approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and check CAN circuits between the central junction box, the instrument cluster and the electronic steering column lock. Refer to the electrical circuit diagrams and check the central junction box, the instrument cluster and the electronic steering column lock power and ground supply circuits for short circuit to ground, short circuit to power, open circuit, high resistance. Repair circuit(s) as required. Clear DTC, perform an on demand self-test and retest<br>• If fault persists, check and install a new electric steering column lock control module as required |
| B1024-87 | Start Control Unit - Missing message | • Smart card docking station failure - slave node not responding | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check the smart card docking station LIN circuit for short, open circuit. Suspect the smart card docking station, check and install a new docking station as required, refer to the new module/component installation note at the top of the DTC Index |
| B1046-11 | Front Fog Lamp Control Switch - Circuit short to ground | • Fog lamp switch circuit - short to ground | • Refer to the electrical circuit diagrams and check fog lamp switch circuit for short to ground |
| B1046-15 | Front Fog Lamp Control Switch - Circuit short to battery or open | • Fog lamp switch circuit - short to power, open circuit | • Refer to the electrical circuit diagrams and check fog lamp switch circuit for short to power, open circuit |
| B1048-11 | Brake Fluid Level Switch - Circuit short to ground | • Brake fluid level switch circuit - short to ground | • Refer to the electrical circuit diagrams and check brake fluid level switch circuit for short to ground |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B10A0-11 | Wiper/ Washer Switch - Circuit short to ground | • Wash/wipe circuit - short to ground | • Refer to the electrical circuit diagrams and check wash/wipe circuit for short to ground |
| B10A0-15 | Wiper/ Washer Switch - Circuit short to battery or open | • Wash/wipe circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check wash/wipe circuit for short to power, open circuit |
| B10A6-11 | Main Light Switch - Circuit short to ground | • Master lighting switch circuit - short to ground | • Refer to the electrical circuit diagrams and check master lighting switch circuit for short to ground |
| B10A6-15 | Main Light Switch - Circuit short to battery or open | • Master lighting switch circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check master lighting switch circuit for short to power, open circuit |
| B112B-87 | Steering Wheel Module - Missing message | • Steering wheel module failure - slave node not responding | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check the clockspring LIN circuit for short, open circuit. Suspect the clockspring, check and install a new clockspring as required, refer to the new module/component installation note at the top of the DTC Index |
| B115C-7A | Transfer Fuel Pump - Fluid leak or seal failure | • Fuel pump system fault | • Check for fuel system jet pump or jet pump fuel level sensor fault |
| B1A85-15 | Ambient Light Sensor - Circuit short to battery or open | • Autolamp sensor circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check autolamp sensor circuit for short to power, open circuit |
| B1B01-00 | Key Transponder - No sub type information | • Operator only cycles one key<br>• During transponder key programming the instrument cluster, smartcard docking station or key loses power/circuit failure<br>• Faulty key during key programming<br>• Unable to program transponder key due to noise/EMC related error | • Ensure all keys to be programmed are available. Refer to electrical circuit diagrams and check power and ground supply circuits to all relevant modules. Replace faulty key and repeat key programming. Check CAN network for interference/EMC related issues |
| B1B01-05 | Key Transponder - System programming failures | • Error following SCU replacement<br>• Smartcard docking station power and ground supply circuits - short, open circuit<br>• LIN fault<br>• Instrument cluster power and ground supply circuits - short, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Perform the Immobilisation application from the Set-up menu using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check smartcard docking station power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check LIN communications between smartcard docking station and instrument cluster |
| B1B01-51 | Key Transponder - Not programmed | • LIN fault<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Key fault<br>• Smartcard docking station power and ground supply circuits - short, open circuit<br>• Attempted to program a non | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check LIN communications between smartcard docking station and instrument cluster. Refer to the electrical circuit diagrams and check smartcard docking station power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Confirm |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | default key | transponder key operation. Ensure new keys are from a known source |
| B1B01-55 | Key Transponder - Not configured | • Un-programmed key inserted in SCU2<br>• A non default key inserted during key programming | • Confirm the correct keys are used |
| B1B01-62 | Key Transponder - Signal compare failure | • Instrument cluster power and ground supply circuits - short, open circuit<br>• Smartcard docking station power and ground supply circuits - short, open circuit<br>• Incorrect instrument cluster or smartcard docking station installed<br>• Error during or following the Write Target SID routine<br>• Noise/EMC related error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check smartcard docking station power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check correct instrument cluster and smartcard docking station are installed. Perform the Immobilisation application from the Set-Up menu using the manufacturer approved diagnostic system. Check CAN network for interference/EMC related issues |
| B1B01-64 | Key Transponder - Signal plausibility failure | • LIN fault<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Transponder key fault<br>• Smartcard docking station power and ground supply circuits - short, open circuit<br>• Error occurred during transponder key programming | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check LIN communications between smartcard docking station and instrument cluster. Refer to the electrical circuit diagrams and check smartcard docking station power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Confirm transponder key operation. Repeat transponder key programming |
| B1B01-67 | Key Transponder - Signal incorrect after event | • LIN fault<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Transponder key fault<br>• Smartcard docking station power and ground supply circuits - short, open circuit<br>• Another key in close proximity<br>• Instrument cluster in incorrect programming state<br>• Attempted to program a non default key<br>• Instrument cluster Cold init whilst in Ignition On state, without key being present in the SCU<br>• Race condition caused by closing driver door and pressing the start button within a small time window<br>• Passive Key search function from last door closed and key inserted in the SCU | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check LIN communications between smartcard docking station and instrument cluster. Refer to the electrical circuit diagrams and check smartcard docking station power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Confirm transponder key operation. Confirm single key operation. Ensure instrument cluster in correct mode i.e. Auto Enable, Key erase etc. Ensure new keys are from a known source. Check for intermittent power and ground to instrument cluster. Design condition - advise customer of starting sequence. Design condition - determine customer transponder key usage |
| B1B01-87 | Key Transponder - Missing message | • LIN fault<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Smartcard docking station power and ground supply circuits - short, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check LIN communications between smartcard docking station and instrument cluster. Refer to the electrical circuit diagrams and check smartcard docking station power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit |
| B1B33-05 | Target I.D. Transfer - System programming failures | • CAN fault<br>• ECM ignition, power and ground supply circuits - short, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check CAN communications between ECM and instrument cluster. Refer to electrical |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | • Instrument cluster power and ground supply circuits - short, open circuit<br>• ECM or instrument cluster incorrectly configured | circuit diagrams and check ECM ignition, power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Perform the Immobilisation application from the Set-up menu using the manufacturer approved diagnostic system |
| B1B33-62 | Target I.D. Transfer - Signal compare failure | • CAN fault<br>• ECM ignition, power and ground supply circuits - short, open circuit<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Incorrect ECM or instrument cluster installed<br>• Synchronisation error following re-programming<br>• Noise/EMC related error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check CAN communications between ECM and instrument cluster. Refer to electrical circuit diagrams and check ECM ignition, power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check correct ECM and instrument cluster installed. Perform the Immobilisation application from the Set-up menu using the manufacturer approved diagnostic system. Check CAN network for interference/EMC related issues |
| B1B33-64 | Target identification transfer - Signal plausibility failure | • Algorithm based failure - signal plausibility failure<br>• CAN fault<br>• ECM ignition, power and ground supply circuits - short, open circuit<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• electronic steering column lock status incomplete<br>• Race condition caused by closing driver door and pressing the start button within a small time window | • If the customer has not reported a non start issue, clear the DTC and check vehicle starts correctly. If a non start has been reported run the manufacturers approved diagnostic system Start Authorisation Application and follow the actions required for this DTC. Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check CAN communications between ECM and instrument cluster. Refer to electrical circuit diagrams and check ECM ignition, power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check electronic steering column lock operation. Advise customer of starting sequence and to allow time to elapse between closing door and pressing start button |
| B1B33-87 | Target I.D. Transfer - Missing message | • CAN fault<br>• ECM ignition, power and ground supply circuits - short, open circuit<br>• Instrument cluster power and ground supply circuits - short, open circuit<br>• Low battery voltage | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check CAN communications between ECM and instrument cluster. Refer to electrical circuit diagrams and check ECM ignition, power and ground supply circuits for short, open circuit and instrument cluster power and ground supply circuits for short, open circuit. Check battery is in serviceable condition and is fully charged, check terminals etc |
| B1C32-77 | Steering Column Tilt Solenoid - Commanded position not reachable | • TILT axis fails to move minimum distance within allotted time period. Motion may have been prohibited due to motor jamming, stalling or solenoid pin not engaging | • Check for restricted/jammed steering column motor mechanism. Refer to the electrical circuit diagrams and check steering column motor UP/IN, DOWN/OUT circuit for short, open circuit |
| B1C32-94 | Steering Column Tilt Solenoid - Unexpected operation | • TELE axis moves when it has not been commanded to. Motion may have occurred due to solenoid pin not disengaging or mechanism has been jammed on, whilst REACH axis has been commanded to move | • Check for stuck/jammed solenoid/switch. Refer to the electrical circuit diagrams and check steering column motor UP/IN, DOWN/OUT circuit for short, open circuit |
| B1C33-12 | Steering Column Tilt Feedback Signal - Circuit short to battery | • Steering column tilt feedback signal circuit - short to power | • Refer to the electrical circuit diagrams and check steering column tilt feedback signal circuit for short to power |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1C33-14 | Steering Column Tilt Feedback Signal - Circuit short to ground or open | • Steering column tilt feedback signal circuit - short to ground, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check steering column tilt feedback signal circuit for short to ground, open circuit |
| B1C34-77 | Steering Column Telescope Solenoid - Commanded position not reachable | • REACH axis fails to move minimum distance within allotted time period. Motion may have been prohibited due to motor jamming, stalling or solenoid pin not engaging | • Check for restricted/jammed steering column motor mechanism. Refer to the electrical circuit diagrams and check steering column motor UP/IN, DOWN/OUT circuit for short, open circuit |
| B1C34-94 | Steering Column Telescope Solenoid - Unexpected operation | • REACH axis moves when it has not been commanded to. Motion may have occurred due to solenoid pin not disengaging or mechanism has been jammed on, whilst TILT axis has been commanded to move | • Check for stuck/jammed solenoid/switch. Refer to the electrical circuit diagrams and check steering column motor UP/IN, DOWN/OUT circuit for short, open circuit |
| B1C35-12 | Steering Column Telescope Feedback Signal - Circuit short to battery | • Steering column TELE feedback signal circuit - short to power | • Refer to the electrical circuit diagrams and check steering column TELE feedback signal circuit for short to power |
| B1C35-14 | Steering Column Telescope Feedback Signal - Circuit short to ground or open | • Steering column TELE feedback signal circuit - short to ground, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check steering column TELE feedback signal circuit for short to ground, open circuit |
| B1C36-11 | Steering Column Tilt/Telescope Switch - Circuit short to ground | • Steering column adjust switch circuit - short to ground | • Refer to the electrical circuit diagrams and check steering column adjust switch circuit for short to ground |
| B1C48-11 | Flash to Pass Switch - Circuit short to ground | • Main beam flash switch circuit - short to ground | • Refer to the electrical circuit diagrams and check main beam flash switch circuit for short to ground |
| B1C48-15 | Flash to Pass Switch - Circuit short to battery or open | • Main beam flash switch circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check main beam flash switch circuit for short to power, open circuit |
| B1C53-11 | Front Wiper Intermittent Data - Circuit short to ground | • Intermittent wipe switch circuit - short to ground | • Refer to the electrical circuit diagrams and check intermittent wipe switch circuit for short to ground |
| B1C53-15 | Front Wiper Intermittent Data - Circuit short to battery or open | • Intermittent wipe switch circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check intermittent wipe switch circuit for short to power, open circuit |
| B1D36-11 | Turn Indicator Switch - Circuit short to ground | • Direction indicator switch circuit - short to ground | • Refer to the electrical circuit diagrams and check direction indicator switch circuit for short to ground |
| B1D36-15 | Turn Indicator Switch - Circuit short to battery or open | • Direction indicator switch circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check direction indicator switch circuit for short to power, open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1D37-11 | Wiper Switch Connection Circuit - Circuit short to ground | • Flick wipe switch circuit - short to ground | • Refer to the electrical circuit diagrams and check flick wipe switch circuit for short to ground |
| B1D37-15 | Wiper Switch Connection Circuit - Circuit short to battery or open | • Flick wipe switch circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check flick wipe switch circuit for short to power, open circuit |
| C1110-64 | Power steering Calibration Data - Signal plausibility failure | • Invalid VAPS curve loaded | • Re-configure the instrument cluster as new to download VAPS curve data |
| P0635-11 | Power Steering Control Circuit - Circuit short to ground | • VAPS ignition supply circuit - short to ground | • Refer to the electrical circuit diagrams and check VAPS ignition supply circuit for short to ground |
| P0635-12 | Power Steering Control Circuit - Circuit short to battery | • VAPS ignition supply circuit - short to power | • Refer to the electrical circuit diagrams and check VAPS ignition supply circuit for short to power |
| P0635-13 | Power Steering Control Circuit - Circuit open | • VAPS ignition supply circuit - open circuit | • Refer to the electrical circuit diagrams and check VAPS ignition supply circuit for open circuit |
| P0635-22 | Power Steering Control Circuit - Signal amplitude > maximum | • First valid received speed value above threshold | • Check ABS module for DTCs and refer to relevant DTC Index |
| P0635-44 | Power Steering Control Circuit - Data memory failure | • Data memory failure | • Re-configure the instrument cluster as new to download VAPS curve data |
| U0001-88 | High Speed CAN Communication Bus - Bus off | • Bus Off | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Carry out CAN network integrity test using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check HS CAN network to instrument cluster |
| U0010-88 | Medium Speed CAN Communication Bus - Bus off | • Bus Off | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Carry out CAN network integrity test using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check MS CAN network to instrument cluster |
| U0100-00 | Lost Communication With ECM/PCM "A" - No sub type information | • Loss of CAN communication with ECM | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check ECM for DTCs and refer to the relevant DTC Index |
| U0101-00 | Lost Communication with TCM - No sub type information | • Loss of CAN communication with TCM | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check TCM for DTCs and refer to the relevant DTC Index |
| U0103-00 | Lost Communication With Gear Shift Module - No sub type information | • Loss of CAN communication with transmission shift module | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check transmission shift module for DTCs and refer to the relevant DTC Index |
| U0104-00 | Lost Communication With Cruise Control Module - No sub type information | • Loss of CAN communication with speed control module | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check speed control module for DTCs and refer to the relevant DTC Index |
| U0121-00 | Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information | • Loss of CAN communication with ABS module | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check ABS module for DTCs and refer to the relevant DTC Index |

Published: 12-May-2014

# General Information - Diagnostic Trouble Code (DTC) Index DTC: Integrated Audio Module (IAM)

Description and Operation

## Integrated Audio Module (IAM)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 |
|---|---|---|---|
| B1B69-15 | 12 Volt supply circuit - Circuit short to battery or open | • Antenna power supply circuit - short to battery, high resistance | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. |
| B1B69-11 | 12 Volt supply circuit - Circuit short to ground | • Antenna power supply circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. to the electrical circuit diagrams and test the antenna power supply circuit for short to ground |
| B1D19-16 | Compact Disc Unit - Circuit voltage below threshold | • Circuit voltage below threshold | • Suspect the integrated audio module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1D19-77 | Compact Disc Unit - Commanded position not reachable | • Commanded position not reachable | • Suspect the integrated audio module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1D19-93 | Compact Disc Unit - No operation | • No operation | • Suspect the integrated audio module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A01-11 | Speaker #1 - Circuit short to ground | • Front driver speaker circuits - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test front driver speaker circuits for short to ground |
| B1A01-12 | Speaker #1 - Circuit short to battery | • Front driver speaker circuits - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test front driver speaker circuits for short to power |
| B1A01-1A | Speaker #1 - Circuit resistance below threshold | • Front driver speaker circuits - resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A01-1B | Speaker #1 - Circuit resistance above threshold | • Front driver speaker circuits - resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A01-1C | Speaker #1 - Circuit voltage out of range | • Front driver speaker circuits - voltage out of range. Power IC failure internal to the integrated audio | • Suspect the integrated audio module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A02-11 | Speaker #2 - Circuit short to ground | • Front passenger speaker circuits - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test front passenger speaker circuits for short to ground |
| B1A02-12 | Speaker #2 - Circuit short to battery | • Front passenger speaker circuits - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test front passenger speaker circuits for short to power |
| B1A02-1A | Speaker #2 - Circuit resistance below threshold | • Front passenger speaker circuits - resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A02-1B | Speaker #2 - Circuit resistance above threshold | • Front passenger speaker circuits - resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A02-1C | Speaker #2 - Circuit voltage out of range | • Front passenger speaker circuits - voltage out of range. Power IC failure internal to the integrated audio | • Suspect the integrated audio module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A03-11 | Speaker #3 - Circuit short to ground | • Rear left speaker circuits - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test rear left speaker circuits for short to ground |
| B1A03-12 | Speaker #3 - Circuit short to battery | • Rear left speaker circuits - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test rear left speaker circuits for short to power |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A03-1A | Speaker #3 - Circuit resistance below threshold | • Rear left speaker circuits - resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A03-1B | Speaker #3 - Circuit resistance above threshold | • Rear left speaker circuits - resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A03-1C | Speaker #3 - Circuit voltage out of range | • Rear left speaker circuits - voltage out of range. Power IC failure internal to the integrated audio | • Suspect the integrated audio module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A04-11 | Speaker #4 - Circuit short to ground | • Rear right speaker circuits - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test rear right speaker circuits for short to ground |
| B1A04-12 | Speaker #4 - Circuit short to battery | • Rear right speaker circuits - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test rear right speaker circuits for short to power |
| B1A04-1A | Speaker #4 - Circuit resistance below threshold | • Rear right speaker circuits - resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A04-13 | Speaker #4 - Circuit open | • Rear right speaker circuits - resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B1A04-1C | Speaker #4 - Circuit voltage out of range | • Rear right speaker circuits - voltage out of range. Power IC failure internal to the integrated audio | • Suspect the integrated audio module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B1A56-13 | Antenna - Circuit open | • Antenna circuit - open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check antenna circuit for open circuit |
| B1D78-11 | Auxiliary Input - Circuit short to ground | • Auxiliary input circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test Auxiliary input circuits for short to ground |
| B1D78-12 | Auxiliary Input - Circuit short to battery | • Auxiliary input circuit - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test Auxiliary input circuits for short to power |
| B1D78-13 | Auxiliary Input - Circuit open | • Auxiliary input circuit - high resistance | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test Auxiliary input circuits for high resistance |
| B1D79-11 | Microphone Input - Circuit short to ground | • Microphone input circuit - short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test microphone input circuits for short to ground |
| B1D79-12 | Microphone Input - Circuit short to battery | • Microphone input circuit - short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test microphone input circuits for short to power |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1D79-13 | Microphone Input - Circuit open | • Microphone input circuit - high resistance | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and test microphone input circuits for high resistance |
| B1134-11 | Phone Input - Circuit short to ground | • Phone input circuit - short to ground | • Refer to the electrical circuit diagrams and test phone input circuits for short to ground |
| B1134-12 | Phone Input - Circuit short to battery | • Phone input circuit - short to power | • Refer to the electrical circuit diagrams and test phone input circuits for short to power |
| B1134-13 | Phone Input - Circuit open | • Phone input circuit - high resistance | • Refer to the electrical circuit diagrams and test phone input circuits for high resistance |
| U2100-00 | Initial Configuration Not Complete - No sub type information | • Car configuration data not received | • Check RJB for related DTCs and refer to the relevant DTC Index |
| U2101-00 | Control Module Configuration Incompatible - No sub type information | • Incorrect car configuration data received | • Check RJB for related DTCs and refer to the relevant DTC Index. Check/amend Car Configuration File using the manufacturer approved diagnostic system |
| U3000-49 | Control Module - Internal electronic failure | • Internal electronic failure | • Suspect the integrated audio module, install a new module as required, refer to the new module installation note at the top of the DTC Index |
| U3000-55 | Control Module - Not configured | • Incorrect car configuration data received | • Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the integrated audio module, refer to the new module installation note at the top of the DTC Index |
| U3000-87 | Control Module - Missing message | • Missing message | • Re-configure the RJB using the manufacturer approved diagnostic system. Check integrated audio module for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system |
| U3000-98 | Control Module - Component or system over temperature | • Component or system over temperature | • Check for additional DTCs and refer to DTC Index. Clear DTC and re-test/monitor condition |
| U3003-62 | Battery Voltage - Signal compare failure | • Mis-match in battery voltage, of 2 volts or more, between integrated audio module and RJB | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Integrated Control Panel (FCIMB)

Description and Operation

## Integrated Control Panel (ICP)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 |
|---|---|---|---|
| B1012-23 | Heated Windshield Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B1013-23 | Heater Rear Defog Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B1014-23 | Recirculation Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B1015-23 | Screen On/Off Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1016-23 | Status Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B1017-23 | Left Temperature Decrease Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B1018-23 | Right Temperature Decrease Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B1019-23 | Left Temperature Increase Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B101A-23 | Right Temperature Increase Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B101B-23 | Defrost Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B101C-23 | Seek Up Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B101D-23 | Seek Down Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B101E-23 | Air Conditioning Mode Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B101F-23 | Eject Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B1020-23 | Load Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B1021-23 | Source Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B1022-23 | Audio On/Off Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B11A9-23 | Tone Button - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| B121F-23 | Climate Switch - Signal stuck low | • Button stuck down/jammed<br>• Integrated control panel failure | • Check for stuck down/jammed button. Check and install a new integrated control panel as required |
| U0010-88 | Medium Speed CAN Communication Bus - Bus off | • Bus off | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U0140-00 | Lost Communication With Body Control Module - No sub type information | • Missing message from CJB | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U0142-00 | Lost Communication With Body Control Module "B" - No sub type information | • Missing message from RJB | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U0155-00 | Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information | • Missing message from instrument cluster | • Carry out any pinpoint tests associated to this DTC using the manufacturer approved diagnostic system |
| U0156-00 | Lost Communication With Information Center "A" - No sub type information | • Missing message from information and entertainment control module | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • Invalid car configuration data received | • Re-configure the integrated control panel as new. Clear DTC and re-test, if DTC remains suspect the integrated control panel. Check and install a new integrated control panel as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-41 | Control Module - General checksum failure | • Checksum error, internal module failure | • Suspect the integrated control panel, check and install a new integrated control panel as required, refer to the new module/component installation note at the top of the DTC Index |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Occupant Classification System (OCS)

Description and Operation

## Occupant Classification System (OCS)

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:

It is advisable not to use a cellular phone or to have a cellular phone in close proximity when working on the restraints control module or associated systems

Given the legal implications of a restraints system failure, harness repairs to Air Bag module circuits are not acceptable. Where the text refers to "REPAIR the circuit", this will normally mean the replacement of a harness.

If the control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 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 occupant classification system, for additional diagnosis and testing information refer to the relevant diagnosis and testing section.
For additional information, refer to: Air Bag and Safety Belt Pretensioner Supplemental Restraint System (SRS) (501-20 Supplemental Restraint System, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1193-53 | Crash Event Storage Full and Locked - Deactivated | • Crash event occurred | • Clear diagnostic trouble code and re-test |
| B1A54-01 | Occupant Belt Tension Sensor - General Electrical Failure | • General electrical failure | • Clear diagnostic trouble code and re-test. If the problem persists, check and install a new safety belt tension 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 |
| B1A54-02 | Occupant Belt Tension Sensor - General signal failure | • General signal failure | • Refer to the electrical circuit diagrams and check safety belt tension and mat pressure sensor circuits for short to each other |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A54-11 | Occupant Belt Tension Sensor - Circuit short to ground | • Safety belt tension sensor voltage reference or signal circuit - short to ground | • Refer to the electrical circuit diagrams and check safety belt tension sensor voltage reference and signal circuits for short to ground |
| B1A54-12 | Occupant Belt Tension Sensor - Circuit short to battery | • Safety belt tension sensor voltage reference or signal circuit - short to power | • Refer to the electrical circuit diagrams and check safety belt tension sensor voltage reference and signal circuits for short to power |
| B1A54-13 | Occupant Belt Tension Sensor - Circuit open | • Safety belt tension sensor voltage reference or signal circuit - open circuit | • Refer to the electrical circuit diagrams and check safety belt tension sensor voltage reference and signal circuits for open circuit |
| B1A62-02 | Pressure Sensor - General signal failure | • General signal failure | • Refer to the electrical circuit diagrams and check safety belt tension and mat pressure sensor circuits for short to each other |
| B1A62-11 | Pressure Sensor - Circuit short to ground | • Mat pressure sensor voltage reference or signal circuits - short to ground | • Refer to the electrical circuit diagrams and check mat pressure sensor voltage reference and signal circuits for short to ground |
| B1A62-12 | Pressure Sensor - Circuit short to battery | • Mat pressure sensor voltage reference, ground or signal circuits - short to power | • Refer to the electrical circuit diagrams and check mat pressure sensor voltage reference, ground and signal circuits for short to power |
| B1A62-13 | Pressure Sensor - Circuit open | • Mat pressure sensor voltage reference or signal circuit - open circuit | • Refer to the electrical circuit diagrams and check mat pressure sensor voltage reference and signal circuits for open circuit |
| B1A62-7B | Pressure Sensor - Low fluid level | • Low fluid level - bladder damaged | • Check and install new bladder 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 |
| U0001-88 | High Speed CAN Communication Bus - Bus off | • Bus off | • Refer to the electrical circuit diagrams and check CAN network for short, open circuit. Carry out the CAN network integrity test using the manufacturer approved diagnostic system |
| U0151-00 | Lost Communication With Restraints Control Module - No sub type information | • Restraints control module missing message | • Refer to the electrical circuit diagrams and check power and ground supplies to restraints control module. Carry out CAN network integrity test using the manufacturer approved diagnostic system |
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • Master car configuration file ID does not correspond | • Check correct occupancy seat module is installed for vehicle specification. Check rear junction box for related diagnostic trouble codes and refer to relevant diagnostic trouble code index |
| U2016-51 | Control Module Main Software - Not programmed | • Main software not programmed | • Check and install a new occupancy seat 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 |
| U201A-51 | Control Module Main Calibration Data - Not programmed | • Main calibration data not programmed | • Check and install a new occupancy seat 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U3000-04 | Control Module - System Internal Failures | • Occupancy seat module internal electronic failure | • Check and install a new occupancy seat 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 |
| U3000-54 | Control Module - Missing calibration | • This diagnostic trouble code is set if a 'calibrate occupancy seat module empty seat offset' routine is requested and fails due to one of the pre-conditions to execute the routine | • Check the following criteria have all been achieved: Ignition status set to RUN/START. Verify seat is always empty after power-up before re-zero is requested. The occupancy seat 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. Occupancy seat module has enough time to begin classification. Temperature is between 6C (42F) and 36C (97F) |
| U3003-16 | Battery Voltage - Circuit voltage below threshold | • Circuit voltage below threshold | • Check battery is in fully charged and serviceable condition. Check integrity of charging system |
| U3003-17 | Battery Voltage - Circuit voltage above threshold | • Circuit voltage above threshold | • Check battery is in fully charged and serviceable condition. Check integrity of charging system |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Parking Aid Module (PAM)

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, 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

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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1B40-01 | Front Left Outer Sensor - General electrical failure | • Wiring harness fault<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1B42-96 | Front Left Inner Sensor - Component internal failure | • Wiring harness fault<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• If the problem persists remove the suspect sensor from the bumper. Inspect the sensor connector for |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test |
| B1B48-96 | Rear Left Outer Sensor - Component internal failure | • Wiring harness fault<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• 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<br>• 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<br>• Check the connector for integrity and damage, then re-connect sensor to confirm connection<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test<br>• 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<br>• 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<br>• 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<br>• Switch/LED - Component internal failure<br>• 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<br>• 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<br>• Control Module - Component internal failure | • Check front and rear bumper harness for signs of damage and security of connections<br>• 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<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test. If the problem persists, suspect the control module |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | • 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<br>• Control Module - Component internal failure | • Check rear and front (if front PDC fitted) bumper harness for signs of damage and security of connections<br>• 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<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test. If the problem persists, suspect the control module<br>• 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<br>• 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<br>• Using the manufacturers approved diagnostic system clear the DTC and run the on demand self test. If the problem persists, suspect the control switch<br>• 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 medium speed CAN bus for short circuit to ground, short circuit to power, open circuit, high resistance, or short circuit between the paired CAN wires<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• Cycle the ignition off, then on, and check if the DTC is still logged |
| U0073-00 | Control Module Communication Bus "A" Off - No sub type information | • Control module communication Bus "A" 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<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• 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<br>• 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 |
| U0142-00 | Lost Communication With Body Control Module "B" - No sub type information | • Loss of CAN communication with auxiliary junction box | • Refer to the electrical circuit diagrams and check the power and ground connections to the auxiliary junction box. Clear DTC and retest<br>• 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<br>• 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 |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| 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<br>• 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<br>• Check the components installed on the vehicle were installed by the factory or a dealer<br>• 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<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• Cycle the ignition off, then on, and check if the DTC is still logged<br>• 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<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• Cycle the ignition off, then on, and check if the DTC is still logged<br>• Clear the DTC and re-test |
| U0443-00 | Invalid Data Received From Body Control Module "B" - No sub type information | • Invalid data received | • Using the manufacturer approved diagnostic system, check auxiliary junction box, for related DTCs and refer to the relevant DTC index<br>• Using the manufacturer approved diagnostic system, complete a CAN network integrity test<br>• Cycle the ignition off, then on, and check if the DTC is still logged<br>• Clear the DTC and re-test |
| U2100-00 | Initial Configuration Not Complete - No sub type information | • Car 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<br>• 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<br>• 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<br>• If the DTC is still logged replace the parking aid control module |
| U3003-16 | Battery voltage - Circuit voltage below threshold | • Circuit voltage below threshold | • Using the manufacturer approved diagnostic system, check central junction box, for related DTCs and refer to the relevant DTC index<br>• Check the vehicle charging system performance to ensure the voltage regulation is correct<br>• Refer to relevant section of workshop manual and battery care manual. Check battery state of charge and starting/charging system performance<br>• Refer to the electrical circuit diagrams and check parking aid control module power and ground circuits |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | for short circuit to ground, short circuit to power, open circuit<br>• Clear the DTC and retest |
| U3003-17 | Battery Voltage - Circuit voltage above threshold | • Circuit voltage above threshold | • Using the manufacturer approved diagnostic system, check central junction box, for related DTCs and refer to the relevant DTC index<br>• Check the vehicle charging system performance to ensure the voltage regulation is correct<br>• Refer to relevant section of workshop manual and battery care manual. Check battery state of charge and starting/charging system performance<br>• 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<br>• Clear the DTC and retest |
| U3003-62 | Battery Voltage - Signal compare failure | • Signal compare failure in battery voltage, of 2 volts or more, between parking aid 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<br>• Check the vehicle charging system performance to ensure the voltage regulation is correct<br>• Refer to relevant section of workshop manual and battery care manual. Check battery state of charge and starting/charging system performance<br>• 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<br>• Clear the DTC and retest |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Pedestrian Protection System Control Module (PPSCM)

Description and Operation

## Pedestrian Protection System Control Module (PPSCM)

WARNING: TO AVOID ACCIDENTAL DEPLOYMENT AND POSSIBLE PERSONAL INJURY, THE BACKUP POWER SUPPLY MUST BE DEPLETED BEFORE REPAIRING OR REPLACING ANY PEDESTRIAN PROTECTION SYSTEM COMPONENTS. TO DEPLETE THE BACKUP POWER SUPPLY ENERGY, DISCONNECT THE BATTERY GROUND CABLE AND WAIT TWO MINUTES. 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 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, 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 Pedestrian Protection System Control Module (PPSCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Pedestrian Protection System (501-20C Pedestrian Protection System, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1001-11 | Right Hood Deployment Control - Circuit short to ground | • Right hood deployment control circuit short circuit to ground | • Refer to the electrical circuit diagrams and check the right hood deployment control circuit for short circuit to ground. Install a new wiring harness as necessary. If no wiring harness fault exists, using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new right hood deployment control |
| B1001-12 | Right Hood Deployment Control - Circuit short to battery | • Right hood deployment control circuit short circuit to power | • Refer to the electrical circuit diagrams and check the right hood deployment control circuit for short circuit to power. Install a new wiring harness as necessary. If no wiring harness fault exists, using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new right hood deployment control |

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# 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, 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

If the rear differential control module, rear differential actuator or the rear differential are replaced, the on demand self test (ODST) must be carried out to calibrate the components

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 needed

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 9 volts | • 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. 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 | • Rear differential control module internal error | • Clear the DTC and retest. If the problem persists, renew the control module. Refer to the warranty policy and procedures manual, or determine if any |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | prior approval programme is in operation, prior to the installation of a new module/component |
| P0606-00 | Control Module Processor - No sub type information | • Watchdog reset - internal control module failure | • This is a control module internal check DTC. If no other DTCs are logged and no customer complaint exists, clear/ignore this DTC. If the problem persists, renew the control module. 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 | • Rear differential control module internal error - charge pump voltage below threshold | • Clear the DTC and retest. If the problem persists, renew the control module. 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 |
| P0652-00 | Sensor Reference Voltage B Circuit Low - No sub type information | • Position sensor supply below 5.7V<br>• Sensor failure (within actuator) | • Refer to the electrical circuit diagrams and check the differential actuator sensor position circuit, repair as necessary. Clear the DTC and retest<br>• If no circuit problems exist, renew the differential actuator. 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 |
| P0653-00 | Sensor Reference Voltage B Circuit High - No sub type information | • Motor position sensor supply above 8.3 V<br>• Internal control module failure | • Refer to the electrical circuit diagrams and check the differential actuator hall sensor reference voltage at the control module or the actuator<br>• If voltage is too high, then renew control module. 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 |
| P0666-00 | PCM / ECM / TCM Internal Temperature Sensor A Circuit - No sub type information | • Internal electronic control unit temperature sensor value above 105°C | • This is a control module internal check DTC. 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. 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 |
| P0702-64 | Transmission Control System Electrical - Signal plausibility failure | • Implausibility of differential motor temperature sensor and oil temperature sensor readout detected<br>• 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<br>• Refer to the electrical circuit diagrams and check motor temperature sensor and oil sump temperature sensors and circuit for short circuit to ground, short circuit to power |
| P0712-00 | Transmission Fluid Temperature Sensor A Circuit Low - No sub type information | • Differential actuator internal temperature sensor circuit - open circuit or short circuit to ground | • Refer to the electrical circuit diagrams and check rear differential actuator motor temperature sensor circuit for short circuit to ground, open circuit, high resistance. Clear the DTC and retest. If no circuit problems exist, renew the differential actuator. 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 |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Rear Junction Box (RJB)

Description and Operation

## Rear Junction Box (RJB)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Junction Box (RJB). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0460-11 | Fuel Level Sensor A Circuit - Circuit short to ground | • Fuel level sensor A analogue input circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check fuel level sensor A analogue input circuit for short to ground |
| P0460-15 | Fuel Level Sensor A Circuit - Circuit short to battery or open | • Fuel level sensor A analogue input circuit - short to power, open circuit | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check fuel level sensor A analogue input circuit for short to power, open circuit |
| P0571-12 | Brake Switch A Circuit - Circuit short to battery | • Footbrake switch digital input signal circuits - short to power | • Refer to the electrical circuit diagrams and check footbrake switch digital input signal circuits for short to power |
| P1230-12 | Fuel Pump Low Speed Malfunction (VLCM) - Circuit short to battery | • High Side output not driven - Diagnosis feedback indicates output is short to power | • Refer to the electrical circuit diagrams and check fuel pump delivery module for short to power |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P1230-14 | Fuel Pump Low Speed Malfunction (VLCM) - Circuit short to ground or open | • High Side output not driven - Diagnosis feedback indicates output is short to ground, open circuit | • Refer to the electrical circuit diagrams and check fuel pump delivery module for short to ground, open circuit |
| P1230-93 | Fuel Pump Low Speed Malfunction (VLCM) - No operation | • High Side output not driven - Diagnosis feedback indicates output is at open load or short to power | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check fuel pump delivery module for short to power, open circuit |
| P1346-11 | Fuel Level Sensor B Circuit - Circuit short to ground | • Fuel level sensor B analogue input circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check fuel level sensor B analogue input circuit for short to ground |
| P1346-15 | Fuel Level Sensor B Circuit - Circuit short to battery or open | • Fuel level sensor B analogue input circuit - short to power, open circuit | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check fuel level sensor B analogue input circuit for short to power, open circuit |
| P1624-13 | Anti-theft System - Circuit open | • Anti-theft signal circuit from CJB - open circuit | • Refer to the electrical circuit diagrams and check anti-theft signal circuit from CJB for open circuit |
| C111A-11 | Right Stop Lamp - Circuit short to ground | • Right stomp lamp control circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check right stomp lamp control circuit for short to ground |
| C111A-12 | Right Stop Lamp - Circuit short to battery | • Right stomp lamp control circuit - short to power | • Refer to the electrical circuit diagrams and check right stomp lamp control circuit for short to power |
| C111A-13 | Right Stop Lamp - Circuit open | • Right stomp lamp control circuit - open circuit | • Refer to the electrical circuit diagrams and check right stomp lamp control circuit for open circuit |
| C111B-11 | Left Stop Lamp - Circuit short to ground | • Left stomp lamp control circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left stomp lamp control circuit for short to ground |
| C111B-13 | Left Stop Lamp - Circuit open | • Left stomp lamp control circuit - open circuit | • Refer to the electrical circuit diagrams and check left stomp lamp control circuit for open circuit |
| C1120-11 | Reversing lamp - Circuit short to ground | • Reverse lamp control circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check reverse lamp control circuit for short to ground |
| C1120-12 | Reversing lamp - Circuit short to battery | • Reverse lamp control circuit - short to power | • Refer to the electrical circuit diagrams and check reverse lamp control circuit for short to power |
| C1120-13 | Reversing lamp - Circuit open | • Reverse lamp control circuit - open circuit | • Refer to the electrical circuit diagrams and check reverse lamp control circuit for open circuit |
| C1120-15 | Reversing lamp - Circuit short to battery or open | • Reverse lamp control circuit - short circuit to power, open circuit, high resistance | • Refer to the electrical circuit diagrams and check reverse lamp control circuit for short circuit to power, open circuit, high resistance. Repair wiring harness as required. Clear DTC and retest |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B100A-51 | Fuel Pump Authorisation - Not programmed | • RJB fault<br>• Low speed CAN fault<br>• Instrument cluster fault | • Check power and ground supplies to RJB. Check CAN communications between RJB and instrument cluster. Check power and ground supplies to instrument cluster |
| B100A-62 | Fuel Pump Authorisation - Signal compare failure | • Low speed CAN fault<br>• RJB fault<br>• Instrument cluster fault<br>• Incorrect module installed (RJB/Instrument cluster)<br>• Write target SID synchronisation error following re-programming<br>• Noise/EMC related error | • Check CAN communications between RJB and instrument cluster. Check power and ground supplies to RJB and instrument cluster. Confirm correct module installed. Re-synchronise ID by re-configuring the RJB as a new module. Check CAN network for interference/EMC related issues |
| B100A-63 | Fuel Pump Authorisation - Circuit/component protection time-out | • RJB fault<br>• Low speed CAN fault<br>• Instrument cluster fault<br>• Low battery voltage <9V | • Check power and ground supplies to RJB and instrument cluster. Check CAN communications between RJB and instrument cluster. Check battery is in fully charged and serviceable condition, refer to the battery care manual |
| B1026-12 | Steering Column Lock - Circuit short to battery | • Steering column lock ground circuit - short to power | • Refer to the electrical circuit diagrams and check steering column lock ground circuit for short to power |
| B1087-83 | LIN Bus "A" - Value of signal protection calculation incorrect | • The checksum of the received LIN frame is incorrect | • Check the battery monitoring system and rear parking aid system for DTCs and refer to relevant DTC Index |
| B1087-86 | LIN Bus "A" - Signal invalid | • The header of the LIN message received is incorrect | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Check the battery monitoring system and rear parking aid system for DTCs and refer to relevant DTC Index |
| B1087-88 | LIN Bus "A" - Bus off | • Battery monitoring system LIN circuit - short to ground, power | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check battery monitoring system LIN circuit for short to ground, power |
| B108A-23 | Start Button - Signal stuck low | • Start/Stop switch digital input signal circuit - stuck low | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check Start/Stop switch digital input signal circuit for short to ground |
| B10A1-11 | Trailer Tow Detection - Circuit short to ground | • Trailer tow detection digital input circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check trailer tow detection digital input circuit for short to ground |
| B10AF-12 | Blower Fan Relay - Circuit short to battery | • High Side output not driven - Diagnosis feedback indicates output is short to power | • Refer to the electrical circuit diagrams and check blower motor supply circuit for short to power |
| B10AF-14 | Blower Fan Relay - Circuit short to ground or open | • High Side output not driven - Diagnosis feedback indicates output is short to ground, open circuit | • Refer to the electrical circuit diagrams and check blower motor supply circuit for short to ground, open circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B10AF-93 | Blower Fan Relay - No operation | • High Side output not driven - Diagnosis feedback indicates output is at open load or short to power | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check blower motor supply circuit for short to power, open circuit |
| B10DD-11 | Airbag Deployed - Circuit short to ground | • Airbag deployed digital input signal circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check airbag deployed digital input signal circuit for short to ground |
| B10DD-15 | Airbag Deployed - Circuit short to battery or open | • Airbag deployed digital input signal circuit - short to power, open circuit | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check airbag deployed digital input signal circuit for short to power, open circuit |
| B10DD-38 | Airbag Deployed - Signal frequency incorrect | • Signal frequency incorrect | • Check the RCM for related DTCs and refer to the relevant DTC Index |
| B10DE-11 | Low Fuel Warning Switch - Circuit short to ground | • Diesel run-dry switch analogue input circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check diesel run-dry switch analogue input circuit for short to ground |
| B10DE-15 | Low Fuel Warning Switch - Circuit short to battery or open | • Diesel run-dry switch analogue input circuit - short to power, open circuit | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check diesel run-dry switch analogue input circuit for short to power, open circuit |
| B1112-11 | Park Aid Ignition - Circuit short to ground | • Parking aid ignition supply circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check parking aid ignition supply circuit for short to ground |
| B1112-12 | Park Aid Ignition - Circuit short to battery | • Parking aid ignition supply circuit - short to power | • Refer to the electrical circuit diagrams and check parking aid ignition supply circuit for short to power |
| B1115-11 | High Mounted Stop Lamp Control - Circuit short to ground | • High mounted stop lamp control circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check high mounted stop lamp control circuit for short to ground |
| B1116-11 | Left Tail Lamp - Circuit short to ground | • Left hand tail lamp control circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left hand tail lamp control circuit for short to ground |
| B1117-11 | Right Tail Lamp - Circuit short to ground | • Right hand tail lamp control circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check right hand tail lamp control circuit for short to ground |
| B111A-11 | Number Plate Lamps - Circuit short to ground | • Right hand or left hand number plate lamp control circuits - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check right hand and left hand number plate lamp control circuits for short to ground |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B111A-12 | Number Plate Lamps - Circuit short to battery | • Right hand or left hand number plate lamp control circuits - short to power | • Refer to the electrical circuit diagrams and check right hand and left hand number plate lamp control circuits for short to power |
| B111A-13 | Number Plate Lamps - Circuit open | • Right hand or left hand number plate lamp control circuits - open circuit | • Refer to the electrical circuit diagrams and check right hand and left hand number plate lamp control circuits for open circuit |
| B111A-15 | Number Plate Lamps - Circuit short to battery or open | • Right or left side licence plate lamp(s) inoperative<br>• Right or left side licence plate lamp control circuits - short circuit to power, open circuit, high resistance | • Refer to the electrical circuit diagrams and check right side and left side licence plate lamp control circuits for short circuit to power, open circuit, high resistance. Repair wiring harness as required. Clear DTC and retest |
| B111D-12 | Boot/Trunk Motor Open - Circuit short to battery | • Luggage compartment lid latch actuator control circuit - short to power | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check luggage compartment lid latch actuator control circuit for short to power |
| B111D-14 | Boot/Trunk Motor Open - Circuit short to ground or open | • Luggage compartment lid latch actuator control circuit - short to ground, open circuit | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check luggage compartment lid latch actuator control circuit for short to ground, open circuit |
| B111E-11 | Boot/Trunk Lamps - Circuit short to ground | • Luggage compartment lamp control circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check luggage compartment lamp control circuit for short to ground |
| B111E-12 | Boot/Trunk Lamps - Circuit short to battery | • Luggage compartment lamp control circuit - short to power | • Refer to the electrical circuit diagrams and check luggage compartment lamp control circuit for short to power |
| B111E-13 | Boot/Trunk Lamps - Circuit open | • Luggage compartment lamp control circuit - open circuit | • Refer to the electrical circuit diagrams and check luggage compartment lamp control circuit for open circuit |
| B111E-15 | Boot/Trunk Lamps - Circuit short to battery or open | • Luggage compartment lamp inoperative<br>• Luggage compartment lamp control circuit - short circuit to power, open circuit, high resistance | • Refer to the electrical circuit diagrams and check luggage compartment lamp control circuit for short circuit to power, open circuit, high resistance. Repair wiring harness as required. Clear DTC and retest |
| B1123-12 | Restraints Ignition Relay - Circuit short to battery | • High Side output not driven - diagnosis feedback indicates output is short to power | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check restraints ignition relay output for short to power |
| B1123-14 | Restraints Ignition Relay - Circuit short to ground or open | • High Side output not driven - diagnosis feedback indicates output is short to ground, open circuit | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check restraints ignition relay output for short to ground, open circuit |
| B1123-93 | Restraints Ignition Relay - No operation | • High Side output not driven - diagnosis feedback indicates output is at open load | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check restraints ignition relay output for open load or |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | or short to power | short to power |
| B1124-11 | Lamp Fade Control - Circuit short to ground | • Interior lamp fade control circuit - short to ground | • Refer to the electrical circuit diagrams and check interior lamp fade control circuit for short to ground |
| B1124-12 | Lamp Fade Control - Circuit short to battery | • Interior lamp fade control circuit - short to power | • Refer to the electrical circuit diagrams and check interior lamp fade control circuit for short to power |
| B113C-12 | Hazard Switch Illumination - Circuit short to battery | • Hazard switch illumination control circuit - short to power | • Refer to the electrical circuit diagrams and check hazard switch illumination control circuit for short to power |
| B113C-14 | Hazard Switch Illumination - Circuit short to ground or open | • Hazard switch illumination control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check hazard switch illumination control circuit for short to ground, open circuit |
| B113E-12 | External Boot/Trunk Release Switch - Circuit short to battery | • External luggage compartment lid release switch digital input circuit - short to power | • Refer to the electrical circuit diagrams and check external luggage compartment lid release switch digital input circuit for short to power |
| B113E-23 | External Boot/Trunk Release Switch - Signal stuck low | • External luggage compartment lid release switch digital input circuit - signal stuck low | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check external luggage compartment lid release switch digital input circuit for short to ground |
| B11D9-49 | Vehicle Battery - Internal electronic failure | • Vehicle battery damaged/worn out | • Check battery is in fully charged and serviceable condition using the Midtronics battery tester and the battery care manual |
| B11DB-49 | Battery Monitoring Module - Internal electronic failure | • Internal electronic failure | • Suspect the battery monitoring module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| B11DB-87 | Battery Monitoring Module - Missing message | • Battery monitoring module connector dis-connected/poor connection<br>• Battery monitoring module to RJB LIN circuit - open circuit<br>• Battery monitoring module to battery positive monitor circuit - open circuit<br>• Battery monitoring module/RJB failure | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. If additional DTCs B108783, B108786, B108787 are logged, suspect the RJB. Check and install a new RJB as required, refer to the new module/component installation note at the top of the DTC Index. If additional DTCs B108783, B108786, B108787 are NOT logged, check for good/clean contact at battery monitoring module connector, refer to electrical circuit diagrams and check battery monitoring module to RJB LIN circuit and battery monitoring module to battery positive monitor circuit for open circuit. Clear DTC and repeat automated diagnostic procedure using manufacturer approved diagnostic system. If DTC remains suspect the battery monitoring module, check and install a new battery monitoring module as required, refer to the new module/component installation note at the top of the DTC Index |
| B123A-11 | Left Front Turn Indicator - Circuit short to ground | • Left front turn signal lamp control circuit - short to ground | • Refer to the electrical circuit diagrams and check left front turn signal lamp control circuit for short to ground |
| B123A-12 | Left Front Turn Indicator - Circuit short to battery | • Left front turn signal lamp control circuit - short to power | • Refer to the electrical circuit diagrams and check left front turn signal lamp control circuit for short to power |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B123A-13 | Left Front Turn Indicator - Circuit open | • Left front turn signal lamp control circuit - open circuit | • Refer to the electrical circuit diagrams and check left front turn signal lamp control circuit for open circuit |
| B123A-15 | Left Front Turn Indicator - Circuit short to battery or open | • Left front turn signal lamp control circuit - short circuit to power, open circuit, high resistance | • Refer to electrical circuit diagrams and check left front turn signal lamp control circuit for short circuit to power, open circuit, high resistance. Repair wiring harness as required. Clear DTC and retest |
| B123B-11 | Right Front Turn Indicator - Circuit short to ground | • Right front turn signal lamp control circuit - short to ground | • Refer to the electrical circuit diagrams and check right front turn signal lamp control circuit for short to ground |
| B123B-12 | Right Front Turn Indicator - Circuit short to battery | • Right front turn signal lamp control circuit - short to power | • Refer to the electrical circuit diagrams and check right front turn signal lamp control circuit for short to power |
| B123B-13 | Right Front Turn Indicator - Circuit open | • Right front turn signal lamp control circuit - open circuit | • Refer to the electrical circuit diagrams and check right front turn signal lamp control circuit for open circuit |
| B123B-15 | Right Front Turn Indicator - Circuit short to battery or open | • Right front turn signal lamp control circuit - short circuit to power, open circuit, high resistance | • Refer to electrical circuit diagrams and check right front turn signal lamp control circuit for short circuit to power, open circuit, high resistance. Repair wiring harness as required. Clear DTC and retest |
| B1247-11 | Left Rear Turn Indicator - Circuit short to ground | • Left rear turn signal lamp control circuit - short to ground | • Refer to the electrical circuit diagrams and check left rear turn signal lamp control circuit for short to ground |
| B1247-12 | Left Rear Turn Indicator - Circuit short to battery | • Left rear turn signal lamp control circuit - short to power | • Refer to the electrical circuit diagrams and check left rear turn signal lamp control circuit for short to power |
| B1247-13 | Left Rear Turn Indicator - Circuit open | • Left rear turn signal lamp control circuit - short to power, open circuit | • Refer to the electrical circuit diagrams and check left rear turn signal lamp control circuit for open circuit |
| B1247-15 | Left Rear Turn Indicator - Circuit short to battery or open | • Left rear turn signal lamp control circuit - short circuit to power, open circuit, high resistance | • Refer to electrical circuit diagrams and check left rear turn signal lamp control circuit for short circuit to power, open circuit, high resistance. Repair wiring harness as required. Clear DTC and retest |
| B1248-11 | Right Rear Turn Indicator - Circuit short to ground | • Right rear turn signal lamp control circuit - short to ground | • Refer to the electrical circuit diagrams and check right rear turn signal lamp control circuit for short to ground |
| B1248-12 | Right Rear Turn Indicator - Circuit short to battery | • Right rear turn signal lamp control circuit - short to power | • Refer to the electrical circuit diagrams and check right rear turn signal lamp control circuit for short to power |
| B1248-13 | Right Rear Turn Indicator - Circuit open | • Right rear turn signal lamp control circuit - open circuit | • Refer to the electrical circuit diagrams and check right rear turn signal lamp control circuit for open circuit |
| B1248-15 | Right Rear Turn Indicator - Circuit short to battery or open | • Right rear turn signal lamp control circuit - short circuit to power, open circuit, high resistance | • Refer to electrical circuit diagrams and check right rear turn signal lamp control circuit for short circuit to power, open circuit, high resistance. Repair wiring harness as required. Clear DTC and retest |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1261-13 | Fuel Flap/Door Release Switch - Circuit open | • Fuel filler flap digital input signal circuit - open circuit | • Refer to the electrical circuit diagrams and check fuel filler flap digital input signal circuit for open circuit |
| B1A79-11 | Rear Fog Lamp - Circuit short to ground | • Rear fog lamp control circuit - short to ground | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check rear fog lamp control circuit for short to ground |
| B1A79-12 | Rear Fog Lamp - Circuit short to battery | • Rear fog lamp control circuit - short to power | • Refer to the electrical circuit diagrams and check rear fog lamp control circuit for short to power |
| B1A79-13 | Rear Fog Lamp - Circuit open | • Rear fog lamp control circuit - open circuit | • Refer to the electrical circuit diagrams and check rear fog lamp control circuit for open circuit |
| B1C55-12 | Horn Relay - Circuit short to battery | • Horn control circuit - short to power | • Refer to the electrical circuit diagrams and check horn control circuit for short to power |
| B1C55-14 | Horn Relay - Circuit short to ground or open | • Horn control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check horn control circuit for short to ground, open circuit |
| B1C83-12 | Rear Defog Relay - Circuit short to battery | • High Side output not driven - diagnosis feedback indicates output is short to power | • Refer to the electrical circuit diagrams and check heated rear window power supply circuit for short to power |
| B1C83-14 | Rear Defog Relay - Circuit short to ground or open | • High Side output not driven - diagnosis feedback indicates output is short to ground, open circuit | • Refer to the electrical circuit diagrams and check heated rear window power supply circuit for short to ground, open circuit |
| B1C83-93 | Rear Defog Relay - No operation | • High Side output not driven - diagnosis feedback indicates output is at open load or short to power | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check heated rear window power supply circuit for open load and short to power |
| B1C91-12 | Fuel Flap/Door Lock Relay Coil Circuit - Circuit short to battery | • Fuel filler flap locking motor control circuit - short to power | • Refer to the electrical circuit diagrams and check fuel filler flap locking motor control circuit for short to power |
| B1C91-14 | Fuel Flap/Door Lock Relay Coil Circuit - Circuit short to ground or open | • Fuel filler flap locking motor control circuit - short to ground, open circuit | • Refer to the electrical circuit diagrams and check fuel filler flap locking motor control circuit for short to ground, open circuit |
| B1D35-12 | Hazard Switch - Circuit short to battery | • Hazard warning lamp switch digital input circuit - short to power | • Refer to the electrical circuit diagrams and check hazard warning lamp switch digital input circuit for short to power |
| B1D35-23 | Hazard Switch - Signal stuck low | • Hazard warning lamp switch digital input circuit - signal stuck low | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check hazard warning lamp switch digital input circuit for short to ground |
| U0019-88 | Low Speed CAN Communication Bus - Bus off | • Bus off | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system |
| U0140-00 | Lost Communication With Body Control Module - No sub type information | • No sub type information | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U0155-00 | Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information | • No sub type information | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system |
| U0159-00 | Lost Communication With Parking Assist Control Module "A" - No sub type information | • No sub type information | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system |
| U0164-00 | Lost Communication With HVAC Control Module - No sub type information | • No sub type information | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system |
| U0214-00 | Lost Communication With Remote Function Actuation - No sub type information | • No sub type information | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system |
| U0300-46 | Internal Control Module Software Incompatibility - Calibration/parameter memory failure | • Calibration/parameter memory failure | • Suspect the RJB. Check and install a new RJB as required, refer to the new module/component installation note at the top of the DTC Index |
| U1000-00 | Solid State Driver Protection Active -Driver Disabled - No sub type information | • No sub type information | • Carry out any pinpoint test associated with this DTC using the manufacturer approved diagnostic system |
| U1A14-49 | CAN Initialisation Failure - Internal electronic failure | • Internal electronic failure | • Suspect the RJB. Check and install a new RJB as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-49 | Control Module - Internal electronic failure | • Internal electronic failure | • Suspect the RJB. Check and install a new RJB as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-55 | Control Module - Not configured | • Not configured | • Re-configure the RJB using the manufacturer approved diagnostic system |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Remote Keyless Entry Module (RFA)

Description and Operation

## Remote Keyless Entry Module (RFA)

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 remote keyless entry module, for additional diagnosis and testing information refer to the relevant diagnosis and testing section.
For additional information, refer to: Remote Keyless Entry (RKE) Module (419-10 Multifunction Electronic Modules, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B102B-00 | Passive Key - No sub type information | • Response Error - general failure | • Using the manufacturer approved diagnostic system, clear all passive keys, re-learn all passive keys |
| B10C1-00 | Left Front Unlock Pull Switch - No sub type information | • No power supply to door handle<br>• Switch circuit open, or short circuit to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check the power supply to the door handle. Check the switch circuit is not open circuit or short to power. Repair wiring as required |
| B10C1-24 | Left Front Unlock Pull Switch - Signal stuck high | • Signal stuck high - button stuck in active position | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check for stuck left front unlock switch. Refer to the electrical circuit diagrams and check left front unlock switch circuit for short to ground |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B10C2-00 | Left Rear Unlock Pull Switch - No sub type information | • No power supply to door handle<br>• Switch circuit open, or short circuit to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check the power supply to the door handle. Check the switch circuit is not open circuit or short to power. Repair wiring as required |
| B10C2-24 | Left Rear Unlock Pull Switch - Signal stuck high | • Signal stuck high - button stuck in active position | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check for stuck left rear unlock switch. Refer to the electrical circuit diagrams and check left rear unlock switch circuit for short to ground |
| B10C3-00 | Right Front Unlock Pull Switch - No sub type information | • No power supply to door handle<br>• Switch circuit open, or short circuit to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check the power supply to the door handle. Check the switch circuit is not open circuit or short to power. Repair wiring as required |
| B10C3-24 | Right Front Unlock Pull Switch - Signal stuck high | • Signal stuck high - button stuck in active position | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check for stuck right front unlock switch. Refer to the electrical circuit diagrams and check right front unlock switch circuit for short to ground |
| B10C4-00 | Right Rear Unlock Pull Switch - No sub type information | • No power supply to door handle<br>• Switch circuit open, or short circuit to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check the power supply to the door handle. Check the switch circuit is not open circuit or short to power. Repair wiring as required |
| B10C4-24 | Right Rear Unlock Pull Switch - Signal stuck high | • Signal stuck high - button stuck in active position | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check for stuck right rear unlock switch. Refer to the electrical circuit diagrams and check right front unlock switch circuit for short to ground |
| B10C5-24 | Trunk Unlock Pull Switch - Signal stuck high | • Signal stuck high - button stuck in active position | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check for stuck luggage compartment lid unlock switch. Refer to the electrical circuit diagrams and check luggage compartment lid unlock switch circuit for short to ground |
| B10C6-1F | Exterior Trunk Antenna - Circuit intermittent | • Circuit intermittent - general electrical error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check exterior luggage compartment antenna circuits for short to ground, power, open circuit |
| B10C7-1F | Interior Trunk Antenna - Circuit intermittent | • Circuit intermittent - general electrical error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check interior luggage compartment antenna circuits for short to ground, power, open circuit |
| B10C8-1F | Interior Center Antenna - Circuit intermittent | • Circuit intermittent - general electrical error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check interior center antenna circuits for short to ground, power, open circuit |
| B10C9-1F | Interior Front Antenna - Circuit intermittent | • Circuit intermittent - general electrical error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check interior front antenna circuits for short to |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | ground, power, open circuit |
| B10CA-1F | Left Rear Door Handle Antenna - Circuit intermittent | • Circuit intermittent - general electrical error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check left rear door handle antenna circuits for short to ground, power, open circuit |
| B10CB-1F | Right Rear Door Handle Antenna - Circuit intermittent | • Circuit intermittent - general electrical error | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check right rear door handle antenna circuits for short to ground, power, open circuit |
| B10CC-24 | Left Front Latch Clutch Switch - Signal stuck high | • Signal stuck high - button stuck in active position | • Check for stuck left front door latch clutch switch. Refer to the electrical circuit diagrams and check left front door latch clutch switch circuit for short to ground |
| B10CD-24 | Left Rear Latch Clutch Switch - Signal stuck high | • Signal stuck high - button stuck in active position | • Check for stuck left rear door latch clutch switch. Refer to the electrical circuit diagrams and check left front door latch clutch switch circuit for short to ground |
| B10CE-24 | Right Front Latch Clutch Switch - Signal stuck high | • Signal stuck high - button stuck in active position | • Check for stuck right front door latch clutch switch. Refer to the electrical circuit diagrams and check left front door latch clutch switch circuit for short to ground |
| B10CF-24 | Right Rear Latch Clutch Switch - Signal stuck high | • Signal stuck high - button stuck in active position | • Check for stuck right rear door latch clutch switch. Refer to the electrical circuit diagrams and check left front door latch clutch switch circuit for short to ground |
| B10D1-24 | Left Front Lock Button - Signal stuck high | • Signal stuck high - button stuck in active position | • Check for stuck left front door handle lock switch. Refer to the electrical circuit diagrams and check left front door latch clutch switch circuit for short to ground |
| B10D2-24 | Left Rear Lock Button - Signal stuck high | • Signal stuck high - button stuck in active position | • Check for stuck left rear door handle lock switch. Refer to the electrical circuit diagrams and check left front door latch clutch switch circuit for short to ground |
| B10D3-24 | Right Front Lock Button - Signal stuck high | • Signal stuck high - button stuck in active position | • Check for stuck right front door handle lock switch. Refer to the electrical circuit diagrams and check left front door latch clutch switch circuit for short to ground |
| B10D4-24 | Right Rear Lock Button - Signal stuck high | • Signal stuck high - button stuck in active position | • Check for stuck right rear door handle lock switch. Refer to the electrical circuit diagrams and check left front door latch clutch switch circuit for short to ground |
| U0010-00 | Medium Speed CAN Communication Bus - No subtype information | • No subtype information | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Carry out CAN network integrity test using the manufacturer approved diagnostic system |
| U0140-00 | Lost Communication With Body Control Module - No subtype information | • Missing message from CJB | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Carry out CAN network integrity test using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check power and ground supplies to CJB |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U0142-00 | Lost Communication With Body Control Module "B" - No subtype information | • Missing message from RJB | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Carry out CAN network integrity test using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check power and ground supplies to RJB |
| U0155-00 | Lost Communication With Instrument Panel Cluster (IPC) Control Module - No subtype information | • Missing message from instrument cluster | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Carry out CAN network integrity test using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check power and ground supplies to instrument cluster |
| U0300-00 | Internal Control Module Software Incompatibility - No subtype information | • Invalid configuration message is received | • Re-configure the RJB using the manufacturer approved diagnostic system. Clear the DTC and retest. If the DTC is still logged suspect the remote keyless entry module, refer to the new module installation note at the top of the DTC Index |
| U201F-00 | External Receiver - No subtype information | • No subtype information - communication error | • Suspect the RF receiver, check and install a new RF receiver as required, refer to the new module/component installation note at top of DTC Index |
| U201F-13 | External Receiver - Circuit open | • Line open | • Refer to the electrical circuit diagrams and test RF receiver communication circuit to remote keyless entry module for short to ground or open circuit |
| U201F-87 | External Receiver - Missing message | • Transmission error | • Refer to the electrical circuit diagrams and check the data line between the RF receiver and the remote keyless entry module for short, open circuit. Suspect the RF receiver or remote keyless entry module, check and install a new RF receiver or remote keyless entry module as required, refer to the new module/component installation note at top of DTC Index |
| U2100-00 | Initial Configuration Not Complete - No subtype information | • No subtype information | • Configure the Remote Keyless Entry module using the manufacturer approved diagnostic system |
| U2101-00 | Control Module Configuration Incompatible - No subtype information | • No subtype information | • Re-configure the RJB using the manufacturer approved diagnostic system |
| U3000-49 | Control Module - Internal electronic failure | • Internal electronic failure | • Install a new remote keyless entry module, refer to the new module installation note at the top of the DTC Index |
| U3002-81 | Vehicle Identification Number - Invalid serial data received | • Vehicle/component mis-match. Module previously installed to other vehicle | • Install correct/new module to vehicle specification, refer to the new module/component installation note at the top of the DTC Index |
| U3003-62 | Battery Voltage - Signal compare failure | • Mis-match in battery voltage, of 2 volts or more, between remote keyless entry module and RJB | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system<br>• Refer to the relevant section of the workshop manual and test the battery and charging system |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Restraints Control Module (RCM)

Description and Operation

## Restraints Control Module (RCM)

WARNINGS:

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

Do not use a multimeter to probe the restraints control module. It is possible for the power from the meter battery to trigger the activation of the airbags. 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 tested and/or the donor vehicle.

NOTES:

If a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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.

It is advisable not to use a cellular phone or to have a cellular phone in close proximity when working on the restraints control module or associated systems.

Given the legal implications of a restraints system failure, harness repairs to air bag module circuits are not acceptable. Where the text refers to "REPAIR the circuit", this will normally mean the replacement of a harness.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Restraints Control Module (RCM). 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 and Safety Belt Pretensioner Supplemental Restraint System (SRS) (501-20B Supplemental Restraint System, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B0001-09 | Driver Frontal Stage 1 Deployment Control - Component failures | • Driver front stage 1 air bag - internal driver failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B0001-11 | Driver Frontal Stage 1 Deployment Control - Circuit short to ground | • Driver front stage 1 air bag circuit - short to ground | • Refer to electrical circuit diagrams and test driver front stage 1 air bag circuit for short to ground |
| B0001-12 | Driver Frontal Stage 1 Deployment Control - Circuit short to battery | • Driver front stage 1 air bag circuit - short to power | • Refer to electrical circuit diagrams and test driver front stage 1 air bag circuit for short to power |
| B0001-1A | Driver Frontal Stage 1 Deployment Control - Circuit resistance below threshold | • Circuit resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0001-1B | Driver Frontal Stage 1 Deployment Control - Circuit resistance above threshold | • Circuit resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0001-1C | Driver Frontal Stage 1 Deployment Control - Circuit voltage out of range | • Driver front stage 1 air bag circuit - high resistance | • Refer to electrical circuit diagrams and test driver front stage 1 air bag circuit for high resistance |
| B0001-56 | Driver Frontal Stage 1 Deployment Control - Invalid/incomplete configuration | • Incompatible configuration | • Re-configure the RCM using the manufacturer approved diagnostic system |
| B0001-95 | Driver Frontal Stage 1 Deployment Control - Incorrect assembly | • Crosscoupling with other firing loop | • Refer to electrical circuit diagrams and test driver front stage 1 air bag circuit for crosscoupling with other firing loop |
| B0002-09 | Driver Frontal Stage 2 Deployment Control - Component failures | • Driver front stage 2 air bag - internal driver failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0002-11 | Driver Frontal Stage 2 Deployment Control - Circuit short to ground | • Driver front stage 2 air bag circuit - short to ground | • Refer to the electrical circuit diagrams and test driver front stage 2 air bag circuit for short to ground |
| B0002-12 | Driver Frontal Stage 2 Deployment Control - Circuit short to battery | • Driver front stage 2 air bag circuit - short to power | • Refer to the electrical circuit diagrams and test driver front stage 2 air bag circuit for short to power |
| B0002-1A | Driver Frontal Stage 2 Deployment Control - Circuit resistance below threshold | • Circuit resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0002-1B | Driver Frontal Stage 2 Deployment Control - Circuit resistance above threshold | • Circuit resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0002-1C | Driver Frontal Stage 2 Deployment Control - Circuit voltage out of range | • Driver front stage 2 air bag circuit - high resistance | • Refer to electrical circuit diagrams and test driver front stage 2 air bag circuit for high resistance |
| B0002-56 | Driver Frontal Stage 2 Deployment Control - Invalid/incomplete configuration | • Incompatible configuration | • Re-configure the RCM using the manufacturer approved diagnostic system |
| B0002-95 | Driver Frontal Stage 2 Deployment Control - Incorrect assembly | • Crosscoupling with other firing loop | • Refer to electrical circuit diagrams and test driver front stage 2 air bag circuit for crosscoupling with other firing loop |
| B0010-09 | Passenger Frontal Stage 1 Deployment Control - Component failures | • Passenger front stage 1 air bag - internal driver failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B0010-11 | Passenger Frontal Stage 1 Deployment Control - Circuit short to ground | • Passenger front stage 1 air bag circuit - short to ground | • Refer to the electrical circuit diagrams and test passenger front stage 1 air bag circuit for short to ground |
| B0010-12 | Passenger Frontal Stage 1 Deployment Control - Circuit short to battery | • Passenger front stage 1 air bag circuit - short to power | • Refer to the electrical circuit diagrams and test passenger front stage 1 air bag circuit for short to power |
| B0010-1A | Passenger Frontal Stage 1 Deployment Control - Circuit resistance below threshold | • Circuit resistance below threshold | • Carry out the pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0010-1B | Passenger Frontal Stage 1 Deployment Control - Circuit resistance above threshold | • Circuit resistance above threshold | • Carry out the pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0010-1C | Passenger Frontal Stage 1 Deployment Control - Circuit voltage out of range | • Passenger front stage 1 air bag circuit - high resistance | • Refer to electrical circuit diagrams and test passenger front stage 1 air bag circuit for high resistance |
| B0010-56 | Passenger Frontal Stage 1 Deployment Control - Invalid/incomplete configuration | • Incompatible configuration | • Re-configure the RCM using the manufacturer approved diagnostic system |
| B0010-95 | Passenger Frontal Stage 1 Deployment Control - Incorrect assembly | • Crosscoupling with other firing loop | • Refer to electrical circuit diagrams and test passenger front stage 1 air bag circuit for crosscoupling with other firing loop |
| B0011-09 | Passenger Frontal Stage 2 Deployment Control - Component failures | • Passenger front stage 2 air bag - internal driver failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0011-11 | Passenger Frontal Stage 2 Deployment Control - Circuit short to ground | • Passenger front stage 2 air bag circuit - short to ground | • Refer to the electrical circuit diagrams and test passenger front stage 2 air bag circuit for short to ground |
| B0011-12 | Passenger Frontal Stage 2 Deployment Control - Circuit short to battery | • Passenger front stage 2 air bag circuit - short to power | • Refer to the electrical circuit diagrams and test passenger front stage 2 air bag circuit for short to power |
| B0011-1A | Passenger Frontal Stage 2 Deployment Control - Circuit resistance below threshold | • Circuit resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0011-1B | Passenger Frontal Stage 2 Deployment Control - Circuit resistance above threshold | • Circuit resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0011-1C | Passenger Frontal Stage 2 Deployment Control - Circuit voltage out of range | • Passenger front stage 2 air bag circuit - high resistance | • Refer to electrical circuit diagrams and test passenger front stage 2 air bag circuit for high resistance |
| B0011-56 | Passenger Frontal Stage 2 Deployment Control - Invalid/incomplete configuration | • Incompatible configuration | • Re-configure the RCM using the manufacturer approved diagnostic system |
| B0011-95 | Passenger Frontal Stage 2 Deployment Control - Incorrect assembly | • Crosscoupling with other firing loop | • Refer to electrical circuit diagrams and test passenger front stage 2 air bag circuit for crosscoupling with other firing loop |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B0020-09 | Left Side Air Bag Deployment Control - Component failures | • Left side air bag circuit - internal driver failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0020-11 | Left Side Air Bag Deployment Control - Circuit short to ground | • Left side air bag circuit - short to ground | • Refer to the electrical circuit diagrams and test left side air bag circuit for short to ground |
| B0020-12 | Left Side Air Bag Deployment Control - Circuit short to battery | • Left side air bag circuit - short to power | • Refer to the electrical circuit diagrams and test left side air bag circuit for short to power |
| B0020-1A | Left Side Air Bag Deployment Control - Circuit resistance below threshold | • Circuit resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0020-1B | Left Side Air Bag Deployment Control - Circuit resistance above threshold | • Circuit resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0020-1C | Left Side Air Bag Deployment Control - Circuit voltage out of range | • Left side air bag circuit - high resistance | • Refer to electrical circuit diagrams and test left side air bag circuit for high resistance |
| B0020-56 | Left Side Air Bag Deployment Control - Invalid/incomplete configuration | • Incompatible configuration | • Re-configure the RCM using the manufacturer approved diagnostic system |
| B0020-95 | Left Side Air Bag Deployment Control - Incorrect assembly | • Crosscoupling with other firing loop | • Refer to electrical circuit diagrams and test left side air bag circuit for crosscoupling with other firing loop |
| B0028-09 | Right Side Air Bag Deployment Control - Component failures | • Right side air bag circuit - internal driver failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0028-11 | Right Side Air Bag Deployment Control - Circuit short to ground | • Right side air bag circuit - short to ground | • Refer to the electrical circuit diagrams and test right side air bag circuit for short to ground |
| B0028-12 | Right Side Air Bag Deployment Control - Circuit short to battery | • Right side air bag circuit - short to power | • Refer to the electrical circuit diagrams and test right side air bag circuit for short to power |
| B0028-1A | Right Side Air Bag Deployment Control - Circuit resistance below threshold | • Circuit resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0028-1B | Right Side Air Bag Deployment Control - Circuit resistance above threshold | • Circuit resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0028-1C | Right Side Air Bag Deployment Control - Circuit voltage out of range | • Right side air bag circuit - high resistance | • Refer to electrical circuit diagrams and test right side air bag circuit for high resistance |
| B0028-56 | Right Side Air Bag Deployment Control - Invalid/incomplete configuration | • Incompatible configuration | • Re-configure the RCM using the manufacturer approved diagnostic system |
| B0028-95 | Right Side Air Bag Deployment Control - Incorrect assembly | • Crosscoupling with other firing loop | • Refer to electrical circuit diagrams and test right side air bag circuit for crosscoupling with other firing loop |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B0029-09 | Right Curtain Deployment Control 1 - Component failures | • Right curtain deployment control 1 circuit - internal driver failure | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0029-11 | Right Curtain Deployment Control 1 - Circuit short to ground | • Right curtain deployment control 1 circuit - short to ground | • Refer to electrical circuit diagrams and check right curtain deployment control 1 circuit for short to ground |
| B0029-12 | Right Curtain Deployment Control 1 - Circuit short to battery | • Right curtain deployment control 1 circuit - short to power | • Refer to electrical circuit diagrams and check right curtain deployment control 1 circuit for short to power |
| B0029-1A | Right Curtain Deployment Control 1 - Circuit resistance below threshold | • Circuit resistance below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0029-1B | Right Curtain Deployment Control 1 - Circuit resistance above threshold | • Circuit resistance above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0029-1C | Right Curtain Deployment Control 1 - Circuit voltage out of range | • Right curtain deployment control 1 circuit - high resistance | • Refer to electrical circuit diagrams and test right curtain deployment control 1 circuit for high resistance |
| B0029-56 | Right Curtain Deployment Control 1 - Invalid/incomplete configuration | • Incompatible configuration | • Re-configure the RCM using the manufacturer approved diagnostic system |
| B0029-95 | Right Curtain Deployment Control 1 - Incorrect assembly | • Crosscoupling with other firing loop | • Refer to electrical circuit diagrams and test right curtain deployment control 1 circuit for crosscoupling with other firing loop |
| B0050-11 | Driver Safety Belt Sensor - Circuit short to ground | • Driver safety belt sensor circuit - short to ground | • Refer to the electrical circuit diagrams and test driver safety belt sensor circuit for short to ground |
| B0050-12 | Driver Safety Belt Sensor - Circuit short to battery | • Driver safety belt sensor circuit - short to power | • Refer to the electrical circuit diagrams and test driver safety belt sensor circuit for short to power |
| B0050-13 | Driver Safety Belt Sensor - Circuit open | • Driver safety belt sensor circuit - open circuit | • Refer to the electrical circuit diagrams and test driver safety belt sensor circuit for open circuit |
| B0050-1E | Driver Safety Belt Sensor - Circuit resistance out of range | • Driver safety belt sensor circuit - resistance out of range | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B0050-56 | Driver Safety Belt Sensor - Invalid/incomplete configuration | • Incompatible configuration | • Re-configure the RCM using the manufacturer approved diagnostic system |
| B0052-11 | Passenger Safety Belt Sensor - Circuit short to ground | • Passenger safety belt sensor circuit - short to ground | • Refer to the electrical circuit diagrams and test passenger safety belt sensor circuit for short to ground |
| B0052-12 | Passenger Safety Belt Sensor - Circuit short to battery | • Passenger safety belt sensor circuit - short to power | • Refer to the electrical circuit diagrams and test passenger safety belt sensor circuit for short to power |
| B0052-13 | Passenger Safety Belt Sensor - Circuit open | • Passenger safety belt sensor circuit - open circuit | • Refer to the electrical circuit diagrams and test passenger safety belt sensor circuit for open circuit |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Satellite Digital Audio Radio System Module (SARM)

Description and Operation

## Satellite Radio Module (SARM)

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, 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 needed

The table below lists all diagnostic trouble codes (DTCs) that could be logged on the satellite radio 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 Causes | Action |
|---|---|---|---|
| B1A89-01 | Satellite Antenna - General electrical failure | • Wiring harness fault - Coaxial cable between satellite radio module and the satellite antenna<br>• Internal electronic failure - Satellite digital audio radio antenna<br>• Internal electronic failure - Satellite radio module | • Refer to the electrical circuit diagrams and check satellite digital audio radio antenna coaxial cable for short circuit to ground, short circuit to power, open circuit, high resistance. Repair wiring harness as required, clear DTC and retest<br>• If fault persists, check and install a new satellite digital audio radio antenna<br>• If fault persists, check and install a new satellite radio module<br>• 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 |
| B1A89-11 | Satellite Antenna - Circuit short to ground | • Satellite antenna circuit - short to ground | • Refer to the electrical circuit diagrams and check satellite antenna circuit for short circuit to ground. Repair wiring harness as required. Clear DTC and retest |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A89-12 | Satellite Antenna - Circuit short to battery | • Satellite antenna circuit - short to power | • Refer to the electrical circuit diagrams and check satellite antenna circuit for short circuit to power. Repair wiring harness as required. Clear DTC and retest |
| B1A89-13 | Satellite Antenna - Circuit open | • Satellite antenna circuit - open circuit, high resistance | • Refer to the electrical circuit diagrams and check satellite antenna circuit for open circuit, high resistance. Repair wiring harness as required. Clear DTC and retest |
| U3000-04 | Control Module - System internal failures | • System internal failure | • Check and install a new satellite radio 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 |
| U3000-4A | Control Module - Incorrect component installed | • Satellite radio module - Incorrect component installed<br>• Car configuration mismatch | • Using the manufacturer approved diagnostic system select the vehicle configuration main menu>vehicle configuration>display and modify the vehicle configuration file data<br>• Check update as required |
| U3000-55 | Control Module - Not configured | • Satellite radio module - Incorrect component installed<br>• Incorrect car configuration file data received | • Using the manufacturer approved diagnostic system select the vehicle configuration main menu>select configure existing modules menu and program the satellite radio module |
| U3000-87 | Control Module - Missing message | • The satellite radio module has not received the configuration file<br>• Master module not transmitting configuration file | • Using the manufacturer approved diagnostic system check that the satellite radio module is configured correctly<br>• Check that the configuration file is being transmitted by the master module<br>• Using the manufacturer approved diagnostic system, complete a MOST network integrity test |
| U3000-98 | Control Module - Component or system over temperature | • Satellite radio module cooling vents obstructed<br>• Wiring harness fault<br>• Internal electronic failure | • Check for possible causes of the satellite radio module overheating. Check that the ventilation is not obstructed<br>• Check for short circuit related DTCs. Refer to the electrical circuit diagrams and check ground circuit for high resistance. Check antenna circuit for short to power or ground. Repair wiring harness as required. Clear DTC and retest<br>• Check for internal electronic failure related DTCs<br>• If fault persists, check and install a new satellite radio module. 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 |
| U3003-62 | Battery Voltage - Signal compare failure | • Signal compare failure<br>• Satellite radio module voltage differs more than ±2V compared to rear junction box voltage | • Refer to relevant section of workshop manual and battery care manual. Check battery state of charge and starting/charging system performance. Check power supply circuit from rear junction box to satellite radio module<br>• Refer to electrical circuit diagrams and check the power and ground supply circuits to the module. Repair wiring harness as required. Clear DTC and retest |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Speed Control Module (CCM)

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:

If a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Adaptive Speed Control Module (ASCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual. For additional information, refer to: Speed Control (310-03C Speed Control - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A84-81 | Car Configuration Data - Invalid serial data received | • RJB reporting invalid data | • Re-configure the RJB using manufacturer approved diagnostic system |
| C1A67-54 | Forward Looking Sensor - Missing calibration | • Speed control sensor out of alignment | • Check speed control sensor for correct vertical alignment, and carry out speed control sensor alignment procedure using manufacturer approved diagnostic system |
| C1A67-81 | Forward Looking Sensor - Invalid serial data received | • Yaw voltage unreasonable for 0.5 seconds or unchanged for 1.2 seconds. Note: Yaw sensor internal to speed control sensor | • Clear DTC and re-test, if DTC remains suspect speed control sensor. Check and install a new sensor as required, refer to the new module/component installation note at the top of the DTC Index |
| C1A67-87 | Forward Looking Sensor - Missing Message | • Incorrect or missing data from speed control sensor | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check power and ground supplies for short, open circuit. Check private CAN network between speed control sensor and speed control module for failure, clear DTC and re-test. If DTC remains suspect the |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | speed control sensor, check and install a new sensor as required, refer to the new module/component installation note at the top of the DTC Index |
| C1A67-96 | Forward Looking Sensor - Component internal Failure | • Internal hardware failure | • Suspect the speed control sensor. Check and install a new sensor as required, refer to the new module/component installation note at the top of the DTC Index |
| C1A67-97 | Forward Looking Sensor - Component or system operation obstructed or blocked | • Sensor reduced visibility | • Check for blockage in front of radar. Note: This DTC will be cleared automatically when environmental conditions allow |
| C1A67-98 | Forward Looking Sensor - Component or system over temperature | • Speed control sensor internal temperature exceeded threshold | • Allow system to cool. Note: This DTC will be cleared automatically when environmental conditions allow |
| P174E-81 | Output Shaft Speed/ABS Wheel Speed Correlation - Invalid serial data received | • Follow speed is mis-calculated to too high a value | • Clear DTC and re-test |
| U0001-88 | High Speed CAN Communication Bus - Bus off | • Vehicle CAN Bus off condition | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Carry out CAN network integrity tests using the manufacturer approved diagnostic system |
| U0100-00 | Lost Communications With ECM/PCM "A" - No sub type information | • ECM missing message | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check ECM for related DTCs and refer to the relevant DTC Index |
| U0101-00 | Lost Communications With TCM - No sub type information | • TCM missing message | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check TCM for related DTCs and refer to the relevant DTC Index |
| 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 Shift 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 Shift Module and Speed Control Module |
| U0103-87 | Lost Communication With Gear Shift Module - Missing Message | • Transmission shift module missing message | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check transmission shift 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 | • ABS missing message | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check ABS for related DTCs and refer to the relevant DTC Index |
| U0128-00 | Lost Communications With Park Brake Module - No sub type information | • Parking brake missing message | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check parking brake module for related DTCs and refer to the relevant DTC Index |
| U0155-00 | Lost Communications With Instrument Panel Cluster (IPC) Control Module - No sub type information | • Instrument cluster missing message | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check instrument cluster for related DTCs and refer to the relevant DTC Index |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • Invalid configuration message is received | • Re-configure the speed control module using the manufacturer approved diagnostic system. Clear DTCs and re-test. If DTC still logged, suspect incorrect speed control module installed. Check and install a new module as required, refer to new module/component installation note at top of DTC Index |
| U0300-55 | Internal Control Module Software Incompatibility - Not configured | • RJB - at least one of the car configuration parameters is not configured | • Re-configure the RJB using the manufacturer approved diagnostic system |
| U0401-00 | Invalid Data Received From ECM/PCM A - No sub type information | • ECM did not respond properly to speed control cancel or auto brake cancel request | • Check ECM for related DTCs and refer to relevant DTC Index |
| U0401-67 | Invalid Data Received From ECM/PCM A - Signal incorrect after event | • ECM did not respond properly to speed control resume request | • Check ECM for related DTCs and refer to relevant DTC Index |
| U0401-81 | Invalid Data Received From ECM/PCM A - Invalid serial data received | • Invalid data received from engine control module<br>• Bus signal/message failure<br>• Speed control inhibited by ECM | • Check the Engine Control Module for related DTCs and refer to relevant DTC Index. If U040181 is logged as historic but no other DTCs have logged in the engine control module at the same time and distance, it may be caused by cranking with low voltage conditions. Check battery and charging system according to instructions in the battery care manual. Install the latest Engine Control Module software using the manufacturer approved diagnostic system, contact Dealer Technical Support before replacing components |
| U0415-53 | Invalid Data Received From Anti-Lock Braking System (ABS) Control Module - De-activated | • Event information<br>• Deactivated | • Check the Anti-Lock Braking System Module for related DTCs and refer to the relevant DTC index |
| U0415-81 | Invalid Data Received From Anti-lock Brake System (ABS) Control Module - Invalid serial data received | • Stability assist fault | • Check ABS module for related DTCs and refer to relevant DTC Index |
| U0417-67 | Invalid Data Received From Park Brake Control Module - Signal incorrect after event | • Parking brake module did not respond properly to apply request | • Check parking brake module for related DTCs and refer to relevant DTC Index |
| U0417-81 | Invalid Data Received From Park Brake Control Module - Invalid serial data received | • Speed control inhibited by parking brake module | • Check parking brake module for related DTCs and refer to relevant DTC Index |
| U0418-68 | Invalid Data Received From Brake System Control Module - Event information | • Event information | • Check the Anti-Lock Braking System 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 | • Invalid serial data received | • Check the 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 | • Speed control inhibited by instrument cluster | • Check instrument cluster, CJB and RJB for related DTCs and refer to relevant DTC Index |
| U1A00-88 | Private Communication Network - Bus off | • Bus off | • The module setting this code has disabled CAN transmission. Check for other bus off codes. Check the module and circuits. Refer to the electrical circuit diagrams. Clear all DTCs and road test the vehicle. If the concern reoccurs contact Dealer Technical |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | Support for further advice. Under no circumstance should any parts be replaced to overcome this issue |
| U1A14-49 | CAN Initialisation Failure - Internal electronic failure | • Internal electronic failure | • Suspect the speed control module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U2101-00 | Control Module Configuration Incompatible - No sub type information | • Data sent from RJB is invalid | • Check/amend Car Configuration File using the manufacturer approved diagnostic system, clear DTC and re-test. If DTC remains, re-configure RJB using manufacturer approved diagnostic system, clear DTC and re-test. If DTC remains check RJB for DTCs and refer to DTC Index |
| U3000-41 | Control Module - General checksum failure | • Internal micro controller error<br>• Checksum fault | • Suspect the speed control module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-42 | Control Module - General memory failure | • Internal RAM test fault | • Suspect the speed control module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-49 | Control Module - Internal electronic failure | • Internal control module failure | • Suspect the speed control module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-63 | Control Module - Circuit/component protection time-out | • Circuit/component protection time-out | • The Control module internal protection has been activated. Check for other related DTCs that could lead to this event. Clear the DTC and retest. If the problem persists, renew the module. Refer to the warranty policy and procedures manual if a module is suspect |
| U3003-62 | Battery Voltage - Signal compare failure | • Signal compare failure<br>• Battery supply voltage below a recognized value | • 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 modules |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Steering Column Lock Module (VIM)

Description and Operation

## Steering Column Lock Module (VIM)

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, 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.

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 Steering Column Lock Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Steering Column Switches (211-05 Steering Column Switches, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B100D-51 | Column Lock Authorisation - Not programmed | • Module not programmed | • Configure the Steering Column Lock Module using the manufacturers approved diagnostic system |
| B100D-62 | Column Lock Authorisation - Signal compare failure | • Signal compare failure - This DTC will be logged if the encrypted data exchange does not match between Steering Column Lock and the Central Junction Box | • Configure the modules using the manufacturers approved diagnostic system. If the problem persists, complete a CAN network integrity test using the manufacturers approved diagnostic system. Perform an on demand self-test and retest |
| B100D-64 | Column Lock Authorisation - Signal plausibility failure | • Signal plausibility failure<br>• Steering Column Lock unable to perform lock action<br>• CAN Network fault<br>• Anti-lock Braking System, Engine Control Module, Central Junction Box fault | NOTE: Prior to clearing this DTC, carry out the Vehicle Functional Reset application using the manufacturer approved diagnostic system<br>• Check the serviceability of the steering column and lock. Clear the DTC and retest. If the problem persists, carry out CAN Network Integrity Test and Module Self Test using the manufacturer approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | check CAN Network |
| B100D-87 | Column Lock Authorisation - Missing message | • Missing message<br>• CAN fault<br>• No response from electric steering column lock control module, instrument cluster, central junction box<br>• Battery voltage at electric steering column lock control module too low<br>• Electric steering column lock control module, instrument cluster, central junction box fault |  NOTE: Prior to clearing this DTC, carry out the Vehicle Functional Reset application using the manufacturer approved diagnostic system<br>• Clear DTC, repeatedly lock and unlock car using the key fob and retest. Check for related DTCs and refer to the relevant DTC index<br>• If the fault is cleared, notify the customer that the steering column lock may fail to unlock if the vehicle is parked with a high steering angle or with the road wheel against a curb. If the column lock is failing to disengage, the customer may be able to rectify this by rotating the steering wheel while pressing the engine start button<br>• If fault persists, complete a CAN network integrity test using the manufacturers approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and check CAN circuits between the central junction box, the instrument cluster and the electronic steering column lock. Refer to the electrical circuit diagrams and check the central junction box, the instrument cluster and the electronic steering column lock power and ground supply circuits for short circuit to ground, short circuit to power, open circuit, high resistance. Repair circuit(s) as required. Clear DTC, perform an on demand self-test and retest<br>• If fault persists, check that the vehicle battery supply voltage is between 9-16 volts. Rectify as required |
| 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 module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network |
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • No sub type information | • Refer to network communication section of the workshop manual. Clear the DTC and ensure the vehicle battery supply voltage is between 9-16Volts. Using the manufacturers approved diagnostic system, complete a CAN integrity test. Perform an on demand self-test and retest |
| U3000-49 | Control Module - Internal electronic failure | • Internal electronic failure detected during self test or lock/unlock operation | • Refer to network communication section of the workshop manual. Clear the DTC and ensure the vehicle battery supply voltage is between 9-16Volts. Perform an on demand self-test and if the DTC returns suspect the electric steering column lock, refer to the warranty policy and procedures manual if a module/component is suspect |
| U3000-87 | Control Module - Missing message | • Configuration message not received | • 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. Check modules are configured correctly using the manufacturer approved diagnostic system |
| U3002-81 | Vehicle Identification Number - Invalid serial data received | • Invalid vehicle identification number | • Confirm the correct VIN details are stored in Steering Column Lock Module using the approved diagnostic system |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Television Module (TVM)

Description and Operation

## Television Control Module (TVCM)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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). 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 |
|---|---|---|---|
| B1A56-11 | Antenna - Circuit short to ground | • Antenna circuit short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna circuit for short to ground |
| B1A56-12 | Antenna - Circuit short to battery | • Antenna circuit short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna circuit for short to power |
| B1A56-13 | Antenna - Circuit open | • Antenna circuit open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna circuit for open circuit |
| B1D55-11 | Antenna#2 - Circuit short to ground | • Antenna #2 circuit short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna #2 circuit for short to ground |
| B1D55-12 | Antenna#2 - Circuit short to battery | • Antenna #2 circuit short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna #2 circuit for short to power |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1D55-13 | Antenna#2 - Circuit open | • Antenna #2 circuit open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna #2 circuit for open circuit |
| B1D56-11 | Antenna #3 Circuit - Circuit short to ground | • Antenna #3 circuit short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna #3 circuit for short to ground |
| B1D56-12 | Antenna #3 Circuit - Circuit short to battery | • Antenna #3 circuit short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna #3 circuit for short to power |
| B1D56-13 | Antenna #3 Circuit - Circuit open | • Antenna #3 circuit open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna #3 circuit for open circuit |
| B1D57-11 | Antenna #4 Circuit - Circuit short to ground | • Antenna #4 circuit short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna #4 circuit for short to ground |
| B1D57-12 | Antenna #4 Circuit - Circuit short to battery | • Antenna #4 circuit short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna #4 circuit for short to power |
| B1D57-13 | Antenna #4 Circuit - Circuit open | • Antenna #4 circuit open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check antenna #4 circuit for open circuit |
| B1D58-11 | Television Output - Circuit short to ground | • Television output circuit short to ground | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check television output circuit for short to ground |
| B1D58-12 | Television Output - Circuit short to battery | • Television output circuit short to power | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check television output circuit for short to power |
| B1D58-13 | Television Output - Circuit open | • Television output circuit open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to electrical circuit diagrams and check television output circuit for open circuit |
| U3000-49 | Control Module - Internal electronic failure | • Internal electronic failure | • Suspect the television module, check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3003-16 | Battery Voltage - Circuit voltage below threshold | • Circuit voltage below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U3003-17 | Battery Voltage - Circuit voltage above threshold | • Circuit voltage above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Tire Pressure Monitoring System Module (TPM)

Description and Operation

## Tire Pressure Monitoring System (TPM)

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, 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.

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 Tire Pressure Monitoring System, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C1A56-31 | Left Front Tire Pressure Sensor and Transmitter Assembly - No signal | • Missing, incompatible or defective tire pressure sensor or radio frequency receiver | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test F in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A56-68 | Left Front Tire Pressure Sensor and Transmitter Assembly - Event information | • Information only - vehicle exposed to extreme temperature environment and/or tire pressure sensor low battery voltage event | • No action required |
| C1A56-91 | Left Front Tire Pressure Sensor and Transmitter Assembly - Parametric | • Tire pressure sensor has reported out of range information for pressure, temperature or acceleration | • Replace defective tire pressure sensor. Refer to the relevant section of the workshop manual |
| C1A56-93 | Left Front Tire Pressure Sensor and Transmitter Assembly - No operation | • No tire pressure sensor can be localized at this position due to an initiator or tire pressure | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test G in section 204-04, Diagnosis and Testing, Wheels and Tires |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | sensor malfunction | |
| C1A57-11 | Left Front Initiator - Circuit short to ground | • Left front initiator circuit is short to ground | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test B1 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A57-12 | Left Front Initiator - Circuit short to battery | • Left front initiator circuit is short to power | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test B2 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A57-13 | Left Front Initiator - Circuit open | • Left front initiator circuit open | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test B9 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A58-31 | Right Front Tire Pressure Sensor and Transmitter Assembly - No signal | • Missing, incompatible or defective tire pressure sensor or radio frequency receiver | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test F in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A58-68 | Right Front Tire Pressure Sensor and Transmitter Assembly - Event information | • Information only - vehicle exposed to extreme temperature environment and/or tire pressure sensor low battery voltage event | • No action required |
| C1A58-91 | Right Front Tire Pressure Sensor and Transmitter Assembly - Parametric | • Tire pressure sensor has reported out of range information for pressure, temperature or acceleration | • Replace defective tire pressure sensor. refer to the relevant section of the workshop manual |
| C1A58-93 | Right Front Tire Pressure Sensor and Transmitter Assembly - No operation | • No tire pressure sensor can be localized at this position due to an initiator or tire pressure sensor malfunction | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test G in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A59-11 | Right Front Initiator - Circuit short to ground | • Right front initiator circuit is short to ground | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test C1 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A59-12 | Right Front Initiator - Circuit short to battery | • Right front initiator circuit is short to power | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test C2 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A59-13 | Right Front Initiator - Circuit open | • Right front initiator circuit open | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test C9 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A60-31 | Left Rear Tire Pressure Sensor and Transmitter Assembly - No signal | • Missing, incompatible or defective tire pressure sensor or radio frequency receiver | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test F in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A60-68 | Left Rear Tire Pressure Sensor and Transmitter Assembly - Event information | • Information only - Vehicle exposed to extreme temperature environment and/or tire pressure sensor low battery voltage event | • No action required |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C1A60-91 | Left Rear Tire Pressure Sensor and Transmitter Assembly - Parametric | • Tire pressure sensor has reported out of range information for pressure, temperature or acceleration | • Replace defective tire pressure sensor, refer to the relevant section of the workshop manual |
| C1A60-93 | Left Rear Tire Pressure Sensor and Transmitter Assembly - No operation | • No tire pressure sensor can be localized at this position due to an initiator or tire pressure sensor malfunction | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test G in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A61-11 | Left Rear Initiator - Circuit short to ground | • Left rear initiator circuit short to ground | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test D1 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A61-12 | Left Rear Initiator - Circuit short to battery | • Left rear initiator circuit short to power | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test D2 in section 204-04,Diagnosis and Testing, Wheels and Tires |
| C1A61-13 | Left Rear Initiator - Circuit open | • Left rear initiator circuit open | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test D9 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A62-31 | Right Rear Tire Pressure Sensor and Transmitter Assembly - No signal | • Missing, incompatible or defective tire pressure sensor or radio frequency receiver | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test F in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A62-68 | Right Rear Tire Pressure Sensor and Transmitter Assembly - Event information | • Information only - vehicle exposed to extreme temperature environment and/or tire pressure sensor low battery voltage event | • No action required |
| C1A62-91 | Right Rear Tire Pressure Sensor and Transmitter Assembly - Parametric | • Tire pressure sensor has reported out of range information for pressure, temperature or acceleration | • Replace defective tire pressure sensor, refer to the relevant section of the workshop manual |
| C1A62-93 | Right Rear Tire Pressure Sensor and Transmitter Assembly - No operation | • No tire pressure sensor can be localized at this position due to an initiator or tire pressure sensor malfunction | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test G in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A63-11 | Right Rear Initiator - Circuit short to ground | • Right rear initiator circuit short to ground | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test E1 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A63-12 | Right Rear Initiator - Circuit short to battery | • Right rear initiator circuit short to power | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing). Go to pinpoint test E2 in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1A63-13 | Right Rear Initiator - Circuit open | • Right rear initiator circuit open | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test E9 in section 204-04, Diagnosis and Testing, Wheels and Tires |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| C1A64-68 | Spare Wheel Tire Pressure Sensor and Transmitter Assembly - Event information | • Information only - vehicle exposed to extreme temperature environment and/or tire pressure sensor low battery voltage event | • No action required |
| C1A64-91 | Spare Wheel Tire Pressure Sensor and Transmitter Assembly - Parametric | • Tire pressure sensor has reported out of range information for pressure, temperature or acceleration | • Replace defective tire pressure sensor, refer to the relevant section of the workshop manual |
| C1A64-93 | Spare Wheel Tire Pressure Sensor and Transmitter Assembly - No operation | • Missing, incompatible or defective tire pressure sensor or radio frequency receiver | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test H in section 204-04, Diagnosis and Testing, Wheels and Tires |
| C1D19-11 | External Receiver Data Line - Circuit short to ground | • Tire pressure monitoring system radio frequency receiver or data line circuit is short to ground | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test A in section 204-04,Diagnosis and Testing, Wheels and Tires |
| C1D19-12 | External Receiver Data Line - Circuit short to battery | • Tire pressure monitoring system radio frequency receiver or data line circuit is short to power | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test I in section 204-04, diagnosis and testing |
| C1D19-87 | External Receiver Data Line - Missing message | • Radio Frequency reception blocked<br>• Tire pressure monitoring system radio frequency receiver faulty<br>• Tire pressure monitoring system radio frequency receiver or data line circuits open circuit<br>• Missing, incompatible or defective tire pressure sensors | • For additional information, refer to: Wheels and Tires (204-04 Wheels and Tires, Diagnosis and Testing).Go to pinpoint test J in section 204-04, Diagnosis and Testing, Wheels and Tires |
| U0010-88 | Medium Speed CAN Communication Bus - Bus off | • CAN bus fault | • Carry out CAN network integrity tests. Refer to the electrical wiring diagrams and check CAN network for short, open circuit |
| U0140-00 | Lost communication with body control module - No sub type information | • CAN bus fault<br>• Central junction box fault | • Refer to the electrical wiring diagrams and check central junction box power and ground supplies for short, open circuit. Carry out CAN network integrity tests |
| U0142-00 | Lost Communication With Body Control Module "B" - No sub type information | • CAN bus fault<br>• Rear junction box fault | • Refer to the electrical wiring diagrams and check rear junction box power and ground supplies for short, open circuit. Carry out CAN network integrity tests |
| U0155-00 | Lost Communications With Instrument Panel Cluster (IPC) Control Module - No sub type information | • CAN bus fault<br>• Instrument cluster fault | • Refer to the electrical wiring diagrams and check instrument cluster power and ground supplies for short, open circuit. Carry out CAN network integrity tests |
| U0164-00 | Lost Communication With HVAC Control Module - No sub type information | • CAN bus fault<br>• Climate control module fault | • Refer to the electrical wiring diagrams and check climate control module power and ground supplies for short, open circuit. Carry out CAN network integrity tests |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U0300-00 | Internal Control Module Software Incompatibility - No sub type information | • Incompatible tire pressure monitoring system module for vehicle CAN network | • Check correct tire pressure monitoring system module is installed to vehicle specification, otherwise suspect the rear junction box |
| U0415-00 | Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - No sub type information | • Invalid data received from the anti-lock braking system control module<br>• CAN bus fault<br>• Anti-lock braking system fault | • Check anti-lock braking system control module and Instrument Cluster for related DTCs and refer to the relevant DTC index. Carry out CAN network integrity tests |
| U0424-00 | Invalid Data Received From HVAC Control Module - No sub type information | • HVAC control module fault | • Check climate control module for related DTCs and refer to relevant DTC index |
| U1A14-49 | CAN Initialisation Failure - Internal electronic failure | • Tire pressure monitoring system module fault | • Install a new tire pressure monitoring module. Refer to the new module/component installation note at the top of the DTC index |
| U3000-55 | Control Module - Not configured | • Tire pressure monitoring system configuration data is invalid | • Check and amend the car configuration file |
| U3000-87 | Control Module - Missing message | • Tire pressure monitoring system configuration data not received | • Check the rear junction box for related DTCs and refer to the relevant DTC index. Carry out CAN network integrity test |
| U3002-81 | Vehicle Identification Number - Invalid serial data received | • Tire pressure monitoring system module and vehicle VIN mismatch |  NOTE: This DTC indicates that the tire pressure monitoring system module is not the original part installed to the vehicle at the factory/dealer and could have been substituted. Refer to the note above the DTC index about replacing components which may remain under manufacturer warranty.<br>• Re-install the original or a new tire pressure monitoring system control module |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Touch Screen Display (FCDIM)

Description and Operation

## Touch Screen (TS)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Touch Screen (TS). 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 |
|---|---|---|---|
| B100E-25 | Video Input 'A' - Signal shape/waveform failure | • ODST Only - TV video synch mis-match | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| B100F-25 | Video Input 'B' - Signal shape/waveform failure | • ODST Only - Reverse Camera video synch mis-match | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U1A01-01 | Communication Link - General electrical failure | • ODST Only - cable from navigation module not correctly installed | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check electrical harness from navigation module is correctly installed |
| U1A01-15 | Communication Link - Circuit short to battery or open | • TSD to navigation module circuit - short to power, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check TSD to navigation module circuit for short to power, open circuit |
| U1A4B-48 | Control Module Processor B - Supervision software failure | • Supervision software failure | • Re-configure the TSD using the manufacturer approved diagnostic system |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U3000-44 | Control Module - Data memory failure | • EEPROM, External RAM access failure | • Suspect the TSD, check and install a new TSD as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-48 | Control Module - Supervision software failure | • Supervision software failure | • Re-configure the TSD using the manufacturer approved diagnostic system |
| U3000-4B | Control Module - Over temperature | • Touch panel backlight - high temperature detected | • Allow the system to cool, clear the DTC and check/monitor system for re-occurrence. If DTC re-occurs suspect the TSD. Check and install a new TSD as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-55 | Control Module - Not configured | • Incorrect Car Configuration Parameters received | • Check/amend Car Configuration File using the manufacturer approved diagnostic system |
| U3000-87 | Control Module - Missing message | • Car Configuration File not received | • Check RJB for related DTCs and refer to relevant DTC Index. Check CAN and MOST networks, carry out the CAN and MOST network tests using the manufacturer approved diagnostic system |
| U3000-98 | Control Module - Component or system over temperature | • TSD internal temperature over limit | • Allow the system to cool, clear the DTC and check/monitor system for re-occurrence. If DTC re-occurs suspect the TSD. Check and install a new TSD as required, refer to the new module/component installation note at the top of the DTC Index |
| U3003-16 | Battery Voltage - Circuit voltage below threshold | • Circuit voltage below threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |
| U3003-17 | Battery Voltage - Circuit voltage above threshold | • Circuit voltage above threshold | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

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# General Information - Diagnostic Trouble Code (DTC) Index Vehicles With: 6HP28 6-Speed Automatic Transmission, DTC: Transmission Control Module (TCM)

Description and Operation

## Transmission Control Module (TCM) 6 speed (6HP28 Applications)

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, 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 needed

The table below lists all diagnostic trouble codes (DTCs) that could be logged in the transmission control module, for additional diagnosis and testing information refer to the relevant diagnosis and testing section
For additional information, refer to: Diagnostics (307-01 Automatic Transmission/Transaxle - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0121-86 | Throttle/Pedal Position Sensor A Circuit Range/Performance - Signal invalid | • Throttle/Pedal Position Sensor Fault (Data received over CAN Bus) | • Check Engine Control Module for stored DTCs |
| P0219-86 | Engine Overspeed Condition - Signal invalid | • Engine speed too low or too high (Data received over CAN Bus) | • Check Engine Control Module for stored DTCs |
| P0500-81 | Vehicle Speed Sensor A - Invalid serial data received | • Vehicle Speed Sensor fault (Data received over CAN Bus) | • Check Dynamic Stability Control module for stored DTCs |
| P0501-81 | Vehicle Speed Sensor A Range/Performance - Invalid serial data received | • Vehicle Speed receive over CAN Bus does not match Transmission Output-Shaft speed | • Check Dynamic Stability Control module for stored DTCs. Check correct Differential is installed to the vehicle |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0561-1C | System Voltage Unstable - Circuit voltage out of range | • Power supply voltage out of range when engine running | • Check Engine Control Module for stored DTCs. Check Charging System and Battery condition |
| P0562-21 | System Voltage Low - Signal amplitude < minimum | • Circuit low voltage. Battery supply voltage to Transmission Control Module | • Refer to Circuit diagrams and check Power and Ground Circuit for fault. Check Engine Control Module for stored DTCs. Check Charging System and Battery condition |
| P0563-22 | System Voltage High - Signal amplitude > maximum | • High Battery charge, alternator fault | • Check Engine Control Module for stored DTCs. Check Charging System and Battery condition |
| P0601-41 | Internal Control Module Memory Check Sum Error - General checksum failure | • Software error<br>• Transmission Control Module failure | • Re-configure the Transmission Control Module using the manufacturer approved diagnostic system, clear DTC and re-test. If DTC remains, Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0604-00 | Internal Control Module Random Access Memory (RAM) Error - No sub type information | • Shift-by-Wire fault | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0605-41 | Internal Control Module Read Only Memory (ROM) Error - General checksum failure | • General checksum failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0606-04 | TCM Processor - System Internal Failures | • Micro controller component faults | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0606-26 | TCM Processor - Signal rate of change below threshold | • Micro controller component faults | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0606-49 | TCM Processor - Internal electronic failure | • Micro controller component faults | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-04 | TCM Processor - System Internal Failures | • Micro controller component faults | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-06 | TCM Processor - Algorithm Based Failures | • Micro controller component faults | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-11 | TCM Processor - Circuit Short to Ground | • Watchdog fault | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-12 | TCM Processor - Circuit Short to Battery | • Watchdog fault | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0613-13 | TCM Processor - Circuit Open | • Watchdog fault | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-14 | TCM Processor - Circuit Short to Ground or Open | • Watchdog fault | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-21 | TCM Processor - Signal amplitude < minimum | • Watchdog fault | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-22 | TCM Processor - Signal amplitude > maximum | • Watchdog fault | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-47 | TCM Processor - Watchdog / safety Micro controller failure | • Watchdog fault | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-49 | TCM Processor - Internal electronic failure | • Micro controller component faults | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0613-68 | TCM Processor - Event Information | • Watchdog fault | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P061B-02 | Internal Control Module Torque Calculation Performance - General signal failure | • Transmission Control Module - positive torque signal not valid | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P061B-26 | Internal Control Module Torque Calculation Performance - Signal rate of change below threshold | • Transmission Control Module positive torque signal not valid | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P062F-04 | Internal Control Module EEPROM Error - System Internal Failures | • EEPROM communication error | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0642-21 | Sensor Reference Voltage A Circuit Low - Signal amplitude < minimum | • Sensor supply voltage fault low | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0643-22 | Sensor Reference Voltage A Circuit High - Signal amplitude > maximum | • Sensor supply voltage fault high | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0657-13 | Actuator Supply Voltage A Circuit / Open - Circuit Open | • Actuator supply (pressure control valves etc) Open Circuit | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0657-1C | Actuator Supply Voltage A Circuit / Open - Circuit voltage out of range | • Actuator supply (pressure control valves etc) voltage plausibility fault | • Refer to electrical Circuit diagrams and check Transmission Control Module connector for signs of water ingress or damage, check pin 7 for Short to Power or Ground (should NOT be connected and harness terminal should have a bung installed). If no fault identified, suspect the Transmission Control Module. Check and install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0658-11 | Actuator Supply Voltage A Circuit Low - Circuit Short to Ground | • Actuator supply (pressure control valves etc) voltage Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0659-12 | Actuator Supply Voltage A Circuit High - Circuit Short to Battery | • Actuator supply (pressure control valves etc) voltage Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0667-01 | PCM / ECM / TCM Internal Temperature Sensor A Range/Performance - General Electrical Failure | • General electrical failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0667-04 | PCM / ECM / TCM Internal Temperature Sensor A Range/Performance - System Internal Failures | • Internal Electronic Failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0667-49 | PCM / ECM / TCM Internal Temperature Sensor A Range/Performance - Internal electronic failure | • Internal electronic failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0700-02 | Transmission Control System (MIL Request) - General signal failure | • General Signal failure | • Clear DTC, Road test and re-test, Read DTCs and Investigate as required |
| P0700-22 | Transmission Control System (MIL Request) - Signal amplitude > maximum | • Double fault from monitoring of internal power supply and pressure regulator/solenoid control software | • If any of the following DTCs are also present; P074013, P096712, P273912, P273012, P272112, P096312, P276312, P097112, suspect the Transmission Control Module, check and install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0700-75 | Transmission Control System (MIL Request) - Emergency Position Not Reachable | • Emergency Position Not Reachable | • Clear DTC, Road test and re-test, Read DTCs and investigate as required |
| P0710-13 | Transmission Fluid Temperature Sensor A Circuit - Circuit Open | • Transmission fluid temperature sensor Circuit Open Circuit | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0711-01 | Transmission Fluid Temperature Sensor A Circuit Range/Performance - General Electrical Failure | • General electrical failure | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0711-22 | Transmission Fluid Temperature Sensor A Circuit Range/Performance - Signal amplitude > maximum | • Signal amplitude > maximum. Excessive jump in temperature | • Clear DTC. Carry out cold start road test, continue driving vehicle until normal operating temperature is achieved. Reads DTCs, if DTC returns, suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | the warranty policy and procedures manual if a module/component is suspect. |
| P0712-11 | Transmission Fluid Temperature Sensor A Circuit Low - Circuit Short to Ground | • Transmission fluid temperature sensor Circuit Short to Ground | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0713-01 | Transmission Fluid Temperature Sensor A Circuit High - General Electrical Failure | • General electrical failure | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0713-12 | Transmission Fluid Temperature Sensor A Circuit High - Circuit Short to Battery | • Transmission fluid temperature sensor Circuit Short to Power | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0716-14 | Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Circuit Short to Ground or Open | • Turbine/Input Shaft Speed Sensor Circuit Short to Ground or Open Circuit | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0716-21 | Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Signal amplitude < minimum | • Turbine/Input Shaft Speed Sensor signal too small | • Clear DTC and road test, if DTC returns suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0716-22 | Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Signal amplitude > maximum | • Turbine/Input Shaft Speed Sensor signal above maximum | • Clear DTC and road test, if DTC returns suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0717-12 | Turbine/Input Shaft Speed Sensor A Circuit No Signal - Circuit Short to Battery | • Turbine/input shaft speed sensor A Circuit Short to Power | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0720-12 | Output Shaft Speed Sensor Circuit - Circuit Short to Battery | • Transmission output shaft speed sensor Circuit Short to Power | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0720-14 | Output Shaft Speed Sensor Circuit - Circuit Short to Ground or Open | • Transmission output shaft speed sensor Circuit Short to Ground or Open Circuit | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0721-22 | Output Shaft Speed Sensor Circuit Range/Performance - Signal amplitude > maximum | • Transmission output shaft speed sensor signal above maximum | • Clear DTC and road test, if DTC returns suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0721-27 | Output Shaft Speed Sensor Circuit Range/Performance - Signal rate of change above threshold | • Output shaft speed negative gradient too high | • Clear DTC and road test, if DTC returns suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0721-64 | Output Shaft Speed Sensor Circuit Range/Performance - Signal plausibility failure | • Signal plausibility failure | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0729-07 | Gear 6 Incorrect Ratio - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0731-07 | Gear 1 Incorrect Ratio - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0732-07 | Gear 2 Incorrect Ratio - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0733-07 | Gear 3 Incorrect Ratio - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0734-07 | Gear 4 Incorrect Ratio - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0735-07 | Gear 5 Incorrect Ratio - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0736-07 | Reverse Incorrect Ratio - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0740-13 | Torque Converter Clutch Solenoid Circuit / Open - Circuit Open | • Pressure control solenoid 2 Circuit Open Circuit | • Clear DTC and test. If code re-detects suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0741-07 | Torque Converter Clutch Solenoid Circuit Performance/Stuck Off - Mechanical Failures | • Too high slip at torque converter clutch. Mechanical Failures | • Suspect torque converter lockup clutch. Install a new torque converter, refer to the warranty policy and procedures manual if a module/component is suspect. If transmission fluid is in very poor condition and dirty, install a new transmission, refer to the warranty policy and procedures manual if a module/component is suspect. |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0745-04 | Pressure Control Solenoid A - System Internal Failures | • System Internal Failures | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0745-48 | Pressure Control Solenoid A - Supervision Software Failure | • Supervision Software Failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0758-12 | Shift Solenoid B Electrical - Circuit Short to Battery | • Circuit Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0758-13 | Shift Solenoid B Electrical - Circuit Open | • Solenoid valve 1 or Pressure control Solenoid G Circuit Open Circuit | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0771-71 | Shift Solenoid E Performance/Stuck Off - Actuator stuck | • Actuator stuck | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0775-04 | Pressure Control Solenoid B - System Internal Failures | • System Internal Failures | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0775-48 | Pressure Control Solenoid B - Supervision Software Failure | • Supervision Software Failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0781-07 | 1-2 Shift - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0781-77 | 2-1 Shift - Commanded position not reachable | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0782-07 | 2-3 Shift - Commanded position not reachable | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0782-77 | 3-2 Shift - Commanded position not reachable | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0783-07 | 3-4 Shift - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | suspect. |
| P0783-77 | 3-4 Shift - Commanded position not reachable | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0784-07 | 4-5 Shift - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0784-77 | 4-5 Shift - Commanded position not reachable | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0798-1A | Pressure Control Solenoid C Electrical - Circuit Resistance Below Threshold | • Pressure control solenoid C Circuit resistance below threshold | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0798-1E | Pressure Control Solenoid C Electrical - Circuit Short to Ground | • Pressure control solenoid C electrical circuit short to ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0798-21 | Pressure Control Solenoid C Electrical - Signal amplitude < minimum | • Pressure Control Solenoid C Electrical signal amplitude < minimum | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0814-62 | Transmission Range Display Circuit - Signal compare failure | • Transmission Range Display Circuit signal compare failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0826-08 | Up and Down Switch circuit - Bus Signal Message Failures | • Invalid CAN signal from Central Junction Box/Instrument Cluster<br>• Stuck Sprintronic switch<br>• CAN bus circuit fault | • Check Central Junction Box and Instrument Cluster for stored DTCs. Check gear change switches for correct operation. Refer to circuit diagrams and check CAN bus for a circuit fault |
| P0826-81 | Up and Down Switch Circuit - Invalid serial data received | • Invalid Can signal from Central Junction Box / Instrument Cluster<br>• Stuck Sprintronic switch<br>• CAN Bus Circuit fault | • Check Central Junction Box and Instrument Cluster for stored DTCs. Check Gear Change Switches for correct operation. Refer to Circuit diagrams and check CAN Bus for Circuit fault |
| P0826-88 | Up and Down Switch Circuit - Bus off | • Steering Wheel Module to Central Junction Box / Instrument Cluster LIN Bus failure | • Check Central Junction Box and Steering Wheel Ice Switches for stored DTCs. Refer to Circuit diagrams and check LIN Bus for Circuit fault |
| P0829-07 | 5-6 Shift - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P0829-77 | 6-5 Shift - Commanded Position Not Reachable | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P084F-01 | Park / Neutral Switch Input Circuit - General Electrical Failure | • Wrong voltage level detected on Park/No Park signal | • Check for correct output at Transmission Control Module park signal pin (check in all positions) 12 volts in Park, 0 volts in all other positions. If fault identified, suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. If no fault identified, check Park signal circuit to Transmission Shift Module for short, open circuit |
| P0850-01 | Park / Neutral Switch Input Circuit - General Electrical Failure | • General electrical failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0850-02 | Park / Neutral Switch Input Circuit - General signal failure | • General signal failure | • Check Parklock mechanism, If Parklock operation correct suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0850-29 | Park / Neutral Switch Input Circuit - Signal invalid | • Signal Invalid | • Check Parklock mechanism, If Parklock operation correct suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0850-1C | Park / Neutral Switch Input Circuit - Circuit voltage out of range | • Circuit voltage out of range | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0919-93 | Gear Shift Position Control Error - No operation | • No shifting despite driver request | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0919-94 | Gear Shift Position Control Error - Unexpected operation | • Shifting without driver request | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0938-29 | Hydraulic Oil Temperature Sensor Range/Performance - Signal invalid | • Transmission fluid temperature compared with module temperature fault | • Clear DTC. Carry out cold start road test, continue driving vehicle until normal operating temperature is achieved. Read DTCs, if DTC returns, suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0963-12 | Pressure Control Solenoid A Control Circuit High - Circuit Short to Battery | • Pressure control solenoid 1 Circuit Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0964-13 | Pressure Control Solenoid B Control Circuit / Open - Circuit Open | • Pressure Control Solenoid B Control Circuit Open | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | if a module/component is suspect. |
| P0964-14 | Pressure Control Solenoid B Control Circuit / Open - Circuit Short to Ground or Open | • Pressure Control Solenoid B Control Circuit Short to Ground or Open | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0966-11 | Pressure Control Solenoid B Control Circuit Low - Circuit Short to Ground | • Pressure control solenoid 2 Circuit Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0967-12 | Pressure Control Solenoid B Control Circuit High - Circuit Short to Battery | • Pressure control solenoid 2 Circuit Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0968-14 | Pressure Control Solenoid C Control Circuit / Open - Circuit Short to Ground or Open | • Pressure control solenoid 3 Circuit Short to Ground or Open Circuit | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0970-11 | Pressure Control Solenoid C Control Circuit Low - Circuit Short to Ground | • Pressure control solenoid 3 Circuit Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0971-12 | Pressure Control Solenoid C Control Circuit High - Circuit Short to Battery | • Pressure control solenoid 3 Circuit Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0972-22 | Shift Solenoid A Control Circuit Range/Performance - Signal amplitude > maximum | • Pressure control solenoid 1 current too large | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0973-11 | Shift Solenoid A Control Circuit Low - Circuit Short to Ground | • Shift solenoid A control Circuit Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0973-14 | Shift Solenoid A Control Circuit Low - Circuit Short to Ground or Open | • Pressure control solenoid 1 Circuit Short to Ground or Open Circuit | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0973-1A | Shift Solenoid A Control Circuit Low - Circuit Resistance Below Threshold | • Shift Solenoid A control circuit resistance below threshold | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0973-1E | Shift Solenoid A Control Circuit Low - Circuit Resistance Out Of Range | • Shift Solenoid A control circuit resistance out of range | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0976-11 | Shift Solenoid B Control Circuit Low - Circuit Short to Ground | • Solenoid valve 2 Circuit Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P0976-14 | Shift Solenoid B Control Circuit Low - Circuit Short to Ground or Open | • Solenoid valve 2 Circuit Short to Ground or Open Circuit | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P1674-04 | Control Module Software Corrupted - System Internal Failures | • System internal failures | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P1674-48 | Control Module Software Corrupted - Supervision Software Failure | • Supervision software failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P1707-07 | Transfer Case Neutral or Park/Neutral Indication Circuit - Commanded position not reachable | • Transfer case neutral or park/neutral indication circuit - mechanical failures | • Clear the DTC. Test drive the Vehicle, engaging and disengaging the parking lock several times. If the DTC recurs, check parking lock components and replace as required. If no faulty parklock component is found Clear DTC and the DTC returns suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P1707-72 | Transfer Case Neutral or Park/Neutral Indication Circuit - Actuator Stuck Open | • Transfer case neutral or park/neutral indication circuit - Actuator stuck open | • Clear the DTC. Test drive the Vehicle, engaging and disengaging the parking lock several times. If the DTC recurs, check parking lock components and replace as required. If no faulty parklock component is found Clear DTC and the DTC returns suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P1707-77 | Transfer Case Neutral or Park/Neutral Indication Circuit - Commanded position not reachable | • Commanded position not reachable | • Clear the DTC. Test drive the Vehicle, engaging and disengaging the parking lock several times. If the DTC recurs, check parking lock components and replace as required. If no faulty parklock component is found Clear DTC and the DTC returns suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2700-07 | Transmission Friction Element A Apply Time Range/Performance - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2701-07 | Transmission Friction Element B Apply Time Range/Performance - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2702-07 | Transmission Friction Element C Apply Time Range/Performance - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2703-07 | Transmission Friction Element D Apply Time Range/Performance - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P2704-07 | Transmission Friction Element E Apply Time Range/Performance - Mechanical Failures | • Gear Ratio Monitoring. Mechanical Failures | • Check and correct oil level. Clear DTC. If code re-detects suspect Transmission (mechanical) internal fault. Install a new Transmission as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2713-04 | Pressure Control Solenoid D - System Internal Failures | • System internal failures | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2713-48 | Pressure Control Solenoid D - Supervision Software Failure | • Supervision software failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2716-22 | Pressure Control Solenoid D Electrical - Signal amplitude > maximum | • Pressure Control Solenoid D Electrical signal amplitude > maximum | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2716-1A | Pressure Control Solenoid D Electrical - Circuit Resistance Below Threshold | • Pressure control solenoid D circuit resistance below threshold | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2716-1E | Pressure Control Solenoid D Electrical - Circuit Resistance Out Of Range | • Pressure control solenoid D circuit resistance out of range | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2718-14 | Pressure Control Solenoid D Control Circuit / Open - Circuit Short to Ground or Open | • Pressure control solenoid D Circuit Short to Ground or Open Circuit | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2720-11 | Pressure Control Solenoid D Control Circuit Low - Circuit Short to Ground | • Pressure control solenoid D Circuit Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2721-12 | Pressure Control Solenoid D Control Circuit High - Circuit Short to Battery | • Pressure control solenoid D Circuit Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2722-04 | Pressure Control Solenoid E - System Internal Failures | • Pressure Control Solenoid E system internal failures | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2722-48 | Pressure Control Solenoid E - Supervision Software Failure | • Pressure Control Solenoid E supervision control software failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2725-22 | Pressure Control Solenoid E Electrical - Signal amplitude > maximum | • Pressure Control Solenoid E Electrical signal amplitude > maximum | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2725-1A | Pressure Control Solenoid E Electrical - Circuit Resistance Below Threshold | • Pressure control solenoid E electrical resistance below threshold | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P2725-1E | Pressure Control Solenoid E Electrical - Circuit Resistance Out Of Range | • Pressure control solenoid E circuit resistance out of range | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2727-14 | Pressure Control Solenoid E Control Circuit / Open - Circuit Short to Ground or Open | • Pressure Control Solenoid E Control Circuit Short to Ground or Open Circuit | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2729-11 | Pressure Control Solenoid E Control Circuit Low - Circuit Short to Ground | • Pressure control solenoid E Circuit Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2730-12 | Pressure Control Solenoid E Control Circuit High - Circuit Short to Battery | • Pressure control solenoid E Circuit Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2731-04 | Pressure Control Solenoid F - System Internal Failures | • Pressure Control Solenoid F no sub type information | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2731-48 | Pressure Control Solenoid F - Supervision Software Failure | • Pressure Control Solenoid F supervision software failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2734-22 | Pressure Control Solenoid F Electrical - Signal amplitude > maximum | • Pressure Control Solenoid F Electrical signal amplitude > maximum | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2734-1A | Pressure Control Solenoid F Electrical-Circuit Resistance Below Threshold | • Pressure control solenoid F electrical circuit resistance below threshold | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2734-1E | Pressure Control Solenoid F Electrical-Circuit Resistance Out Of Range | • Pressure control solenoid F electrical circuit resistance out of range | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2736-14 | Pressure Control Solenoid F Control Circuit / Open - Circuit Short to Ground or Open | • Pressure Control Solenoid F Control Circuit Short to Ground or Open | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2738-11 | Pressure Control Solenoid F Control Circuit Low - Circuit Short to Ground | • Pressure Control Solenoid F Control Circuit Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2739-12 | Pressure Control Solenoid F Control Circuit High - Circuit Short to Battery | • Pressure Control Solenoid F Control Circuit Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2763-12 | Torque Converter Clutch Pressure Control Solenoid Control Circuit High - Circuit Short to Battery | • Pressure control solenoid F Circuit Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| P2764-11 | Torque Converter Clutch Pressure Control Solenoid Control Circuit Low - Circuit Short to Ground | • Torque converter clutch pressure control solenoid control Circuit Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2764-1A | Torque Converter Clutch Pressure Control Solenoid Control Circuit Low - Circuit Resistance Below Threshold | • Torque converter clutch pressure control solenoid control circuit resistance below threshold | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2764-1E | Torque Converter Clutch Pressure Control Solenoid Control Circuit Low - Circuit Resistance Out Of Range | • Torque converter clutch pressure control solenoid control circuit resistance out of range | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2807-11 | Pressure Control Solenoid G - Circuit Short to Ground | • Park solenoid Circuit Short to Ground | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2807-12 | Pressure Control Solenoid G - Circuit Short to Battery | • Park solenoid Circuit Short to Power | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2807-13 | Pressure Control Solenoid G - Circuit Open | • Park solenoid Circuit Open Circuit | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| P2807-14 | Pressure Control Solenoid G - Circuit Short to Ground or Open | • Park solenoid Circuit Short to Ground or Open Circuit | • Carry out any diagnostic pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| B1087-82 | LIN Bus "A" - Alive / sequence counter incorrect / not updated | • Alive counter fault | • Check Transmission Shift Module for stored DTCs. Refer to the electrical Circuit diagrams and check Transmission Control Module to Transmission Shift Module for Short to Ground or Open Circuit (LIN Bus) |
| B1087-83 | LIN Bus "A" - Value of signal protection calculation incorrect | • Checksum error | • Check Transmission Shift Module for stored DTCs Refer to the electrical Circuit diagrams and check Transmission Control Module to Transmission Shift Module for Short to Ground or Open Circuit (LIN Bus) |
| B1087-87 | LIN Bus "A" - Missing message | • Transmission Shift Module is NOT visible to the Transmission Control Module on the LIN Bus | • Check Transmission Shift Module for stored DTCs Refer to the electrical Circuit diagrams and check Transmission Control Module to Transmission Shift Module for Short or Open Circuit (LIN Bus) |
| B1087-88 | LIN Bus "A" - Bus off | • LIN Bus Circuit fault. Check hardware of LIN connection between transmission and Transmission Shift Module | • Refer to the electrical Circuit diagrams and check Transmission Control Module to Transmission Shift Module LIN bus circuit for Short, Open Circuit. Check Transmission Shift Module for related DTCs |
| U0001-88 | High Speed CAN Communication Bus - Bus off | • CAN Bus off | • Refer to the electrical Circuit diagrams and check CAN Bus for Circuit fault |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U0100-82 | Lost Communication With ECM/PCM "A" - Alive / sequence counter incorrect / not updated | • Alive counter fault | • Check Engine Control Module for stored DTCs |
| U0100-83 | Lost Communication With ECM/PCM "A" - Value of signal protection calculation incorrect | • Checksum fault | • Check Engine Control Module for stored DTCs |
| U0100-87 | Lost Communication With ECM/PCM "A" - Missing message | • CAN Timeout | NOTE: Do NOT install a new Engine Control Module if an Engine Control Module Timeout DTC is only logged in the Transmission Control Module, the failure is NOT with the Engine Control Module<br>• Check Engine Control Module for stored DTCs. Check CAN Bus Circuit for fault |
| U0103-82 | Lost Communication With Gear Shift Control Module A - Alive / sequence counter incorrect / not updated | • Alive counter fault | • Check Transmission Shift Module for stored DTCs. Check CAN Bus Circuit for fault |
| U0103-83 | Lost Communication With Gear Shift Control Module A - Value of signal protection calculation incorrect | • Checksum fault | • Check Transmission Shift Module for stored DTCs. Check CAN Bus Circuit for fault |
| U0103-87 | Lost Communication With Gear Shift Control Module A - Missing message | • CAN Timeout | • Check Transmission Shift Module for stored DTCs. Check CAN Bus Circuit for fault |
| U0122-82 | Lost Communication With Vehicle Dynamics Control Module - Alive / sequence counter incorrect / not updated | • Alive counter fault | • Check Dynamic Stability Control (ABS) for stored DTCs. Check CAN Bus Circuit for fault |
| U0122-83 | Lost Communication With Vehicle Dynamics Control Module - Value of signal protection calculation incorrect | • Checksum fault | • Check Dynamic Stability Control (ABS) for stored DTCs. Check CAN Bus Circuit for fault |
| U0122-87 | Lost Communication With Vehicle Dynamics Control Module - Missing message | • CAN Timeout | • Check Dynamic Stability Control (ABS) for stored DTCs. Check CAN Bus Circuit for fault |
| U0126-00 | Lost Communication With Steering Angle Sensor Module - No sub type information | • Lost Communication With Steering Angle Sensor Module | • Check SAS for stored DTCs. Check CAN Bus Circuit for fault |
| U0128-87 | Lost Communication With Park Brake Control Module - Missing message | • CAN timeout electronic parking brake module | • Check Electronic Parking Brake Module (EPB) for stored DTCs. Check CAN Bus Circuit for fault |
| U0140-82 | Lost Communication With Body Control Module - Alive / sequence counter incorrect / not updated | • Alive counter fault | • Check Central Junction Box for stored DTCs. Check CAN Bus Circuit for fault |
| U0140-83 | Lost Communication With Body Control Module - Value of signal protection calculation incorrect | • Checksum fault | • Check Central Junction Box for stored DTCs. Check CAN Bus Circuit for fault |
| U0140-87 | Lost Communication With Body Control Module - Missing message | • CAN Timeout | • Check Central Junction Box for stored DTCs. Check CAN Bus Circuit for fault |
| U0155-87 | Lost Communication With Instrument Panel Cluster (IPC) Control Module - Missing message | • CAN timeout instrument cluster | • Check Instrument Cluster for stored DTCs. Check CAN Bus Circuit for fault |
| U0300-68 | Control Module - Event information | • Transmission software does not match vehicle network | • Check Central Junction Box software level, Check Transmission Control Module Software level, Update software as required using the manufacturer approved process |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U0401-08 | Invalid Data Received From ECM/PCM A - Bus Signal Message Failures | • Inaccurate engine speed, torque information | • Check Engine Control Module for stored DTCs, Check CAN Bus circuit for faults |
| U0401-68 | Invalid Data Received from ECM/PCM A - Event information | • Inaccurate engine speed, torque information | • Check Engine Control Module for stored DTCs. Check CAN Bus Circuit for fault |
| U0401-86 | Invalid Data Received from ECM/PCM A - Signal Invalid | • Inaccurate engine speed, torque information | • Check Engine Control Module for stored DTCs. Check CAN Bus Circuit for fault |
| U0404-68 | Invalid Data Received from Gear Shift Control Module A - Event information | • Incorrect CAN data received from Transmission Shift Module | • Check Transmission Shift Module for stored DTCs. Refer to Circuit diagrams and check CAN and LIN Bus for Circuit fault |
| U0404-81 | Invalid Data Received from Gear Shift Control Module A - Invalid Serial Data Received | • Incorrect LIN data received from Transmission Shift Module | • Check Transmission Shift Module for stored DTCs. Refer to Circuit diagrams and check CAN and LIN Bus for Circuit fault |
| U0416-68 | Invalid Data Received From Vehicle Dynamics Control Module - Event information | • Event information brake information | • Check Engine Control Module for stored DTCs. Check CAN Bus Circuit for fault |
| U0422-68 | Invalid Data Received From Body Control Module - Event information | • Event information invalid Power mode information | • Check Central Junction Box for stored DTCs. Check CAN Bus Circuit for fault |
| U101B-87 | Lost Communication With GSM - Multiple Bus - Missing message | • Missing message lost communication with Transmission Shift Module (multiple Bus) | • Check Transmission Shift Module for stored DTCs. Refer to Circuit diagrams and check CAN and LIN Bus for Circuit fault |
| U3000-49 | Control Module - Internal electronic failure | • Internal electronic failure | • Suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| U3000-4B | Control Module - Circuit resistance above threshold | • Internal electronic failure | • Check and correct oil level. Check hydraulic flow through oil cooler and pipe circuit for restriction or blockage. If no restrictions found, suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |
| U3000-81 | Control Module - Invalid serial data received | • Vehicle or Engine type signal incorrect from Central Junction Box or incorrect Transmission Control Module software installed | • Reflash the Transmission Control Module using the manufacturer approved process |
| U3001-94 | Control Module Improper Shutdown - Unexpected operation | • Control Module Improper Shutdown (voltage related) | • Check Engine Control Module For Power (alternator) faults. Check Power and Ground Circuit and Battery for fault. Clear DTCs. Road Test. If DTC reoccurs suspect the Transmission Control Module. Install a new Transmission Control Module as required, refer to the warranty policy and procedures manual if a module/component is suspect. |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Transmission Shift Module (GSM)

Description and Operation

## Gear Shift Module (GSM)

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, 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 needed

The table below lists all diagnostic trouble codes (DTCs) that could be logged in the gear shift module, for additional diagnosis and testing information refer to the relevant diagnosis and testing section.
For additional information, refer to: External Controls (307-05 Automatic Transmission/Transaxle External Controls - V6 3.0L Petrol, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1087-08 | LIN Bus "A" - Bus Signal / Message Failures | • LIN bus 'A' Error | • Refer to the electrical circuit diagrams and check LIN input signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance |
| B1087-81 | LIN Bus "A" - Invalid serial data received | • Transmission control module LIN message error - LIN/CAN signal mismatch (complement fault) | • Refer to the electrical circuit diagrams and check LIN input signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Check transmission control module for related DTCs and refer to relevant DTC index |
| B1087-82 | LIN Bus "A" - Alive / sequence counter incorrect / not updated | • Transmission control module LIN message error - Alive counter fault | • Refer to the electrical circuit diagrams and check LIN input signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Check transmission control module for related DTCs and refer to relevant DTC index |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1087-83 | LIN Bus "A" - Value of signal protection calculation incorrect | • Transmission control module LIN message error - checksum fault | • Refer to the electrical circuit diagrams and check LIN input signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Check transmission control module for related DTCs and refer to relevant DTC index |
| B1087-87 | LIN Bus "A" - Missing message | • Transmission control module LIN message error - Missing message | • Refer to the electrical circuit diagrams and check LIN input signal circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Check transmission control module for related DTCs and refer to relevant DTC index |
| B1142-62 | Ignition Status 1 - Signal compare failure | • Hardwired ignition and CAN powermode signals differ | • Refer to the electrical circuit diagrams and check ignition supply circuit for short circuit to ground, short circuit to power, open circuit, high resistance |
| B123C-01 | Dynamic Stability Control Status Indicator - General Electrical Failure | • Dynamic stability control LED failure | • Check transmission shift module, check operation of the dynamic stability control button status illumination, check and install new transmission 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 |
| B123D-64 | Dynamic Stability Control Button - Signal plausibility failure | • Dynamic stability control button may be stuck, may be due to a faulty button or to the user holding the button for a prolonged period (dynamic stability control button detected as pressed for 30 seconds) (S1) | • Check for normal dynamic stability control button functionality. If it operates normally then no further action required. If the dynamic stability control button fails to operate normally then may be due to an internal fault, check and install new transmission 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 |
| B123F-01 | Adaptive Speed Limiter Mode Indicator - General Electrical Failure | • Adaptive speed limiter LED failure | • Check transmission shift module, check operation of the active speed limiter button status illumination, check and install new transmission 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 |
| B1241-64 | Adaptive Speed Limiter Button - Signal plausibility failure | • May be due to a faulty button or to the user holding the button for a prolonged period (adaptive speed limiter button detected as pressed for 30 seconds) | • Check for normal adaptive speed limiter button functionality. If it operates normally then no further action required. If the adaptive speed limiter button fails to operate normally then may be due to an internal fault, check and install new transmission 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 |
| B1242-64 | Winter Button - Signal plausibility failure | • May be due to a faulty button or to the user holding the button for a prolonged period (winter button detected as pressed for 30 seconds) | • Check for normal winter button functionality. If it operates normally then no further action required. If the winter button fails to operate normally then may be due to an internal fault, check and install new transmission 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 |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Portable Audio Interface Control Module (PAICM)

Description and Operation

## Portable Audio Interface Control Module (PAICM)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Portable Audio Interface Control Module (PAICM). 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 |
|---|---|---|---|
| U3000-13 | Control Module - Circuit open | • Universal serial bus (USB) harness between portable audio interface panel and user interface panel is not properly connected<br>• Connection - detect circuit between portable audio interface panel and user interface panel is not grounded<br>• Universal serial bus (USB) harness between portable audio interface panel and user interface panel is open circuit | • Check for correct connection of universal serial bus (USB) harness between portable audio interface panel and user interface panel. Refer to the electrical circuit diagrams and check portable audio interface module connection detect circuit between portable audio interface panel and user interface panel is grounded. Install universal serial bus (USB) harness between portable audio interface panel and user interface panel as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-44 | Control Module - Data memory failure | • Portable audio interface module internal RAM memory | • Suspect the portable audio interface module. Check and install a new module as required. Refer to the warranty policy and procedures manual if a module is suspect |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | failure | |
| U3000-45 | Control Module - Program memory failure | • Portable audio interface module internal flash memory failure | • Suspect the portable audio interface module. Check and install a new module as required. Refer to the warranty policy and procedures manual if a module is suspect |
| U3000-55 | Control Module - Not configured | • Portable audio interface module not configured correctly | • Re-program the portable audio interface module, clear DTC and re-test. If DTC remains carry out MOST tests and test USB cable for open, short circuit, clear DTC and re-test. If DTC remains suspect the portable audio interface module, check and install a new module as required. Refer to the warranty policy and procedures manual if a module is suspect |
| U3003-62 | Battery Voltage - Signal compare failure | • Portable audio interface module voltage differs more than ±2V compared to central electronics module voltage | • Refer to the electrical circuit diagrams and check the fuses, power and ground connections to both modules |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Hybrid Digital Radio Control Module (HDRCM)

Description and Operation

## Hybrid Digital Radio Control Module (HDRCM)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Hybrid Digital Radio Control Module (HDRCM). 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 |
|---|---|---|---|
| B1A56-02 | Antenna - General signal failure | • Antenna general signal failure | • Renew the diversity antenna amplifier |
| B1A56-11 | Antenna - Circuit short to ground | • Diversity antenna amplifier circuit short to ground | • Refer to the electrical guides and check the diversity antenna amplifier circuit and the antenna for short circuit to ground |
| B1A56-12 | Antenna - Circuit short to battery | • Diversity antenna amplifier circuit short to power | • Refer to the electrical guides and check the diversity antenna amplifier circuit and the antenna for short circuit to power |
| B1A56-13 | Antenna - Circuit open | • Diversity antenna amplifier circuit open circuit | • Refer to the electrical guides and check the diversity antenna amplifier circuit and the antenna for open circuit |
| U200D-14 | Control Module Output Power A - Circuit short to ground or open | • Diversity antenna amplifier power supply circuit short to ground or open circuit | • Refer to the electrical guides and check the diversity antenna amplifier power circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| U3000-04 | Control Module - System internal failures | • Diversity antenna amplifier internal failure | • Renew the amplifier module |
| U3000-4A | Control Module - Incorrect component installed | • Diversity antenna amplifier internal incorrect component installed<br>- The module has been installed to a vehicle not configured to accept it | • Using the manufacturer approved diagnostic system select the vehicle configuration main menu, select configure existing modules menu and program the module |
| U3000-55 | Control Module - Not configured | • Diversity antenna amplifier not configured correctly | • Using the manufacturer approved diagnostic system select the vehicle configuration main menu, select configure existing modules menu and program the module |
| U3000-87 | Control Module - Missing message | • Missing message | • Using the manufacturer approved diagnostic system select the vehicle configuration main menu, select configure existing modules menu and program the module |
| U3000-98 | Control Module - Component or system over temperature | • Diversity antenna amplifier component or system over temperature | • Consider moving the amplifier mounting position to prevent unit overheating. Cool the vehicle interior down by ensuring it is in the shade and have the A/C on cool. When cool, clear the DTC and retest. If the problem persists, renew the amplifier module |
| U3003-62 | Battery Voltage - Signal compare failure | • Mismatch in battery voltage of 2 volts or more for longer than 1 minute, between the measured battery voltage at the Digital Audio Control Module C and the battery voltage signal sent from the Rear Junction Box. | • Refer to the electrical guides and check that power supply voltage at Digital Audio Control Module C and Rear Junction Box is not different by more than 2 volts. Rectify as required |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Infotainment Control Module (ICM)

Description and Operation

## Infotainment Control Module (ICM)

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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Infotainment Control Module (ICM). 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 |
|---|---|---|---|
| B1D21-11 | Remote control switch - Circuit short to ground | • The information and entertainment module has detected a ground measurement for a period longer than expected or has detected a ground measurement when another value was expected<br>• Front remote circuit short circuit to ground | • Refer to electrical circuit diagrams and check front remote circuit for short to ground |
| U0010-00 | Medium speed CAN communication bus - No sub type information | • General failure<br>• Open circuit medium speed CAN negative circuit<br>• Short circuit to power medium speed CAN negative circuit<br>• Short circuit to ground medium speed CAN negative circuit<br>• Open circuit medium speed CAN positive circuit<br>• Short circuit to power medium speed CAN positive | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Clear DTC and re-test, if DTC remains, refer to electrical circuit diagrams and check for open circuit, short to power, short to ground on medium speed CAN negative circuit. Check for open circuit, short to power, short to ground on medium speed CAN positive circuit. Check for short circuit between medium speed CAN positive circuit and medium speed CAN negative circuit |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | circuit<br>• Short circuit to ground medium speed CAN positive circuit<br>• Short circuit between medium speed CAN positive circuit and medium speed CAN negative circuit | |
| U0156-4A | Lost communication with information center "A" - Incorrect component installed | • The information and entertainment module has detected a mismatch between the hardware connected and the expected hardware<br>• Module has incorrect serial number | • Suspect incorrect instrument cluster installed. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0159-00 | Lost communication with parking assist control module "A" - No sub type information | • General failure<br>• Parking aid module, battery supply circuit, open circuit<br>• Parking aid module, ground supply circuit, open circuit<br>• Parking aid module medium speed CAN negative circuit, open circuit<br>• parking aid module medium speed CAN positive circuit, open circuit | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check parking aid module for DTCs and refer to the relevant DTC Index. Refer to electrical circuit diagrams, check battery and ground supplies, to parking aid module for open circuit. Check medium speed CAN negative and positive harness to parking aid module, repair as necessary |
| U0163-00 | Lost communication with navigation control module - No sub type information | • General failure<br>• Navigation system module, battery supply circuit, open circuit<br>• Navigation system module ground supply circuit, open circuit<br>• Navigation system module, MOST network, open circuit<br>• Navigation system module not configured<br>• Navigation system module failure | • Check the navigation system module for DTCs and refer to the relevant DTC index. Using the manufacturing approved diagnostic system carry out MOST ring test. Using the manufacturers approved diagnostic system re-configure the navigation system module. Refer to electrical circuit diagrams check battery and ground supplies to navigation system module for open circuit. Repair as necessary. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0163-4A | Lost communication with navigation control module - Incorrect component installed | • The information and entertainment module has detected a mismatch between the hardware connected and the expected hardware<br>• Module has incorrect serial number | • Suspect incorrect navigation module installed. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0184-00 | Lost communication with radio - No sub type information | • General failure<br>• Integrated audio module battery supply circuit, open circuit<br>• Integrated audio module ground supply circuit, open circuit<br>• Integrated audio module MOST network, open circuit<br>• Integrated audio module not configured<br>• Integrated audio module failure | • Check the integrated audio module for DTCs and refer to the relevant DTC index. Using the manufacturing approved diagnostic system carry out MOST ring test. Using the manufacturers approved diagnostic system re-configure the integrated audio module. Refer to electrical circuit diagrams check battery and ground supplies to integrated audio module for open circuit. Repair as necessary. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0184-4A | Lost communication with radio - Incorrect component installed | • The information and entertainment module has detected a mismatch between the hardware connected and the expected hardware | • Suspect incorrect integrated audio module installed. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | • Module has incorrect serial number | |
| U0186-00 | Lost communication with audio amplifier "A" - No sub type information | • General failure<br>• Amplifier audio module battery supply circuit, open circuit<br>• Amplifier audio module ground supply circuit, open circuit<br>• Amplifier audio module MOST network, open circuit<br>• Amplifier audio module not configured<br>• Amplifier audio module failure | • Check the amplifier audio module for DTCs and refer to the relevant DTC index. Using the manufacturing approved diagnostic system carry out MOST ring test. Using the manufacturers approved diagnostic system re-configure the amplifier audio module. Refer to electrical circuit diagrams check battery and ground supplies to amplifier audio module for open circuit. Repair as necessary. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0186-4A | Lost communication with audio amplifier "A" - Incorrect component installed | • The information and entertainment module has detected a mismatch between the hardware connected and the expected hardware<br>• Module has incorrect serial number | • Suspect incorrect amplifier audio module installed. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0191-00 | Lost communication with television - No sub type information | • General failure<br>• Television receiver module battery supply, open circuit<br>• Television receiver module ground supply circuit, open circuit<br>• Television receiver module MOST network, open circuit<br>• Television receiver module not configured<br>• Television receiver module failure | • Check the television receiver module for DTCs and refer to the relevant DTC index. Using the manufacturing approved diagnostic system carry out MOST ring test. Using the manufacturers approved diagnostic system re-configure the television receiver module. Refer to electrical circuit diagrams check battery and ground supplies to television receiver module for open circuit. Repair as necessary. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0191-4A | Lost communication with television - Incorrect component installed | • The information and entertainment module has detected a mismatch between the hardware connected and the expected hardware<br>• Module has incorrect serial number | • Suspect incorrect television receiver module installed. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0193-00 | Lost communication with digital audio control module A - No sub type information | • General failure<br>• Digital audio broadcast module/satellite radio module battery supply circuit, open circuit<br>• Digital audio broadcast module/satellite radio module ground supply circuit, open circuit<br>• Digital audio broadcast module/satellite radio module MOST network, open circuit<br>• Digital audio broadcast module/satellite radio module not configured<br>• Digital audio broadcast module/satellite radio module failure | • Check the digital audio broadcast module/satellite radio module for DTCs and refer to the relevant DTC index. Using the manufacturing approved diagnostic system carry out MOST ring test. Using the manufacturers approved diagnostic system re-configure the digital audio broadcast module/satellite radio module. Refer to electrical circuit diagrams check battery and ground supplies to digital audio broadcast module/satellite radio module for open circuit. Repair as necessary. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0193-4A | Lost communication with digital audio control module A - Incorrect component installed | • The information and entertainment module has detected a mismatch between the hardware connected and the expected | • Suspect incorrect digital audio broadcast module/satellite radio module installed. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | hardware<br>• Module has incorrect serial number | |
| U0197-00 | Lost communication with telephone control module - No sub type information | • General failure<br>• Telephone control module battery supply circuit, open circuit<br>• Telephone control module ground supply circuit, open circuit<br>• Telephone control module MOST network open circuit<br>• Telephone control module not configured<br>• Telephone control module failure | • Check the telephone control module for DTCs and refer to the relevant DTC index. Using the manufacturing approved diagnostic system carry out most ring test. Using the manufacturers approved diagnostic system re-configure the telephone control module. Refer to electrical circuit diagrams check battery and ground supplies to telephone control module for open circuit. Repair as necessary. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0197-4A | Lost communication with telephone control module - Incorrect component installed | • The information and entertainment module has detected a mismatch between the hardware connected and the expected hardware<br>• Module has incorrect serial number | • Suspect incorrect telephone module installed. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0237-00 | Lost communication with digital audio control module C - No sub type information | • General failure<br>• High definition radio module battery supply circuit, open circuit<br>• High definition radio module ground supply circuit, open circuit<br>• High definition radio module MOST network, open circuit<br>• High definition radio module not configured<br>• High definition radio module failure | • Check the module for DTCs and refer to the relevant DTC index. Using the manufacturing approved diagnostic system carry out MOST ring test. Using the manufacturers approved diagnostic system re-configure the high definition radio module . Refer to electrical circuit diagrams check battery and ground supplies to high definition radio module for open circuit. Repair as necessary. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0237-4A | Lost communication with digital audio control module C - Incorrect component installed | • The information and entertainment module has detected a mismatch between the hardware connected and the expected hardware<br>• Module has incorrect serial number | • Suspect incorrect high definition radio module installed, Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0253-00 | Lost communication with accessory protocol interface module - No sub type information | • General failure<br>• Portable audio interface console battery supply circuit, open circuit<br>• Portable audio interface console ground supply circuit, open circuit<br>• Portable audio interface console MOST network, open circuit<br>• Portable audio interface console not configured<br>• Portable audio interface console failure | • Check the portable audio interface console for DTCs and refer to the relevant DTC index. Using the manufacturing approved diagnostic system carry out MOST ring test. Using the manufacturers approved diagnostic system re-configure the portable audio interface console. Refer to electrical circuit diagrams check battery and ground supplies to portable audio interface console for open circuit. Repair as necessary. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |
| U0253-4A | Lost communication with accessory protocol interface module - Incorrect component installed | • The information and entertainment module has detected a mismatch between the hardware connected and the expected hardware<br>• Module has incorrect serial number | • Suspect incorrect portable audio interface console installed. Refer to the warranty policy and procedures manual if module is suspect. Check the system is operating correctly and there are no DTCs |

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# General Information - Diagnostic Trouble Code (DTC) Index DTC: Telephone Module (TEL)

Description and Operation

## Telephone 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 a control module or a component is suspect and the vehicle remains under manufacturer warranty, 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.

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 Telephone Module. For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.
For additional information, refer to: Cellular Phone (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| B1A56-13 | Antenna - Circuit open | • Bluetooth antenna circuit - open circuit | • Refer to the electrical circuit diagrams and check blue tooth antenna circuit for open circuit |
| B1D79-84 | Microphone Input - Signal below allowable range | • Signal amplitude < minimum | • Refer to the electrical circuit diagrams and test microphone input circuit for short/open circuit. Check integrated audio module for related DTCs and refer to relevant DTC Index |
| U1A00-88 | Private Communication Network - Bus off | • Bluetooth phone module internal communications failure | • Suspect the module. Check and install a new telephone module as required, refer to the new module/component installation note at the top of the DTC Index |
| U2100-00 | Initial Configuration Not Complete - No sub type information | • Initial configuration not complete | • Re-configure the RJB using the manufacturer approved diagnostic system. If DTC remains, carry out CAN network integrity tests using the manufacturer approved diagnostic system |
| U2101-00 | Control Module Configuration Incompatible - No sub type information | • Configuration incompatible | • Re-configure the RJB using the manufacturer approved diagnostic system. If DTC remains, suspect the telephone module. Check and install a new telephone |

| DTC | Description | Possible Causes | Action |
|---|---|---|---|
| | | | module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-44 | Control Module - Data memory failure | • Data memory failure | • Re-configure the telephone module. If the DTC remains, suspect the telephone module. Check and install a new telephone module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-45 | Control Module - Program memory failure | • Program memory failure | • Re-configure the telephone module. If the DTC remains, suspect the telephone module. Check and install a new telephone module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-55 | Control Module - Not configured | • Incorrect car configuration data received | • Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the telephone module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index |
| U3000-98 | Control Module - Component or system over temperature | • Component or system over temperature | • Check for additional DTCs and refer to DTC Index. Clear DTC and re-test/monitor condition for re-occurrence |
| U3003-62 | Battery Voltage - Signal compare failure | • Mis-match in battery voltage, of 2 volts or more, between telephone module and RJB | • Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system |

Published: 19-Dec-2011

# Identification Codes - Identification Codes

Description and Operation

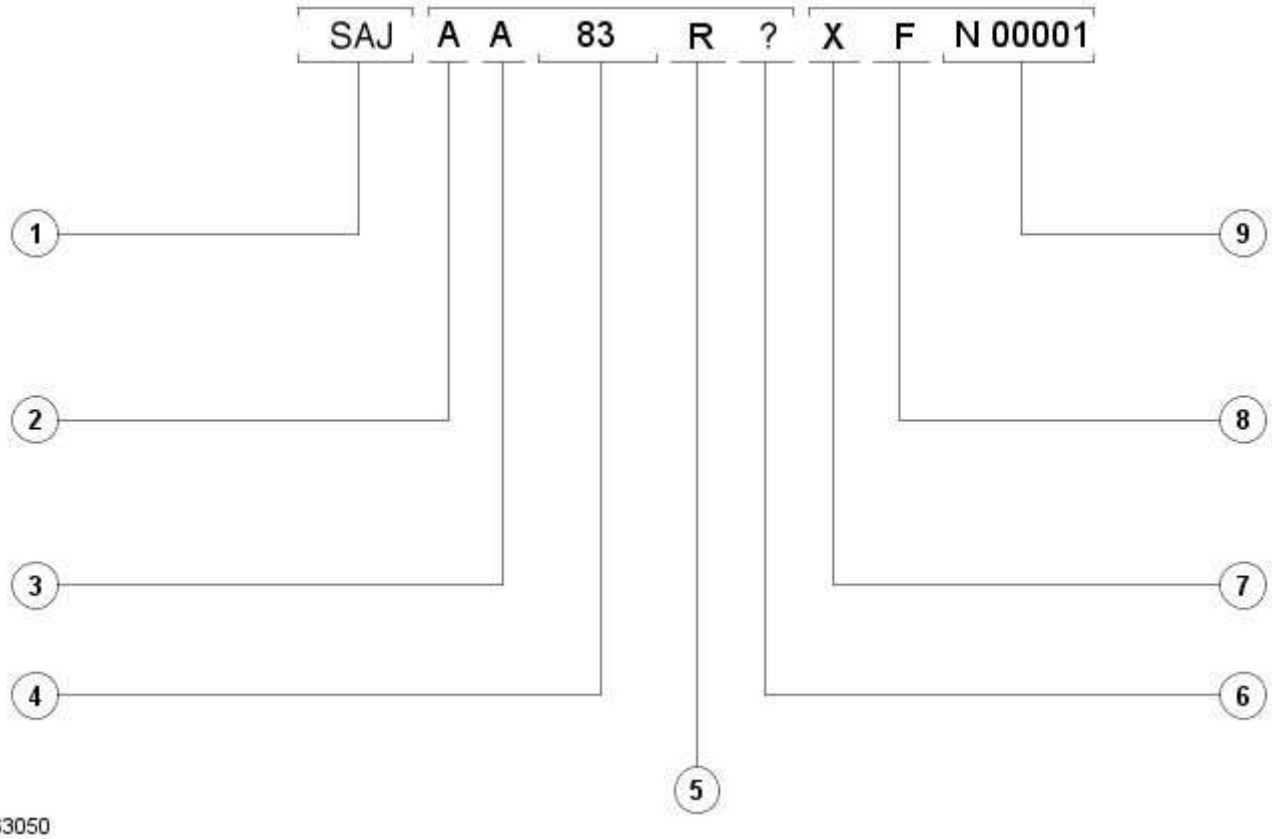
## Vehicle Identification Number (VIN)

The official Vehicle Identification Number (VIN) for title and registration purposes is stamped on a metal plate and fastened to the instrument panel. It is positioned close on the left-hand side of the vehicle and is visible from the outside.

The VIN is also located on the vehicle certification label.


| Item | Part Number | Description |
|---|---|---|
| 1 | — | VIN (stamped) To the end of 11MY |
| 2 | — | Bar code label (USA) |
| 3 | — | VIN label (Europe/Rest of World shown) |
| 4 | — | VIN plate |
| 5 | — | VIN (stamped) From 12MY onwards |

## Vehicle Identification Number (Typical)




E63050

| Item | | Description |
|---|---|---|
| 1 | | World manufacturer identifier |
| 2 | | Market, air bag specification |
| 3 | | Transmission and steering code |
| 4 | | Body code |
| 5 | | Emission control system |
| 6 | | Check digit |
| 7 | | Model year |
| 8 | | Assembly plant, model line |
| 9 | | Production sequence number |

## World Manufacturer Identifier

**VIN Positions 1**

| Codes | Manufacturer | Make | Type |
|---|---|---|---|
| SAJ | Jaguar Cars Limited, England | Jaguar | Passenger Car |

## Market, Air Bag Specification

**VIN position 2**

| VIN code | Description |
|---|---|
| A | Rest of World with twin air bags, side air bags and curtain air bags |
| K | Japan with twin air bags, side air bags and curtain air bags |
| W | USA with twin air bags, side air bags and curtain air bags |
| X | Canada with twin air bags, side air bags and curtain air bags |
| Y | Mexico with twin air bags, side air bags and curtain air bags |

## Transmission, Steering Code

**VIN Position 3**

| VIN Code | Description |
|---|---|
| A | Automatic LHS |
| C | Automatic RHS |

## Body Code - All except USA and Canada - 2010 and 2011 model years

**VIN Position 4**

| VIN Code | Description |
|---|---|
| 05 | Luxury |
| 06 | Premium luxury |
| 07 | Sport luxury/Portfolio/SV8 |
| 08 | 'R' |

## Body Code (USA and Canada) 2010 and 2011 model years

**VIN Position 4**

| VIN Code | Description |
|---|---|
| 0F | Luxury |
| 0G | Premium luxury |
| 0H | Portfolio/SV8 |
| 0J | 'R' |

## Body Code - All except USA and Canada - 2012 model year

**VIN Position 4**

| VIN Code | Description |
|---|---|
| 04 | Entry |
| 05 | Luxury |
| 06 | Premium luxury |
| 07 | Sport luxury/Portfolio/SV8 |
| 08 | 'R' |
| 85 | Luxury+speedpack |
| 86 | Premium luxury+speedpack |
| 87 | Sport luxury/Portfolio/SV8+speedpack |
| 88 | 'R' + speedpack |

## Body Code (USA and Canada) 2012 model year

**VIN Position 4**

| VIN Code | Description |
|---|---|
| 0F | Luxury |
| 0G | Premium luxury |
| 0H | Portfolio/SV8 |
| 0J | 'R' |
| 8E | Luxury+speedpack |
| 8F | Premium luxury+speedpack |
| 8G | Sport luxury/Portfolio/SV8+speedpack |
| 8H | 'R' + speedpack |

## Engine Emission System - 2009 model year

**VIN Position 5**

NOTES:

*1 EU. Includes the following markets; Austria, Belgium, Bulgaria, Cyprus, Czech Rep, Denmark, Eire, Estonia, Finland, France, Germany, Greece, Holland, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovenia, Slovakia, Spain (incl. Canary Islands), Sweden and UK.

*2 East Europe. Includes the following markets; Albania, Bosnia, Croatia, Former Yugoslav Republic of Macedonia, Kosovo, Montenegro and Serbia.

*3 Russia. Includes the following markets; Belarus, Kazakhstan, Ukraine and Uzbekistan.

*4 Middle East. Includes the following markets; Abu Dhabi, Bahrain, Dubai, Jordan, Kuwait, Lebanon, Oman, Qatar and Saudi Arabia.

*5 Caribbean. Includes the following markets; Bahamas, Barbados, Grand Cayman, Grenada and Trinidad and Tobago.

| VIN Code | Engine | Market |
|---|---|---|
| D | 3.0L | *5 Caribbean, Chile, Dominican Rep, Guatemala, Indonesia, Malaysia, *4 Middle East, Morocco, |
| F | 4.2L | Panama, Phillipines, Singapore, Sri Lanka and Uruguay |

| VIN Code | Engine | Market |
|---|---|---|
| G | 4.2L Supercharged | |
| N/A | 2.7L Diesel | |
| M | 3.0L | China |
| N/A | 4.2L | |
| N/A | 4.2L Supercharged | |
| N/A | 2.7L Diesel | |
| M | 3.0L | *2 East Europe, *1 EU, Israel, Norway, *3 Russia, Switzerland and Turkey |
| P | 4.2L | |
| R | 4.2L Supercharged | |
| 1 | 2.7L Diesel | |
| W | 3.0L | Brazil |
| X | 4.2L | |
| Y | 4.2L Supercharged | |
| N/A | 2.7L Diesel | |
| S | 3.0L | Egypt and Syria |
| U | 4.2L | |
| V | 4.2L Supercharged | |
| N/A | 2.7L Diesel | |
| H | 3.0L | Japan |
| K | 4.2L | |
| L | 4.2L Supercharged | |
| N/A | 2.7L Diesel | |
| N/A | 3.0L | USA |
| B | 4.2L | |
| C | 4.2L Supercharged | |
| N/A | 2.7L Diesel | |
| N/A | 3.0L | Canada |
| B | 4.2L | |
| C | 4.2L Supercharged | |
| N/A | 2.7L Diesel | |
| N/A | 3.0L | Mexico |
| K | 4.2L | |
| L | 4.2L Supercharged | |
| N/A | 2.7L Diesel | |
| N/A | 3.0L | South Korea |
| B | 4.2L | |
| C | 4.2L Supercharged | |
| 1 | 2.7L Diesel | |
| D | 3.0L | South Africa |
| F | 4.2L | |
| G | 4.2L Supercharged | |
| 1 | 2.7L Diesel | |
| M | 3.0L | Argentina, Australia, Cyprus, Hong Kong, Malta, New Zealand, Taiwan, Thailand and UK (and Eire) |
| P | 4.2L | |
| R | 4.2L Supercharged | |
| 1 | 2.7L Diesel | |

## Engine Emission System - 2010 model year

**VIN Position 5**

NOTES:

*1 EU. Includes the following markets; Austria, Belgium, Bulgaria, Cyprus, Czech Rep, Denmark, Eire, Estonia, Finland, France, Germany, Greece, Holland, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovenia, Slovakia, Spain (incl. Canary Islands), Sweden and UK.

*2 East Europe. Includes the following markets; Albania, Bosnia, Croatia, Former Yugoslav Republic of Macedonia,

Kosovo, Montenegro and Serbia.

 *3 Russia. Includes the following markets; Belarus, Kazakhstan, Ukraine and Uzbekistan.

 *4 Middle East. Includes the following markets; Abu Dhabi, Bahrain, Dubai, Jordan, Kuwait, Lebanon, Oman, Qatar and Saudi Arabia.

 *5 Caribbean. Includes the following markets; Bahamas, Barbados, Grand Cayman, Grenada and Trinidad and Tobago.

| VIN Code | Engine | Market |
|---|---|---|
| D | 3.0L | Algeria, Brunei, *5 Caribbean, Dominican Rep, Guatemala, Indonesia, Libya, *4 Middle East, Morrocco, Pakistan, Panama, Phillipines, Sri Lanka, Tunisia and Uruguay |
| F | 5.0L | |
| G | 5.0L Supercharged | |
| H | 3.0L | China |
| P | 5.0L | |
| R | 5.0L Supercharged | |
| H | 3.0L | Chile |
| P | 5.0L | |
| R | 5.0L Supercharged | |
| H | 3.0L | Argentina |
| P | 5.0L | |
| R | 5.0L Supercharged | |
| H | 3.0L | *1 EU, *2 East Europe, Israel, Norway, Switzerland and Turkey |
| P | 5.0L | |
| R | 5.0L Supercharged | |
| 2 | 3.0L Diesel | |
| W | 3.0L | Brazil |
| X | 5.0L | |
| Y | 5.0L Supercharged | |
| S | 3.0L - **Egypt only** | Egypt and Syria |
| F | 5.0L | |
| G | 5.0L Supercharged | |
| H | 3.0L | Japan |
| P | 5.0L | |
| R | 5.0L Supercharged | |
| A | 4.2L | USA |
| B | 5.0L | |
| C | 5.0L Supercharged | |
| A | 4.2L | Canada |
| B | 5.0L | |
| C | 5.0L Supercharged | |
| A | 4.2L | Mexico |
| B | 5.0L | |
| C | 5.0L Supercharged | |
| B | 5.0L | South Korea |
| C | 5.0L Supercharged | |
| 2 | 3.0L Diesel | |
| H | 3.0L | Malaysia |
| P | 5.0L | |
| R | 5.0L Supercharged | |
| D | 3.0L | South Africa |
| F | 5.0L | |
| G | 5.0L Supercharged | |
| 2 | 3.0L Diesel | |

| VIN Code | Engine | Market |
|---|---|---|
| H | 3.0L | Taiwan |
| P | 5.0L | |
| R | 5.0L Supercharged | |
| 2 | 3.0L Diesel | |
| D | 3.0L | Thailand |
| F | 5.0L | |
| G | 5.0L Supercharged | |
| D | 3.0L | Singapore |
| F | 5.0L | |
| G | 5.0L Supercharged | |
| H | 3.0L | Australia, Cyprus, Hong Kong, Malta, New Zealand and UK (and Eire) |
| P | 5.0L | |
| R | 5.0L Supercharged | |
| 2 | 3.0L Diesel | |

## Engine Emission System - 2011 model year

**VIN Position 5**

NOTES:

 *1 EU. Includes the following markets; Andorra, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, India (gasoline only), Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK; (Canary Islands, Azores, Madeira, Martinique, Guadeloupe, Reunion are included as remote parts of sovereign states).

 *2 With Diesel Particulate Filter (DPF), includes the following markets; Australia, Belarus, Gibraltar, Hong Kong, Iceland, Israel, Korea (diesel), Macau, Morocco, New Zealand, Palestine, Singapore (diesel only), South Africa (Diesel), Taiwan, Tunisia.

 *3 With-out DPF, includes the following markets; Argentina, Bermuda, Chile, China, Guadeloupe, India (diesel only), Kazakhstan, Morocco, Ukraine, Russia.

 *4 Rest Of World (ROW), includes the following markets; Barbados, Benin, Botswana, Burkina Faso, Burundi, Brunei, Cameroon, Central African Republic, Chad, Congo, Costa Rica, Democratic Republic of Congo, Dominican Republic, Equatorial Guinea, Ethiopia, Falklands, Fiji, Gabon, Gambia, Ghana, Guatemala, Guinea, Guinea Bissau, Guyana, Haiti, Honduras, Ivory Coast, Lesotho, Liberia, Madagascar, Malawi, Mali, Mozambique, Mauritania, Namibia, New Caledonia, Niger, Panama, Papua New Guinea, Rwanda, Sierra Leone, Singapore (gasoline only),Somalia, Swaziland, Tahiti, Tanzania, Togo, Trinidad & Tobago, Uganda, Western Sahara, Zambia, Zimbabwe.

 *5 Emergent World, With-out OBD, includes the following markets; Albania, Angola, Bolivia, Colombia, Ecuador, Georgia, Indonesia, Jamaica, Kenya, Kyrgystan, Macedonia, Malaysia, Mauritius, Nigeria, Paraguay, Peru, Philippines, South Africa (gasoline only), Sri Lanka, Turkmenistan, Uruguay, Uzbekhistan, Venezuela, Vietnam.

 *6 Hot Climate, With-out OBD, includes the following markets; Algeria, Azerbaijan, Bahrain, Bangladesh for gasoline, Bhutan, Dubai, Egypt, Iraq, Jordan, Kuwait, Lebanon (gasoline only), Libya, Oman, Pakistan, Qatar, Saudi Arabia, Sudan, Syria (gasoline only), Thailand, Tunisia, United Arab Emirates, Yemen.

| | | |
|---|---|---|
| B | 5.0L | USA, Canada, Mexico and Korea |
| C | 5.0L Supercharged | USA, Canada, Mexico and Korea |
| D | 3.0L | *4 ROW, *5 Emergent World and *6 Hot Climate |
| E | 5.0L Supercharged | USA, Canada, Mexico and Korea |
| F | 5.0L | *4 ROW, *5 Emergent World and *6 Hot Climate |
| G | 5.0L Supercharged | *4 ROW, *5 Emergent World and *6 Hot Climate |
| H | 3.0L | #(*2 With DPF, *3 With-out DPF),* Japan and *1 EU |
| J | 5.0L Supercharged | *1 EU, *2 With DPF, *3 With-out DPF and Japan |
| K | 5.0L Supercharged | Brazil |
| L | 5.0L Supercharged | *4 ROW, *5 Emergent World and *6 Hot Climate |
| P | 5.0L | *1 EU, *2 With DPF, *3 With-out DPF and Japan |
| R | 5.0L Supercharged | *1 EU, *2 With DPF, *3 With-out DPF and Japan |
| W | 3.0L | Brazil |
| X | 5.0L | Brazil |

| | | |
|---|---|---|
| Y | 5.0L Supercharged | Brazil |
| 2 | 3.0L Diesel | *1 EU and *2 With DPF |
| 3 | 3.0L Diesel | *1 EU |
| 4 | 3.0L Diesel | *1 EU and *2 With DPF |
| 5 | 3.0L Diesel | *4 ROW, *5 Emergent World, *3 With-out DPF, Japan and *6 Hot Climate |

#( ) 3.0L Gasoline EU4 is compliant with european emission requirements until December 2010.

## Engine Emission System - 2012 model year

**VIN Position 5**

NOTES:

*1 EU. Includes the following markets; Andorra, Austria, Belgium, Bulgaria, Chile(diesel only), Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, India (gasoline only), Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK; (Canary Islands, Azores, Madeira, Martinique, Guadeloupe, Reunion are included as remote parts of sovereign states).

*2 With DPF, Australia, Belarus, Gibraltar, Hong Kong, Iceland, Israel, Korea (diesel only), Macau, Morocco, New Zealand, Palestine, Singapore (diesel only), South Africa (Diesel), Taiwan, Tunisia

*3 With-out DPF, Argentina, Bermuda, Chile (gasoline only), China, Guadeloupe, India (diesel only), Kazakhstan, Mexico (diesel only), Morocco, Ukraine, Russia.

*4 Rest Of World (ROW), includes the following markets; Barbados, Benin, Botswana, Burkina Faso, Burundi, Brunei, Cameroon, Central African Republic, Chad, Congo, Costa Rica, Democratic Republic of Congo, Dominican Republic, Equatorial Guinea, Ethiopia, Falklands, Fiji, Gabon, Gambia, Ghana, Guatemala, Guinea, Guinea Bissau, Guyana, Haiti, Honduras, Ivory Coast, Lesotho, Liberia, Madagascar, Malawi, Mali, Mozambique, Mauritania, Namibia, New Caledonia, Niger, Panama, Papua New Guinea, Rwanda, Sierra Leone, Singapore (gasoline only),Somalia, Swaziland, Tahiti, Tanzania, Togo, Trinidad & Tobago, Uganda, Western Sahara, Zambia, Zimbabwe.

*5 Emergent World, With-out OBD, includes the following markets; Albania, Angola, Bolivia, Colombia, Ecuador, Georgia, Indonesia, Jamaica, Kenya, Kyrgystan, Macedonia, Malaysia, Mauritius, Nigeria, Paraguay, Peru, Philippines, South Africa (gasoline only), Sri Lanka, Turkmenistan, Uruguay, Uzbekhistan, Venezuela, Vietnam.

*6 Hot Climate, With-out OBD, includes the following markets; Algeria, Azerbaijan, Bahrain, Bangladesh for gasoline, Bhutan, Dubai, Egypt, Iraq, Jordan, Kuwait, Lebanon (gasoline only), Libya, Oman, Pakistan, Qatar, Saudi Arabia, Sudan, Syria (gasoline only), Thailand, Tunisia, United Arab Emirates, Yemen.

| | | |
|---|---|---|
| B | 5.0L | USA, Canada, Mexico and Korea |
| C | 5.0L Supercharged | USA, Canada, Mexico and Korea |
| D | 3.0L | *4 ROW, *5 Emergent World and *6 Hot Climate |
| E | 5.0L Supercharged | USA, Canada, Mexico and Korea |
| F | 5.0L | *4 ROW, *5 Emergent World and *6 Hot Climate |
| G | 5.0L Supercharged | *4 ROW, *5 Emergent World and *6 Hot Climate |
| H | 3.0L | *2 With DPF, *3 With-out DPF and Japan |
| J | 5.0L Supercharged | *1 EU, *2 With DPF, *3 With-out DPF and Japan |
| K | 5.0L Supercharged | Brazil |
| L | 5.0L Supercharged | *4 ROW, *5 Emergent World and *6 Hot Climate |
| P | 5.0L | *1 EU, *2 With DPF, *3 With-out DPF and Japan |
| R | 5.0L Supercharged | *1 EU, *2 With DPF, *3 With-out DPF and Japan |
| T | 2.2L Diesel | *1 EU and *2 With DPF |
| W | 3.0L | Brazil |
| X | 5.0L | Brazil |
| Y | 5.0L Supercharged | Brazil |
| 2 | 3.0L Diesel | *1 EU and *2 With DPF |
| 4 | 3.0L Diesel | *1 EU and *2 With DPF |
| 5 | 3.0L Diesel | *4 ROW, *5 Emergent World, *3 With-out DPF, Japan and *6 Hot Climate |
| 6 | 2.2L Diesel | *1 EU and *2 With DPF |

## Check Digit

**VIN Position 6**

| VIN Code | Description |
|---|---|
| 0 - 9 or X | Calculated in accordance with American standard CFR part 565 |

## Model Year

**VIN Position 7**

| VIN Code | Description |
|---|---|
| 9 | 2009 model year |
| A | 2010 model year |
| B | 2011 model year |
| C | 2012 model year |

## Assembly Plant and Model Line

**VIN Position 8**

| VIN Code | Description |
|---|---|
| D | Castle Bromwich 2.2L Diesel |
| F | Castle Bromwich 3.0L Petrol |
| H | Castle Bromwich 4.2L Normally aspirated Petrol |
| L | Castle Bromwich 5.0L Normally aspirated Petrol |
| M | Castle Bromwich 5.0L Supercharged Petrol |
| N | Castle Bromwich 3.0L Diesel |
| 1 | Castle Bromwich 4.2L Supercharged Petrol |
| 7 | Castle Bromwich 2.7L Diesel |

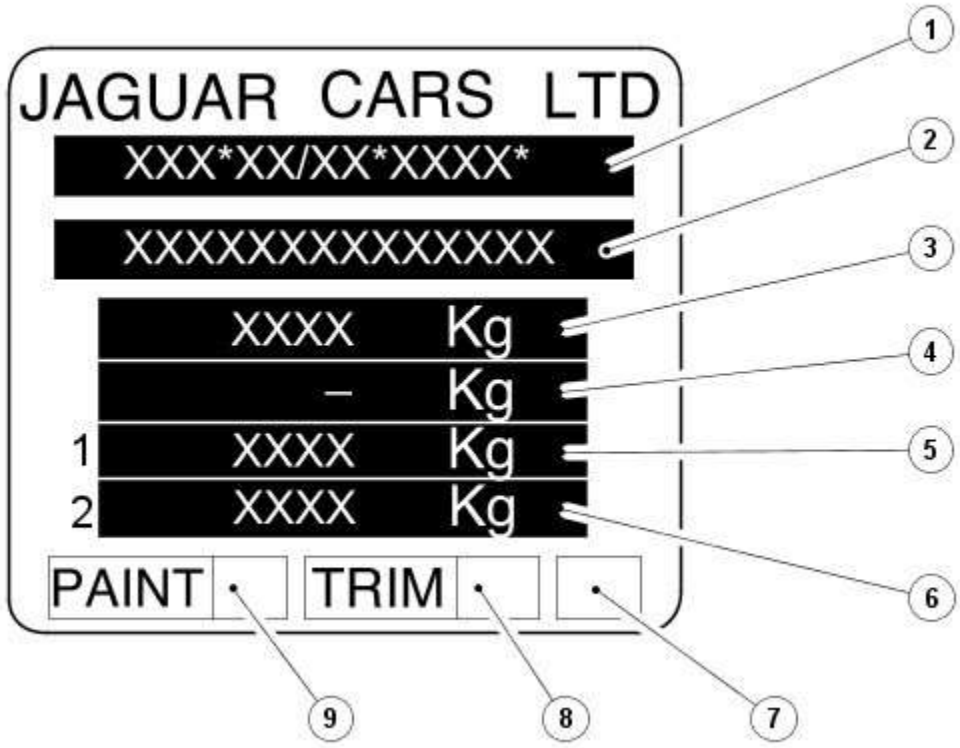
## Production Sequence Number

**VIN Position 9**

| Sequence Number |
|---|
| R00001 - R99999 |
| S00001 - S99999 |
| T00001 - T99999 |

## VIN Label

**VIN Label (Europe and Rest of world)**

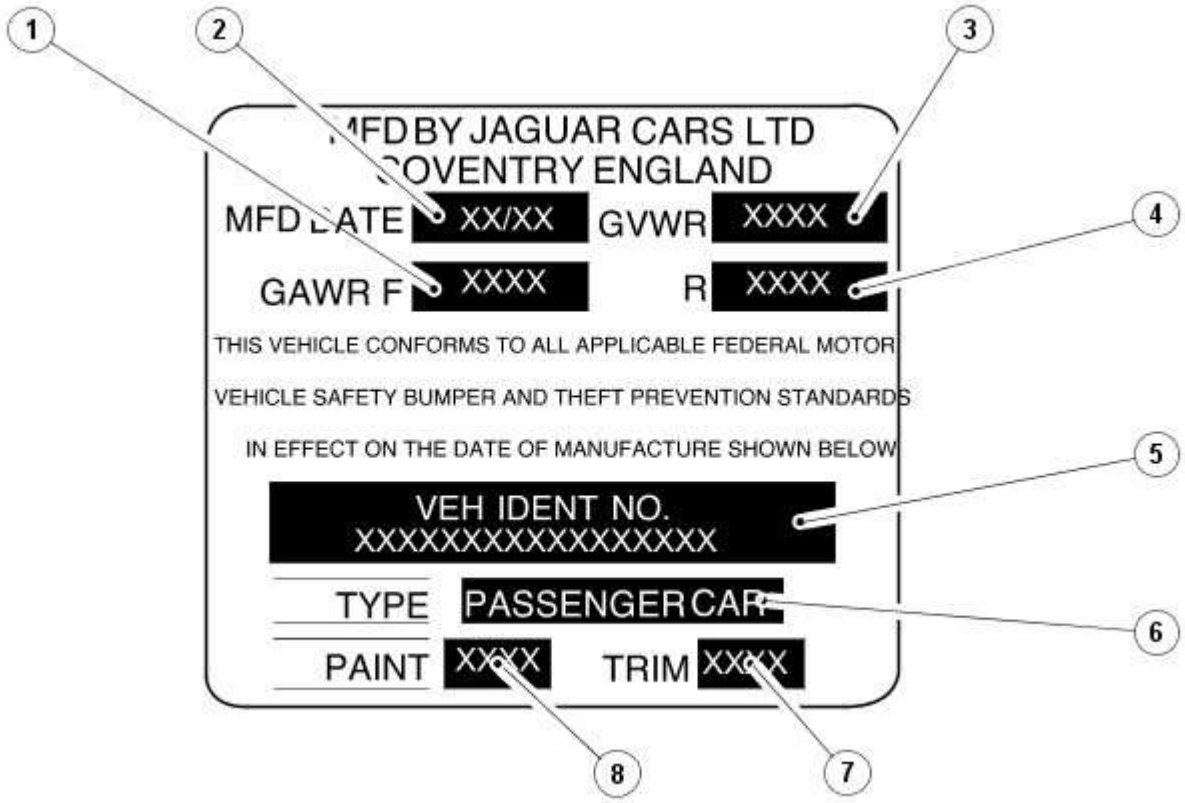



E 36533

| Item | | Description |
|---|---|---|
| 1 | | Whole Vehicle Type Approval (WVTA) - Only shown for certain markets |
| 2 | | VIN |
| 3 | | Gross vehicle weight |

| | | |
|---|---|---|
| 4 | | Gross train weight |
| 5 | | Maximum permitted front axle loading |
| 6 | | Maximum permitted rear axle loading |
| 7 | | Date of manufacture |
| 8 | | Interior trim code |
| 9 | | Paint code |

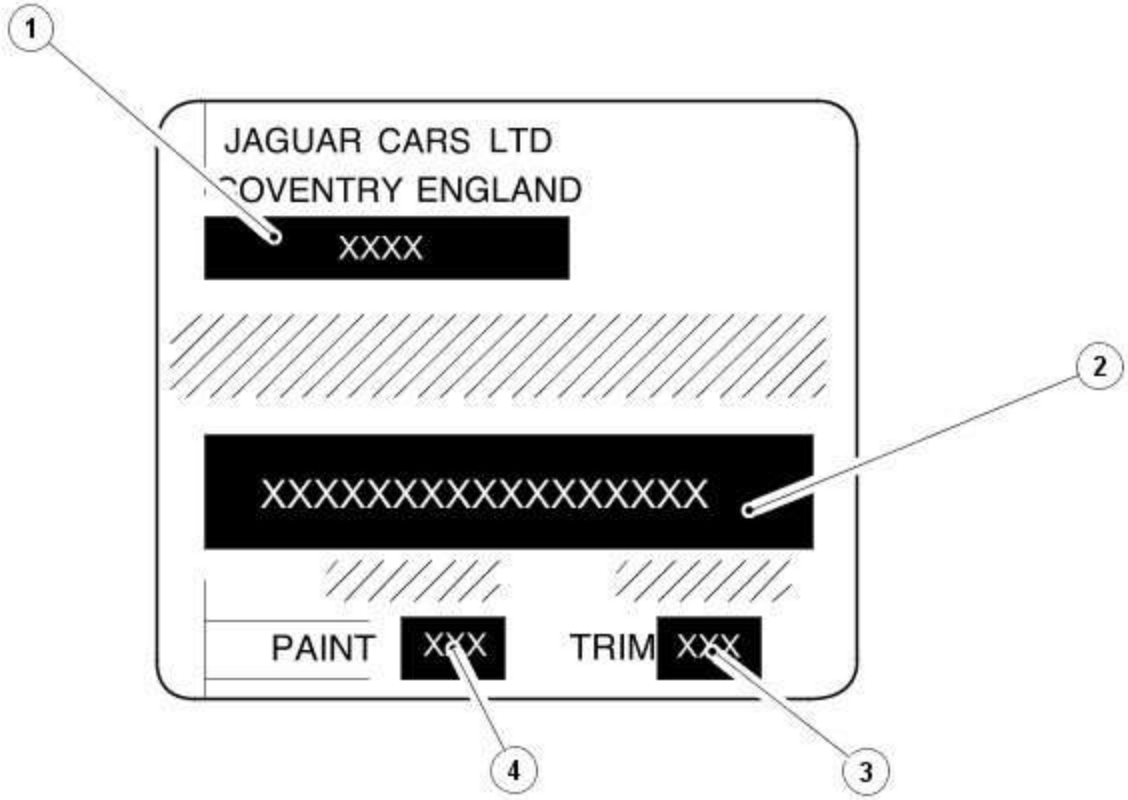
**VIN Label (North America)**




E36534

| Item | | Description |
|---|---|---|
| 1 | | Maximum permitted front axle loading |
| 2 | | Date of manufacture |
| 3 | | Gross vehicle weight |
| 4 | | Maximum permitted rear axle loading |
| 5 | | VIN |
| 6 | | Type |
| 7 | | Interior trim code |
| 8 | | Paint code |

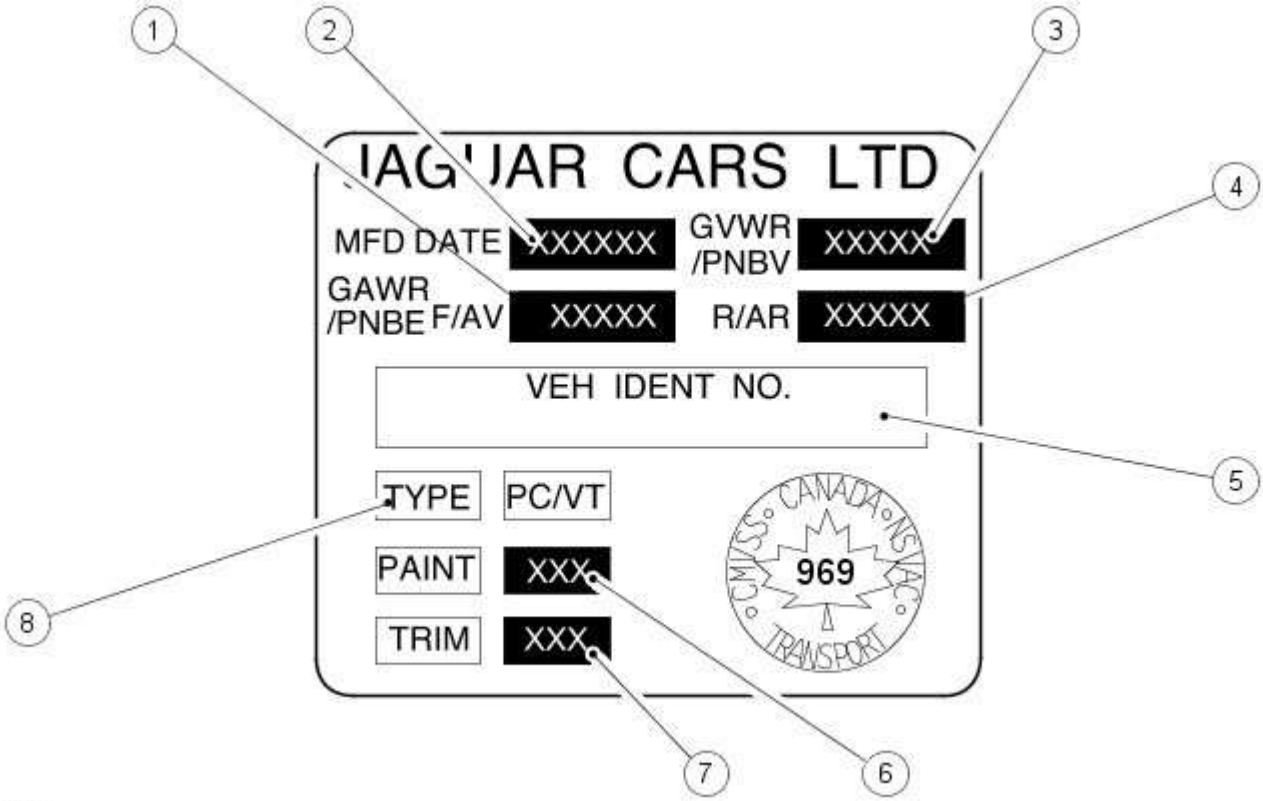
**VIN Label (Saudi Arabia and Gulf States)**




E36535

| Item | | Description |
|---|---|---|
| 1 | | Date of manufacture |
| 2 | | VIN |
| 3 | | Interior trim code |
| 4 | | Paint code |

**VIN Label (Canada)**




E36536

| Item | | Description |
|---|---|---|
| 1 | | Maximum permitted front axle loading |
| 2 | | Date of manufacture |
| 3 | | Gross vehicle weight |
| 4 | | Maximum permitted rear axle loading |
| 5 | | VIN |
| 6 | | Paint code |
| 7 | | Interior trim code |
| 8 | | Type |

**VIN Label (China)**


E99220

| Item | | Description |
|---|---|---|
| 1 | | Occupant number |
| 2 | | Engine specification (Type/Capacity/Power) |
| 3 | | VIN |
| 4 | | Trade mark |
| 5 | | Vehicle type |
| 6 | | Gross vehicle weight |
| 7 | | Date of manufacture |
| 8 | | Manufacturer name |

**VIN Label (Argentina)**


| Item | | Description |
|---|---|---|
| 1 | | VIN |
| 2 | | Trade mark and manufacturer adress (in Spanish) |
| 3 | | Gross vehicle weight |
| 4 | | Gross train weight |
| 5 | | Maximum permitted front axle loading |
| 6 | | Maximum permitted rear axle loading |
| 7 | | Date of manufacture |
| 8 | | Interior trim code |
| 9 | | Paint code |

## Automatic Transmission Number

The serial number of the transmission unit is displayed on a metal label or bar code (if equipped) attached to the transmission casing.

## Engine Number(s)

### Engine Number - 2.2L Diesel

The serial number is stamped on an engine web on the right-hand side of the cylinder block behind the engine mounting.

### Engine Number - 2.7L Diesel

The serial number is stamped on an engine web on the right-hand side of the cylinder block behind the engine mounting.

### Engine Number - 3.0L Diesel

The serial number is stamped on an engine web on the right-hand side of the cylinder block behind the engine mounting.

### Engine Number - 3.0L

The engine number is contained on a bar code label on the front cover and is also stamped in the cylinder block casting on the

left-hand side of the engine below the engine mounting.

### Engine Number - 4.2L and 4.2L Supercharged

The serial number is stamped on an engine web on the left-hand side of the cylinder block behind the engine mounting. The emission code is also located here, on the transmission flange.

### Engine Number - 5.0L and 5.0L Supercharged

The serial number is stamped on an engine web on the left-hand side of the cylinder block behind the engine mounting.

Published: 11-May-2011

# Jacking and Lifting - Jacking

Description and Operation

## Safety Precautions

 WARNING: The jack provided with the vehicle is intended to be used in an emergency for changing a deflated tire. To avoid damage to the vehicle, never use the jack to raise the vehicle for any other purpose. Refer to the Driver Handbook when using the jack supplied with the vehicle. Failure to follow these instructions may result in personal injury.

The following safety precautions must be observed when raising the vehicle to carry out service operations:

- Never rely on a jack alone to support a vehicle. Always use suitable vehicle stands to provide rigid support.
- When working beneath a vehicle, whenever possible use a vehicle hoist instead of a jack and vehicle stands.
- Make sure that the vehicle is standing on firm, level ground before using a jack.
- Do not rely on the parking brake alone; chock the wheels and put the automatic transmission into Park if possible.
- Check that any lifting equipment used has adequate capacity for the load being lifted and is in correct working order.

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# Jacking and Lifting - Lifting

Description and Operation

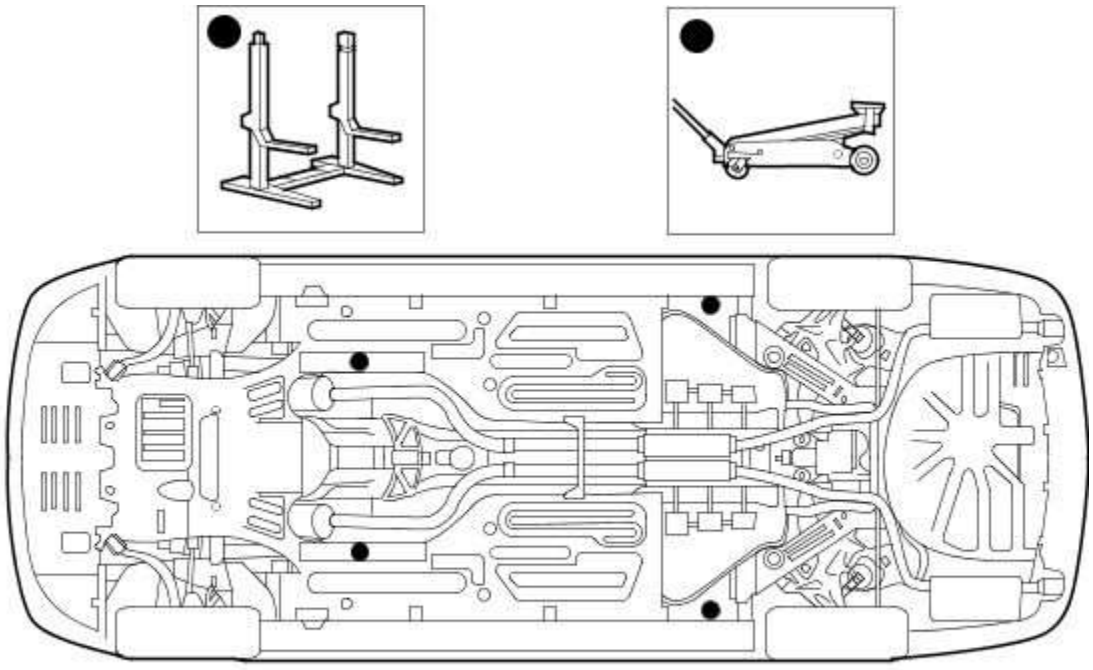
## Lifting Points—Twin-Post Hoist and Floor Jack

CAUTIONS:

Do not allow the hoist adapters to contact the steering linkage, suspension arms, stabilizer bar, rear subframe stabilizer brackets or to compress the lower suspension arm stabilizer bar insulator. Damage to the suspension, exhaust and steering linkage components may occur if care is not exercised when positioning the hoist adapters of two-post hoists prior to lifting the vehicle.

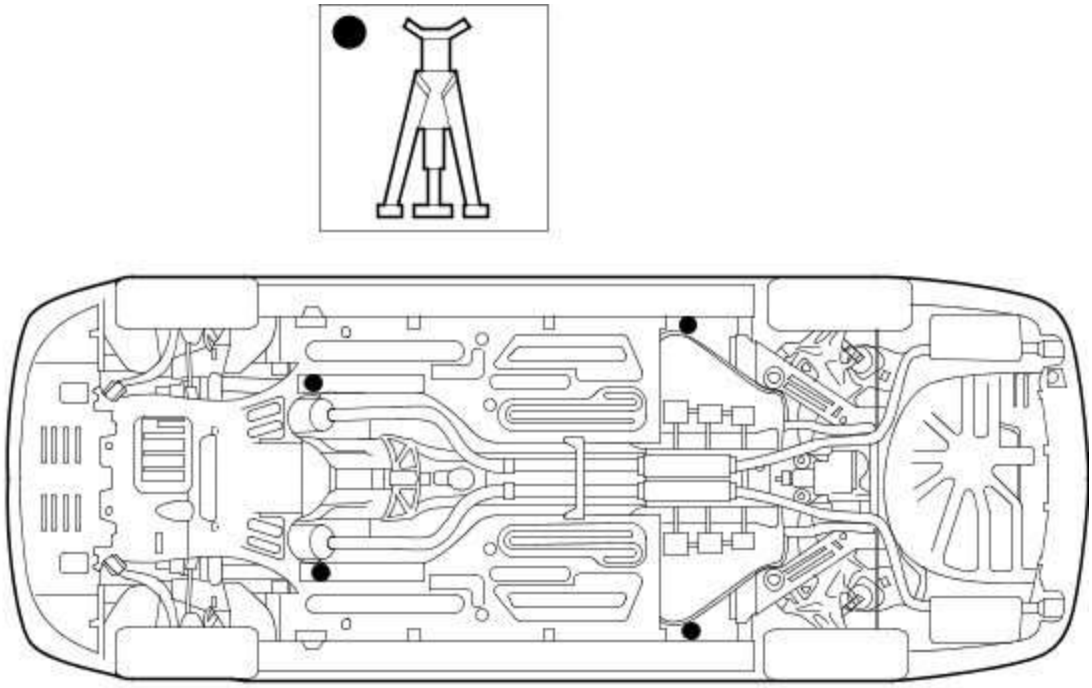
Never use the differential housing as a lift point. Damage to the differential housing and cover may occur.

When using a floor jack, a cushioned pad must be utilized to avoid body damage.



E30331

## Vehicle Support Points



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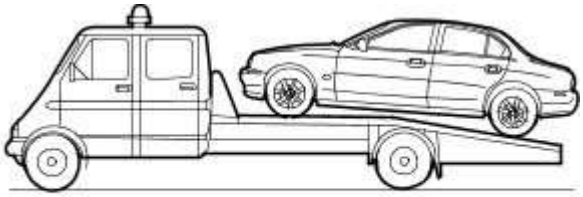
## Vehicle Recovery

NOTE: Prior to vehicle recovery, make sure the vehicle keys are available and the security system is disarmed.

Vehicle recovery methods are:

- By flat-bed transporter.
- By rear suspended tow.
- By rear suspended tow.

### Transporter or Trailer Recovery

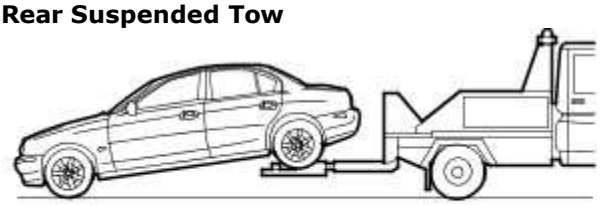


VUJ0001116

When the vehicle is being recovered by transporter or trailer:

- The parking brake must be applied and the wheels chocked.
- The gear selector lever must be in Neutral. Do not select Park on automatic transmission vehicles, as the parking lock mechanism may be damaged by the forward and backward rocking motion of the vehicle.
- The vehicle must be securely tied down to the transporter or trailer.

### Rear Suspended Tow



VUJ0001117

When the vehicle is being recovered by rear suspended tow:

- The ignition key must be removed from the ignition switch to lock the steering.
- The rear wheels must be correctly positioned in the lifting cradle and securely tied down.

### Emergency Towing

WARNING: If the engine is not running, the steering will become heavy and the force necessary to effectively apply the brakes will be greatly increased.

CAUTION: A vehicle with a defective transmission must be towed by rear suspended tow.

When the vehicle is being towed on its own wheels:

- Local regulations for the towing of vehicles must be followed. In some countries the registration number of the towing vehicle and an 'On Tow' sign or warning triangle must be displayed at the rear of the towed vehicle.
- The gear selector lever must be in Neutral.
- The ignition switch must be in position II to release the steering lock and make the direction indicators, horn and stop lamps operate.
- A distance of 0,8 km (0.5 mile) must not be exceeded.
- A speed of 48 km/h (30 mph) must not be exceeded.
- The tow rope must be attached to the front towing eye.

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# Noise, Vibration and Harshness - Noise, Vibration and Harshness (NVH)

Description and Operation

Noise, vibration and harshness (NVH) is becoming more important as vehicles become more sophisticated and passenger comfort levels increase. This section is designed to aid in the diagnosis, testing and repair of NVH concerns.

- Noise is defined as sounds not associated with the operation of passenger compartment equipment that interface with customer satisfaction.
- Vibration is defined as impulses felt by the customer that are not caused by road surface changes.
- Harshness is a ride quality issue where the customer feels that the vehicle response to the road surface is sharply transmitted to the customer.

## Diagnostic Theory

Diagnosis is more than just following a series of interrelated steps in order to find the solution to the specific condition. It is a way of looking at systems that are not functioning the way they should and finding out why. Also it is knowing how the system should work and whether it is working correctly.

There are basic rules for diagnosis. If these rules are followed, the cause of the condition is usually found the first time through the system.

## Know the System

- Know how the parts go together.
- Know how the system operates as well as its limits and what happens when the system goes wrong.
- Sometimes this means checking the system against one that is known to be working correctly.

## Know the History of the System

A clue in any one of these areas may save time:

- How old or new is the system?
- What kind of treatment has it had?
- Has it been repaired in the past in such a manner that might relate to the present condition?
- What is the repair history?

## Know the History of the Condition

- Did it start suddenly or appear gradually?
- Was it related to some other occurrence such as a collision or previous part renewal?
- Know how the condition made itself known; it may be an important clue to the cause.

## Know the Probability of Certain Conditions Developing

- Look for the simple rather than the complex.
- For example:
  - Electrical conditions usually occur at connections rather than components.
  - An engine no-start is more likely to be caused by a loose wire or small adjustment rather than a sheared-off camshaft.
- Know the difference between impossible and improbable. Certain failures in a system can be improbable but still happen.
- New parts are just that, new. It does not mean they are always good functioning parts.

## Do Not Cure the Symptom and Leave the Cause

Lowering the pressure in a front tire may correct the condition of a vehicle leaning to one side, but it does not correct the original condition.

## Be Positive the Cause is Found

- Double check the findings.
- What caused a worn component?
- A loose transmission or engine mount could indicate that other mounts are also loose.

## Diagnostic Charts

Charts are a simple way of expressing the relationship between basic logic and a physical system of components. They help discover the cause of a condition in the least time. Diagnostic charts combine many areas of diagnosis into one visual display:

- probability of certain things occurring in a system
- speed of checking certain components or functions before others
- simplicity of carrying out certain tests before others
- elimination of checking huge portions of a system by carrying out simple tests
- certainty of narrowing down the search to a small portion before carrying out in-depth testing

The fastest way to find a condition is to work with the tools that are available. This means working with proven diagnostic charts and the correct special equipment for the system.

Published: 16-Sep-2013

# Noise, Vibration and Harshness - Noise, Vibration and Harshness (NVH)

Diagnosis and Testing

## Principle of Operation

For a detailed description of Noise, Vibration and Harshness issues, refer to the Description and Operation section of the workshop manual.
REFER to: Noise, Vibration and Harshness (NVH) (100-04 Noise, Vibration and Harshness, Description and Operation).

## Inspection and Verification

1. Verify the customer's concerns by operating the vehicle to duplicate the condition.
2. Visually inspect the vehicle to determine any obvious cause(s) of the concern(s).
3. If the inspection reveals obvious causes that can be readily identified, repair as necessary.
4. If the concern(s) remains after the inspection, determine the symptom(s) and refer to the Symptom Chart.

## How To Use This Diagnostic Procedure Section

- Noise, vibration and harshness (NVH) concerns have become more important as vehicles have become more sensitive to these vibrations. This section is designed as an aid to identifying these situations
- The section provides diagnostic procedures based on symptoms. If the condition occurs at high speed, for instance, the most likely place to start is under High Speed Shake
- The road test procedure will tell how to sort the conditions into categories and how to tell a vibration from a shake
- A series of Road Test Quick Checks is provided to make sure that a cause is either pinpointed or eliminated
- Name the condition, proceed to the appropriate section and locate the correct diagnosis. When the condition is identified, the job is partly done
- Follow the diagnostic procedure as outlined
- Quick Checks are described within the step, while more involved tests and adjustments are outlined in General Procedures
- Always follow each step exactly and make notes to recall important findings later

## Customer Interview

The road test and customer interview (if available) provide information that will help identify the concerns and will provide direction to the correct starting point for diagnosis.

## Identify the Condition

NVH problems usually occur in a number of areas:

- tires
- engine accessories
- suspension
- driveline
- air leakage (wind noise)
- squeaks and rattles
- heating ventilation and air conditioning (HVAC)
- electrical (e.g. motor noise)
- transmission
- engine

It is important, therefore, that an NVH concern be isolated into its specific area(s) as soon as possible. The easiest and quickest way to do this is to carry out the Road Test as outlined.

## Noise Diagnostic Procedure

### Non-Axle Noise

The five most important sources of non-axle noise are exhaust, tires, roof racks, trim and mouldings, and transmission.

Therefore, make sure that none of the following conditions are the cause of the noise before proceeding with a driveline tear down and diagnosis.

- Under certain conditions, the pitch of the exhaust may sound very much like gear noise. At other times, it can be mistaken for a wheel bearing rumble
- Tires, especially snow tires, can have a high pitched tread whine or roar, similar to gear noise. Radial tires, to some degree, have this characteristic. Also, any non-standard tire with an unusual tread construction may emit a roar or whine type noise
- Trim and mouldings can also cause whistling or a whining noise
- Clunk may be a metallic noise heard when the automatic transmission is engaged in reverse or drive, or it may occur when the throttle is applied or released. It is caused by backlash somewhere in the driveline
- Bearing rumble sounds like marbles being tumbled. This condition is usually caused by a damaged wheel bearing

### Noise Conditions

- Gear noise is typically a howling or whining due to gear damage or incorrect bearing preload. It can occur at various speeds and driving conditions, or it can be continuous
- Chuckle is a particular rattling noise that sounds like a stick against the spokes of a spinning bicycle wheel. It occurs while decelerating from approximately 64 km/h (40 miles/h) and can usually be heard all the way to a stop. The frequency varies with vehicle speed
- Knock is very similar to chuckle, though it may be louder and occurs on acceleration or deceleration. The tear down will disclose what has to be corrected

Check and rule out tires, exhaust and trim items before disassembling the transmission to diagnose and correct gear noise.

The noises described under Road Test usually have specific causes that can be diagnosed by observation as the unit is disassembled. The initial clues are the type of noise heard on the road test and the driving conditions.

### Vibration Conditions

 NOTE: New Constant Velocity (CV) joints should not be installed unless disassembly and inspection revealed unusual wear.

Clicking, popping or grinding noises may be caused by the following:

- Cut or damaged CV joint boots resulting in inadequate or contaminated lubricant in the outboard or inboard CV joint bearing housings
- Loose CV joint boot clamps
- Another component contacting the rear drive half shaft
- Worn, damaged or incorrectly installed wheel bearing, suspension or brake component

Vibration at highway speeds may be caused by the following:

- Out-of-balance front or rear wheels
- Out-of-round tires
- Driveline imbalance
- Driveline run-out (alignment)

 NOTE: Rear drive half shafts are not balanced and are not likely to contribute to rotational vibration disturbance.

Shudder or vibration during acceleration (including from rest) may be caused by the following:

- Driveline alignment
- Excessively worn or damaged outboard or inboard CV joint bearing housing
- Excessively high CV joint operating angles caused by incorrect ride height. Check ride height, verify correct spring rate and check items under Inoperative Conditions
- Excessively worn driveshaft components

## Leakage Conditions

1. Inspect the CV joint boots for evidence of cracks, tears or splits.
2. Inspect the underbody for any indication of grease splatter in the vicinity of the rear drive half shaft, outboard and inboard CV joint boot locations, which is an indication of CV joint boot or CV joint boot clamp damage.
3. Inspect the inboard CV joint bearing housing seal for leakage.

## Inoperative Conditions

If a CV joint or rear drive half shaft pull-out occurs, check the following:

- suspension components for correct location, damage or wear
- bushings for wear
- subframe for damage
- bent or worn components
    - Stabilizer bar link
    - Left-hand rear suspension lower arm and bushing
    - Right-hand rear suspension lower arm and bushing
    - Rear wheel hub and rear drive half shaft

## Road Test

A gear-driven unit will produce a certain amount of noise. Some noise is acceptable and may be audible at certain speeds or under various driving conditions as on a newly paved blacktop road. The slight noise is in no way detrimental and must be considered normal.

The road test and customer interview (if available) provide information needed to identify the condition and give direction to the correct starting point for diagnosis.

1. Make notes throughout the diagnosis routine. Make sure to write down even the smallest piece of information, because

it may turn out to be the most important.

2. Do not touch anything until a road test and a thorough visual inspection of the vehicle have been carried out. Leave the tire pressures and vehicle load just where they were when the condition was first observed. Adjusting tire pressures, vehicle load or making other adjustments may reduce the conditions intensity to a point where it cannot be identified clearly. It may also inject something new into the system, preventing correct diagnosis.

3. Make a visual inspection as part of the preliminary diagnosis routine, writing down anything that does not look right. Note tire pressures, but do not adjust them yet. Note leaking fluids, loose nuts and bolts, or bright spots where components may be rubbing against each other. Check the luggage compartment for unusual loads.

4. Road test the vehicle and define the condition by reproducing it several times during the road test.

5. Carry out the Road Test Quick Checks as soon as the condition is reproduced. This will identify the correct diagnostic procedure. Carry out the Road Test Quick Checks more than once to verify they are providing a valid result. Remember, the Road Test Quick Checks may not tell where the concern is, but they will tell where it is not.

## Road Test Quick Checks

1. 24-80 km/h (15-50 miles/h): With light acceleration, a moaning noise is heard and possibly a vibration is felt in the front floor pan. It is usually worse at a particular engine speed and at a particular throttle setting during acceleration at that speed. It may also produce a moaning sound, depending on what component is causing it. Refer to Tip-In Moan in the Symptom Chart.

2. Acceleration/deceleration: With slow acceleration and deceleration, a shake is sometimes noticed in the steering wheel/column, seats, front floor pan, front door trim panel or front end sheet metal. It is a low frequency vibration (around 9-15 cycles per second). It may or may not be increased by applying brakes lightly. Refer to Idle Boom/Shake /Vibration in the Symptom Chart.

3. High speed: A vibration is felt in the front floor pan or seats with no visible shake, but with an accompanying sound or rumble, buzz, hum, drone or booming noise. Coast with the clutch pedal depressed or shift control selector lever in neutral and engine idling. If vibration is still evident, it may be related to wheels, tires, front brake discs, wheel hubs or front wheel bearings. Refer to High Speed Shake in the Symptom Chart.

4. Engine rpm sensitive: A vibration is felt whenever the engine reaches a particular rpm. It will disappear in neutral coasts. The vibration can be duplicated by operating the engine at the problem rpm while the vehicle is stationary. It can be caused by any component, from the accessory drive belt to the torque converter which turns at engine speed when the vehicle is stopped. Refer to High Speed Shake in the Symptom Chart.

5. Noise/vibration while turning: Clicking, popping, or grinding noises may be due to a worn, damaged, or incorrectly installed front wheel bearing, rear drive half shaft or CV joint.

6. Noise/vibration that is road speed relative: This noise/vibration can be diagnosed independent of engine speed or gear selected (engine speed varies but torque and road speed remain constant). The cause may be a rear drive axle/differential whine.

## Road Conditions

An experienced technician will always establish a route that will be used for all NVH diagnosis road tests. The road selected should be reasonably smooth, level and free of undulations (unless a particular condition needs to be identified). A smooth asphalt road that allows driving over a range of speeds is best. Gravel or bumpy roads are unsuitable because of the additional road noise produced. Once the route is established and consistently used, the road noise variable is eliminated from the test results.

 NOTE: Some concerns may be apparent only on smooth asphalt roads.

If a customer complains of a noise or vibration on a particular road and only on a particular road, the source of the concern may be the road surface. If possible, try to test the vehicle on the same type of road.

## Vehicle Preparation

Carry out a thorough visual inspection of the vehicle before carrying out the road test. Note anything which is unusual. Do not repair or adjust any condition until the road test is carried out, unless the vehicle is inoperative or the condition could pose a hazard to the technician.

After verifying the condition has been corrected, make sure all components removed have been installed.

## Lift Test

After a road test, it is sometimes useful to do a similar test on a lift.

When carrying out the high-speed shake diagnosis or engine accessory vibration diagnosis on a lift, observe the following precautions:

 WARNING: If only one drive wheel is allowed to rotate, speed must be limited to 55 km/h (35 miles/h) indicated on the speedometer since actual wheel speed will be twice that indicated on the speedometer. Speed exceeding 55 km/h (35 miles/h) or allowing the drive wheel to hang unsupported could result in tire disintegration, differential failure, constant velocity joint

and drive half shaft failure, which could cause serious personal injury and extensive vehicle damage. Failure to follow these instructions may result in personal injury.

 CAUTION: The suspension should not be allowed to hang free. When the CV joint is run at a very high angle, extra vibration as well as damage to the seals and joints can occur.

The rear suspension lower arm should be supported as far outboard as possible. To bring the vehicle to its correct ride height, the full weight of the vehicle should be supported in the rear by floor jacks. REFER to: (100-02 Jacking and Lifting)

Jacking (Description and Operation),
Lifting (Description and Operation).

1. Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting)
   Jacking (Description and Operation),
   Lifting (Description and Operation).
2. Explore the speed range of interest using the Road Test Quick Checks as previously described.
3. Carry out a coast down in neutral. If the vehicle is free of vibration when operating at a steady indicated speed and behaves very differently in drive and coast, a transmission concern is likely.

Note, however, that a test on the lift may produce different vibrations and noises than a road test because of the effect of the lift. It is not unusual to find vibrations on the lift that were not found in the road test. If the condition found on the road can be duplicated on the lift, carrying out experiments on the lift may save a great deal of time.

## Exhaust Neutralization Procedure

1. Raise vehicle on lift and slacken all exhaust fixings.
2. With all fixings loose, neutralize the exhaust system.
3. Tighten all fixings to correct torque, starting at the rear-most point working towards the front of the vehicle.

## Symptom Chart

| Symptom | Possible Cause | Action |
|---|---|---|
| High-speed shake | • Wheel end vibration<br>• Engine/transmission<br>• Driveline | GO to Pinpoint Test A. |
| Tip-in moan | • Air cleaner<br>• Power steering<br>• Powertrain<br>• Engine mounts<br>• Exhaust system | GO to Pinpoint Test B. |
| Idle boom/shake/vibration, or shudder | • Cable(s)/hoses(s)<br>• Intake air distribution and filtering system<br>• Engine mounts<br>• Exhaust system<br>• Belt/pulleys | GO to Pinpoint Test C. |
| Wheel end vibration analysis | • Suspension/rear drive halfshaft and CV joints<br>• Tires/wheels<br>• Wheel bearings<br>• CV joint boots | GO to Pinpoint Test D. |
| Non-axle noise | • Trim/mouldings<br>• A/C system<br>• Accessories | GO to Pinpoint Test E. |

## Pinpoint Tests

 NOTE: These Pinpoint Tests are designed to take the technician through a step-by-step diagnosis procedure to determine the cause of a condition. It may not always be necessary to follow the chart to its conclusion. Carry out only the Pinpoint Test steps necessary to correct the condition. Then check operation of the system to make sure the condition is corrected.

After verifying that the condition has been corrected, make sure all components removed have been installed.

| PINPOINT TEST A : HIGH-SPEED SHAKE | |
|---|---|
| TEST | DETAILS/RESULTS/ACTIONS |

## PINPOINT TEST B : TIP-IN MOAN

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| **B1: CHECK THE AIR CLEANER** | |
| | **1** Check the air cleaner.<br>• Check the air cleaner, inlet tube, outlet tube, resonators and all other components associated with the air induction system for correct installation and tightness of all connections. |
| | Are the components OK?<br>**Yes**<br>GO to B2.<br>**No**<br>Correct the condition. Repeat the Road Test as outlined. |
| **B2: CHECK THE EXHAUST SYSTEM** | |
| | **1** Carry out the exhaust system neutralizing procedure in this section. |
| | Is the exhaust system OK?<br>**Yes**<br>GO to B3.<br>**No**<br>Repair as necessary. Restore vehicle. Repeat the Road Test as outlined. |
| **B3: CHECK THE POWER STEERING** | |
| | **1** Remove the auxiliary drive belt and test for tip-in moan. |
| | Is the tip-in moan OK?<br>**Yes**<br>Repair the power steering as necessary. For additional information, refer to Section 211-00.<br>**No**<br>Check and install new engine/transmission mounts as necessary. Repeat Road Test as outlined. |

## PINPOINT TEST C : IDLE BOOM/SHAKE/VIBRATION/SHUDDER

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| **C1: CHECK CABLE/HOSES** | |
| | **1** Check the engine compartment for any component that may be grounding between the engine and body or chassis. Example: air conditioning (A/C) hoses. |
| | Are the components OK?<br>**Yes**<br>GO to C2.<br>**No**<br>Correct the condition. Repeat the Road Test as outlined. |
| **C2: CHECK THE COOLING RADIATOR** | |
| | **1** Check the engine cooling radiator mountings and bushings for security and condition. Check the radiator installation for any component that may have a touch condition. |
| | Are the installation and bushings OK?<br>**Yes**<br>GO to C3.<br>**No**<br>Correct the condition. Repeat the Road Test as outlined. |
| **C3: CHECK THE EXHAUST SYSTEM** | |
| | **1** Carry out the exhaust system neutralizing procedure in this section. |
| | Is the exhaust system OK?<br>**Yes**<br>Check and install new engine/transmission mounts as necessary. Repeat Road Test as outlined.<br>**No**<br>Repair as necessary. Repeat Road Test. |

## PINPOINT TEST D : WHEEL END VIBRATION ANALYSIS

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| **D1: INSPECT THE TIRES** | |
| | **1** Inspect the tires.<br>• Raise and support the vehicle. REFER to: (100-02 Jacking and Lifting) Jacking (Description and Operation), Lifting (Description and Operation).<br>• Inspect the tires for:<br>• Correct tire size<br>• Tire/wheel compatibility<br>• Wear or damage |

| | |
|---|---|
| | • Tire beads correctly seated |
| | Are the tires OK?<br>**Yes**<br>GO to D2.<br>**No**<br>Inspect the wheels. For additional information, refer to Section 204-00. |
| **D2: INSPECT WHEEL BEARINGS** | |
| | **1** Inspect the wheel bearings. For additional information, refer to Section 204-00. |
| | Are the wheel bearings OK?<br>**Yes**<br>GO to D3.<br>**No**<br>Repair as necessary. Repeat the Road Test as outlined. |
| **D3: INSPECT THE CONSTANT VELOCITY (CV) JOINT BOOTS** | |
| | **1** Inspect the CV joint boots.<br>• Spin the rear tire by hand<br>• Inspect for evidence of cracks, tears, splits or splattered grease |
| | Are the CV joint boots OK?<br>**Yes**<br>GO to D4.<br>**No**<br>Repair as necessary. Repeat the Road Test as outlined. |
| **D4: INSPECT WHEEL AND TIRE RUNOUT** | |
| | **1** Inspect the wheel and tire runout.<br>• Carry out the Wheel and Tire Check procedure.<br>REFER to: Lifting (100-02 Jacking and Lifting, Description and Operation). |
| | Is the wheel and tire runout OK?<br>**Yes**<br>Balance the wheels and tires. Refer to the wheel balance equipment manufacturers instructions.<br>**No**<br>Repair as necessary.<br>REFER to: Lifting (100-02 Jacking and Lifting, Description and Operation).<br>Repeat the Road Test as outlined. |

**PINPOINT TEST E : NON-AXLE NOISE**

| TEST CONDITIONS | DETAILS/RESULTS/ACTIONS |
|---|---|
| **E1: INSPECT VEHICLE TRIM** | |
| | **1** Check the grille and trim mouldings to see if they are the source of the noise. |
| | Are the vehicle trim components causing the noise?<br>**Yes**<br>Install new trim or repair as necessary. For additional information, refer to Section 501-08.<br>**No**<br>GO to E2. |
| **E2: CHECK THE A/C SYSTEM FOR NOISE** | |
| | **1** Check the A/C system components for noise by turning the A/C system on and off. |
| | Is the A/C system causing the noise?<br>**Yes**<br>Diagnose the A/C system.<br>REFER to: Lifting (100-02 Jacking and Lifting, Description and Operation).<br>**No**<br>GO to E3. |
| **E3: CHECK NON-FACTORY ACCESSORIES** | |
| | **1** Inspect any accessories for being the source of the noise. Example: grounding body-to-frame, antennas, visors, bug deflectors and fog lights? |
| | Are the accessories the cause of the noise?<br>**Yes**<br>Adjust, repair or install new accessories or fasteners as required.<br>**No**<br>Verify the customer concern. |

Published: 11-May-2011

# Noise, Vibration and Harshness - Exhaust System Neutralizing

General Procedures

1. Loosen the muffler inlet pipe and resonator pipe to exhaust manifold fasteners at the flanges and the muffler inlet connection.
2. Place a stand to support the muffler parallel to the vehicle frame with the muffler pipe bracket free of stress.
3. Tighten the muffler connection.
4. Position the exhaust pipes to the manifolds and tighten. Make sure that the catalytic converter and heat shield do not contact the frame rails.
5. With the complete exhaust system tight (and cooled) the rear hanger insulator should be angled forward, to allow the system to expand rearward when heated during normal running