GENERAL INFORMATION

DESCRIPTION AND OPERATION

ADAPTIVE DAMPING CONTROL MODULE (SUMB)

CAUTION:

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

NOTES:

- If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the warranty policy and procedures manual, 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 Adaptive Damping Control 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).

C101D-12Left Front Vertical Acceleration Sensor - Circuit short to battery

- 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-14Left Front Vertical Acceleration Sensor - Circuit short to ground or open

- Left Front vertical acceleration sensor circuit short to ground or open circuit
- 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-22Left Front Vertical Acceleration Sensor - Signal amplitude > maximum

- Left Front vertical acceleration sensor signal amplitude above maximum
- Left front vertical acceleration sensor insecurely mounted
- Left front vertical acceleration sensor signal circuit short to another circuit
- Left front vertical acceleration sensor internal fault
- With vehicle parked on a level surface, read left front vertical accelerometer voltage and check it lies in range 1.9 to 2.1 volts. If not OK then check electrical wiring for shorts, loose connections and repair as required. If wiring OK then suspect faulty sensor/incorrectly installed sensor. Check the sensor is correctly mounted, secure or renew sensor as required. Refer to the new module/component installation note at the top of the DTC Index, clear DTC and retest system

C101D-26Left Front Vertical Acceleration Sensor - Signal rate of change below threshold

- Left Front vertical acceleration sensor signal rate of change below threshold
- Left front vertical acceleration sensor signal circuit short to another circuit
- 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-78Left Front Vertical Acceleration Sensor - Alignment or adjustment incorrect

- Left Front vertical acceleration sensor alignment or adjustment incorrect
- Left front vertical acceleration sensor bracket bent
- 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-12Right Front Vertical Acceleration Sensor - Circuit short to battery

- 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-14Right Front Vertical Acceleration Sensor - Circuit short to ground or open

- Right Front vertical acceleration sensor circuit short to ground or open circuit
- 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-22Right Front Vertical Acceleration Sensor - Signal amplitude > maximum

- Right Front vertical acceleration sensor signal amplitude above maximum
- Right front vertical acceleration sensor insecurely mounted
- Right front vertical acceleration sensor signal circuit short to another circuit
- 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 installed sensor. Check the sensor is correctly mounted, secure or renew sensor as required. Clear DTC and retest system

C101E-26Right Front Vertical Acceleration Sensor - Signal rate of change below threshold

- Right front vertical acceleration sensor signal circuit short to another circuit
- 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-78Right Front Vertical Acceleration Sensor - Alignment or adjustment incorrect

- Right front vertical acceleration sensor alignment or adjustment incorrect
- Right front vertical acceleration sensor bracket bent
- Right front vertical acceleration sensor damaged
- Check the right front vertical accelerometer for location and security. If correct, suspect a faulty accelerometer. Replace the sensor/bracket as required, clear the DTC and retest the system

C1024-00System 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 dynamic suspension control module for intermittent or poor connection. Repair wiring circuits as required, clear DTC and retest the system

C102C-12Right Rear Vertical Acceleration Sensor - Circuit short to battery

- Right rear vertical acceleration sensor circuit short to power
- Refer to the electrical circuit diagrams and check right rear vertical acceleration sensor circuit for short to power or another circuit. Repair circuit, clear the DTC and retest the system

C102C-14Right Rear Vertical Acceleration Sensor - Circuit short to ground

or open

- Right Rear vertical acceleration sensor circuit short to ground, open circuit
- Vertical acceleration sensor fault
- Refer to the electrical circuit diagrams and check right rear vertical acceleration sensor circuit for short to ground, open circuit. If no fault found on wiring suspect sensor. Renew sensor, clear DTC and retest the system

C102C-22Right Rear Vertical Acceleration Sensor - Signal amplitude > maximum

- Right rear vertical acceleration sensor - signal amplitude > maximum
- Right rear vertical acceleration sensor insecurely mounted
- Right rear vertical acceleration sensor signal circuit short to another circuit
- Right rear vertical acceleration sensor internal fault
- With vehicle parked on a level surface, read right rear vertical accelerometer voltage and check it lies in range 1.9 to 2.1 volts. If not OK then check electrical wiring for shorts, loose connections and repair as required. If wiring OK then suspect faulty sensor/incorrectly installed sensor. Check the sensor is correctly mounted, secure or renew sensor as required. Clear DTC and retest system

C102C-26Right Rear Vertical Acceleration Sensor - Signal rate of change below threshold

- Right rear vertical acceleration sensor signal rate of change below threshold
- Right rear vertical acceleration sensor signal circuit short to another circuit
- Right Rear vertical acceleration sensor internal fault
- Refer to the electrical circuit diagrams and check Right 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

C102C-78Right Rear Vertical Acceleration Sensor - Alignment or adjustment incorrect

- Right Rear vertical acceleration sensor alignment or adjustment incorrect
- Right rear vertical acceleration sensor bracket bent
- Right rear vertical acceleration sensor damaged
- Check right rear vertical accelerometer for location and security, if correct suspect faulty accelerometer. Replace the sensor/bracket as required, clear the DTC and retest the system

C110C-01Left Front Damper Solenoid - General electrical failure

- General electrical failure
- Left front damper solenoid circuit fault
- Refer to the electrical circuit diagrams and check front left damper solenoid circuit. If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index

C110C-14Left Front Damper Solenoid - Circuit short to ground or open

- Front Left Damper Solenoid circuit short to ground, open circuit or high circuit Resistance
- Front left damper solenoid failure
- Refer to the electrical circuit diagrams and check front Left damper solenoid circuit for short to ground or open circuit. Check for corrosion, backed out terminals and poor crimping of terminals

C110C-18Left Front Damper Solenoid - Circuit current below threshold

- Left front damper solenoid circuit current below threshold
- Front left damper actuator open circuit at startup
- Refer to the electrical circuit diagrams and check front left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110C-19Left Front Damper Solenoid - Circuit current above threshold

- Front left damper solenoid circuit current above threshold
- Refer to the electrical circuit diagrams and check front left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110C-1DLeft Front Damper Solenoid - Circuit current out of range

C110C-1DLeft Front Damper Solenoid - Circuit current out of range

- Left front damper solenoid circuit current out of range
- Front Left Damper Solenoid circuit short to ground/power, open circuit
- Front left damper solenoid failure
- Refer to the electrical circuit diagrams and check front Left damper solenoid circuit. Check and install a new front left damper as required

C110C-64Left Front Damper Solenoid - Signal plausibility failure

- Left front damper solenoid signal plausibility failure
- Front left damper solenoid measured current control loop failed
- Front left damper Solenoid open circuit
- Refer to the electrical circuit diagrams and check front left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110D-01Right Front Damper Solenoid - General electrical failure

- General electrical failure
- Right front damper solenoid circuit fault
- Refer to the electrical circuit diagrams and check front right damper solenoid circuit. If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index

C110D-14Right Front Damper Solenoid - Circuit short to ground or open

- Front right damper solenoid circuit short to ground, open circuit or high circuit Resistance
- Front right damper solenoid failure
- Refer to the electrical circuit diagrams and check front right damper solenoid circuit for short to ground or open circuit. Check for corrosion, backed out terminals and poor crimping of terminals

C110D-18Right Front Damper Solenoid - Circuit current below threshold

- Right front damper solenoid circuit current below threshold
- Front Right damper actuator open circuit at startup
- Refer to the electrical circuit diagrams and check Front Right Damper

Solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110D-19Right Front Damper Solenoid - Circuit current above threshold

- Front right damper solenoid circuit current above threshold
- Refer to the electrical circuit diagrams and check front right damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110D-1DRight Front Damper Solenoid - Circuit current out of range

- Right front damper solenoid circuit current out of range
- Front right damper Solenoid circuit short to ground/power, open circuit
- Front right damper solenoid failure
- Refer to the electrical circuit diagrams and check front right damper solenoid circuit for short to ground, power or open circuit. Check and install a new front right shock actuator as required

C110D-64Right Front Damper Solenoid - Signal plausibility failure

- Right front damper solenoid signal plausibility failure
- Front right damper solenoid measured current control loop failed
- Front right damper solenoid open circuit
- Refer to the electrical circuit diagrams and check Front Right Damper Solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110E-01Left Rear Damper Solenoid - General electrical failure

- General electrical failure
- Left rear damper solenoid circuit fault
- Refer to the electrical circuit diagrams and check rear left damper solenoid circuit. If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index

C110E-14Left Rear Damper Solenoid - Circuit short to ground or open

- Rear left damper solenoid circuit short to ground, open circuit or high circuit resistance
- Rear left damper solenoid failure

- Refer to the electrical circuit diagrams and check rear left damper solenoid circuit for short to ground or open circuit. Check for corrosion, backed out terminals and poor crimping of terminals

C110E-18Left Rear Damper Solenoid - Circuit current below threshold

- Left rear damper solenoid circuit current below threshold
- Rear Left damper actuator open circuit at startup
- Refer to the electrical circuit diagrams and check rear left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110E-19Left 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 (nominal = 2 - 3.5 Ohms)

C110E-1DLeft Rear Damper Solenoid - Circuit current out of range

- Left rear damper solenoid circuit current out of range
- Rear left damper solenoid circuit short to ground/power, open circuit
- Rear left damper solenoid failure
- Refer to the electrical circuit diagrams and check rear left damper solenoid circuit for short to ground, power or open circuit. Check and install a new damper as required

C110E-64Left Rear Damper Solenoid - Signal plausibility failure

- Left rear damper solenoid signal plausibility failure
- Rear left damper solenoid measured current control loop failed
- Rear left damper solenoid open circuit
- Refer to the electrical circuit diagrams and check rear left damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110F-01Right Rear Damper Solenoid - General electrical failure

- General electrical failure
- Right rear damper solenoid circuit fault

- Refer to the electrical circuit diagrams and check rear right damper solenoid circuit. If no faults are evident suspect a faulty control module, refer to the new module installation note at the top of the DTC Index

C110F-14Right Rear Damper Solenoid - Circuit short to ground or open

- Rear right damper solenoid circuit short to ground, open circuit or high circuit Resistance
- Rear right damper solenoid failure
- Refer to the electrical circuit diagrams and check rear right damper solenoid circuit. Check for corrosion, backed out terminals and poor crimping of terminals

C110F-18Right Rear Damper Solenoid - Circuit current below threshold

- Right rear damper solenoid circuit current below threshold
- Rear right damper actuator open circuit at startup
- Refer to the electrical circuit diagrams and check rear right damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110F-19Right Rear Damper Solenoid - Circuit current above threshold

- Rear right damper solenoid circuit current above threshold
- Refer to the electrical circuit diagrams and check rear right damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C110F-1DRight Rear Damper Solenoid - Circuit current out of range

- Right rear damper solenoid circuit current out of range
- Rear right damper solenoid circuit short to ground/power, open circuit
- Rear right damper solenoid failure
- Refer to the electrical circuit diagrams and check rear right damper solenoid circuit. Check and install a new damper as required

C110F-64Right Rear Damper Solenoid - Signal plausibility failure

- Right rear damper solenoid signal plausibility failure
- Rear right damper solenoid measured current control loop failed
- Rear right damper solenoid open circuit

- Refer to the electrical circuit diagrams and check rear right damper solenoid circuit resistance (nominal = 2 - 3.5 Ohms)

C1A03-12Left Front Height Sensor - Circuit short to battery

- Left front height sensor circuit short to power
- Height sensor circuit shorted to another cable
- Height sensor internal fault
- Refer to the electrical circuit diagrams and check front left height sensor circuit. If circuit correct suspect sensor internal fault, renew as required

C1A03-14Left Front Height Sensor - Circuit short to ground or open

- Wiring to sensor (signal) open circuit
- Wiring to height sensor partial short to ground
- Wiring to height sensor short to other cable
- 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 three terminals and vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected): voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V. All voltages should be within ± 0.15V

C1A03-16Left Front Height Sensor - Circuit voltage below threshold

- Left front height sensor circuit voltage below threshold
- Incorrect height calibration
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A03-17Left Front Height Sensor - Circuit voltage above threshold

- Left front height sensor circuit voltage above threshold

- Left front height sensor circuit voltage above threshold
- Incorrect height calibration
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A03-21Left Front Height Sensor - Signal amplitude < minimum

- Left front height sensor signal amplitude below minimum
- Height sensor linkage not connected
- Height sensor or bracket loose
- Height sensor bracket bent
- Incorrect height calibration
- Height sensor linkage toggled
- Height sensor water ingress
- Wiring to height sensor partial short to ground
- Wiring to height sensor short to other cable
- Height sensor electrical fault
- Height sensor linkage bent
- Incorrect height sensor installed

NOTE:

> If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated

- Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at control module then: (A) Check for short circuits between any of the three terminals and vehicle ground. (B) Check for electrical continuity between the two

connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure

C1A03-22Left Front Height Sensor - Signal amplitude > maximum

- Left front height Sensor signal amplitude above maximum
- Height sensor linkage not connected
- Height sensor or bracket loose
- Height sensor bracket bent
- Incorrect height calibration
- Height sensor linkage toggled
- Height sensor water ingress
- Wiring to height sensor partial short to ground

- Wiring to height sensor short to other cable
- Height sensor electrical fault
- Height sensor linkage bent
- Incorrect height sensor installed

NOTE:

> If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated

- Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at control module then: (A) Check for short circuits between any of the three terminals and vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement

beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure

C1A03-76Left Front Height Sensor - Wrong mounting position

- Incorrect left front height sensor mounting position
- Incorrect height calibration
- Check for correct height sensor installation and orientation. Rectify as necessary
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A03-78Left Front Height Sensor - Alignment or adjustment incorrect

- Left front height sensor alignment or adjustment incorrect
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A04-12Right Front Height Sensor - Circuit short to battery

- Right front height sensor circuit short to power
- Height sensor circuit shorted to another cable
- Height sensor internal fault
- Refer to the electrical circuit diagrams and check front right height sensor circuit. If circuit correct suspect a sensor internal fault, renew as required

C1A04-14Right Front Height Sensor - Circuit short to ground or open

- Wiring to sensor (signal) open circuit
- Wiring to height sensor partial short to ground
- Wiring to height sensor short to other cable
- 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 three terminals and vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V

C1A04-16Right Front Height Sensor - Circuit voltage below threshold

- Right front height sensor circuit voltage below threshold
- Incorrect height calibration
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A04-17Right Front Height Sensor - Circuit voltage above threshold

- Right front height sensor circuit voltage above threshold
- Incorrect height calibration
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A04-21Right Front Height Sensor - Signal amplitude < minimum

- Right front height sensor signal amplitude below minimum
- Height sensor linkage not connected
- Height sensor or bracket loose
- Height sensor bracket bent
- Incorrect height calibration
- Height sensor linkage toggled
- Height sensor water ingress
- Wiring to height sensor partial short to ground
- Wiring to height sensor short to other cable

- Height sensor electrical fault
- Height sensor linkage bent
- Incorrect height sensor installed

NOTE:

> If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated

- Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at control module then: (A) Check for short circuits between any of the three terminals and vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or

~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure

C1A04-22Right Front Height Sensor - Signal amplitude > maximum

- Right front height sensor signal amplitude above maximum
- Height sensor linkage not connected
- Height sensor or bracket loose
- Height sensor bracket bent
- Incorrect height calibration
- Height sensor linkage toggled
- Height sensor water ingress
- Wiring to height sensor partial short to ground
- Wiring to height sensor short to other cable
- Height sensor electrical fault
- Height sensor linkage bent
- Incorrect height sensor installed

NOTE:

> If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated

- Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at control module then: (A) Check for short circuits between any of the three terminals and

vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure

C1A04-76Right Front Height Sensor - Wrong mounting position

- Incorrect right front height sensor mounting position
- Incorrect height calibration
- Check for correct height sensor installation and orientation. Rectify as necessary
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A04-78Right Front Height Sensor - Alignment or adjustment incorrect

- Right Front height sensor alignment or adjustment incorrect
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A05-12Left Rear Height Sensor - Circuit short to battery

- Left rear height sensor circuit short to power
- Height sensor circuit shorted to another cable
- Height sensor internal fault
- Refer to the electrical circuit diagrams and check rear left height sensor circuit. If circuit correct suspect a sensor internal fault, renew as required

C1A05-14Left Rear Height Sensor - Circuit short to ground or open

- Wiring to sensor (signal) open circuit
- Wiring to height sensor partial short to ground
- Wiring to height sensor short to other cable
- Height sensor internal electrical fault
- Disconnect electrical connector to height sensor and inspect connector pins and terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at the control module. (A) Check for short circuits between any of the three terminals and vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V

C1A05-16Left Rear Height Sensor - Circuit voltage below threshold

- Left rear height sensor circuit voltage below threshold
- Incorrect height calibration
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A05-17Left Rear Height Sensor - Circuit voltage above threshold

- Left rear height sensor circuit voltage above threshold
- Incorrect height calibration
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A05-21Left Rear Height Sensor - Signal amplitude < minimum

- Left rear height sensor signal amplitude below minimum
- Height sensor linkage not connected
- Height sensor or bracket loose
- Height sensor bracket bent
- Incorrect height calibration
- Height sensor linkage toggled
- Height sensor water ingress
- Wiring to height sensor partial short to ground
- Wiring to height sensor short to other cable
- Height sensor electrical fault
- Height sensor linkage bent
- Incorrect height sensor installed

NOTE:

> If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated

- Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at control module then: (A) Check for short circuits between any of the three terminals and vehicle ground. (B) Check for electrical continuity between the two

connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure

C1A05-22Left Rear Height Sensor - Signal amplitude > maximum

- Left rear height sensor signal amplitude above maximum
- Height sensor linkage not connected
- Height sensor or bracket loose
- Height sensor bracket bent
- Incorrect height calibration
- Height sensor linkage toggled
- Height sensor water ingress
- Wiring to height sensor partial short to ground

- Wiring to height sensor short to other cable
- Height sensor electrical fault
- Height sensor linkage bent
- Incorrect height sensor installed

NOTE:

> If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated

- Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at control module then: (A) Check for short circuits between any of the three terminals and vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not

change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure

C1A05-76Left Rear Height Sensor - Wrong mounting position

- Incorrect left rear height sensor mounting position
- Incorrect height calibration
- Check for correct height sensor installation and orientation. Rectify as necessary
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A05-78Left Rear Height Sensor - Alignment or adjustment incorrect

- Left rear height sensor alignment or adjustment incorrect
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A06-12Right Rear Height Sensor - Circuit short to battery

- Right rear height sensor circuit short to power
- Height sensor circuit shorted to another cable
- Height sensor internal fault
- Refer to the electrical circuit diagrams and check the rear right height sensor circuit. If circuit correct suspect a sensor internal fault, renew as required

C1A06-14Right Rear Height Sensor - Circuit short to ground or open

- Wiring to sensor (signal) open circuit
- Wiring to height sensor partial short to ground
- Wiring to height sensor short to other cable

- 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 three terminals and vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V

C1A06-16Right Rear Height Sensor - Circuit voltage below threshold

- Right rear height sensor circuit voltage below threshold
- Incorrect height calibration
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A06-17Right Rear Height Sensor - Circuit voltage above threshold

- Right rear height sensor circuit voltage above threshold
- Incorrect height calibration
- Refer to the workshop manual and perform the height sensor calibration procedure. Clear the DTC and retest the system

C1A06-21Right Rear Height Sensor - Signal amplitude < minimum

- Right rear height sensor signal amplitude below minimum
- Height sensor linkage not connected
- Height sensor or bracket loose
- Height sensor bracket bent
- Incorrect height calibration
- Height sensor linkage toggled
- Height sensor water ingress
- Wiring to height sensor partial short to ground

- Wiring to height sensor short to other cable
- Height sensor electrical fault
- Height sensor linkage bent
- Incorrect height sensor installed

NOTE:

> If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated

- Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water ingress. If no corrosion is found, disconnect harness at control module then: (A) Check for short circuits between any of the three terminals and vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not

change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated. Refer to the relevant section of the workshop manual for the calibration procedure

C1A06-22Right Rear Height Sensor - Signal amplitude > maximum

- Right Rear Height Sensor - signal amplitude above maximum
- Height sensor linkage not connected
- Height sensor or bracket loose
- Height sensor bracket bent
- Incorrect height calibration
- Height sensor linkage toggled
- Height sensor water ingress
- Wiring to height sensor partial short to ground
- Wiring to height sensor short to other cable
- Height sensor electrical fault
- Height sensor linkage bent
- Incorrect height sensor installed

NOTE:

If any height sensor fixings were slackened or found to be loose or if a height sensor was changed, the vehicle ride height MUST be re-calibrated

- Inspect for damage or loose fixings. Confirm that the correct height sensor part number is installed, as specified in the service parts database. To check height sensor: Disconnect electrical connector to height sensor and inspect connecter pins & terminals for evidence of corrosion or water

ingress. If no corrosion is found, disconnect harness at control module then: (A) Check for short circuits between any of the three terminals and vehicle ground. (B) Check for electrical continuity between the two connectors for each of the three terminals. Reconnect electrical connector at control module only. C) Check voltages at terminals within height sensor connector (sensor not connected). • Voltage to sensor ground connection should be ~0V, voltage to sensor signal connection should be ~0V, voltage to sensor supply connection should be ~5V All voltages should be within ± 0.15V. To check sensor operation on the vehicle: Check for water ingress around the height sensors, electrical connectors or shaft end. Check for excessive movement in the shaft in all directions. Raise vehicle (ideally on wheels-free ramp) until suspension on corner under investigation is at full extension to gain access to height sensor. Access may be improved by removing road-wheel. Carefully disconnect the height sensor link from the upper suspension arm. Monitor the height sensor signal voltage output for the height sensor under investigation. Position the sensor arm so it is in the mid position and confirm that the voltage is around 2.5 volts. Move the sensor arm over the range ±40° around the mid position and confirm that the voltage changes smoothly between around 0.2 volts and 4.8 volts. If voltages are incorrect or do not change smoothly then renew the sensor. NOTE: For angles of movement beyond ±40°, the sensor signal will remain at a voltage of ~0.15V or ~4.85V, depending on position of sensor lever. This is normal. When investigation is complete, install the height sensor link to the upper arm. If any fixings to the height sensor body or mounting bracket were slackened, found to be loose or if a height sensor was changed, the

AIR SUSPENSION CONTROL MODULE (RIM)

CAUTION:

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

NOTES:

- If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.
- Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.
- Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.
- If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Air Suspension Control 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).

Air Spring Sir Supply - Fluid leak or seal failureLED - Circuit current above thresholdC1A03-29Left Front Height Sensor - Signal invalid

- Left-hand front height sensor signal invalid
- Incorrect height calibration process
- Using the manufacturer approved diagnostic system, perform routine - Suspension system - Height calibration - Located under 'Service Functions'
- Check/renew fuses as necessary. Where available, refer to the guided diagnostic routine for this DTC on the approved diagnostic system. Check the operation of the compressor relay. Repair/renew as necessary
- Where available, refer to the guided diagnostic routine for this code on the approved diagnostic system. Refer to the electrical circuit diagrams and check the power supply circuits to the module. Check the module connector for security and integrity

DTC	DESCRIPTION	POSSIBLE CAUSES	
B1A84-55	Car Configuration Data - Not configured	▪ System not configured ▪ Data does not match that expected for specification ▪ Incorrect software version loaded	▪ Using the manufacturer approv necessary. Ensure the air suspe retest
C112F-72	Air Spring Valve - Actuator stuck open	Corner valve stuck open (fully or partially) ▪ Vehicle driven while system in "Tight Tolerance" mode	▪ Where possible, refer to the gu Complete corner valve checks.
C1130-66	Air Spring Air Supply - Signal has too many transitions/events	▪ Air spring leak ▪ Leak in air harness to air spring ▪ Corner valve leak to gallery ▪ Compressor assembly fault ▪ Vehicle driven while system in "Tight Tolerance" mode	▪ Visually inspect the system for this DTC on the approved diag
C1130-7A	▪ Detached or burst air pipe	▪ Visually inspect the system for an excessive air leak.	

	▪ Leaking air spring or pipe to air spring (large leak) ▪ Loose pipe connection ▪ Insufficient pressure from compressor ▪ Height sensor fault	Check the height sensor linkage(s) for damage/restrictions. Visually inspect the air harness for evidence of melting, crushing, kinking or collapsing. Where possible, refer to the guided diagnostic routine for this DTC on the approved diagnostic system	
C1131-92	Air Supply - Performance or incorrect operation	▪ Loose or burst air pipe ▪ Detached air pipe ▪ Leaking pipe from reservoir valve block to air supply unit or either axle valve block ▪ Insufficient pressure from compressor ▪ Reservoir valve block piped incorrectly	▪ Visually inspect the system for installation
C1138-23	Access Switch - Signal stuck low	▪ Switch signal stuck low (switch on driver's door) ▪ Switch harness short to ground ▪ Switch stuck in pressed position ▪ Driver's door switchpack fault	▪ Check the access switch opera diagrams and check the wiring suspension control module for
C1A01-19	**NOTE:** Circuit reference - LED_NEG ▪ Switch pack LED circuit current above threshold ▪ LED cathode (negative) connection shorted to positive ▪ One or more LEDs short circuit	▪ Refer to the electrical circuit diagrams and check circuit between the air suspension control module and switch pack for short circuit to power. Repair as necessary. Clear the DTCs and retest. If the DTC is still logged suspect the switch pack	

C1A03-1C	Left Front Height Sensor - Circuit voltage out of range	▪ Height sensor disconnected ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Height sensor fault	▪ Check the sensor connector fo circuit for continuity or short ci sensor fixings are slackened or height must be re-calibrated. C
C1A03-26	Left Front Height Sensor - Signal rate of change below threshold	▪ Sensor signal rate of change below threshold/signal voltage stuck ▪ Height sensor linkage disconnected ▪ Height sensor fault ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance	▪ Check height sensor linkage is security, damage and correct o the electrical circuit diagrams a necessary. Where possible, ref diagnostic system
C1A03-27	Left Front Height Sensor - Signal rate of change above threshold	▪ Left-hand front height sensor signal rate of change above threshold ▪ Height sensor harness wiring short circuit to ground, short circuit to power or intermittent connection ▪ Height sensor fault	▪ Check the sensor connector fo circuit for continuity or short ci orientation/installation. Repair/ routine for this DTC on the app
C1A03-78	Left Front Height Sensor - Alignment or adjustment incorrect	▪ Sensor alignment or adjustment incorrect; signal out of range ▪ Height sensor linkage not connected ▪ Height sensor linkage toggled ▪ Height sensor loose ▪ Height sensor bracket bent ▪ Incorrect height calibration ▪ Wiring to height sensor short to ground ▪ Wiring to height sensor short to other cable	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L ▪ Check height sensor linkage is security, damage and correct o the electrical circuit diagrams a necessary. Where possible, ref diagnostic system

		▪ Height sensor electrical fault	
C1A03-92	Left Front Height Sensor - Performance or incorrect operation	▪ Left-hand front height sensor height performance not as expected/signal changing slower than expected ▪ Axle valve block pipes connected incorrectly ▪ Height sensor incorrectly installed ▪ Blocked/damaged or crushed gallery pipe ▪ Blocked/damaged or crushed air spring pipe ▪ Corner valve stuck closed (mechanically) ▪ Reservoir valve stuck open (mechanically)	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L ▪ Check that the vehicle is free o of fixings. If necessary, calibrat refer to the guided diagnostic spring leak. Check the air harn front and rear valve block pipe system for corner, reservoir an
C1A04-1C	Right Front Height Sensor - Circuit voltage out of range	▪ Right-hand front height sensor signal voltage out of range ▪ Height sensor disconnected ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Height sensor fault	▪ Check the sensor connector fo circuit for continuity or short ci sensor fixings are slackened or height must be re-calibrated. C
C1A04-26	Right Front Height Sensor - Signal rate of change below threshold	▪ Right-hand front height sensor signal rate of change below threshold/signal voltage stuck ▪ Height sensor linkage disconnected ▪ Height sensor fault ▪ Height sensor harness wiring short circuit to ground, short circuit to power or short to each other	Check height sensor linkag connectors for water ingre the approved diagnostic sy
C1A04	Right Front Height	▪ Right-hand front height	▪ Visually inspect the wiring harn

C1A04-27	Right Front Height Sensor - Signal rate of change above threshold	▪ Right-hand front height sensor signal rate of change above threshold ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Height sensor fault	▪ Visually inspect the wiring harn height sensor for security, dam Where possible, refer to the gu
C1A04-29	Right Front Height Sensor - Signal invalid	▪ Right-hand front height sensor signal invalid ▪ Incorrect height calibration process	▪ Using the manufacturer approv calibration - Located under 'Se
C1A04-78	Right Front Height Sensor - Alignment or adjustment incorrect	▪ Sensor alignment or adjustment incorrect; signal out of range ▪ Height sensor linkage not connected ▪ Height sensor linkage toggled ▪ Height sensor loose ▪ Height sensor bracket bent ▪ Incorrect height calibration ▪ Wiring to height sensor short to ground ▪ Wiring to height sensor short to other cable ▪ Height sensor electrical fault	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L ▪ Check height sensor linkage is security, damage and correct c the electrical circuit diagrams a necessary. Where possible, ref diagnostic system
C1A04-92	Right Front Height Sensor - Performance or incorrect operation	▪ Right-hand front height sensor height changing slower than expected ▪ Axle valve block pipes incorrectly installed (unions reversed) ▪ Height sensor incorrectly installed ▪ A gallery pipe is blocked/damaged/crushed ▪ An air spring pipe is blocked/damaged/crushed ▪ Corner valve stuck closed ▪ Reservoir valve stuck open	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L ▪ Check that the vehicle is free o of fixings. If necessary, calibrat refer to the guided diagnostic spring leak. Check the air harn front and rear valve block pipe pipes for correct routing and ir and exhaust valve checks. Che

		(mechanically)	
C1A05-1C	Left Rear Height Sensor - Circuit voltage out of range	▪ Left-hand rear height sensor signal voltage out of range ▪ Height sensor disconnected ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Height sensor fault	Check the sensor connector for d circuit for continuity or short circu sensor fixings are slackened or fo height must be re-calibrated. Cali
C1A05-26	Left Rear Height Sensor - Signal rate of change below threshold	▪ Left-hand rear height sensor signal voltage stuck whilst vehicle is driven ▪ Height sensor linkage disconnected ▪ Height sensor fault ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance	▪ Check height sensor linkage is connectors for water ingress. V the approved diagnostic syster
C1A05-27	Left Rear Height Sensor - Signal rate of change above threshold	▪ Left-hand rear height sensor signal rate of change above threshold ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Height sensor linkage disconnected ▪ Height sensor failure	▪ Check height sensor linkage is connectors for water ingress. V the approved diagnostic syster
C1A05-29	Left Rear Height Sensor - Signal invalid	▪ Left-hand rear height sensor signal invalid ▪ Incorrect height calibration process	▪ Using the manufacturer approv calibration - Located under 'Se
C1A05-78	Left Rear Height Sensor - Alignment or adjustment incorrect	▪ Sensor alignment or adjustment incorrect; signal out of range ▪ Height sensor linkage not connected ▪ Height sensor linkage	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L

		toggled ▪ Height sensor loose ▪ Height sensor bracket bent ▪ Incorrect height calibration ▪ Wiring to height sensor short to ground ▪ Wiring to height sensor short to other cable ▪ Height sensor electrical fault	▪ Check height sensor linkage is security, damage and correct c the electrical circuit diagrams a necessary. Where possible, ref diagnostic system
C1A05-92	Left Rear Height Sensor - Performance or incorrect operation	▪ Left-hand rear height sensor height changing slower than expected ▪ Axle valve block pipes connected incorrectly ▪ Height sensor incorrectly installed ▪ A gallery pipe is blocked/damaged/crushed ▪ An air spring pipe is blocked/damaged/crushed ▪ Corner valve stuck closed (mechanically) ▪ Reservoir valve stuck open (mechanically)	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L ▪ Check that the vehicle is free o of fixings. If necessary, calibrat refer to the guided diagnostic spring leak. Check the air harn front and rear valve block pipe pipes for correct routing and ir and exhaust valve checks. Che
C1A06-1C	Right Rear Height Sensor - Circuit voltage out of range	▪ Right-hand rear height sensor signal voltage out of range ▪ Height sensor disconnected ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Height sensor fault	▪ Check the sensor connector fo circuit for continuity or short ci sensor fixings are slackened or height must be re-calibrated. C
C1A06-26	Right Rear Height Sensor - Signal rate of change below threshold	▪ Right-hand rear height sensor signal voltage stuck whilst vehicle is driven ▪ Height sensor linkage disconnected ▪ Height sensor fault	▪ Check height sensor linkage is connectors for water ingress. V approved diagnostic system

		▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance	
C1A06-27	Right Rear Height Sensor - Signal rate of change above threshold	▪ Right- hand rear height sensor signal rate of change above threshold ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Height sensor linkage disconnected ▪ Height sensor fault	▪ Check height sensor linkage is connectors for water ingress. V approved diagnostic system
C1A06-29	Right Rear Height Sensor - Signal invalid	▪ Right-hand rear height sensor signal invalid ▪ Incorrect height calibration process	▪ Using the manufacturer approv calibration - Located under 'Se
C1A06-78	Right Rear Height Sensor - Alignment or adjustment incorrect	▪ Sensor alignment or adjustment incorrect; signal out of range ▪ Height sensor linkage not connected ▪ Height sensor linkage toggled ▪ Height sensor loose ▪ Height sensor bracket bent ▪ Incorrect height calibration ▪ Wiring to height sensor short to ground ▪ Wiring to height sensor short to other cable ▪ Height sensor electrical fault	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L ▪ Check height sensor linkage is security, damage and correct c the electrical circuit diagrams a necessary. Where possible, ref diagnostic system
C1A06-92	Right Rear Height Sensor - Performance or incorrect operation	▪ Right-hand rear height sensor height changing slower than expected ▪ Axle valve block pipes incorrectly installed (unions reversed) ▪ Height sensor incorrectly	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L

		installed ▪ A gallery pipe is blocked/damaged/crushed ▪ An air spring pipe is blocked/damaged/crushed ▪ Corner valve stuck shut (mechanically) ▪ Reservoir valve stuck open (mechanically)	▪ Check that the vehicle is free o of fixings. If necessary, calibrat refer to the guided diagnostic spring leak. Check the air harn front and rear valve block pipe pipes for correct routing and ir and exhaust valve checks. Che
C1A07-62	Cross Articulation - Signal compare failure	**NOTE:** This DTC may be set by a fault relating to any of the height sensors. It will only set if fault is present and vehicle speed is greater than 55kph (35mph) for more than 25 seconds ▪ Incorrect height calibration, e.g. height sensor removed and re-installed or renewed without re-calibrating ▪ Height sensor linkage damaged/bent (after calibration) ▪ Height sensor linkage loose/disconnected ▪ Height sensor bracket damaged/bent ▪ Height sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Height sensor fault	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L ▪ Follow the process detailed in security of the height sensor br torque
C1A08-1C	Pressure Sensor Supply - Circuit voltage out of range	▪ Pressure sensor supply voltage out of range ▪ Pressure sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Pressure sensor failure	▪ Where available, refer to the g Refer to the electrical circuit di

		▪ Wiring to pressure sensor short to other cable	
C1A10-64	Pressure Fluctuates When System Inactive - Signal plausibility failure	▪ Signal plausibility failure ▪ Axle valve block pipes connected incorrectly ▪ Pneumatic parts disconnected while system active ▪ Corner valve stuck open (mechanically) ▪ Pressure sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Pressure sensor fault (calibration drift) ▪ Pressure gallery leak ▪ Exhaust valve fault	▪ Check the air spring pipes from Where available, refer to the g Check for leaks. Refer to the el sensor if faulty
C1A11-64	Pressure Increases When System Inactive - Signal plausibility failure	▪ Signal plausibility failure ▪ Axle valve block pipes connected incorrectly ▪ Corner valve internal leak ▪ Reservoir valve internal leak ▪ Pressure sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Pressure sensor fault ▪ Exhaust valve fault	▪ Check the reservoir and air spr correct ports. Where available, diagnostic system. Refer to the the sensor if faulty
C1A13-64		▪ Signal plausibility failure ▪ Reservoir valve block pipes incorrectly installed (unions reversed) ▪ Exhaust valve stuck closed ▪ Exhaust valve does not hold minimum retention pressure ▪ Exhaust valve coil/wiring short circuit ▪ Gallery pipe blocked/damaged	Check the pipes from the reservo to the guided diagnostic routine circuit diagrams and check the pr

		▪ Air suspension exhaust silencer blocked/restricted ▪ Axle valve block pipes connected incorrectly ▪ Pressure sensor fault	
C1A18-64	Pressure Increase Too Rapid When Filling Reservoir - Signal plausibility failure	Signal plausibility failure Reservoir valve stuck closed (mechanically) Reservoir pipe blocked/damaged Reservoir port blocked/restricted Pressure sensor fault	▪ Where available, refer to the g Renew the sensor if faulty
C1A20-64	Pressure Increase Too Slow When Filling Reservoir - Signal plausibility failure	▪ Signal plausibility failure ▪ Gallery pipe air leak ▪ Compressor fault ▪ Reservoir pipe air leak ▪ Reservoir air leak ▪ Intake filter blocked/restricted ▪ Intake pipe blocked/restricted ▪ Air suspension intake silencer blocked/restricted ▪ Corner valve stuck open	▪ Where available, refer to the g Check the Air suspension intak
C1A24-64	No Temperature Increase When Compressor Requested - Signal plausibility failure	▪ Signal plausibility failure ▪ Air compressor cylinder head temperature sensor disconnected ▪ Air compressor cylinder head temperature sensor detached from cylinder head ▪ Air compressor cylinder head temperature sensor fault	Check the security of the comp Where available, refer to the g
C1A24-67	No Temperature Increase When Compressor Requested - Signal	▪ Signal plausibility failure ▪ Air compressor cylinder head temperature sensor disconnected	▪ Check the security of the comp Where available, refer to the g

	Incorrect after event	▪ Air compressor cylinder head temperature sensor fault ▪ Air compressor disconnected ▪ Air compressor ground circuit high resistance ▪ Air compressor fault	
C1A27-12	Compressor Circuit - Circuit short to battery	▪ Compressor voltage present when compressor not requested ▪ Air compressor harness wiring short circuit to power ▪ Compressor voltage present when compressor not requested ▪ Air compressor relay fault ▪ Compressor motor connector disconnected ▪ Compressor ground terminal loose	▪ Where available, refer to the g Refer to the electrical circuit di security and integrity of the co relay. Repair/renew as necessa
C1A27-14	Compressor Circuit - Circuit short to ground or open	▪ Compressor circuit short to ground or open circuit Air suspension control module supply (COMP_V) fuse in battery junction box failed ▪ Air supply relay/air compressor supply fusible link in battery junction box failed/not installed ▪ ▪	
C1A27-29	Compressor Circuit - Signal invalid	▪ Compressor relay control voltage signal invalid	▪ Refer to DTC C1A27-12 which
C1A28-64	Wrong Number of LEDs Illuminated - Signal plausibility failure	▪ Switch pack disconnected ▪ Air suspension control module supply (BATTERY) fuse in battery junction box failed ▪ LED circuit short circuit to	**NOTE:** Circuit reference - LED_NEG/HIGH_LED/ST_HT_

		power ▪ One or more LEDs short circuit to each other ▪ Switch pack failure ▪ Switch pack harness wiring short circuit to ground, short circuit to power or high resistance	▪ Check/renew fuses as necessar circuit to ground, short circuit t between air suspension contro short circuit to each other. Clea and the DTC is persists, suspec
C1A29-92	Switch Activation Too Long - Performance or incorrect operation	▪ Ride height change switch performance or incorrect operation ▪ Switch pressed for more than 255 seconds ▪ Switch pack harness wiring short circuit to ground, short circuit to power or high resistance ▪ Switch pack failure	▪ Where available, refer to the g Refer to the electrical circuit di ground, power, or between ha and center console switch pack DTCs and retest. If no fault was center console switch pack
C1A30-64	Both Switches Pressed At Same Time - Signal plausibility failure	▪ Signal plausibility failure ▪ Air suspension control module supply (BATTERY) fuse in battery junction box failed ▪ Switch pack harness wiring short circuit to ground ▪ Switch pack failure	▪ Check/renew fuse as necessary the approved diagnostic syster RAISE_SW circuits for short to air suspension control module damage, stuck contacts. Clear the DTC is persists, suspect ce
C1A31-01	Left Front Corner Valve - General electrical failure	▪ Left-hand front corner valve general electrical failure ▪ Front valve block disconnected ▪ Front valve block circuit short circuit to ground, open circuit or high resistance ▪ Left-hand front corner valve failure	▪ Where available, refer to the g Refer to the electrical circuit di Clear the DTCs and retest
C1A32-01	Right Front Corner Valve - General electrical failure	▪ Right-hand front corner valve general electrical failure ▪ Front valve block disconnected	▪ Where available, refer to the g Refer to the electrical circuit di the DTCs and retest

		▪ Front valve block circuit short circuit to ground, open circuit or high resistance ▪ Right-hand front corner valve failure	
C1A33-01	Left Rear Corner Valve - General electrical failure	▪ Left-hand rear corner valve, general electrical failure Rear valve block disconnected ▪ Rear valve block circuit short circuit to ground, open circuit or high resistance ▪ Left-hand rear corner valve failure	▪ Where available, refer to the g Refer to the electrical circuit di Clear the DTCs and retest
C1A34-01	Right Rear Corner Valve - General electrical failure	▪ Right-hand rear corner valve general electrical failure ▪ Rear valve block circuit short circuit to ground, open circuit or high resistance ▪ Rear valve block disconnected Right-hand rear corner valve failure	Where available, refer to the guic Refer to the electrical circuit diag Clear the DTCs and retest
C1A35-01	Reservoir Valve - General electrical failure	▪ Reservoir valve general electrical failure ▪ Reservoir valve block harness wiring short circuit to ground or open circuit ▪ Reservoir valve block disconnected ▪ Reservoir valve block failure	▪ Where available, refer to the g Refer to the electrical circuit di Clear the DTCs and retest
C1A36-01	Exhaust Valve - General electrical failure	Exhaust valve general electrical failure Exhaust valve harness wiring short circuit to ground or open circuit Exhaust valve disconnected	▪ Where available, refer to the g Refer to the electrical circuit di compressor. Clear the DTCs ar

		Exhaust valve failure	
C1A37-01	Front Cross-Link Valve - General electrical failure	▪ Front cross-link valve general electrical failure ▪ Front valve block harness wiring short circuit to ground or open circuit ▪ Front valve block disconnected ▪ Front cross-link valve failure	▪ Where available, refer to the g Refer to the electrical circuit di Clear the DTCs and retest
C1A38-01	Rear Cross-Link Valve - General electrical failure	▪ Rear cross-link valve general electrical failure ▪ Rear valve block harness wiring short circuit to ground or open circuit Rear valve block disconnected ▪ Rear cross-link valve failure	▪ Where available, refer to the g Refer to the electrical circuit di Clear the DTCs and retest
C1A68-1C	Left Front Height Sensor Supply - Circuit voltage out of range	▪ Left-hand front height sensor supply circuit voltage out of range ▪ Height sensor harness wiring short circuit to ground or power ▪ Height sensor failure	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L ▪ Where available, refer to the g Check the height sensor conne check height sensor circuit. Re
C1A69-1C	Right Front Height Sensor Supply - Circuit voltage out of range	▪ Right-hand front height sensor supply circuit voltage out of range ▪ Height sensor harness wiring short circuit to ground or power ▪ Height sensor failure	**NOTE:** If any height sensor fixings ar changed, using the manufactu system - Height calibration - L ▪ Where available, refer to the g Check the height sensor conne check height sensor circuit. Re
C1A70-1C	Left Rear Height Sensor Supply - Circuit voltage out of range	▪ Left-hand rear height sensor supply circuit voltage out of range ▪ Height sensor harness	**NOTE:** If any height sensor fixings ar changed, using the manufactu

		wiring short circuit to ground, short circuit to power or high resistance ▪ Height sensor failure	changed, using the manufact system - Height calibration - L ▪ Where available, refer to the g Check the height sensor conne check height sensor circuit. Re
C1A71-1C	Right Rear Height Sensor Supply - Circuit voltage out of range	▪ Right-hand rear height sensor supply circuit voltage out of range ▪ Height sensor harness wiring short circuit to ground or power ▪ Height sensor failure	**NOTE:** If any height sensor fixings ar changed, using the manufact system - Height calibration - L ▪ Where available, refer to the g Check the height sensor conne check height sensor circuit. Re
C1A99-1C	Pressure Sensor - Circuit voltage out of range	▪ Pressure sensor circuit voltage out of range ▪ Sensor disconnected ▪ Pressure sensor circuit short circuit to ground or to each other ▪ Pressure sensor fault	▪ Where available, refer to the g Check the sensor connector fo height sensor circuit. Renew th
C1B18-62	Supply Voltage X-Ref Check - Signal compare failure	▪ Signal compare failure ▪ Inconsistent battery and ignition voltages received by air suspension control module ▪ Air suspension control module supply circuit(s) short circuit to ground ▪ Air suspension control module supply circuit(s) high resistance	
C1B21-1C	Compressor Brush Card Temperature Sensor Circuit - Circuit voltage out of range	▪ Compressor brush card temperature sensor circuit voltage out of range ▪ Compressor brush card temperature sensor harness wiring short circuit to ground, short circuit to power or high resistance ▪ Compressor brush card	▪ Where available, refer to the g system. Refer to the electrical the compressor and the modul

		temperature sensor failure	
U0073-88	Control Module Communication Bus 'A' Off - Bus off	▪ CAN Bus connections short circuit to each other	▪ Refer to the electrical circuit di suspension control module. Us network integrity test. Refer to
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	▪ CAN Bus fault	▪ Refer to the electrical circuit di control module. Using the man integrity test. Refer to the elec control module and the air sus
U0101-00	Lost Communication With Transmission Control Module - No sub type information	▪ CAN Bus fault	▪ Refer to the electrical circuit di control module. Using the man integrity test. Refer to the elec transmission control module ar
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	▪ CAN Bus fault	▪ Refer to the electrical circuit di case control module. Using the integrity test. Refer to the elec case control module and the ai
U0122-00	Lost Communication With Vehicle Dynamics Control Module - No sub type information	▪ CAN Bus fault	▪ Refer to the electrical circuit di dynamics control module. Usin network integrity test. Refer to vehicle dynamics control modu
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	▪ CAN Bus fault	▪ Refer to the electrical circuit di angle sensor module. Using th integrity test. Refer to the elec angle sensor module and the a
U0128-00	Lost Communication With Park Brake Module - No sub type information	▪ CAN Bus fault	▪ Refer to the electrical circuit di module. Using the manufacture Refer to the electrical circuit di the air suspension control mod
U0133-00	Lost Communication With Active Roll Control Module - No sub type information	▪ CAN Bus fault	▪ Refer to the electrical circuit di control module. Using the man integrity test. Refer to the elec roll control module and the air
U0136-00	Lost Communication With Differential Control Module - Rear - No sub type information	▪ CAN Bus fault	▪ Refer to the electrical circuit di control module. Using the man integrity test. Refer to the elec differential control module and
U0138-00	Lost Communication with All Terrain	▪ CAN bus fault	▪ Refer to the electrical circuit di control module. Using the man

00	with All Terrain Control Module - No sub type information		control module. Using the man integrity test. Refer to the elec control module and the air sus
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ CAN bus fault	▪ Refer to the electrical circuit di control module. Using the man integrity test. Refer to the elec electronic module and the air s
U0300-55	Internal Control Module Software Incompatibility - Not configured	▪ Incorrect software loaded ▪ CAN wiring to generic electronic module high resistance ▪ Incorrect instrument cluster CAN configuration	▪ Using the manufacturer approv and instrument cluster with the
U0416-68	Invalid Data Received From Vehicle Dynamics Control Module - Event information	▪ Invalid data received from vehicle dynamics control module	▪ Check the vehicle dynamics co
U0417-68	Invalid Data Received From Park Brake Control Module - Event information	▪ Invalid data received from park brake control module	▪ Check the park brake control m
U0428-68	Invalid Data Received From Steering Angle Sensor Module (SASM) - Event information	▪ Invalid data received from steering angle sensor module	▪ Check the steering angle senso
U1A14-49	CAN Initialization Failure - Internal electronic failure	▪ Air suspension control module failure	▪ Refer to the electrical circuit di Using the manufacturer approv the electrical circuit diagrams a
U2000-67	Motor Temperature - Signal incorrect after event	▪ Motor signal incorrect after event ▪ Compressor brush card temperature sensor not connected electrically ▪ Compressor brush card temperature sensor failure ▪ Compressor disconnected ▪ Compressor ground connection disconnected	▪ Where possible, refer to the gu Check the compressor connect Renew the compressor if temp
U2007-11	Valve(s) - Circuit short to ground	▪ Valve circuit short circuit to ground when system is inactive	▪ Visually inspect the wiring harn control valves for water ingress

		▪ Water ingress to wiring harness or connectors ▪ Valve harness wiring short circuit to ground or high resistance	
U2007-67	Valve(s) - Signal incorrect after event	▪ Valve signal incorrect after event ▪ Valve positive connections shorted to power or ground ▪ Electrical leakage between permanent battery volts and any valve positive connection	▪ Visually inspect the wiring harn control valves for water ingress the approved diagnostic syster
U210A-16	Temperature Sensor - Circuit voltage below threshold	▪ Compressor cylinder head temperature sensor circuit voltage below threshold ▪ Temperature sensor circuit short to ground or short to other cable	▪ Refer to the electrical circuit di compressor and the control mo
U3000-05	Control Module - System Programming Failures	▪ System programming failure	▪ This DTC is not a fault but is lo the manufacturers approved di
U3000-1C	Control Module - Circuit voltage out of range	▪ Circuit voltage out of range ▪ Vehicle battery voltage has been too low to operate the air suspension system ▪ Valve positive circuit intermittent short to ground	▪ This may not be a fault. Check determine a discharged batter inspect the wiring harness and valves for water ingress. Refer
U3000-1D	Control Module - Circuit current out of range	▪ Circuit current out of range ▪ Rear valve block disconnected ▪ Any valve positive short circuit to ground (more than 20A flowing)	Check the rear valve block con power-up diagnostic check). Re
U3000-49	Control Module - Internal electronic failure	▪ Air suspension control module failure	▪ Renew the air suspension contr module is suspect

U3000-52	Control Module - Not activated	▪ Not activated	▪ This DTC is not a fault, the con tester. Using the manufacturer
U3000-53	Control Module - De-activated	▪ Deactivated	▪ This DTC is not a fault, the syst deflation routine using manufa
U3000-54	Control Module - Missing calibration	▪ Vehicle Ride Height Calibration routine not completed	**NOTE:** This DTC is for information or ▪ Using the manufacturer approv calibration - Located under 'Se
U3000-55	Control Module - Not configured	▪ Missing calibration	▪ This DTC is not a fault, the syst ▪ Using the manufacturer approv calibration - Located under 'Se
U3002-62	Vehicle Identification Number - Signal compare failure	▪ Signal compare failure ▪ Air suspension control module has been swapped from another vehicle (NOTE Air suspension requires re-calibration) ▪ Instrument pack has been changed and not re-coded	▪ Using the manufacturer approv ▪ Using the manufacturer approv calibration - Located under 'Se
U300D-01	Ignition Input On/Start - General electrical failure	▪ General electrical failure ▪ Ignition fuse failed/missing ▪ No wake-up signal to ECU	▪ Refer to the electrical circuit di

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

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 - Traction Control (206-09A Anti-Lock Control - Traction Control, Diagnosis and Testing).

C0031-31

- Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on

- Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on

- Clear the DTC and retest. If the problem persists, renew the sensor

C0063-86Brake Light Switch - Signal plausibility failureC2009-64Front Axle Wheel Speed Sensors Swapped - Signal plausibility failure

- Sensor location swapped

- Swap the front wheel speed sensor locations. Clear the DTC and retest. In order to clear the DTC/warning lamp after fault is rectified, the vehicle must be driven above 15km/h

- Ensure the correct module is installed

Invalid data received

- Check the all terrain control module for related DTCs and refer to the relevant DTC index

- Check that the correct ABS module has been installed. Configure the car configuration file using the manufacturers approved diagnostic system

- Clear the DTC and retest. Repeat for several times. If the problem persists, renew the ABS control module. Refer to the warranty policy and procedures manual if a module is suspect

- Stability [illegible]

- Stability assist operation is in progress and this has been continuing for an unfeasible length of time

Battery Voltage - Signal compare failure

- Signal compare failure

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

			shifter (if installed) before returning the ignition state to on
C0031-2F	Left Front Wheel Speed Sensor - Signal erratic	▪ Sensor circuit fault ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
Left Front Wheel Speed Sensor - No signal	▪ No sensor signal ▪ Sensor fault		
C0031-62	Left Front Wheel Speed Sensor - Signal compare failure	▪ Sensor signal compare failure ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition

			state to on
C0031-64	Left Front Wheel Speed Sensor - Signal plausibility failure	▪ Sensor signal plausibility failure ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module
C0033-38	Right Front Tone Wheel - Signal frequency incorrect	▪ Signal frequency incorrect ▪ Damaged ABS sensor ring	▪ Check front right wheel speed sensor ring for missing teeth or damage. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-14	Right Front Wheel Speed Sensor - Circuit short to ground or open	▪ Sensor short circuit to ground or open ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-25	Right Front Wheel Speed Sensor -	▪ Sensor signal shape / waveform	▪ Check the sensor lead and connector for damage. If

	Signal shape/waveform failure	failure ▪ Sensor short circuit to ground ▪ Sensor fault	damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-2F	Right Front Wheel Speed Sensor - Signal erratic	▪ Sensor signal erratic ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-31	Right Front Wheel Speed Sensor - No signal	▪ No sensor signal ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the

			vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0034-62	Right Front Wheel Speed Sensor - Signal compare failure	▪ Sensor signal compare failure ▪ Sensor fault	
C0034-64	Right Front Wheel Speed Sensor - Signal plausibility failure	▪ Sensor signal plausibility failure ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module
C0036-38	Left Rear Tone Wheel - Signal frequency incorrect	▪ Signal frequency incorrect ▪ Damaged ABS sensor ring	▪ Check rear left wheel speed sensor ring for missing teeth or damage. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-14	Left Rear Wheel Speed Sensor - Circuit short to ground or open	▪ Sensor short circuit to ground or open circuit ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module
C0037-	Left Rear Wheel	▪ Sensor signal	▪ Check the sensor lead and

25	Speed Sensor - Signal shape/waveform failure	shape / waveform failure ▪ Sensor short circuit to ground ▪ Sensor fault	connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-2F	Left Rear Wheel Speed Sensor - Signal erratic	▪ Sensor signal erratic ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-31	Left Rear Wheel Speed Sensor - No signal	▪ No sensor signal ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the

			ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-62	Left Rear Wheel Speed Sensor - Signal compare failure	▪ Sensor signal compare failure ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0037-64	Left Rear Wheel Speed Sensor - Signal plausibility failure	▪ Sensor signal plausibility failure ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module
C0039-38	Right Rear Tone Wheel - Signal frequency incorrect	▪ Signal frequency incorrect ▪ Damaged ABS sensor ring	▪ Check rear right wheel speed sensor ring for missing teeth or damage. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow

			sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-14	Right Rear Wheel Speed Sensor - Circuit short to ground or open	▪ Sensor short circuit to ground or open circuit ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module
C003A-25	Right Rear Wheel Speed Sensor - Signal shape/waveform failure	▪ Sensor signal shape / waveform failure ▪ Sensor short circuit to ground ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-2F	Right Rear Wheel Speed Sensor - Signal erratic	▪ Sensor signal erratic ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow

			sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-31	Right Rear Wheel Speed Sensor - No signal	▪ No sensor signal ▪ Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-62	Right Rear Wheel Speed Sensor - Signal compare failure	▪ Sensor signal compare failure Sensor fault	▪ Check the sensor lead and connector for damage. If damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C003A-64	Right Rear Wheel Speed Sensor -	▪ Sensor signal plausibility failure	▪ Check the sensor lead and connector for damage. If

	Signal plausibility failure	▪ Sensor fault	damaged, renew the sensor. Refer to the electrical circuit diagrams and check the circuit between the sensor and the ABS module
C0051-28	Steering Wheel Position Sensor - Signal bias level out of range/zero adjustment failure	▪ Signal bias level out of range/zero adjustment failure ▪ Incorrect angle sensor installed ▪ Wheel speed sensor wiring incorrectly wired across one axle ▪ Steering angle sensor fault	▪ Check for a correctly installed steering angle sensor. Refer to the electrical circuit diagrams and check the circuit between the wheel speed sensors and the ABS module to ensure the sensors on one axle are correctly wired to the correct control module left or right pin outs. Renew the steering angle sensor. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle (not always in a straight line) for at least 9 seconds to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0051-67	Steering Wheel Position Sensor - Signal incorrect after event	▪ Sensor signal incorrect after event ▪ Steering angle sensor fault ▪ Control module software error	▪ Check for other DTCs that may aid diagnosis, especially in the steering angle sensor module. Renew the steering angle sensor. Clear the DTC and retest. If the problem persists, renew the ABS control module. Refer to the warranty policy and procedures manual if a module is suspect
C0062-28	Longitudinal Acceleration Sensor - Signal bias level out of range/zero adjustment failure	▪ Sensor signal bias level out of range/zero adjustment failure ▪ Incorrectly	▪ Check installation and mounting of sensor cluster. Clear the DTC and retest, if problem persists renew the sensor. After rectification, either clear

		installed sensor	the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C0062-54	Longitudinal Acceleration Sensor - Missing calibration	▪ Sensor missing calibration ▪ Incorrect sensor installed ▪ Incorrectly configured sensor	▪ Ensure the correct sensor has been installed. Check mounting, connector and fuse of the sensor. Configure the sensor cluster using the manufacturers approved diagnostic system
C0062-64	Longitudinal Acceleration Sensor - Signal plausibility failure	▪ Sensor signal plausibility failure ▪ Incorrectly installed sensor	▪ Clear the DTC and retest. Check mounting, connector and fuse of the sensor. Configure the sensor cluster using the manufacturers approved diagnostic system
C0063-14	Yaw Rate Sensor - Circuit short to ground or open	▪ Sensor circuit short to ground or open ▪ Sensor fault	▪ The most likely cause of the fault is an open circuit on the harness. Refer to the electrical circuit diagrams and check the circuit between the sensor and the control module. Repair as necessary. Clear the DTC and retest. If the problem persists, renew the sensor
C0063-1C	Yaw Rate Sensor - Circuit voltage out of range	▪ Sensor circuit voltage out of range	▪ Refer to the electrical circuit diagrams and check the sensor power supply circuit
C0063-27	Yaw Rate Sensor - Signal rate of change above threshold	▪ Sensor circuit power supply fuse failure ▪ Sensor insecurely	▪ Refer to the electrical circuit diagrams and check the sensor power supply fuse. Check the yaw rate sensor connector

		mounted ▪ Sensor fault ▪ Control module software error	condition. Ensure the sensor is correctly secured. If problem persists, renew the sensor. If the problem still persists, renew the ABS control module. Refer to the warranty policy and procedures manual if a module is suspect
C0063-28	Yaw Rate Sensor - Signal bias level out of range/zero adjustment failure	▪ Sensor signal bias level out of range/zero adjustment failure ▪ Sensor insecurely mounted ▪ Sensor fault	▪ Ensure the sensor is correctly secured. If problem persists, renew the sensor
C0063-41	Yaw Rate Sensor - General checksum failure	▪ Sensor general checksum failure ▪ Sensor fault ▪ Control module fault	▪ Renew the sensor. If the problem persists, renew the ABS control module. Refer to the warranty policy and procedures manual if a module is suspect
C0063-4A	Yaw Rate Sensor - Incorrect component installed	▪ Incorrect sensor installed	▪ Clear the DTC and retest. If the fault still exists renew the Yaw rate sensor with the suitable sensor cluster and repeat test cycle
C0063-49	Yaw Rate Sensor - Internal electronic failure	▪ Sensor internal electronic failure	
C0063-64	Yaw Rate Sensor - Signal plausibility failure	▪ Sensor signal plausibility failure ▪ The sensor value is not within the expected range compared to the steering angle sensor. ▪ Sensor insecurely mounted	**NOTE:** This DTC can be set if the vehicle is being tested on chassis dyno rollers. ▪ Ensure the sensor is correctly secured. Check that the steering angle sensor is correctly calibrated using the

			manufacturers recommended diagnostic system. If problem persists, renew the sensor. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 80kph (not always in a straight line) to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
Yaw Rate Sensor - Signal invalid	▪ Sensor signal invalid ▪ Incorrectly configured sensor	▪ Clear the DTC and retest. If the problem persists, renew the sensor	
C0063-95	Yaw Rate Sensor - Incorrect assembly	▪ Sensor incorrect assembly/internal sensor fault	▪ Ensure the correct sensor has been installed. Clear the DTC and retest. If the problem persists, renew the sensor. If the problem persists, renew the ABS control module. Refer to the warranty policy and procedures manual if a module is suspect
C0063-96	Yaw Rate Sensor - Component internal failure	▪ Sensor power supply intermittent connection ▪ Sensor ground intermittent connection ▪ Sensor internal failure	▪ Refer to the electrical circuit diagrams and check the sensor power supply and ground connections to the sensor. Check the sensor connecter and ABS module for security and integrity (water ingress of damaged pins). If the problem persists, renew the yaw rate sensor. Calibrate the new sensor using the manufacturers approved diagnostic system. If the fault returns after an ignition cycle, renew the control

			module. Refer to the warranty policy and procedures manual if a module is suspect
C0064-64	Roll Rate Sensor - Signal plausibility failure	Sensor signal plausibility failure ▪ Sensor insecurely mounted	▪ Ensure the sensor is correctly installed/secured. Clear DTC and Retest. If problem persists, renew the sensor
C006A-54	Multi-axis Acceleration Sensor - Missing calibration	Sensor missing calibration Serial number of yaw rate sensor saved in stored in control module memory does not match serial number of sensor Incorrect sensor installed Installed sensor not correctly calibrated	▪ Check that the correct sensor has been installed. Configure the sensor cluster using the manufacturers approved diagnostic system. If calibration fails several times, renew the control module. Refer to the warranty policy and procedures manual if a module is suspect
C0072-4B	Brake Temperature Too High - Over temperature	▪ Excessive use of brakes ▪ Excessive use of traction control system	▪ This DTC is for information only. Clear the DTC
C101F-49	Generic Valve Failure - Internal electronic failure	▪ ABS modulator internal fault	▪ Renew the control module. Refer to the warranty policy and procedures manual if a module is suspect
C1109-24	Vehicle Dynamics Control Switch - Signal stuck high	▪ Signal stuck high - DSC Switch operation fault ▪ If the DSC switch is pressed for longer than 1 minute, the switch is deemed to be malfunctioning	▪ Check the switch operation. Refer to the electrical circuit diagrams and check the DSC switch and circuits. Check and install a new DSC switch as required
C1A77-16	Valve Relay Supply Circuit - Circuit	▪ Circuit voltage below threshold	▪ Refer to the electrical circuit diagrams and

16	Circuit - Circuit voltage below threshold	below threshold ▪ Fuse ▪ Harness/connector damaged	circuit diagrams and check the harness connection and fuse to the valve relay circuits
C1A90-12	Wheel Speed Sensor Supply - Circuit short to battery	▪ Wheel speed sensor supply circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the wheel speed sensor power supply line circuits between the sensors and the control module
C1A95-4A	Wheel Speed Sensor - Incorrect component installed	▪ The incorrect wheel speed sensor has been installed	▪ Check the correct wheel speed sensors are installed. Clear the DTC and retest
C1A95-64	Wheel Speed Sensor - Signal plausibility failure	▪ Signal plausibility failure ▪ Wheel speed sensor fault (any) ▪ Sensor ring damaged, incorrect or defective ▪ Harness fault ▪ Incorrect wheel/tire assembly size	▪ Check for correct wheel/tire sizes. Check the wheel speed sensors and circuits for damage. Remove the sensor and visually inspect the sensor ring on the constant velocity joint (CVJ) for missing or damaged teeth. If the sensor ring is damaged, renew the CVJ. Use an oscilloscope to examine the signals from all wheel speed sensors for abnormal high frequencies (modulation and peak signals). Renew sensors as necessary. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph for at least 30 seconds to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C1A96-	▪ Signal plausibility	▪ Check the Stop	

64	failure ▪ Stop lamp switch fault ▪ Harness/connector issue	lamp function. Ensure the brake lamp switch is correctly installed and configured. Refer to the electrical circuit diagrams and check the stop lamp switch circuit, rectify as necessary. Check the engine control module for DTCs. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph with at least one brake pedal press to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on	
C1A97-24	Lateral Accelerometer - Signal stuck high	Signal stuck high Yaw rate/lateral acceleration sensor internal error	▪ Renew the combined lateral acceleration/yaw rate sensor
C1A98-96	Yaw Rate Sensor - Component internal failure	▪ Incorrect assembly ▪ Sensor installation incorrect ▪ Yaw rate/lateral acceleration sensor internal error	▪ Check the combined lateral acceleration/yaw rate sensor installation and orientation. Check mounting, connector and fuse of the sensor. Clear the DTC and retest. If the problem persists, renew the combined lateral acceleration/yaw rate sensor
C1A98-2F	Yaw Rate Sensor - Signal erratic	▪ Yaw rate sensor signal fault for 2	▪ Information only, regard as normal operation.

		minutes	Clear the DTC, cycle the ignition and retest. If the fault reoccurs, renew the combined lateral acceleration/yaw rate sensor. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C1B00-29	Steering Angle Sensor - Signal invalid	▪ Sensor signal invalid ▪ Sensor installation incorrect ▪ Steering angle sensor fault	▪ Check steering angle sensor module for DTCs. Check the steering angle sensor installation and orientation. Clear the DTC and retest. If the problem persists, renew the sensor
C1B00-49	Steering Angle Sensor - Internal electronic failure	Sensor internal electronic failure	▪ Check steering angle sensor module for DTCs. Renew the sensor
C1B00-64	Steering Angle Sensor - Signal plausibility failure	Sensor signal plausibility failure Sensor installation incorrect Steering angle sensor fault Yaw rate sensor installation incorrect	▪ Check steering angle sensor module for DTCs. Check the steering angle sensor installation and orientation. Check the yaw rate sensor installation and orientation. Clear the DTC and retest. If the problem persists, renew the steering angle sensor
C1B00-92	Steering Angle Sensor - Performance or incorrect operation	▪ Sensor performance or incorrect operation ▪ Sensor installation incorrect ▪ Steering angle sensor fault	▪ Check steering angle sensor module for DTCs. Check the steering angle sensor installation and orientation. Check the yaw rate sensor installation and orientation. Clear the DTC and retest. If the problem persists, renew the steering angle sensor
C1B02-16	Return Pump - Circuit voltage below threshold	Return pump circuit voltage below threshold	▪ Refer to the electrical circuit diagrams and check the circuit, fuses and the connection to the

		Harness damaged Defective fuse	ABS module. Rectify as necessary. After rectification, either clear the DTCs and cycle the ignition or cycle the ignition and drive the vehicle above 15kph to ensure the lamps extinguish. When cycling the ignition, allow sufficient time for the 'P' symbol illumination to extinguish on the gear shifter (if installed) before returning the ignition state to on
C1B02-49	Return Pump - Internal electronic failure	▪ ABS control module internal electronic failure	▪ Renew the ABS modulator. Refer to the warranty policy and procedures manual if a module is suspect
C1B22-24	Hill Descent Switch - Signal stuck high	▪ Signal stuck high ▪ If the HDC switch is pressed for longer than 1 minute, this DTC may be logged ▪ Harness/connector issue	▪ Check the switch operation. Refer to the electrical circuit diagrams and check the switch and circuit for short to power
C200A-64	Rear Axle Wheel Speed Sensors Swapped - Signal plausibility failure	▪ Sensor location swapped	▪ Swap the rear wheel speed sensor locations. Clear the DTC and retest. In order to clear the DTC/warning lamp after fault is rectified, the vehicle must be driven above 15km/h
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
U0074-88	Control Module Communication Bus "B" Off - Bus off	▪ CAN Bus off	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the engine control module and traction control module
U0101-00	Lost Communication With TCM - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transmission control module and traction control module
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved

			diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transfer case control module and traction control module
U0103-00	Lost Communication With Gear Shift Control Module A - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the gear shift control module and traction control module
	Lost Communication With Cruise Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the cruise control module and traction control module
U0123-00	Lost Communication With Yaw Rate Sensor Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the yaw rate sensor control module and traction

			control module
U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the steering angle sensor module and traction control module
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the park brake control module and traction control module
U0132-00	Lost Communication With Suspension Control Module "A" - No sub type information	▪ No sub type information	Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the suspension control module and traction control module
U0133-00	Lost Communication With Active Roll Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network

			complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the active roll control module and traction control module
U0136-00	Lost Communication With Differential Control Module - Rear - No sub type information	No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the differential control module and traction control module
U0138-00	Lost Communication With All Terrain Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the all terrain control module and traction control module
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Central Junction Box and traction control module

U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Control module has been installed to the incorrect vehicle	
U0401-68	Invalid Data Received from ECM/PCM A - Event information	▪ Invalid data received	▪ Check the engine control module for related DTCs and refer to the relevant DTC index
U0402-68	Invalid Data Received from TCM - Event information	▪ Invalid data received	▪ Check the transmission control module for related DTCs and refer to the relevant DTC index
U0403-68	Invalid Data Received From Transfer Case Control Module - Event information	▪ Invalid data received	▪ Check the transfer case control module for related DTCs and refer to the relevant DTC index
U0405-68	Invalid Data Received From Cruise Control Module - Event information	▪ Invalid data received	▪ Check the cruise control module for related DTCs and refer to the relevant DTC index
U0417-68	Invalid Data Received From Park Brake Control Module - Event information	▪ Invalid data received	▪ Check the park brake control module for related DTCs and refer to the relevant DTC index
U0421-68	Invalid Data Received from Suspension Control Module A - Event information	▪ Invalid data received	▪ Check the suspension control module for related DTCs and refer to the relevant DTC index
U0428-68	Invalid Data Received From Steering Angle Sensor Module - Event information	▪ Invalid data received	▪ Check the steering angle sensor control module for related DTCs and refer to the relevant DTC index
U0437-68	Invalid Data Received From Differential Control Module-Rear - Event information	▪ Invalid data received	▪ Check the differential control module for related DTCs and refer to the relevant DTC index
U0439-68	Invalid Data Received From All		

	Terrain Control Module - Event information		
U1A14-00	CAN Initialisation Failure - No sub type information	Incorrect control module installed to vehicle	▪ Check that the correct ABS module has been installed. Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U2101-00	Control Module Configuration Incompatible - No sub type information	▪ Car configuration file incorrectly configured ▪ Vehicle variant code value not supported in this project ▪ Variant code value not released in this project ▪ Variant code value out of range	▪ Configure the car configuration file using the manufacturers approved diagnostic system
U2101-68	Control Module Configuration Incompatible - Event information	▪ Vehicle variant code distributed via CAN is not matching the code stored in the Central Junction Box memory ▪ ABS module has been installed from another vehicle (codes do not match expected) ▪ New ABS module has been installed and at first use code did not match (becomes historic after first use)	

U3000-00	Control Module - No sub type information	▪ Incorrect control module installed to vehicle	▪ Check that the correct ABS module has been installed. Refer to the electrical circuit diagrams and check the power and ground circuits to the component. Configure the module(s) using the manufacturers approved diagnostic system. Refer to the warranty policy and procedures manual if a module is suspect. Refer to the Network Communications section of the workshop manual
U3000-45	Control Module - Program memory failure	▪ Program memory failure (software error)	
U3000-49	Control Module - Internal electronic failure	▪ Internal electronic failure	▪ Renew the ABS control module. Refer to the warranty policy and procedures manual if a module is suspect
U3000-4B	Control Module - Over temperature	▪ Module over temperature has been detected ▪ Excessive ABS interaction has been invoked, possibly by diagnostic equipment	▪ Allow the unit to cool, clear the DTC and retest. If the problem persists, as a last resort renew the ABS control module. Consider environmental conditions before suspecting the module. Refer to the warranty policy and procedures manual if a module is suspect
U3000-53	Control Module - De-activated	▪ Deactivated during software download to other modules on vehicle	▪ This is not a fault. ECU temporarily deactivated following programming session. Please cycle the ignition to clear
U3000-68	Control Module - Event information	▪ Check for other related DTCs. Check the wheel speed sensors, combined yaw rate/lat Acc sensor and steering angle	

		sensor	
U3000-87	Control Module - Missing message	▪ Car configuration file missing message	▪ Configure the car configuration file using the manufacturers approved diagnostic system
U3002-81	Vehicle Identification Number - Invalid serial data received	▪ ▪	▪ Configure the car configuration file using the manufacturers approved diagnostic system
U3003-62	▪ Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section		
U3006-16	Control Module Input Power "A" - Circuit voltage below threshold	▪ ABS control module circuit voltage below threshold ▪ Battery voltage low ▪ Battery ground cable: high resistance ▪ Battery connections loose/corroded ▪ Battery current drain	▪ Refer to the electrical circuit diagrams and check the module power and ground circuits. Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section
U3006-17	Control Module Input Power "A" - Circuit voltage above threshold	▪ ABS control module circuit voltage above threshold ▪ Charging system fault	▪ Check the battery condition and state of charge. Check the vehicle charging system. Refer to the relevant workshop manual section
U3006-1C	Control Module Input Power "A" - Circuit voltage out of range	▪ ABS control module circuit voltage out of range, a	▪ Check the battery condition and state of charge. Check the vehicle charging system. Check

			momentary low voltage occurred	the connecter security to the module. Refer to the relevant workshop manual

GENERAL INFORMATION

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 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 Audio Amplifier Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Information and Entertainment System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).

B128C-13

- Wiring harness fault
- Speaker fault
- Audio amplifier internal fault

Refer to electrical circuit diagrams, check right front tweeter speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect

- Refer to electrical circuit diagrams, check right front tweeter speaker circuits for short to power. Check speaker for short circuit, open circuit. If

no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect

B1A03-13Speaker #3 - Circuit open

- Wiring harness fault
- Speaker fault
- Audio amplifier internal fault
- Refer to electrical circuit diagrams, check right front tweeter speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
- Refer to electrical circuit diagrams, check right front bass speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
- Refer to electrical circuit diagrams, check left rear co-axial speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
- Refer to electrical circuit diagrams, check left rear bass speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect

B1A07-1A

- Refer to electrical circuit diagrams, check right rear bass speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect

B1A09-11

- Refer to electrical circuit diagrams, check right front mid range speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the

harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B128A-11	Speaker #13 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128A-12	Speaker #13 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128A-13	Speaker #13 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128A-1A	Speaker #13 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is

			module/component is suspect
B128A-1E	Speaker #13 - Circuit resistance out of range	**NOTE:** Check that the correct speaker is installed to vehicle specification ▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left co-axial surround speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128B-11	Speaker #14 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128B-12	Speaker #14 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128B-13	Speaker #14 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault

			harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128B-1A	Speaker #14 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128B-1E	Speaker #14 - Circuit resistance out of range	**NOTE:** Check that the correct speaker is installed to vehicle specification ▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right co-axial surround speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128C-11	Speaker #15 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check front centre speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128C-12	Speaker #15 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault	▪ Refer to electrical circuit diagrams, check front centre speaker circuits for short to

		▪ Audio amplifier internal fault	power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
Speaker #15 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check front centre speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect	
B128C-1A	Speaker #15 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check front centre speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B128C-1E	Speaker #15 - Circuit resistance out of range	**NOTE:** Check that the correct speaker is installed to vehicle specification ▪ Wiring harness fault ▪ Speaker fault	▪ Refer to electrical circuit diagrams, check front centre speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect

		▪ Audio amplifier internal fault	
B1A01-11	Speaker #1 - Circuit short to ground	▪ Refer to electrical circuit diagrams, check left front tweeter speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect	
B1A01-12	Speaker #1 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front tweeter speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A01-13	Speaker #1 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front tweeter speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A01-1A	Speaker #1 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front tweeter speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault

			suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A01-1E	Speaker #1 - Circuit resistance out of range	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front tweeter speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A02-11	Speaker #2 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front bass speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A02-12	Speaker #2 - Circuit short to battery	▪ Wiring harness fault Speaker faultAudio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front bass speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A02-13	Speaker #2 - Circuit open	Wiring harness fault Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front bass speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier

			module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A02-1A	Speaker #2 - Circuit resistance below threshold	Wiring harness fault Speaker fault Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front bass speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A02-1E		▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front bass speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A03-11	Speaker #3 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	
B1A03-12	Speaker #3 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	
B1A03-1A	Speaker #3 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front tweeter speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier

			module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A03-1E	Speaker #3 - Circuit resistance out of range	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front tweeter speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A04-11	Speaker #4 - Circuit short to ground	▪ Wiring harness fault Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front bass speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A04-12	Speaker #4 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front bass speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A04-13	Speaker #4 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front bass speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the

			Warranty Policy and Procedures manual if a module/component is suspect
B1A04-1A	Speaker #4 - Circuit resistance below threshold	▪ Wiring harness fault Speaker fault ▪ Audio amplifier internal fault	
B1A04-1E	Speaker #4 - Circuit resistance out of range	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front bass speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A05-11	Speaker #5 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	
B1A05-12	Speaker #5 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left rear co-axial speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A05-13	Speaker #5 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left rear co-axial speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a

			Procedures manual if a module/component is suspect
B1A05-1A	Speaker #5 - Circuit resistance below threshold	Wiring harness fault Speaker fault Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left rear co-axial speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A05-1E	Speaker #5 - Circuit resistance out of range	**NOTE:** Check that the correct speaker is installed to vehicle specification Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left rear co-axial speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A06-11	Speaker #6 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left rear bass speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A06-12	Speaker #6 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left rear bass speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio

			amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A06-13	Speaker #6 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left rear bass speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A06-1A	Speaker #6 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left rear bass speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A06-1E	Speaker #6 - Circuit resistance out of range	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	
B1A07-11	Speaker #7 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right rear co-axial speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A07-12	Speaker #7 - Circuit short	▪ Wiring harness fault	▪ Refer to electrical circuit diagrams, check right rear

	to battery	▪ Speaker fault ▪ Audio amplifier internal fault	co-axial speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A07-13	Speaker #7 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right rear co-axial speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
Speaker #7 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right rear co-axial speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect	
B1A07-1E	Speaker #7 - Circuit resistance out of range	**NOTE:** Check that the correct speaker is installed to vehicle specification ▪ Wiring harness fault ▪ Speaker fault	▪ Refer to electrical circuit diagrams, check right rear co-axial speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect

		▪ Speaker fault ▪ Audio amplifier internal fault	
B1A08-11	Speaker #8 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	
B1A08-12	Speaker #8 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right rear bass speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A08-13	Speaker #8 - Circuit open	Wiring harness fault Speaker fault Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right rear bass speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A08-1A	Speaker #8 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right rear bass speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A08-1E	Speaker #8 - Circuit resistance out of range	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier	▪ Refer to electrical circuit diagrams, check right rear bass speaker circuits for open circuit, high resistance,

		internal fault	or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
Speaker #9 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front mid range speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect	
B1A09-12	Speaker #9 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front mid range speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A09-13	Speaker #9 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front mid range speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect

B1A09-1A	Speaker #9 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front mid range speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A09-1E	Speaker #9 - Circuit resistance out of range	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check left front mid range speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A10-11	Speaker #10 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front mid range speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A10-12	Speaker #10 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front mid range speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect

B1A10-13	Speaker #10 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	
B1A10-1A	Speaker #10 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front mid range speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A10-1E	Speaker #10 - Circuit resistance out of range	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check right front mid range speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A11-11	Speaker #11 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A11-12	Speaker #11 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for short to power. Check speaker for short circuit, open circuit. If

			no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A11-13	Speaker #11 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A11-1A	Speaker #11 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A11-1E	Speaker #11 - Circuit resistance out of range	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A12-11	Speaker #12 - Circuit short to ground	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for short to ground. Check speaker for short circuit, open circuit. If no harness or speaker fault

			suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A12-12	Speaker #12 - Circuit short to battery	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for short to power. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A12-13	Speaker #12 - Circuit open	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for open circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A12-1A	Speaker #12 - Circuit resistance below threshold	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
B1A12-1E	Speaker #12 - Circuit resistance out of range	▪ Wiring harness fault ▪ Speaker fault ▪ Audio amplifier internal fault	▪ Refer to electrical circuit diagrams, check sub-woofer speaker circuits for open circuit, high resistance, or short circuit. Check speaker for short circuit, open circuit. If no harness or speaker fault suspect audio amplifier

			module. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
U2300-56	Central Configuration - Invalid / incomplete configuration	▪ Vehicle configuration file error	▪ Check the vehicle is configured correctly using the manufacturer approved diagnostic system
U2300-64	Central Configuration - Signal plausibility failure	▪ Car Configuration File (CCF) error ▪ Substituted component ▪ New (blank) component	▪ Check the components fitted to the vehicle are correct (not substituted from another vehicle). Install the original or a new component as required. This DTC will occur once if a new module is installed. Cycle ignition ON/OFF and clear the DTC. Retest the system
U3000-55	Control Module - Not configured	▪ Audio unit not configured ▪ Can also be set by a harness fault ▪ Equalizer setting not equal to car information of integrated head unit	▪ Where available, configure the module using the approved diagnostic system
U3000-96	Control Module - Component internal failure	▪ Audio amplifier internal fault	▪ Check power and ground supplies to the Audio Amplifier Module. If no fault found suspect internal fault within audio amplifier module. Clear DTCs and run Amplifier On Demand Self Test. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
U3000-98	Control Module - Component or system over temperature	▪ Audio amplifier cooling vents obstructed ▪ Speaker circuit fault ▪ Internal electronic failure	▪ Check for possible causes of the amplifier overheating. Check that the amplifier module ventilation is not obstructed (rear left quarter of luggage compartment). Check for speaker circuit related DTCs. Check for

			related DTCs. Check for internal electronic failure related DTCs. Refer to the Warranty Policy and Procedures manual if a module/component is suspect
U3003-16	Battery voltage - Circuit voltage below threshold	▪ Power distribution fault ▪ Wiring harness fault	▪ The power supply voltage to audio amplifier module is 2 volts below the voltage value broadcast on the MOST circuit. Refer to the electrical circuit diagrams and check the power and ground supply circuits to the audio amplifier module. Repair wiring as required, clear the DTC and retest the system
U3003-17	Battery voltage - Circuit voltage above threshold	▪ Wiring harness fault ▪ Vehicle charging system fault	▪ The power supply voltage to audio amplifier module is 2 volts higher than the voltage value broadcast on the MOST circuit. Check power and ground circuits to audio system components. Check the Engine Control Module (ECM) for charging related DTCs and refer to the relevant DTC index. Refer to the battery care manual and check the vehicle charging circuit performance. Rectify any charging circuit concerns and clear the DTC. Retest the system

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

DESCRIPTION AND OPERATION

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 Audio Front Control 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).

- Invalid data received from Heating Ventilation Air Conditioning (HVAC) module

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B1A56-01	Antenna - General electrical failure	▪ Antenna connection broken ▪ Antenna failure	▪ Check antenna connection wiring for integrity ▪ Check antenna for signs of damage. Repair wiring or replace antenna as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B1D79-01	Microphone Input - General electrical failure	▪ Microphone circuit open circuit, short circuit to ground, short circuit to power ▪ Microphone configuration mismatched with Car Configuration File (CCF)	▪ Refer to the electrical circuit diagrams and check the microphone input circuit for open circuit, short circuit to ground, short circuit to power ▪ Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0010-88	Medium Speed CAN	▪ Power or ground supply to the	▪ Refer to the electrical circuit diagrams and check the power

	Communication Bus - Bus off	Audio Control Module (ACM) fault ▪ Medium speed CAN network circuit, short to ground, high resistance, open circuit	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. Refer to the Network Communications section of the workshop manual
U0140-00	Lost communication with Body Control Module - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0155-00	Lost communication with Instrument Panel Cluster (IPC) - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0156-00	Lost communication	▪ CAN communication	▪ Check for other modules reporting CAN bus off or lost

	with Information Centre "A" - No sub type information	error ▪ Incorrect component installed	communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0164-00	Lost communication with HVAC Control Module - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0186-00	Lost communication with Audio amplifier "A" - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. . Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as

			required. Clear the DTC and re-test
U0187-4A	Lost Communication With Digital Disc Player/Changer Module "A" - Incorrect component installed	▪ Incorrect component installed ▪ The security of the MOST network prevents the unauthorized addition of a module to the system	▪ Using the approved manufacturer diagnostic system configure the network to accept the module
U0191-00	Lost communication with Television - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0193-00	Lost communication with Digital Audio Control Module "A" - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test

			test
U0194-00	Lost communication with Digital Audio Control Module "B" - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0196-00	Lost communication with Entertainment Control Module Rear "A" - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0197-00	Lost communication with Telephone Control Module - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual

			▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0237-00	Lost communication with Digital Audio Control Module "C" - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0253-00	Lost Communication With Accessory Protocol Interface Module - No sub type information	▪ CAN communication error ▪ Incorrect component installed	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0264-00	Lost communication with Camera Module - Rear - No sub type information	▪ CAN communication error ▪ Incorrect component	▪ Check for other modules reporting CAN bus off or lost communication faults. Check CAN wiring. Using the manufacturer approved diagnostic system, complete a

	information	installed	diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual ▪ Check that correct component is installed. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0300-00	Software Incompatibility - No sub type information	▪ Master configuration ID is incorrect	▪ Using the manufacturer approved diagnostic system re-configure the Front Audio Control Module (ACM)
U0300-48	Software Incompatibility - Supervision software failure	▪ Supervision software failure	▪ Using the manufacturer approved diagnostic system re-configure the Front Audio Control Module (ACM)
U0417-00	Invalid Data Received From Park Brake Control Module - No sub type information	▪ Invalid data received from Park Brake Module (PBM)	Check for related DTCs. Refer to the relevant DTC index. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0422-00	Invalid Data Received From Body Control Module - No sub type information	▪ Invalid data received from Central Junction Box (CJB)	▪ Check for related DTCs. Refer to the relevant DTC index. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear the DTC and re-test
U0424-00	Invalid Data Received From HVAC Control Module - no sub type information	▪ Check for related DTCs. Refer to the relevant DTC index. Using the manufacturer approved diagnostic system check and up-date the Car Configuration File (CCF) as required. Clear	

		required. Clear the DTC and re-test	
U1A14-48	CAN Initialization Failure - Supervision software failure	▪ Audio control module supervision software failure	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U1A14-49	CAN Initialization Failure - Internal electronic failure	▪ CAN communication error ▪ Front Audio Control Module (ACM) internal failure	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network ▪ Check and install a new Front Audio Control Module (ACM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U2003-31	Fibre Optic Communication Bus - No signal	▪ Media Orientated System Transport (MOST) ring break - No data received	▪ Carry out the general Media Orientated System Transport (MOST) test. Refer to the Network Communications section of the workshop manual
U2003-88	Fibre Optic Communication Bus - Bus off	▪ Media Orientated System Transport (MOST) bus off	▪ Carry out the general Media Orientated System Transport (MOST) test. Refer to the Network Communications section of the workshop manual
U3000-55	Control Module - Not configured	▪ Audio Control Module (ACM) not configured ▪ Audio Control Module (ACM) circuit short to	Using the manufacturer approved diagnostic system re-configure the Audio Control Module (ACM). Clear the DTC and retest. Refer to the electrical circuit diagrams and check Audio Control

		ground, short to power, open circuit, high resistance ▪ EQ setting not equal to car information of integrated head unit	Module (ACM) circuit for short to ground, short to power, open circuit, high resistance Adjust the EQ setting as required
U3000-68	Control Module - Event information	▪ Audio Control Module (ACM) event information - Media Orientated System Transport (MOST) transceiver overheating	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the component. Check the Media Orientated System Transport (MOST) circuit. Carry out the general Media Orientated System Transport (MOST) test. Refer to the Network Communications section of the workshop manual and in the approved diagnostic system. Clear the DTC and retest. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component

GENERAL INFORMATION

DESCRIPTION AND OPERATION

BLIND SPOT MONITORING SYSTEM MODULE LEFT/RIGHT (SODL/R)

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 Blind Spot Monitoring System Module Left/Right, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Warning Devices

(413-09A 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 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	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer

	(IPC) Control Module - No sub type information		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 ▪ 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 ▪ 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 ▪ 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 ▪ 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

			installed
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
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. If fault persists, check and install a new blind spot monitoring system 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
U3003-42	Battery Voltage - Signal compare	▪ Mis-match in battery voltage	▪ Check the module connector for security and integrity. Refer to

62	Signal compare failure	battery voltage, between Central Junction Box and Blind Spot Monitoring System module, of 2 volts or more	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

GENERAL INFORMATION

DESCRIPTION AND OPERATION

BLUETOOTH MODULE (TEL)

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 Bluetooth Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Cellular Phone (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B1D79-84	Microphone Input - Signal below allowable range	▪ The 'Receive Audio over MOST Test' failed and means that the audio received at the microphone detection point is too low ▪ Microphone fault ▪ Harness/connector fault ▪ Integrated head unit (IHU) fault	▪ Check the operation of the microphone. Refer to the electrical circuit diagrams and check the microphone (MIC) circuits. Renew/repair as necessary. Refer to the warranty policy and procedures manual if a module is suspect

U1A00-88	Private Communication Network - Bus off	▪ Internal communications failure	▪ Clear the DTC and retest. If the problem persists, renew the Bluetooth Module. Refer to the warranty policy and procedures manual if a module is suspect
U2001-9A	Reduced System Function - Component or system operating conditions	▪ Bluetooth error - system over-temperature	▪ Allow the system to cool, clear the DTC and check /monitor for re-occurrence. If DTC re-occurs suspect the module. Check and install a new module as required. Refer to the Warranty Policy and Procedures manual if a module is suspect
U201A-54	Control Module Main Calibration Data - Missing calibration	▪ Local configuration file is missing (not loaded) in the control module	▪ Configure the module using the manufacturers approved diagnostic system (file download may take several minutes)
U3000-44	Control module - Data memory failure	▪ Bluetooth Module RAM fault (data memory failure leading to possible corrupt local configuration file)	▪ Configure the module using the manufacturers approved diagnostic system and download the local configuration file. Clear the DTC and retest. If the problem persists, renew the Bluetooth Module. Refer to the warranty policy and procedures manual if a module is suspect
U3000-45	Control module - Program memory failure	▪ Bluetooth Module ROM fault (data memory failure leading to possible corrupt local configuration file)	▪ Configure the module using the manufacturers approved diagnostic system and download the local configuration file. Clear the DTC and retest. If the problem persists, renew the Bluetooth Module. Refer to the warranty policy and procedures manual if a module is suspect
U3000-54	Control module - Missing calibration	▪ MOST not configured correctly - incorrect voice	▪ Check and amend the Car Configuration File in the Information and Entertainment Control

		language installed	Module using the manufacturer approved diagnostic system
U3000-56	Control module - Invalid/incomplete configuration	▪ One or more of the received car configuration file (CCF) data parameters is deemed to be invalid	▪ Check and amend the Car Configuration File using the manufacturer approved diagnostic system
U3003-16	Battery Voltage - Circuit voltage below threshold	▪ Battery voltage below threshold	▪ Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power supply circuits to the module
U3003-17	Battery Voltage - Circuit voltage above threshold	▪ Battery voltage above threshold	▪ Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power supply circuits to the module

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

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 PDW for

- 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).

B108C-11Start Button Circuit "B" - Circuit short to ground

- Circuit short to ground
- Refer to the electrical circuit diagrams and check the start button circuit
- Remove the motor and check the cables for free movement and damage. Check the sunroof for smooth operation and obstructions that would cause the motor to slip. If necessary, renew the motor

B1248-11

- Refer to the electrical circuit diagrams and check the circuit between the steering column telescope sensor and the central junction box. If no circuit faults are evident, suspect the steering column telescope sensor

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B1009-51	Ignition Authorization - Not programmed	▪ Not programmed	▪ Configure the module using the manufacturers approved diagnostic system
B1009-62	Ignition Authorization - Signal compare failure	**NOTE:** This DTC is only likely to occur following component replacement applications failing prior to completion ▪ Encrypted data exchange between	▪ Configure the module using the manufacturers approved diagnostic system. If problem persists, carry out CAN network integrity test and module self test using manufacturer approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and check CAN circuit

		instrument cluster and the central junction box does not match	
B1009-63	Ignition Authorization - Circuit/component protection time-out	▪ Circuit/component protection time-out ▪ CAN circuit fault ▪ Instrument cluster fault ▪ Central junction box fault ▪ Battery voltage too low	**NOTE:** Only diagnose this DTC if the customer is reporting a start related issue ▪ Clear the DTC and retest. Check for additional ignition related DTCs and rectify as necessary. If problem persists, carry out CAN network integrity test and on demand self test using manufacturer approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and check CAN circuits
B1009-81	Ignition Authorization - Invalid serial data received	▪ Invalid serial data received ▪ CAN circuit fault ▪ Instrument cluster fault	▪ Check for instrument cluster related DTCs. Configure the module using the manufacturer approved diagnostic system
B100D-51	Column Lock Authorization - Not programmed	▪ Module not programmed	▪ Configure the electric steering column lock control module using the manufacturers approved diagnostic system
B100D-64	Column Lock Authorization - Signal plausibility failure	▪ Signal plausibility failure ▪ Steering column lock unable to perform lock action ▪ CAN network fault ▪ 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

			Check the serviceability of the steering column and lock. Clear the DTC and retest. If problem persists, carry out CAN network integrity test and on demand self test using manufacturer approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and check CAN circuits
B100D-67	Column Lock Authorization - Signal incorrect after event	▪ Signal incorrect after event ▪ Instrument cluster fault ▪ CAN network fault	▪ Check for additional related DTCs. Clear the DTC and retest. If problem persists, carry out CAN network integrity test and on demand self test using manufacturer approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and check CAN circuits
B100D-81	Column Lock Authorization - Invalid serial data received	**NOTE:** This DTC is only likely to occur following component replacement applications failing prior to completion ▪ Encrypted data exchange between steering column lock and the central junction box does not match	**NOTE:** Prior to clearing this DTC, carry out the Vehicle Functional Reset application using the manufacturer approved diagnostic system ▪ Configure the module using the manufacturers approved diagnostic system. If problem persists, carry out CAN network integrity test and module self test using manufacturer approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and check CAN circuit
B100D-87	Column Lock Authorization - Missing message	▪ Missing message ▪ Battery voltage too low ▪ CAN network fault ▪ No response from electric steering column lock control	▪ Check for additional related DTCs. Clear the DTC and retest. If problem persists, carry out CAN network integrity test and module self test using manufacturer approved diagnostic system. Alternatively, refer to the

		column lock control module, instrument cluster, central junction box ▪ Electric steering column lock control module, instrument cluster, central junction box fault	electrical circuit diagrams and check CAN circuit
B100D-96	Column Lock Authorization - Component internal failure	▪ Component internal failure ▪ Battery voltage too low ▪ Torque load on steering column	**NOTE:** Prior to clearing this DTC, carry out the Vehicle Functional Reset application using the manufacturer approved diagnostic system Clear the DTC and retest. Check steering is not under high side load. Refer to the electrical circuit diagrams and check steering column lock circuits. Carry out CAN network integrity test and module self test using manufacturer approved diagnostic system. If the problem persists, renew the electric steering column lock control module
B1024-83	Start Control Unit - Value of signal protection calculation incorrect	▪ Value of signal protection calculation incorrect ▪ Start control unit fault ▪ LIN network fault	▪ Clear the DTC and retest. Refer to the electrical circuit diagrams and check start control unit circuits. If the problem persists, renew the start control unit
B1024-87	Start Control Unit - Missing message	▪ Missing message ▪ Start control unit fault ▪ LIN network fault	▪ Clear the DTC and retest. Refer to the electrical circuit diagrams and check start control unit circuits. If the problem persists, renew the start control unit
B1026-11	Steering Column Lock - Circuit short to ground	▪ Circuit short to ground	▪ Refer to the electrical circuit diagrams and check electric steering column lock circuits

B102B-67	Passive Key - Signal incorrect after event	▪ Passive key authorization signal incorrect after event ▪ Encrypted data exchange between electric steering column lock control module and central junction box does not match ▪ Low speed CAN fault ▪ Keyless vehicle module fault ▪ Central junction box fault	▪ Configure the module using the manufacturer approved diagnostic system. Check CAN communications between the modules
B102B-87	Passive Key - Missing message	▪ Passive key authorization missing message ▪ Confirm placement of key within vehicle ▪ Low speed CAN fault ▪ Key fob battery low/battery contact issue ▪ Interference from other RF signal ▪ Electromagnetic compatibility/noise ▪ Keyless vehicle module fault ▪ Receiver fault ▪ Receiver not programmed correctly ▪ Serial communication fault (between receiver and keyless vehicle module) ▪ Key fault ▪ Passive antenna fault ▪ Central junction box fault	**NOTE:** The action below is only required if this DTC and DTC B1B01-87 have been stored, or vehicle start issue has been reported ▪ Check whereabouts of keys, including spare and confirm correct functionality ▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the keyless vehicle module and receiver ▪ Check CAN communications between central junction box and keyless vehicle module ▪ Check key fob battery ▪ Check vehicle surroundings for possible sources of interference, move vehicle and retest. Check CAN network for interference/electromagnetic compatibility related issues ▪ Check serial circuit between receiver and keyless vehicle module. Refer to the electrical circuit diagrams

			electrical circuit diagrams and check circuits to all three antennas ▪ Disconnect battery, then re-connect - confirm correct operation by re-programming keys using the manufacturer approved diagnostic system
B1046-23	Front Fog Lamp Control Switch - Signal stuck low	▪ Switch signal stuck low ▪ Switch circuit short to ground ▪ Switch activated for more than one minute ▪ Switch fault	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the switch circuit. Clear the DTC and retest. If the DTC persists, renew the switch
B1047-23	Rear Fog Lamp Control Switch - Signal stuck low	▪ Switch signal stuck low ▪ Switch circuit short to ground ▪ Switch activated for more than one minute ▪ Switch fault	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the switch circuit. Clear the DTC and retest. If the DTC persists, renew the switch
B1051-23	Front Washer Switch - Signal stuck low	▪ Switch signal stuck low ▪ Switch circuit short to ground ▪ Switch activated for more than one minute ▪ Switch fault	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the switch circuit. Clear the DTC and retest. If the DTC persists, renew the switch
B1052-23	Rear Washer Switch - Signal stuck low	▪ Switch signal stuck low ▪ Switch circuit short to ground ▪ Switch activated for more than one minute ▪ Switch fault	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the switch circuit. Clear the DTC and retest. If the DTC persists, renew the switch

B1087-86	LIN Bus "A" - Signal invalid	The header of the LIN message received is incorrect	▪ Clear the stored DTC and retest, if the DTC returns localize the fault, refer to the electrical circuit diagrams and disconnect the analogue clock (by removing the supply fuse) and retest. Check the operation of the steering wheel switches on the LIN bus circuit (i.e. cruise, gearshift paddles, information and entertainment lower switchpack where installed). If a fault is evident with either the analogue clock or the left-side steering wheel module, replace as required
B1087-88	LIN Bus "A" - Bus off	▪ LIN bus circuit short to power or ground	▪ Refer to the electrical circuit diagrams and check the LIN circuit between the central junction box, the left-side steering wheel module and the analogue clock module for short circuit to power or short circuit to ground
B1088-86	LIN Bus "B" - Signal invalid	▪ Signal invalid	▪ Refer to the electrical circuit diagrams and check the LIN B circuit between the central junction box and the rain/light sensor, battery backed sounder and volumetric sensor (where installed)
B1088-88	LIN Bus "B" - Bus off	▪ Bus off	▪ Refer to the electrical circuit diagrams and check the LIN B circuit between the central junction box and the rain/light sensor, battery backed sounder and volumetric sensor (where installed)
B108B-11	Start Button Circuit "A" - Circuit short to ground	▪ Circuit short to ground	▪ Refer to the electrical circuit diagrams and check the start button circuit
B108B-12	Start Button Circuit "A" - Circuit short to battery	▪ Circuit short to power	▪ Refer to the electrical circuit diagrams and check the start button circuit

B108B-13	Start Button Circuit "A" - Circuit open	▪ Circuit open circuit	▪ Refer to the electrical circuit diagrams and check the start button circuit
B108B-23	Start Button Circuit "A" - Signal stuck low	▪ Start button signal stuck low ▪ Switch activated for more than one minute ▪ SW1 constantly active for a long period of time while button press detected at SW2 ▪ Switch failure	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the start button circuit. Renew the start switch as required
B108C-12	Start Button Circuit "B" - Circuit short to battery	▪ Circuit short to power	▪ Refer to the electrical circuit diagrams and check the start button circuit
B108C-13	Start Button Circuit "B" - Circuit open	▪ Circuit open circuit	▪ Refer to the electrical circuit diagrams and check the start button circuit
B108C-23	Start Button Circuit "B" - Signal stuck low	▪ Start button signal stuck low ▪ Switch activated for more than one minute ▪ SW1 constantly active for a long period of time while button press detected at SW2 ▪ Switch failure	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the start button circuit. Renew the start switch as required
B1095-11	Wiper On/Off Relay - Circuit short to ground	▪ Wiper on/off relay circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B1095-12	Wiper On/Off Relay - Circuit short to battery	▪ Wiper on/off relay circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the circuit
B1095-[illegible]	Wiper On/Off Relay - [illegible]	▪ Wiper on/off relay [illegible]	▪ Refer to the electrical circuit [illegible]

13	Circuit open	circuit open circuit	diagrams and check the circuit
B1096-11	Wiper High/Low Relay - Circuit short to ground	▪ Wiper circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B1096-12	Wiper High/Low Relay - Circuit short to battery	▪ Wiper circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the circuit
B1096-13	Wiper High/Low Relay - Circuit open	▪ Wiper circuit open circuit	▪ Refer to the electrical circuit diagrams and check the circuit
B1097-11	Heated Windshield Relay - Circuit short to ground	▪ Heated windshield relay circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B1097-12	Heated Windshield Relay - Circuit short to battery	▪ Heated windshield relay circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the circuit
B1097-13	Heated Windshield Relay - Circuit open	▪ Heated windshield relay circuit open circuit	▪ Refer to the electrical circuit diagrams and check the circuit
B109D-11	Rear Courtesy Light - Circuit short to ground	▪ Rear courtesy lamp circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B109D-13	Rear Courtesy Light - Circuit open	▪ Rear courtesy lamp circuit open circuit	**NOTE:** This DTC may be logged under normal operating conditions. No action required if function is correct ▪ Refer to the electrical circuit diagrams and check the circuit
B109E-51	Remote Keyless Entry - Not programmed	▪ Not programmed	▪ Configure the system using the manufacturers approved diagnostic system

B10A2-31	Crash Input - No signal	▪ No signal	▪ Check the supplemental restraints system and engine control module for related DTCs. Refer to the electrical circuit diagrams and check the circuit between the supplemental restraints system, the central junction box and the engine control module
B10A2-38	Crash Input - Signal frequency incorrect	▪ Signal frequency incorrect	▪ Check the restraints control module for DTCs and rectify first
B10AB-51	Remote Keyless Entry Synchronization - Not programmed	Not programmed	▪ Configure the system using the manufacturers approved diagnostic system
B10AD-09	Rain Sensor - Component Failures	▪ Rain/light sensor obscured ▪ Battery supply voltage below 9 volts ▪ Sensor incorrectly installed ▪ Component failure	▪ Check the rain/light sensor is not obscured. Check for related low voltage stored DTCs ▪ Check the security and installation of the rain/light sensor. Clear the DTC and retest ▪ If the DTC returns suspect an internal fault
B10AD-83	Rain Sensor - Value of signal protection calculation incorrect	▪ Value of signal protection calculation incorrect ▪ Sensor fault	Clear the DTC and retest. If the problem persists, renew the rain/light sensor
B10AD-87	Rain Sensor - Missing message	▪ Missing message ▪ LIN slave node is not responding	▪ Check the operation of the rain/light sensor. Refer to the electrical circuit diagrams and check the LIN circuit between the rain/light sensor and the central junction box. Should also check LIN control unit and rain/light sensor power and ground circuits
B10AD-96	Rain Sensor - Component internal	▪ Component internal failure	▪ Clear the DTC and retest. If the problem persists, renew

	failure		the rain/light sensor
B10E5-11	PCM Wake-Up Signal - Circuit short to ground	▪ Engine control module wake-up signal short to ground	▪ Refer to the electrical circuit diagrams and test the early wake-up signal circuit
B10E5-15	PCM Wake-Up Signal - Circuit short to battery or open	▪ Engine control module wake-up signal short circuit to power or open circuit	▪ Refer to the electrical circuit diagrams and test the early wake-up signal circuit
B10F2-4B	Sunroof Control - Over temperature	▪ Sunroof control motor over temperature ▪ Temperature sensor defective or not calibrated ▪ Debris in the channels/guides ▪ Cable(s) sticking/damaged ▪ Roof opening panel not correctly aligned ▪ Motor fault	▪ Check the sunroof for smooth operation and obstructions that would cause the motor to overheat. If necessary, renew the motor
B10F2-74	Sunroof Control - Actuator slipping	▪ Sunroof control motor slipping due to mechanical failure ▪ Debris in the channels/guides ▪ Cable(s) sticking/damaged ▪ Roof opening panel not correctly aligned ▪ Motor fault	
B10F2-93	Sunroof Control - No operation	▪ No operation, roof position is not valid ▪ Motor position not calibrated	▪ Configure the module using the manufacturers approved diagnostic system
B10F2-9A	Sunroof Control - Component or system operating conditions	▪ Component or system operating conditions ▪ Excessive continuous motor operation	▪ This DTC is not necessarily a fault and may be logged when the sunroof has been operated continuously and the sunroof has temporarily been disabled to prevent

			been disabled to prevent motor over-heat. Clear the DTC and check the operation of the switch and sunroof operation
B10F8-11	Accessory Socket 'A' Relay - Circuit short to ground	▪ Accessory socket 'A' relay circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B10F8-12	Accessory Socket 'A' Relay - Circuit short to battery	▪ Accessory socket 'A' relay circuit short to power	▪ Refer to the electrical circuit diagrams and check the circuit
B10F8-13	Accessory Socket 'A' Relay - Circuit open	▪ Accessory socket 'A' relay circuit open ground	▪ Refer to the electrical circuit diagrams and check the circuit
B10F9-11	Accessory Socket 'B' Relay - Circuit short to ground	▪ Accessory socket 'B' relay circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B10F9-12	Accessory Socket 'B' Relay - Circuit short to battery	▪ Accessory socket 'B' relay circuit short to power	▪ Refer to the electrical circuit diagrams and check the circuit
B10F9-13	Accessory Socket 'B' Relay - Circuit open	▪ Accessory socket 'B' relay circuit open ground	▪ Refer to the electrical circuit diagrams and check the circuit
B1102-11	Trailer Stop Lamp - Circuit short to ground	▪ Trailer stop lamp circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit Repair as necessary
B1115-11	High Mounted Stop Lamp Control - Circuit short to ground	▪ High mounted stop lamp control circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit Repair as necessary
B112B-83	Steering Wheel Module - Value of signal protection calculation incorrect	▪ Value of signal protection calculation incorrect	▪ Check the steering wheel switch functions to localize the failure. Clear the stored DTC and retest. If the DTC returns suspect the left-side steering wheel module and replace as required
B112B-87	Steering Wheel Module - Missing	▪ Missing message	▪ Check the operation of the steering wheel switches on

	message		the LIN bus circuit (i.e. cruise, gearshift paddles, information and entertainment lower switchpack where installed) ▪ Refer to the electrical circuit diagrams and check the LIN circuit between the steering wheel module and the central junction box. Check the left-side steering wheel module power and ground circuits
B112B-96	Steering Wheel Module - Component internal failure	▪ Component internal failure	▪ Clear the stored DTC and retest. If the DTC returns suspect the left-side steering wheel module and replace as required
B112C-83	Interior Motion Sensor - Value of signal protection calculation incorrect	▪ Value of signal protection calculation incorrect	▪ Clear the DTC and retest. If the problem persists, renew the volumetric sensor
B112C-87	Interior Motion Sensor - Missing message	▪ Missing message	▪ Check the operation of the volumetric sensor ▪ Refer to the electrical circuit diagrams and check the LIN circuit between the volumetric sensor and the central junction box. Should also check LIN control unit power and ground circuits. Clear the DTC and retest ▪ If the DTC persists, renew the volumetric sensor
B112C-96	Interior Motion Sensor - Component internal failure	▪ The central junction box has detected an internal error in the volumetric sensor	▪ Clear the DTC and retest. If the problem persists, renew the volumetric sensor
B113C-11	Hazard Switch Illumination - Circuit short to ground	▪ Hazard switch illumination circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the circuit. Repair as necessary
B113C-12	Hazard Switch Illumination - Circuit short to battery	▪ Hazard switch illumination circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the circuit. Repair as necessary

B113C-13	Hazard Switch Illumination - Circuit open	▪ Hazard switch illumination circuit open circuit	▪ Refer to the electrical circuit diagrams and check the circuit. Repair as necessary
B113E-23	External Boot/Trunk Release Switch - Signal stuck low	▪ External luggage compartment lid release switch digital input circuit - Signal stuck low ▪ Switch activated for more than one minute	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the external luggage compartment lid release switch digital input circuit for short to ground
B1140-11	Engine Crank Authorization - Circuit short to ground	▪ Engine crank authorization signal circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check engine crank authorization signal circuit
B1140-15	Engine Crank Authorization - Circuit short to battery or open	▪ Engine crank authorization signal circuit short circuit to power or open circuit	▪ Refer to the electrical circuit diagrams and check engine crank authorization signal circuit
B1145-11	Glove Box Locking Motor - Circuit short to ground	▪ Glove box locking motor circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B1145-12	Glove Box Locking Motor - Circuit short to battery	▪ Glove box locking motor circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the circuit
B1145-13	Glove Box Locking Motor - Circuit open	▪ Glove box locking motor circuit open circuit	▪ Refer to the electrical circuit diagrams and check the circuit
B1146-11	Passive Sounder Supply - Circuit short to ground	▪ Security passive sounder control circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the security passive sounder control circuit
B1146-15	Passive Sounder Supply - Circuit short to battery or open	Security passive sounder control circuit short circuit to power, open circuit	▪ Refer to the electrical circuit diagrams and check the security passive sounder control circuit
B1182-	Tire Pressure	▪ Diagnostic test to	**NOTE:**

51	Monitoring System - Not programmed	verify reception of all tire low pressure sensors has failed	NOTE: This DTC is for event information only and does not indicate a fault. ▪ No action required
B11D1-86	LIN Bus "C" - Signal invalid	▪ Signal invalid	▪ Refer to the electrical circuit diagrams and check the roof opening panel LIN circuit between the roof opening panel control module, passenger fuse box and the central junction box
B11D1-88	LIN Bus "C" - Bus off	▪ Bus off ▪ Roof opening panel LIN network short to power, ground	▪ Refer to the electrical circuit diagrams and check the roof opening panel LIN circuit between the roof opening panel control module, passenger fuse box and the central junction box
B11D9-92	Vehicle Battery - Performance or incorrect operation	▪ Internal electronic failure	▪ Renew the battery monitoring system control module
B11DB-49	Battery Monitoring Module - Internal electronic failure	▪ Internal electronic failure	▪ Renew the battery monitoring system control module
B11DB-83	Battery Monitoring Module - Value of signal protection calculation incorrect	▪ Value of signal protection calculation incorrect	▪ Clear the DTC and retest. If the problem persists, renew the battery monitoring system control module
B11DB-87	Battery Monitoring Module - Missing message	▪ Missing message ▪ Battery monitoring system control module connector dis-connected/poor connection ▪ Battery monitoring system control module to passenger fuse box LIN circuit - Open circuit	**NOTE:** Fault logging is inhibited by the CCF, but an incorrectly configured CCF could give erroneous DTC logging ▪ Check the operation of the

		▪ Battery monitoring system control module to battery positive monitor circuit open circuit ▪ Battery monitoring system control module/passenger fuse box failure	monitoring system control module. Refer to the electrical circuit diagrams and check the LIN circuit between the monitoring system control module and the central junction box. Should also check LIN control unit power and ground circuits
B123A-11	Left Front Turn Indicator - Circuit short to ground	▪ Left front turn signal lamp circuit short to ground	▪ Refer to the electrical circuit diagrams and check left front turn signal lamp circuit
B123A-15	Left Front Turn Indicator - Circuit short to battery or open	▪ Left front turn signal lamp circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check left front turn signal lamp circuit
B123B-11	Right Front Turn Indicator - Circuit short to ground	▪ Right front turn signal lamp circuit short to ground	▪ Refer to the electrical circuit diagrams and check right front turn signal lamp circuit
B123B-15	Right Front Turn Indicator - Circuit short to battery or open	▪ Right front turn signal lamp circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check right front turn signal lamp circuit
B1247-11	Left Rear Turn Indicator - Circuit short to ground	▪ Left rear turn signal lamp circuit short to ground	▪ Refer to the electrical circuit diagrams and check left rear turn signal lamp circuit
B1247-15	Left Rear Turn Indicator - Circuit short to battery or open	▪ Left rear turn signal lamp circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check left rear turn signal lamp circuit
Right Rear Turn Indicator - Circuit short to ground	▪ Right rear turn signal lamp circuit short to ground	▪ Refer to the electrical circuit diagrams and check right rear turn signal lamp circuit	
B1248-15	Right Rear Turn Indicator - Circuit short to battery or open	▪ Right rear turn signal lamp circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check right rear turn signal lamp circuit
B1298-73	Steering Column Adjust Up Switch - Actuator stuck closed	▪ Internal switch fault	▪ Check the switch operation. Refer to the electrical circuit diagrams and check the

	Actuator stuck closed		diagrams and check the column switch circuit
B1299-73	Steering Column Adjust Down Switch - Actuator stuck closed	▪ Internal switch fault	▪ Check the switch operation. Refer to the electrical circuit diagrams and check the column switch circuit
B129A-86	LIN Bus "D" - Signal invalid	▪ Signal invalid	▪ Refer to the electrical circuit diagrams and check the immobilizer antenna LIN circuit between the central junction box and the immobilizer antenna unit. Check for other immobilizer DTCs
B129A-88	LIN Bus "D" - Bus off	▪ Bus off ▪ Immobilizer antenna LIN network short to power, ground - this is detected when nothing is read back after a header is transmitted	▪ Refer to the electrical circuit diagrams and check the immobilizer antenna LIN circuit between the central junction box and the immobilizer antenna unit. Check for other immobilizer DTCs
B12A1-73	Steering Column Adjust Out Switch - Actuator stuck closed	▪ Internal switch fault	▪ Check the switch operation. Refer to the electrical circuit diagrams and check the column switch circuit
B12A2-73	Steering Column Adjust In Switch - Actuator stuck closed	▪ Internal switch fault	▪ Check the switch operation. Refer to the electrical circuit diagrams and check the column switch circuit
B12A3-11	Steering Column Adjust Motor Drive A - Circuit short to ground	▪ Motor circuit short to ground ▪ Motor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the steering column adjust motor and the central junction box. If no circuit faults are evident, suspect the steering column adjust motor
B12A3-12	Steering Column Adjust Motor Drive A - Circuit short to battery	▪ Motor circuit short to power ▪ Motor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the steering column adjust motor and the central junction box. If no circuit faults are evident,

			circuit faults are evident, suspect the steering column adjust motor
B12A3-15	Steering Column Adjust Motor Drive A - Circuit short to battery or open	▪ Motor circuit short to power or open circuit ▪ Motor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the steering column adjust motor and the central junction box. If no circuit faults are evident, suspect the steering column adjust motor
B12A4-11	Steering Column Adjust Motor Drive B - Circuit short to ground	▪ Motor circuit short to ground ▪ Motor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the steering column adjust motor and the central junction box. If no circuit faults are evident, suspect the steering column adjust motor
B12A4-12	Steering Column Adjust Motor Drive B - Circuit short to battery	▪ Motor circuit short to ground ▪ Motor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the steering column adjust motor and the central junction box. If no circuit faults are evident, suspect the steering column adjust motor
B12A4-15	Steering Column Adjust Motor Drive B - Circuit short to battery or open	▪ Motor circuit short to power or open circuit ▪ Motor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the steering column adjust motor and the central junction box. If no circuit faults are evident, suspect the steering column adjust motor
B12A7-31	Steering Column Tilt Sensor A - No signal	▪ Steering column tilt sensor no signal ▪ Sensor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the steering column tilt sensor and the central junction box. If no circuit faults are evident, suspect the steering column tilt sensor
B12A8-31	Steering Column Telescope Sensor A - No signal	▪ Steering column telescope sensor no signal	

		▪ Sensor fault	
B12A9-54	Steering Column Tilt Sensor B - Missing calibration	▪ Steering column tilt sensor missing calibration	▪ Check for other steering column related DTCs. Calibrate the sensor using the manufacturer approved diagnostic system
B12A9-62	Steering Column Tilt Sensor B - Signal compare failure	▪ Steering column tilt sensor signal compare failure ▪ Harness/connector issue	▪ Refer to the electrical circuit diagrams and check the steering tilt sensor, connector and circuits
B12AA-54	Steering Column Telescope Sensor B - Missing calibration	▪ Steering column telescope sensor missing calibration	▪ Check for other steering column related DTCs. Calibrate the sensor using the manufacturer approved diagnostic system
B12AA-62	Steering Column Telescope Sensor B - Signal compare failure	▪ Steering column telescope sensor signal compare failure ▪ Harness/connector issue	▪ Refer to the electrical circuit diagrams and check the steering telescope sensor, connector and circuits
B12C9-86	LIN Bus "E" - Signal invalid	▪ Battery monitoring system signal invalid	▪ Refer to the electrical circuit diagrams and check the battery monitoring system LIN circuit between the central junction box and the battery monitoring system control module. Check for other battery monitoring system related DTCs
B12C9-88	LIN Bus "E" - Bus off	▪ ▪ Battery monitoring system LIN network short to power, ground - This is detected when nothing is read back after a header is transmitted	▪ Refer to the electrical circuit diagrams and check the battery monitoring system LIN circuit between the central junction box and the battery monitoring system control module. Check for other battery monitoring system related DTCs
B12E8-23	Liftgate/Tailgate Control/Release Switch - Signal stuck	▪ Liftgate/tailgate control/release switch signal stuck low	▪ Refer to the electrical circuit diagrams and check the circuit

	low		
B12EE-11	Tailgate/Trunk Release - Circuit short to ground	▪ Tailgate/Trunk release circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B12EF-11	Trailer Fog Lamp - Circuit short to ground	▪ Trailer fog lamp circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B12F3-11	Secondary Tailgate Release - Circuit short to ground	▪ Secondary tailgate release circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B12F4-12	Vehicle Speed Output - Circuit short to battery	▪ Circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the circuit
B12F5-12	Fridge Relay Control - Circuit short to battery	▪ Circuit short to power	▪ Refer to the electrical circuit diagrams and check the circuit
B12F6-11	Headlamp Power Supply A - Circuit short to ground	▪ Circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B12FA-11	Power Steering Solenoid Control A - Circuit short to ground	**NOTE:** Circuit reference Solenoid valve + ▪ Servotronic valve circuit short circuit to ground (customer may complain of heavy steering or variable steering effort required)	▪ Refer to the electrical circuit diagrams and check the circuit between the servotronic valve and the central junction box
B12FA-1F	Power Steering Solenoid Control A - Circuit intermittent	**NOTE:** Circuit reference Solenoid valve + ▪ Servotronic valve circuit - Short circuit	▪ Refer to the electrical circuit diagrams and check the servotronic valve circuit for short circuit to ground, short circuit to power, open circuit, high resistance (note, the fault may be an intermittent one). Repair circuit as required, clear DTC

		circuit - Short circuit to ground, short circuit to power, open circuit, high resistance (customer may complain of heavy steering or variable steering effort required)	and retest
B12FA-13	Power Steering Solenoid Control A - Circuit open	**NOTE:** Circuit reference Solenoid valve + ▪ Servotronic valve circuit open circuit (customer may complain of heavy steering or variable steering effort required)	▪ Refer to the electrical circuit diagrams and check the circuit between the servotronic valve and the central junction box
B12FB-12	Power Steering Solenoid Control B - Circuit short to battery	**NOTE:** Circuit reference Solenoid valve - ▪ Servotronic valve circuit short circuit to power (customer may complain of heavy steering or variable steering effort required)	▪ Refer to the electrical circuit diagrams and check the circuit between the servotronic valve and the central junction box
B12FB-14	Power Steering Solenoid Control B - Circuit short to ground or open	**NOTE:** Circuit reference Solenoid valve - ▪ Servotronic valve circuit short circuit to ground, open circuit, high resistance (customer may complain of heavy steering or variable	**NOTE:** This DTC will not be logged during an on demand self-test routine. The DTC is only logged if the fault is noted continuously for over two seconds, during the on demand self-test routine the output from the servotronic valve is only

		steering or variable steering effort required)	monitored for a one second duration ▪ Refer to the electrical circuit diagrams and check the servotronic valve circuit for short circuit to ground, open circuit, high resistance (note, the fault may be an intermittent one). Repair circuit as required, clear DTC and retest
B12FB-1F	Power Steering Solenoid Control B - Circuit intermittent	**NOTE:** Circuit reference Solenoid valve - ▪ Servotronic valve circuit - Short circuit to ground, short circuit to power, open circuit, high resistance (customer may complain of heavy steering or variable steering effort required)	▪ Refer to the electrical circuit diagrams and check the servotronic valve circuit for short circuit to ground, short circuit to power, open circuit, high resistance (note, the fault may be an intermittent one). Repair circuit as required, clear DTC and retest
B130B-11	Right Rear Fog Lamp - Circuit short to ground	▪ Circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit for short to ground
B130B-15	Right Rear Fog Lamp - Circuit short to battery or open	▪ Circuit short to power or open	▪ Refer to the electrical circuit diagrams and check the circuit for short to power or open circuit
B130E-11	Left Rear Fog Lamp - Circuit short to ground	▪ Circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit for short to ground
B130E-15	Left Rear Fog Lamp - Circuit short to battery or open	▪ Circuit short to power or open	▪ Refer to the electrical circuit diagrams and check the circuit for short to power or open circuit
B1311-	Clock Module - Value	▪ Value of signal	▪ Clear the DTC and retest.

83	of signal protection calculation incorrect	protection calculation incorrect ▪ LIN 1 circuit fault	Refer to electrical circuit diagrams and check power and ground connections to clock module, check LIN circuit. Rectify any wiring faults. If the problem persists, renew the clock module
B1311-87	Clock Module - Missing message	▪ The central junction box has detected that the clock is not responding	▪ Refer to the electrical circuit diagrams to locate the fused supply circuit to the analogue clock. With the ignition supply in the OFF state, remove and reinstall the fuse. Clear the DTC and retest. Refer to electrical circuit diagrams and check power and ground connections to clock module, check LIN circuit. Rectify any wiring faults. If the problem persists, renew the clock module
B1311-96	Clock Module - Component internal failure	▪ Component internal failure	▪ Refer to the electrical circuit diagrams to locate the fused supply circuit to the analogue clock. With the ignition supply in the OFF state, remove and reinstall the fuse. The clock hands will now set to the 12 position. Cycle the ignition state to ON (the clock should now have self-adjusted to the time currently set within the central junction box). Record then clear the stored DTC, cycle the ignition state to OFF, return the state to ON, retest, if the DTC returns, renew the analogue clock module
B134D-11	Headlamp Control A - Circuit short to ground	▪ Circuit short to ground	▪ Refer to the electrical circuit diagrams and check for short circuit to ground between the central junction box and the headlamp levelling control module (either left or right side control module)
B134D-	Headlamp Control A -	▪ Circuit short to	▪ Check for DTC B134D-11

B134D-14	Headlamp Control A - Circuit short to ground or open	▪ Circuit short to ground or open	▪ Check for DTC B134D-11 this will confirm circuit short to ground. Refer to the electrical circuit diagrams and check for short circuit to ground between the central junction box and the headlamp levelling control module (either left or right side control module)
B134E-11	Switch Illumination Adjustment Control - Circuit short to ground	▪ Circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B134E-12	Switch Illumination Adjustment Control - Circuit short to battery	▪ Circuit short to power	▪ Refer to the electrical circuit diagrams and check the circuit
B134E-13	Switch Illumination Adjustment Control - Circuit open	▪ Circuit open circuit	▪ Refer to the electrical circuit diagrams and check the circuit
B134F-11	Headlamp Flash Switch - Circuit short to ground	▪ Circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B134F-1E	Headlamp Flash Switch - Circuit resistance out of range	▪ Circuit resistance out of range	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the circuit
B134F-23	Headlamp Flash Switch - Signal stuck low	▪ Circuit signal stuck low ▪ Switch activated for more than one minute	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the circuit
B136B-11	Suspension Control Module Wake-up Signal - Circuit short to ground	▪ Circuit short to ground	▪ Refer to the electrical circuit diagrams and check the circuit
B136B-15	Suspension Control Module Wake-up Signal - Circuit short to battery or open	▪ Circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the circuit
B136D-11	Front Wiper Intermittent Delay Control - Circuit short	▪ Circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the circuit

	Control - Circuit short to ground		circuit
B136D-15	Front Wiper Intermittent Delay Control - Circuit short to battery or open	▪ Circuit short circuit to power or open circuit	▪ Refer to the electrical circuit diagrams and check the circuit
B136D-1E	Front Wiper Intermittent Delay Control - Circuit resistance out of range	▪ Circuit resistance out of range	▪ Check the operation of the switch. Refer to the electrical circuit diagrams and check the circuit
B1A75-11	Fuel Sender No.1 - Circuit short to ground	▪ Active fuel level sensor circuit - Short circuit to ground ▪ Fuel level sensor fault	▪ Refer to the electrical circuit diagrams and check the active fuel level sensor circuit for short circuit to ground. Repair circuit as required, clear DTC and retest ▪ If fault persists, check and install a new active fuel level sensor as required. Clear DTC and retest
B1A75-15	Fuel Sender No.1 - Circuit short to battery or open	▪ Active fuel level sensor circuit - Short circuit to power, open circuit, high resistance ▪ Fuel level sensor fault	▪ Refer to the electrical circuit diagrams and check the active fuel level sensor circuit for short circuit to power, open circuit, high resistance. Repair circuit as required, clear DTC and retest ▪ If fault persists, check and install a new active fuel level sensor as required. Clear DTC and retest
B1A75-1C	Fuel Sender No.1 - Circuit voltage out of range	▪ Active fuel level sensor circuit - Short circuit to ground, short circuit to power, open circuit, high resistance ▪ Fuel level sensor fault	▪ Refer to the electrical circuit diagrams and check the active fuel level sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Repair circuit as required, clear DTC and retest ▪ Clear DTC and retest. If fault persists, check and install a new active fuel level sensor as required. Clear DTC and retest
B1A76-11	Fuel Sender No.2 - Circuit short to ground	▪ Passive fuel level sensor circuit - Short circuit to ground	▪ Refer to the electrical circuit diagrams and check the passive fuel level sensor

		▪ Fuel level sensor fault	circuit for short circuit to ground. Repair circuit as required, clear DTC and retest ▪ If fault persists, check and install a new passive fuel level sensor as required. Clear DTC and retest
B1A76-15	Fuel Sender No.2 - Circuit short to battery or open	▪ Passive fuel level sensor circuit - Short circuit to power, open circuit, high resistance ▪ Fuel level sensor fault	▪ Refer to the electrical circuit diagrams and check the passive fuel level sensor circuit for short circuit to power, open circuit, high resistance. Repair circuit as required, clear DTC and retest ▪ If fault persists, check and install a new passive fuel level sensor as required. Clear DTC and retest
B1A76-1C	Fuel Sender No.2 - Circuit voltage out of range	▪ Passive fuel level sensor circuit - Short circuit to ground, short circuit to power, open circuit, high resistance ▪ Fuel level sensor fault	▪ Refer to the electrical circuit diagrams and check the passive fuel level sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance. Repair circuit as required, clear DTC and retest ▪ Clear DTC and retest. If fault persists, check and install a new passive fuel level sensor as required. Clear DTC and retest
B1A84-51	Car Configuration Data - Not programmed	▪ Not programmed	▪ Configure the module using the manufacturer approved diagnostic system
B1A85-96	Ambient Light Sensor - Component internal failure	▪ Rain/light sensor obscured ▪ Sensor incorrectly installed ▪ Component failure	▪ Check the rain/light sensor is not obscured. Check the security and installation of the rain/light sensor. Clear the DTC and retest. If the DTC returns suspect an internal fault
B1A91-31	Speed/Position Sensor A - No signal	▪ No signal from sensor (restricted sunroof	▪ Clear the DTC and retest. If the problem persists, renew

		functionality) ▪ Hall sensor A failure	the roof opening panel module
B1A92-31	Speed/Position Sensor B - No signal	▪ No signal from sensor (restricted sunroof functionality) ▪ Hall sensor B failure	▪ Clear the DTC and retest. If the problem persists, renew the roof opening panel module
B1B01-55	Key Transponder - Not configured	▪ Not configured	▪ Configure the module using the manufacturers approved diagnostic system
B1B01-64	Key Transponder - Signal plausibility failure	▪ Signal plausibility failure	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the central junction box and keyless vehicle module. Check CAN communications between the modules. Re-synchronize ID by re-configuring the keyless vehicle module as a new module
B1B01-81	Key Transponder - Invalid serial data received	▪ Invalid serial data received	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the central junction box and keyless vehicle module. Check CAN communications between the modules. Re-synchronize ID by re-configuring the keyless vehicle module as a new module
B1B01-87	Key Transponder - Missing message	▪ This DTC could be logged if 'Smart Key Not Found' warning message is displayed, and the start button is pressed without the key in the correct location as defined in the driver handbook ▪ No communication from key transponder during alternative (not passive) start event	▪ First confirm that the customer has not performed a start event with the key incorrectly located when the warning message 'Smart Key Not Found' is displayed. Re-synchronize ID by re-configuring the immobilizer antenna unit as a new module. Refer to the electrical circuit diagrams and check the power and ground circuits to the immobilizer antenna unit

B1B33-51	Target ID Transfer - Not programmed	▪ Not programmed ▪ A new engine control module has been installed ▪ Failed communication with engine management system	▪ If necessary, program the relevant module using the manufacturers approved diagnostic system. Clear/ignore DTC
B1B33-64	Target ID Transfer - Signal plausibility failure	▪ Signal plausibility failure ▪ Failed communication with engine management system	▪ No action necessary, clear/ignore DTC
B1B33-81	Target ID Transfer - Invalid serial data received	▪ Invalid serial data received ▪ Failed communication with engine management system	▪ No action necessary, clear/ignore DTC

GENERAL INFORMATION

DESCRIPTION AND OPERATION

CLIMATE CONTROL MODULE (HVAC)

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 Climate Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For

additional information, refer to: Climate Control System (412-00 Climate Control System - General Information, Diagnosis and Testing).

B11FF-85

- Dynamic Stability Control switch output signal short to ground

NOTE:

> The fuel fired booster heater assembly contains many serviceable components. It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify this fault

- Refer to the electrical circuit diagrams and check the fuel fired booster heater engine coolant bypass valve circuit for open circuit, high resistance
- Repair the circuit or install a new engine coolant bypass valve located within the fuel fired booster heater as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater

Screen On/Off LED - Circuit short to groundB1D22-11B1D27-15

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B1015-23	Screen On/Off Switch - Signal stuck low	▪ Cannot switch touch screen On/Off; touch screen power button stuck in 'Pressed' position	Check the switch operation. Renew the Climate Control Module/switch pack
B102E-11	Air Quality Sensor - Circuit short to ground	▪ Air quality sensor circuit short to ground	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the air quality sensors and the Climate Control Module

B102E-12	Air Quality Sensor - Circuit short to battery	▪ Air quality sensor circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the air quality sensors and the Climate Control Module
B1034-11	Left Front Seat Heater Element - Circuit short to ground	▪ Left seat heater element short to ground	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the seat cushion heater and the Climate Control Module
B1034-15		▪ Left seat heater element short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the seat cushion heater and the Climate Control Module
B1036-11	Right Front Seat Heater Element - Circuit short to ground	▪ Right seat heater element short to ground	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the seat cushion heater and the Climate Control Module
B1036-15	Right Front Seat Heater Element - Circuit short to battery or open	▪ Right seat heater element short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the seat cushion heater and the Climate Control Module
B1038-11	Left Front Seat Heater Sensor - Circuit short to ground	▪ Left seat heater sensor short to ground	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the seat temp sensor and the Climate Control Module
B1038-15	Left Front Seat Heater Sensor -	▪ Left seat heater sensor short to	▪ Refer to the electrical circuit diagrams and

	Circuit short to battery or open	power or open circuit	check the wiring circuit between the seat temp sensor and the Climate Control Module
B103A-11	Right Front Seat Heater Sensor - Circuit short to ground	▪ Right seat heater sensor short to ground	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the seat temp sensor and the Climate Control Module
B103A-15	Right Front Seat Heater Sensor - Circuit short to battery or open	▪ Right seat heater sensor short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the seat temp sensor and the Climate Control Module
B1083-11	Recirculation Damper Motor - Circuit short to ground	▪ Recirculation actuator signal circuit short to ground	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the re-circulated air motor and the Climate Control Module
B1083-15	Recirculation Damper Motor - Circuit short to battery or open	▪ Recirculation actuator signal circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the re-circulated air motor and the Climate Control Module
B1085-1C	Defroster Damper Motor - Circuit voltage out of range	▪ Motor voltage supply under/over limits	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the screen air distribution motor and the Climate Control Module
B1085-77	Defroster Damper Motor - Commanded position not reachable	▪ Defroster actuator limited movement range compared to expected	▪ Clear the DTC and retest. If the problem persists, remove the defrost vent/register blend door actuator

	[illegible]	▪ Defrost vent/register blend door obstruction ▪ Actuator fault	[illegible] and check the blend flap operation. Renew the actuator
B1085-87	Defroster Damper Motor - Missing message	▪ Missing response(s) from defrost actuator ▪ Connector or harness related issue ▪ Actuator fault	▪ Check the defrost vent actuator connector for security and serviceability. Refer to the electrical circuit diagrams and check the wiring circuit between the screen air distribution motor and the Climate Control Module. Renew the actuator
B1085-98	Defroster Damper Motor - Component or system over temperature	▪ Actuator internal coil temperature over limit ▪ Actuator fault	▪ Consider environmental conditions before condemning the actuator. Allow the actuator to cool, clear the DTC and retest. If the problem persists, renew the actuator
B1087-54	LIN Bus "A" - Missing calibration	▪ Climate Control distribution flap actuator calibration routine has not been run successfully	▪ Using the manufacturers approved diagnostic system, configure existing heating ventilation and air conditioning control module ▪ Clear the DTC and retest ▪ If the problem persists run, Actuator End Stop Detection routine
B1087-83	LIN Bus "A" - Value of signal protection calculation incorrect	▪ Invalid LIN signal checksums on Climate Control LIN actuator Bus	▪ Refer to the electrical circuit diagrams and check the Climate Control LIN circuits
B1087-86	LIN Bus "A" - Signal invalid	▪ Invalid received signals on Climate [illegible]	▪ Refer to the electrical circuit diagrams and [illegible]

		Control LIN actuator Bus	check the Climate Control LIN circuits
B1087-88	LIN Bus "A" - Bus off	▪ Climate Control actuator LIN Bus short to ground or power	▪ Refer to the electrical circuit diagrams and check the Climate Control LIN circuits
B10B9-11	Blower Control - Circuit short to ground	▪ Climate Control blower motor control output signal short to ground	▪ Refer to the electrical circuit diagrams and check the blower motor control output circuit
B10B9-12	Blower Control - Circuit short to battery	▪ Climate Control blower motor control output signal short to power	▪ Refer to the electrical circuit diagrams and check the blower motor control output circuit
B11EE-11	A/C Compressor - Circuit short to ground	▪ A/C compressor output signal short to ground	▪ Refer to the electrical circuit diagrams and check the A/C compressor circuit
B11EE-12	A/C Compressor - Circuit short to battery	▪ A/C compressor output signal short to power	▪ Refer to the electrical circuit diagrams and check the A/C compressor circuit
B11EE-13	A/C Compressor - Circuit open	▪ A/C compressor output signal open circuit	▪ Refer to the electrical circuit diagrams and check the A/C compressor circuit
B11FF-11	A/C Refrigerant Pressure - Circuit short to ground	▪ A/C pressure sensor input signal short to ground	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the refrigerant pressure sensor and the Climate Control Module
B11FF-15	A/C Refrigerant Pressure - Circuit short to battery or open	▪ A/C pressure sensor input signal short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the refrigerant pressure sensor and the

			Climate Control Module
B11FF-84	A/C Refrigerant Pressure - Signal below allowable range	▪ A/C high pressure below low threshold ▪ A/C system leak ▪ Incorrect A/C system charge ▪ Pressure sensor fault	▪ Check for other A/C system DTCs. Check the A/C system operating pressures and gas charge. Renew the pressure sensor
A/C Refrigerant Pressure - Signal above allowable range	▪ A/C high pressure above high threshold ▪ Incorrect A/C system charge ▪ Pressure sensor fault	▪ Check the A/C system operating pressures and gas charge. Renew the pressure sensor	
B123D-11	Dynamic Stability Control Button - Circuit short to ground	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the Dynamic Stability Control switch and the Climate Control Module	
B123D-12	Dynamic Stability Control Button - Circuit short to battery	▪ Dynamic Stability Control switch output signal short to power	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the Dynamic Stability Control switch and the Climate Control Module
B123D-13	Dynamic Stability Control Button - Circuit open	▪ Dynamic Stability Control switch output signal circuit open circuit	▪ Refer to the electrical circuit diagrams and check the wiring circuit between the Dynamic Stability Control switch and the Climate Control Module
B12A6-11	Auxiliary Heater Water Pump - Circuit short to	▪ ▪	**NOTE:**

		ground		The fuel fired booster heater assembly contains many serviceable components. It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify this fault ▪ Refer to the electrical circuit diagrams and check the fuel fired booster heater coolant pump circuit for short circuit to ground ▪ Repair the circuit or install a new coolant pump located within the fuel fired booster heater as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater	

B12A6-15	Auxiliary Heater Water Pump - Circuit short to battery or open	▪ Fuel fired booster heater coolant pump circuit short circuit to power, open circuit, high resistance	**NOTE:** The fuel fired booster heater assembly contains many serviceable components. It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify this fault ▪ Refer to the electrical circuit diagrams and check the fuel fired booster heater coolant pump circuit for short circuit to power, open circuit, high resistance ▪ Repair the circuit or install a new coolant pump located within the fuel fired booster heater as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to

			be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater
B12AD-11	Left Heat Exchanger Temperature Sensor - Circuit short to ground	▪ Left heater coolant temperature sensor short to ground ▪ Sensor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the left heater coolant temperature sensor and the Climate Control Module. Renew the sensor
B12AD-15	Left Heat Exchanger Temperature Sensor - Circuit short to battery or open	▪ Left heater coolant temperature sensor short to power or open circuit ▪ Sensor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the left heater coolant temperature sensor and the Climate Control Module. Renew the sensor
B12AE-11	Right Heat Exchanger Temperature Sensor - Circuit short to ground	▪ Right heater coolant temperature sensor short to ground ▪ Sensor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the right heater coolant temperature sensor and the Climate Control Module. Renew the sensor
B12AE-15	Right Heat Exchanger Temperature Sensor - Circuit short to battery or open	▪ Right heater coolant temperature sensor short to power or open circuit ▪ Sensor fault	▪ Refer to the electrical circuit diagrams and check the circuit between the right heater coolant temperature sensor and the Climate Control Module. Renew the sensor
B12AF-11	Left Coolant Control Valve - Circuit short to ground	▪ Left coolant control valve output signal short to ground ▪ Coolant control valve fault	▪ Refer to the electrical circuit diagrams and check the circuit between the left water valve and the Climate Control

			Climate Control Module. Renew the coolant valve
B12AF-12	Left Coolant Control Valve - Circuit short to battery	▪ Left coolant control valve output signal short to power ▪ Coolant control valve fault	▪ Refer to the electrical circuit diagrams and check the circuit between the left water valve and the Climate Control Module. Renew the coolant valve
B12AF-13	Left Coolant Control Valve - Circuit open	▪ Left coolant control valve open circuit ▪ Coolant control valve fault	▪ Refer to the electrical circuit diagrams and check the circuit between the left water valve and the Climate Control Module. Renew the coolant valve
B12BF-11	Right Coolant Control Valve - Circuit short to ground	▪ Right coolant control valve output signal short to ground ▪ Coolant control valve fault	▪ Refer to the electrical circuit diagrams and check the circuit between the right water valve and the Climate Control Module. Renew the coolant valve
B12BF-12	Right Coolant Control Valve - Circuit short to battery	▪ Right coolant control valve output signal short to power ▪ Coolant control valve fault	▪ Refer to the electrical circuit diagrams and check the circuit between the right water valve and the Climate Control Module. Renew the coolant valve
B12BF-13	Right Coolant Control Valve - Circuit open	▪ Right coolant control valve open circuit ▪ Coolant control valve fault	▪ Refer to the electrical circuit diagrams and check the circuit between the right water valve and the Climate Control Module. Renew the coolant valve
B12B1-11	Heated Washer Jet and Wiper Park Relay - Circuit short to	▪ Heated washer jet output short to ground	▪ Refer to the electrical circuit diagrams and check the circuit between the washer

	Circuit short to ground	▪ Relay fault	between the washer jet relay and the Climate Control Module. Renew the relay
B12B1-12	Heated Washer Jet and Wiper Park Relay - Circuit short to battery	▪ Heated washer jet output short to power ▪ Relay fault	▪ Refer to the electrical circuit diagrams and check the circuit between the washer jet relay and the Climate Control Module. Renew the relay
B12B1-13	Heated Washer Jet and Wiper Park Relay - Circuit open	▪ Heated washer jet output open circuit ▪ Relay fault	▪ Refer to the electrical circuit diagrams and check the circuit between the washer jet relay and the Climate Control Module. Renew the relay
B12B2-11	AUX Heater Coolant Diverter Valve - Circuit short to ground	▪ Fuel fired booster heater engine coolant bypass valve circuit short circuit to ground	**NOTE:** The fuel fired booster heater assembly contains many serviceable components. It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify this fault ▪ Refer to the electrical circuit diagrams and check the fuel fired booster heater engine coolant bypass valve circuit for short circuit to ground ▪ Repair the circuit or install a new engine coolant bypass valve located within the fuel fired booster heater

			as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater
B12B2-12	AUX Heater Coolant Diverter Valve - Circuit short to battery	▪ Fuel fired booster heater engine coolant bypass valve circuit short circuit to power	**NOTE:** The fuel fired booster heater assembly contains many serviceable components. It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify this fault ▪ Refer to the electrical circuit diagrams and check the fuel fired booster heater engine coolant bypass valve circuit for short circuit to power

			▪ Repair the circuit or install a new engine coolant bypass valve located within the fuel fired booster heater as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater
B12B2-13	AUX Heater Coolant Diverter Valve - Circuit open	▪ Fuel fired booster heater engine coolant bypass valve circuit open circuit, high resistance	
B12B3-11	Air Quality Sensor Heater Supply - Circuit short to ground	▪ Air quality sensor heater power supply circuit short to ground	▪ Refer to the electrical circuit diagrams and check the air quality sensor heater power circuit between the sensor and the Climate Control Module
B12B3-12	Air Quality Sensor Heater Supply - Circuit short to battery	▪ Air quality sensor heater power supply circuit short to power	▪ Refer to the electrical circuit diagrams and check the air quality sensor heater power

			circuit between the sensor and the Climate Control Module
B12B3-13	Air Quality Sensor Heater Supply - Circuit open	▪ Air quality sensor heater power supply circuit open circuit	▪ Refer to the electrical circuit diagrams and check the air quality sensor heater power circuit between the sensor and the Climate Control Module
B12B9-16	Auxiliary Heater Control Module - Circuit voltage below threshold	▪ Fuel fired booster heater power or ground circuit open circuit, high resistance ▪ Battery/charging system fault ▪ Fuel fired booster heater control module internal failure	▪ Refer to the electrical circuit diagrams and check the fuel fired booster heater power and ground circuits for open circuit, high resistance ▪ Refer to the relevant section of the workshop manual and test the battery and charging system ▪ Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel

			fired booster heater ▪ If the fault persists, install a new fuel fired booster heater, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A)
B12B9-17	Auxiliary Heater Control Module - Circuit voltage above threshold	▪ Battery/charging system fault ▪ Fuel fired booster heater control module internal failure	▪ Refer to the relevant section of the workshop manual and test the battery and charging system ▪ Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater ▪ If the fault persists, install a new fuel fired booster heater, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A)

B12B9-43	Auxiliary Heater Control Module - Special memory failure	▪ Fuel fired booster heater control module internal microcontroller ROM/RAM corruption	▪ Refer to the relevant section of the workshop manual and test the battery and charging system ▪ Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater ▪ If the fault persists, install a new fuel fired booster heater, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A)
B12B9-49	Auxiliary Heater Control Module - Internal electronic failure	▪ Fuel fired booster heater control module internal failure	▪ Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that

			the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater ▪ If the fault persists, install a new fuel fired booster heater, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A)
B12CF-1C	Face Damper Motor - Circuit voltage out of range	▪ Face air distribution actuator voltage supply under/over limits ▪ Face air distribution motor circuit fault ▪ Battery charge state ▪ Charging system fault	▪ Refer to the electrical circuit diagrams and check the face air distribution motor circuit. Check for charging system DTCs. Check the battery charge condition and charging system voltage output
B12CF-77	Face Damper Motor - Commanded position not reachable	▪ Face air distribution actuator limited movement range compared to expected ▪ Face air distribution flap obstruction or damage	▪ Check the face air distribution mechanism for obstructions. Clear DTC and retest. If the problem persists, renew the Climate Control Module. Refer to the warranty policies and procedures before renewing a module
B12CF-87	Face Damper Motor - Missing message	▪ One or more missing response(s) from face air	▪ Check the face air distribution mechanism for

	message	from face air distribution actuator ▪ Face air distribution circuit fault ▪ Actuator fault	mechanism for obstructions
B12CF-98	Face Damper Motor - Component or system over temperature	▪ Face air distribution mode actuator internal coil temperature over limit ▪ Actuator fault	▪ Consider environmental conditions before condemning the actuator. Allow the actuator to cool, clear the DTC and retest. If the problem persists, renew the actuator.
B12D0-1C	Foot Damper Motor - Circuit voltage out of range	▪ Foot air distribution actuator voltage supply under/over limits ▪ Foot air distribution motor circuit fault ▪ Battery charge state ▪ Charging system fault	▪ Refer to the electrical circuit diagrams and check the foot air distribution motor circuit. Check for charging system DTCs. Check the battery charge condition and charging system voltage output
B12D0-77	Foot Damper Motor - Commanded position not reachable	▪ Foot air distribution actuator limited movement range compared to expected ▪ Foot air distribution flap obstruction or damage	▪ Check the foot air distribution mechanism for obstructions. Clear DTC and retest. If the problem persists, renew the Climate Control Module. Refer to the warranty policies and procedures before renewing a module
B12D0-87	Foot Damper Motor - Missing message	▪ One or more missing response(s) from foot air distribution actuator ▪ Foot air distribution circuit fault ▪ Actuator fault	▪ Check the foot air distribution mechanism for obstructions
B12D0-98	Foot Damper Motor -	▪ Foot air distribution mode actuator	▪ Consider environmental

	Component or system over temperature	internal coil temperature over limit ▪ Actuator fault	conditions before condemning the actuator. Allow the actuator to cool, clear the DTC and retest. If the problem persists, renew the actuator.
B12D1-1C	Dynamic Air Pressure Damper Motor - Circuit voltage out of range	▪ Incoming airflow actuator voltage supply under/over limits ▪ Incoming airflow motor circuit fault ▪ Battery charge state ▪ Charging system fault	▪ Refer to the electrical circuit diagrams and check the incoming airflow motor circuit. Check for charging system DTCs. Check the battery charge condition and charging system voltage output
B12D1-77	Dynamic Air Pressure Damper Motor - Commanded position not reachable	▪ Incoming airflow actuator limited movement range compared to expected ▪ Foot air distribution flap obstruction or damage	▪ Check the incoming airflow distribution mechanism for obstructions. Clear DTC and retest. If the problem persists, renew the Climate Control Module. Refer to the warranty policies and procedures before renewing a module
B12D1-87	Dynamic Air Pressure Damper Motor - Missing message	▪ One or more missing response(s) from incoming airflow actuator ▪ Incoming airflow distribution circuit fault ▪ Actuator fault	▪ Check the incoming airflow distribution mechanism for obstructions
B12D1-98	Dynamic Air Pressure Damper Motor - Component or system over temperature	▪ Incoming airflow distribution mode actuator internal coil temperature over limit ▪ Actuator fault	▪ Consider environmental conditions before condemning the actuator. Allow the actuator to cool, clear the DTC and retest. If the problem persists, renew the actuator.

B12D2-11	▪ Infotainment LED output short to ground (LED not working)	▪ Refer to the electrical circuit diagrams and check the On/Off tell tail circuit between the Climate Control Module and the touch screen.	
B12D2-12	Screen On/Off LED - Circuit short to battery	▪ Infotainment LED output short to power (LED permanently on)	▪ Refer to the electrical circuit diagrams and check the On/Off tell tail circuit between the Climate Control Module and the touch screen.
B1A59-11	Sensor 5 Volt Supply - Circuit short to ground	▪ 5 volt supply short circuit to ground	**NOTE:** This supply voltage feeds multiple circuits ▪ Refer to the electrical circuit diagrams and check circuits - C1629-2 - C1629-3 - C1629- 4 - C0923-17 - for circuit short to ground
B1A59-12	Sensor 5 Volt Supply - Circuit short to battery	▪ 5 volt supply short circuit to power	**NOTE:** This supply voltage feeds multiple circuits ▪ Refer to the electrical circuit diagrams and check circuits - C1629-2 - C1629-3 - C1629- 4 - C0923-17 - for circuit short to power
B1A61-07	Cabin Temperature Sensor - Mechanical	▪ In vehicle temperature sensor fan motor failure	▪ Sensor is an internal part of the control module. Refer to the warranty policies and

	Failures		procedures before renewing the module/unit
B1A61-49	Cabin Temperature Sensor - Internal electronic failure	▪ In vehicle temperature sensor/motor failure	▪ Sensor is an internal part of the control module. Refer to the warranty policies and procedures before renewing the module/unit
B1A63-12	Right Solar Sensor - Circuit short to battery	▪ Right solar sensor input short circuit to power	▪ Refer to the electrical circuit diagrams and check the sunlight sensor circuit between the Climate Control Module and the sensor. Renew the sensor
B1A63-14	Right Solar Sensor - Circuit short to ground or open	▪ Right solar sensor input short circuit to ground or open	▪ Refer to the electrical circuit diagrams and check the sunlight sensor circuit between the Climate Control Module and the sensor. Renew the sensor
B1A64-12	Left Solar Sensor - Circuit short to battery	▪ Left solar sensor input short circuit to power	▪ Refer to the electrical circuit diagrams and check the sunlight sensor circuit between the Climate Control Module and the sensor. Renew the sensor
B1A64-14	Left Solar Sensor - Circuit short to ground or open	▪ Left solar sensor input short circuit to ground or open	▪ Refer to the electrical circuit diagrams and check the sunlight sensor circuit between the Climate Control Module and the sensor. Renew the sensor
B1B71-11	Evaporator Temperature Sensor - Circuit short to ground	▪ Evaporator sensor input signal short to ground	▪ Refer to the electrical circuit diagrams and check the evaporator sensor circuit. Renew

	short to ground		the sensor
B1B71-15	Evaporator Temperature Sensor - Circuit short to battery or open	▪ Evaporator sensor input signal short to power	▪ Refer to the electrical circuit diagrams and check the evaporator sensor circuit. Renew the sensor
B1B72-12	LIN Bus #1 Power Supply Circuit - Circuit short to battery	▪ LIN BUS power supply circuit short circuit to power	▪ Check the LIN circuits. Refer to the electrical circuit diagrams
B1B72-14	LIN Bus #1 Power Supply Circuit - Circuit short to ground or open	▪ LIN BUS power supply circuit short circuit to ground or open circuit	▪ Check the LIN circuits. Refer to the electrical circuit diagrams
B1C30-11	Disable Switch - Park Aid - Circuit short to ground	▪ Cannot disable parking distance Control ▪ Parking distance Control output signal short to ground	▪ Refer to the electrical circuit diagrams and check the output circuit from the Climate Control unit to the parking distance Control module
B1C30-12	Disable Switch - Park Aid - Circuit short to battery	▪ Cannot disable parking distance Control ▪ Parking distance Control output signal short to power	▪ Refer to the electrical circuit diagrams and check the output circuit from the Climate Control unit to the parking distance Control module
B1C30-13	Disable Switch - Park Aid - Circuit open	▪ Cannot disable parking distance Control ▪ Parking distance Control output signal open circuit	▪ Refer to the electrical circuit diagrams and check the output circuit from the Climate Control unit to the parking distance Control module
Coolant Temperature Sensor - Circuit short to ground	▪ Fuel fired booster heater coolant temperature sensor circuit short circuit to ground	**NOTE:** The fuel fired booster heater assembly	

		ground	contains many serviceable components. It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify this fault ▪ Refer to the electrical circuit diagrams and check the fuel fired booster heater coolant temperature sensor circuit for short circuit to ground. Repair the circuit or install a new coolant temperature sensor located within the fuel fired booster heater as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired	

		booster heater	
B1D22-15	Coolant Temperature Sensor - Circuit short to battery or open	▪ Fuel fired booster heater coolant temperature sensor circuit short circuit to power, open circuit, high resistance	**NOTE:** The fuel fired booster heater assembly contains many serviceable components. It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify this fault ▪ Refer to the electrical circuit diagrams and check the fuel fired booster heater coolant temperature sensor circuit for short circuit to power, open circuit, high resistance. Repair the circuit or install a new coolant temperature sensor located within the fuel fired booster heater as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat

			the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater
B1D23-64	Overheat Sensor - Signal plausibility failure	▪ Fuel fired booster heater internal failure	**NOTE:** Consider whether environmental conditions may have caused this DTC to log before condemning the unit ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new fuel fired booster heater, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A)
B1D24-11	Glow Plug - Circuit short to ground	▪ Fuel fired booster heater glow plug circuit short circuit to ground	**NOTE:** The fuel fired booster heater assembly contains many serviceable components. It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify this fault

			▪ Refer to the electrical circuit diagrams and check the fuel fired booster heater glow plug circuit for short circuit to ground. Repair the circuit or install a new glow plug located within the fuel fired booster heater as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater
B1D24-15	Glow Plug - Circuit short to battery or open	▪ Fuel fired booster heater glow plug circuit short circuit to power, open circuit, high resistance	**NOTE:** The fuel fired booster heater assembly contains many serviceable components. It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify

			this fault ▪ Refer to the electrical circuit diagrams and check the fuel fired booster heater glow plug circuit for short circuit to power, open circuit, high resistance. Repair the circuit or install a new glow plug located within the fuel fired booster heater as necessary. Using the manufacturer approved diagnostic system, clear the DTCs and perform routine - Auxiliary Heater (AHCM) Activation Test (0x900A). This will operate the fuel fired booster heater for 15 minutes. Note that the routine should be started only when the engine is cool. The routine should be performed with the engine running and with the climate controls set to maximum heat and maximum fan. Repeat the routine again if smoke continues to be visible from the fuel fired booster heater exhaust pipe or from the area surrounding the fuel fired booster heater
B1D24-64	Glow Plug - Signal plausibility failure	▪ Fuel fired booster heater glow plug failure	**NOTES:** ▪ The fuel fired booster heater assembly contains many serviceable components. It should NOT

				It should NOT be necessary to replace the entire fuel fired booster heater unit to rectify this fault

GENERAL INFORMATION

DESCRIPTION AND OPERATION

COMPACT DISC PLAYER MODULE (CDP)

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)

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 Compact Disc Player 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
B1D19-71	Compact Disc Unit - Actuator stuck	▪ CD release actuator stuck - mechanism error (jammed)	▪ This DTC may be logged following an unsuccessful attempt to eject the CD magazine. Check for incorrectly loaded discs and that the magazine ejects smoothly. Clear the DTC and test the operation of the unit. If the problem persists, renew the player. Refer to the warranty policy and procedures manual if a

			module is suspect
B1D19-98	Compact Disc Unit - Component or system over temperature	▪ Compact disc unit over-temperature or under-temperature ▪ Recorded temperature below -30 or greater than +80°C.	▪ Consider the environmental conditions before condemning the unit. Allow the unit temperature to stabilize/normalize, clear the DTC and test the operation of the unit. If the problem persists, renew the player. Refer to the warranty policy and procedures manual if a module is suspect
U0184-87	Lost Communication With Radio - Missing message	▪ Media orientated system transport (MOST) communication error detected	▪ Carry out the general media orientated system transport (MOST) test. Refer to the Network Communications section of the workshop manual and in the approved diagnostic system, where available

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

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 in 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	▪ L-Band antenna circuit short to ground	▪ Refer to the electrical guides and check the circuit between the antenna and the tuner module
B11A4-15	L-Band Antenna - Circuit short to battery or open	▪ L-Band antenna circuit short to power or open circuit	▪ Refer to the electrical guides and check the circuit between the antenna and the tuner module
B11A5-11	Band 3 Antenna - Circuit short to ground	▪ Band 3 antenna circuit short to ground	▪ Refer to the electrical guides and check the circuit
B11A5-15	Band 3 Antenna - Circuit short to battery or open	▪ Band 3 antenna circuit short to power or open circuit	▪ Refer to the electrical guides and check the circuit
U3000-04	Control Module - System	▪ Digital audio broadcast module	▪ Renew the control module. Refer to the warranty policy and procedures manual if a module is suspect

	internal failures	internal failure	
U3000-44	Control Module - Data memory failure	▪ Digital audio broadcast module internal RAM memory failure	▪ Renew the control module. Refer to the warranty policy and procedures manual if a module is suspect
U3000-4A	Control Module - Incorrect component installed	▪ Digital audio broadcast module incorrect component installed ▪ 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	▪ Digital audio broadcast module 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	▪ Digital audio broadcast module component or system over temperature	▪ 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 module. Refer to the warranty policy and procedures manual if a module is suspect
U3003-62	Battery Voltage - Signal compare failure	▪ Digital audio broadcast module voltage differs more than ±2V compared to central	▪ 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

		electronics module voltage	

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GENERAL INFORMATION

DESCRIPTION AND OPERATION

DIGITAL AUDIO CONTROL MODULE C (DACMC)

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.

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 Digital Audio Control Module C, 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
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	**NOTE:** This DTC will always be present, due to electrical architecture of vehicle ▪ No repair action is required
U3000-04	Control Module - System internal failures	▪ Diversity antenna amplifier internal failure	▪ Renew the amplifier module
U3000-4A	Control Module -	▪ Diversity antenna	▪ Using the manufacturer approved diagnostic system select the vehicle

	Incorrect component installed	amplifier internal incorrect component installed ▪ The module has been installed to a vehicle not configured to accept it	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

GENERAL INFORMATION

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
- 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 Driver/Passenger Door Module (DDM/PDM). For additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
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
B109D-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 ground

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 ground
B10EB-15	Driver Door Double Locking Motor - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test driver door double locking motor circuit for short to power or open circuit
B10EC-11	Passenger Door Double Locking Motor - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test passenger door double locking motor circuit for short 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
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 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 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
B1163-11	Left Mirror Heater Output Short To Ground - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test left mirror heater output circuit for short to ground

B1163-15	Left Mirror Heater Output Short To Power - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test left mirror heater output circuit for short to power or open circuit
B1164-11	Right Mirror Heater Output Short To Ground - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test right mirror heater output circuit for short to ground
B1164-15	Right Mirror Heater Output Short To 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
B117E-72	Front 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
B117E-	Front Power	▪ Door module	▪ Renew the relevant rear door

73	Window Up - Actuator stuck closed	internal relay sticking closed	module. Refer to the warranty policy and procedures manual if a module is suspect
B117F-72	Front 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
B117F-73	Front 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
B1189-29	Front Window Position Sensor - Signal invalid	▪ Missing signal from hall sensor 1 or 2 ▪ Sensor circuit fault ▪ Hall sensor fault	▪ Refer to the electrical circuit diagrams and check the hall sensor circuit between the door module and window motor. Repair as necessary. If the problem persists, renew the window motor
B118A-29	Rear Window Position Sensor - Signal invalid	▪ Missing signal from hall sensor 1 or 2 ▪ Sensor circuit fault ▪ Hall sensor fault	▪ Refer to the electrical circuit diagrams and check the hall sensor circuit between the door module and window motor. Repair as necessary. If the problem persists, renew the window motor
B1A94-11	Driver Mirror - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test driver mirror fold motor circuit for short to ground
B1A94-15	Driver Mirror - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test driver mirror fold motor circuit for short to power or open circuit
B1A95-11	Passenger Mirror - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test passenger mirror fold motor circuit for short to ground
B1A95-15	Passenger Mirror - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test passenger mirror fold motor circuit for short to power or open circuit

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 test LIN circuit between driver switch pack and DDM for short/open circuits, clear DTC and re-test. If DTC remains install a new switch pack
B1A98-86	LIN Bus Circuit #1 - Signal invalid	▪ Signal Invalid	▪ Refer to the electrical circuit diagrams and test LIN circuit between driver switch pack and DDM for short/open circuits, clear DTC and re-test. If DTC remains install a new switch pack
B1A98-87	LIN Bus Circuit #1 - Missing message	▪ Missing Message	▪ Refer to the electrical circuit diagrams and test LIN circuit between driver switch pack and DDM for short/open circuits, clear DTC and re-test. If DTC remains install a new switch pack
B1C09-11	Driver Left/Right Mirror Motor Circuit - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test driver left/right mirror motor circuit for short to ground
B1C09-15	Driver Left/Right Mirror Motor Circuit - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test driver left/right mirror motor circuit for short to power or open circuit
B1C10-11	Driver Up/Down Mirror Motor Circuit - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test driver up/down mirror motor circuit for short to ground
B1C10-15	Driver Up/Down Mirror Motor Circuit - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test driver up/down mirror motor circuit for short to power or open circuit
B1C11-11	Passenger Left/Right Mirror Motor	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test passenger left/right mirror motor circuit

	Circuit - Circuit short to ground		for short to ground
B1C11-15	Passenger Left/Right Mirror Motor Circuit - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test passenger left/right mirror motor circuit for short to power or open circuit
B1C12-11	Passenger Up/Down Mirror Motor Circuit - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test passenger up/down mirror motor circuit for short to ground
B1C12-15	Passenger Up/Down Mirror Motor Circuit - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test passenger up/down mirror motor circuit for short to power or open circuit
B1C13-11	Driver Up/Down Mirror Motor Feedback Circuit - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test driver up/down mirror motor feedback circuit for short to ground
B1C13-15	Driver Up/Down Mirror Motor Feedback Circuit - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test driver up/down mirror motor feedback circuit for short to power or open circuit
B1C14-11	Driver Left/Right Mirror Motor Feedback Circuit - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test driver left/right mirror motor feedback circuit for short to ground
B1C14-15	Driver Left/Right Mirror Motor Feedback Circuit - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test driver left/right mirror motor feedback circuit for short to power or open circuit
B1C15-11	Passenger Up/Down Mirror Motor Feedback Circuit - Circuit	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test passenger up/down mirror motor feedback circuit for short to ground

	short to ground		
B1C15-15	Passenger Up/Down Mirror Motor Feedback Circuit - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test passenger up/down mirror motor feedback circuit for short to power or open circuit
B1C16-11	Passenger Left/Right Mirror Motor Feedback Circuit - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test passenger left/right mirror motor feedback circuit for short to ground
B1C16-15	Passenger Left/Right Mirror Motor Feedback Circuit - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test passenger left/right mirror motor feedback circuit for short to power or open circuit
C1B14-11	Sensor Supply #1 - Circuit short to ground	▪ Short to ground	▪ Refer to the electrical circuit diagrams and test window sensor supply circuit for short to ground
C1B14-15	Sensor Supply #1 - Circuit short to battery or open	▪ Short to power or open circuit	▪ Refer to the electrical circuit diagrams and test window sensor supply circuit for short to power or open circuit
U0010-00	Medium Speed CAN Communication Bus - No sub type information	▪ Medium speed CAN communication Bus	▪ Carry out network integrity test using manufacturer approved diagnostic system. Refer to electrical circuit diagrams and test Medium speed CAN network for open, short circuit and high resistance
U0140-00	Lost Communication With CJB - No sub type information	▪ Logged when subscribed CAN message missing from CJB	▪ Refer to the electrical circuit diagrams and test power and ground supplies to Central Junction Box. Check CAN network between Driver Door Module and Central Junction Box. Carry out network integrity test using manufacturer approved diagnostic system

U0208-00	Lost Communication With Driver Seat Module (DSM) - No sub type information	▪ Missing message	▪ Refer to the electrical circuit diagrams and test power and ground supplies to Driver Seat Module. Check CAN network between Driver Door Module and Driver Seat Module. Carry out network integrity test using manufacturer approved diagnostic system
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Car configuration file mismatch with vehicle specification	**NOTE:** After updating the car configuration file, set the ignition to on and wait 30 seconds before clearing the DTCs ▪ Using the manufacturer approved diagnostic system, check and up-date the car configuration file as necessary
U2002-24	Switch - Signal stuck high	▪ Signal stuck high	▪ Clear DTC and re-test. If DTC remains, install a new passenger side window switch
U2010-11	Switch Illumination - Circuit short to ground	▪ Circuit short to ground	▪ Carry out CAN network tests using the manufacturer approved diagnostic system
U2010-12	Switch Illumination - Circuit short to battery	▪ Circuit short to power	▪ Carry out CAN network tests using the manufacturer approved diagnostic system
U2012-08	Car Configuration Parameter(s) - Bus Signal/Message Failures	▪ Bus signal/message failures	▪ Cycle the ignition status and re-test. If DTC remains, re-configure the RJB using the manufacturer approved diagnostic system
U2013-24	Switch Pack - Signal stuck high	▪ Signal stuck high	▪ Clear DTC and re-test. If DTC remains, install a new driver side window switch pack
U2014-44	Control Module Hardware - Data memory	▪ Data Memory Failure	▪ Install a new DDM/PDM, refer to the new module installation note at the top of the DTC

	failure		Index
U2100-00	Initial Configuration Not Complete - No sub type information	▪ No sub type information	▪ Re-configure the DDM/PDM using the manufacturer approved diagnostic system
U3000-49	Control Module - Internal electronic failure	▪ Internal electronic failure	▪ Install a new DDM/PDM, refer to the new module installation note at the top of the DTC Index
U3002-55	Vehicle Identification Number (VIN) - Not configured	▪ Not configured	▪ Re-configure the relevant module as new using the manufacturer approved diagnostic system and re-test. If DTC remains install a new module, refer to the new module installation note at the top of 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
U3003-62	Battery Voltage - Signal compare failure	▪ Mis-match of battery voltage, of 2 volts or lower, between DDM/PDM and RJB	▪ Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power and ground supply circuits to both modules

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GENERAL INFORMATION

DESCRIPTION AND OPERATION

DRIVER/PASSENGER FRONT 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 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 Driver Front Seat 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
B105D-11	Seat Bolster Inflate Output - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat bolster circuit
B105D-15	Seat Bolster Inflate Output - Circuit short to battery or open	▪ Circuit short to power or open	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat bolster circuit
B105E-11	Seat Bolster Deflate Output - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat bolster circuit
B105E-15	Seat Bolster Deflate Output - Circuit short to battery or open	▪ Circuit short to power or open	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit

			to the electrical circuit diagrams and check the seat bolster circuit
B105F-11	Seat Cushion Extension Motor Output - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat cushion extension circuit
B105F-15	Seat Cushion Extension Motor Output - Circuit short to battery or open	▪ Circuit short to power or open	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat cushion extension circuit
B1060-11	Seat Headrest Motor Output - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat headrest motor circuit
B1060-15	Seat Headrest Motor Output - Circuit short to battery or open	▪ Circuit short to power or open	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat headrest motor circuit
B1063-31	Seat Cushion Extension Motor Sensor - No signal	▪ Harness/connector problem ▪ No signal from sensor ▪ Sensor/motor malfunction	▪ Check the seat wiring harness/connectors for security/integrity ▪ 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 Sensor - No signal	▪ Harness/connector problem ▪ No signal from sensor ▪ Sensor/motor	▪ Check the seat wiring harness/connectors for security/integrity ▪ Refer to the electrical circuit diagrams and

		▪ Sensor/motor malfunction	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 ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1066-24	Cushion Retract Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1067-24	Lumbar In Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1068-24	Lumbar Out Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1069-24	Lumbar Down Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B106A-24	Lumbar Down Switch -Signal stuck high	▪ Lumbar down switch, faulty or	▪ Check switch operation. Refer to the electrical

		circuit short to power	circuit diagrams and check, lumbar down switch for fault or circuit short to power
B106B-24	Bolster Inflate Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B106C-24	Bolster Deflate Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B106D-24	Headrest Up Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B106E-24	Headrest Down Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1087-83	LIN Bus "A" - Value of signal protection calculation incorrect	▪ LIN bus checksum error ▪ Value of signal protection calculation incorrect ▪ Generic LIN bus failure	▪ Check for other LIN Bus related DTCs. Refer to the electrical circuit diagrams and check the LIN Bus circuit
B1087-	LIN Bus "A" - Signal	▪ Generic LIN bus	▪ Check for other LIN Bus

86	invalid	failure ▪ Signal invalid ▪ LIN bus Bit error / Parity Error /Synch Error	related DTCs. Refer to the electrical circuit diagrams and check the LIN Bus circuit
B1087-87	LIN Bus "A" - Missing message	▪ Generic LIN bus failure ▪ Missing message ▪ Slave not responding or LIN bus short circuit to ground or power	▪ Check for other LIN Bus related DTCs. Refer to the electrical circuit diagrams and check the LIN Bus circuit
B1136-11	Lumbar Control A - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1136-12	Lumbar Control A - Circuit short to battery	▪ Circuit short to power	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1136-13	Lumbar Control A - Circuit open	▪ Circuit open circuit	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1137-11	Lumbar Control B - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1137-12	Lumbar Control B - Circuit short to battery	▪ Circuit short to power	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit

B1137-13	Lumbar Control B - Circuit open	▪ Circuit open circuit	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1138-11	Lumbar Control C - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1138-12	Lumbar Control C - Circuit short to battery	▪ Circuit short to power	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1138-13	Lumbar Control C - Circuit open	▪ Circuit open circuit	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1139-11	Lumbar Control D - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1139-12	Lumbar Control D - Circuit short to battery	▪ Circuit short to power	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B1139-13	Lumbar Control D - Circuit open	▪ Circuit open circuit	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit

B113A-00	General Failure on Seat Lumbar - No sub type information	▪ No sub type information	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B113B-00	Lumbar Control Multiple Failures - No sub type information	▪ No sub type information	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the lumbar control circuit
B131C-11	Rear Seat Recline Motor Relay Control - Circuit short to ground	▪ Related internal feedback line not set while output is activated. Output is protected ▪ Rear seat recline motor circuit short to ground	▪ Refer to the electrical circuit diagrams and check rear seat recline motor circuit for short to ground. Check and install a new rear seat recline motor relay as required
B131C-15	Rear Seat Recline Motor Relay Control - Circuit short to battery or open	▪ Related internal feedback line not set while output is activated. Output is protected ▪ Rear seat recline motor circuit short to power, open circuit	▪ Refer to the electrical circuit diagrams and check rear seat recline motor circuit for short to power, open circuit. Check and install a new rear seat recline motor relay as required
B131D-31	Rear Seat Recline Motor Speed/ Position Sensor - No signal	▪ Harness/connector problem ▪ No signal from sensor ▪ Sensor/motor malfunction	▪ Check the rear seat wiring harness/connectors for security/integrity ▪ Refer to the electrical circuit diagrams and check the rear seat recline motor sensor circuit. Repair circuit as required. Clear DTC and retest
B1332-87	Drivers Side Rear Seat Switch Pack - Missing message	▪ Slave not responding ▪ LIN bus short circuit to ground, short to power	▪ Refer to electrical circuit diagrams and test LIN Bus between passengers side rear seat switch-pack and control module for open circuit, short to

			open circuit, short to power or ground. Check power and ground supplies to switch-pack
B1333-02	Passengers Side Rear Seat switch-pack - General signal failure	▪ Switch status (on/off). Switch detected as active for more than 30sec	▪ Check switch-pack for inadvertently pressed or stuck buttons. Check and install a new passengers side rear seat switch-pack as required
B1333-87	Passengers Side Rear Seat switch-pack - Missing message	▪ Slave not responding ▪ LIN bus short circuit to ground, short to power	▪ Refer to electrical circuit diagrams and test LIN Bus between passengers side rear seat switch-pack and control module for open circuit, short to power or ground. Check power and ground supplies to switch-pack
B1B86-11	Seat Height Motor Relay - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat height motor circuit
B1B86-15	Seat Height Motor Relay - Circuit short to battery or open	▪ Circuit short to power or open	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat height motor circuit
B1B87-31	Seat Height Motor Speed/Position Sensor - No signal	▪ Harness/connector problem ▪ No signal from sensor ▪ Sensor/motor malfunction	▪ Check the seat wiring harness/connectors for security/integrity ▪ 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	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat slide motor relay

			circuit
B1B88-15	Seat Slide Motor Relay - Circuit short to battery or open	▪ Circuit short to power or open circuit	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat slide motor relay circuit
B1B89-31	Seat Slide Motor Speed/Position Sensor - No signal	▪ Harness/connector problem ▪ No signal from sensor ▪ Sensor/motor malfunction	▪ Check the seat wiring harness/connectors for security/integrity ▪ 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	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat tilt motor relay circuit
B1B90-15	Seat Tilt Motor Relay - Circuit short to battery or open	▪ Circuit short to power or open circuit	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat tilt motor relay circuit
B1B91-31	Seat Tilt Motor Speed/Position Sensor - No signal	▪ Harness/connector problem ▪ No signal from sensor ▪ Sensor/motor malfunction	▪ Check the seat wiring harness/connectors for security/integrity ▪ 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	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit

			to the electrical circuit diagrams and check the seat recline motor relay circuit
B1B92-15	Seat Recline Motor Relay - Circuit short to battery or open	▪ Circuit short to power or open circuit	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat recline motor relay circuit
B1B93-31	Seat Recline Motor Speed/Position Sensor - No signal	▪ Harness/connector problem ▪ No signal from sensor ▪ Sensor/motor malfunction	▪ Check the seat wiring harness/connectors for security/integrity ▪ 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 ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1B95-24	Seat Height Down Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1B96-24	Seat Slide Forward Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1B97-	Seat Slide Backward	▪ Signal stuck high	▪ Check the switch

24	Switch - Signal stuck high	▪ Switch malfunction	function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1B98-24	Seat Tilt Up Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1B99-24	Seat Tilt Down Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1C00-24	Seat Recline Up Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1C01-24	Seat Recline Down Switch - Signal stuck high	▪ Seat recline down switch, faulty or circuit short to power	▪ Check switch operation. Refer to the electrical circuit diagrams and check, seat recline down switch for fault or circuit short to power
B1C02-24	Memory Store Switch - Signal stuck high	▪ Memory store switch, faulty or circuit short to power	▪ Check switch operation. Refer to the electrical circuit diagrams and check, memory Store switch for fault or circuit short to power
B1C03-24	Memory #1 Switch - Signal stuck high	▪ Memory #1 switch, faulty or circuit short to	▪ Check switch operation. Refer to the electrical circuit diagrams and

		circuit short to power	circuit diagrams and check, memory #1 switch for fault or circuit short to power
B1C04-24	Memory #2 Switch - Signal stuck high	▪ Memory #2 switch, faulty or circuit short to power	▪ Check switch operation. Refer to the electrical circuit diagrams and check, memory #2 switch for fault or circuit short to power
B1C05-24	Memory #3 Switch - Signal stuck high	▪ Memory #3 switch, faulty or circuit short to power	▪ Check switch operation. Refer to the electrical circuit diagrams and check, memory #3 switch for fault or circuit short to power
B1C10-24	Seat Recline Down Switch - Signal stuck high	▪ Signal stuck high ▪ Switch malfunction	▪ Check the switch function. Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the switch circuit
B1D94-11	Lumbar Motor Relay - Circuit short to ground	▪ Circuit short to ground	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat lumbar motor relay circuit
B1D94-15	Lumbar Motor Relay - Circuit short to battery or open	▪ Circuit short to power or open circuit	▪ Check the seat wiring harness/connectors for security/integrity. Refer to the electrical circuit diagrams and check the seat lumbar motor relay circuit
U0010-88	Medium speed CAN Communication Bus - Bus off	▪ CAN signal fault ▪ Possible open circuit ▪ Faulty Control 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
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 Seat Module
U0142-00	Lost Communication With Body Control Module "B" - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the 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 Seat 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 Seat Module
U0199-00	Lost Communication With "Door Control Module A" - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to

			the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Driver Door Module and Seat Module
U0209-00	Lost Communication With Seat Control Module B - No sub type information	▪ Power supply fault ▪ Wiring harness fault	▪ No passenger's seat climate functionality. 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 passenger's seat control module and the Touch Screen Display Control Module. Refer to the electrical circuit diagrams and check the power and ground connections to the passenger's seat control module
U0300-00	Software Incompatibility - No sub type information	▪ No sub type information	▪ Check the module configuration using the approved diagnostic system. Check that the module software versions are the latest release and update as necessary
U1A14-49	CAN Initialization Failure - Internal electronic failure	▪ Internal electronic failure	▪ Suspect the driver seat module, check and install a new module as required, refer to the Warranty Policy and Procedures manual if a module is suspect
U1A4C-00	Build / End of Line mode Active - No sub type information	▪ Vehicle configuration incorrect	▪ Check the module configuration using the approved diagnostic system
U2100-	Initial Configuration	▪ Incorrect Car	▪ Check Car Configuration

00	Not Complete - No sub type information	Configuration File (CCF)	File (CCF) is correct. Ensure all the correct seat options are enabled/disabled as required. Clear the DTC and re-test. Clear the DTC and re-test
U2101-00	Control Module Configuration Incompatible - No sub type information	▪ Incorrect Car Configuration File (CCF)	▪ Check Car Configuration File (CCF) is correct. Ensure all the correct seat options are enabled/disabled as required. Clear the DTC and re-test. Clear the DTC and re-test
U3000-49	Control Module - Internal electronic failure	▪ Internal electronic failure ▪ Internal RAM/ROM error	▪ Renew the Control module. Refer to the Warranty Policy and Procedures manual if a module is suspect
U3001-46	Control Module Improper Shutdown - Calibration/parameter memory failure	▪ Event information	▪ DTC for information only. Clear the DTC and retest. If the problem persists, renew the module. Refer to the warranty policies and procedures before renewing a control module
U3002-81	Vehicle Identification Number - Invalid serial data received	▪ Invalid serial data received	▪ Configure the module using the manufacturers approved diagnostic system
U3003-16	Battery Voltage - Circuit voltage below threshold	▪ Battery voltage below threshold (8 volts)	▪ 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 supply circuits to the module
U3003-17	Battery Voltage - Circuit voltage above threshold	▪ Battery voltage above threshold	▪ Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the

			electrical circuit diagrams and check the power supply circuits to the module

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

DESCRIPTION AND OPERATION

DUAL VIEW TOUCH SCREEN (FEM)

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 Dual View Touch Screen (FEM). 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

For additional information, refer to: Information and Entertainment System (415-00, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B100F-25	Video Input "B" - Signal shape/waveform failure	▪ Rear proximity camera video input disconnected ▪ Camera malfunction	▪ Check the video signal connection and whether it is being broadcasted. Where available, configure the rear/proximity cameras using the approved diagnostic system. Check whether the rear/proximity cameras are broadcasting an image by entering touch screen diagnostics selecting 'Video Input Test' then press 'Rear View/Proximity Camera'. Check whether a clear image is displayed. Refer to the electrical circuit diagrams and check the video signal circuit between the rear/proximity cameras and the camera control module ▪ If the problem persists, renew the camera or cameras. Clear the DTC and perform an on demand self test
B1010-25	Video Input "C" - Signal shape/waveform failure	▪ Television/Rear seat entertainment video input disconnected ▪ TV/DVD malfunction	▪ Check the video signal connection and whether it is being broadcasted. Where available, configure the TV or DVD using the manufacturers approved diagnostic system. Check whether the TV or rear seat entertainment module (RSE) is broadcasting an image by entering diagnostics selecting 'Video Input Test' then press 'TV/DVD'. Check whether a clear image is displayed. Refer to the electrical circuit diagrams and check the video signal circuit from the TV or rear seat entertainment (RSE) module ▪ If the problem persists,

			renew the television or rear seat entertainment module (RSE) or DVD 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
B108E-14	Display - Circuit short to ground or open	▪ Internal display circuit short circuit to ground, open circuit	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. If the DTC persists contact dealer technical support (DTS)
B108E-17	Display - Circuit voltage above threshold	▪ Internal display circuit short circuit to ground, open circuit	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. If the DTC persists contact dealer technical support (DTS)
B108E-1C	Display - Circuit voltage out of range	▪ Internal display circuit short circuit to ground, open circuit	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. If the DTC persists contact dealer technical support (DTS)
B108E-87	Display - Missing message	▪ Display communication failure	▪ Clear the DTC and switch off the ignition. Allow sufficient time for the infotainment relay to power down and retest. If DTC persists reprogram the front entertainment module (FEM)
B108E-88	Display - Bus off	▪ Bus off ▪ Front entertainment module (FEM) internal failure	▪ Clear the DTC and switch off the ignition. Allow sufficient time for the infotainment relay to power down and retest. If DTC persists renew the front entertainment module (FEM). Refer to the warranty policy and

			procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B119F-11	GPS Antenna - Circuit short to ground	▪ Global Positioning System (GPS) antenna circuit short circuit to ground	▪ Check the global positioning system (GPS) [blue] connector to the front entertainment module (FEM) for security and integrity. Check that the GPS antenna is not damaged. Refer to the electrical circuit diagrams and check the circuit between the GPS antenna and the front entertainment module (FEM). Test the GPS outside in open space for more than 2 minutes after power on. Enter touch screen diagnostics and select 'Next', 'Vehicle Information' then 'GPS Information'. Check that HDOP is less than 5 and GPS satellites show more than 4 'P's
B119F-13	GPS Antenna - Circuit open	▪ Antenna circuit open circuit ▪ Antenna not connected	▪ Check the global positioning system (GPS) [blue] connector to the front entertainment module (FEM) for security and integrity. Check that the GPS antenna is not damaged. Refer to the electrical circuit diagrams and check the circuit between the GPS antenna and the front entertainment module (FEM). Test the GPS outside in open space for more than 2 minutes after power on. Enter touch screen diagnostics and select 'Next', 'Vehicle Information' then 'GPS Information'. Check that HDOP is less than 5 and GPS satellites show more than 4 'P's

B11A3-49	Gyroscope - Internal electronic failure	▪ Internal gyroscope failure	▪ Enter touch screen diagnostics and select 'Next', 'Vehicle information' then 'Vehicle sensor'. Check that the Gyro sensor voltage is around 2500mV when stationary, but changes along the bearing when the car is moving while turning the steering wheel. If the Gyro sensor voltage or bearing does not change when the car is moving while turning the steering wheel renew the front entertainment module (FEM). Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B121B-13	Keypad Input Switch - Circuit open	▪ Touch screen display input key circuit open circuit ▪ Touch screen display input key fault	▪ Check whether the input keys are working by entering the touch screen diagnostics and selecting 'Hard Key Test'. If one or more of the input keys do not respond (except audio off) renew the front entertainment 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
B121C-13	Hard Drive - Circuit open	▪ Module internal hard drive open circuit/not connected	▪ Check whether the Hard Drive is connected by entering the touch screen diagnostics selecting 'Next' then 'HDD Information'. Check that the hard drive serial number, operating time and model name appear. If the SMART test fails 'NG' renew the front entertainment module

			(FEM). Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B121C-44	Hard Drive - Data memory failure	▪ Internal hard drive data memory failure	▪ Check whether the Hard Drive is connected by entering the touch screen diagnostics selecting 'Next' then 'HDD Information'. Check that the hard drive serial number, operating time and model name appear. If the SMART test fails 'NG' renew the front entertainment module (FEM). Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B1D55-14	Antenna #2 - Circuit short to ground or open	**NOTE:** - This DTC is always set after the On Demand Self Test (ODST) has been run. Ignore this DTC, if this is the only DTC set ▪ Antenna disconnected ▪ Antenna circuit short circuit to ground ▪ Antenna circuit open circuit	▪ Check that the traffic message (TMC) connector is connected to the Dual View Touch Screen and the TMC antenna or circuit is not damaged. Where an approved diagnostic system is available, enter diagnostics and select 'RDS-TMC Information'. Check the date/time and frequency is shown
B1D56-14	Antenna #3 - Circuit short to	▪ Vehicle information	▪ Enter touch screen

14	Circuit short to ground or open	and communication antenna (VICS) disconnected ▪ Vehicle information and communication antenna (VICS) circuit short circuit to ground, open circuit	diagnostics and select 'Next', 'Vehicle information', 'VICS' then 'Radio Wave Beacon' and 'Infrared beacon'. Check that Time and Beacon number data are shown. Check that the vehicle information and communication system (VICS) antenna or circuit is not damaged ▪ Refer to the electrical circuit diagrams and check the circuit between the vehicle information and communication system (VICS) antenna and the front entertainment module (FEM) for short to ground, open circuit
U1A01-56	Communication Link - Invalid/incomplete configuration	▪ Internal communication failure	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. If the DTC persists reprogram the front entertainment module (FEM) ▪ If DTC still persists renew the front entertainment 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
U1A4B-82	Control Module Processor B - Alive/sequence counter incorrect / not updated	▪ Internal communication failure	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. Enter touch screen diagnostics and select 'Configurations'. Check that the vehicle type is displayed and the sub CPU SW version are shown. If the DTC persists reprogram the front entertainment module (FEM). Refer to the

			warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U1A4B-87	Control Module Processor B - Missing message	▪ Internal communication failure	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. Re-configure the front entertainment module (FEM) using the manufacturers approved diagnostic system ▪ If DTC persists renew the front entertainment module (FEM). Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U2005-62	Vehicle Speed - Signal compare failure	▪ Vehicle speed and calculated GPS system vehicle speed mismatch ▪ Vehicle speed signal circuit between Anti-Lock Braking (ABS) Module and Navigation System Module (NAV) short to ground, short to power	▪ Check the Anti-Lock Braking (ABS) Module connector and wiring harness. Using the manufacturer approved diagnostic system, enter diagnostics and select 'Vehicle Signals'. Check that the vehicle speeds both increase when the car is moving ▪ Refer to the electrical circuit diagrams and check vehicle speed signal circuit between the Anti-Lock Braking (ABS) Module and Navigation System Module (NAV) for short to ground, short to power, open circuit
U2101-00	Control Module Configuration Incompatible - No sub type information	▪ Car configuration file (CCF) parameter mismatch ▪ Invalid/incomplete configuration	▪ Enter touch screen diagnostics and select ‘Self Test’ and wait for the test results to complete. The car configuration file (CCF) mismatch parameter(s) will

			be listed in the description with DTC 'U210100'. The car configuration file (CCF) parameters values for Brand, HLDF, MMMType, Navigation, MMMJapan, MMMFitted, MMMVariant, NavRegion, MMM3, VICS, GPSReceiver, Intercom, ParkingAidDisplay, HandOfDrive or AmbientLight can be found by entering the touch screen diagnostics 'Vehicle Configurations' and pressing 'Next' until the parameter is shown. Contact dealer technical support (DTS) reporting the Car Configuration (CCF) parameter name and value ▪ Contact dealer technical support to assist in re-configuring the car configuration file (CCF) using the manufacturers approved diagnostic system. Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down
U2101-4A	Control Module Configuration Incompatible - Incorrect component installed	▪ Navigation map license mismatch ▪ Invalid/incomplete configuration	**NOTE:** - If multiple maps are installed clear the DTC. No further action is required ▪ If the map screen is not shown after entering diagnostics and pressing 'I Agree' then start routine 0x6024 'Update Map Configuration' with option 0x03. Allow 30 seconds for the routine to complete before entering the map screen. If a map screen is still not shown contact dealer technical support (DTS) ▪ Enter the navigation menu

			▪ Enter the navigation menu and select 'Map changer'. Check that the map regions match the front entertainment module market. The car configuration file parameters values for Map Configuration can be found by entering the touch screen diagnostics ‘Vehicle Configurations’ and pressing ‘Next’ until the parameter is shown. Contact dealer technical support (DTS) to assist in re-configuring the car configuration file (CCF) for the map market using the manufacturers approved diagnostic system. Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down
U210A-85	Temperature Sensor - Signal above allowable range	▪ Front entertainment module (FEM) over temperature ▪ Interior cabin over heating	▪ Cool the vehicle interior down by ensuring it is in the shade and have the A/C on cool. Enter touch screen diagnostics and select 'Vehicle Signals'. Check the media orientated system transport (MOST) FOT temperature ▪ When cool, clear the DTC and retest
U3003-17	Battery Voltage - Circuit voltage above threshold	▪ Battery voltage above 16 volts	▪ 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 supply circuits to the module

GENERAL INFORMATION

DESCRIPTION AND OPERATION

ENGINE CONTROL MODULE (PCM) - 5.0L

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

P0562-00System Voltage Low - No sub type information

NOTE:

- Circuit BATTERY -

- Battery circuit high resistance

- Battery circuit high resistance
- Generator circuit open circuit, high resistance
- Generator failure

- Refer to the electrical circuit diagrams and check battery circuit for high resistance
- Refer to the electrical circuit diagrams and check generator circuit for open circuit, high resistance
- Check and install a new generator as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component

P0572-17Brake Switch A Circuit Low - Circuit voltage above threshold

NOTE:

- Circuit BRAKE_SW -

- Brake switch 2 sense circuit short circuit to ground
- Brake switch incorrectly installed/adjusted
- Customer is driving with foot resting on brake pedal
- Brake switch 2 failure

- Refer to the electrical circuit diagrams and check brake switch 2 circuit for short circuit to ground
- Check brake switch is correctly installed and adjusted
- Ensure customer is not driving with foot resting on brake pedal
- Check and install a new brake switch as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component

Internal Control Module Memory Check Sum Error - Special memory failure

DTC	DESCRIPTION	POSSIBLE CAUSES	A

B10A2-31	Crash Input - No signal	**NOTE:** - Circuit SRS_SIGNAL - ▪ Loss of communication between restraints control module and engine control module	▪ Refer to circuit c check re module modula line circ connect engine and res module to grou to powe Repair c require and ret
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 th press al wheel s check fo the elec diagram speed c circuit f short ci short ci disconn ▪ Check a steering as requ warrant proced determi approva in opera the inst module
B10AC-82	Cruise Control Switch - Alive / sequence counter incorrect / not updated	▪ Cruise buttons alive counter is not incrementing. Which suggests that the LIN bus is faulty ▪ Steering wheel module is not connected ▪ Steering wheel module failure	▪ Refer to circuit c check th switch c circuit, s power, ground, ▪ Refer to circuit c check th betwee module gatewa ▪ Check a steering

			as requ warrant procedu determi approva in opera the inst module
B10AC-83	Cruise Control Switch - Value of signal protection calculation incorrect	▪ Cruise buttons checksum incorrect, incorrect cruise switches fitted to vehicle	▪ Check a cruise s require warrant procedu determi approva in opera the inst module
B10AC-96	Cruise Control Switch - Component internal failure	▪ Speed control switch circuit, open circuit, short circuit to power, short circuit to ground, disconnected ▪ Speed control switch failure ▪ Steering wheel module failure	▪ Check f in other boxes ▪ Refer to circuit d check th switch c circuit, s power, ground, ▪ Check a speed c require install a wheel n require warrant procedu determi approva in opera the inst module
B10FF-68	Ignition Control - Event information	▪ Spark plug(s) fault ▪ Wiring harness fault ▪ Ignition coil(s) fault	▪ Refer to and che for con security defectiv as requ ▪ Refer to diagram ignition intermit

			circuit, power, ground ▪ Check a coil(s) a to the v and pro or dete approva in opera the inst module
B11DB-01	Battery Monitoring Module - General electrical failure	**NOTE:** - Circuit BATTERY - ▪ Charging system fault ▪ Battery monitoring signal line circuit fault ▪ Vehicle battery fault	▪ Refer to diagram chargin faults. F repairs ▪ Refer to wiring c check th monitor module circuit, ground, power ▪ Refer to manual care ma vehicle ensure and ser perform
B11DB-87	Battery Monitoring Module - Missing message	**NOTE:** - Circuit BATTERY - ▪ Battery signal line circuit fault	▪ Refer to wiring c check th monitor module circuit, ground, power ▪ Refer to circuit c check th short ci short ci open ci
B1206-68	Crash Occurred - Event information	**NOTE:**	▪ Refer to circuit c check th

		- Circuit SRS_SIGNAL - ▪ Engine control module has detected the vehicle has crashed - event information DTC only	control restrain module circuit t circuit t circuit. require and ret
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 a system related to relev
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 a system related to relev
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 a system related to relev
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 a system related to relev
P0010-13	Intake (A) Camshaft Position Actuator (Bot 1) - Circuit open	**NOTE:** - Circuit VFS_IN_A - ▪ Intake (A) camshaft position actuator (Bank 1) open circuit ▪ Engine control module interface harness open circuit	▪ Refer to circuit d check in camsha actuato for ope ▪ Refer to circuit d check e module harness
P0011-00	Intake (A) Camshaft Position Timing - Over-Advanced (Bank 1) - No sub type information	**NOTE:** - Circuit VFS_IN_A - ▪ Intake (A) camshaft position actuator (Bank 1) open circuit ▪ Engine control module interface harness	▪ Refer to circuit d check in camsha actuato for ope ▪ Refer to circuit d check e module

		open circuit	harness
P0013-13	Exhaust (B) Camshaft Position Actuator (Bank 1) - Circuit open	**NOTE:** - Circuit VFS_EX_A - ▪ Exhaust (B) camshaft position actuator (Bank 1) open circuit ▪ Engine control module interface harness open circuit	▪ Refer to circuit c check e camsha actuato for ope ▪ Refer to circuit c check e module harness
P0015-00	Exhaust (B) Camshaft Position Timing - Over-Retarded (Bank 1) - No sub type information	**NOTE:** - Circuit VFS_EX_A - ▪ Exhaust (B) camshaft position actuator (Bank 1) open circuit, short circuit to ground, short circuit to power	▪ Check f P0365-(electric diagram exhaust position 1) for o circuit t circuit t
P0016-00	Crankshaft Position - Camshaft Position Correlation - Bank 1 Sensor A - No sub type information	**NOTE:** Circuit VFS_IN_A - ▪ The relative positions of the crankshaft position sensor and cam timing plate teeth are not correct ▪ Engine timing incorrect ▪ Timing chain installed incorrectly ▪ Variable valve timing forced fully advanced	▪ Check e Check c timing p correctl chain is correctl
P0017-00	Crankshaft Position - Camshaft Position Correlation - Bank 1 Sensor B - No sub type information	**NOTE:** Circuit VFS_EX_A - ▪ The relative positions of the crankshaft position sensor and camshaft timing plate teeth are not correct ▪ Engine timing incorrect ▪ Timing chain installed incorrectly	▪ Check f P0365-(timing. sensor t installe Check t installe ▪ Refer to circuit c check e camsha actuato open ci

		▪ Variable valve timing forced fully advanced	circuit t circuit t
P0018-00	Crankshaft Position - Camshaft Position Correlation - Bank 2 Sensor A - No sub type information	**NOTE:** - Circuit VFS_IN_B - ▪ The relative positions of the crankshaft position sensor and camshaft timing plate teeth are not correct ▪ Engine timing incorrect ▪ Timing chain installed incorrectly ▪ Variable valve timing forced fully advanced	▪ Check e Check c timing p correctl chain is correctl
P0019-00	Crankshaft Position - Camshaft Position Correlation - Bank 2 Sensor B - No sub type information	**NOTE:** - Circuit VFS_EX_B - ▪ The relative positions of the crankshaft position sensor and camshaft timing plate teeth are not correct ▪ Engine timing incorrect ▪ Timing chain installed incorrectly ▪ Variable valve timing forced fully advanced	▪ Check e Check c timing p correctl chain is correctl
P001A-13	Intake (A) Cam Profile Control Circuit (Bank 1) - Circuit open	**NOTE:** - Circuit CPS_A - ▪ Camshaft profile switching solenoid bank 1 open circuit	▪ Refer to circuit c check c switchir 1 for op
P001B-11	Intake (A) Cam Profile Control Circuit Low (Bank 1) - Circuit short to ground	**NOTE:** - Circuit CPS_A - ▪ Camshaft profile switching solenoid bank 1 circuit short circuit to ground	▪ Refer to circuit c check c switchir 1 circuit to grou

P001C-12	Intake (A) Cam Profile Control Circuit High (Bank 1) - Circuit short to battery	**NOTE:** - Circuit CPS_A - ▪ Camshaft profile switching solenoid bank 1 circuit short circuit to power	▪ Refer to circuit c check c switchin 1 circuit to powe
P001D-13	Intake (A) Cam Profile Control Circuit (Bank 2) - Circuit open	**NOTE:** - Circuit CPS_B - ▪ Camshaft profile switching solenoid bank 2 open circuit	▪ Refer to circuit c check c switchin 2 for op
P001E-11	Intake (A) Cam Profile Control Circuit Low (Bank 2) - Circuit short to ground	**NOTE:** - Circuit CPS_B - ▪ Camshaft profile switching solenoid bank 2 circuit short circuit to ground	▪ Refer to circuit c check c switchin 2 circuit to grou
P001F-12	Intake (A) Cam Profile Control Circuit High (Bank 2) - Circuit short to battery	**NOTE:** - Circuit CPS_B - ▪ Camshaft profile switching solenoid bank 2 circuit short circuit to power	▪ Refer to circuit c check c switchin 2 circuit to powe
P0020-13	Intake (A) Camshaft Position Actuator (Bank 2) - Circuit open	**NOTE:** - Circuit VFS_IN_B - ▪ Intake valve solenoid 2 open circuit	▪ Refer to circuit c check in solenoi circuit
P0023-13	Exhaust (B) Camshaft Position Actuator (Bank 2) - Circuit open	**NOTE:** - Circuit VFS_EX_B -	▪ Refer to circuit c check e camsha actuato for ope

		▪ Exhaust (B) Camshaft Position actuator (Bank 2) circuit, open circuit	
P0026-72	Intake Valve Control Solenoid Circuit Range/Performance (Bank 1) - Actuator stuck open	**NOTE:** - Circuit VFS_IN_A - ▪ Intake valve solenoid 1 angle less than target ▪ Intake valve solenoid 1 slow or not operating	▪ Check c intake v Check a intake v as requ warrant proced determi approva in opera the inst module
P0026-77	Intake Valve Control Solenoid Circuit Range/Performance (Bank 1) - Commanded position not reachable	**NOTE:** - Circuit VFS_IN_A - ▪ Intake valve solenoid 1 angle greater than target ▪ Intake valve solenoid 1 not returning to target in time ▪ Intake valve solenoid 1 stuck advanced	▪ Check c intake v Check a intake v as requ warrant proced determi approva in opera the inst module
P0027-72	Exhaust Valve Control Solenoid Circuit Range/Performance (Bank 1) - Actuator stuck open	**NOTE:** - Circuit VFS_EX_A - ▪ Exhaust valve solenoid 1 angle less than target ▪ Exhaust valve solenoid 1 slow or not operating	▪ Check c exhaust 1. Chec new exh solenoi Refer to policy a manual, any pric progra operati installat module
P0027-77	Exhaust Valve Control Solenoid Circuit Range/Performance (Bank 1) - Commanded position not reachable	**NOTE:** - Circuit VFS_EX_A - ▪ Exhaust valve solenoid 1 angle greater than target	▪ Check c exhaust 1. Chec new exh solenoi Refer to policy a manual, any pric

		▪ Exhaust valve solenoid 1 not returning to target in time ▪ Exhaust valve solenoid 1 stuck advanced	progra operati installat module
P0028-72	Intake Valve Control Solenoid Circuit Range/Performance (Bank 2) - Actuator stuck open	**NOTE:** - Circuit VFS_IN_B - ▪ Intake valve solenoid 2 angle less than target ▪ Intake valve solenoid 2 slow or not operating	▪ Check c intake v Check a intake v as requ warrant proced determi approva in opera the inst module
P0028-77	Intake Valve Control Solenoid Circuit Range/Performance (Bank 2) - Commanded position not reachable	**NOTE:** - Circuit VFS_IN_B - ▪ Intake valve solenoid 2 angle greater than target ▪ Intake valve solenoid 2 not returning to target in time ▪ Intake valve solenoid 2 stuck advanced	▪ Check c intake v Check a intake v as requ warrant proced determi approva in opera the inst module
P0029-72	Exhaust Valve Control Solenoid Circuit Range/Performance (Bank 2) - Actuator stuck open	**NOTE:** - Circuit VFS_EX_B - ▪ Exhaust valve solenoid 2 angle less than target ▪ Exhaust valve solenoid 2 slow or not operating	▪ Check c exhaust 2. Chec new exh solenoi Refer to policy a manual, any pric progra operati installat module
P0029-77	Exhaust Valve Control Solenoid Circuit Range/Performance (Bank 2) - Commanded position not reachable	**NOTE:** - Circuit VFS_EX_B - ▪ Exhaust valve solenoid 2 angle greater than target	▪ Check c exhaust 2. Chec new exh solenoi Refer to policy a manual,

		▪ Exhaust valve solenoid 2 not returning to target in time ▪ Exhaust valve solenoid 2 stuck advanced	any pric progra operati installat module
P0031-11	HO2S Heater Control Circuit Low (Bank 1, Sensor 1) - Circuit short to ground	**NOTES:** ▪ - Circuit HTR_CTRL_A_UPSTREAM - ▪ LR - Circuit UHEGO HEATER A - ▪ Pre catalyst oxygen sensor-odd heater control circuit (Bank 1, Sensor 1) circuit short circuit to ground	▪ Using th approve system datalog Oxygen Heater 1 Sensc ▪ Refer to circuit c check p oxygen heater c (Bank 1 for shor ground
P0031-13	HO2S Heater Control Circuit Low (Bank 1, Sensor 1) - Circuit open	**NOTES:** ▪ - Circuit HTR_CTRL_A_UPSTREAM - ▪ LR - Circuit UHEGO HEATER A - ▪ Pre catalyst oxygen sensor-odd heater control circuit (Bank 1, Sensor 1) circuit, open circuit	▪ Using th approve system datalog Oxygen Heater 1 Sensc ▪ Refer to circuit c check p oxygen heater c (Bank 1 for ope
P0032-12	HO2S Heater Control Circuit High (Bank 1, Sensor 1) - Circuit short to battery	**NOTES:** ▪ - Circuit HTR_CTRL_A_UPSTREAM - ▪ LR - Circuit UHEGO HEATER A - ▪ Pre catalyst oxygen sensor-odd heater control circuit (Bank 1, Sensor 1) circuit short circuit to power	▪ Using th approve system datalog Oxygen Heater 1 Sensc ▪ Refer to circuit c check p oxygen heater c (Bank 1 for shor power

P0036-00	HO2S Heater Control Circuit (Bank 1, Sensor 2) - No sub type information	**NOTE:** - Circuit HTR_HEGO_A - ▪ Catalyst oxygen sensor heater circuit control fuse failure ▪ Post catalyst oxygen sensor-odd heater control circuit short circuit to ground, short circuit to power, open circuit ▪ Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit ▪ Catalyst oxygen sensor heater circuit control relay failure ▪ Post catalyst oxygen sensor-odd failure	▪ Using th approve system datalog Oxygen Heater 1 Senso ▪ Refer to circuit d check p oxygen sensor f circuit ▪ Refer to circuit d check p oxygen sensor d circuit t circuit t circuit ▪ Refer to circuit d check c sensor h control short ci short ci open ci ▪ Check a catalyst heater d required install a catalyst odd as to the v and pro or dete approva in opera the inst module
P003C-00	A Camshaft Profile Control Performance /Stuck Off (Bank 1) - No sub type information	**NOTE:** - Circuit CPS_A - ▪ Oil supply blockage to camshaft profile switching solenoid ▪ Catalyst oxygen sensor failure, giving false	▪ Check f of oil at profile s solenoi ▪ Check f oxygen DTCs ▪ Refer to circuit d

			flag ▪ Camshaft profile switching solenoid bank 1 circuit fault ▪ Camshaft profile switching solenoid bank 1 fault	check c switchir 1 circuit to powe to grou ▪ Check a camsha switchir 1 as rec the war proced determi approva in opera the inst module ▪ Clear D the veh remains technic before further
	P003E-00	A Camshaft Profile Control Performance/ Stuck Off (Bank 2) - No sub type information	**NOTE:** - Circuit CPS_B - ▪ Oil supply blockage to camshaft profile switching solenoid ▪ Catalyst oxygen sensor failure, giving false flag ▪ Camshaft profile switching solenoid bank 2 circuit fault ▪ Camshaft profile switching solenoid bank 2 fault	▪ Check f of oil at profile s solenoi ▪ Check f oxygen DTCs ▪ Refer to circuit c check c switchir 2 circuit to powe to grou ▪ Check a camsha switchir 2 as rec the war proced determi approva in opera the inst module ▪ Clear D the veh remains technic before further

P0051-11	HO2S Heater Control Circuit Low (Bank 2, Sensor 1) - Circuit short to ground	**NOTES:** - Circuit HTR_CTRL_B_UPSTREAM - LR - Circuit UHEGO HEATER B - Pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit short circuit to ground	Using th approve system datalog Oxygen Heater 2 Senso Refer to circuit c check p oxygen heater c (Bank 2 for shor ground
P0051-13	HO2S Heater Control Circuit Low (Bank 2, Sensor 1) - Circuit open	**NOTES:** - Circuit HTR_CTRL_B_UPSTREAM - LR - Circuit UHEGO HEATER B - Pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit, open circuit	Using th approve system datalog Oxygen Heater 2 Senso Refer to circuit c check p oxygen heater c (Bank 2 for ope
P0052-12	HO2S Heater Control Circuit High (Bank 2, Sensor 1) - Circuit short to battery	**NOTES:** - Circuit HTR_CTRL_B_UPSTREAM - LR - Circuit UHEGO HEATER B - Pre catalyst oxygen sensor-even heater control circuit (Bank 2, Sensor 1) circuit short circuit to power	Using th approve system datalog Oxygen Heater 2 Senso Refer to circuit c check p oxygen heater c (Bank 2 for shor power
P0054-00	HO2S Heater Resistance (Bank 1, Sensor 2) - No sub type information	**NOTES:** - Circuit HTR_CTRL_A_UPSTREAM -	Using th approve system datalog

		▪ LR - Circuit UHEGO HEATER A - ▪ Catalyst oxygen sensor heater circuit control fuse failure ▪ Post catalyst oxygen sensor-odd heater control circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit ▪ Catalyst oxygen sensor heater circuit control relay failure ▪ Post catalyst oxygen sensor-odd failure	Oxygen Heater 1 Senso ▪ Refer to circuit c check p oxygen sensor f circuit ▪ Refer to circuit c check p oxygen sensor c circuit t circuit t circuit, ▪ Refer to circuit c check c sensor h control short ci short ci open ci ▪ Check a catalyst heater c require install a catalyst odd as to the v and pro or dete approva in opera the inst module
P0056-00	HO2S Heater Control Circuit (Bank 2, Sensor 2) - No sub type information	**NOTE:** - Circuit HTR_HEGO_B - ▪ Post catalyst oxygen sensor-even heater control circuit short circuit to ground, short circuit to power, open circuit ▪ Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit ▪ Catalyst oxygen sensor heater circuit control relay failure	▪ Using th approve system datalog Oxygen Heater 2 Senso ▪ Refer to circuit c check p oxygen sensor c circuit t circuit t circuit

		relay failure ▪ Post catalyst oxygen sensor-even failure	circuit ▪ Refer to circuit c check c sensor h control short ci short ci open ci ▪ Check a catalyst heater c require install a catalyst even, as to the v and pro or dete approva in opera the inst module
P0060-00	HO2S Heater Resistance (Bank 2, Sensor 2) - No sub type information	**NOTES:** ▪ - Circuit HTR_CTRL_B_UPSTREAM - ▪ LR - Circuit UHEGO HEATER B - ▪ Catalyst oxygen sensor heater circuit control fuse failure ▪ Post catalyst oxygen sensor-even heater control circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Catalyst oxygen sensor heater circuit control relay circuit short circuit to ground, short circuit to power, open circuit ▪ Catalyst oxygen sensor heater circuit control relay failure ▪ Post catalyst oxygen sensor-even failure	▪ Using th approve system datalog Oxygen Heater 2 Senso ▪ Refer to circuit c check p oxygen sensor f circuit ▪ Refer to circuit c check p oxygen sensor c circuit t circuit t circuit, h ▪ Refer to circuit c check c sensor h control short ci short ci open ci ▪ Check a

			catalyst heater r required install a catalyst even as to the v and pro or dete approva in opera the inst module
P0069-29	MAP - Barometric Pressure Correlation - Signal invalid	▪ Manifold absolute pressure sensor failure ▪ Engine control module failure	▪ Using th approve system datalog Barome Sensor (0x035A related absolut sensor D ▪ Refer to circuit c check m pressur for shor ground, power, ▪ Check a manifol pressur required install a control required warrant proced determi approva in opera the inst module
P0071-21	Ambient Air Temperature Sensor Range/Performance - Signal amplitude < minimum	**NOTES:** ▪ Jaguar - Circuit AMBIENT_TEMP_SENSOR - ▪ LR - Circuit TAMB TEMP -	▪ Using th approve system datalog Ambien Temper Voltage ▪ Refer to circuit c

			▪ Ambient air temperature sensor circuit short circuit to ground, short circuit to power, open circuit ▪ Temperature and manifold absolute pressure sensor circuit short circuit to ground, short circuit to power, open circuit ▪ Ambient air temperature sensor failure ▪ Temperature and manifold absolute pressure sensor failure	▪ circuit check a temper circuit f ground, power, ▪ Refer to circuit c check te manifol pressur for shor ground, power, ▪ Check a ambien sensor a Check a temper manifol pressur require warrant proced determi approva in opera the inst module
	P0071-22	Ambient Air Temperature Sensor Range/Performance - Signal amplitude > maximum	**NOTES:** ▪ - Circuit AMBIENT_TEMP_SENSOR - ▪ LR - Circuit TAMB TEMP - ▪ Ambient air temperature sensor circuit short circuit to ground, short circuit to power, open circuit ▪ Temperature and manifold absolute pressure sensor circuit short circuit to ground, short circuit to power, open circuit ▪ Ambient air temperature sensor failure ▪ Temperature and manifold absolute pressure sensor failure	▪ Using th approve system datalog Ambien Temper Voltage ▪ Refer to circuit c check a temper circuit f ground, power, ▪ Refer to circuit c check te manifol pressur for shor ground, power, ▪ Check a ambien sensor a

			Check a temper manifol pressur require warrant proced determ approv in opera the inst module
P0072-00	Ambient Air Temperature Sensor Circuit Low - No sub type information	**NOTES:** - Circuit AMBIENT_TEMP_SENSOR - LR - Circuit TAMB TEMP - Ambient air temperature sensor circuit short circuit to ground, open circuit, high resistance Ambient air temperature sensor failure	Using th approve system datalog Ambien Temper Voltage Refer to circuit c check a temper circuit f ground, high res Check a ambien sensor a Refer to policy a manual, any prio progra operati installat module
P0073-00	Ambient Air Temperature Sensor Circuit High - No sub type information	**NOTES:** - Circuit AMBIENT_TEMP_SENSOR - LR - Circuit TAMB TEMP - Ambient air temperature sensor ground circuit high resistance, open circuit Ambient air temperature sensor signal circuit short circuit to power Ambient air temperature sensor failure	Using th approve system datalog Ambien Temper Voltage Refer to circuit c check a temper circuit f ground, short ci Check c

				termina or dam ▪ Check a ambien sensor a Refer to policy a manual, any pric prograr operati installat module
	P007B-23	Charge Air Cooler Temperature Sensor Circuit Range/Performance (Bank 1) - Signal stuck low	▪ The engine control module measures a signal that remains low when transitions are expected ▪ Battery disconnection resulting in errors in engine off time (short soaks may look like long soaks) ▪ Electric block heater applied and not detected ▪ Charge air temperature sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance ▪ Connector is disconnected, connector pin is backed out, connector pin corrosion ▪ Charge air temperature sensor failure ▪ **Additional checks to carry out ONLY for Range Rover / L405 and Range Rover Sport / L494 vehicles equipped with Fuel Fired Booster Heater (FFBH) system** ▪ Changeover valve - Fuel Fired Booster Heater (FFBH) system failure ▪ This valve should only allow coolant into the engine if the engine coolant temperature is -25°C (-13°F) or below. When de-energized, the changeover valve connects the heater coolant circuit to the engine coolant circuit. When energized, the changeover valve isolates the heater coolant circuit from the engine coolant circuit. If this valve is de-energizing above -25°C (-13°F) it will be inadvertently allowing heated coolant into the engine and causing the DTC to set due to a mismatch between coolant temperature sensor 1 and all the other temperature sensors	▪ Leave v for a mi hours a to a sta Using th approve system datalog Ambien Temper - Engine Temper Boost A Raw ph (0x0341 Temper Engine Temper (0x0489 should deg°C ▪ Refer to diagram charge sensor circuit t circuit t circuit, ▪ Inspect signs of and pin and/or ▪ Check a charge sensor a ▪ Check a sensor t higher other se ▪ **Additio**

				carry ou **Range** **and Ra** **/ L494** **equipp** **Fired B** **(FFBH)** ▪ Check a change Fired B (FFBH) ▪ Using th approv system DTCs u 'Diagnc and ret
	P007B-24	Charge Air Cooler Temperature Sensor Circuit Range/Performance (Bank 1) - Signal stuck high	▪ The engine control module measures a signal that remains high when transitions are expected ▪ Battery disconnection resulting in errors in engine off time (short soaks may look like long soaks) ▪ Electric block heater applied and not detected ▪ Fuse failure ▪ Charge air temperature sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance ▪ Connector is disconnected, connector pin is backed out, connector pin corrosion ▪ Charge air temperature sensor failure ▪ Air charge coolant pump and control circuit, short circuit to ground, short circuit to power, open circuit, high resistance ▪ Air charge coolant pump relay failure ▪ Air charge coolant pump failure ▪ **Additional checks to carry out ONLY for Range Rover / L405 and Range Rover Sport / L494 vehicles equipped with Fuel Fired Booster Heater (FFBH) system** ▪ Changeover valve - Fuel Fired Booster Heater (FFBH) system failure ▪ This valve should only allow coolant into the engine if the engine coolant temperature is -25°C (-13°F) or below. When de-energized, the changeover valve connects the heater coolant circuit to the engine coolant circuit. When	▪ Leave v for a mi hours a to a sta Using th approv system datalog Ambien Temper - Engine Temper Boost A Raw ph (0x0341 Temper Engine Temper (0x0489 should deg°C ▪ Refer to diagram fuse fail fuse as ▪ Refer to diagram charge sensor circuit t circuit t circuit, ▪ Inspect signs of and pin and/or

		energized, the changeover valve isolates the heater coolant circuit from the engine coolant circuit. If this valve is de-energizing above -25°C (-13°F) it will be inadvertently allowing heated coolant into the engine and causing the DTC to set due to a mismatch between coolant temperature sensor 1 and all the other temperature sensors	▪ Check a charge sensor a ▪ Refer to diagram air char and cor short ci short ci open ci resistan ▪ Refer to diagram air char for ope resistan ▪ Refer to section manual air char for corr Check a air char as requ ▪ Check a sensor t higher c other se ▪ **Additio carry ou Range and Ra / L494 equipp Fired B (FFBH)** ▪ Check a change Fired B (FFBH) ▪ Using th approve system DTCs us 'Diagnc and ret
P007B-29	Charge Air Cooler Temperature Sensor Circuit Range/Performance (Bank 1) - Signal invalid	▪ Battery disconnection resulting in errors in engine off time (short soaks may look like long soaks) ▪ Electric block heater applied and not detected	▪ Leave v for a mi hours a to a sta Using th approve

			▪ Fuse failure ▪ Charge air temperature sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance ▪ Connector is disconnected, connector pin is backed out, connector pin corrosion ▪ Charge air temperature sensor failure ▪ Air charge coolant pump and control circuit, short circuit to ground, short circuit to power, open circuit, high resistance ▪ Air charge coolant pump relay failure ▪ Air charge coolant pump failure	system datalog Ambien Temper - Engine Temper Boost A Raw ph (0x0341 Temper Engine Temper (0x0489 should deg°C ▪ Refer to diagram fuse fail fuse as ▪ Refer to diagram charge sensor circuit t circuit t circuit, ▪ Inspect signs of and pin and/or ▪ Check a charge sensor ▪ Refer to diagram air char and cor short ci short ci open ci resistan ▪ Refer to diagram air char for ope resistan ▪ Refer to section manual air char for corr Check a air char as requ

			▪ Using th approve system DTCs us 'Diagnc and rete
P007C-00	Charge Air Cooler Temperature Sensor Circuit Low (Bank 1) - No sub type information	▪ Charge air temperature sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance ▪ Connector is disconnected, connector pin is backed out, connector pin corrosion ▪ Charge air temperature sensor failure	▪ Refer to diagram charge sensor circuit t circuit t circuit, ▪ Inspect signs of and pin and/or ▪ Check a charge sensor a ▪ Using th approve system DTCs us 'Diagnc and rete
P007D-00	Charge Air Cooler Temperature Sensor Circuit High (Bank 1) - No sub type information	▪ Charge air temperature sensor circuit, short circuit to ground, short circuit to power, open circuit, high resistance ▪ Connector is disconnected, connector pin is backed out, connector pin corrosion ▪ Charge air temperature sensor failure	▪ Refer to diagram charge sensor circuit t circuit t circuit, ▪ Inspect signs of and pin and/or ▪ Check a charge sensor a ▪ Using th approve system DTCs us 'Diagnc and rete
P0087-00	Fuel Rail/System Pressure - Too Low - No sub type	**NOTE:**	▪ Using th approve

	information	- Circuit FUEL_HIGH_PRESS_SENSOR - ▪ Fuel rail pressure sensor circuit short circuit to ground, open circuit, high resistance ▪ Fuel rail pressure sensor failure ▪ Fuel lines leaking or restricted ▪ Fuel pump failure	system datalog Rail Pre High Ra Voltage ▪ Refer to circuit d check fu sensor c circuit t circuit, l ▪ Check f related fuel line restricti ▪ Check a fuel rail as requ install a as requ warrant proced determi approva in opera the inst module
P0088-00	Fuel Rail/System Pressure - Too High - No sub type information	**NOTE:** - Circuit FUEL_HIGH_PRESS_SENSOR - ▪ Fuel rail pressure sensor circuit short to each other, high resistance, short circuit to power ▪ Fuel rail pressure sensor failure	▪ Using th approve system datalog Rail Pre High Ra Voltage ▪ Refer to circuit d check fu sensor c to each resistan to powe ▪ Check a fuel rail as requ warrant proced determi approva in opera the inst module
P008A	Low Pressure Fuel Syst		Using th

P008A-00	Low Pressure Fuel System Pressure - Too Low - No sub type information	**NOTE:** - Circuit LOW_PRESS_FUEL_PRESS_SENSOR - - Low pressure fuel sensor circuit failure, short circuit to ground, short circuit to power, open circuit - Fuel pump driver module circuit short circuit to ground, short circuit to power, open circuit - Low pressure fuel - Fuel pump driver module failure	- Using th approve system datalog Rail Pre Range S (0x0376 - Check f leakage - Refer to circuit c check lo sensor c circuit t circuit t circuit - Refer to circuit c check fu module circuit t circuit t circuit - Check a low pre as requ install a driver m require warrant proced determi approva in opera the inst module
P008B-00	Low Pressure Fuel System Pressure - Too High - No sub type information	**NOTE:** - Circuit LOW_PRESS_FUEL_PRESS_SENSOR - - Low pressure fuel sensor circuit short circuit to ground, short circuit to power, open circuit - Fuel pump driver module circuit short circuit to ground, short circuit to power, open circuit - Blockage or restriction in low pressure fuel line - Low pressure fuel sensor failure	- Using th approve system datalog Rail Pre Range S (0x0376 - Refer to circuit c check lo sensor c circuit t circuit t circuit. blockag in low p - Refer to

		▪ Fuel pump driver module failure	circuit c check fu module circuit t circuit t circuit ▪ Check a low pre as requ install a driver m require warrant proced determi approva in opera the inst module
P00AB-23	Intake Air Temperature Sensor 1 Circuit Range/Performance (Bank 2) - Signal stuck low	**NOTE:** - Circuit INLET_AIR_TEMP_SENSOR_B - ▪ Intake air temperature sensor bank 2 circuit short circuit to ground, open circuit ▪ Intake air temperature sensor bank 2 failure	▪ Using th approve system datalog Intake A Sensor ▪ Refer to circuit c check in temper bank 2 circuit t circuit ▪ Check a intake a sensor b require warrant proced determi approva in opera the inst module
P00AB-24	Intake Air Temperature Sensor 1 Circuit Range/Performance (Bank 2) - Signal stuck high	**NOTE:** Circuit INLET_AIR_TEMP_SENSOR_B	▪ Using th approve system datalog

GENERAL INFORMATION

DESCRIPTION AND OPERATION

HEADLAMP CONTROL MODULE A (HCM)

CAUTION:

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

NOTES:

- If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the warranty policy and procedures manual, 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 Headlamp Control Module A, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: (417-01 Exterior Lighting)

Headlamp Leveling (Diagnosis and Testing),
Headlamps (Diagnosis and Testing).

B1041-04Levelling Control - System internal failures

- No headlamp levelling functionality - Module internal failure
- Install a new headlamp Control module as required. Refer to the warranty policy and procedures manual

B1041-54Levelling Control - Missing calibration

- Levelling sensor calibration routine not carried out

NOTE:

Sensor calibration routine must be carried out with the vehicle unladen and with correct tire pressures

- Carry out the levelling sensor calibration routine using the manufacturer approved diagnostic system

B1087-83LIN Bus "A" - Value of signal protection calculation incorrect

- Checksum error
- Clear the DTC and re-test. If the DTC remains install a new headlamp Control module. Refer to the warranty policy and procedures manual

B1087-86LIN Bus "A" - Signal invalid

- Signal invalid
- Clear the DTC and re-test. If the DTC remains install a new headlamp Control module. Refer to the warranty policy and procedures manual

B1087-88LIN Bus "A" - Bus off

- Bus Off
- LIN Bus circuit short circuit to ground
- Refer to the electrical circuit diagrams and check the LIN bus circuit. Check for other related DTCs

B10AE-11Headlamp Leveling Motor - Circuit short to ground

- Headlamp Levelling motor Control circuit - short to ground
- Refer to the electrical circuit diagrams and check headlamp levelling motor Control circuit for short to ground and the motor signal voltage

B10AE-12Headlamp Leveling Motor - Circuit short to battery

- Headlamp levelling motor Control circuit - short to power
- Refer to the electrical circuit diagrams and check headlamp levelling motor Control circuit for short to power

B10AE-64Headlamp Leveling Motor - Signal plausibility failure

- Signal plausibility failure
- Refer to the electrical circuit diagrams and check the LIN bus circuit. Check for other related DTCs

B1A59-11Sensor 5 Volt Supply - Circuit short to ground

- Headlamp levelling sensor 5 volt supply circuit - short to ground
- Refer to the electrical circuit diagrams and check headlamp levelling

- Refer to the electrical circuit diagrams and check headlamp levelling sensor 5 volt supply circuit for short to ground

B1A59-12Sensor 5 Volt Supply - Circuit short to battery

- Headlamp levelling sensor 5 volt supply circuit - short to power
- Refer to the electrical circuit diagrams and check headlamp levelling sensor 5 volt supply circuit for short to power

B1D64-01Left Headlamp Swivelling Motor - General electrical failure

- General electrical failure - Left headlamp swivelling motor error
- Check the headlamp connections, clear the DTC and re-test. If the DTC remains install a new headlamp

B1D64-04Left Headlamp Swivelling Motor - System internal failures

- System internal failures - Left headlamp swivelling motor error
- Check the headlamp connections, clear the DTC, switch off the ignition and allow sufficient time for the module to power down and re-test. If the DTC persists, install a new headlamp

B1D64-87Left Headlamp Swivelling Motor - Missing message

- Missing message
- Check the headlamp connections, clear DTC and re-test. If DTC remains install a new headlamp

B1D65-01Right Headlamp Swivelling Motor - General electrical failure

- General electrical failure - right headlamp swivelling motor error
- Clear the DTC and re-test. If the DTC remains install a new headlamp

B1D65-04Right Headlamp Swivelling Motor - System internal failures

- System internal failures - Right headlamp swivelling motor error
- Check the headlamp connections, clear the DTC, switch off the ignition and allow sufficient time for the module to power down and re-test. If the DTC persists, install a new headlamp

B1D65-87Right Headlamp Swivelling Motor - Missing message

- Missing message

- Check the headlamp connections, clear DTC and re-test, if DTC remains install a new headlamp

B1D68-00Left Headlamp Swivelling Feedback Sensor - No sub type information

- Sensor not detected

- Check the headlamp connector for integrity. Refer to the circuit diagrams and check headlamp circuit. Clear DTC and re-test, if DTC remains install a new headlamp

B1D69-00Right Headlamp Swivelling Feedback Sensor - No sub type information

- Sensor not detected

- Check the headlamp connector for integrity. Refer to the circuit diagrams and check headlamp circuit. Clear DTC and re-test, if DTC remains install a new headlamp

C1A04-11Right Front Height Sensor - Circuit short to ground

- Height sensor harness wiring short circuit to ground

- Check the Ride Level Module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system

C1A04-15Right Front Height Sensor - Circuit short to battery or open

- Height sensor harness wiring short circuit to power

- Check the Ride Level Module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic

be re-calibrated. Calibrate the system using the approved diagnostic system

C1A04-64Right Front Height Sensor - Signal plausibility failure

- Height sensor signal plausibility failure

- Check the Ride Level Module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system

C1A06-11Right Rear Height Sensor - Circuit short to ground

- Height sensor harness wiring short circuit to ground

- Check the Ride Level Module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system

C1A06-15Right Rear Height Sensor - Circuit short to battery or open

- Height sensor harness wiring short circuit to power

- Check the Ride Level Module for DTCs. Check the sensor connector for damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system

C1A06-64Right Rear Height Sensor - Signal plausibility failure

- Height sensor signal plausibility failure

- Check the Ride Level Module for DTCs. Check the sensor connector for

damage. Refer to the electrical circuit diagrams and check the sensor circuit for continuity or short circuit. Check sensor signal changes when sensor is rotated. If any height sensor fixings are slackened or found to be loose, or a height sensor has been changed, the vehicle ride height must be re-calibrated. Calibrate the system using the approved diagnostic system

U0001-88High 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

U0101-00Lost Communication with TCM - No sub type information

- CAN Bus communication error

- Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Transmission Control Module and Headlamp Control Module

U0102-00Lost Communication with Transfer Case Control Module - No sub type information

- CAN Bus communication error

- Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Transfer Case Control Module and Headlamp Control Module

U0121-00Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information

- CAN Bus communication error

- Refer to the electrical circuit diagrams and check the power and ground connections to the 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 ABS Module and Headlamp Control Module

U0126-00Lost Communication With Steering Angle Sensor Module - No sub type information

- CAN Bus communication error
- Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Steering Angle Sensor Control Module and Headlamp Control Module

U0140-00Lost Communication With Body Control Module - No sub type information

- CAN Bus communication error
- Refer to the electrical circuit diagrams and check the power and ground connections to the 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 Headlamp Control Module

U0142-00Lost Communication With Body Control Module "B" - No sub type information

- CAN Bus communication error
- Refer to the electrical circuit diagrams and check the power and ground connections to the 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 Headlamp Control Module

U0300-00Internal Control Module Software Incompatibility - No sub type information

- Car Configuration File information incompatible to ECU
- Check/amend Car Configuration File using the manufacturer approved diagnostic system

diagnostic system

U0402-00Invalid Data Received From Transmission Control Module - No sub type information

- No sub type information
- Check the Transmission Control Module for related DTCs and refer to the relevant DTC index

U0403-00Invalid Data Received From Transfer Case Control Module - No sub type information

- No sub type information
- Check the Transfer Case Control Module for related DTCs and refer to the relevant DTC index

U0415-00Invalid Data Received From Anti-Lock Brake System Control Module - No sub type information

- Invalid data received from ABS module
- Check the ABS Module for related DTCs and refer to the relevant DTC index

U0428-00Invalid Data Received From Steering Angle Sensor Module - No sub type information

- No sub type information
- Check the steering angle sensor module for related DTCs and refer to the relevant DTC index

U2100-00Initial Configuration Not Complete - No sub type information

- Car Configuration File information not received completely
- Check/amend Car Configuration File using manufacturer approved diagnostic system

U2101-00Control Module Configuration Incompatible - No sub type information

- Car Configuration File information incompatible to ECU
- Check/amend Car Configuration File using manufacturer approved

diagnostic system

U3002-81Vehicle Identification Number - Invalid serial data received

- Stored VIN does not match most recent VIN
- Check/amend Car Configuration File using manufacturer approved diagnostic system

U3003-16Battery Voltage - Circuit voltage below threshold

- Circuit voltage below threshold
- Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical guides and check the power and ground supply circuits to the module

U3003-17Battery Voltage - Circuit voltage above threshold

- Circuit voltage above threshold
- Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical guides and check the power and ground supply circuits to the module

U3003-62Battery Voltage - Signal compare failure

- Mis-match in battery voltage, between Central Junction Box and headlamp Control module, of 2 volts or more
- Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power and ground supply circuits to both modules

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

DESCRIPTION AND OPERATION

HEADLAMP CONTROL MODULE B (INTERIOR MIRROR)

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

complaint and carry out the recommendations as required

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

- Interior mirror module internal failure

NOTE:

The interior mirror module will self recover after a watchdog reset

- This DTC is for information only. Clear the DTC and retest
- If the DTC is set permanent and the problem persists, check and install a new interior mirror module as required

Interior mirror - Component or system over temperatureB134B-78U0010-88

- 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

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B1286-16	Interior mirror - Circuit voltage below threshold	▪ Interior mirror circuit voltage below threshold. The electrochromic function does not work ▪ Interior mirror circuit power or ground circuit open circuit, high resistance ▪ Interior mirror module internal failure	**NOTE:** The interior mirror will self recover after the supply voltage reaches normal conditions ▪ Refer to the electrical circuit diagrams and check

				the interior mirror power and ground circuits for open circuit, high resistance ▪ Check the voltage between pin 1 and pin 3 of the module connector. The voltage should be above 8.5 volts for normal conditions ▪ Using the manufacturer approved diagnostic system, clear the DTC and retest ▪ If the DTC is set permanent and voltage is above 8.5 volts check and install a new module as required
B1286-17	Interior mirror - Circuit voltage above threshold	▪ Interior mirror module circuit voltage above threshold. The electrochromic function does not work ▪ Battery/charging system fault ▪ Interior mirror module internal failure	**NOTE:** The interior mirror will self recover after the supply voltage reaches normal conditions ▪ Using the manufacturer approved diagnostic system, check the datalogger signal - main ECU supply voltage (0xDD02) ▪ Check the voltage between pin 1 and pin 3 of the interior mirror module connector. The voltage should to be below 16.5 volts for normal conditions ▪ Check the vehicle charging system performance to

			performance to ensure the voltage regulation is correct ▪ Clear the DTC and retest. If the problem persists, renew the interior mirror module
B1286-44	Interior mirror - Data memory failure	▪ Clear the DTC and re-test ▪ Check and install a new interior mirror module as required	
B1286-47	Interior mirror - Watchdog/safety micro controller failure	▪ Interior mirror module temporarily disabled due to watchdog reset ▪ Interior mirror module internal failure	
B1286-49	Interior mirror - Internal electronic failure	▪ Interior mirror module internal failure	▪ Clear the DTC and re-test ▪ Check and install a new interior mirror module as required
B1286-60	Interior mirror - Reserved by document	▪ Interior mirror operation temperature below limit	▪ Allow the vehicle interior temperature to increase, the interior mirror will self recover after temperature reaches normal conditions
B1286-78	Interior mirror - Alignment or adjustment incorrect	▪ Interior mirror module low sensitivity mode has been activated	▪ The low sensitivity mode is cancelled when the ignition is cycled ▪ Clear the DTC and re-test
B1286-96	Interior mirror - Component internal failure	▪ Lost communication with the central junction box ▪ Interior mirror	▪ Using the manufacturer approved diagnostic system, clear DTC and retest

		module internal failure	and retest ▪ Using the manufacturer approved diagnostic system, complete a CAN network integrity test ▪ Refer to the electrical circuit diagrams and check the CAN harness between the central junction box and interior mirror module ▪ Check and install a new interior mirror module as required
B1286-97	Interior mirror - Component or system operation obstructed or blocked	Interior mirror temporary disabled ▪ Interior mirror camera has detected a partial or total blockage of the field of view	▪ Check to see if anything is blocking the field of view of the interior mirror camera ▪ ▪ The interior mirror will self recover after failure condition has been rectified
B1286-98	Interior mirror temporary disabled because of operation temperature above limit	▪ Interior mirror will self recover after the temperature reaches normal condition	
B12AC-11	Electrochromic door mirror - Circuit short to ground	▪ Electrochromic door mirror output circuit short circuit to ground	**NOTE:** To aid fault finding use the manufacturer approved diagnostic system to force the automatic dim function ▪ Refer to the electrical circuit

			electrical circuit diagrams and check the interior mirror module harness, including both exterior mirror circuits for short circuit to ground, repair as necessary
B12AC-12	Electrochromic door mirror - Circuit short to battery	▪ Electrochromic door mirror output circuit short circuit to power	**NOTE:** To aid fault finding use the manufacturer approved diagnostic system to force the automatic dim function ▪ Refer to the electrical circuit diagrams and check the interior mirror module harness, including both exterior mirror circuits for short circuit to power, repair as necessary
B12EB-78	Camera horizontal alignment - Alignment or adjustment incorrect	▪ Interior mirror module camera misaligned in the horizontal direction ▪ Interior mirror module fault ▪ Windscreen alignment incorrect	**NOTE:** To trigger the possible fault conditions for this DTC, the vehicle may need to be driven during night time conditions ▪ Check the interior mirror module for security and correct positioning. Clear the DTC and retest for normal operation

			▪ Renew the interior mirror module. See topix workshop manual, section 417-01 exterior lighting, description and operation for auto aim calibration procedure ▪ If the problem persists, suspected windscreen alignment incorrect
B12EC-78	Camera vertical alignment - Alignment or adjustment incorrect	▪ Interior mirror module camera misaligned in the vertical direction ▪ Interior mirror module fault ▪ Windscreen alignment incorrect	**NOTE:** To trigger the possible fault conditions for this DTC, the vehicle may need to be driven during night time conditions ▪ Check the interior mirror module for security and correct positioning. Clear the DTC and retest for normal operation ▪ Renew the interior mirror module. See topix workshop manual, section 417-01 exterior lighting, description and operation for auto aim calibration procedure ▪ If the problem persists, suspected windscreen alignment incorrect
B134A-78	Target aim verification - Camera horizontal alignment - Alignment or adjustment incorrect	**NOTE:** This DTC is for	Check the accuracy of interior mirror module attachment and the windscreen button

	incorrect	use during the factory aim routine only ▪ Interior mirror module camera misaligned in the horizontal direction. The windscreen button and the interior mirror module attachment alignment incorrect ▪ Interior mirror module internal failure	Check and install a new interior mirror module as required
Target aim vertical - Camera horizontal alignment - Alignment or adjustment incorrect	**NOTE:** This DTC is for use during the factory aim routine only ▪ Interior mirror module camera misaligned in the vertical direction. The windscreen button and the interior mirror module attachment alignment incorrect Interior mirror module internal failure	▪ Check the accuracy of the interior mirror module attachment and the windscreen button ▪ Check and install a new interior mirror module as required	
Medium speed CAN communication bus - Bus off	▪ Medium speed CAN bus circuit fault		
U0140-00	Lost communication with body control module - No sub type information	▪ Lost communication with central junction box	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module ▪ Using the manufacturer approved diagnostic

			approved diagnostic system, complete a CAN network integrity test ▪ Refer to the electrical circuit diagrams and check the CAN network between the interior mirror and central junction box
U0300-00	Internal control module software incompatibility - No sub type information	▪ Interior mirror module software incompatibility	▪ Using the manufacturer approved diagnostic system, ensure that the interior mirror module contains the latest software version and is correctly configured, update if necessary. Clear the DTC and retest
U201A-57	Control module main calibration data - Invalid/incomplete software component	▪ Incorrect interior mirror module fitted ▪ Main calibration is invalid to car configuration file or not complete stored to the interior mirror module	**NOTE:** Due to the mechanical calibration tolerance the correct interior mirror module assembly must be used for the vehicle model types in question and it is not exchangeable with other vehicle model types ▪ Using the manufacturers approved diagnostic system, compare the vehicle type in the interior mirror module with the car configuration file (parameter 1), if these do not match

			these do not match the incorrect interior mirror module has been fitted ▪ Using the manufacturers approved diagnostic system, check the configuration of the car configuration file and the software version of the interior mirror module is correct
U2100-00	Initial configuration not complete - No sub type information	▪ Invalid/incomplete software component ▪ Interior mirror module internal failure	Using the manufacturers approved diagnostic system, check the configuration of the car configuration file and the software version of the interior mirror module is correct ▪ Using the manufacturer approved diagnostic system check the central junction box for related DTCs and refer to the relevant DTC index ▪ If the problem persists, renew the interior mirror module
U2101-00	Control module configuration incompatible - No sub type information	▪ Interior mirror is not configured correctly	▪ Using the manufacturer approved diagnostic system check and up-date the car configuration file as required. Clear the DTC and re-test

GENERAL INFORMATION

DESCRIPTION AND OPERATION

IMAGE PROCESSING MODULE B (IPMB)

CAUTION:

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

NOTES:

- If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the warranty policy and procedures manual, 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 Image Processing Module B, 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
B100E-29	Video Input "A" signal - Signal invalid	▪ Video output connection error ▪ Video output line	▪ Refer to the electrical circuit diagrams and check the circuit between the proximity cameras and the touch screen

		short or open circuit	
B1087-00	LIN Bus "A" - No sub type information	▪ LIN bus error	▪ Refer to the electrical circuit diagrams and check the LIN circuit between the proximity cameras and the proximity camera control module
B12BD-19	Rear Camera - Circuit current above threshold	▪ Rear proximity camera circuit current above threshold ▪ Rear proximity camera is drawing little or no current, indicating an open circuit fault or disconnected camera	**NOTE:** When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the rear proximity camera circuit for short to power, open circuit, high resistance
B12BD-31	Rear Camera - No signal	▪ Rear proximity camera circuit fault ▪ Rear proximity camera faulty	**NOTE:** When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the rear proximity camera circuit for open circuit
B12BD-49	Rear Camera - Internal electronic failure	▪ Rear proximity camera internal electronic failure	▪ Clear DTC, wait for a minimum of 2 minutes, then retest ▪ If fault persists, check and install a new rear proximity camera as required
B12BD-54	Rear Camera - Missing calibration	▪ Rear proximity camera not calibrated	▪ Using the manufacturer approved diagnostic system calibrate the rear proximity

		▪ Rear proximity camera not installed correctly	camera ▪ Check the rear proximity camera is fitted and aligned correctly
B12BE-19	Left Front Camera - Circuit current above threshold	▪ Front left proximity camera circuit current above threshold ▪ Front left proximity camera is drawing little or no current, indicating an open circuit fault or disconnected camera	**NOTE:** When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the front left proximity camera circuit for short to power, open circuit, high resistance
B12BE-31	Left Front Camera - No signal	▪ Front left proximity camera circuit fault ▪ Front left proximity camera faulty	**NOTE:** When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the front left proximity camera circuit for open circuit
B12BE-49	Left Front Camera - Internal electronic failure	▪ Front left proximity camera internal electronic failure	▪ Clear DTC, wait for a minimum of 2 minutes, then retest ▪ If fault persists, check and install a new front left proximity camera as required
B12BE-54	Left Front Camera - Missing calibration	▪ Front left proximity camera not calibrated ▪ Front left proximity camera not installed correctly	▪ Using the manufacturer approved diagnostic system calibrate the front left proximity camera ▪ Check the front left proximity camera is fitted and aligned correctly

B12BF-19	Right Front Camera - Circuit current above threshold	▪ Front right proximity camera circuit current above threshold ▪ Front right proximity camera is drawing little or no current, indicating an open circuit fault or disconnected camera	**NOTE:** When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the front right proximity camera circuit for short to power, open circuit, high resistance
B12BF-31	Right Front Camera - No signal	▪ Front right proximity camera circuit fault ▪ Front right proximity camera faulty	**NOTE:** When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the front right proximity camera circuit for open circuit
B12BF-49	Right Front Camera - Internal electronic failure	▪ Front right proximity camera internal electronic failure	▪ Clear DTC, wait for a minimum of 2 minutes, then retest ▪ If fault persists, check and install a new front right proximity camera as required
B12BF-54	Right Front Camera - Missing calibration	▪ Front right proximity camera not calibrated ▪ Front right proximity camera not installed correctly	▪ Using the manufacturer approved diagnostic system calibrate the front right proximity camera ▪ Check the front right proximity camera is fitted and aligned correctly
B12C0-19	Left Mirror Camera - Circuit current	▪ Left mirror proximity camera circuit current	**NOTE:**

	above threshold	above threshold ▪ Left mirror proximity camera is drawing little or no current, indicating an open circuit fault or disconnected camera	When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the left mirror proximity camera circuit for short to power, open circuit, high resistance
B12C0-31	Left Mirror Camera - No signal	▪ Left mirror proximity camera circuit fault ▪ Left mirror proximity camera faulty	**NOTE:** When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the left mirror proximity camera circuit for open circuit
B12C0-49	Left Mirror Camera - Internal electronic failure	▪ Left mirror proximity camera internal electronic failure	▪ Clear DTC, wait for a minimum of 2 minutes, then retest ▪ If fault persists, check and install a new left mirror proximity camera as required
B12C0-54	Left Mirror Camera - Missing calibration	▪ Left mirror proximity camera not calibrated ▪ Left mirror proximity camera not installed correctly	▪ Using the manufacturer approved diagnostic system calibrate the left mirror proximity camera ▪ Check the left mirror proximity camera is fitted and aligned correctly
B12C1-19	Right Mirror Camera - Circuit current above threshold	▪ Right mirror proximity camera circuit current above threshold ▪ Right mirror proximity camera is drawing little	**NOTE:** When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed

		or no current, indicating an open circuit fault or disconnected camera	at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the right mirror proximity camera circuit for short to power, open circuit, high resistance
B12C1-31	Right Mirror Camera - No signal	▪ Right mirror proximity camera circuit fault ▪ Right mirror proximity camera faulty	**NOTE:** When checking LVDS circuits, DO NOT probe the LVDS cables. Visual checks ONLY should be performed at the cable inter-connect points ▪ Refer to the electrical circuit diagrams and check the right mirror proximity camera circuit for open circuit
B12C1-49	Right Mirror Camera - Internal electronic failure	▪ Right mirror proximity camera internal electronic failure	▪ Clear DTC, wait for a minimum of 2 minutes, then retest ▪ If fault persists, check and install a new right mirror proximity camera as required
B12C1-54	Right Mirror Camera - Missing calibration	▪ Right mirror proximity camera not calibrated ▪ Right mirror proximity camera not installed correctly	▪ Using the manufacturer approved diagnostic system calibrate the right mirror proximity camera ▪ Check the right mirror proximity camera is fitted and aligned correctly
P1603-00	EEPROM Malfunction - No sub type information	▪ Proximity camera control module internal memory error	▪ Clear DTC, wait for a minimum of 2 minutes, then retest. If fault persists, check and install a new proximity camera control module as required
U0010-88	Medium Speed CAN Communication Bus - Bus off	▪ Bus off	▪ Refer to the electrical circuit diagrams and check CAN private network for short, open circuit. Carry out CAN network integrity tests using the manufacturer

			approved diagnostic system. Refer to the network communications section of the workshop manual
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Incorrect software loaded ▪ Lost CAN signal	▪ Check for other modules reporting CAN bus off or lost communication faults. If other modules report problems, check the software version in the central junction box using the manufacturers approved diagnostic system. If no other modules report problems, check the software version in the park distance control module. Update as necessary
U1A4B-49	Control Module Processor B - Internal electronic failure	▪ Internal electronic failure	▪ Clear DTC, wait for a minimum of 2 minutes, then retest. If the DTC resets, renew the proximity camera control module
U201A-51	Control Module Main Calibration Data - Not programmed	▪ Local config/calibration file missing/invalid (LCF)	▪ Configure the proximity camera control module using the approved diagnostic system
U3000-46	Control Module - Calibration / parameter memory failure	▪ Internal memory error	▪ Clear DTC, wait for a minimum of 2 minutes, then retest. If the DTC resets, renew the proximity camera control module
U3000-47	Control Module - Watchdog / safety MicroController failure	▪ Watchdog/safety MicroController failure	▪ Clear DTC, wait for a minimum of 2 minutes, then retest. If the DTC resets, renew the proximity camera control module
U3000-49	Control Module - Internal electronic failure	▪ Internal memory error	▪ Clear DTC, wait for a minimum of 2 minutes, then retest. If the DTC resets, renew the proximity camera control module
U3000-98	Control Module - Component or system over temperature	▪ Component or system over temperature	▪ Consider the environmental conditions before suspecting the proximity camera control module. Allow the proximity camera control module to cool, clear DTC, wait for a minimum of 2 minutes, then retest

			2 minutes, then retest
U3003-62	Battery Voltage - Signal compare failure	▪ Signal compare failure	▪ Check vehicle battery connections and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power supply circuits to the proximity camera control module

GENERAL INFORMATION

DESCRIPTION AND OPERATION

INSTRUMENT PANEL CLUSTER (IPC)

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 Instrument Panel Cluster (IPC), for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Instrument Cluster (413-01 Instrument Cluster, Diagnosis and Testing).

- General signal failure

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B1009-51	Ignition Authorisation - Not programmed	▪ Ignition authorisation not programmed	▪ Configure the Instrument Panel Cluster (IPC) using the manufacturers approved diagnostic system
B1009-87	Ignition Authorisation - Missing message	▪ Ignition authorisation message missing	▪ Configure the Instrument Panel Cluster (IPC) using the manufacturers approved diagnostic system
B100D-64	Column Lock Authorisation - Signal plausibility failure	▪ Steering Column Lock system/Steering Column Lock unable to perform lock action ▪ CAN Fault	**NOTE:** Prior to clearing this DTC, carry out the 'Vehicle Functional Reset' application using the manufacturer

		▪ CAN Fault ▪ Anti-Lock Braking System (ABS), Engine Control Module (ECM), Central Junction Box (CJB) fault	approved diagnostic system. ▪ 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. Refer to the electrical circuit diagrams and check CAN network
B1026-12	Steering Column Lock - Circuit short to battery	▪ Electric Steering Column Lock (ESCL) circuit short to power	▪ Refer to the wiring diagrams and check the electric steering column ground circuit
B108E-13	Display - Circuit open	▪ Instrument Panel Cluster (IPC) display connector fails continuity check ▪ Continuity circuit in display flex cable open circuit	▪ Renew the Instrument Panel Cluster (IPC). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B10B7-86	Rear Air Discharge Temperature - Signal invalid	▪ Display illumination area temperature sensor signal is out of range	▪ Check the harness connector to the Instrument Panel Cluster (IPC) for security and integrity. Clear the DTC and retest the switch function. If the problem persists, renew the Instrument Panel Cluster (IPC). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B115C-7A	Transfer Fuel Pump - Fluid leak or seal failure	▪ Transfer fuel pump fault ▪ Fluid leak around	▪ Check for other fuel pump related DTCs. Renew the transfer fuel (jet) pump

		or seal failure	
B1264-13	Control Module Connector(s) Loose Or Disconnected - Circuit open	▪ Display not adequately connected to Instrument Panel Cluster (IPC) circuit board	▪ Suspect the Instrument Panel Cluster (IPC), install a new Instrument Panel Cluster (IPC) as necessary. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B1264-49	Control Module Connector(s) Loose Or Disconnected - Internal electronic failure	▪ Airbag telltale not adequately connected to Instrument Panel Cluster (IPC) circuit board	▪ Suspect the Instrument Panel Cluster (IPC), install a new Instrument Panel Cluster (IPC) as necessary. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B1264-95	Control Module Connector(s) Loose Or Disconnected - Incorrect assembly	▪ Security telltale not adequately connected to Instrument Panel Cluster (IPC) circuit board	▪ Suspect the Instrument Panel Cluster (IPC), install a new Instrument Panel Cluster (IPC) as necessary. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B12FE-09	Fan - Component Failures	▪ Cooling fan is stalled/not running at full speed	▪ Check for foul condition at fan
B12FE-12	Fan - Circuit short to battery	▪ Cooling fan ground cannot be applied. Short to power	▪ Refer to the electrical circuit diagrams and check cooling fan ground circuit for short to power
B12FE-13	Fan - Circuit open	▪ Cooling fan ground cannot be applied.	▪ Refer to the electrical circuit diagrams and check cooling fan ground for broken wire,

		Open circuit	open circuit
B1A14-96	RCM Warning Lamp - Component internal failure	▪ SRS LED failure ▪ Warning lamp circuit fault	▪ Check the harness connector to the Instrument Panel Cluster (IPC) for security and integrity. Clear the DTC and retest the switch function. If the problem persists, renew the Instrument Panel Cluster (IPC). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B1A68-86	Ambient Temperature Sensor - Signal invalid	▪ Internal board temperature sensor signal is out of range/invalid	▪ Check the harness connector to the Instrument Panel Cluster (IPC) for security and integrity. Clear the DTC and retest the switch function. If the problem persists, renew the Instrument Panel Cluster (IPC). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B1A85-96	Ambient Light Sensor - Component internal failure	▪ Internal light sensor failure	▪ Check the harness connector to the Instrument Panel Cluster (IPC) for security and integrity. Clear the DTC and retest the switch function. If the problem persists, renew the Instrument Panel Cluster (IPC). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0607-4B	Control Module Performance - Over temperature	▪ Instrument Panel Cluster (IPC) over temperature	▪ Check the cluster cooling fan/circuit and rectify as necessary. Clear the DTC and retest

P060A-08	Internal Control Module Monitoring Processor Performance - Bus Signal/Message Failures	▪ Internal communication errors are causing lock-ups and resets	▪ Suspect the Instrument Panel Cluster (IPC). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0610-55	Control Module Vehicle Options Error - Not configured	▪ Control module incorrectly configured	▪ Configure the module using the manufacturers approved diagnostic system
U0001-88	High Speed CAN Communication Bus - Bus off	▪ CAN Bus off	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0010-88	Medium Speed CAN Communication Bus - Bus off	▪ Bus off	▪ Carry out the CAN Network Integrity Test using the Manufacturer approved diagnostic system. Alternatively, refer to the electrical circuit diagrams and check CAN network to Instrument Panel Cluster (IPC)
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Engine Control Module and Instrument Panel Cluster (IPC)
U0101-00	Lost Communication with TCM - No sub	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the

	type information		power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Transmission Control Module and Instrument Panel Cluster (IPC)
U0102-00	Lost Communication with Transfer Case Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Transfer Case Control Module and Instrument Panel Cluster (IPC)
U0104-00	Lost Communication With Cruise Control Module - No sub type information	▪ No sub type information	Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Speed Control Module and Instrument Panel Cluster (IPC)
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Anti-lock Braking System Module and Instrument Panel Cluster (IPC)

U0126-00	Lost Communication With Steering Angle Sensor Module - No sub type information	▪ Power or ground circuit fault ▪ CAN Bus circuit fault ▪ Module internal failure	▪ Refer to the electrical circuit diagrams and check the power, ground and CAN Bus circuit to the steering angle sensor for fault. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Parking Brake Module and Instrument Panel Cluster (IPC)
U0132-00	Lost Communication With Suspension Control Module "A" - no sub type information	▪ Power or ground circuit fault ▪ CAN Bus circuit fault ▪ Module internal failure	▪ Refer to the electrical circuit diagrams and check the power, ground and CAN Bus circuits to the air suspension module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0136-00	Lost Communication With Differential Control Module - Rear - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Rear Differential Control Module and Instrument Panel Cluster (IPC)
U0138-00	Lost Communication with All Terrain Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system

			approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Terrain Response Control Module and Instrument Panel Cluster (IPC)
U0139-08	Lost Communication With Suspension Control Module "B" - Bus Signal/Message Failures	▪ Bus signal/message failures	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Suspension Control Module and Instrument Panel Cluster (IPC)
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 Instrument Panel Cluster (IPC)
U0141-00	Lost Communication With Body Control Module "A" - no sub type information	▪ Power or ground circuit fault ▪ CAN Bus circuit fault ▪ Module internal failure	▪ Refer to the electrical circuit diagrams and check the power, ground and CAN Bus circuit to the body control module for fault. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0151-00	Lost Communication With Restraints 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

			approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Restraints Control Module and Instrument Panel Cluster (IPC)
U0159-00	Lost Communication With Parking Assist Control Module "A" - No sub type information	▪ CAN Link Instrument Panel Cluster (IPC) /parking aid module missing message	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 Parking Aid Module (PAM) and Instrument Panel Cluster (IPC)
U0164-00	Lost Communication With HVAC Control Module - No sub type information	▪ CAN Link Instrument Panel Cluster (IPC)/HVAC module missing message	▪ 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 Climate Control Module and Instrument Panel Cluster (IPC)
U0184-00	Lost Communication With Radio - no sub type information	▪ Power or ground circuit fault ▪ CAN Bus circuit fault ▪ Module internal failure	▪ Refer to the electrical circuit diagrams and check the power, ground and CAN Bus circuit to the audio head unit for fault. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0208-00	Lost Communication With "Seat Control Module A" - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the

			electrical circuit diagrams and check the CAN network between the Seat Control Module and Instrument Panel Cluster (IPC)
U0214-00	Lost Communication With Remote Function Actuation - 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 Remote Function Actuation Module and Instrument Panel Cluster (IPC)
U0232-00	Lost Communication With Side Obstacle Detection Control Module - Left - 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 Side Object Detection module and Instrument Panel Cluster (IPC)
U0241-00	Lost Communication With Headlamp Control Module "A" - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Headlamp Control Module and Instrument Panel Cluster (IPC)
U0242-00	Lost Communication With Headlamp Control Module "B" -	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground

	No sub type information		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 Headlamp Control Module and Instrument Panel Cluster (IPC)
U0264-00	Lost Communication With Camera Module-Rear - no sub type information	▪ Power or ground circuit fault ▪ CAN Bus circuit fault ▪ Module internal failure	▪ Refer to the electrical circuit diagrams and check the power, ground and CAN Bus circuit to the rear view camera for fault. Using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ No sub type information	▪ Check for other modules reporting CAN Bus off or lost communication faults. If other modules report problems, check the software version in the Central Junction Box using the manufacturers approved diagnostic system. If no other modules report problems, check the software version in the Instrument Panel Cluster (IPC). Update/configure as necessary
U0402-68	Invalid Data Received from TCM - Event information	▪ Event information	▪ Check for the Transmission Control Module (TCM) for related DTCs. Refer to relevant DTC index
U2013-02	Switch Pack - General signal failure	▪ Refer to the electrical circuit diagrams and check the LIN bus circuit	
U2013-08	Switch Pack - Bus Signal/Message Failures	▪ General signal failure	▪ Refer to the electrical circuit diagrams and check the LIN bus circuit

U3000-46	Control Module - Calibration/parameter memory failure	▪ Odometer reading on cluster is missing or incorrect - calibration / parameter memory failure	▪ Check the harness connector to the Instrument Panel Cluster (IPC) for security and integrity. Clear the DTC and retest. If the problem persists, renew the Instrument Panel Cluster (IPC). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U3000-49	Control Module - Internal electronic failure	▪ Internal electronic failure	▪ Check the harness connector to the Instrument Panel Cluster (IPC) for security and integrity. Clear the DTC and retest. If the problem persists, renew the Instrument Panel Cluster (IPC). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U3000-55	Control Module - Not configured	▪ Speedometer is inaccurate ▪ Tire size compensation is incorrectly configured	▪ 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	▪ Car configuration file missing message	▪ Configure the Car Configuration File (CCF) using the approved diagnostic system
U3002-81	Vehicle Identification Number - Invalid serial data received	▪ Invalid vehicle identification number	▪ Configure the Car Configuration File (CCF) using the approved diagnostic system
U3003-16	Control Module - Circuit voltage below threshold	▪ Circuit voltage below threshold (9V)	▪ 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 supply circuits to the module
U3003-17	Control Module - Circuit voltage above threshold	▪ Circuit voltage above threshold (16V)	▪ 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 supply circuits to the module
U3003-62	Control Module - Signal compare failure	▪ Signal compare failure	▪ 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 supply circuits to the module

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

DESCRIPTION AND OPERATION

NAVIGATION CONTROL MODULE (NCM)

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 Navigation Control Module (NCM). For additional diagnosis

logged in the Navigation Control Module (NCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and Testing section in the workshop manual.

For additional information, refer to: Navigation System (415-00 Information and Entertainment System - General Information, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B100F-25	Video Input "B" - Signal shape/waveform failure	▪ Rear proximity camera video input disconnected ▪ Camera malfunction	▪ Check the video signal connection and whether it is being broadcasted. Where available, configure the rear / proximity cameras using the approved diagnostic system. Check whether the rear / proximity cameras are broadcasting an image by entering touch screen diagnostics selecting 'Video Input Test' then press 'Rear View / Proximity Camera'. Check whether a clear image is displayed. Refer to the electrical circuit diagrams and check the video signal circuit between the rear / proximity cameras and the Camera Control Module ▪ If the problem persists, renew the camera or cameras. Clear the DTC and perform an on demand self test
B1010-25	Video Input "C" - Signal shape/waveform failure	▪ Television/Rear seat entertainment video input disconnected ▪ TV/DVD malfunction	▪ Check the video signal connection and whether it is being broadcasted. Where available, configure the TV or DVD using the manufacturers approved diagnostic system. Check whether the TV or Rear Seat Entertainment Module (RSE) is broadcasting an image by entering diagnostics selecting 'Video Input Test' then press 'TV/DVD'. Check whether a clear image is displayed. Refer to the electrical circuit diagrams and check the video signal circuit from the TV or Rear Seat Entertainment (RSE) module ▪ If the problem persists, renew the Television or Rear Seat

			the Television or Rear Seat Entertainment Module (RSE) or DVD 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
B108E-14	Display - Circuit short to ground or open	▪ Internal display circuit short circuit to ground, open circuit	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. If the DTC persists contact Dealer Technical Support (DTS)
B108E-17	Display - Circuit voltage above threshold	▪ Internal display circuit short circuit to ground, open circuit	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. If the DTC persists contact Dealer Technical Support (DTS)
B108E-1C	Display - Circuit voltage out of range	▪ Internal display circuit short circuit to ground, open circuit	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. If the DTC persists contact Dealer Technical Support (DTS)
B108E-87	Display- Missing message	▪ Display communication failure	▪ Clear the DTC and switch off the ignition. Allow sufficient time for the infotainment relay to power down and retest. If DTC persists reprogram the Front Entertainment Module (FEM)
B108E-88	Display - Bus off	▪ Bus off ▪ Front Entertainment Module (FEM) internal failure	▪ Clear the DTC and switch off the ignition. Allow sufficient time for the infotainment relay to power down and retest. If DTC persists renew the Front Entertainment Module (FEM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new

			module/component
B119F-11	GPS Antenna - Circuit short to ground	▪ Global Positioning System (GPS) antenna circuit short circuit to ground	▪ Check the global positioning system (GPS) [blue] connector to the Front Entertainment Module (FEM) for security and integrity. Check that the GPS antenna is not damaged. Refer to the electrical circuit diagrams and check the circuit between the GPS antenna and the Front Entertainment Module (FEM). Test the GPS outside in open space for more than 2 minutes after power on. Enter touch screen diagnostics and select ‘Next’, ‘Vehicle Information’ then 'GPS Information'. Check that HDOP is less than 5 and GPS satellites show more than 4 ‘P’s
B119F-13	GPS Antenna - Circuit open	▪ Antenna circuit open circuit ▪ Antenna not connected	▪ Check the global positioning system (GPS) [blue] connector to the Front Entertainment Module (FEM) for security and integrity. Check that the GPS antenna is not damaged. Refer to the electrical circuit diagrams and check the circuit between the GPS antenna and the Front Entertainment Module (FEM). Test the GPS outside in open space for more than 2 minutes after power on. Enter touch screen diagnostics and select ‘Next’, ‘Vehicle Information’ then 'GPS Information'. Check that HDOP is less than 5 and GPS satellites show more than 4 ‘P’s
B11A3-49	Gyroscope - Internal electronic failure	▪ Internal gyroscope failure	▪ Enter touch screen diagnostics and select ‘Next’, ‘Vehicle information’ then ‘Vehicle sensor’. Check that the Gyro sensor voltage is around 2500mV when stationary, but changes along the bearing when the car is moving while turning the

			steering wheel. If the Gyro sensor voltage or bearing does not change when the car is moving while turning the steering wheel renew the Front Entertainment Module (FEM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B121B-13	Keypad Input Switch - Circuit open	▪ Touch screen display input key circuit open circuit ▪ Touch screen display input key fault	▪ Check whether the input keys are working by entering the touch screen diagnostics and selecting 'Hard Key Test'. If one or more of the input keys do not respond (except audio off) renew the Front Entertainment 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
B121C-13	Hard Drive - Circuit open	▪ Module internal hard drive open circuit/not connected	▪ Check whether the Hard Drive is connected by entering the touch screen diagnostics selecting 'Next' then 'HDD Information'. Check that the hard drive serial number, operating time and model name appear. If the SMART test fails 'NG' renew the Front Entertainment Module (FEM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B121C-44	Hard Drive - Data memory failure	▪ internal hard drive data memory failure	▪ Check whether the Hard Drive is connected by entering the touch screen diagnostics selecting 'Next' then 'HDD Information'. Check that the hard drive

			serial number, operating time and model name appear. If the SMART test fails 'NG' renew the Front Entertainment Module (FEM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
B1D56-14	Antenna #3 - Circuit short to ground or open	▪ Vehicle Information and Communication Antenna (VICS) disconnected ▪ Vehicle Information and Communication Antenna (VICS) circuit short circuit to ground, open circuit	▪ Enter touch screen diagnostics and select 'Next', 'Vehicle information', 'VICS' then 'Radio Wave Beacon' and 'Infrared beacon'. Check that Time and Beacon number data are shown. Check that the Vehicle Information and Communication System (VICS) antenna or circuit is not damaged ▪ Refer to the electrical circuit diagrams and check the circuit between the Vehicle Information and Communication System (VICS) antenna and the Front Entertainment Module (FEM) for short to ground, open circuit
U1A01-56	Communication Link - Invalid/incomplete configuration	▪ Internal communication failure	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. If the DTC persists reprogram the Front Entertainment Module (FEM) ▪ If DTC still persists renew the Front Entertainment 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
U1A4B-82	Control Module Processor B -	▪ Internal communication	▪ Clear the DTC, switch off the ignition and allow sufficient

	Alive/sequence counter incorrect / not updated	failure	time for the infotainment relay to power down. Enter touch screen diagnostics and select 'Configurations'. Check that the vehicle type is displayed and the sub CPU SW version are shown. If the DTC persists reprogram the Front Entertainment Module (FEM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U1A4B-87	Control Module Processor B - Missing message	▪ Internal communication failure	▪ Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down. Re-configure the Front Entertainment Module (FEM) using the manufacturers approved diagnostic system ▪ If DTC persists renew the Front Entertainment Module (FEM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U2005-62	Vehicle Speed - Signal compare failure	▪ Vehicle speed and calculated GPS system vehicle speed mismatch ▪ Vehicle speed signal circuit between Anti-Lock Braking (ABS) Module and Navigation System Module (NAV) short to ground, short to power	▪ Check the Anti-Lock Braking (ABS) Module connector and wiring harness. using the manufacturer approved diagnostic system, enter diagnostics and select 'Vehicle Signals'. Check that the vehicle speeds both increase when the car is moving ▪ Refer to the electrical circuit diagrams and check vehicle speed signal circuit between the Anti-Lock Braking (ABS) Module and Navigation System Module (NAV) for short to ground, short to power, open circuit

U2101-00	Control Module Configuration Incompatible - No sub type information	▪ Car Configuration File (CCF) parameter mismatch ▪ Invalid/incomplete configuration	▪ Enter touch screen diagnostics and select 'Self Test' and wait for the test results to complete. The Car Configuration File (CCF) mismatch parameter(s) will be listed in the description with DTC 'U210100'. The Car Configuration File (CCF) parameters values for Brand, HLDF, MMMType, Navigation, MMMJapan, MMMFitted, MMMVariant, NavRegion, MMM3, VICS, GPSReceiver, Intercom, ParkingAidDisplay, HandOfDrive or AmbientLight can be found by entering the touch screen diagnostics 'Vehicle Configurations' and pressing 'Next' until the parameter is shown. Contact Dealer Technical Support (DTS) reporting the Car Configuration (CCF) parameter name and value ▪ Contact dealer technical support to assist in re-configuring the Car Configuration File (CCF) using the manufacturers approved diagnostic system. Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down
U2101-4A	Control Module Configuration Incompatible - Incorrect component installed	▪ Navigation map license mismatch ▪ Invalid/incomplete configuration	▪ If the map screen is not shown after entering diagnostics and pressing 'I Agree' then start routine 0x6024 'Update Map Configuration' with option 0x03. Allow 30 seconds for the routine to complete before entering the map screen. If a map screen is still not shown Contact Dealer Technical Support (DTS) ▪ Enter the navigation menu and select 'Map changer'. Check that the map regions match the Front Entertainment Module market. The Car

			Configuration File parameters values for MapConfiguration can be found by entering the touch screen diagnostics ‘Vehicle Configurations’ and pressing ‘Next’ until the parameter is shown. Contact Dealer Technical Support (DTS) to assist in re-configuring the Car Configuration File (CCF) for the map market using the manufacturers approved diagnostic system. Clear the DTC, switch off the ignition and allow sufficient time for the infotainment relay to power down
U210A-85	Temperature Sensor - Signal above allowable range	▪ Front Entertainment Module (FEM) over temperature ▪ Interior cabin over heating	▪ Cool the vehicle interior down by ensuring it is in the shade and have the A/C on cool. Enter touch screen diagnostics and select 'Vehicle Signals'. Check the Media Orientated System Transport (MOST) FOT temperature ▪ When cool, clear the DTC and retest
U3003-17	Battery Voltage - Circuit voltage above threshold	▪ Battery voltage above 16 volts	▪ 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 supply circuits to the module

GENERAL INFORMATION

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:

- 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 Occupant Classification System Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Air Bag Supplemental Restraint System (SRS) (501-20B Supplemental Restraint System, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION

B1193-53	Crash Event Storage Full and Locked - De-activated	▪ Event information, system deactivated ▪ A collision event has occurred ▪ Maximum number of events stored	▪ Clear DTC, cycle ignition and re-test. If DTC remains check for other DTCs and refer to relevant DTC Index
B1A54-01	Occupant Belt Tension Sensor - General electrical failure	▪ General signal failure ▪ Belt tension sensor has jammed for 3 seconds or longer ▪ Belt tension sensor failure	▪ Refer to the electrical circuit diagrams and check belt tension sensor circuit. Renew the safety belt buckle assembly
B1A54-02	Occupant Belt Tension Sensor - General signal failure	▪ General signal failure ▪ Pressure sensor signal short circuit to belt tension sensor signal at initialization ▪ Belt tension sensor failure	▪ Refer to the electrical circuit diagrams and check belt tension sensor circuit. Renew the safety belt buckle assembly
B1A54-11	Occupant Belt Tension Sensor - Circuit short to ground	▪ Pressure sensor circuit short circuit to ground for 3 seconds or longer ▪ Belt tension sensor failure	▪ Refer to the electrical circuit diagrams and check belt tension sensor circuit. Renew the safety belt buckle assembly
B1A54-12	Occupant Belt Tension Sensor - Circuit short to battery	▪ Pressure sensor circuit short circuit to power for 3 seconds or longer ▪ Belt tension sensor failure	▪ Refer to the electrical circuit diagrams and check belt tension sensor circuit. Renew the safety belt buckle assembly

B1A54-13	Occupant Belt Tension Sensor - Circuit open	▪ Pressure sensor circuit open circuit for 3 seconds or longer ▪ Belt tension sensor failure	▪ Refer to the electrical circuit diagrams and check belt tension sensor circuit. Renew the safety belt buckle assembly
B1A62-02	Pressure Sensor - General signal failure	▪ Occupant pressure sensor general signal failure ▪ Occupant pressure sensor signal short circuit to belt tension sensor signal at initialization ▪ Occupant pressure sensor failure	▪ Refer to the electrical guide and check the occupant pressure sensor circuit. Renew the sensor
B1A62-11	Pressure Sensor - Circuit short to ground	▪ Occupant pressure sensor signal short circuit to ground ▪ Restraints Control module fault	▪ Refer to the electrical guide and check the occupant pressure sensor circuit. Renew the Control module. Refer to the warranty policy and procedures manual if a module is suspect
B1A62-12	Pressure Sensor - Circuit short to battery	▪ Occupant pressure sensor signal short circuit to power ▪ Restraints Control module fault	▪ Refer to the electrical guide and check the occupant pressure sensor circuit. Renew the Control module. Refer to the warranty policy and procedures manual if a module is suspect
B1A62-7A	Pressure Sensor - Fluid leak or seal failure	▪ Occupant pressure sensor fluid leak or seal failure ▪ Restraints Control module fault	▪ Clear the DTC and retest. If the problem persists, renew the restraints Control module. Refer to the warranty policy and procedures manual if a module is suspect

B1A62-7B	Pressure Sensor - Low fluid level	▪ Occupant pressure sensor bladder low fluid level	▪ Renew the occupant pressure sensor
U0001-00	High Speed CAN Communication Bus - No sub type information	▪ Bus off ▪ CAN High and CAN Low are shorted together	▪ 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
U0151-00	Lost Communication With Restraints Control Module - No sub type information	▪ Lost communications - CAN or hardwired ▪ Restraints Control module 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 between the Restraints Control Module and Safety Belt System
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Module is not configured correctly ▪ Master config ID does not correspond	▪ Check correct occupancy classification system module is installed for vehicle specification. Check for other DTCs and refer to relevant DTC Index. Configure the module using the approved diagnostic system
U3000-04	Control Module - System internal failures	▪ Restraints Control module fault	▪ Renew the occupancy classification system module. Refer to the warranty policy and procedures manual if a module is suspect
U3000-51	Control Module - Not programmed	▪ Restraints Control module not configured ▪ Can also be set by a harness fault	▪ Configure the module using the approved diagnostic system
U3000-54	Control module - Missing calibration	▪ Missing calibration ▪ Empty seat calibration	▪ Configure the module using the approved diagnostic system

		required	
U3003-16	Battery Voltage - Circuit voltage below threshold	▪ Battery voltage below threshold (8 volts)	▪ Check vehicle battery and charging system. Refer to the relevant section in the workshop manual
U3003-17	Battery Voltage - Circuit voltage above threshold	▪ Battery voltage above threshold (18 volts)	▪ 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 supply circuits to the module

GENERAL INFORMATION

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

- 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 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	▪ General electric failure ▪ Signal circuit short circuit to ground ▪ Signal circuit high resistance ▪ Connecter/harness problem ▪ Sensor missing	▪ If DTCs B1B3601, B1B3801, B1B4001 and B1B4201 are all present, check the car configuration file and vehicle specification to ensure front sensors have been specified. If correctly specified, check that front bumper has sensors and wiring loom installed. Check the front bumper wiring harness connector to main wiring loom for security and integrity. Check the connecters to the parking aid module for security and integrity. Clear DTCs and power up parking aid system and confirm problem resolution. If problem persists, check the car configuration file to ensure correct configuration for front and rear sensors relative to installed vehicle specification

			installed vehicle specification. Check whether the correct parking aid module has been installed to the vehicle. Check the correct/latest software has been installed. Correct the car configuration file or update to the correct software, clear DTCs, power up parking aid system and confirm problem resolution. Refer to the electrical circuit diagrams and check the front bumper harness for short circuit between signal and ground wires within harness. Check the front bumper harness for short circuit to bodywork or other grounded components (chafing). Check the wiring and sensor connecters for integrity and damage, then re-connect sensor and confirm connection (connector latched). Clear DTC, power up parking aid system and check corrective action. If the problem persists then renew the sensor. Clear DTC, power up parking aid system and check corrective action
B1B36-12	Front Right Outer Sensor - Circuit short to battery	▪ Signal circuit short circuit to power	▪ Check front bumper harness for signs of damage. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the front right outer sensor only
B1B36-96	Front Right Outer Sensor - Component internal failure	▪ Component internal failure	▪ Check front bumper harness for signs of damage. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the front right outer sensor only

B1B38-01	Front Right Inner Sensor - General electrical failure	▪ General electric failure ▪ Signal circuit short circuit to ground ▪ Signal circuit high resistance ▪ Connecter/harness problem	▪ If DTCs B1B3601, B1B3801, B1B4001 and B1B4201 are all present, check the car configuration file and vehicle specification to ensure front sensors have been specified. If correctly specified, check that front bumper has sensors and wiring loom installed. Check the front bumper wiring harness connector to main wiring loom for security and integrity. Check the connecters to the parking aid module for security and integrity. Clear DTCs and power up parking aid system and confirm problem resolution. If problem persists, check the car configuration file to ensure correct configuration for front and rear sensors relative to installed vehicle specification. Check whether the correct parking aid module has been installed to the vehicle. Check the correct/latest software has been installed. Correct the car configuration file or update to the correct software, clear DTCs, power up parking aid system and confirm problem resolution. Refer to the electrical circuit diagrams and check the front bumper harness for short circuit between signal and ground wires within harness. Check the front bumper harness for short circuit to bodywork or other grounded components (chafing). Check the wiring and sensor connecters for integrity and damage, then re-connect sensor and confirm connection (connector latched). Clear DTC, power up parking aid system and check corrective action. If the problem persists then renew the sensor. Clear DTC, power up parking aid system and check corrective action
B1B38-12	Front Right Inner Sensor - Circuit short to battery	▪ Signal circuit short circuit to power	▪ Check front bumper harness for signs of damage. Check the connecter for integrity and damage, then re-connect sensor

	battery		damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the front right inner sensor only
B1B38-96	Front Right Inner Sensor - Component internal failure	▪ Component internal failure	▪ Check front bumper harness for signs of damage. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the front right inner sensor only
B1B40-01	Front Left Outer Sensor - General electrical failure	▪ General electric failure ▪ Signal circuit short circuit to ground ▪ Signal circuit high resistance ▪ Connecter/harness problem	▪ If DTCs B1B3601, B1B3801, B1B4001 and B1B4201 are all present, check the car configuration file and vehicle specification to ensure front sensors have been specified. If correctly specified, check that front bumper has sensors and wiring loom installed. Check the front bumper wiring harness connector to main wiring loom for security and integrity. Check the connecters to the parking aid module for security and integrity. Clear DTCs and power up parking aid system and confirm problem resolution. If problem persists, check the car configuration file to ensure correct configuration for front and rear sensors relative to installed vehicle specification. Check whether the correct parking aid module has been installed to the vehicle. Check the correct/latest software has been installed. Correct the car configuration file or update to the correct software, clear DTCs, power up parking aid system and confirm problem resolution. Refer to the electrical circuit diagrams and check the front bumper harness

			check the front bumper harness for short circuit between signal and ground wires within harness. Check the front bumper harness for short circuit to bodywork or other grounded components (chafing). Check the wiring and sensor connecters for integrity and damage, then re-connect sensor and confirm connection (connector latched). Clear DTC, power up parking aid system and check corrective action. If the problem persists then renew the sensor. Clear DTC, power up parking aid system and check corrective action
B1B40-12	Front Left Outer Sensor - Circuit short to battery	▪ Signal circuit short circuit to power	▪ Check front bumper harness for signs of damage. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the front left outer sensor only
B1B40-96	Front Left Outer Sensor - Component internal failure	▪ Component internal failure	▪ Check front bumper harness for signs of damage. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the front left outer sensor only
B1B42-01	Front Left Inner Sensor - General electrical failure	▪ General electric failure ▪ Signal circuit short circuit to ground ▪ Signal circuit high resistance ▪ Connecter/harness problem	▪ If DTCs B1B3601, B1B3801, B1B4001 and B1B4201 are all present, check the car configuration file and vehicle specification to ensure front sensors have been specified. If correctly specified, check that front bumper has sensors and wiring loom installed. Check the front bumper wiring harness connector to main wiring loom

			connector to main wiring loom for security and integrity. Check the connecters to the parking aid module for security and integrity. Clear DTCs and power up parking aid system and confirm problem resolution. If problem persists, check the car configuration file to ensure correct configuration for front and rear sensors relative to installed vehicle specification. Check whether the correct parking aid module has been installed to the vehicle. Check the correct/latest software has been installed. Correct the car configuration file or update to the correct software, clear DTCs, power up parking aid system and confirm problem resolution. Refer to the electrical circuit diagrams and check the front bumper harness for short circuit between signal and ground wires within harness. Check the front bumper harness for short circuit to bodywork or other grounded components (chafing). Check the wiring and sensor connecters for integrity and damage, then re-connect sensor and confirm connection (connector latched). Clear DTC, power up parking aid system and check corrective action. If the problem persists then renew the sensor. Clear DTC, power up parking aid system and check corrective action
B1B42-12	Front Left Inner Sensor - Circuit short to battery	▪ Signal circuit short circuit to power	▪ Check front bumper harness for signs of damage. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the front left inner sensor only
B1B42-96	Front Left Inner Sensor	▪ Component internal failure	▪ Check front bumper harness for signs of damage. Check the

96	Sensor - Component internal failure	internal failure	signs of damage. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the front left inner sensor only
B1B44-01	Rear Right Outer Sensor - General electrical failure	▪ General electric failure ▪ Signal circuit short circuit to ground ▪ Signal circuit high resistance ▪ Connecter/harness problem	▪ If DTCs B1B3601, B1B3801, B1B4001 and B1B4201 are all present, check the car configuration file and vehicle specification to ensure front sensors have been specified. If correctly specified, check that front bumper has sensors and wiring loom installed. Check the front bumper wiring harness connector to main wiring loom for security and integrity. Check the connecters to the parking aid module for security and integrity. Clear DTCs and power up parking aid system and confirm problem resolution. If problem persists, check the car configuration file to ensure correct configuration for front and rear sensors relative to installed vehicle specification. Check whether the correct parking aid module has been installed to the vehicle. Check the correct/latest software has been installed. Correct the car configuration file or update to the correct software, clear DTCs, power up parking aid system and confirm problem resolution. Refer to the electrical circuit diagrams and check the front bumper harness for short circuit between signal and ground wires within harness. Check the front bumper harness for short circuit to bodywork or other grounded components (chafing). Check the wiring and sensor connecters for integrity and damage, then re-connect sensor and confirm connection (connector latched). Clear DTC, power up parking aid system

			power up parking aid system and check corrective action. If the problem persists then renew the sensor. Clear DTC, power up parking aid system and check corrective action
B1B44-12	Rear Right Outer Sensor - Circuit short to battery	▪ Signal circuit short circuit to power	▪ Check rear bumper harness. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the rear right outer sensor only
B1B44-96	Rear Right Outer Sensor - Component internal failure	▪ Component internal failure	▪ Check rear bumper harness. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the rear right outer sensor only
B1B46-01	Rear Right Inner Sensor - General electrical failure	▪ General electric failure ▪ Signal circuit short circuit to ground ▪ Signal circuit high resistance ▪ Connecter/harness problem	▪ If DTCs B1B3601, B1B3801, B1B4001 and B1B4201 are all present, check the car configuration file and vehicle specification to ensure front sensors have been specified. If correctly specified, check that front bumper has sensors and wiring loom installed. Check the front bumper wiring harness connector to main wiring loom for security and integrity. Check the connecters to the parking aid module for security and integrity. Clear DTCs and power up parking aid system and confirm problem resolution. If problem persists, check the car configuration file to ensure correct configuration for front and rear sensors relative to installed vehicle specification. Check whether the correct

			Check whether the correct parking aid module has been installed to the vehicle. Check the correct/latest software has been installed. Correct the car configuration file or update to the correct software, clear DTCs, power up parking aid system and confirm problem resolution. Refer to the electrical circuit diagrams and check the front bumper harness for short circuit between signal and ground wires within harness. Check the front bumper harness for short circuit to bodywork or other grounded components (chafing). Check the wiring and sensor connecters for integrity and damage, then re-connect sensor and confirm connection (connector latched). Clear DTC, power up parking aid system and check corrective action. If the problem persists then renew the sensor. Clear DTC, power up parking aid system and check corrective action
B1B46-12	Rear Right Inner Sensor - Circuit short to battery	▪ Signal circuit short circuit to power	▪ Check rear bumper harness. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the rear right inner sensor only
B1B46-96	Rear Right Inner Sensor - Component internal failure	▪ Component internal failure	▪ Check rear bumper harness. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the rear right inner sensor only

B1B48-01	Rear Left Outer Sensor - General electrical failure	▪ General electric failure ▪ Signal circuit short circuit to ground ▪ Signal circuit high resistance ▪ Connecter/harness problem	▪ If DTCs B1B3601, B1B3801, B1B4001 and B1B4201 are all present, check the car configuration file and vehicle specification to ensure front sensors have been specified. If correctly specified, check that front bumper has sensors and wiring loom installed. Check the front bumper wiring harness connector to main wiring loom for security and integrity. Check the connecters to the parking aid module for security and integrity. Clear DTCs and power up parking aid system and confirm problem resolution. If problem persists, check the car configuration file to ensure correct configuration for front and rear sensors relative to installed vehicle specification. Check whether the correct parking aid module has been installed to the vehicle. Check the correct/latest software has been installed. Correct the car configuration file or update to the correct software, clear DTCs, power up parking aid system and confirm problem resolution. Refer to the electrical circuit diagrams and check the front bumper harness for short circuit between signal and ground wires within harness. Check the front bumper harness for short circuit to bodywork or other grounded components (chafing). Check the wiring and sensor connecters for integrity and damage, then re-connect sensor and confirm connection (connector latched). Clear DTC, power up parking aid system and check corrective action. If the problem persists then renew the sensor. Clear DTC, power up parking aid system and check corrective action
B1B48-12	Rear Left Outer Sensor - Circuit short to battery	▪ Signal circuit short circuit to power	▪ Check rear bumper harness. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to

			connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the rear left outer sensor only
B1B48-96	Rear Left Outer Sensor - Component internal failure	▪ Component internal failure	▪ Check rear bumper harness. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the rear left outer sensor only
B1B50-01	Rear Left Inner Sensor - General electrical failure	▪ General electric failure ▪ Signal circuit short circuit to ground ▪ Signal circuit high resistance ▪ Connecter/harness problem	▪ If DTCs B1B3601, B1B3801, B1B4001 and B1B4201 are all present, check the car configuration file and vehicle specification to ensure front sensors have been specified. If correctly specified, check that front bumper has sensors and wiring loom installed. Check the front bumper wiring harness connector to main wiring loom for security and integrity. Check the connecters to the parking aid module for security and integrity. Clear DTCs and power up parking aid system and confirm problem resolution. If problem persists, check the car configuration file to ensure correct configuration for front and rear sensors relative to installed vehicle specification. Check whether the correct parking aid module has been installed to the vehicle. Check the correct/latest software has been installed. Correct the car configuration file or update to the correct software, clear DTCs, power up parking aid system and confirm problem resolution. Refer to the electrical circuit diagrams and check the front bumper harness for short circuit between signal

			for short circuit between signal and ground wires within harness. Check the front bumper harness for short circuit to bodywork or other grounded components (chafing). Check the wiring and sensor connecters for integrity and damage, then re-connect sensor and confirm connection (connector latched). Clear DTC, power up parking aid system and check corrective action. If the problem persists then renew the sensor. Clear DTC, power up parking aid system and check corrective action
B1B50-12	Rear Left Inner Sensor - Circuit short to battery	▪ Signal circuit short circuit to power	▪ Check rear bumper harness. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the rear left inner sensor only
B1B50-96	Rear Left Inner Sensor - Component internal failure	▪ Component internal failure	▪ Check rear bumper harness. Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sensor circuit. If the problem persists, renew the rear left inner sensor only
B1B52-01	Rear Sounder - Park Aid - General electrical failure	▪ General electric failure ▪ Signal circuit short circuit to ground ▪ Signal circuit high resistance ▪ Connecter/harness problem	▪ Check the connecter for integrity and damage, then re-connect sounder to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sounder circuit. If the problem persists, renew the sounder only

B1B52-12	Rear Sounder - Park Aid - Circuit short to battery	▪ Signal circuit short circuit to ground	▪ Check the connecter for integrity and damage, then re-connect sounder to confirm connection. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the sounder circuit. If the problem persists, renew the sounder only
B1B54-11	Function LED - Park Aid - Circuit short to ground	▪ Signal circuit short circuit to ground	▪ Check the parking aid switch and LED functionality. Refer to the electrical circuit diagrams and check the circuit. Repair/renew as necessary
B1B54-12	Function LED - Park Aid - Circuit short to battery	▪ Signal circuit short circuit to power	▪ Check the parking aid switch and LED functionality. Refer to the electrical circuit diagrams and check the circuit. Repair/renew as necessary
B1B57-11	Front Sensors Power Circuit - Circuit short to ground	▪ Front sensor power circuit short circuit to ground ▪ Connecter/harness problem	▪ Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Check the connector. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the front bumper circuit. If the problem persists, renew the sounder only
B1B58-11	Rear Sensors Power Circuit - Circuit short to ground	▪ Rear sensor power circuit short circuit to ground ▪ Connecter/harness problem	▪ Check the connecter for integrity and damage, then re-connect sensor to confirm connection. Check the connector. Cycle ignition to power up parking aid system and check corrective action. Refer to the electrical circuit diagrams and check the rear bumper circuit. If the problem persists, renew the sounder only
B1C30-73	Disable Switch - Actuator stuck closed	▪ Actuator stuck closed	▪ Check the switch function. Refer to the electrical circuit diagrams and check the circuit

U0010-00	Medium Speed CAN Communication Bus - No sub type information	▪ Medium speed can bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	▪ Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ Central junction box power or ground circuit open circuit, high resistance ▪ Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Central junction box system fault	▪ Refer to the electrical circuit diagrams and check the central junction box module power and ground circuits for open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0140-87	Lost Communication With Body Control Module - Missing message	▪ Central junction box power or ground circuit open circuit, high resistance ▪ Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Central junction box system fault	▪ Refer to the electrical circuit diagrams and check the central junction box power and ground circuits for open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0142-00	Lost Communication With Body	▪ Central junction box power or ground circuit	▪ Refer to the electrical circuit diagrams and check the central junction box module power and

	Control Module "B" - No sub type information	open circuit, high resistance ▪ Medium speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Central junction box system fault	ground circuits for open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information	▪ CAN Link ECM/IPC network malfunction	▪ Check for other modules reporting CAN Bus off or lost communication faults. Check CAN wiring. Where available, using the manufacturer approved diagnostic system, complete a CAN integrity test. Refer to the electrical circuit diagrams and check the module CAN, power and ground circuits. Refer to the Network Communications section of the workshop manual
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Car configuration file mismatch with vehicle specification ▪ Incorrect parking aid module installed	▪ Using the manufacturer approved diagnostic system, check and update the car configuration file as necessary ▪ Install a new parking aid module as necessary
U0422-00	Invalid Data Received From Body Control Module - No sub type information	▪ Missing/invalid data from the central junction box	▪ Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0423-00	Invalid Data Received From Instrument Panel Control Module - No sub type information	▪ Missing/invalid data from the instrument cluster	▪ Using the manufacturer approved diagnostic system, check the instrument cluster for related DTCs and refer to the relevant DTC index

U0443-00	Invalid Data Received From Body Control Module "B" - No sub type information	▪ Missing/invalid data from the central junction box	▪ Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
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 ▪ 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	▪ Car configuration file information incompatible to blindspot monitoring control modules	▪ Check and amend the car configuration file as required using the manufacturer approved diagnostic system
U3000-49	Control Module - Internal electronic failure	▪ Audio unit internal electronic failure (internal error)	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the module. 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
U3002-81	Vehicle Identification Number - Invalid serial data received	▪ Invalid serial data received	▪ Configure the module using the manufacturers approved diagnostic system
U3003-62	Battery Voltage - Signal compare failure	▪ Signal compare failure	▪ Check vehicle battery connections and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power supply circuits to the module

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

DESCRIPTION AND OPERATION

PARKING BRAKE MODULE (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 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 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).

NOTE:

Where reference is made to a drive cycle test, refer to the relevant Diagnosis and Testing Section

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
C0062-01	Longitudinal Acceleration Sensor - General electrical failure	▪ General electrical failure	▪ Check the electrical connections to the sensor. Clear the DTC and retest. If the problem persists, renew the sensor
C0062-02	Longitudinal Acceleration Sensor - General signal failure	▪ General signal failure	▪ Check the electrical connections to the sensor. Clear the DTC and retest. If the problem persists, renew the sensor
C0062-54	Longitudinal Acceleration Sensor - Missing calibration	▪ Missing calibration	▪ Check the electrical connections to the sensor. Calibrate the sensor using the manufacturers approved diagnostic system
C1104-68	Brake Bedding Mode - Event information	▪ Event information ▪ Brake bedding mode has been entered	▪ This is not a fault. This is where the parking brake bedding-in mode has been activated. For information on how the bedding-in mode is activated and deactivated, refer to the relevant section in the workshop manual

C1A43-01	Motor Supply - General electrical failure	**NOTE:** The electric motor is part of the parking brake actuator module ▪ Internal motor circuit fault	▪ Clear DTCs, complete drive cycle 3 to test for normal operation, refer to the relevant drive cycle shown below this table. Refer to the warranty policy and procedures manual if a module is suspect
C1A43-19	Motor Supply - Circuit current above threshold	▪ Circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the circuit. Check the power and ground connections to the modules
C1A43-67	Motor Supply - Signal incorrect after event	▪ Signal incorrect after event	▪ Check the functionality of the park brake. Check for other related DTCs. Clear the DTC and retest. If the problem persists, renew the park brake actuator
C1A46-01	Mismatch Between Motor Drive Current and Resultant Force - General electrical failure	▪ General electrical failure	▪ Check the functionality of the park brake. Check for other related DTCs. Clear the DTC and retest. If the problem persists, renew the park brake actuator
C1A46-64	Mismatch Between Motor Drive Current and Resultant Force - Signal plausibility failure	▪ Signal plausibility failure	▪ Check the functionality of the park brake. Check for other related DTCs. Clear the DTC and retest. If the problem persists, renew the park brake actuator
C1A47-01	Force Sensor - General electrical failure	**NOTE:** The force sensor is part of the parking brake actuator module ▪ Internal force sensor	▪ Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. Refer to the warranty policy and procedures manual if a module is suspect

		electrical fault	
C1A47-02	Force Sensor - General signal failure	**NOTE:** The force sensor is part of the parking brake actuator module ▪ Internal force sensor plausibility failure	▪ Clear DTCs, complete drive cycle 3 to test for normal operation, refer to the relevant drive cycle shown below this table. Refer to the warranty policy and procedures manual if a module is suspect
C1A47-54	Force Sensor - Missing calibration	**NOTE:** The force sensor is part of the parking brake actuator module ▪ Internal force sensor not calibrated	▪ Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. Refer to the warranty policy and procedures manual if a module is suspect
C1A48-01	Warning Lamp - General electrical failure	▪ Parking brake actuator module to instrument cluster warning lamp circuit open circuit ▪ Parking brake actuator module to instrument cluster warning lamp circuit short circuit to ground ▪ Parking brake actuator module to instrument cluster warning lamp circuit short circuit to power ▪ Parking brake actuator module fault ▪ Instrument cluster fault	▪ Check the parking brake actuator module to instrument cluster warning lamp circuit. Refer to the electrical circuit diagrams. Rectify as necessary. Refer to the warranty policy and procedures manual if a module is suspect. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table

C1A53-68	Manual Emergency Release Activated - Event information	▪ Emergency release cable activated and stuck/damaged ▪ Parking brake cables seized/damaged ▪ Actuator jammed	▪ Check that the emergency release cable is not permanently pulled (or stuck). Check the parking brake cables for broken or loose connections. Attempt to re-engage the parking brake by pulling the apply switch TWICE. Clear DTCs, complete the following drive cycle. Pull the parking brake emergency release cable. Pull the parking brake switch to the apply position, hold until the parking brake motor has stopped (this may take up to 20 seconds). Release the switch to idle position. For parking brake actuator module manual emergency release
U0073-88	Control Module Communication Bus "A" Off - Bus off	▪ High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance	▪ 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 power or ground circuit open circuit, high resistance ▪ High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Engine system fault	▪ Refer to the electrical circuit diagrams and check the engine control module power and ground circuits for open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index

U0101-00	Lost Communication with TCM - No sub type information	▪ Transmission control module power or ground circuit open circuit, high resistance ▪ High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transmission system fault	▪ Refer to the electrical circuit diagrams and check the transmission control module power and ground circuits for open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and refer to the relevant DTC index
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	▪ Transfer case control module power or ground circuit open circuit, high resistance ▪ High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case system fault	▪ Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, check the transfer case control module for related DTCs and refer to the relevant DTC index
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	▪ Anti-lock brake system control module power or ground circuit open circuit, high resistance ▪ High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit	▪ Refer to the electrical circuit diagrams and check the anti-lock brake system control module power and ground circuits for open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and

		power, open circuit, high resistance ▪ Anti-lock brake system fault	electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ Central junction box power or ground circuit open circuit, high resistance ▪ High speed CAN bus circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Central junction box system fault	▪ Refer to the electrical circuit diagrams and check the central junction box power and ground circuits for open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, perform a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN bus circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U0300-55	Internal Control Module Software Incompatibility - Not configured	▪ Parking brake module configuration does not match vehicle configuration ▪ Parking brake actuator module fault	▪ Check that the correct module is installed to the vehicle. Check that the car configuration file (CCF) is being used. Configure the module(s) using the approved diagnostic system
U0401-00	Invalid Data Received From ECM/PCM A - No sub type information	▪ Missing/invalid data from the engine control module	▪ Using the manufacturer approved diagnostic system, check the engine control module for related DTCs and refer to the relevant DTC index
U0402-00	Invalid data received from the TCM - No sub type	▪ Missing/invalid data from the transmission control module	▪ Using the manufacturer approved diagnostic system, check the transmission control module for related DTCs and

	information		refer to the relevant DTC index
U0403-00	Invalid Data Received From The Transfer Case Control Module - No sub type information	▪ Missing/invalid data from the transfer case control module	▪ Using the manufacturer approved diagnostic system, check the transfer case control module for related DTCs and refer to the relevant DTC index
U0415-00	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - No sub type information	▪ Missing/invalid data from the anti-lock brake system control module	▪ Using the manufacturer approved diagnostic system, check the anti-lock brake system control module for related DTCs and refer to the relevant DTC index
U0422-00	Invalid Data Received From Body Control Module - No sub type information	▪ Missing/invalid data from the central junction box	▪ Using the manufacturer approved diagnostic system, check the central junction box for related DTCs and refer to the relevant DTC index
U1A14-49	CAN Initialization Failure - Internal electronic failure	▪ CAN error ▪ Parking brake actuator module fault	▪ Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. Refer to the warranty policy and procedures manual if a module is suspect
U2002-01	Switch - General electrical failure	**NOTE:** This DTC can be set by very slow operation of the electric park brake switch ▪ Electric park brake switch needs to reset ▪ Electric park brake switch contaminated ▪ Electric park brake switch connector damaged, corroded or backed out	▪ With the ignition set to on, apply the electric park brake for a minimum of 10 seconds, then release. Clear the DTC and retest ▪ Check for any contamination/debris that may be causing the electric park brake switch to be stuck ▪ Disconnect the electric park brake switch and check for connector damage, corroded or backed out terminals. Clear the DTC and retest ▪ Refer to the electrical circuit diagrams and check the electric park brake switch circuits for short circuit to ground, short circuit to power, open circuit, high resistance

		or backed out terminals ▪ Electric park brake switch circuits short circuit to ground, short circuit to power, open circuit, high resistance ▪ Electric park brake switch internal failure	open circuit, high resistance ▪ Check and install a new electric park brake switch as necessary. Clear DTCs and complete drive cycle 1 as described in section 206-05 Diagnosis and Testing and test for normal operation
U2002-12	Switch - Circuit short to battery	▪ Electric park brake switch needs to reset ▪ Electric park brake switch contaminated ▪ Electric park brake switch connector damaged, corroded or backed out terminals ▪ Electric park brake switch circuit short circuit to power ▪ Electric park brake switch internal failure	▪ With the ignition set to on, apply the electric park brake for a minimum of 10 seconds, then release. Clear the DTC and retest ▪ Check for any contamination/debris that may be causing the electric park brake switch to be stuck ▪ Disconnect the electric park brake switch and check for connector damage, corroded or backed out terminals. Clear the DTC and retest ▪ Refer to the electrical circuit diagrams and check the electric park brake switch circuit for short circuit to power ▪ Check and install a new electric park brake switch as necessary. Clear DTCs and complete drive cycle 1 as described in section 206-05 Diagnosis and Testing and test for normal operation
U2002-2F	Switch - Signal erratic	**NOTE:** This DTC can be set by very slow operation of the electric park brake switch ▪ Electric park brake switch needs to reset	▪ With the ignition set to on, apply the electric park brake for a minimum of 10 seconds, then release. Clear the DTC and retest ▪ Check for any contamination/debris that may be causing the electric park brake switch to be stuck ▪ Disconnect the electric park brake switch and check for connector damage, corroded or backed out terminals. Clear

		reset - Electric park brake switch contaminated - Electric park brake switch connector damaged, corroded or backed out terminals - Electric park brake switch circuits short circuit to ground, short circuit to power, open circuit, high resistance - Electric park brake switch internal failure	the DTC and retest - Refer to the electrical circuit diagrams and check the electric park brake switch circuits for short circuit to ground, short circuit to power, open circuit, high resistance - Check and install a new electric park brake switch as necessary. Clear DTCs and complete drive cycle 1 as described in section 206-05 Diagnosis and Testing and test for normal operation
U2002-92	Switch - Performance or incorrect operation	**NOTE:** This DTC can be set by very slow operation of the electric park brake switch - Electric park brake switch needs to reset - Electric park brake switch contaminated - Electric park brake switch connector damaged, corroded or backed out terminals - Electric park brake switch circuits short circuit to ground, short circuit to power, open circuit, high resistance - Electric park brake switch internal failure	- With the ignition set to on, apply the electric park brake for a minimum of 10 seconds, then release. Clear the DTC and retest - Check for any contamination/debris that may be causing the electric park brake switch to be stuck - Disconnect the electric park brake switch and check for connector damage, corroded or backed out terminals. Clear the DTC and retest - Refer to the electrical circuit diagrams and check the electric park brake switch circuits for short circuit to ground, short circuit to power, open circuit, high resistance - Check and install a new electric park brake switch as necessary. Clear DTCs and complete drive cycle 1 as described in section 206-05 Diagnosis and Testing and test for normal operation
U2012-00	Car Configuration Parameter(s)	- Module incorrectly programmed	- Check/amend the Car Configuration File using the manufacturer approved

	Parameter(s) - No sub type information		manufacturer approved diagnostic system
U3000-00	Control Module - No sub type information	▪ General electric failure	▪ Check the control module connections for security and serviceability. Clear the DTC and retest
U3000-16	Control Module - Circuit voltage below threshold	▪ Control module circuit voltage below threshold: ▪ Voltage less than (master control module voltage - 2V) for > 10 seconds ▪ Battery voltage low ▪ Control module circuit High resistance	▪ Check the battery condition and state of charge. Refer to the relevant section of the workshop manual. Check the module power and ground circuits. Refer to the electrical circuit diagrams
U3000-17	Control Module - Circuit voltage above threshold	▪ Control module circuit voltage above threshold ▪ Battery voltage high (overcharging) ▪ Control module circuit short circuit to power	▪ Check the battery condition and state of charge. Refer to the relevant section of the workshop manual. Check the module power and ground circuits. Refer to the electrical circuit diagrams
U3000-4B	Control Module - Over temperature	▪ Control module over temperature	▪ Allow the unit to cool, clear the DTC and retest. Do not renew the modulator as this is a protection function to ensure no internal damage occurs
U300A-64	Ignition Switch - Signal plausibility failure	▪ Signal plausibility failure	▪ Check the ignition switch connections. Check the circuit between the ignition switch and the parking brake module. Refer to the electrical circuit diagrams. Clear the DTC and retest

GENERAL INFORMATION

DESCRIPTION AND OPERATION

PORTABLE AUDIO INTERFACE MODULE (APIM)

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 Portable Audio Interface 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
U3000-13	Control Module - Circuit open	▪ Universal serial bus (USB) harness between portable audio interface panel and user interface panel is not properly connected ▪ Connection - detect circuit between portable audio interface panel and user interface panel is not grounded ▪ 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 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
U3000-45	Control Module -	▪ Portable audio	▪ Suspect the portable audio interface module. Check and install a new module

	Module Program memory failure	audio interface module internal flash memory failure	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

GENERAL INFORMATION

DESCRIPTION AND OPERATION

REAR CLIMATE CONTROL MODULE (RHVAC)

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

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 Climate Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Climate Control System (412-00 Climate Control System - General Information, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B1A59-11	Sensor 5 Volt Supply - Circuit short to ground	▪ Face/feet air distribution motor 5 volt supply short circuit to ground	▪ Refer to the electrical circuit diagrams and check the Face/feet air distribution motor 5 volt supply circuit
B1A67-13	Sensor Ground - Circuit open	▪ Face/feet air distribution motor and evaporator sensor ground circuit open circuit	▪ Refer to the electrical circuit diagrams and check Face/feet air distribution motor and evaporator sensor ground circuit

B1B7B-01	Left Rear Air Blend Actuator - General electrical failure	▪ Left rear air blend actuator motor locked	▪ Refer to the electrical circuit diagrams and check Left rear air blend actuator motor circuits for open, short circuit. Check the actuator linkage for obstructions or restrictions to movement. Check the motor connecter for security and serviceability. Renew the motor
B1B7B-11	Left Rear Air Blend Actuator - Circuit short to ground	▪ Left rear air blend actuator motor circuit short to ground	▪ Refer to the electrical circuit diagrams and check the motor position (AML) circuit between the rear air conditioning switch pack and the mode motor
B1B7B-15	Left Rear Air Blend Actuator - Circuit short to battery or open	▪ Left rear air blend actuator motor circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the motor position (AM) circuit between the rear air conditioning switch pack and the mode motor
B1B7C-01	Right Rear Air Blend Actuator - General electrical failure	▪ Right rear air blend actuator motor locked	▪ Refer to the electrical circuit diagrams and check Right rear air blend actuator motor circuits for open, short circuit. Check the actuator linkage for obstructions or restrictions to movement. Check the motor connecter for security and serviceability. Renew the motor
B1B7C-11	Right Rear Air Blend Actuator - Circuit short to ground	▪ Right rear air blend actuator motor circuit short to ground	▪ Refer to the electrical circuit diagrams and check the motor position (AMR) circuit between the rear air conditioning switch pack and the mode motor
B1B7C-15	Right Rear Air Blend Actuator - Circuit short to battery or open	▪ Right rear air blend actuator motor circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the motor position (AMR) circuit between the rear air conditioning switch pack and the mode motor
B1B7D-01	Rear Air Distribution Actuator - General electrical failure	▪ Rear air distribution actuator motor locked	▪ Refer to the electrical circuit diagrams and check rear air distribution actuator circuits for open, short circuit. Check the actuator linkage for obstructions or restrictions to movement. Check the motor connecter for security and serviceability. Renew the

			and serviceability. Renew the motor
B1B7D-11	Rear Air Distribution Actuator - Circuit short to ground	▪ Rear air distribution actuator motor circuit short to ground	▪ Refer to the electrical circuit diagrams and check the face/feet air distribution motor position (AO) circuit between the rear air conditioning switch pack and the mode motor
B1B7D-15	Rear Air Distribution Actuator - Circuit short to battery or open	▪ Rear air distribution actuator motor circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the face/feet air distribution motor position (AO) circuit between the rear air conditioning switch pack and the mode motor
B1B81-11	Rear Evaporator Temperature Sensor - Circuit short to ground	▪ Rear evaporator temperature sensor circuit short to ground	▪ Refer to the electrical circuit diagrams and check the sensor circuit. Renew the sensor
B1B81-15	Rear Evaporator Temperature Sensor - Circuit short to battery or open	▪ Rear evaporator temperature sensor circuit short to power	▪ Refer to the electrical circuit diagrams and check the sensor circuit. Renew the sensor
B1C0A-09	Rear Control panel - Component Failures	▪ Component failure	▪ Renew the rear Climate Control switch pack
B1C0A-88	Rear Control panel - Bus off	▪ Communication BUS off	▪ Refer to the Network Communications section of the workshop manual
B1C0A-96	Rear Control panel - Component internal failure	▪ Internal component failure	▪ Renew the rear Climate Control switch pack
B1C0B-11	Rear Refrigerant Magnetic Valve - Circuit short to ground	▪ Rear refrigerant magnetic valve circuit short to ground	▪ Refer to the electrical circuit diagrams and check the magnetic valve circuit. Renew the valve
U0010-88	Medium Speed CAN Communication	▪ Bus off	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the

	Bus - Bus off		module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0140-87	Lost Communication With Body Control Module - Missing message	▪ Missing message	▪ 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 Climate Control Module
U0164-87	Lost Communication With HVAC Control Module - Missing message	▪ CAN Link instrument cluster/ATC module missing message	▪ 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 Climate Control Module
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Incorrect MS CAN signal configuration (expulsion mode) ▪ CAN bus configuration failure ▪ CAN bus short circuit to ground	▪ Refer to the electrical circuit diagrams and check the CAN circuits. Configure the module using the approved diagnostic system
U0300-55	Internal Control Module Software Incompatibility - Not configured	▪ Not configured	▪ Configure the module using the approved diagnostic system
U0300-87	Internal Control Module Software	▪ Missing message	▪ Configure the module using the approved diagnostic system

	Incompatibility - Missing message		
U0401-86	Invalid Data Received from ECM/PCM A - Signal invalid	▪ Invalid data received via the CAN Bus ▪ High speed CAN bus circuit fault ▪ Medium speed CAN bus circuit fault ▪ Component internal failure	**NOTE:** The engine control module is on HS-CAN, the rear automatic temperature control module is on MS-CAN, the instrument cluster is the gateway module and transfers the data from HS-CAN to MS-CAN ▪ Check the engine control module and instrument cluster for related stored DTCs. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the high speed CAN network between the engine control module and the instrument cluster, check the medium speed CAN network between the instrument cluster and the rear automatic temperature control module for circuit fault
U0422-86	Invalid Data Received From Body Control Module - Signal invalid	▪ Invalid data received via the medium speed CAN bus ▪ Medium speed CAN bus circuit fault ▪ Component internal failure	▪ Check the central junction box for related stored DTCs. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN network between the central junction box and rear automatic temperature control module for circuit fault
U0424-86	Invalid Data Received From HVAC Control Module - Signal invalid	▪ Invalid data received via the medium speed CAN bus ▪ Medium speed CAN bus circuit fault ▪ Component internal failure	▪ Check the climate control module for related stored DTCs. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the medium speed CAN network between the climate control module and rear automatic temperature control module for circuit fault

			circuit fault
U1A14-49	CAN Initialization Failure - Internal electronic failure	▪ Internal electronic failure	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U3002-81	Vehicle Identification Number - Invalid serial data received	▪ Invalid serial data received ▪ Module installed from another vehicle ▪ Module incorrectly configured	▪ Configure the module using the approved diagnostic system

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

DESCRIPTION AND OPERATION

REAR DIFFERENTIAL CONTROL MODULE

CAUTION:

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

NOTES:

- If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the warranty policy and procedures manual, 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 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).

DescriptionActionP0562-00System Voltage Low - No sub type information

- Rear differential control module voltage supply below 9V
- Rear differential control module internal fault

P0563-00

DTC	POSSIBLE CAUSES	
• Clear DTCs and retest • If the DTC returns • Using the manufacturers approved diagnostic system carry out the guided diagnostic routine		
System Voltage High - No sub type information	System voltage high (supply voltage supply greater than 16 volts)	• Check engine control module (ECM) 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 fault	▪ Clear the DTC and retest. If the problem persists. Using the manufacturer approved diagnostic system check and install latest relevant level of software to the rear differential control module. Clear the DTC and retest. If the problem persists. Renew the rear differential 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. Using the manufacturer approved diagnostic system check and install latest relevant level of software to the rear differential control module. 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

P0606-00	Control Module Processor - No sub type information	▪ Watch dog reset - Internal control module failure	▪ Clear the DTC and retest. If the problem persists, renew the rear differential control module. This is a control module internal check DTC and is not necessarily a fault. If no other DTCs are logged and no customer complaint exists, clear this DTC and retest. Check the security of control module fixings. Check the module ground connection. Consider environmental conditions before condemning the rear differential control module. If the problem persists. Using the manufacturer approved diagnostic system check and install latest relevant level of software to the rear differential control module. Clear the DTC and retest. If the problem persists. Renew the rear differential 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 fault	▪ Check engine control module (ECM) for stored DTCs, Suspect charging system

			fault. Refer to the electrical circuit diagrams and check, power and ground circuit for fault ▪ Clear DTCs and retest ▪ If the DTC returns ▪ If the concern is still evident suspect an internal module fault ▪ Replace as required. Refer to the 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 ▪ Sensor failure (within rear differential actuator)	▪ Refer to the electrical circuit diagrams and check the rear differential actuator sensor position circuit, repair as necessary. If no circuit problems exist, renew the rear differential actuator as required
P0653-00	Sensor Reference Voltage 'B' Circuit High - No sub type information	▪ Position sensor supply above 8.3V ▪ Internal control module failure	▪ Refer to the electrical circuit diagrams and check the rear differential actuator hall sensor ref voltage at the control module or the rear differential actuator. If voltage at the module is too high, then suspect control module fault. If voltage at the actuator is too high check for short circuit fault. If no other DTCs are

				logged and no customer complaint exists, clear this DTC and retest. Check the security of control module fixings. Check the module ground connection. Consider environmental conditions before condemning 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	
	P0666-00	Control Module Internal Temperature Sensor "A" Circuit - No sub type information	▪ Rear differential control module internal temperature sensor value above 105°C	▪ 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 condemning 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 ▪ Motor or oil temperature sensor circuit short circuit to ground or power	▪ Check the rear differential oil quantity and specification. Refer to the relevant section of the workshop manual. Check both temperature sensor circuits and connectors for damage/water ingress, repair as necessary. Where available, after vehicle has been switched off for at least an hour, use the manufacturer approved diagnostic system to read motor temperature and oil temperature sensor values. Temperature difference should be less than 25°C. Clear the DTC and retest
P0712-00	Transmission Fluid Temperature Sensor 'A' Circuit Low - No sub type information	▪ Rear differential actuator internal temperature sensor open circuit or short circuit to ground	▪ Refer to the electrical circuit diagrams and check the rear differential actuator sensor circuit, repair as necessary. If no circuit problems exist, renew the rear differential actuator. as required
P0713-00	Transmission Fluid Temperature Sensor 'A' Circuit High - No sub type information	▪ Rear differential actuator internal temperature sensor open circuit or short circuit to power ▪ Supply circuit fault ▪ Signal circuit fault	▪ Clear DTCs and retest ▪ If the DTC returns ▪ Using the manufacturers approved diagnostic system carry out the guided diagnostic routine
P0806-00	Clutch Position	▪ Mismatch of actual	NOTE

	Sensor Circuit Range/Performance - No sub type information	and expected/calculated actuator position ▪ Signal circuit fault ▪ Sensor internal fault ▪ Rear differential control module internal fault	NOTE: The position sensor is internal to the rear differential actuator motor ▪ Record then clear any stored DTCs ▪ Carry out the on-demand self test via the 'Monitor DTC' tab on the manufacturers approve diagnostic system ▪ Clear DTCs, ignition state to off for 5 seconds then retest ▪ If the DTC returns ▪ Using the manufacturers approved diagnostic system carry out the guided diagnostic routine ▪ Clear DTCs, ignition state to off for 5 seconds then retest ▪ If the DTC returns suspect rear differential actuator motor internal fault ▪ Replace as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0807-00	Clutch Position Sensor Circuit Low - No sub type information	▪ Rear differential actuator internal position sensor supply open circuit or short circuit to ground, signal A or	▪ Refer to the electrical circuit diagrams and check the rear differential actuator motor position hall sensor

		ground, signal A or B open circuit signal A or B short circuit to ground	position hall sensor signal circuit (A or B), repair as necessary. If no circuit problems exist, renew the rear differential actuator as required
P0808-00	Clutch Position Sensor Circuit High - No sub type information	▪ Rear differential actuator internal position sensor signal 1 or 2 short circuit to power	▪ Refer to the electrical circuit diagrams and check the rear differential actuator motor position hall sensor signal circuit (A or B), repair as necessary. If no circuit problems exist, renew the rear differential actuator as required
P080A-00	Clutch Position Not Learned - No sub type information	▪ Rear differential control module not calibrated ▪ Rear differential control module internal fault	**NOTE:** The rear differential control module system runs a self calibration routine every 500Km, if any other rear differential control module fault is present this routine will not run and log P080A. If other rear differential control module related faults are also logged these should be investigated first. P080A will also log if the rear differential control module has been removed and reconnected ▪ Carry out the on-

			demand self test via the 'Monitor DTC' tab on the manufacturers approve diagnostic system ▪ Clear DTCs, ignition state to off for 5 seconds then retest
P0894-00	Transmission Component Slipping - No sub type information	▪ Rear differential actuator internal magnetic brake is slipping	▪ Check control module supply ▪ If module supply is ok, refer to circuit diagram, check motor brake connections for damage or short circuit faults ▪ If no external fault is present renew the rear differential actuator as required
P0900-00	Clutch Actuator Circuit/Open - No sub type information	▪ Rear differential actuator supply open circuit	▪ Refer to the electrical circuit diagrams. Check Actuator motor circuit for open circuit, Using a multimeter, check vehicle/actuator harness and relevant connectors for open circuits, repair as necessary
P0901-00	Clutch Actuator Circuit Range/Performance - No sub type information	▪ Motor supply circuit fault ▪ Rear differential control module internal fault	▪ Clear DTCs, ignition state to off for 5 seconds then retest ▪ If the DTC returns ▪ Using the manufacturers approved diagnostic system carry out the guided diagnostic routine ▪ Clear DTCs, ignition state to off for 5 seconds then retest

P0902-00	Clutch Actuator Circuit Low - No sub type information	▪ Rear differential actuator supply circuit short to ground.	▪ Refer to the electrical circuit diagrams. Check Actuator motor circuit for short to ground. Using a multimeter, check vehicle/actuator harness and relevant connectors for short circuit to ground, repair as necessary
P0903-00	Clutch Actuator Circuit High - No sub type information	▪ Rear differential actuator supply circuit short to power	▪ Refer to the electrical circuit diagrams. Check Actuator motor circuit for short to power. Using a multimeter, check vehicle/actuator harness and relevant connectors for short circuit to power, repair as necessary
P1603-00	EEPROM Malfunction - No sub type information	▪ Rear differential control module internal error	▪ Clear the DTC and re-test. If the DTC returns. Check and install a new rear differential 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
P1783-00	Transmission Over-Temperature Condition - No sub type information	▪ Rear differential oil sump temperature sensor value above 160°C	▪ Confirm the customer complaint and vehicle usage at the time of DTC event. Check the operation of the rear differential. Check the rear differential oil quantity and specification. Refer

			to the relevant section of the workshop manual. Clear the DTC and retest. If the problem persists, suspect an electrical fault. Check for water ingress into wiring harness/connectors. If no circuit problems exist, renew the rear differential oil temperature sensor as required
P186A-00	Differential Lock-Up Actuator Brake Control Circuit/Open - No sub type information	▪ Open circuit of rear differential actuator internal magnetic brake supply leads	▪ Refer to the electrical circuit diagrams and check the rear differential actuator circuit, repair as necessary. If no circuit problems exist, renew the rear differential actuator as required
P186B-00	Differential Lock-Up Actuator Brake Control Circuit Low - No sub type information	▪ Short circuit to ground of both rear differential actuator internal magnetic brake pins	▪ Refer to the electrical circuit diagrams and check the rear differential actuator circuit, repair as necessary. If no circuit problems exist, renew the rear differential actuator as required
P186C-00	Differential Lock-Up Actuator Brake Control Circuit High - No sub type information	▪ Short circuit to power of both rear differential actuator internal magnetic brake pins	▪ Refer to the electrical circuit diagrams and check the rear differential actuator circuit, repair as necessary. If no circuit problems exist, renew the rear differential actuator as required

P186D-00	Clutch Actuator Stuck - No sub type information	▪ Rear differential actuator brake fault ▪ Actuating mechanism mechanical failure ▪ Motor internal fault	**NOTE:** If any rear differential actuator brake or motor position sensor faults are also logged these should be investigated first ▪ Clear DTCs and retest ▪ Using the manufacturers approved diagnostic system carry out the guided diagnostic routine ▪ If no fault is found with the motor internal resistance, suspect motor brake failure ▪ Replace as required. Refer to the warranty policy and procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component ▪ Clear DTCs and retest
P2742-00	Transmission Fluid Temperature Sensor 'B' Circuit Low - No sub type information	▪ Rear differential oil sump temperature sensor short circuit to ground	▪ Refer to the electrical circuit diagrams and check the differential oil temperature sensor circuit, repair as necessary
P2743-00	Transmission Fluid Temperature Sensor 'B' Circuit High - No sub type	▪ Supply circuit fault ▪ Signal circuit fault ▪ Rear differential	▪ Refer to the electrical circuit diagrams and check the differential oil

	High - No sub type information	▪ Rear differential control module internal fault	the differential oil temperature sensor circuit, repair as necessary ▪ Or ▪ Using the manufacturers approved diagnostic system carry out the guided diagnostic routine ▪ Clear DTCs and retest ▪ If the DTC returns ▪ Suspect a differential oil temperature sensor internal fault
P2785-00	Clutch Actuator Temperature Too High - No sub type information	**NOTE:** Rear differential actuator internal temperature Sensor value above 150°C ▪ Extensive prolonged rear wheel speed differential ▪ Supply circuit fault ▪ Signal circuit fault ▪ Insufficient oil quantity ▪ Incorrect oil specification ▪ Rear differential internal fault ▪ Rear differential control module internal fault	▪ Check for related DTCs. If multiple DTCs exist, suspect a control module internal fault. Confirm the customer complaint and vehicle usage at the time of DTC event. Check the operation of the rear differential. Check the rear differential oil quantity and specification. Refer to the relevant section of the workshop manual. Clear the DTC and retest. If the problem persists, renew the rear differential actuator as required
P2787-00	Clutch Temperature Too High - No sub type information	▪ Extensive prolonged rear wheel speed differential	**NOTE:** Rear

		▪ Oil temperature sensor circuit fault ▪ Motor temperature sensor circuit fault ▪ Insufficient oil quantity ▪ Incorrect oil specification ▪ Rear differential internal fault ▪ Rear differential control module internal fault	Rear differential actuator internal temperature Sensor (calculated from motor and oil temperature) value above 200°C ▪ Confirm the customer concern and vehicle usage at the time of DTC event ▪ Check for related DTCs ▪ Investigate these first ▪ Clear DTCs and retest ▪ If the DTCs return ▪ Suspect a control module internal fault. Check the operation of the rear differential. Check the rear differential oil quantity and specification. Refer to the relevant section of the workshop manual. Clear the DTC and retest. If the problem persists, renew the rear differential actuator as required
U0001-88	High Speed CAN Communication Bus - Bus off	▪ High speed CAN communication bus short to ground, short to power, open circuit	▪ Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN

			network for short to ground, short to power, open circuit
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	▪ Lost communication with engine control module (ECM)	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the engine control module (ECM). Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the all engine control module (ECM) and rear differential control module
U0102-00	Lost Communication With Transfer Case Control Module - No sub type information	▪ No sub type information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the transfer case control module and rear differential control module
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	▪ Lost communication with anti-lock brake system (ABS) module	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the anti-lock brake system (ABS)

			module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the anti-lock brake system (ABS) and rear differential control module
U0139-00	Lost Communication With Suspension Control Module "B" - no sub type information	▪ Lost communication with Suspension Control Module "B"	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the air suspension control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the air suspension control module and rear differential control module
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ Lost communication with central junction box (CJB)	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the central junction box (CJB). 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 (CJB) and rear differential control

			module.
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Rear differential control module not configured ▪ Incorrect software installed	▪ Check & confirm rear differential control module installed is correct. If correct, clear DTC, ignition off for 5 seconds, ignition on and then check if DTC reoccurs. Using the manufacturer approved diagnostic system check and install latest relevant level of software to the rear differential control module
U0403-68	Invalid Data Received From Transfer Case Control Module - Event information	▪ Event information	▪ Check the transfer case control module for related DTCs and refer to the relevant DTC index
U0415-68	Lost Communication With Anti-Lock Brake System (ABS) Control Module - Event information	▪ Event information	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the anti-lock brake system (ABS) and rear differential control module
U0422-68	Invalid Data Received from Body Control Module - Event information	▪ Event information-invalid data received	▪ Check the central junction box (CJB) for related DTCs and refer to the relevant DTC index
U043A-68	Invalid Data	▪ Event information-	▪ Check the air

	Received From Suspension Control Module "B" - event information	invalid data received	suspension control module for related DTCs and refer to the relevant DTC index
U1A14-49	CAN Initialization Failure - Internal electronic failure	▪ Rear differential control module has failed the CAN serial data communication software initialization or the CAN controller initialization ▪ Rear differential control module internal failure	▪ Using the manufacturer approved diagnostic system check and install latest relevant level of software to the rear differential control module. Clear the DTC and re-test. Check and install a new rear differential 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

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GENERAL INFORMATION

DESCRIPTION AND OPERATION

REAR ENTERTAINMENT CONTROL MODULE (REM)

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 Rear Entertainment Control 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
B1D50-79	Digital Disk Player - Mechanical linkage failure	▪ Digital versatile disc (DVD) changer mechanical fault ▪ Error report from AiNet	▪ Check for a mechanical fault (jammed magazine, etc). Rectify as necessary
B1D50-93	Digital Disk Player - No operation	▪ Digital versatile disc (DVD) changer is not responding ▪ Communication error between the main and DVD microprocessors ▪ No response from AiNet	▪ Refer to the electrical circuit diagrams and check the AiNet circuits. Rectify as necessary
B1D50-98	Digital Disk Player - Component or system over temperature	▪ A high temperature condition has been detected	▪ Check the installation of the DVD module. Make sure there is sufficient airflow. Clear the DTC and retest. Consider the atmospheric conditions before condemning a module
B1D81-93	Rear Left Display Module - No operation	▪ Left-hand rear display is not responding ▪ Communication error between the main and left-hand display microprocessors ▪ No response from the IS bus	▪ Check the IS bus circuits. Refer to the electrical circuit diagrams
B1D81-98	Rear Left Display Module - Component or system over temperature	▪ A high temperature condition has been detected	▪ Clear the DTC and retest. Consider the atmospheric conditions before condemning a module
B1D82-	Rear Right	▪ Right-hand rear	▪ Check the IS bus circuits. Refer to

B1D82-93	Rear Right Display Module - No operation	▪ Right-hand rear display is not responding ▪ Communication error between the main and right-hand display microprocessors ▪ No response from the IS bus	▪ Check the IS bus circuits. Refer to the electrical circuit diagrams
B1D82-98	Rear Right Display Module - Component or system over temperature	▪ A high temperature condition has been detected	▪ Clear the DTC and retest. Consider the atmospheric conditions before condemning a module
U1A03-55	Car Config Parameter - Not configured	▪ Rear entertainment module (REM) not configured	▪ Where available, configure the module using the approved diagnostic system
U1A17-31	Incomplete MOST Ring Reported By REM - No signal	▪ No signal from the rear entertainment module (REM) ▪ Fibre optic ring break condition reported	▪ Carry out the general media orientated system transport (MOST) test. Refer to the Network Communications section of the workshop manual and in the approved diagnostic system, where available

GENERAL INFORMATION

DESCRIPTION AND OPERATION

REMOTE DRIVER UTILITY MODULE – VENTURE CAM (RDUM)

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 Remote Driver Utility Module - Venture Cam, 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).

Clear the DTC and retest. If the problem persists, renew the module. Refer warranty policies and procedures before renewing a module

U3000-56Control Module - Invalid/incomplete configuration

- Remote driver utility module invalid/incomplete configuration

Configure the module using the approved diagnostic system

U3003-62

- Refer to the electrical circuit diagrams and check the power and ground connections to both modules

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
U0010-88	Medium Speed CAN Communication Bus - Bus off	▪ Loss of companion control from the integrated head unit, no communication with diagnostic tester	▪ 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
U0184-00	Lost Communication With Radio - No sub type information	▪ Loss of companion control from the integrated head unit, no communication with diagnostic tester	▪ 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	▪ Remote driver utility module incorrectly configured	▪ Configure the module using the approved diagnostic system
U3000-44	Control Module - Data memory failure	▪ Remote driver utility module internal RAM memory failure	▪ Renew the module. Refer warranty policies and procedures before renewing a module
U3000-45	Control Module - Program memory failure	▪ Remote driver utility module calibration/parameter memory failure	▪ Renew the module. Refer warranty policies and procedures before renewing a module
U3000-46	Control Module - Calibration/parameter memory failure	▪ Remote driver utility module internal flash memory failure	▪ Clear the DTC and retest. If the problem persists, renew the module. Refer warranty policies and procedures before

			renewing a module
U3000-47	Control Module - Watchdog/safety microcontroller failure	▪ Remote driver utility module internal watchdog/safety MicroController failure	▪ Clear the DTC and retest. If the problem persists, renew the module. Refer warranty policies and procedures before renewing a module
U3000-49	Control Module - Internal electronic failure	Remote driver utility module internal electronic failure	
Battery Voltage - Signal compare failure	Remote driver utility module voltage differs more than ±2V compared to Central Junction Box voltage		

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GENERAL INFORMATION

DESCRIPTION AND OPERATION

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 Remote Function Actuator Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Locks, Latches and Entry Systems (501-14 Handles, Locks, Latches and Entry Systems, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B102B-00	Passive Key - No sub type information	▪ Passive key response error ▪ Incorrect key ▪ Key incorrectly programmed	▪ Re-Program the key using the manufacturers approved diagnostic system
B10A9-00	Remote Keyless Entry Less Than 2 Keys Programmed - No sub type information	▪ Secret key has been programmed to the vehicle but less than 2 key fobs have been programmed	▪ Re-Program the key fobs using the manufacturers approved diagnostic system
B10C7-00	Interior Trunk Antenna - No sub type information	▪ Antenna failure	▪ Refer to the electrical circuit diagrams and check headliner LHS antenna circuit for short to ground, short to power. Clear the diagnostic trouble code and retest. If the problem persists, check and install new headliner LHS antenna as required. Refer to the warranty policy and procedures manual if a module/component is suspect
B10C7-11	Interior Trunk Antenna - Circuit short to ground	▪ One or both antenna wires shorted to ground or	▪ Refer to the electrical circuit diagrams and check headliner LHS antenna circuit for short to ground, short to each other.

		shorted to each other	Clear the diagnostic trouble code and retest
B10C7-12	Interior Trunk Antenna - Circuit short to battery	▪ One or both antenna wires shorted to battery	▪ Refer to the electrical circuit diagrams and check headliner LHS antenna circuit for short to power. Clear the diagnostic trouble code and retest
B10C7-13	Interior Trunk Antenna - Circuit open	▪ One or both antenna wires open	▪ Refer to the electrical circuit diagrams and check headliner LHS antenna circuit for open circuit. Clear the diagnostic trouble code and retest
B10C7-1C	Interior Trunk Antenna - Circuit voltage out of range	▪ Fault with voltage supply to all antenna drivers	▪ Check and install new keyless vehicle module as required. Refer to the warranty policy and procedures manual if a module/component is suspect
B10C8-00	Interior Center Antenna - No sub type information	▪ Antenna failure	▪ Refer to the electrical circuit diagrams and check headliner RHS antenna circuit for short to ground, short to power. Clear the diagnostic trouble code and retest. If the problem persists, check and install new headliner RHS antenna as required. Refer to the warranty policy and procedures manual if a module/component is suspect
B10C8-11	Interior Center Antenna - Circuit short to ground	▪ One or both antenna wires shorted to ground or shorted to each other	▪ Refer to the electrical circuit diagrams and check headliner RHS antenna circuit for short to ground, short to each other. Clear the diagnostic trouble code and retest
B10C8-12	Interior Center Antenna - Circuit short to battery	▪ One or both antenna wires shorted to battery	▪ Refer to the electrical circuit diagrams and check headliner RHS antenna circuit for short to power. Clear the diagnostic trouble code and retest
B10C8-13	Interior Center Antenna - Circuit open	▪ One or both antenna wires open	▪ Refer to the electrical circuit diagrams and check headliner RHS antenna circuit for open circuit. Clear the diagnostic trouble code and retest

			trouble code and retest
B10C8-1C	Interior Center Antenna - Circuit voltage out of range	▪ Fault with voltage supply to all antenna drivers	▪ Check and install new keyless vehicle module as required. Refer to the warranty policy and procedures manual if a module/component is suspect
B10C9-00	Interior Front Antenna - No sub type information	▪ Antenna failure	▪ Refer to the electrical circuit diagrams and check interior front cabin antenna circuit for short to ground, short to power. Clear the diagnostic trouble code and retest. If the problem persists, check and install new interior front cabin antenna as required. Refer to the warranty policy and procedures manual if a module/component is suspect
B10C9-11	Interior Front Antenna - Circuit short to ground	▪ One or both antenna wires shorted to ground or shorted to each other	▪ Refer to the electrical circuit diagrams and check interior front cabin antenna circuit for short to ground, short to each other. Clear the diagnostic trouble code and retest
B10C9-12	Interior Front Antenna - Circuit short to battery	▪ One or both antenna wires shorted to battery	▪ Refer to the electrical circuit diagrams and check interior front cabin antenna circuit for short to power. Clear the diagnostic trouble code and retest
B10C9-13	Interior Front Antenna - Circuit open	▪ One or both antenna wires open	▪ Refer to the electrical circuit diagrams and check interior front cabin antenna circuit for open circuit. Clear the diagnostic trouble code and retest
B10C9-1C	Interior Front Antenna - Circuit voltage out of range	▪ Fault with voltage supply to all antenna drivers	▪ Check and install new keyless vehicle module as required. Refer to the warranty policy and procedures manual if a module/component is suspect
B12EA-96	Radio Frequency (RF) Receiver - Component internal failure	▪ RF receiver has an internal HW failure	▪ Renew the receiver

B1335-00	Front Triangulation / Loadspace Antenna - No sub type information	▪ Antenna failure	▪ Refer to the electrical circuit diagrams and check center console front antenna circuit for short to ground, short to power. Clear the diagnostic trouble code and retest. If the problem persists, check and install new center console front antenna as required. Refer to the warranty policy and procedures manual if a module/component is suspect
B1335-11	Front Triangulation / Loadspace Antenna - Circuit short to ground	▪ One or both antenna wires shorted to ground or shorted to each other	▪ Refer to the electrical circuit diagrams and check center console front antenna circuit for short to ground, short to each other. Clear the diagnostic trouble code and retest
B1335-12	Front Triangulation / Loadspace Antenna - Circuit short to battery	▪ One or both antenna wires shorted to battery	▪ Refer to the electrical circuit diagrams and check center console front antenna circuit for short to power. Clear the diagnostic trouble code and retest
B1335-13	Front Triangulation / Loadspace Antenna - Circuit open	▪ One or both antenna wires open	▪ Refer to the electrical circuit diagrams and check center console front antenna circuit for open circuit. Clear the diagnostic trouble code and retest
B1335-1C	Front Triangulation / Loadspace Antenna - Circuit voltage out of range	▪ Fault with voltage supply to all antenna drivers	▪ Check and install new keyless vehicle module as required. Refer to the warranty policy and procedures manual if a module/component is suspect
B133D-00	Loadspace/Interior Boot Antenna - No sub type information	▪ Antenna failure	▪ Refer to the electrical circuit diagrams and check loadspace LHS antenna circuit for short to ground, short to power. Clear the diagnostic trouble code and retest. If the problem persists, check and install new right front door handle antenna as required. Refer to the warranty policy and procedures manual if a module/component is suspect

B133D-11	Loadspace/Interior Boot Antenna - Circuit short to ground	▪ One or both antenna wires shorted to ground or shorted to each other	▪ Refer to the electrical circuit diagrams and check loadspace LHS antenna circuit for short to ground, short to each other. Clear the diagnostic trouble code and retest
B133D-12	Loadspace/Interior Boot Antenna - Circuit short to battery	▪ One or both antenna wires shorted to battery	▪ Refer to the electrical circuit diagrams and check loadspace LHS antenna circuit for short to power. Clear the diagnostic trouble code and retest
B133D-13	Loadspace/Interior Boot Antenna - Circuit open	▪ One or both antenna wires open	▪ Refer to the electrical circuit diagrams and check loadspace LHS antenna circuit for open circuit. Clear the diagnostic trouble code and retest
B133D-1C	Loadspace/Interior Boot Antenna - Circuit voltage out of range	▪ Fault with voltage supply to all antenna drivers	▪ Check and install new keyless vehicle module as required. Refer to the warranty policy and procedures manual if a module/component is suspect
U0010-00	Medium Speed CAN Communication Bus - No sub type information	▪ CAN communication failure	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network. Clear the diagnostic trouble code and retest. If the problem persists, check and install new keyless vehicle module as required. Refer to the warranty policy and procedures manual if a module/component is suspect
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ CAN connection open or fault in body control 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 central junction box and keyless vehicle module.

			Clear the diagnostic trouble code and retest. If the problem persists, check and install new body control module as required. Refer to the warranty policy and procedures manual if a module/component is suspect
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Signal configuration file not loaded	▪ Using the manufacturer approved diagnostic system check and up-date the car configuration file as required. Clear the diagnostic trouble code and re-test
U201F-00	External Receiver - No sub type information	▪ Communication to the RF receiver module has been lost, short either to ground, or battery	▪ Check K-Line wiring. Refer to the electrical circuit diagrams and check the module K-Line, power and ground circuits. Clear the diagnostic trouble code and retest. If the problem persists, check and install new keyless vehicle module or RF receive module as required. Refer to the warranty policy and procedures manual if a module/component is suspect
U201F-31	External Receiver - No signal	▪ Communication to the RF receiver module has been lost	▪ Refer to the electrical circuit diagrams and check remote keyless entry module circuit for short to power, open circuit, high resistance ▪ Check and install a new RF receiver module or keyless vehicle module as required
U201F-95	External Receiver - Incorrect assembly	▪ The RF receiver frequency does not match the car config file parameter	▪ Verify car config value for RF frequency is correct. If not, re-configure body control module with proper car configuration file. If correct, replace RF receiver with proper frequency unit.
U2100-00	Initial Configuration Not Complete - No sub type information	▪ Calibration file has not been received or is incomplete	▪ Reload the correct calibration file for the vehicle type into the module using the manufacturer approved diagnostic system
U2101-	Control Module	▪ Car	▪ Verify car config value sent by

00	Configuration Incompatible - No sub type information	configuration parameter is outside expected value	body control module is correct for the vehicle. If not, re-configure body control module with proper car configuration file. If correct, reload the correct calibration file for the vehicle type into the module using the manufacturer approved diagnostic system
U3000-49	Control Module - Internal electronic failure	▪ Internal electronic failure	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the module. Refer to the warranty policy and procedures manual if a module is suspect
U3002-81	Vehicle Identification Number - Invalid serial data received	▪ Invalid vehicle identification number	▪ Configure the car configuration file using the manufacturer approved diagnostic system

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

DESCRIPTION AND OPERATION

RESTRAINTS CONTROL MODULE (RCM)

WARNING:

TO AVOID ACCIDENTAL DEPLOYMENT AND POSSIBLE PERSONAL INJURY, THE BACKUP POWER SUPPLY MUST BE DEPLETED BEFORE REPAIRING OR REPLACING ANY AIRBAG SUPPLEMENTAL RESTRAINT SYSTEM (SRS) 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 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 Restraints Control Module, 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) (501-20B Supplemental Restraint System, Description and Operation).

Passenger side second row peripheral acceleration sensor - Component internal failure

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B0001-11	Driver frontal stage 1 deployment control - Circuit short to ground	▪ Driver airbag circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check driver front airbag circuit for short circuit to ground
B0001-12	Driver frontal stage 1 deployment control - Circuit short to battery	▪ Driver airbag circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check driver front airbag circuit for short circuit to power
B0001-13	Driver frontal stage 1 deployment control - Circuit open	▪ Driver airbag circuit open circuit	▪ Refer to the electrical circuit diagrams and check driver front airbag circuit for open circuit
B0001-19	Driver frontal stage 1 deployment control - Circuit current above threshold	▪ Driver airbag circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver airbag circuit for short circuit to another circuit
B0001-1A	Driver frontal stage 1 deployment	▪ Driver airbag circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the driver airbag circuit for short circuit to

	control - Circuit resistance below threshold		another circuit
B0001-95	Driver frontal stage 1 deployment control - Incorrect assembly	▪ Driver airbag incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B0002-11	Driver frontal stage 2 deployment control - Circuit short to ground	▪ Driver airbag stage 2 circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check driver airbag stage 2 circuit for short circuit to ground
B0002-12	Driver frontal stage 2 deployment control - Circuit short to battery	▪ Driver front airbag stage 2 circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check driver airbag stage 2 circuit for short circuit to power
B0002-13	Driver frontal stage 2 deployment control - Circuit open	▪ Driver front airbag stage 2 circuit open circuit	▪ Refer to the electrical circuit diagrams and check driver airbag stage 2 circuit for open circuit
B0002-19	Driver frontal stage 2 deployment control - Circuit current above threshold	▪ Driver front airbag stage 2 circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver airbag stage 2 circuit for short circuit to another circuit
B0002-1A	Driver frontal stage 2 deployment control - Circuit resistance below threshold	▪ Driver front airbag stage 2 circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the driver airbag stage 2 circuit for short circuit to another circuit
B0002	Driver frontal	▪ Driver front airbag	▪ Suspect the component is

B0002-95	Driver frontal stage 2 deployment control - Incorrect assembly	▪ Driver front airbag stage 2 incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B0004-11	Driver knee bolster deployment control - Circuit short to ground	▪ Driver lower airbag circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check driver lower airbag circuit for short circuit to ground
B0004-12	Driver knee bolster deployment control - Circuit short to battery	▪ Driver lower airbag circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check driver lower airbag circuit for short circuit to power
B0004-13	Driver knee bolster deployment control - Circuit open	▪ Driver lower airbag circuit open circuit	▪ Refer to the electrical circuit diagrams and check driver lower airbag circuit for open circuit
B0004-19	Driver knee bolster deployment control - Circuit current above threshold	▪ Driver lower airbag circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver lower airbag circuit for short circuit to another circuit
B0004-1A	Driver knee bolster deployment control - Circuit resistance below threshold	▪ Driver lower airbag circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the driver lower airbag circuit for short circuit to another circuit
B0004-95	Driver knee bolster deployment control - Incorrect assembly	▪ Driver lower airbag incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control

			module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B0005-95	Collapsible Steering Column Deployment Control - Incorrect assembly	▪ Device is not configured but connected	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B0010-11	Passenger frontal stage 1 deployment control - Circuit short to ground	▪ Passenger airbag stage 1 circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check passenger airbag stage 1 circuit for short circuit to ground
B0010-12	Passenger frontal stage 1 deployment control - Circuit short to battery	▪ Passenger airbag stage 1 circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check passenger airbag stage 1 circuit for short circuit to power
B0010-13	Passenger frontal stage 1 deployment control - Circuit open	▪ Passenger airbag stage 1 circuit open circuit	▪ Refer to the electrical circuit diagrams and check passenger airbag stage 1 circuit for open circuit
B0010-19	Passenger frontal stage 1 deployment control - Circuit current above threshold	▪ Passenger airbag stage 1 circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger airbag stage 1 circuit for short circuit to another circuit
B0010-1A	Passenger frontal stage 1 deployment control - Circuit resistance below	▪ Passenger airbag stage 1 circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the passenger airbag stage 1 circuit for short circuit to another circuit

	threshold		
B0010-95	Passenger frontal stage 1 deployment control - Incorrect assembly	▪ Passenger airbag stage 1 circuit incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B0011-11	Passenger frontal stage 2 deployment control - Circuit short to ground	▪ Passenger airbag stage 2 circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check passenger airbag stage 2 circuit for short circuit to ground
B0011-12	Passenger frontal stage 2 deployment control - Circuit short to battery	▪ Passenger airbag stage 2 circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check passenger airbag stage 2 circuit for short circuit to power
B0011-13	Passenger frontal stage 2 deployment control - Circuit open	▪ Passenger airbag stage 2 circuit open circuit	▪ Refer to the electrical circuit diagrams and check passenger airbag stage 2 circuit for open circuit
B0011-19	Passenger frontal stage 2 deployment control - Circuit current above threshold	▪ Passenger airbag stage 2 circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger airbag stage 2 circuit for short circuit to another circuit
B0011-1A	Passenger frontal stage 2 deployment control - Circuit resistance below threshold	▪ Passenger airbag stage 2 circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the passenger airbag stage 2 circuit for short circuit to another circuit
B0011-95	Passenger frontal stage 2 deployment control -	▪ Passenger airbag stage 2 incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved

	Incorrect assembly		diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B0050-11	Driver seatbelt sensor - Circuit short to ground	▪ Driver safety belt buckle switch circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the driver pretensioner and buckle switch circuit for short circuit to ground
B0050-12	Driver seatbelt sensor - Circuit short to battery	▪ Driver safety belt buckle switch circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check driver pretensioner and buckle switch circuit for short circuit to power
B0050-13	Driver seatbelt sensor - Circuit open	▪ Driver safety belt buckle switch circuit open circuit	▪ Refer to the electrical circuit diagrams and check driver pretensioner and buckle switch circuit for open circuit
B0050-19	Driver seatbelt sensor - Circuit current above threshold	▪ Driver safety belt buckle switch circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver pretensioner and buckle switch circuit for short circuit to another circuit
B0050-1E	Driver seatbelt sensor - Circuit resistance out of range	▪ Driver safety belt buckle switch circuit resistance out of range	▪ Refer to the electrical circuit diagrams and check the driver pretensioner and buckle switch circuit for short circuit to another circuit
B0050-95	Driver seatbelt sensor - Incorrect assembly	▪ Driver safety belt buckle incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp

B0052-11	Passenger seatbelt sensor - Circuit short to ground	▪ Passenger safety belt buckle switch circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the passenger pretensioner and buckle switch circuit for short circuit to ground
B0052-12	Passenger seatbelt sensor - Circuit short to battery	▪ Passenger safety belt buckle switch circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check passenger pretensioner and buckle switch circuit for short circuit to power
B0052-13	Passenger seatbelt sensor - Circuit open	▪ Passenger safety belt buckle switch circuit open circuit	▪ Refer to the electrical circuit diagrams and check passenger pretensioner and buckle switch circuit for open circuit
B0052-19	Passenger seatbelt sensor - Circuit current above threshold	▪ Passenger safety belt buckle switch circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger pretensioner and buckle switch circuit for short circuit to another circuit
B0052-1E	Passenger seatbelt sensor - Circuit resistance out of range	▪ Passenger safety belt buckle switch circuit resistance out of range	▪ Refer to the electrical circuit diagrams and check the passenger pretensioner and buckle switch circuit for short circuit to another circuit
B0052-95	Passenger seatbelt sensor - Incorrect assembly	▪ Passenger safety belt buckle incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B0070-11	Driver seatbelt pretensioner deployment control - Circuit short to ground	▪ Driver safety belt pretensioner circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the driver pretensioner and buckle switch circuit for short circuit to ground
B0070-12	Driver seatbelt pretensioner	▪ Driver safety belt pretensioner circuit	▪ Refer to the electrical circuit diagrams and check driver

12	pretensioner deployment control - Circuit short to battery	pretensioner circuit short circuit to power	diagrams and check driver pretensioner and buckle switch circuit for short circuit to power
B0070-13	Driver seatbelt pretensioner deployment control - Circuit open	▪ Driver safety belt pretensioner circuit open circuit	▪ Refer to the electrical circuit diagrams and check driver pretensioner and buckle switch circuit for open circuit
B0070-19	Driver seatbelt pretensioner deployment control - Circuit current above threshold	▪ Driver safety belt pretensioner circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver pretensioner and buckle switch circuit for short circuit to another circuit
B0070-1A	Driver seatbelt pretensioner deployment control - Circuit resistance below threshold	▪ Driver safety belt pretensioner circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the driver pretensioner and buckle switch circuit for short circuit to another circuit
B0070-95	Driver seatbelt pretensioner deployment control - Incorrect assembly	▪ Driver safety belt pretensioner circuit incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B0072-11	Passenger seatbelt pretensioner "A" deployment control - Circuit short to ground	▪ Passenger safety belt buckle pretensioner circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the passenger pretensioner and buckle switch circuit for short circuit to ground
B0072-12	Passenger seatbelt pretensioner "A" deployment control -	▪ Passenger safety belt buckle pretensioner circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check passenger pretensioner and buckle switch circuit for short circuit to power

	control - Circuit short to battery		
B0072-13	Passenger seatbelt pretensioner "A" deployment control - Circuit open	▪ Passenger safety belt buckle pretensioner circuit open circuit	▪ Refer to the electrical circuit diagrams and check passenger pretensioner and buckle switch circuit for open circuit
B0072-19	Passenger seatbelt pretensioner "A" deployment control - Circuit current above threshold	▪ Passenger safety belt buckle pretensioner circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger pretensioner and buckle switch circuit for short circuit to another circuit
B0072-1A	Passenger seatbelt pretensioner "A" deployment control - Circuit resistance below threshold	▪ Passenger safety belt buckle pretensioner circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the passenger pretensioner and buckle switch circuit for short circuit to another circuit
B0072-95	Passenger seatbelt pretensioner "A" deployment control - Incorrect assembly	▪ Passenger safety belt buckle pretensioner c incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B00B5-11	Driver seat track position restraints sensor - Circuit short to ground	▪ Driver seat track position sensor circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the driver seat track position sensor circuit for short circuit to ground
B00B5-12	Driver seat track position restraints sensor - Circuit	▪ Driver seat track position sensor circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check driver seat track position sensor circuit for short circuit to power

	short to battery		
B00B5-13	Driver seat track position restraints sensor - Circuit open	▪ Driver seat track position sensor circuit open circuit	▪ Refer to the electrical circuit diagrams and check driver seat track position sensor circuit for open circuit
B00B5-19	Driver seat track position restraints sensor - Circuit current above threshold	▪ Driver seat track position sensor circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver seat track position sensor circuit for short circuit to another circuit
B00B5-1E	Driver seat track position restraints sensor - Circuit resistance out of range	▪ Driver seat track position sensor circuit resistance out of range	▪ Refer to the electrical circuit diagrams and check the driver seat track position sensor circuit for short circuit to another circuit
B00B5-95	Driver seat track position restraints sensor - Incorrect assembly	▪ Driver seat track position sensor incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B00D2-68	Restraint system malfunction indicator 1 - Event information	▪ Fault event has occurred	▪ Using the manufacturer approved diagnostic system, check the instrument panel cluster for DTCs and refer to relevant DTC Index
B00D2-95	Restraint system malfunction indicator 1 - Incorrect assembly	▪ Restraint system malfunction indicator 1 incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp

B00D5-12	Restraint system passenger disable indicator - Circuit short to battery	▪ Passenger airbag disable indicator circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check passenger airbag disable indicator circuit for short circuit to power
B00D5-14	Restraint system passenger disable indicator - Circuit short to ground or open	▪ Passenger airbag disable indicator circuit short circuit to ground, open circuit	▪ Refer to the electrical circuit diagrams and check passenger airbag disable indicator circuit for short circuit to ground or open circuit
B00D5-95	Restraint system passenger disable indicator - Incorrect assembly	▪ Passenger airbag disable indicator incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B00DF-24	Restraint system passenger disable indicator - Signal stuck high	▪ Passenger airbag disable switch signal stuck high	**NOTE:** Check for correct operation of the passenger air bag disable switch ▪ Refer to the electrical circuit diagrams and check the passenger airbag disable switch circuit for fault. Clear the DTC and retest. If the DTC returns, suspect the passenger airbag disable switch. Replace as required, refer to the new module/component installation note at the top of the DTC index
B00DF-	Restraint	▪ Passenger airbag	▪ Suspect the component is

55	system passenger disable indicator - Not configured	disable switch invalid configuration	installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B00DF-64	Restraint system passenger disable indicator - Signal plausibility failure	▪ Passenger airbag disable switch signal plausibility failure	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B10FD-11	Drivers side peripheral acceleration sensor - Circuit short to ground	▪ Driver side front side impact sensor circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the driver side front side impact sensor circuit for short circuit to ground
B10FD-12	Drivers side peripheral acceleration sensor - Circuit short to battery	▪ Driver side front side impact sensor circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the driver side front side impact sensor circuit for short circuit to power
B10FD-19	Drivers side peripheral acceleration sensor - Circuit current above threshold	▪ Driver side front side impact sensor circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver side front side impact sensor circuit for short circuit to another circuit
B10FD-4A	Drivers side peripheral acceleration sensor - Incorrect component installed	▪ Driver side front side impact sensor incorrect component installed	▪ Suspect the incorrect component has been installed. Cross-reference the part number to confirm the correct component is installed to vehicle specification

B10FD-87	Drivers side peripheral acceleration sensor - Missing message	▪ Driver side front side impact sensor circuit missing message	▪ Refer to the electrical circuit diagrams and check the driver side front side impact sensor circuit for fault. Clear the DTC and retest. If the DTC returns, suspect the driver side front side impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B10FD-95	Drivers side peripheral acceleration sensor - Incorrect assembly	▪ Driver side front side impact sensor incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B10FD-96	Drivers side peripheral acceleration sensor - Component internal failure	▪ Driver side front side impact sensor - Failure	▪ Clear the DTC and retest. If the DTC returns, suspect the driver side front side impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B10FE-11	Passenger side peripheral acceleration sensor - Circuit short to ground	▪ Passenger side front side impact sensor circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the passenger side front side impact sensor circuit for short circuit to ground
B10FE-12	Passenger side peripheral acceleration sensor - Circuit short to battery	▪ Passenger side front side impact sensor circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the passenger side front side impact sensor circuit for short circuit to power
B10FE-19	Passenger side peripheral acceleration sensor - Circuit current above threshold	▪ Passenger side front side impact sensor circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger side front side impact sensor circuit for short circuit to another circuit

B10FE-4A	Passenger side peripheral acceleration sensor - Incorrect component installed	▪ Passenger side front side impact sensor incorrect component installed	▪ Suspect the incorrect component has been installed. Cross-reference the part number to confirm the correct component is installed to vehicle specification
B10FE-87	Passenger side peripheral acceleration sensor - Missing message	▪ Passenger side front side impact sensor missing message	▪ Refer to the electrical circuit diagrams and check the passenger side front side impact sensor circuit for fault. Clear the DTC and retest. If the DTC returns, suspect the passenger side front side impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B10FE-95	Passenger side peripheral acceleration sensor - Incorrect assembly	▪ Passenger side front side impact sensor incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B10FE-96	Passenger side peripheral acceleration sensor - Component internal failure	▪ Passenger side front side impact sensor - Failure	▪ Clear the DTC and retest. If the DTC returns, suspect the passenger side front side impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B1126-11	Drivers side-side airbag deployment control - Circuit short to ground	▪ Driver side airbag circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the driver side airbag circuit for short circuit to ground
B1126-12	Drivers side-side airbag deployment control -	▪ Driver side airbag circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the driver side airbag circuit for short circuit to power

	Circuit short to battery		
B1126-13	Drivers side-side airbag deployment control - Circuit open	▪ Driver side airbag circuit open circuit	▪ Refer to the electrical circuit diagrams and check the driver side airbag circuit for open circuit
B1126-19	Drivers side-side airbag deployment control - Circuit current above threshold	▪ Driver side airbag circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver side airbag circuit for short circuit to another circuit
B1126-1A	Drivers side-side airbag deployment control - Circuit resistance below threshold	▪ Driver side airbag circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the driver side airbag circuit for short circuit to another circuit
B1126-95	Drivers side-side airbag deployment control - Incorrect assembly	▪ Driver side airbag incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1127-11	Passengers side-side airbag deployment control - Circuit short to ground	▪ Passenger side airbag circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the passenger side airbag circuit for short circuit to ground
B1127-12	Passengers side-side airbag deployment control - Circuit short to battery	▪ Passenger side airbag circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the passenger side airbag circuit for short circuit to power
B1127-	Passengers	▪ Passenger side	▪ Refer to the electrical circuit

13	side-side airbag deployment control - Circuit open	airbag circuit open circuit	diagrams and check the passenger side airbag circuit for open circuit
B1127-19	Passengers side-side airbag deployment control - Circuit current above threshold	▪ Passenger side airbag circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger side airbag circuit for short circuit to another circuit
B1127-1A	Passengers side-side airbag deployment control - Circuit resistance below threshold	▪ Passenger side airbag circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the passenger side airbag circuit for short circuit to another circuit
B1127-95	Passengers side-side airbag deployment control - Incorrect assembly	▪ Passenger side airbag incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1128-11	Drivers side-side inflatable curtain deployment control - Circuit short to ground	▪ Drivers side curtain airbag circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the drivers side curtain airbag circuit for short circuit to ground
B1128-12	Drivers side-side inflatable curtain deployment control - Circuit short to battery	▪ Drivers side curtain airbag circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the drivers side curtain airbag circuit for short circuit to power
B1128-13	Drivers side-side inflatable curtain	▪ Drivers side curtain airbag circuit open circuit	▪ Refer to the electrical circuit diagrams and check the drivers side curtain airbag circuit for

	curtain deployment control - Circuit open	circuit	side curtain airbag circuit for open circuit
B1128-19	Drivers side-side inflatable curtain deployment control - Circuit current above threshold	▪ Drivers side curtain airbag circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the drivers side curtain airbag circuit for short circuit to another circuit
B1128-1A	Drivers side-side inflatable curtain deployment control - Circuit resistance below threshold	▪ Drivers side curtain airbag circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the drivers side curtain airbag circuit for short circuit to another circuit
B1128-95	Drivers side-side inflatable curtain deployment control - Incorrect assembly	▪ Drivers side curtain airbag incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1129-11	Passengers side-side inflatable curtain deployment control - Circuit short to ground	▪ Passengers side curtain airbag circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the passenger side curtain airbag circuit for short circuit to ground
B1129-12	Passengers side-side inflatable curtain deployment control - Circuit short to battery	▪ Passengers side curtain airbag circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the passenger side curtain airbag circuit for short circuit to power
B1129-13	Passengers side-side	▪ Passengers side curtain airbag	▪ Refer to the electrical circuit diagrams and check the

	inflatable curtain deployment control - Circuit open	circuit open circuit	passenger side curtain airbag circuit for open circuit
B1129-19	Passengers side-side inflatable curtain deployment control - Circuit current above threshold	▪ Passengers side curtain airbag circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger side curtain airbag circuit for short circuit to another circuit
B1129-1A	Passengers side-side inflatable curtain deployment control - Circuit resistance below threshold	▪ Passengers side curtain airbag circuit resistance below threshold	▪ Refer to the electrical circuit diagrams and check the passenger side curtain airbag circuit for short circuit to another circuit
B1129-95	Passengers side-side inflatable curtain deployment control - Incorrect assembly	▪ Passengers side curtain airbag incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1193-68	Crash event storage full and locked - Event information	▪ Crash event storage full and locked event information	▪ Replace the restraint control module
B1194-11	Driver side frontal acceleration sensor - Circuit short to ground	▪ Driver side front impact sensor circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the driver side front impact sensor circuit for short circuit to ground
B1194-12	Driver side frontal acceleration	▪ Driver side front impact sensor circuit short circuit	▪ Refer to the electrical circuit diagrams and check the driver side front impact sensor circuit

	sensor - Circuit short to battery	to power	for short circuit to power
B1194-19	Driver side frontal acceleration sensor - Circuit current above threshold	▪ Driver side front impact sensor circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver side front impact sensor circuit for short circuit to another circuit
B1194-4A	Driver side frontal acceleration sensor - Incorrect component installed	▪ Driver side front impact sensor circuit incorrect component installed	▪ Suspect the incorrect component has been installed. Cross-reference the part number to confirm the correct component is installed to vehicle specification
B1194-87	Driver side frontal acceleration sensor - Missing message	▪ Driver side front impact sensor missing message	▪ Refer to the electrical circuit diagrams and check the driver side front impact sensor circuit for fault. Clear the DTC and retest. If the DTC returns, suspect the driver side front impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B1194-95	Driver side frontal acceleration sensor - Incorrect assembly	▪ Driver side front impact sensor circuit incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1194-96	Driver side frontal acceleration sensor - Component internal failure	▪ Driver side front impact sensor circuit - Failure	▪ Clear the DTC and retest. If the DTC returns, suspect the driver side front impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B1195-11	Passenger side frontal	▪ Passenger side front impact sensor	▪ Refer to the electrical circuit diagrams and check the

	acceleration sensor - Circuit short to ground	circuit short circuit to ground	passenger side front impact sensor circuit for short circuit to ground
B1195-12	Passenger side frontal acceleration sensor - Circuit short to battery	▪ Passenger side front impact sensor circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the passenger side front impact sensor circuit for short circuit to power
B1195-19	Passenger side frontal acceleration sensor - Circuit current above threshold	▪ Passenger side front impact sensor circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger side front impact sensor circuit for short circuit to another circuit
B1195-4A	Passenger side frontal acceleration sensor - Incorrect component installed	▪ Passenger side front impact sensor incorrect component installed	▪ Suspect the incorrect component has been installed. Cross-reference the part number to confirm the correct component is installed to vehicle specification
B1195-87	Passenger side frontal acceleration sensor - Missing message	▪ Passenger side front impact sensor missing message	▪ Refer to the electrical circuit diagrams and check the passenger side front impact sensor circuit for fault. Clear the DTC and retest. If the DTC returns, suspect the passenger side front impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B1195-95	Passenger side frontal acceleration sensor - Incorrect assembly	▪ Passenger side front impact sensor incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1195-96	Passenger side frontal acceleration	▪ Passenger side front impact sensor - Failure	▪ Clear the DTC and retest. If the DTC returns, suspect the passenger side front impact

	acceleration sensor - Component internal failure	Failure	passenger side front impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B1196-11	Driver side second row peripheral acceleration sensor - Circuit short to ground	▪ Driver side rear side impact sensor short circuit to ground	▪ Refer to the electrical circuit diagrams and check the driver side rear side impact sensor circuit for short circuit to ground
B1196-12	Driver side second row peripheral acceleration sensor - Circuit short to battery	▪ Driver side rear side impact sensor short circuit to power	▪ Refer to the electrical circuit diagrams and check the driver side rear side impact sensor circuit for short circuit to power
B1196-19	Driver side second row peripheral acceleration sensor - Circuit current above threshold	▪ Driver side rear side impact sensor circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the driver side rear side impact sensor circuit for short circuit to another circuit
B1196-4A	Driver side second row peripheral acceleration sensor - Incorrect component installed	▪ Driver side rear side impact sensor incorrect component installed	▪ Suspect the incorrect component has been installed. Cross-reference the part number to confirm the correct component is installed to vehicle specification
B1196-87	Driver side second row peripheral acceleration sensor - Missing message	▪ Driver side rear side impact sensor missing message	▪ Refer to the electrical circuit diagrams and check the driver side rear side impact sensor circuit for fault. Clear the DTC and retest. If the DTC returns, suspect the driver side rear side impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B1196-95	Driver side second row peripheral acceleration sensor -	▪ Driver side rear side impact sensor incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform

	Incorrect assembly		routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1196-96	Driver side second row peripheral acceleration sensor - Component internal failure	▪ Driver side rear side impact sensor circuit - Failure	▪ Clear the DTC and retest. If the DTC returns, suspect the driver side rear side impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B1197-11	Passenger side second row peripheral acceleration sensor - Circuit short to ground	▪ Passenger side rear side impact sensor short circuit to ground	▪ Refer to the electrical circuit diagrams and check the passenger side rear side impact sensor circuit for short circuit to ground
B1197-12	Passenger side second row peripheral acceleration sensor - Circuit short to battery	▪ Passenger side rear side impact sensor crash sensor short circuit to power	▪ Refer to the electrical circuit diagrams and check the passenger side rear side impact sensor circuit for short circuit to power
B1197-19	Passenger side second row peripheral acceleration sensor - Circuit current above threshold	▪ Passenger side rear side impact sensor circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger side rear side impact sensor circuit for short circuit to another circuit
B1197-4A	Passenger side second row peripheral acceleration sensor - Incorrect component installed	▪ Passenger side rear side impact sensor incorrect component installed	▪ Suspect the incorrect component has been installed. Cross-reference the part number to confirm the correct component is installed to vehicle specification
B1197-87	Passenger side second row peripheral acceleration sensor - Missing	▪ Passenger side rear side impact sensor missing message	▪ Refer to the electrical circuit diagrams and check the passenger side rear side impact sensor circuit for fault. Clear the DTC and retest. If the DTC returns, suspect the passenger

	message		side rear side impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index
B1197-95	Passenger side second row peripheral acceleration sensor - Incorrect assembly	▪ Passenger side rear side impact sensor incorrect component assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1197-96	▪ Passenger side rear side impact sensor - Failure	▪ Clear the DTC and retest. If the DTC returns, suspect the passenger side rear side impact sensor. Replace as required, refer to the new module/component installation note at the top of the DTC index	
B119A-11	Second Row Drivers Side Head Airbag - Circuit short to ground	▪ Second row driver side head airbag circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the second row driver side head airbag circuit for short circuit to ground
B119A-12	Second Row Drivers Side Head Airbag - Circuit short to battery	▪ Second row driver side head airbag circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the second row driver side head airbag circuit for short circuit to power
B119A-13	Second Row Drivers Side Head Airbag - Circuit open	▪ Second row driver side head airbag circuit open circuit	▪ Refer to the electrical circuit diagrams and check the second row driver side head airbag circuit for open circuit
B119A-19	Second Row Drivers Side Head Airbag -	▪ Second row driver side head airbag circuit cross	▪ Refer to the electrical circuit diagrams and check the second row driver side head airbag

	Circuit current above threshold	coupling between 2 firing lines	circuit for short circuit to another circuit
B119A-1A	Second Row Drivers Side Head Airbag - Circuit resistance below threshold	▪ Second row driver side head airbag circuit short circuit between both lines to deployable device	▪ Refer to the electrical circuit diagrams and check the second row driver side head airbag circuit for short circuit to another circuit
B119A-95	Second Row Drivers Side Head Airbag - Incorrect assembly	▪ Second row driver side head airbag is not configured but connected	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B119B-11	Second Row Passengers Side Head Airbag - Circuit short to ground	▪ Second row passenger side head airbag circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the second row passenger side head airbag circuit for short circuit to ground
B119B-12	Second Row Passengers Side Head Airbag - Circuit short to battery	▪ Second row passenger side head airbag circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the second row passenger side head airbag circuit for short circuit to power
B119B-13	Second Row Passengers Side Head Airbag - Circuit open	▪ Second row passenger side head airbag circuit open circuit	▪ Refer to the electrical circuit diagrams and check the second row passenger side head airbag circuit for open circuit
B119B-19	Second Row Passengers Side Head Airbag - Circuit current above threshold	▪ Second row passenger side head airbag circuit cross coupling between 2 firing lines	▪ Refer to the electrical circuit diagrams and check the second row passenger side head airbag circuit for short circuit to another circuit
B119B-1A	Second Row Passengers Side Head	▪ Second row passenger side head airbag circuit	▪ Refer to the electrical circuit diagrams and check the second row passenger side head

	Side Head Airbag - Circuit resistance below threshold	head airbag circuit short circuit between both lines to deployable device	row passenger side head airbag circuit for short circuit to another circuit
B119B-95	Second Row Passengers Side Head Airbag - Incorrect assembly	▪ Second row passenger side head airbag device is not configured but connected	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1A55-11	Crash record output - Circuit short to ground	▪ Crash record output circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the crash record output (ENS) circuit for short circuit to ground
B1A55-12	Crash record output - Circuit short to battery	▪ Crash record output circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the crash record output (ENS) circuit for short circuit to power
B1D74-11	Passenger airbag cutoff enable switch - Circuit short to ground	▪ Passenger airbag disable indicator circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check passenger airbag disable indicator (B) circuit for short circuit to ground
B1D74-12	Passenger airbag cutoff enable switch - Circuit short to battery	▪ Passenger airbag disable indicator circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check passenger airbag disable indicator (B) circuit for short circuit to power
B1D74-13	Passenger airbag cutoff enable switch - Circuit open	▪ Passenger airbag disable switch circuit open circuit	▪ Refer to the electrical circuit diagrams and check passenger airbag disable switch (B) circuit for open circuit
B1D74-19	Passenger airbag cutoff enable switch - Circuit current above threshold	▪ Passenger airbag disable switch circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger airbag disable switch (B) circuit for short circuit to another circuit

	threshold		
B1D74-1E	Passenger airbag cutoff enable switch - Circuit resistance out of range	▪ Passenger airbag disable switch circuit resistance out of range	▪ Refer to the electrical circuit diagrams and check passenger airbag disable switch (B) circuit
B1D74-95	Passenger airbag cutoff enable switch - Incorrect assembly	▪ Passenger airbag disable switch incorrect assembly	▪ Suspect the component is installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
B1D75-11	Passenger airbag cutoff disable switch - Circuit short to ground	▪ Passenger airbag disable indicator circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check passenger airbag disable indicator (A) circuit for short circuit to ground
B1D75-12	Passenger airbag cutoff disable switch - Circuit short to battery	▪ Passenger airbag disable indicator circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check passenger airbag disable indicator (A) circuit for short circuit to power
B1D75-13	Passenger airbag cutoff disable switch - Circuit open	▪ Passenger airbag disable switch circuit open circuit	▪ Refer to the electrical circuit diagrams and check passenger airbag disable switch (A) circuit for open circuit
B1D75-19	Passenger airbag cutoff disable switch - Circuit current above threshold	▪ Passenger airbag disable switch circuit current above threshold	▪ Refer to the electrical circuit diagrams and check the passenger airbag disable switch (A) circuit for short circuit to another circuit
B1D75-1E	Passenger airbag cutoff disable switch - Circuit resistance out of range	▪ Passenger airbag disable switch circuit resistance out of range	▪ Refer to the electrical circuit diagrams and check the passenger airbag disable switch (A) circuit for short circuit to another circuit
B1D75-	Passenger	▪ Passenger airbag	▪ Suspect the component is

95	airbag cutoff disable switch - Incorrect assembly	disable switch incorrect assembly	installed but not registered in the car configuration file. Using the manufacturer approved diagnostic system, perform routine - Configure existing module - Restraints control module - Located under the 'extras' tab in - Diagnosis - With symptom set to – Electrical – Instruments - Warning lamps - Air bag warning lamp
U0001-88	High speed CAN communication bus - Bus off	▪ High speed CAN communication bus off	▪ Refer to the electrical circuit diagrams and check the CAN bus connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Check other modules for related DTCs and refer to relevant DTC index
U0100-00	Lost communication with ECM/PCM "A" - No sub type information	▪ Lost communication with the engine control module	▪ Refer to the electrical circuit diagrams and check the power, ground and CAN bus connections to the engine control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Check other modules for related DTCs and refer to relevant DTC index
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	▪ Refer to the electrical circuit diagrams and check the power, ground and CAN bus connections to the anti-lock brake system (ABS) control module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Check other modules for related DTCs and refer to relevant DTC index
U0128-00	Lost communication with park brake control module - No sub type	▪ Lost communication with park brake control module	▪ Refer to the electrical circuit diagrams and check the power, ground and CAN bus connections to the park brake control module. Using the manufacturer approved

	information		diagnostic system, complete a CAN network integrity test. Check other modules for related DTCs and refer to relevant DTC index

GENERAL INFORMATION

DESCRIPTION AND OPERATION

RETRACTABLE RUNNING BOARD MODULE (RBM)

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 Retractable Running Board Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Retractable Running Board (501-08 Exterior Trim and Ornamentation, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
C1002-77	Left Power Running Board Stow - Commanded position not reachable	▪ Mechanical fault with the link ▪ Output shaft torque ring slipping	▪ Check the power side retractable running board hinge for dirt and debris, wash the step if necessary. Remove the wedge key and check the retractable running board hinge for free movement and if NOT OK renew the retractable running board hinge. If OK renew the retractable running board motor
C1003-	Right Power	▪ Mechanical	▪ Check the power side retractable

77	Running Board Stow - Commanded position not reachable	fault with the link ▪ Output shaft torque ring slipping	running board hinge for dirt and debris, wash the step if necessary. Remove the wedge key and check the retractable running board hinge for free movement and if NOT OK renew the retractable running board hinge. If OK renew the retractable running board motor
C1004-77	Right Power Running Board Deploy - Commanded position not reachable	▪ Mechanical fault with the link ▪ Output shaft torque ring slipping	▪ Check the power side retractable running board hinge for dirt and debris, wash the step if necessary. Remove the wedge key and check the retractable running board hinge for free movement and if NOT OK renew the retractable running board hinge. If OK renew the retractable running board motor
C1005-77	Left Power Running Board Deploy - Commanded position not reachable	▪ Mechanical fault with the link ▪ Output shaft torque ring slipping	▪ Check the power side retractable running board hinge for dirt and debris, wash the step if necessary. Remove the wedge key and check the retractable running board hinge for free movement and if NOT OK renew the retractable running board hinge. If OK renew the retractable running board motor
C1006-11	Left Power Running Board Motor - Circuit short to ground	▪ Retractable running board motor circuit short circuit to ground ▪ Faulty retractable running board motor ▪ Control module	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary. Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation
C1006-12	Left Power Running Board Motor - Circuit short to battery	▪ Retractable running board motor stow or deploy circuit short circuit to power	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary. Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable

		▪ Faulty retractable running board motor ▪ Control module	running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation
C1006-13	Left Power Running Board Motor - Circuit open	▪ Retractable running board motor stow or deploy circuit open circuit ▪ Faulty retractable running board motor ▪ Control module	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary. Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation
C1006-19	Left Power Running Board Motor - Circuit current above threshold	▪ Retractable running board motor stow or deploy circuit current above threshold ▪ Faulty retractable running board motor ▪ Control module	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary. Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation
C1006-67	Left Power Running Board Motor - Signal incorrect after event	▪ Retractable running board motor stow or deploy signal incorrect after event ▪ Faulty retractable running board motor ▪ Control module	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary. Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation

			normal operation
C1007-11	Right Power Running Board Motor - Circuit short to ground	▪ Retractable running board motor circuit short circuit to ground ▪ Faulty retractable running board motor ▪ Control module	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary. Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation
C1007-12	Right Power Running Board Motor - Circuit short to battery	▪ Retractable running board motor stow or deploy circuit short circuit to power ▪ Faulty retractable running board motor ▪ Control module	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary. Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation
C1007-13	Right Power Running Board Motor - Circuit open	▪ Retractable running board motor stow or deploy circuit open circuit ▪ Faulty retractable running board motor ▪ Control module	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary. Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation
C1007-19	Right Power Running Board Motor - Circuit current above	▪ Retractable running board motor stow or	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary.

	threshold	deploy circuit current above threshold ▪ Faulty retractable running board motor ▪ Control module	Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation
C1007-67	Right Power Running Board Motor - Signal incorrect after event	▪ Retractable running board motor stow or deploy signal incorrect after event ▪ Faulty retractable running board motor ▪ Control module	▪ Disconnect the retractable running board motor and the retractable running board module, check the circuit and repair/renew as necessary. Check the retractable running board motor connections for security and integrity. If faulty renew the retractable running board motor. If the wiring harness and retractable running board motor are OK, renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect. Clear DTCs and check for normal operation
C1008-29	Left Power Running Board Position/Motion Sensor - Signal invalid	▪ Invalid signal ▪ Motor hall effect sensor fault ▪ Retractable running board motor fault	▪ Connect an oscilloscope to the hall effect signal line (Refer to the electrical circuit diagrams) and cycle the retractable running board. If the hall effect pulse width is shorter than 1.5ms, then renew the retractable running board motor assembly
C1008-3A	Left Power Running Board Position/Motion Sensor - Incorrect has too many pulses	▪ Output shaft torque ring slipping	▪ Check the power side retractable running board hinge for dirt and debris, wash the step if necessary. Remove the wedge key and check the retractable running board hinge for free movement and if NOT OK renew the retractable running board hinge. If OK renew the retractable running board motor
C1008-93	Left Power Running Board Position/Motion Sensor - No operation	▪ Retractable running board motor fault	▪ Renew the motor, clear DTCs and check for normal operation

C1009-29	Right Power Running Board Position/Motion Sensor - Signal invalid	▪ Invalid signal ▪ Motor hall effect sensor fault ▪ Retractable running board motor fault	▪ Connect an oscilloscope to the hall effect signal line (Refer to the electrical circuit diagrams) and cycle the retractable running board. If the hall effect pulse width is shorter than 1.5ms, then renew the retractable running board motor assembly
C1009-3A	Right Power Running Board Position/Motion Sensor - Incorrect has too many pulses	▪ Output shaft torque ring slipping	▪ Check the power side retractable running board hinge for dirt and debris, wash the step if necessary. Remove the wedge key and check the retractable running board hinge for free movement and if NOT OK renew the retractable running board hinge. If OK renew the retractable running board motor
C1009-93	Right Power Running Board Position/Motion Sensor - No operation	▪ Retractable running board motor fault	▪ Renew the motor, clear DTCs and check for normal operation
C1B14-11	Sensor Supply Voltage A - Circuit short to ground	▪ Retractable running board motor hall effect sensor power circuit short to ground ▪ Retractable running board motor fault ▪ Control module	▪ Disconnect the motor and check the voltage on the hall effect sensor line (Refer to the electrical circuit diagrams), if OK renew the retractable running board motor. If not check harness for short or open circuit and repair/renew as necessary. If OK renew the retractable running board module. Refer to the warranty policy and procedures manual if the module is suspect
C1B14-12	Sensor Supply Voltage A - Circuit short to battery	▪ Retractable running board motor hall effect sensor power circuit short to power	▪ Remove the ignition key, close the doors and wait 5 minutes for the vehicle to enter into sleep mode. Disconnect the retractable running board motor from vehicle harness and ensure the vehicle has remained in sleep mode. Measure the voltage between the hall effect sensor supply line and ground. If voltage is present repair/renew as necessary. If voltage is not present, check the retractable running board motor harness for

			running board motor harness for short to power. If found repair/renew as necessary or renew the retractable running board motor
U0010-88	Medium 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
U0121-68	Lost Communication With Anti-Lock Brake System (ABS) Control Module - Event information	▪ Incorrect signal received	▪ Check the Anti-Lock Brake System Control Module for related DTCs and refer to the relevant DTC index. Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network between the Anti-Lock Brake System Control Module and Retractable Running Board Control Module
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ CAN harness link between Retractable Running Board Control Module and Body Control Module network malfunction ▪ Retractable Running Board Control Module has not received the expected CAN signal from the Body Control Module within the specified time interval	▪ Check the Body Control Module for related DTCs and refer to the relevant DTC index. 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 Body Control Module and Retractable Running Board Control Module

U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Incorrect control module installed	▪ Check that the correct module is installed to the vehicle. Check the module software level and install the latest version if necessary. Refer to the warranty and policy and procedures manual if a retractable running board module is suspect
U0439-68	Invalid Data Received From All Terrain Control Module - Event information	▪ Incorrect signal received	▪ Check the All Terrain Control Module for related DTCs and refer to the relevant DTC index
U1001-23	Switch Pack - Switch Circuit - Signal stuck low	▪ Switch stuck ▪ Switch circuit short circuit to ground	▪ Check the switch operation. Refer to the electrical circuit diagrams and check the switch circuit. Repair/renew as necessary
U1002-11	Switch Pack - Status Indicator Circuit - Circuit short to ground	▪ Switch circuit short circuit to ground (switch LED remains illuminated)	Refer to the electrical circuit diagrams and check the switch LED circuit. Repair/renew as necessary
U1002-12	Switch Pack - Status Indicator Circuit - Circuit short to battery	▪ Switch circuit short circuit to power (switch LED remains illuminated)	▪ Refer to the electrical circuit diagrams and check the switch LED circuit. Repair/renew as necessary
U2101-00	Control Module Configuration Incompatible - No sub type information	▪ No sub type information	▪ Using the manufacturers approved diagnostic system, check the set-up of the car configuration file and the software version of the control module
U3000-41	Control Module - General checksum failure	▪ Retractable running board module RAM fault (data memory failure leading to possible corrupt local configuration	Configure the module using the approved diagnostic system and download the local configuration file. 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

		file)	
U3000-49	Control Module - Internal electronic failure	▪ Internal electronic failure	▪ Renew the module. Refer to the warranty policy and procedures manual if a module is suspect
U3000-52	Control Module - Not activated	▪ Module not activated	▪ Using the manufacturers approved diagnostic system, check the set-up of the car configuration file and correct/activate as necessary
U3003-16	Battery Voltage - Circuit voltage below threshold	▪ Battery voltage below threshold (8 volts)	▪ 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 supply circuits to the module
U3003-17	Battery Voltage - Circuit voltage above threshold	▪ Battery voltage above threshold	▪ Check vehicle battery and charging system. Refer to the relevant section in the workshop manual. Refer to the electrical circuit diagrams and check the power supply circuits to the module
U3003-62	Battery Voltage - Signal compare failure	▪ Battery voltage signal compare failure	▪ Refer to the electrical circuit diagrams and check the power and ground circuits to the control module. 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

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GENERAL INFORMATION

DESCRIPTION AND OPERATION

SATELLITE DIGITAL AUDIO RADIO SYSTEM 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 required

The table below lists all Diagnostic Trouble Codes (DTCs) that could be logged in the Satellite Digital Audio Radio System Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B1A89-11	Satellite Antenna - Circuit short to ground	▪ Circuit short to power. The Satellite Digital Audio Radio Module has detected a vehicle power measurement for a period longer than expected, or has detected a vehicle power measurement when another value was expected ▪ Satellite Digital Audio Radio antenna cable short to ground ▪ Internal failure Satellite Digital Audio Radio Module ▪ Internal failure Satellite Digital Audio	▪ Refer to the electrical circuit diagrams and check Satellite Digital Audio Radio antenna cable for short to ground. Install Satellite Digital Audio Radio antenna harness as required. Suspect the Satellite Digital Audio Radio Module, check and install a new Satellite Digital Audio Radio Module as required. Suspect the Satellite Digital Audio Radio antenna, check and install a new Satellite Digital Audio Radio antenna as required. Refer to the warranty policy and procedures manual if a Module is suspect

		Digital Audio Radio antenna	
B1A89-12	Satellite Antenna - Circuit short to battery	▪ Circuit short to power. The Satellite Digital Audio Radio Module has detected a vehicle power measurement for a period longer than expected, or has detected a vehicle power measurement when another value was expected ▪ Satellite Digital Audio Radio antenna cable short to power ▪ Internal failure Satellite Digital Audio Radio Module ▪ Internal failure Satellite Digital Audio Radio antenna	▪ Refer to the electrical circuit diagrams and check Satellite Digital Audio Radio antenna cable for short to power. Install Satellite Digital Audio Radio antenna harness as required. Suspect the Satellite Digital Audio Radio Module, check and install a new Satellite Digital Audio Radio Module as required. Suspect the Satellite Digital Audio Radio antenna, check and install a new Satellite Digital Audio Radio antenna as required. Refer to the warranty policy and procedures manual if a module is suspect
B1A89-13	Satellite Antenna - Circuit open	▪ Circuit open. The Satellite Digital Audio Radio Module has determined an open circuit via lack of bias voltage, low current flow, no change in the state of an input in response to an output ▪ Satellite Digital Audio	▪ Refer to the electrical circuit diagrams and check Satellite Digital Audio Radio antenna cable for open circuit. Install Satellite Digital Audio Radio antenna harness as required. Suspect the Satellite Digital Audio Radio Module, check and install a new Satellite Digital Audio Radio Module as required. Suspect the Satellite Digital Audio Radio antenna, check and install a new Satellite Digital Audio Radio antenna as required. Refer to the warranty policy and procedures manual if a module is suspect

		Radio antenna cable open circuit ▪ Internal failure Satellite Digital Audio Radio Module ▪ Internal failure Satellite Digital Audio Radio antenna	
U3000-04	Control Module - System internal failures	▪ Satellite Digital Audio Radio Module internal failure	▪ Suspect the Satellite Digital Audio Radio Module, check and install a new Satellite Digital Audio Radio Module as required, Refer to the warranty policy and procedures manual if a module is suspect
U3000-4A	Control Module - Incorrect component installed	▪ Satellite Digital Audio Radio Module. Incorrect component installed ▪ Car configuration mismatch	▪ Using the manufacturer approved diagnostic system select the vehicle configuration Main Menu, vehicle configuration, display and or modify the vehicle configuration file data. Check update as required
U3000-55	Control Module - Not configured	▪ Satellite Digital Audio Radio Module, not configured ▪ 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 Digital Audio Radio Module

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GENERAL INFORMATION

DESCRIPTION AND OPERATION

CLIMATE CONTROLLED SEAT MODULE - FRONT/REAR (SCME/SCMF)

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).
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.
- Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.
- If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.
- The climate system functions in a manner that means any detected error state either intermittent or permanent will shut down the complete seat climate system until the next ignition cycle, this does not mean that both climate units within the one seat have failed. This shut down is design intent to protect the system to ensure that the fault detected does not damage the units, it is possible that both units are functioning correctly and that the fault lies elsewhere within the system. The following process can be carried out without removing either the seats or the climate units from the vehicle and should correctly identify any failed units, this should ensure that only failed units are changed under warranty. Any units exhibiting the correct reading as per process below, should **NOT** be changed under warranty. If all units have a correct reading then re-confirm customer symptom, if customer symptom is still present then carry out further system checks

- 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 Controlled Seat Module - Front/Rear (SCME/SCMF), for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Seats - Vehicles With: Climate Controlled Seats (501-10 Seating, Diagnosis and Testing).

Possible Causes

DTC	DESCRIPTION	ACTION	
B10B9-13	Blower Control - Circuit open	LH seat blower + circuit, open circuit - LH seat blower - circuit, open circuit - Connectors disconnected - Connector pin damage - Blower motor assembly open circuit - Climate Control Seat Module failure	- Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check LH seat blower + circuit for open circuit. Check LH seat blower - circuit for open circuit. Check for any disconnected connectors or damaged connector pins. Check blower motor assembly for open circuit. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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 - LH seat blower + circuit, short to ground	- Check for mechanical restriction or debris in blower motor assembly. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and

		▪ LH seat blower - circuit, short to ground ▪ Blower motor assembly, short to ground ▪ Climate Control Seat Module failure	check LH seat blower + circuit for short to ground. Check LH seat blower - circuit for short to ground. Check blower motor assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ RH seat blower + circuit, open circuit ▪ RH seat blower - circuit, open circuit ▪ Connectors disconnected ▪ Connector pin damage ▪ Blower motor assembly open circuit ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check RH seat blower + circuit for open circuit. Check RH seat blower - circuit for open circuit. Check for any disconnected connectors or damaged connector pins. Check blower motor assembly for open circuit. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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 ▪ RH seat blower + circuit, short to ground ▪ RH seat blower - circuit, short to ground ▪ Blower motor	▪ Check for mechanical restriction or debris in blower motor assembly. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check RH seat blower + circuit for short to ground. Check RH seat blower - circuit for short to ground. Check blower motor assembly for short to ground

		assembly, short to ground ▪ Climate Control Seat Module failure	assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ RH seat back thermal electric device + circuit, open circuit ▪ RH seat back thermal electric device - circuit, open circuit ▪ RH seat cushion thermal electric device + circuit, open circuit ▪ RH seat cushion thermal electric device - circuit, open circuit ▪ Connectors disconnected ▪ Connector pin damage ▪ Climate seat backrest thermal electric device assembly, open circuit ▪ Climate seat cushion thermal electric device assembly, open circuit ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, RH seat back thermal electric device + circuit for open circuit. Check RH seat back thermal electric device - circuit for open circuit. Check RH seat cushion thermal electric device + circuit for open circuit. Check RH seat cushion thermal electric device - circuit for open circuit. Check for any disconnected connectors or damaged connector pins. Check climate seat backrest thermal electric device assembly for open circuit. Check climate seat cushion thermal electric device assembly for open circuit. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ RH seat back thermal electric device + circuit, short to ground ▪ RH seat back	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit

	threshold	▪ RH seat back thermal electric device - circuit, short to ground ▪ RH seat cushion thermal electric device + circuit, short to ground ▪ RH seat cushion thermal electric device - circuit, short to ground ▪ Climate seat backrest thermal electric device assembly, short to ground ▪ Climate seat cushion thermal electric device assembly, short to ground ▪ Climate Control Seat Module failure	diagrams and check, RH seat back thermal electric device + circuit for short to ground. Check RH seat back thermal electric device - circuit for short to ground. Check RH seat cushion thermal electric device + circuit for short to ground. Check RH seat cushion thermal electric device - circuit for short to ground. Check climate seat backrest thermal electric device assembly for short to ground. Check climate seat cushion thermal electric device assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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-4B	Right Thermal Electric Device Control - Over temperature	▪ Restriction in thermal electric device air path ▪ RH seat back thermal electric device + circuit, short to ground ▪ RH seat back thermal electric device - circuit, short to ground ▪ RH seat cushion thermal electric device + circuit, short to ground ▪ RH seat cushion thermal electric device - circuit, short to ground ▪ Climate seat backrest thermal electric device assembly, short to ground ▪ Climate seat	▪ Check for blockage or restriction in thermal electric device air path. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, RH seat back thermal electric device + circuit for short to ground. Check RH seat back thermal electric device - circuit for short to ground. Check RH seat cushion thermal electric device + circuit for short to ground. Check RH seat cushion thermal electric device - circuit for short to ground. Check climate seat backrest thermal electric device assembly for short to ground. Check climate seat cushion thermal electric device assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand

		cushion thermal electric device assembly, short to ground ▪ Climate Control Seat Module failure	Self Test (ODST) 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	▪ The Climate Control Seat Module LH cushion sensor input circuit temperature exceeds 65 Degrees C continuously for more than 4 seconds during cooling ▪ The Climate Control Seat Module LH cushion sensor input circuit temperature is greater than 110 Degrees C for more than 4 seconds during heating ▪ Blocked or restricted thermal electric device fan exhaust vent ▪ Restricted thermal electric fan movement	**NOTE:** For a more detailed repair procedure of this DTC please refer to section 501-10 climate controlled seats diagnosis and testing workshop manual ▪ Check for blockage or restriction in thermal electric device fan exhaust vent. Check for restricted thermal electric fan movement. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification. Alternatively carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. For additional information, refer to: **Seats - Vehicles With: Climate Controlled Seats** (501-10 Seating, Diagnosis and Testing).
B1223-13	Right Seat Cushion Temperature Sensor - Circuit open	▪ RH seat cushion sensor circuit, open circuit ▪ RH seat cushion sensor - circuit, open circuit ▪ Connectors disconnected ▪ Connector pin damage ▪ Climate seat cushion temperature sensor assembly,	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, RH seat cushion sensor circuit for open circuit. Check RH seat cushion sensor - circuit for open circuit. Check for any disconnected connectors or damaged connector pins. Check Climate seat cushion temperature sensor assembly for open circuit. Refer to the warranty policy and procedures manual

		open circuit ▪ Climate Control Seat Module failure	if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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 Seat Cushion Temperature Sensor - Circuit open	▪ LH seat back thermal electric device + circuit, open circuit ▪ LH seat back thermal electric device - circuit, open circuit ▪ LH seat cushion thermal electric device + circuit, open circuit ▪ LH seat cushion thermal electric device - circuit, open circuit ▪ Connectors disconnected ▪ Connector pin damage ▪ Climate seat backrest thermal electric device assembly, open circuit ▪ Climate seat cushion thermal electric device assembly, open circuit ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, LH seat back thermal electric device + circuit for open circuit. Check LH seat back thermal electric device - circuit for open circuit. Check LH seat cushion thermal electric device + circuit for open circuit. Check LH seat cushion thermal electric device - circuit for open circuit. Check for any disconnected connectors or damaged connector pins. Check climate seat backrest thermal electric device assembly for open circuit. Check climate seat cushion thermal electric device assembly for open circuit. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification. Alternatively carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B1224-19	Left Thermal Electric Device Control - Circuit current above threshold	▪ LH seat back thermal electric device + circuit, short to ground ▪ LH seat back thermal electric device - circuit, short to ground	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, LH seat back thermal electric device + circuit for short to ground.

		short to ground ▪ LH seat cushion thermal electric device + circuit, short to ground ▪ LH seat cushion thermal electric device - circuit, short to ground ▪ Climate seat backrest thermal electric device assembly, short to ground ▪ Climate seat cushion thermal electric device assembly, short to ground ▪ Climate Control Seat Module failure	Check LH seat back thermal electric device - circuit for short to ground. Check LH seat cushion thermal electric device + circuit for short to ground. Check LH seat cushion thermal electric device - circuit for short to ground. Check climate seat backrest thermal electric device assembly for short to ground. Check climate seat cushion thermal electric device assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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 ▪ LH seat back thermal electric device + circuit, short to ground ▪ LH seat back thermal electric device - circuit, short to ground ▪ LH seat cushion thermal electric device + circuit, short to ground ▪ LH seat cushion thermal electric device - circuit, short to ground ▪ Climate seat backrest thermal electric device assembly, short to ground ▪ Climate seat cushion thermal electric device assembly, short to	▪ Check for blockage or restriction in thermal electric device air path. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, LH seat back thermal electric device + circuit for short to ground. Check LH seat back thermal electric device - circuit for short to ground. Check LH seat cushion thermal electric device + circuit for short to ground. Check LH seat cushion thermal electric device - circuit for short to ground. Check climate seat backrest thermal electric device assembly for short to ground. Check climate seat cushion thermal electric device assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm

		assembly, short to ground ▪ Climate Control Seat Module failure	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	▪ RH seat back sensor circuit, open circuit ▪ RH seat back sensor - circuit, open circuit ▪ Connectors disconnected ▪ Connector pin damage ▪ Climate seat back temperature sensor assembly, open circuit ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, RH seat back sensor circuit for open circuit. Check RH seat back sensor - circuit for open circuit. Check for any disconnected connectors or damaged connector pins. Check Climate seat back temperature sensor assembly for open circuit. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ LH seat back sensor circuit, open circuit ▪ LH seat back sensor - circuit, open circuit ▪ Connectors disconnected ▪ Connector pin damage ▪ Climate seat back temperature sensor assembly, open circuit ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, LH seat back sensor circuit for open circuit. Check LH seat back sensor - circuit for open circuit. Check for any disconnected connectors or damaged connector pins. Check Climate seat back temperature sensor assembly for open circuit. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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-11	Right Seat Cushion Blower Speed Sensor - Circuit short to ground	▪ RH cushion fan speed, circuit short to ground ▪ Blower motor assembly, short to ground ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, RH cushion fan speed for circuit short to ground. Check blower motor assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ RH cushion fan speed, circuit short to power ▪ Blower motor assembly, short to power ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, RH cushion fan speed for circuit short to power. Check blower motor assembly for short to power. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ RH seat back fan speed, circuit short to ground ▪ Blower motor assembly, short to ground	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, RH seat back fan speed for circuit short

		▪ Climate Control Seat Module failure	to ground. Check blower motor assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ RH seat back fan speed, circuit short to power ▪ Blower motor assembly, short to power ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, RH seat back fan speed for circuit short to power. Check blower motor assembly for short to power. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ LH cushion fan speed, circuit short to ground ▪ Blower motor assembly, short to ground ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, LH cushion fan speed for circuit short to ground. Check blower motor assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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-12	Left Seat Cushion Blower Speed Sensor - Circuit short to battery	▪ LH cushion fan speed, circuit short to power ▪ Blower motor assembly, short to power ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, LH cushion fan speed for circuit short to power. Check blower motor assembly for short to power. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ LH seat back fan speed, circuit short to ground ▪ Blower motor assembly, short to ground ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, LH seat back fan speed for circuit short to ground. Check blower motor assembly for short to ground. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ LH seat back fan speed, circuit short to power ▪ Blower motor assembly, short to power ▪ Climate Control	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, LH seat back fan speed for circuit short to power. Check blower motor

		Seat Module failure	assembly for short to power. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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	▪ The Climate Control Seat Module RH cushion sensor input circuit temperature exceeds 65 Degrees C continuously for more than 4 seconds during cooling ▪ The Climate Control Seat Module RH cushion sensor input circuit temperature is greater than 110 Degrees C for more than 4 seconds during heating ▪ Blocked or restricted thermal electric device fan exhaust vent ▪ Restricted thermal electric fan movement	**NOTE:** For a more detailed repair procedure of this DTC please refer to section 501-10 climate controlled seats diagnosis and testing workshop manual ▪ Check for blockage or restriction in thermal electric device fan exhaust vent. Check for restricted thermal electric fan movement. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification. Alternatively carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. For additional information, refer to: **Seats - Vehicles With: Climate Controlled Seats** (501-10 Seating, Diagnosis and Testing).
B122F-98	Right Seat Back - Component or system over temperature	▪ The Climate Control Seat Module RH seat back sensor input circuit temperature exceeds 65 Degrees C continuously for more than 4 seconds during cooling	**NOTE:** For a more detailed repair procedure of this DTC please refer to section 501-10 climate controlled seats diagnosis and testing workshop manual

		▪ The Climate Control Seat Module RH seat back sensor input circuit temperature is greater than 110 Degrees C for more than 4 seconds during heating ▪ Blocked or restricted thermal electric device fan exhaust vent ▪ Restricted thermal electric fan movement	▪ Check for blockage or restriction in thermal electric device fan exhaust vent. Check for restricted thermal electric fan movement. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification. Alternatively carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. For additional information, refer to: **Seats - Vehicles With: Climate Controlled Seats** (501-10 Seating, Diagnosis and Testing).
B1230-98	Left Seat Back - Component or system over temperature	▪ The Climate Control Seat Module LH seat back sensor input circuit temperature exceeds 65 Degrees C continuously for more than 4 seconds during cooling ▪ The Climate Control Seat Module LH seat back sensor input circuit temperature is greater than 110 Degrees C for more than 4 seconds during heating ▪ Blocked or restricted thermal electric device fan exhaust vent ▪ Restricted thermal electric fan movement	**NOTE:** For a more detailed repair procedure of this DTC please refer to section 501-10 climate controlled seats diagnosis and testing workshop manual ▪ Check for blockage or restriction in thermal electric device fan exhaust vent. Check for restricted thermal electric fan movement. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification. Alternatively carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. For additional information, refer to: **Seats - Vehicles With: Climate Controlled Seats** (501-10 Seating, Diagnosis and Testing).
B1231-7A	Right Seat - Fluid leak or seal failure	▪ The Climate Control Seat Module has detected an input temperature difference greater	**NOTE:** For a more detailed repair procedure of this DTC please refer to section

		than expected between RH seat back sensor and RH cushion sensor ▪ Climate seat back assembly air path leaking ▪ Climate seat cushion assembly air path leaking ▪ Seat assembly damaged	501-10 climate controlled seats diagnosis and testing workshop manual ▪ Check for blockage or restriction in seat back thermal electric device fan ducts. Check seat back thermal electric device fan exhaust vent is clear. Check for blockage or restriction in seat cushion thermal electric device fan ducts. Check seat cushion thermal electric device fan exhaust vent is clear. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification. Alternatively carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. For additional information, refer to: **Seats - Vehicles With: Climate Controlled Seats** (501-10 Seating, Diagnosis and Testing).
B1232-7A	Left Seat - Fluid leak or seal failure	▪ The Climate Control Seat Module has detected an input temperature difference greater than expected between LH seat back sensor and LH cushion sensor ▪ Climate seat back assembly air path leaking ▪ Climate seat cushion assembly air path leaking ▪ Seat assembly damaged	**NOTE:** For a more detailed repair procedure of this DTC please refer to section 501-10 climate controlled seats diagnosis and testing workshop manual ▪ Check for blockage or restriction in seat back thermal electric device fan ducts. Check seat back thermal electric device fan exhaust vent is clear. Check for blockage or restriction in seat cushion thermal electric device fan ducts. Check seat cushion thermal electric device fan exhaust vent is clear. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification. Alternatively carry

			out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. For additional information, refer to: **Seats - Vehicles With: Climate Controlled Seats** (501-10 Seating, Diagnosis and Testing).
B1235-13	Left Seat Cushion Temperature Sensor - Circuit open	▪ LH seat cushion sensor circuit, open circuit ▪ LH seat cushion sensor - circuit, open circuit ▪ Connectors disconnected ▪ Connector pin damage ▪ Climate seat cushion temperature sensor assembly, open circuit ▪ Climate Control Seat Module failure	▪ Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm the fault is present. Refer to the electrical circuit diagrams and check, LH seat cushion sensor circuit for open circuit. Check LH seat cushion sensor - circuit for open circuit. Check for any disconnected connectors or damaged connector pins. Check Climate seat cushion temperature sensor assembly for open circuit. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect. Carry out On Demand Self Test (ODST) 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. Using the manufacturer approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ CAN harness link between Climate Control Seat Module and Central Junction Box malfunction	▪ Using the manufacturer approved diagnostic system, check Central Junction Box for DTCs and refer to the relevant DTC Index. Using the manufacturer approved diagnostic system, carry out

		▪ The Climate Control Seat Module has not received the expected CAN signal from the Central Junction Box within the specified time interval	diagnostic system, carry out network integrity test. Refer to the electrical circuit diagrams and check Central Junction Box power and ground circuits for open circuit. Check CAN harness between Climate Control Seat Module and Central Junction Box, repair as necessary
U0142-00	Lost Communication With Body Control Module "B" - No sub type information	▪ CAN harness link between Climate Control Seat Module and Rear Junction Box malfunction ▪ The Climate Control Seat Module has not received the expected CAN signal from the Rear Junction Box within the specified time interval	▪ Using the manufacturer approved diagnostic system, check Rear Junction Box for DTCs and refer to the relevant DTC Index. Using the manufacturer approved diagnostic system, carry out network integrity test. Refer to the electrical circuit diagrams and check Rear Junction Box power and ground circuits for open circuit. Check CAN harness between Climate Control Seat Module and Rear Junction Box, repair as necessary
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information	▪ CAN harness link between Climate Control Seat Module and Instrument Panel Cluster (IPC) network malfunction ▪ The Climate Control Seat Module has not received the expected CAN signal from the Instrument Panel Cluster (IPC) within the specified time interval	▪ Using the manufacturer approved diagnostic system, check Instrument Panel Cluster (IPC) for DTCs and refer to the relevant DTC Index. Using the manufacturer approved diagnostic system, carry out network integrity test. Refer to the electrical circuit diagrams and check Instrument Panel Cluster (IPC) power and ground circuits for open circuit. Check CAN harness between Climate Control Seat Module and Instrument Panel Cluster (IPC), repair as necessary
U0156-00	Lost Communication With Information Center "A" - No sub type information	▪ CAN harness link between Climate Control Seat Module and Information and Entertainment Control Module network	▪ Using the manufacturer approved diagnostic system, check Information and Entertainment Control Module for DTCs and refer to the relevant DTC Index. Using the manufacturer approved diagnostic system, carry out

		network malfunction ▪ The Climate Control Seat Module has not received the expected CAN signal from the Information and Entertainment Control Module within the specified time interval	diagnostic system, carry out network integrity test. Refer to the electrical circuit diagrams and check Information and Entertainment Control Module power and ground circuits for open circuit. Check CAN harness between Climate Control Seat Module and Information and Entertainment Control Module, repair as necessary
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Incorrect or invalid software has been installed	▪ Using the manufacturer approved diagnostic system, re-configure the Climate Control Seat Module and the Rear Junction Box. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification. Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect
U0401-00	Invalid Data Received from ECM/PCM A - No sub type information	▪ The Engine Control Module (ECM) has transmitted engine speed quality factor CAN signal at a specific value for a greater than expected time period	▪ Using the manufacturer approved diagnostic system, check Engine Control Module for DTCs and refer to the relevant DTC Index
U2101-00	Control module Configuration Incompatible - No sub type information	▪ Calibration incomplete/corrupt	▪ Using the manufacturer approved diagnostic system, re-configure the Climate Control Seat Module and the Rear Junction Box. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification
U3000-04	Control Module - System internal failures	▪ Climate Control Seat Module failure ▪ Climate Control Seat Module microprocessor failed internal ROM	▪ Refer to the warranty policy and procedures manual if the Climate Control Seat Module is suspect

		and/or RAM checksum test	
U3003-62	Battery Voltage - Signal compare failure	▪ Mismatch in battery voltage of 2 volts or more between the measured battery voltage at the Climate Control Seat Module and the battery voltage signal sent from the Rear Junction Box	▪ Refer to the electrical circuit diagrams and check that power supply voltage at Climate Control Seat Module and Rear Junction Box is not different by more than 2 volts. Rectify as required. Carry out On Demand Self Test (ODST) using manufacturer approved diagnostic system to confirm rectification

GENERAL INFORMATION

DESCRIPTION AND OPERATION

SPEED CONTROL MODULE (CCM)

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 Speed Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section.
For additional information, refer to: Speed Control (310-03C Speed Control - V8 5.0L Petrol/V8 S/C 5.0L Petrol, 5.0L, Diagnosis and Testing).

U3000-44

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B1A84-81	Car Configuration Data - Invalid serial data received	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC)	▪ Using the manufacturer approved diagnostic system re-configure the Central Junction Box (CJB) Car Configuration File (CCF), clear the DTC and retest the system

		displays warning message "Cruise Not Available" ▪ Incorrect Car Configuration File (CCF) parameters in the Central Junction Box (CJB)	
C1A67-54	Forward Looking Sensor - Missing calibration	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ This DTC will clear when the speed control sensor is correctly aligned	▪ Refer to the relevant section of the workshop manual and carry out speed control sensor alignment procedure
C1A67-87	Forward Looking Sensor - Missing message	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ Internal communication error between DSP and Host	▪ Using the manufacturer approved diagnostic system clear the DTC and retest. If the DTC remains check and install Speed Control Module (CCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component

C1A67-96	Forward Looking Sensor - Component internal failure	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" - Speed control sensor unreasonable radar data	- Install speed control 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
C1A67-97	Forward Looking Sensor - Component or system operation obstructed or blocked	**NOTE:** Adaptive cruise control is disabled and instrument pack displays warning message "radar sensor blocked" - Adaptive speed control module obstructed by snow, heavy rain or paint protection covering - The adaptive speed control module misaligned	- Check and clear any obstructions from the sensor. This DTC will be cleared automatically when environmental conditions allow - Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, refer to the relevant section of the workshop manual and adjust the adaptive speed control module alignment
C1A67-98	Forward Looking Sensor - Component or system over temperature	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC)	- Clear the DTC, allow vehicle to cool down and retest - Consider the atmospheric conditions before suspecting the component

		displays warning message "Cruise Not Available" ▪ Speed control sensor is over temperature	▪ This fault will be cleared automatically when environmental conditions allow
P174E-29	Output Shaft Speed / ABS Wheel Speed Correlation - Signal invalid	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ Speed Control Module (CCM) has received greater than expected wheel speed data from the Anti-Lock Brake System (ABS) control module	▪ Check the Anti-Lock Brake System (ABS) control module for DTCs and refer to the relevant DTC index ▪ Clear the DTC and retest the system
U0001-88	High Speed CAN Communication Bus - Bus off	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ High speed CAN bus circuit short to ground, short to	▪ Refer to the electrical circuit diagrams and check high speed CAN bus for short to ground, short to power, open circuit, short between CAN high and CAN low

		ground, short to power, open circuit ▪ High speed CAN bus circuit, short between CAN high and CAN low	
U0100-00	Lost Communication With ECM/PCM "A" - No sub type information	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ CAN harness link between Speed Control Module (CCM) and Engine Control Module (ECM) network malfunction ▪ The Speed Control Module (CCM) has not received the expected CAN signal from the Engine Control Module (ECM) within the specified time interval	▪ Using the manufacturer approved diagnostic system, check Engine Control Module (ECM) for DTCs and refer to the relevant DTC Index ▪ Using the manufacturer approved diagnostic system, carry out network integrity test ▪ Refer to the electrical circuit diagrams and check Engine Control Module (ECM) power and ground circuits for open circuit ▪ Check CAN harness between Speed Control Module (CCM) and Engine Control Module (ECM), repair as necessary
U0101-00	Lost Communication with TCM - No sub type information	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available"	▪ Using the manufacturer approved diagnostic system, check Transmission Control Module (TCM) for DTCs and refer to the relevant DTC Index ▪ Using the manufacturer approved diagnostic system, carry out network integrity test ▪ Refer to the electrical

		▪ CAN harness link between Speed Control Module (CCM) and Transmission Control Module (TCM) network malfunction ▪ The Speed Control Module (CCM) has not received the expected CAN signal from the Transmission Control Module (TCM) within the specified time interval	circuit diagrams and check Transmission Control Module (TCM) power and ground circuits for open circuit ▪ Check CAN harness between Speed Control Module (CCM) and Transmission Control Module (TCM), repair as necessary
U0103-00	Lost Communication With Gear Shift Control Module A - No sub type information	**NOTE:** Adaptive Cruise Control (ACC) will function as normal ▪ CAN harness link between Speed Control Module (CCM) and Gear Shift Control Module (GSM) network malfunction ▪ The Speed Control Module (CCM) has not received the expected CAN signal from the Gear Shift Control Module (GSM) within the specified time interval	▪ Using the manufacturer approved diagnostic system, check Gear Shift Control Module (GSM) for DTCs and refer to the relevant DTC Index ▪ Using the manufacturer approved diagnostic system, carry out network integrity test ▪ Refer to the electrical circuit diagrams and check Gear Shift Control Module (GSM) power and ground circuits for open circuit ▪ Check CAN harness between Speed Control Module (CCM) and Gear Shift Control Module (GSM), repair as necessary
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type information	**NOTE:** Adaptive Cruise Control	▪ Using the manufacturer approved diagnostic system, check Anti-Lock Brake System

		(ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" - CAN harness link between Speed Control Module (CCM) and Anti-Lock Brake System (ABS) Control Module network malfunction - The Speed Control Module (CCM) has not received the expected CAN signal from the Anti-Lock Brake System (ABS) Control Module within the specified time interval	(ABS) Control Module for DTCs and refer to the relevant DTC Index - Using the manufacturer approved diagnostic system, carry out network integrity test - Refer to the electrical circuit diagrams and check Anti-Lock Brake System (ABS) Control Module power and ground circuits for open circuit - Check CAN harness between Speed Control Module (CCM) and Anti-Lock Brake System (ABS) Control Module, repair as necessary
U0128-00	Lost Communication With Park Brake Control Module - No sub type information	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" - CAN harness link between Speed Control Module (CCM) and Parking Brake Module (PBM) network malfunction - The Speed Control Module (CCM) has not received the	- Using the manufacturer approved diagnostic system, check Parking Brake Module (PBM) for DTCs and refer to the relevant DTC Index - Using the manufacturer approved diagnostic system, carry out network integrity test - Refer to the electrical circuit diagrams and check Parking Brake Module (PBM) power and ground circuits for open circuit - Check CAN harness between Speed Control Module (CCM) and Parking Brake Module (PBM),

		expected CAN signal from the Parking Brake Module (PBM) within the specified time interval	repair as necessary
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - No sub type information	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ CAN harness link between Speed Control Module (CCM) and Instrument Cluster (IPC) network malfunction ▪ The Speed Control Module (CCM) has not received the expected CAN signal from the Instrument Cluster (IPC) within the specified time interval	▪ Using the manufacturer approved diagnostic system, check Instrument Cluster (IPC) for DTCs and refer to the relevant DTC Index ▪ Using the manufacturer approved diagnostic system, carry out network integrity test ▪ Refer to the electrical circuit diagrams and check Instrument Cluster (IPC) power and ground circuits for open circuit ▪ Check CAN harness between Speed Control Module (CCM) and Instrument Cluster (IPC), repair as necessary
U0300-00	Internal Control Module Software Incompatibility - No sub type information	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available"	▪ Using the manufacturer approved diagnostic system check/amend the Car Configuration File (CCF)

		▪ Car configuration signal not received ▪ Car Configuration File (CCF) incorrect	
U0300-55	Internal Control Module Software Incompatibility - Not configured	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "ACC not available. Module not configured" ▪ Car configuration signal not received ▪ Car Configuration File (CCF) incorrect	▪ Using the manufacturer approved diagnostic system check/amend the Car Configuration File (CCF)
U0401-00	Invalid Data Received From ECM/PCM - No sub type information	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ The Engine Control Module (ECM) did not respond correctly to the ACC cancel request ▪ The Engine Control Module (ECM) did not respond	▪ Using the manufacturer approved diagnostic system, check Engine Control Module (ECM) for DTCs and refer to the relevant DTC Index

		correctly to the ACC auto brake cancel request	
U0401-67	Invalid Data Received From ECM/PCM - Signal incorrect after event	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ The Engine Control Module (ECM) did not respond correctly to the ACC resume active request	▪ Using the manufacturer approved diagnostic system, check Engine Control Module (ECM) for DTCs and refer to the relevant DTC Index
U0401-81	Invalid Data Received From ECM/PCM - Invalid serial data received	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ The Engine Control Module (ECM) has inhibited the Adaptive Cruise Control (ACC)	▪ Using the manufacturer approved diagnostic system, check Engine Control Module (ECM) for DTCs and refer to the relevant DTC Index
U0415-53	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Deactivated	**NOTE:** Adaptive Cruise Control	▪ Using the manufacturer approved diagnostic system, check Anti-Lock Brake System

		(ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ Adaptive Cruise Control (ACC) is disabled due to Anti-Lock Brake System (ABS) error	(ABS) Control Module for DTCs and refer to the relevant DTC Index
U0415-81	Invalid Data Received From Anti-Lock Brake System Control Module - Invalid serial data received	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ The Anti-Lock Brake System (ABS) Control Module has inhibited the Adaptive Cruise Control (ACC)	▪ Using the manufacturer approved diagnostic system, check Anti-Lock Brake System (ABS) Control Module for DTCs and refer to the relevant DTC Index
U0417-67	Invalid Data Received From Park Brake Control Module - Signal incorrect after event	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available"	▪ Using the manufacturer approved diagnostic system, check Parking Brake Module (PBM) for DTCs and refer to the relevant DTC Index

		▪ The Parking Brake Module (PBM) did not respond correctly to the ACC EPB apply request	
U0417-81	Invalid Data Received From Park Brake Control Module - Invalid serial data received	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ The Parking Brake Module (PBM) has inhibited the Adaptive Cruise Control (ACC)	▪ Using the manufacturer approved diagnostic system, check Parking Brake Module (PBM) for DTCs and refer to the relevant DTC Index
U0418-68	Invalid Data Received From Brake System Control Module - Event information	**NOTE:** Instrument Pack (IPC) displays warning message "CMbB disabled and Forward Alert Not Available" ▪ Signal message error received over CAN	▪ Using the manufacturer approved diagnostic system, check Anti-Lock Brake System (ABS) Control Module for DTCs and refer to the relevant DTC Index
U0421-81	Invalid Data Received from Suspension Control Module A - Invalid serial data received	**NOTE:** Adaptive Cruise Control (ACC) is	▪ Using the manufacturer approved diagnostic system, check Air Suspension Control Module (RLM) for

		(ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" - The Air Suspension Control Module (RLM) has inhibited the Adaptive Cruise Control (ACC)	Module (RLM) for DTCs and refer to the relevant DTC Index
U0423-81	Invalid Data Received From Instrument Panel Control Module - Invalid serial data received	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" - The Instrument Cluster (IPC) has inhibited the Adaptive Cruise Control (ACC) - Central Junction Box (CJB) missing or not updated CAN message	- Using the manufacturer approved diagnostic system, check Instrument Cluster (IPC) for DTCs and refer to the relevant DTC Index
U1A00-88	Private Communication Network - Bus off	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message	- The Speed Control Module (CCM) setting this code has disabled CAN transmission - Using the manufacturer approved diagnostic system, check for other bus off codes - Refer to the electrical circuit diagrams and

		"Cruise Not Available" ▪ Speed Control Module (CCM) indicates bus off, on private CAN bus	check the Speed Control Module (CCM) and circuits ▪ Clear all DTCs and road test the vehicle ▪ If the concern reoccurs contact Dealer Technical Support for further advice. Under no circumstance should any parts be replaced to overcome this issue
U1A14-49	CAN Initialisation Failure - Internal electronic failure	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ Harness Fault - CAN circuit fault	▪ Using the manufacturer approved diagnostic system, complete a CAN network integrity test ▪ Refer to the electrical circuit diagrams and check the power and ground connections to the Speed Control Module (CCM) ▪ Refer to the electrical circuit diagrams and check the CAN network
U2101-00	Control Module Configuration Incompatible - No sub type information	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ Car Configuration File (CCF) mis-match	▪ Using the manufacturer approved diagnostic system check/amend the Car Configuration File (CCF)
U3000	Control Module		Using the

U3000-41	Control Module - General checksum failure	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" - Speed Control Module (CCM) internal micro controller error	- Using the manufacturer approved diagnostic system clear the DTC and retest - If the DTC remains check and install Speed Control Module (CCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U3000-42	Control Module - General memory failure	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" - Speed Control Module (CCM) internal RAM test error	- Using the manufacturer approved diagnostic system clear the DTC and retest - If the DTC remains check and install Speed Control Module (CCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
Control Module data - Memory failure	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not	- Using the manufacturer approved diagnostic system clear the DTC and retest - If the DTC remains check and install Speed Control Module (CCM) as required. Refer to the Warranty Policy and Procedures manual, or	

	Available" ▪ Speed Control Module (CCM) internal DSP RAM test error	manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component	
U3000-49	Control Module - Internal electronic failure	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ Speed Control Module (CCM) internal clock error	▪ Using the manufacturer approved diagnostic system clear the DTC and retest ▪ If the DTC remains check and install Speed Control Module (CCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
U3000-63	Control Module - Circuit / component protection time-out	**NOTE:** Instrument Pack (IPC) displays warning message "CMbB disabled and Forward Alert Not Available" ▪ Speed Control Module (CCM) internal protection has been activated	▪ Using the manufacturer approved diagnostic system, check for related DTCs and refer to the relevant DTC Index ▪ Using the manufacturer approved diagnostic system clear the DTC and retest ▪ If the DTC remains check and install Speed Control Module (CCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

U3000-96	Control Module - Component internal failure	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" - Speed Control Module (CCM) hardware ID mismatch	- Using the manufacturer approved diagnostic system, check for related DTCs and refer to the relevant DTC Index - Using the manufacturer approved diagnostic system clear the DTC and retest - If the concern reoccurs contact Dealer Technical Support (DTS)
U3003-16	Battery Voltage - Circuit voltage below threshold	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" - Power supply voltage to the Speed Control Module (CCM) is lower than expected	- Using the manufacturer approved diagnostic system check the value of Datalogger signal ECU Power Supply Voltage (0xD112) - Refer to the relevant section of the workshop manual and check vehicle battery and charging system - Refer to the electrical circuit diagrams and check the power and ground connections to the Speed Control Module (CCM)
U3003-17	Battery Voltage - Circuit voltage above threshold	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning	- Using the manufacturer approved diagnostic system check the value of Datalogger signal ECU Power Supply Voltage (0xD112) - Refer to the relevant section of the

		warning message "Cruise Not Available" ▪ Power supply voltage to the Speed Control Module (CCM) is higher than expected	workshop manual and check vehicle battery and charging system for overcharging
U3003-62	Battery Voltage - Signal compare failure	**NOTE:** Adaptive Cruise Control (ACC) is disabled and Instrument Pack (IPC) displays warning message "Cruise Not Available" ▪ Power supply voltage to the Speed Control Module (CCM) is lower than main ECU voltage reported on CAN	▪ Using the manufacturer approved diagnostic system check the value of Datalogger signal ECU Power Supply Voltage (0xD112) ▪ Refer to the electrical circuit diagrams and check the power and ground connections to the Speed Control Module (CCM)

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GENERAL INFORMATION

STEERING ANGLE SENSOR MODULE (SASM)

CAUTION:

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

NOTES:

- If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the warranty policy and procedures manual, 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 (DTC's) that could be logged in the Steering Angle Sensor Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Steering System (211-00, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
C0051-04	Steering wheel position sensor - System internal failures	▪ System internal failure ▪ Harness/connector issue	▪ Refer to the electrical circuit diagrams and check the steering angle sensor connector and circuits. Check the sensor calibration using the approved diagnostic/calibration system before renewing the sensor
C0051-62	Steering wheel position sensor - Signal compare failure	▪ Signal compare failure ▪ Harness/connector issue	▪ Refer to the electrical circuit diagrams and check the steering angle sensor connector and circuits. Check the sensor calibration using the approved diagnostic/calibration system
C0051-64	Steering wheel position sensor - Signal plausibility failure	▪ Signal plausibility failure ▪ Harness/connector issue	▪ Refer to the electrical circuit diagrams and check the steering angle sensor, connector and circuits. Check the sensor calibration using the approved diagnostic/calibration system
U0001-88	High speed CAN communication bus - Bus off	▪ CAN bus off	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the module. Using the manufacturer

			approved diagnostic system, complete a CAN network integrity test. Refer to the electrical circuit diagrams and check the CAN network
U0122-00	Lost communication with vehicle dynamics control module - No sub type information	▪ Lost Communication	▪ Refer to the electrical circuit diagrams and check the power and ground supplies to vehicle dynamics control module. Check CAN network between steering angle sensor Module and vehicle dynamics control module. Alternatively, using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0140-00	Lost communication with body control module - No sub type information	▪ Lost Communication	▪ Refer to the electrical circuit diagrams and check the power and ground supplies to body control module. Check CAN network between steering angle sensor module and body control module. Alternatively, using the manufacturer approved diagnostic system, complete a CAN network integrity test
U0300-55	Internal control module software incompatibility - Not configured	▪ Connector or connection failure ▪ CAN hardware failure ▪ CAN configuration failure - The module has failed to recognize the correct Master Configuration ID ▪ Indicates that an internal software mismatch has occurred	▪ Configure the modules using the approved diagnostic/calibration system. Refer to the network communications section of the workshop manual
U1A14-49	CAN initialization failure - Internal electronic failure	▪ Steering angle sensor module internal CAN controller failure	▪ Renew the steering angle sensor module. Refer to the warranty policy and procedures manual if a module is suspect
U3002-	Vehicle	▪ Mismatch	▪ Program the module using the

62	identification number - Signal compare failure	between received VIN and stored VIN in steering angle sensor	approved diagnostic/calibration system

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GENERAL INFORMATION

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 tested and/or the donor vehicle.

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 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 (211-04, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
B100D-16	Column Lock Authorisation - Circuit voltage below threshold	▪ Circuit voltage below threshold ▪ Harness/connector issue	▪ Check for other related DTCs from other modules and rectify first. Refer to the electrical circuit diagrams and check connectivity to Steering Column Lock. Refer to the electrical circuit diagrams and check the ignition power supply circuit to the Steering Column Lock. Complete a CAN network integrity test using the manufacturers approved diagnostic system
B100D-29	Column Lock Authorisation - Signal invalid	▪ Unlock or lock sensor invalid	▪ Clear the DTC, perform an on demand self-test and retest. If the problem persists, renew the Steering Column Lock. Refer to the warranty policy and procedures manual if a module is suspect
B100D-42	Column Lock Authorisation - General memory failure	▪ Module general memory failure	▪ Clear the DTC. Complete a CAN network integrity test using the manufacturers approved diagnostic system. Perform an on demand self-test and retest. If the problem persists, renew the Steering Column Lock. Refer to the warranty policy and procedures manual if a module is suspect
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	▪ 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

		does not match between Steering Column Lock and the Central Junction Box	approved diagnostic system. Perform an on demand self-test and retest
B100D-64	Column Lock Authorisation - Signal plausibility failure	▪ Signal plausibility failure ▪ Steering Column Lock unable to perform lock action ▪ CAN Network fault ▪ 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 ▪ 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 check CAN Network
B100D-72	Column Lock Authorisation - Actuator stuck open	▪ Actuator stuck open ▪ Steering Column Lock unable to reach locked state	▪ Clear the DTC. Ensure the vehicle battery supply voltage is between 9-16 Volts. Complete a CAN network integrity test using the manufacturers approved diagnostic system. Perform an on demand self-test and retest. If the problem persists, renew the Steering Column Lock. Refer to the warranty policy and procedures manual if a module is suspect
B100D-73	Column Lock Authorisation - Actuator stuck closed	▪ Actuator stuck closed ▪ Steering Column Lock unable to reach unlocked state	▪ Clear the DTC. Ensure the vehicle battery supply voltage is between 9-16 Volts. 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). Complete a CAN network integrity test using the manufacturers approved diagnostic system. Perform an on demand self-test and retest. If the problem persists, renew the Steering Column Lock. Refer to the warranty policy and procedures manual if a module is suspect
B100D-77	Column Lock Authorisation - Commanded position not reachable	▪ Commanded position not reachable ▪ Steering Column Lock unable to reach unlocked or locked state	▪ Clear the DTC. Ensure the vehicle battery supply voltage is between 9-16 Volts. 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). Complete a CAN network integrity test using the manufacturers approved diagnostic system. Perform an on demand self-test and retest. If the problem persists, renew the Steering Column Lock. Refer to the warranty policy and procedures manual if a module is suspect
B100D-92	Column Lock Authorisation - Performance or incorrect operation	▪ Steering Column Lock performance or incorrect operation	▪ Clear the DTC. Ensure the vehicle battery supply voltage is between 9-16 Volts. 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). Complete a CAN network integrity test using the manufacturers approved diagnostic system. Perform an on demand self-test and retest.

			If the problem persists, renew the Steering Column Lock. Refer to the warranty policy and procedures manual if a module is suspect
B100D-94	Column Lock Authorisation - Unexpected operation	▪ Steering Column Lock unexpected operation	▪ Clear the DTC. Ensure the vehicle battery supply voltage is between 9-16 Volts. 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). Complete a CAN network integrity test using the manufacturers approved diagnostic system. Perform an on demand self-test and retest. If the problem persists, renew the Steering Column Lock. Refer to the warranty policy and procedures manual if a module is suspect
B100D-96	Column Lock Authorisation - Component internal failure	▪ Component internal failure ▪ Battery voltage too low ▪ Torque load on Steering column	**NOTE:** Prior to clearing this DTC, carry out the Vehicle Functional Reset application using the manufacturer approved diagnostic system ▪ Clear the DTC and retest. Check steering is not under high side load. Refer to the electrical circuit diagrams and check Steering Column Lock circuits. Carry out CAN Network Integrity Test and Module Self Test using the manufacturer approved diagnostic system. If the problem persists, renew the Steering Column Lock Module. Refer to the warranty policy and procedures manual if a module is suspect

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 9-16 Volts. Using the manufacturers approved diagnostic system, complete a CAN integrity test. Perform an on demand self-test and retest
U3002-81	Vehicle Identification Number - Invalid serial data received	▪ Invalid vehicle identification number	▪ Confirm the correct VIN details are stored in Steering Column Lock using the approved diagnostic system

GENERAL INFORMATION

DESCRIPTION AND OPERATION

TELEVISION MODULE (TVM)

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 Television 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
B1A00-16	Control Module - Circuit voltage below threshold	▪ Control module circuit voltage below threshold: ▪ Voltage less than (master	▪ Check the battery condition and state of charge. Refer to the relevant section of the workshop manual. Check the module power and ground circuits. Refer to the electrical circuit diagrams

		(master control module voltage - 2V) for >10 seconds ▪ Battery voltage low ▪ Control module circuit High resistance	
B1A00-17	Control Module - Circuit voltage above threshold	▪ Control module circuit voltage above threshold ▪ Battery voltage high (overcharging) ▪ Control module circuit short circuit to power	▪ Check the battery condition and state of charge. Refer to the relevant section of the workshop manual. Check the module power and ground circuits. Refer to the electrical circuit diagrams
B1A00-48	Control Module - Supervision software failure	▪ Control module supervision software fault	▪ Where available, configure the module using the approved diagnostic system. Refer to the warranty policy and procedures manual if a module is suspect
B1A00-49	Control Module - Internal electronic failure	▪ Control module hardware fault	▪ Renew the module. Refer to the warranty policy and procedures manual and renew the module
B1A56-11	Antenna - Circuit short to ground	▪ Antenna circuit short circuit to ground	▪ Refer to the electrical circuit diagrams and check the antenna circuit. Where possible, refer to the guided diagnostic routine for this code on the approved diagnostic system
B1A56-12	Antenna - Circuit short to battery	▪ Antenna circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the antenna circuit. Where possible, refer to the guided diagnostic routine for this code on the approved diagnostic system
B1A56-13	Antenna - Circuit	▪ Antenna circuit high	▪ Refer to the electrical circuit diagrams and check the antenna circuit. Where

13	Circuit open	circuit high resistance	and check the antenna circuit. Where possible, refer to the guided diagnostic routine for this code on the approved diagnostic system
B1D55-11	Antenna #2 - Circuit short to ground	▪ Antenna 2 circuit short circuit to ground	▪ Check the antenna and circuits. Refer to the electrical circuit diagrams
B1D55-12	Antenna #2 - Circuit short to battery	▪ Antenna 2 circuit short circuit to power	▪ Check the antenna and circuits. Refer to the electrical circuit diagrams
B1D55-13	Antenna #2 - Circuit open	▪ Antenna 2 circuit High resistance	▪ Check the antenna and circuits. Refer to the electrical circuit diagrams
B1D56-11	Antenna #3 Circuit - Circuit short to ground	▪ Antenna 3 circuit short circuit to ground	▪ Check the antenna and circuits. Refer to the electrical circuit diagrams
B1D56-12	Antenna #3 Circuit - Circuit short to battery	▪ Antenna 3 circuit short circuit to power	▪ Check the antenna and circuits. Refer to the electrical circuit diagrams
B1D56-13	Antenna #3 Circuit - Circuit open	▪ Antenna 3 circuit High resistance	▪ Check the antenna and circuits. Refer to the electrical circuit diagrams
B1D57-11	Antenna #4 Circuit - Circuit short to ground	▪ Antenna 4 circuit short circuit to ground	▪ Check the antenna and circuits. Refer to the electrical circuit diagrams
B1D57-12	Antenna #4 Circuit - Circuit short to battery	▪ Antenna 4 circuit short circuit to power	▪ Check the antenna and circuits. Refer to the electrical circuit diagrams
B1D57-13	Antenna #4 Circuit - Circuit open	▪ Antenna 4 circuit High resistance	▪ Check the antenna and circuits. Refer to the electrical circuit diagrams
B1D58-	Television	▪ Television	▪ Check the television output circuits.

11	Output - Circuit short to ground	output circuit short circuit to ground	Refer to the electrical circuit diagrams
B1D58-12	Television Output - Circuit short to battery	▪ Television output circuit short circuit to power	▪ Check the television output circuits. Refer to the electrical circuit diagrams
B1D58-13	Television Output - Circuit open	▪ Television output circuit High resistance	▪ Check the television output circuits. Refer to the electrical circuit diagrams
U1A20-87	Incomplete MOST Ring Reported By TVM - Missing message	▪ No signal from the TV module (TVM) ▪ Fibre optic ring break condition reported	▪ Carry out the general media orientated system transport (MOST) test. Refer to the Network Communications section of the workshop manual and in the approved diagnostic system, where available

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GENERAL INFORMATION

GENERAL INFORMATION

DESCRIPTION AND OPERATION

TERRAIN RESPONSE CONTROL MODULE (ATCM)

CAUTION:

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

NOTES:

- If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the warranty policy and procedures manual, 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

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 All Terrain Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Ride and Handling Optimization (204-06 Ride and Handling Optimization, Diagnosis and Testing).

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
C1A00-46	Control Module - Calibration/parameter memory failure	▪ The terrain response control module has indicated a calibration/parameter memory failure for embedded systems using FLASH memory. This is equivalent to EEPROM in RAM/ROM/EEPROM embedded systems ▪ Corruption in the non-volatile memory storage system (EEPROM) in the Terrain response control module	▪ Rectify this DTC before attempting to rectify others. Record all DTCs logged and clear them. With ignition on select a terrain response special program, turn off the ignition, then turn back on the ignition and verify the selected special program is still active. If the selected terrain response special program is still not active and has returned to the general program, confirm if DTC has returned. Repeat procedure again once more. If DTC is still present install a new terrain response rotary control switch and control module. Refer to the warranty policy

			to the warranty policy and procedures manual if a module is suspect
C1A01-96	LED - Component internal failure	▪ LED circuit short circuit to ground or open circuit	**NOTE:** If the system is in 'failsafe default mode due to another issue no LEDs will illuminate. This fault does not cause the system to go to 'failsafe default' ▪ Refer to the Description and Operation section of workshop manual. Check terrain response system, special program LEDs. One or more of the LEDs is suspected of not illuminating as appropriate. With the engine running move the terrain response rotary control switch through all five programmes and confirm the appropriate special program LED does not illuminate when the terrain response rotary control switch is in that position. Suspect the terrain response rotary control switch and control module, check and install a new terrain response rotary control switch and control module as required. Refer to the warranty policy and procedures manual if a module is suspect
C1A02-	Rotary Encoder Stuck	▪ The terrain response	**NOTE:**

94	In Intermediate Position - Unexpected operation	rotary control switch is held in an intermediate position (between the special programmes) for more than 60 seconds ▪ Foreign object preventing correct operation of terrain response rotary control switch ▪ Mechanical damage to the terrain response rotary control switch	NOTE: Suspect driver error do not replace the terrain response rotary control at this time ▪ Check for foreign object preventing correct operation of terrain response rotary control. Start the vehicle engine, rotate the terrain response rotary control until it has located a genuine detent, wait 60 seconds. Stop the vehicle engine, clear the DTC and retest
U0001-88	High Speed CAN Communication Bus Off - Bus off	▪ Bus off. The Terrain response control module has detected the data bus is not available ▪ CAN bus short circuit to ground, power or open circuit ▪ Failure of another control module on the CAN bus	▪ Refer to the electrical circuit diagrams and check the power and ground connections to the 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 The ECM/PCM 'A' - No sub type information	▪ The Terrain response control module has not received one or more expected messages from the Engine Control Module ▪ Engine Control Module power circuit open circuit ▪ Engine Control Module ground circuit open circuit ▪ High speed CAN circuit communications	▪ Using the manufacturer approved diagnostic system, check the Engine Control Module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the Engine Control Module. Refer to

		failure ▪ Engine Control Module disconnected from the high speed CAN communication bus ▪ Engine Control Module disconnected from the high speed CAN communication bus ▪ Engine Control Module high speed CAN Low circuit open circuit ▪ Engine Control Module not configured ▪ Engine Control Module failure	Module. Refer to electrical circuit diagrams check the power and ground connections to Engine Control Module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the Engine Control Module. Refer to the warranty policy and procedures manual if a module is suspect. Check the system is operating correctly and the DTC does not return
U0101-00	Lost Communication With The TCM - No sub type information	▪ The Terrain response control module has not received one or more expected messages from the Transmission Control Module ▪ High speed CAN circuit communications failure ▪ Transmission Control Module power circuit open circuit ▪ Transmission Control Module ground circuit open circuit ▪ Transmission Control Module disconnected from the high speed CAN communication bus ▪ Transmission Control Module disconnected from the high speed CAN communication bus ▪ Transmission Control Module high speed CAN Low circuit	▪ Using the manufacturer approved diagnostic system, check the Transmission Control Module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the Transmission Control Module. Refer to electrical circuit diagrams check the power and ground connections to Transmission Control Module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the Transmission Control Module. Refer to the warranty policy and

		open circuit ▪ Transmission Control Module not configured ▪ Transmission Control Module failure	procedures manual if a module is suspect. Check the system is operating correctly and the DTC does not return
U0102-00	Lost Communication With The Transfer Case Control Module - No sub type information	▪ The Terrain response control module has not received one or more expected messages from the Transfer Case Control Module ▪ High speed CAN circuit communications failure ▪ Transfer Case Control Module power circuit open circuit ▪ Transfer Case Control Module ground circuit open circuit ▪ Transfer Case Control Module disconnected from the high speed CAN communication bus ▪ Transfer Case Control Module high speed CAN Low circuit open circuit ▪ Transfer Case Control Module high speed CAN High circuit open circuit ▪ Transfer Case Control Module not configured ▪ Transfer Case Control Module failure	▪ Using the manufacturer approved diagnostic system, check the Transfer Case Control Module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the Transfer Case Control Module. Refer to electrical circuit diagrams check the power and ground connections to Transfer Case Control Module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the Transfer Case Control Module. Refer to the warranty policy and procedures manual if a module is suspect. Check the system is operating correctly and the DTC does not return
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - No sub type	▪ The Terrain response control module has not received one or more expected	▪ Using the manufacturer approved diagnostic system, check the ABS

	information	messages from the ABS Control Module ▪ High speed CAN circuit communications failure ▪ ABS Control Module power circuit open circuit ▪ ABS Control Module ground circuit open circuit ▪ ABS Control Module disconnected from the high speed CAN communication bus ▪ ABS Control Module high speed CAN Low circuit open circuit ▪ ABS Control Module high speed CAN High circuit open circuit ▪ ABS Control Module not configured ▪ ABS Control Module failure	Control Module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the ABS Control Module. Refer to electrical circuit diagrams check the power and ground connections to ABS Control Module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the ABS Control Module. Refer to the warranty policy and procedures manual if a module is suspect. Check the system is operating correctly and the DTC does not return
U0132-00	Lost Communication With Suspension Control Module 'A' - No sub type information	▪ The Terrain response control module has not received one or more expected messages from the Suspension Control Module (Ride Level Module) ▪ High speed CAN circuit communications failure ▪ Suspension Control Module power circuit open circuit ▪ Suspension Control Module ground circuit open circuit ▪ Suspension Control Module	▪ Using the manufacturer approved diagnostic system, check the Suspension Control Module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the Suspension Control Module. Refer to electrical circuit diagrams check the power and ground connections to

	disconnected from the high speed CAN communication bus ▪ Suspension Control Module high speed CAN Low circuit open circuit ▪ Suspension Control Module high speed CAN High circuit open circuit ▪ Suspension Control Module not configured ▪ Suspension Control Module failure	Suspension Control Module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the Suspension Control Module. Refer to the warranty policy and procedures manual if a module is suspect. Check the system is operating correctly and the DTC does not return
U0139-00	Lost Communication With Suspension Control Module 'B' - No sub type information	▪ The Terrain response control module has not received one or more expected messages from the Suspension Control Module (Continuously Variable Dampening) ▪ High speed CAN circuit communications failure ▪ Suspension Control Module power circuit open circuit ▪ Suspension Control Module ground circuit open circuit ▪ Suspension Control Module disconnected from the high speed CAN communication bus ▪ Suspension Control Module high speed CAN Low circuit open circuit ▪ Suspension Control Module high speed CAN High circuit open circuit ▪ Suspension Control Module not	▪ Using the manufacturer approved diagnostic system, check the Suspension Control Module for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the Suspension Control Module. Refer to electrical circuit diagrams check the power and ground connections to Suspension Control Module. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the Suspension Control Module. Refer to the warranty policy and procedures manual if a module is suspect. Check the system is operating correctly and the DTC does not

		configured ▪ Suspension Control Module failure	return
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ The Terrain response control module has not received one or more expected messages from the Central Junction Box ▪ High speed CAN circuit communications failure ▪ Central Junction Box power circuit open circuit ▪ Central Junction Box ground circuit open circuit ▪ Central Junction Box disconnected from the high speed CAN communication bus ▪ Central Junction Box high speed CAN Low circuit open circuit ▪ Central Junction Box high speed CAN High circuit open circuit ▪ Central Junction Box not configured ▪ Central Junction Box failure	▪ Using the manufacturer approved diagnostic system, check the Central Junction Box for DTCs and refer to the relevant DTC index. Using the manufacturer approved diagnostic system, carry out network integrity test. Using the manufacturer approved diagnostic system, re-configure the Central Junction Box. Refer to electrical circuit diagrams check the power and ground connections to Central Junction Box. Check the high speed CAN low and CAN high circuits, repair as necessary. Clear the DTC and retest. If the problem persists, suspect the Central Junction Box. Refer to the warranty policy and procedures manual if a module is suspect. Check the system is operating correctly and the DTC does not return
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ The Terrain response control module has failed to recognize a matching master configuration ID from the CAN data bus master ▪ The Terrain response control module has incorrect CAN configuration ▪ CAN Bus master not	▪ Using the manufacturer approved diagnostic system, check the CAN configuration in the Terrain response control module, check correct software versions installed and update as necessary. If similar DTCs from other modules exist suspect CAN Bus or

		correctly configured ▪ Message containing config ID not received due to CAN Bus issue ▪ Message containing config ID not transmitted by CAN Bus master	CAN Bus master Control module. Check CAN Bus operation, check the CAN configuration in the CAN Bus master module, check correct software versions installed and update as necessary. Check the system is operating correctly and the DTC does not return
U0401-68	Invalid Data Received From The ECM/PCM 'A' - Event information	▪ * The Terrain response control module has detected that the Engine Control Module had operated in a way or at a time that it had not been commanded to operate ▪ The engine management system, Engine Control Module is unable to support normal terrain response functionality, the terrain response system will go into default condition ▪ Engine management fault ▪ Engine Control Module failure	▪ Using the manufacturer approved diagnostic system, check the Engine Control Module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the Engine Control Module. Refer to the warranty policy and procedures manual if a module is suspect
U0402-68	Invalid Data Received From The TCM - Event information	▪ The Terrain response control module has detected that the Transmission Control Module had operated in a way or at a time that it had not been commanded to operate ▪ The Transmission Control Module is unable to support normal terrain response	▪ Using the manufacturer approved diagnostic system, check the Transmission Control Module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the Transmission Control Module. Refer to the

		functionality, the terrain response system will go into default condition ▪ Transmission system fault ▪ Transmission Control Module failure	module. Refer to the warranty policy and procedures manual if a module is suspect
U0403-68	Invalid Data Received From The Transfer Case Control Module - Event information	▪ The Terrain response control module has detected that the Transfer Case Control Module had operated in a way or at a time that it had not been commanded to operate ▪ The Transfer Case Control Module is unable to support normal terrain response functionality, the terrain response system will go into default condition ▪ Transfer Case system fault ▪ Transfer Case Control Module failure	▪ Using the manufacturer approved diagnostic system, check the Transfer Case Control Module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the Transfer Case Control Module. Refer to the warranty policy and procedures manual if a module is suspect
U0415-68	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Event information	▪ The Terrain response control module has detected that the ABS Module had operated in a way or at a time that it had not been commanded to operate ▪ The ABS Module is unable to support normal terrain response functionality, the terrain response system will go into default condition ▪ ABS system fault	▪ Using the manufacturer approved diagnostic system, check the ABS Module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the ABS Module. Refer to the warranty policy and procedures manual if a module is suspect

		▪ ABS Module failure	
U0421-68	Invalid Data Received From Suspension Control Module 'A' - Event information	▪ The Terrain response control module has detected that the Suspension Control Module (Ride Level Module) had operated in a way or at a time that it had not been commanded to operate ▪ The Suspension Control Module is unable to support normal terrain response functionality, the terrain response system will go into default condition ▪ Suspension system fault ▪ Suspension Control Module failure	▪ Using the manufacturer approved diagnostic system, check the Suspension Control Module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the Suspension Control Module. Refer to the warranty policy and procedures manual if a module is suspect
U0422-68	Invalid Data Received From Body Control Module - Event information	▪ The Terrain response control module has detected that the Central Junction Box had operated in a way or at a time that it had not been commanded to operate ▪ The Central Junction Box is unable to support normal terrain response functionality, the terrain response system will go into default condition ▪ Central Junction Box system fault ▪ Central Junction Box failure	▪ Using the manufacturer approved diagnostic system, check the Central Junction Box for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the Central Junction Box. Refer to the warranty policy and procedures manual if a module is suspect
U043A-68	Invalid Data Received From Suspension	▪ The Terrain response control module has	▪ Using the manufacturer

	Control Module "B" - Event information	detected that the Suspension Control Module (Continuously Variable Damping) had operated in a way or at a time that it had not been commanded to operate ▪ The Suspension Control Module is unable to support normal terrain response functionality, the terrain response system will go into default condition ▪ Suspension system fault ▪ Suspension Control Module failure	approved diagnostic system, check the Suspension Control Module for DTCs and refer to the relevant DTC index, rectify as required. Check the system is operating correctly and the DTC does not return. If the problem persists, suspect the Suspension Control Module. Refer to the warranty policy and procedures manual if a module is suspect
U2101-00	Control Module Configuration Incompatible - No sub type information	▪ The Terrain response control module has detected a mismatch between the hardware connected and the hardware expected ▪ Vehicle not correctly configured ▪ Incorrect components installed for vehicle configuration	▪ Using the manufacturer approved diagnostic system, check the vehicle configuration file, rectify as necessary. Check correct components for vehicle configuration are installed, rectify as necessary. Check the system is operating correctly and the DTC does not return

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

DESCRIPTION AND OPERATION

TRANSFER CASE CONTROL MODULE (TCCM)

CAUTION:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable.

Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

- If 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 Transfer Case Control Module (TCCM). For additional diagnosis and testing information, refer to the relevant Diagnosis and

Testing section in the workshop manual.
For additional information, refer to: Transfer Case (308-07B Transfer Case, Diagnosis and Testing).

U0121-00

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
P0560-00	System Voltage - No sub type information	▪ Transfer case control module power or ground circuit open circuit, high resistance ▪ Battery/charging system fault ▪ Transfer case control module internal failure	▪ Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance ▪ Refer to the relevant section of the workshop manual and test the battery and charging system ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0561-00	System Voltage Unstable - No sub type information	▪ Transfer case control module power or ground circuit open circuit, high resistance ▪ Battery/charging system fault ▪ Transfer case control module internal failure	▪ Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open

			circuits for open circuit, high resistance ▪ Refer to the relevant section of the workshop manual and test the battery and charging system ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0562-00	System Voltage Low - No sub type information	▪ Transfer case control module power or ground circuit open circuit, high resistance ▪ Battery/charging system fault ▪ Transfer case control module internal failure	▪ Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance ▪ Refer to the relevant section of the workshop manual and test the battery and charging system ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0563-00	System Voltage High - No sub type information	▪ Battery/charging system fault	**NOTE:**

	information		This DTC may be set when the vehicle is jump started. ▪ Using the manufacturer approved diagnostic system, check datalogger signal - ECU Power Supply Voltage (0xD111). Refer to the relevant section of the workshop manual and test the battery and charging system
P0607-00	Control Module Performance - No sub type information	▪ Transfer case control module internal failure	▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0634-00	PCM / ECM / TCM Internal Temperature A Too High - No sub type information	▪ Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case control module internal failure	**NOTES:** ▪ Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. ▪ This DTC may be induced by excessive high/low range changes. ▪ This DTC may be induced by prolonged off-road driving.

			▪ Allow the vehicle to cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0641-00	Sensor Reference Voltage A Circuit - No sub type information	▪ Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case control module internal failure	**NOTE:** Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor position

				sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
	P0642-00	Sensor Reference Voltage A Circuit Low - No sub type information	▪ Transfer case motor position sensor circuit short circuit to ground ▪ Transfer case control module internal failure	**NOTE:** Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists,

			install a new transfer case control module and perform routine - Transfer Case Replacement
P0643-00	Sensor Reference Voltage A Circuit High - No sub type information	▪ Transfer case motor position sensor circuit short circuit to power ▪ Transfer case control module internal failure	**NOTE:** Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to power ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0652-00	Sensor Reference Voltage B Circuit Low - No sub type information	▪ Transfer case selector fork position sensor circuit short circuit to ground ▪ Transfer case control module	**NOTE:** Transfer case selector fork position sensor voltage (supply

		control module internal failure	circuit to ground circuit) should be 4.0V to 6.0V. ▪ Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to ground ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0653-00	Sensor Reference Voltage B Circuit High - No sub type information	▪ Transfer case selector fork position sensor circuit short circuit to power ▪ Transfer case control module internal failure	**NOTE:** Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. ▪ Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to power ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement

P0666-00	PCM/ECM/TCM Internal Temperature Sensor 'A' Circuit - No sub type information	▪ Transfer case solenoid circuit short circuit to ground ▪ Transfer case control module internal failure	**NOTE:** Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. ▪ Allow the vehicle to cool. Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0702-00	Transmission Control System Electrical - No sub type information	▪ Transfer case control module power or ground circuit open circuit, high resistance ▪ Battery/charging system fault	**NOTE:** This DTC may be set during a forced reset by the manufacturer approved diagnostic system. ▪ Using the manufacturer approved diagnostic system, check datalogger signal -

			ECU Power Supply Voltage (0xD111). Refer to the electrical circuit diagrams and check the transfer case control module power and ground circuits for open circuit, high resistance ▪ Refer to the relevant section of the workshop manual and test the battery and charging system
P0712-00	Transmission Fluid Temperature Sensor A Circuit Low - No sub type information	▪ Transfer case motor temperature sensor circuit short circuit to ground ▪ Transfer case control module internal failure	**NOTE:** Transfer case motor temperature sensor (temperature signal circuit to motor position sensor ground circuit) resistance should be 1.0k ohms to 30.0k ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor temperature sensor circuit for short circuit to ground ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0713-00	Transmission Fluid Temperature	▪ Transfer case motor	**NOTE:**

	Temperature Sensor A Circuit High - No sub type information	motor temperature sensor circuit short circuit to power ▪ Transfer case control module internal failure	Transfer case motor temperature sensor (temperature signal circuit to motor position sensor ground circuit) resistance should be 1.0k ohms to 30.0k ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor temperature sensor circuit for short circuit to power ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0780-00	Shift Malfunction - No sub type information	▪ Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case control module internal failure ▪ Transfer case	**NOTES:** ▪ Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. ▪ Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance

			▪ Transfer case internal failure	resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case and perform routine - Transfer	

			Routine - Transfer Case Replacement
P0806-00	Clutch Position Sensor Circuit Range/Performance - No sub type information	▪ Transfer case selector fork position sensor not calibrated ▪ Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case selector fork position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case motor failure ▪ Transfer case selector fork position sensor failure ▪ Transfer case control module internal failure ▪ Transfer case internal failure	**NOTES:** ▪ If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest. ▪ Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. ▪ Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. ▪ Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should

				be 4.0V to 6.0V. - Using the manufacturer approved diagnostic system, perform routine - Transfer Case Replacement. Clear the DTCs and retest - Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance - Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance - Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance - Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement - Using the manufacturer approved diagnostic	

			system, clear the DTCs and retest. If the fault persists, install a new transfer case selector fork position sensor and perform routine - Transfer Case Replacement ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case and perform routine - Transfer Case Replacement
P0807-00	Clutch Position Sensor Circuit Low - No sub type information	▪ Transfer case motor position sensor circuit short circuit to ground ▪ Transfer case control module internal failure	**NOTE:** Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms.

				▪ Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
	P0808-00	Clutch Position Sensor Circuit High - No sub type information	▪ Transfer case motor position sensor circuit short circuit to ground ▪ Transfer case control module internal failure	**NOTE:** Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists

			the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0826-00	Up and Down Switch Circuit - No sub type information	▪ Transfer case high/low range switch stuck active ▪ Transfer case high/low range switch signal circuit short circuit to power ▪ Transfer case control module internal failure	**NOTES:** ▪ This DTC will be set if the switch signal is active for > 255 seconds. ▪ This DTC may be induced by the driver. ▪ Check the operation of the transfer case high/low range switch ▪ Using the manufacturer approved diagnostic system, check datalogger signal - TCCM Input Status (0x1983). Refer to the electrical circuit diagrams and check the transfer case high/low range switch signal circuits for short circuit to power ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0900-00	Clutch Actuator Circuit/Open - No sub type information	▪ Transfer case motor circuit short circuit to ground, short circuit to power, open circuit,	**NOTE:** Transfer case motor resistance should be 0.2

		high resistance ▪ Transfer case control module internal failure	ohms to 10.0 ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0902-00	Clutch Actuator Circuit - No sub type information	▪ Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case control module internal failure	**NOTE:** Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0903-00	Clutch Actuator Circuit - No sub type information	▪ Transfer case motor circuit short circuit to	**NOTE:**

	type information	short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case control module internal failure	Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0915-00	Gear Shift Position Circuit Range/Performance - No sub type information	▪ Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case selector fork position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case selector fork position sensor failure ▪ Transfer case motor failure ▪ Transfer case control module	**NOTES:** ▪ If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest. ▪ Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground

			internal failure	circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. ▪ Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. ▪ Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case selector fork position sensor and perform routine - Transfer Case Replacement	

			▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0916-00	Gear Shift Position Circuit Low - No sub type information	▪ Transfer case selector fork position sensor circuit short circuit to ground ▪ Transfer case control module internal failure	**NOTE:** Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to ground Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P0917-00	Gear Shift Position Circuit High - No sub type	▪ Transfer case selector fork position sensor	**NOTE:**

	information	circuit short circuit to power ▪ Transfer case control module internal failure	Transfer case selector fork position sensor voltage (supply circuit to ground circuit) should be 4.0V to 6.0V. ▪ Refer to the electrical circuit diagrams and check the transfer case selector fork position sensor circuit for short circuit to power ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P173A-00	Clutch Actuator Position Sensor Circuit Range/Performance - No sub type information	▪ Transfer case motor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case motor failure ▪ Transfer case control module internal failure	**NOTES:** ▪ If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest. ▪ Transfer case motor resistance should be 0.2 ohms to 10.0 ohms. ▪ Transfer case motor position sensor voltage (sensor supply to sensor ground)

should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms.

- Refer to the electrical circuit diagrams and check the transfer case motor circuit for short circuit to ground, short circuit to power, open circuit, high resistance
- Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance
- Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement
- Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists,

			install a new transfer case control module and perform routine - Transfer Case Replacement
P173B-00	Clutch Actuator Position Sensor Circuit Low - No sub type information	▪ Transfer case motor position sensor circuit short circuit to ground ▪ Transfer case control module internal failure	**NOTE:** Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P173C-00	Clutch Actuator Position Sensor Circuit High - No sub type information	▪ Transfer case motor position sensor circuit short circuit to power	**NOTE:** Transfer case motor position sensor voltage

		▪ Transfer case control module internal failure	sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to power ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P1804-00	4-Wheel Drive High Indicator Circuit Failure - No sub type information	▪ Transfer case high range LED circuit short circuit to ground, open circuit, high resistance	▪ Refer to the electrical circuit diagrams and check the transfer case high range LED circuit for short circuit to ground, open circuit, high resistance
P1806-00	4-Wheel Drive High Indicator Short Circuit To Battery - No sub type information	Transfer case high range LED circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the transfer case high range LED circuit for short circuit to power
P1807-00	4-Wheel Drive High Indicator Short	▪ Transfer case high range LED	▪ Refer to the electrical circuit diagrams and

	Indicator Short Circuit To Ground - No sub type information	high range LED circuit short circuit to ground	circuit diagrams and check the transfer case high range LED circuit for short circuit to ground
P1808-00	4-Wheel Drive Low Indicator Circuit Failure - No sub type information	▪ Transfer case low range LED circuit short circuit to ground, open circuit, high resistance	▪ Refer to the electrical circuit diagrams and check the transfer case low range LED circuit for short circuit to ground, open circuit, high resistance
P1810-00	4-Wheel Drive Low Indicator Short Circuit To Battery - No sub type information	▪ Transfer case low range LED circuit short circuit to power	▪ Refer to the electrical circuit diagrams and check the transfer case low range LED circuit for short circuit to power
P181B-00	Clutch Actuator Changeover Solenoid Low - No sub type information	▪ Transfer case solenoid circuit short circuit to ground Transfer case control module internal failure	**NOTE:** Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P181C-00	Clutch Actuator Changeover	▪ Transfer case solenoid circuit	**NOTE:**

	Solenoid High - No sub type information	short circuit to power ▪ Transfer case control module internal failure	Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms. ▪ Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to power ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement
P181D-00	Clutch Actuator Changeover Solenoid Range/Performance - No sub type information	▪ Transfer case motor position sensor circuit short circuit to ground, short circuit to power, open circuit, high resistance Transfer case solenoid circuit short circuit to ground, short circuit to power, open circuit, high resistance ▪ Transfer case motor failure ▪ Transfer case solenoid failure ▪ Transfer case control module internal failure ▪ Transfer case internal failure	**NOTES:** ▪ If additional transfer case circuit fault related DTCs are also set, perform the relevant corrective action(s) first and retest. ▪ Transfer case motor position sensor voltage (sensor supply to sensor ground) should be 8V to 11V, resistance (signal A circuit to ground circuit) should be 16.0k ohms to 20.0k ohms and resistance

and resistance (signal B circuit to ground circuit) should be 16.0k ohms to 20.0k ohms.
- Transfer case solenoid resistance should be 0.2 ohms to 10.0 ohms.

- Refer to the electrical circuit diagrams and check the transfer case motor position sensor circuit for short circuit to ground, short circuit to power, open circuit, high resistance
- Refer to the electrical circuit diagrams and check the transfer case solenoid circuit for short circuit to ground, short circuit to power, open circuit, high resistance
- Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case motor and perform routine - Transfer Case Replacement
- Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case solenoid and perform routine - Transfer Case Replacement
- Using the

			▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transfer case control module and perform routine - Transfer Case Replacement ▪ Using the manufacturer approved diagnostic

GENERAL INFORMATION

DESCRIPTION AND OPERATION

TRANSMISSION CONTROL MODULE (TCM) - 8 SPEED (8HP70 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 required
- If a failure condition is reported indicating the need to renew the transmission assembly on a vehicle that remains under manufacturer warranty, an authorisation request must first go through the warranty prior approval programme before any work is begun

The table below lists all diagnostic trouble codes (DTCs) that could be logged in the transmission control module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Diagnostics - TDV8 4.4L Diesel, Vehicles With: 8HP70 8-Speed Automatic Transmission AWD (307-01B Automatic Transmission/Transaxle - TDV8 4.4L Diesel, Diagnosis and Testing).

Control Module Processor - System Internal FailuresShift Solenoid E Control Circuit Range/Performance - No operation
Control circuit no operation

P0984-94Shift Solenoid E Control Circuit Range/Performance - Unexpected operation

- Control circuit unexpected operation

Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the 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
B1087-41	LIN Bus "A" - General checksum failure	▪ Local Interconnect Network (LIN) circuit fault	▪ Refer to the electrical circuit diagrams and check Local Interconnect Network (LIN) circuit to Electronic Transmission Shift (ETS) module. Clear the DTC and retest
B1087-63	LIN Bus "A" - Circuit / component protection time-out	▪ Local Interconnect Network (LIN) circuit fault	▪ Refer to the electrical circuit diagrams and check Local Interconnect Network (LIN) circuit to Electronic Transmission Shift (ETS) module. Clear the DTC and retest
B1087-64	LIN Bus "A" - Signal plausibility failure	▪ Signal plausibility failure	▪ Gear selector position fault. Vehicle issue - Check gear selector unit
B1087-82	LIN Bus "A" - Alive / sequence counter incorrect / not updated	▪ Local Interconnect Network (LIN) circuit fault	▪ Refer to the electrical circuit diagrams and check Local Interconnect Network (LIN) circuit to Electronic Transmission

			Shift (ETS) module. Clear the DTC and retest
B1087-83	LIN Bus "A" - Signal plausibility failure - Value of signal protection calculation incorrect	▪ Value of signal protection calculation incorrect	▪ Gear selector position fault. Vehicle issue - Check gear selector unit
B1087-88	LIN Bus "A" - Bus off	▪ Local Interconnect Network (LIN) circuit fault	▪ Refer to the electrical circuit diagrams and check Local Interconnect Network (LIN) circuit to Electronic Transmission Shift (ETS) module. Clear the DTC and retest
B108E-02	Display - General signal failure	▪ General signal failure	▪ Clear DTCs. Test drive the car and watch the displayed position matches the engaged gear. If the problem persists, renew the module. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
C1A88-64	High Pressure Switching Valve #1 - Signal plausibility failure	▪ Signal plausibility failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component

P0071-02	Ambient Air Temperature Sensor Circuit "A" Range/Performance - General signal failure	Ambient air temperature sensor range performance	▪ Check Engine Control Module (ECM) for related DTCs and refer to the relevant DTC index
P0121-86	Throttle/Pedal Position Sensor A Circuit Range/Performance - Signal invalid	▪ Throttle position sensor sensing circuit signal invalid ▪ Throttle position sensor failure	▪ Check Engine Control Module (ECM) for related DTCs and refer to the relevant DTC index
P0219-64	Engine Overspeed Condition - Signal plausibility failure	▪ Crankshaft position sensor circuit ▪ Camshaft position sensor circuit	▪ Check Engine Control Module (ECM) for related DTCs and refer to the relevant DTC index. Clear the DTC and retest
P0562-1C	System Voltage Low - Circuit voltage out of range	▪ Power supply voltage is out of range when the engine is running	▪ Check the battery and charging system. Refer to the relevant workshop manual section. Clear the DTC and retest
P0562-21	System Voltage Low - Signal amplitude < minimum	▪ Supply voltage to Transmission Control Module (TCM) very low	▪ Check the battery condition and state of charge. Check the Transmission Control Module (TCM) connector and power supply circuits
P0563-22	System Voltage High - Signal amplitude > maximum	▪ Power supply voltage is too high if the engine is running and there has been no jump-start or transmission limp-home event	▪ Check the battery condition and state of charge. Check the Transmission Control Module (TCM) connector and power supply circuits. Check if the vehicle has been jump-started. Clear the DTC and retest
P0601-41	Internal Control Module Memory Check Sum Error - General checksum failure	▪ Checksum error	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission

			Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-04	▪ Internal failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component	
P0606-11	Control Module Processor - Circuit short to ground	▪ Internal failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the

			installation of a new module/component
P0606-62	Control Module Processor - Signal compare failure	▪ Internal failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0606-64	Control Module Processor - Signal plausibility failure	▪ Internal failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0613-04	TCM Processor - System internal failures	▪ Internal failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval

			programme is in operation, prior to the installation of a new module/component
P0613-06	TCM Processor - Algorithm Based Failures	▪ Internal processor watchdog error	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0613-11	TCM Processor - Circuit short to ground	▪ Internal circuit short to ground	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0613-12	TCM Processor - Circuit short to battery	▪ Internal circuit short to power	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty

			Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0613-13	TCM Processor - Circuit open	▪ Internal circuit open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0613-15	TCM Processor - Circuit short to battery or open	▪ Internal circuit short to power or open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0613-18	TCM Processor - Circuit current below threshold	▪ Internal circuit short to ground or open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission

			Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P061B-02	Internal Control Module Torque Calculation Performance - General signal failure	▪ Internal failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P061B-64	Internal Control Module Torque Calculation Performance# - Signal plausibility failure	▪ Signal plausibility failure	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P062F-04	Internal Control Module EEPROM Error - System internal failures	▪ EEPROM error	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear

			the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0641-64	Sensor Reference Voltage A Circuit/Open - Signal plausibility failure	▪ Internal failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, check and install a new Transmission Control Module. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0642-21	Sensor Reference Voltage A Circuit Low - Signal amplitude < minimum	▪ Reference voltage circuit signal amplitude below minimum	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0643-	Sensor Reference	▪ Reference voltage	▪ Check the Transmission

22	Voltage A Circuit High - Signal amplitude > maximum	circuit signal amplitude above maximum	Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0657-13	Actuator Supply Voltage A Circuit / Open - Circuit open	▪ Supply voltage circuit open circuit	▪ Check for other related DTCs. Check the park lock actuator, the actuator connector and wiring. Check the Transmission Control Module (TCM) connector and the power/ground circuits to the module. Clear the DTC and test the shift lever in all positions. If the problem persists, check and install a new Transmission Control Module. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0657-64	Actuator Supply Voltage A Circuit / Open - Signal plausibility failure	▪ Actuator supply (pressure control valves etc) voltage plausibility fault	▪ Check solenoid at lever, check wiring and connectors, clear DTCs. Test position lever in all positions and cycle ignition. If the problem persists, check and install a new Transmission Control Module. Refer to the Warranty Policy and

			Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0658-11	Actuator Supply Voltage A Circuit Low - Circuit short to ground	▪ Supply voltage circuit short circuit to ground	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the module. If the problem persists, check and install a new Transmission 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
P0659-12	Actuator Supply Voltage A Circuit High - Circuit short to battery	▪ Supply voltage circuit short circuit to power	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the module. If the problem persists, check and install a new Transmission 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
P0666-64	Control Module Internal Temperature Sensor "A" Circuit - Signal plausibility failure	▪ Internal Temperature Sensor	▪ Check for engine overheating and cooling system faults. Check the Transmission Control Module connector and the power/ground circuits to the module. Allow the Transmission Control Module to cool. Clear the DTC

			cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the 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
P0667-01	PCM / ECM / TCM Internal Temperature Sensor Range/Performance - General electrical failure	▪ Module internal temperature sensor general failure	▪ Check for engine overheating and cooling system faults. Check the Transmission Control Module connector and the power/ground circuits to the module. Allow the Transmission Control Module to cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0668-21	PCM / ECM / TCM Internal Temperature Sensor A Circuit Low - Signal amplitude < minimum	▪ Module internal temperature too low ▪ Temperature sensor circuit high resistance ▪ Temperature sensor circuit short circuit to ground	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Allow the Transmission Control Module to cool. Clear the DTC and retest. If the problem persists, renew the module

			renew the module. Consider environmental conditions before condemning the 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
P0669-22	ECM / ECM / TCM Internal Temperature Sensor A Circuit High - Signal amplitude > maximum	▪ Module internal temperature too high ▪ Temperature sensor circuit short circuit to power	▪ Check for engine overheating and cooling system faults. Check the Transmission Control Module connector and the power/ground circuits to the module. Allow the Transmission Control Module to cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P06AC-01	PCM / ECM / TCM Internal Temperature Sensor B Range/Performance - General Electrical Failure	▪ General electrical failure	▪ Check for engine overheating and cooling system faults. Check the Transmission Control Module connector and the power/ground circuits to the module. Allow the Transmission Control Module to cool. Clear the DTC and retest. If the problem persists, renew the module

			renew the module. Consider environmental conditions before condemning the 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
P06AC-64	PCM / ECM / TCM Internal Temperature Sensor B Range/Performance - Signal plausibility failure	▪ Signal plausibility failure	▪ Check for engine overheating and cooling system faults. Check the Transmission Control Module connector and the power/ground circuits to the module. Allow the Transmission Control Module to cool. Clear the DTC and retest. If the problem persists, renew the module. Consider environmental conditions before condemning the module. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P06AD-22	PCM / ECM / TCM Internal Temperature Sensor B Circuit Low - Signal amplitude > maximum	▪ Signal amplitude greater than maximum	▪ Check for engine overheating and cooling system faults. Check the Transmission Control Module connector and the power/ground circuits to the module. Allow the Transmission Control Module to cool. Clear the DTC and retest. If the problem persists, renew the module

			renew the module. Consider environmental conditions before condemning the 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
P06AE-21	PCM / ECM / TCM Internal Temperature Sensor B Circuit High - Signal amplitude < minimum	▪ Signal amplitude greater than minimum	TCM chip temperature fault. Allow cooling time. If fault occurs again refer to the warranty policies and procedures before renewing a Transmission Control Module
P0700-02	Transmission Control System (MIL Request) - General signal failure	▪ General signal failure	▪ Check for other DTCs and rectify those first. Clear the DTCs and road test the vehicle. If further DTCs are logged, investigate according to the individual faults logged
P0700-83	Transmission Control System (MIL Request) - Value of signal protection calculation incorrect	▪ Value of signal protection calculation incorrect	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0702-98	Transmission Control System (MIL Request)	▪ Value of signal protection	▪ Check the transmission oil level and quality

76	System (MIL Request) - Value of signal protection calculation incorrect	protection calculation incorrect	oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest
P0710-04	Transmission Control System Electrical - Component or system over temperature	▪ Component or system over temperature	▪ Check transmission cooling circuit. Clear DTCs and test drive the vehicle. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0710-13	Transmission Fluid Temperature Sensor A Circuit - Circuit open	▪ Transmission fluid temperature sensor circuit open circuit ▪ Temperature sensor fault	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Consider environmental conditions before condemning the 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
P0710-27	Transmission Fluid Temperature Sensor	▪ Transmission fluid temperature sensor	▪ Allow the transmission to cool, clear the DTC

27	Temperature Sensor A Circuit - Signal rate of change above threshold	temperature sensor signal rate of change above threshold	to cool, clear the DTC and retest. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0710-64	Transmission Fluid Temperature Sensor A Circuit - Signal plausibility failure	▪ Transmission fluid temperature sensor signal plausibility failure	▪ Allow the transmission to cool, clear the DTC and retest. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0712-11	Transmission Fluid Temperature Sensor A Circuit Low - Circuit short to ground	▪ Sensor circuit short circuit to ground	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0713-12	Transmission Fluid Temperature Sensor A Circuit High - Circuit short to battery	▪ Transmission Fluid Temperature Sensor circuit short circuit to power	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission

	battery		to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0715-12	Turbine/Input Shaft Speed Sensor A Circuit - Circuit short to battery	▪ Turbine sensor circuit short to power	▪ Check the Transmission Control Module connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.
P0715-64	Turbine/Input Shaft Speed Sensor A Circuit - Signal plausibility failure	▪ Turbine sensor signal plausibility failure	▪ Clear the DTC and test drive the vehicle. Check output speed and vehicle speed plausibility against turbine speed If the problem persists renew the Transmission Control Module (TCM). Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.
P0716-14	Turbine/Input Shaft Speed Sensor A	▪ Sensor circuit short circuit to ground or	▪ Check the Transmission Control Module (TCM)

	Circuit Range/Performance - Circuit short to ground or open	open circuit	connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0716-27	Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Signal rate of change above threshold	▪ Turbine sensor signal rate of change above threshold	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0716-64	Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Signal plausibility failure	▪ Turbine sensor signal plausibility failure	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new

			module/component
P0720-12	Output Shaft Speed Sensor Circuit - Circuit short to battery	▪ Sensor circuit short circuit to power	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0720-14	Output Shaft Speed Sensor Circuit - Circuit short to ground or open	▪ Sensor circuit short circuit to ground or open circuit	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0720-64	Output Shaft Speed Sensor Circuit - Signal plausibility failure	Output shaft speed sensor signal plausibility failure	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures

			manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0721-02	Output Shaft Speed Sensor Circuit Range/Performance - General signal failure	▪ Output shaft speed sensor general signal failure	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0721-27	Output Shaft Speed Sensor Circuit Range/Performance - Signal rate of change above threshold	▪ Signal rate of change above threshold	▪ Check for the possible wheel lock up due to Anti-lock Braking System (ABS) issue. Check Anti-lock Braking System (ABS) module for related DTCs. Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component

P0721-62	Output Shaft Speed Sensor Circuit Range/Performance - Signal compare failure	▪ Output shaft speed sensor circuit signal compare failure	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0721-64	Output Shaft Speed Sensor Circuit Range/Performance - Signal plausibility failure	▪ Engine speed signal plausibility failure	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0725-83	Engine Speed Input Circuit - Value of signal protection calculation incorrect	▪ Engine speed input circuit failure	▪ Check Engine Control Module (ECM) for related DTCs and refer to the relevant DTC index
P0729-07	Gear 6 Incorrect Ratio - Mechanical failures	▪ Mechanical failures	▪ Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear

			the DTC and retest. If the problem persists, renew the transmission. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0730-00	Incorrect Gear Ratio - No sub type information	▪ Mechanical failures	▪ Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0731-07	Gear 1 Incorrect Ratio - Mechanical failures	▪ Mechanical failures	▪ Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0732-07	Gear 2 Incorrect Ratio - Mechanical failures	▪ Mechanical failures	▪ Check the transmission oil level and quality, refer to the relevant section of the workshop manual.

			Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0733-07	Gear 3 Incorrect Ratio - Mechanical failures	▪ Mechanical failures	▪ Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0734-07	Gear 4 Incorrect Ratio - Mechanical failures	▪ Mechanical failures	▪ Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0735-07	Gear 5 Incorrect Ratio - Mechanical failures	▪ Mechanical failures	▪ Check the transmission oil level and quality, refer to the relevant

			section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0736-07	Reverse Incorrect Ratio - Mechanical failures	▪ Mechanical failures	▪ Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. Clear the DTC and retest. If the problem persists, renew the transmission. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0741-07	Torque Converter Clutch Solenoid Circuit Performance/Stuck Off - Mechanical failures	▪ Mechanical failures	▪ Check the transmission oil level and quality, refer to the relevant section of the workshop manual. Clear the DTC and test drive the vehicle. If the problem persists, renew the torque convertor. If the problem still persists, renew the transmission. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component

P0745-11	Pressure Control Solenoid A - Circuit short to ground	▪ Pressure control solenoid A circuit short to ground	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0745-12	Pressure Control Solenoid A - Circuit short to battery	▪ Pressure control solenoid A circuit short to power	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0745-13	Pressure Control Solenoid A - Circuit open	▪ Pressure control solenoid A circuit, open circuit	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval

			programme is in operation, prior to the installation of a new module/component
P0745-14	Pressure Control Solenoid A - Circuit short to ground or open	▪ Pressure control solenoid A circuit short to ground, open circuit	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0745-64	Pressure Control Solenoid A - Signal plausibility failure	▪ Pressure control solenoid A circuit signal plausibility failure	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission Control Module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module (TCM) as required. Refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0745-93	Pressure Control Solenoid A - No operation	▪ Control solenoid not operating	▪ Check the Transmission Control Module (TCM) connector and the power/ground circuits to the Transmission

GENERAL INFORMATION

DESCRIPTION AND OPERATION

TRANSMISSION CONTROL MODULE (TCM) - SIEMENS

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 Transmission Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: Diagnostics (307-01C Automatic Transmission/Transaxle - V8 5.0L Petrol/V8 S/C 5.0L Petrol, Diagnosis and Testing).

- Checksum error

- Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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

- Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module Consider environmental conditions before condemning the 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

DTC	DESCRIPTION	POSSIBLE CAUSES	ACTION
P0121-	Throttle/Pedal	▪ Throttle position	▪ Check for engine

86	Throttle/Pedal Position Sensor A Circuit Range/Performance - Signal invalid	- Throttle position sensor sensing circuit signal invalid - Throttle position sensor failure	- Check for engine management DTCs
P0219-86	Engine Overspeed Condition - Signal invalid	- Engine speed implausible (signal invalid)	- Check for engine management DTCs
P0500-81	Vehicle Speed Sensor A - Invalid serial data received	- Vehicle speed signal invalid serial data received	- Check for ABS DTCs
P0501-81	Vehicle Speed Sensor A Range/Performance - Invalid serial data received	- Vehicle speed signal invalid serial data received	- Check for ABS DTCs
P0561-1C	System Voltage Unstable - Circuit voltage out of range	- Power supply voltage is out of range when the engine is running	- Check the battery and charging system. Refer to the relevant workshop manual section. Clear DTC and retest
P0562-21	System Voltage Low - Signal amplitude < minimum	- Supply voltage to TCM very low	- Check the battery condition and state of charge. Check the Transmission Control Module connector and power supply circuits. Refer to the electrical circuit diagrams. Clear DTC and retest
P0563-22	System Voltage High - Signal amplitude > maximum	- Power supply voltage is too high if the engine is running and there has been no jump-start or transmission limp-home event	- Check the battery condition and state of charge. Check the Transmission Control Module connector and power supply circuits. Refer to the electrical circuit diagrams. Check if the vehicle has been jump-started. Clear the DTC and retest
P0601-41	Internal Control Module Memory Check Sum Error-General checksum		

	failure		
P0604-92	Internal Control Module Random Access Memory (RAM) Error - Performance or incorrect operation	▪ Control module internal memory error	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0613-06	TCM Processor - Algorithm Based Failures	▪ Internal processor watchdog error	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0613-47	TCM Processor - Watchdog/safety microcontroller failure	▪ Internal processor watchdog error	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0613-68	TCM Processor - Event information	▪ Event information	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest.

			If the problem persists, renew the Transmission 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
P061B-00	Internal Control Module Torque Calculation Performance - No sub type information	▪ No sub type information	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P061B-64	Internal Control Module Torque Calculation Performance# - Signal plausibility failure	▪ Signal plausibility failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P062F-04	Internal Control Module EEPROM Error - System internal failures	▪ EEPROM error	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0642-21	Sensor Reference Voltage A Circuit Low - Signal amplitude < minimum	▪ Reference voltage circuit signal amplitude below minimum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0643-22	Sensor Reference Voltage A Circuit High - Signal amplitude > maximum	▪ Reference voltage circuit signal amplitude above maximum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0657-13	Actuator Supply Voltage A Circuit / Open - Circuit open	▪ Supply voltage circuit open circuit	▪ Check for other related DTCs. Check the park lock actuator, the actuator connector and wiring. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and test the shift lever in all positions. If the problem persists, renew the Transmission Control Module Refer to the warranty policies and procedures before renewing the transmission

P0658-11	Actuator Supply Voltage A Circuit Low - Circuit short to ground	▪ Supply voltage circuit short circuit to ground	▪ Check for other related DTCs. Check the park lock actuator, the actuator connector and wiring. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and test the shift lever in all positions. If the problem persists, renew the Transmission Control Module Refer to the warranty policies and procedures before renewing the transmission
P0659-12	Actuator Supply Voltage A Circuit High - Circuit short to battery	▪ Supply voltage circuit short circuit to power	▪ Check for other related DTCs. Check the park lock actuator, the actuator connector and wiring. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and test the shift lever in all positions. If the problem persists, renew the Transmission Control Module Refer to the warranty policies and procedures before renewing the transmission
P0667-01	PCM / ECM / TCM Internal Temperature Sensor Range/Performance - General electrical failure	▪ Module internal temperature sensor general failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module Consider environmental conditions before condemning the 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

P0667-04	PCM / ECM / TCM Internal Temperature Sensor Range/Performance - System internal failures	▪ Module internal temperature sensor general failure	
P0667-49	PCM / ECM / TCM Internal Temperature Sensor A Circuit Low - Internal electronic failure	▪ Module internal temperature sensor general failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module Consider environmental conditions before condemning the 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
P0700-02	Transmission Control System (MIL Request) - General signal failure	▪ General signal failure	▪ Check for other DTCs and rectify those first. Clear the DTCs and road test the vehicle. If further DTCs are logged, investigate according to the individual faults logged
P0700-22	Transmission Control System (MIL Request) - Signal amplitude > maximum	▪ Signal amplitude above maximum	▪ Check for other DTCs and rectify those first. Clear the DTCs and road test the vehicle. If further DTCs are logged, investigate according to the individual faults logged
P0700-75	Transmission Control System (MIL Request) - Emergency position not reachable	▪ Emergency position not reachable	▪ Check for other DTCs and rectify those first. Clear the DTCs and road test the vehicle. If further DTCs are logged, investigate according to the individual faults logged

P0710-15	Transmission Fluid Temperature Sensor A Circuit - Circuit short to battery or open	▪ Circuit short to power or open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0711-22	Transmission Fluid Temperature Sensor A Circuit Range/Performance - Signal amplitude > maximum	▪ Signal amplitude above maximum	▪ Allow the transmission to cool, clear the DTC and retest. If the problem persists, renew the Transmission 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
P0712-11	Transmission Fluid Temperature Sensor A Circuit Low - Circuit short to ground	▪ Sensor circuit short circuit to ground	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0716-14	Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Circuit short to ground or open	▪ Sensor circuit short circuit to ground or open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module Refer to the Warranty Policy and

			the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0716-21	Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Signal amplitude < minimum	▪ Signal amplitude below minimum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0716-22	Turbine/Input Shaft Speed Sensor A Circuit Range/Performance - Signal amplitude > maximum	▪ Signal amplitude above maximum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0717-12	Turbine/Input Shaft Speed Sensor A Circuit No Signal - Circuit short to battery	▪ Sensor circuit short circuit to power	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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

P0720-12	Output Shaft Speed Sensor Circuit - Circuit short to battery	▪ Sensor circuit short circuit to power	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0720-14	Output Shaft Speed Sensor Circuit - Circuit short to ground or open	▪ Sensor circuit short circuit to ground or open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0721-22	Output Shaft Speed Sensor Circuit Range/Performance - Signal amplitude > maximum	▪ Signal amplitude above maximum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0721-27	Output Shaft Speed Sensor Circuit Range/Performance - Signal rate of change above threshold	▪ Signal rate of change above threshold	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists

	threshold		If the problem persists, renew the Transmission 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
P0721-64	Output Shaft Speed Sensor Circuit Range/Performance - Signal plausibility failure	▪ Signal plausibility failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0729-07	Gear 6 Incorrect Ratio - Mechanical Failures	▪ Mechanical Failures	▪ Check the oil level and quality. Adjust as necessary. Clear the DTC and retest. If fault persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0731-07	Gear 1 Incorrect Ratio - Mechanical Failures	▪ Mechanical failures	▪ Check the oil level and quality. Adjust as necessary. Clear the DTC and retest. If fault persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0732-07	Gear 2 Incorrect Ratio - Mechanical Failures	▪ Mechanical failures	▪ Check the oil level and quality. Adjust as necessary. Clear the DTC and retest. If fault persists, renew the transmission. Refer to the warranty policies and procedures

			before renewing the transmission
P0733-07	Gear 3 Incorrect Ratio - Mechanical Failures	▪ Mechanical failures	▪ Check the oil level and quality. Adjust as necessary. Clear the DTC and retest. If fault persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0734-07	Gear 4 Incorrect Ratio - Mechanical Failures	▪ Mechanical failures	▪ Check the oil level and quality. Adjust as necessary. Clear the DTC and retest. If fault persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0735-07	Gear 5 Incorrect Ratio - Mechanical Failures	▪ Mechanical failures	▪ Check the oil level and quality. Adjust as necessary. Clear the DTC and retest. If fault persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0736-07	Reverse Incorrect Ratio - Mechanical Failures	▪ Mechanical failures	▪ Check the oil level and quality. Adjust as necessary. Clear the DTC and retest. If fault persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0740-13	Torque Converter Clutch Solenoid Circuit / Open - Circuit open	▪ Solenoid circuit open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0741-07	Torque Converter Clutch Solenoid Circuit Performance/Stuck Off - Mechanical Failures	▪ Mechanical failures	▪ Renew the torque convertor. If the transmission oil condition is very poor/dirty, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0781-07	1 - 2 Shift - Mechanical Failures	▪ Mechanical failures	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0781-77	1 - 2 Shift - Commanded position not reachable	▪ Commanded position not reachable	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0782-07	2 - 3 Shift - Mechanical Failures	▪ Mechanical failures	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the transmission. Refer to the warranty policies and

			procedures before renewing the transmission
P0782-77	2 - 3 Shift - Commanded position not reachable	▪ Commanded position not reachable	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0783-07	3 - 4 Shift - Mechanical Failures	▪ Mechanical failures	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0783-77	3 - 4 Shift - Commanded position not reachable	▪ Commanded position not reachable	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0784-07	4 - 5 Shift - Mechanical Failures	▪ Mechanical failures	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the

			transmission. Refer to the warranty policies and procedures before renewing the transmission
P0784-77	4 - 5 Shift - Commanded position not reachable	▪ Commanded position not reachable	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0798-1E	Pressure Control Solenoid C Electrical - Circuit resistance out of range	▪ Circuit resistance out of range	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0798-21	Pressure Control Solenoid C Electrical - Signal amplitude < minimum	▪ Signal amplitude below minimum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0798-22	Pressure Control Solenoid C Electrical - Signal	▪ Signal amplitude above maximum	▪ Check the Transmission Control Module connector and the power/ground

	amplitude > maximum		circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0815-33	Upshift Switch Circuit - Signal low time > maximum	▪ Circuit signal low time greater than maximum	▪ Refer to the electrical circuit diagrams and check the circuit between the command upshift switch and the Transmission Control Module. Check the switch operation of the Transmission Shift Selector
P0816-33	Downshift Switch Circuit - Signal low time > maximum	▪ Circuit signal low time greater than maximum	▪ Refer to the electrical circuit diagrams and check the circuit between the command downshift switch and the Transmission Control Module. Check the switch operation of the Transmission Shift Selector
P081C-64	Park Input Circuit - Signal plausibility failure	▪ Park lock circuit short circuit to ground, short circuit to power, open circuit or high resistance ▪ Park lock solenoid internal failure	▪ Refer to the electrical circuit diagrams and check the park lock circuit between the Transmission Control Module, and the park lock solenoid for short circuit to ground, short circuit to power, open circuit or high resistance ▪ Inspect connectors for signs of water ingress, and pins for damage and/or corrosion ▪ Clear the DTC and retest ▪ Check and install a new park lock solenoid as required

P0826-62	Up and Down Switch Circuit - Signal compare failure	▪ Circuit signal compare failure	▪ Refer to the electrical circuit diagrams and check the circuit between the command shift switch and the Transmission Control Module. Check the switch operation of the Transmission Shift Selector
P0829-07	5-6 Shift - Mechanical Failures	▪ Mechanical failures	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0829-77	5-6 Shift - Commanded position not reachable	▪ Mechanical failures	▪ Check the fluid level and condition. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and road test the vehicle. If the problem persists, renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P0850-29	Park / Neutral Switch Input Circuit - Signal invalid	▪ Starter inhibit signal invalid	▪ Refer to the electrical circuit diagrams and check the park/neutral switch circuit between the central electronics module, the Engine Control Module and Transmission Control Module Clear the DTC and check that the engine starts in park and neutral and not in any other selected position. If the fault persists, renew the renew the Transmission Control Module

P0915-01	Gear Shift Position Circuit Range/Performance - General electrical failure	▪ General electrical failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0915-64	Gear Shift Position Circuit Range/Performance - Signal plausibility failure	▪ Signal plausibility failure	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P092C-00	Gear Shift Lock Solenoid Actuator Circuit B Low - No sub type information	**NOTE:** This DTC only applies to vehicles fitted with a park lock solenoid ▪ No sub type information	▪ Check for other related DTCs. Check the shift lock actuator, the connectors and wiring. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and test the shift lever in all positions. If the problem persists, renew the Transmission Control Module Refer to the warranty policies and procedures before renewing the transmission
P092D-00	Gear Shift Lock Solenoid Actuator Circuit B High - No sub type	**NOTE:** This DTC only	▪ Check for other related DTCs. Check the shift lock actuator, the connectors and wiring. Check the

	information	applies to vehicles fitted with a park lock solenoid ▪ No sub type information	Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and test the shift lever in all positions. If the problem persists, renew the Transmission Control Module Refer to the warranty policies and procedures before renewing the transmission
P0930-00	Gear Shift Lock Solenoid/Actuator Circuit A Low - No sub type information	▪ No sub type information	▪ Check for other related DTCs. Check the shift lock actuator, the connectors and wiring. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and test the shift lever in all positions. If the problem persists, renew the Transmission Control Module Refer to the warranty policies and procedures before renewing the transmission
P0931-00	Gear Shift Lock Solenoid/Actuator Circuit A High - No sub type information	▪ No sub type information	▪ Check for other related DTCs. Check the shift lock actuator, the connectors and wiring. Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and test the shift lever in all positions. If the problem persists, renew the Transmission Control Module Refer to the warranty policies and procedures before renewing the transmission
P0938-29	Hydraulic Oil Temperature Sensor Range/Performance - Signal invalid	▪ Temperature sensor signal invalid	▪ Allow the transmission to cool, clear the DTC and road test the vehicle. If the problem persists, renew the Transmission 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
P0963-12	Pressure Control Solenoid A Control Circuit High - Circuit short to battery	▪ Control circuit short circuit to power	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0963-13	Pressure Control Solenoid A Control Circuit High - Circuit open	▪ Control circuit open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0964-13	Pressure Control Solenoid B Control Circuit / Open - Circuit open	▪ Control circuit high resistance	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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

P0966-11	Pressure Control Solenoid B Control Circuit Low - Circuit short to ground	▪ Control circuit short circuit to ground	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0966-14	Pressure Control Solenoid B Control Circuit Low - Circuit short to ground or open	▪ Control circuit short circuit to ground or open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0966-1E	Pressure Control Solenoid B Control Circuit Low - Circuit resistance out of range	▪ Circuit resistance out of range	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0966-21	Pressure Control Solenoid B Control Circuit Low - Signal amplitude < minimum	▪ Circuit signal amplitude below minimum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission

			renew the Transmission 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
P0967-12	Pressure Control Solenoid B Control Circuit High - Circuit short to battery	▪ Control circuit short circuit to power	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0967-22	Pressure Control Solenoid B Control Circuit High - Signal amplitude > maximum	▪ Circuit signal amplitude above maximum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0968-13	Pressure Control Solenoid C Control Circuit / Open - Circuit open	▪ Control circuit open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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

			installation of a new module/component
P0970-11	Pressure Control Solenoid C Control Circuit Low - Circuit short to ground	▪ Control circuit short circuit to ground	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0970-14	Pressure Control Solenoid C Control Circuit Low - Circuit short to ground or open	▪ Control circuit short circuit to power	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0971-12	Pressure Control Solenoid C Control Circuit High - Circuit short to battery	▪ Control circuit short circuit to power	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0972-21	Shift Solenoid A Control Circuit Range/Performance - Signal amplitude	▪ Circuit signal amplitude below minimum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module

	- Signal amplitude < minimum		circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0972-22	Shift Solenoid A Control Circuit Range/Performance - Signal amplitude > maximum	▪ Circuit signal amplitude above maximum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0973-11	Shift Solenoid A Control Circuit Low - Circuit short to ground	▪ Shift solenoid circuit short to ground	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P0973-14	Shift Solenoid A Control Circuit Low - Circuit short to ground or open	▪ Shift solenoid circuit short to ground or open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission Control Module Refer to the Warranty Policy and Procedures manual, or determine if any prior

			determine if any prior approval programme is in operation, prior to the installation of a new module/component
P0973-1E	Shift Solenoid A Control Circuit Low - Circuit resistance out of range	▪ Shift solenoid circuit resistance out of range	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P1706-9A	High Vehicle Speed Observed in Park - Component or system operating conditions	▪ Component or system operating conditions	▪ Possibly indicates a misuse/incorrect selection while vehicle in motion. Check the transmission park lock operation
P2700-07	Transmission Friction Element A Apply Time Range/Performance - Mechanical Failures	▪ Mechanical failures	▪ Renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P2701-07	Transmission Friction Element B Apply Time Range/Performance - Mechanical Failures	▪ Mechanical failures	▪ Renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P2702-07	Transmission Friction Element C Apply Time Range/Performance - Mechanical Failures	▪ Mechanical failures	▪ Renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P2703-07	Transmission Friction Element D Apply Time Range/Performance - Mechanical Failures	▪ Mechanical failures	▪ Renew the transmission. Refer to the warranty policies and procedures before renewing the transmission

P2704-07	Transmission Friction Element E Apply Time Range/Performance - Mechanical Failures	▪ Mechanical failures	▪ Renew the transmission. Refer to the warranty policies and procedures before renewing the transmission
P2716-1E	Pressure Control Solenoid D Electrical - Circuit resistance out of range	▪ Circuit resistance out of range	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P2716-21	Pressure Control Solenoid D Electrical - Signal amplitude < minimum	▪ Circuit signal amplitude below minimum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P2716-22	Pressure Control Solenoid D Electrical - Signal amplitude > maximum	▪ Circuit signal amplitude above maximum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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

P2718-13	Pressure Control Solenoid D Control Circuit / Open - Circuit open	▪ Control circuit open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P2720-11	Pressure Control Solenoid D Control Circuit Low - Circuit short to ground	▪ Control circuit short circuit to ground	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P2720-14	Pressure Control Solenoid D Control Circuit Low - Circuit short to ground or open	▪ Control circuit short circuit to ground or open circuit	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P2721-12	Pressure Control Solenoid D Control Circuit High - Circuit short to battery	▪ Control circuit short circuit to power	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists,

			renew the Transmission 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
P2725-1E	Pressure Control Solenoid E Electrical - Circuit resistance out of range	▪ Circuit signal amplitude below minimum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission 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
P2725-21	Pressure Control Solenoid E Electrical - Signal amplitude < minimum	▪ Circuit signal amplitude below minimum	▪ Check the Transmission Control Module connector and the power/ground circuits to the module. Clear the DTC and retest. If the problem persists, renew the Transmission

GENERAL INFORMATION

DESCRIPTION AND OPERATION

TRANSMISSION SHIFT MODULE (GSM)

CAUTION:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable

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 Rear Differential Control Module, for additional Diagnosis and Testing information refer to the relevant Diagnosis and Testing Section. For additional information, refer to: External Controls (307-05B Automatic Transmission/Transaxle External Controls - TDV8 4.4L Diesel, Diagnosis and Testing).

- Using the manufacturer approved diagnostic system, check Transmission Control Module (TCM) for DTCs and refer to the relevant DTC Index. Using the manufacturer approved diagnostic system, carry out network integrity test. Refer to the electrical circuit diagrams and check Transmission Control Module (TCM) power and ground circuits for open circuit. Check CAN harness between Gear Shift Control Module (GSM) and Transmission Control Module (TCM), repair as necessary

U0402-81

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, open circuit
B1087-81	LIN Bus "A" - Invalid serial data received	▪ Transmission control module LIN message error: complement fault	▪ Refer to the electrical circuit diagrams and check LIN input signal circuit for short, open circuit faults. 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, open circuit faults. Check Transmission control module for related DTCs and refer to relevant DTC Index

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, open circuit faults. 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, open circuit faults. Check Transmission control module for related DTCs and refer to relevant DTC Index
B1142-62	Ignition Status 1 - Signal compare failure	▪ Hard wired ignition and CAN powermode signals differ	▪ Refer to the electrical circuit diagrams and check ignition supply circuit for short, open circuit
B123C-01	Dynamic Stability Control Status Indicator - General Electrical Failure	▪ Dynamic stability control LED failure	▪ Suspect transmission shift module. Check operation of the dynamic stability control switch status illumination. Check and install a 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/component
B123D-64	Dynamic Stability Control Button - Signal plausibility failure	▪ Dynamic stability control switch may be stuck due to a faulty switch, or the user holding the switch pressed for a prolonged period. (Dynamic stability control switch	▪ Check for normal Dynamic stability control switch functionality. If it operates normally then no further action required. If the Dynamic stability control switch fails to

		control switch detected as pressed for 30 seconds) (S1)	control switch fails to operate normally then it 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/component
B123F-01	Adaptive Speed Limiter Mode Indicator - General Electrical Failure	▪ Adaptive Speed Limiter LED failure	▪ Suspect transmission shift module. Check operation of the active speed limiter switch 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/component
B1241-64	Adaptive Speed Limiter Button - Signal plausibility failure	▪ May be due to a faulty switch, or the user holding the switch pressed for a prolonged period (Adaptive Speed Limiter switch detected as pressed for 30 seconds)	▪ Check for normal adaptive speed limiter switch functionality. If it operates normally then no further action required. If the adaptive speed limiter switch fails to operate normally, it 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/component
B1242-64	Winter Button	May be due to a faulty	Check for normal

B1242-64	Winter Button - Signal plausibility failure	▪ May be due to a faulty switch or the user holding the switch pressed for a prolonged period. (Winter switch detected as pressed for 30 seconds)	▪ Check for normal winter switch functionality. If it operates normally, then no further action is required. If the winter switch fails to operate normally it 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/component
B1243-01	Winter Button Mode Indicator - General Electrical Failure	▪ Winter LED failure	▪ Suspect transmission shift module, check operation of the winter switch 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/component
B1244-64	Dynamic / Sport Button - Signal plausibility failure	▪ May be due to a faulty switch or the user holding the switch pressed for a prolonged period. (Dynamic/Performance switch detected as pressed for 30 seconds)	▪ Check for normal dynamic mode switch functionality. If it operates normally, then no further action is required. If the dynamic mode switch fails to operate normally, it 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

			programme is in operation, prior to the installation of a new module/component
B1245-01	Dynamic / Sport Button Mode Indicator - General Electrical Failure	▪ Dynamic / Sport LED Failure	▪ Suspect transmission shift module, check operation of the dynamic mode switch 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/component
C113A-62	Wake up Control - Signal compare failure	▪ Hardwired delayed power and CAN Bus Engine Running status differ.	▪ Refer to the electrical circuit diagrams and check hardwired wake up (start stop illumination) input circuit for short, open circuit
P0603-44	Internal Control Module Keep Alive Memory (KAM) Error - Data memory failure	▪ Transmission shift module Internal failure	▪ Suspect transmission shift module. 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/component
P0604-44	Internal Control Module Random Access Memory (RAM) Error - Data memory failure	▪ Transmission shift module Internal failure	▪ Suspect transmission shift module. 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/component
P0605-45	Internal Control Module Read Only Memory (ROM) Error - Program memory failure	▪ Transmission shift module Internal failure	▪ Suspect transmission shift module. 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/component
P0606-2F	Control Module Processor - Signal erratic	▪ Transmission shift module Internal failure	▪ Suspect transmission shift module. 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/component
P0606-47	Control Module Processor - Watchdog / safety Micro controller failure	▪ Transmission shift module Internal failure	▪ Suspect transmission shift module.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/component
P0705-09	Transmission Range Sensor A Circuit (PRNDL Input) - Component Failures	▪ PRNDS sensor fault	▪ Suspect transmission shift module. 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/component
P0705-46	Transmission Range Sensor A Circuit (PRNDL Input) - Calibration / parameter memory failure	▪ PRNDS calibration missing/invalid	▪ Suspect transmission shift module. 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/component
P0705-86	Transmission Range Sensor A Circuit (PRNDL Input) - Signal invalid	▪ Received signal incorrect	▪ Suspect transmission shift module. 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/component
P0814-01	Transmission Range Display Circuit - General Electrical Failure	▪ PRNDS LED failure	Suspect transmission shift module. Check operation of PRNDS display. 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/component
P081C-64	Park Input Circuit - Signal plausibility failure	▪ Hardwired Park and Transmission control module position display signals are not consistent	▪ Refer to electrical circuit diagrams and check Park input signal circuit for short, open circuit. Check Transmission control module for Park signal

			failure DTCs. Check operation of signal - should be set (equal to vehicle supply voltage) when transmission in P and un-set (equal to vehicle ground) when transmission in R,N,D,S
P084F-11	Park/Neutral Switch Output Circuit - Circuit short to ground	▪ Park/neutral signal circuit short to ground	▪ Refer to the electrical circuit diagrams and check the park/neutral signal circuit for short to ground
P084F-15	Park / Neutral Switch Output Circuit - Circuit short to battery or open	▪ Park/neutral signal circuit short to power or open circuit	▪ Refer to the electrical circuit diagrams and check the park/neutral signal circuit for short to power or open circuit
P176A-01	Transmission Range Selector Up and Down Position Circuit - General Electrical Failure	▪ Raise/Lower mechanism up / down sensor fault	▪ Cycle ignition, clear DTC and retest ▪ If fault persists, 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/component
P176A-13	Transmission Range Selector Up and Down Position Circuit - Circuit open	▪ Raise/Lower mechanism current sense fault	▪ Cycle ignition, clear DTC and retest ▪ If fault persists, 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/component

P176A-19	Transmission Range Selector Up and Down Position Circuit - Circuit current above threshold	▪ Raise/Lower mechanism motor over current	▪ Cycle ignition, clear DTC and retest ▪ If fault persists, 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/component
P176A-94	Transmission Range Selector Up and Down Position Circuit - Unexpected operation	▪ Motor current detected while gear selector knob not moving up or down for 100ms	▪ Cycle ignition, clear DTC and retest ▪ If fault persists, 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/component
P176B-71	Transmission Range Selector Up and Down Position Control Error - Actuator stuck	▪ Transmission control switch raise/lower operation has been forced/abused ▪ Level of software in the transmission control switch is incorrect ▪ Transmission control switch internal failure	▪ Check for evidence of obstruction or abuse and rectify as appropriate ▪ Using the manufacturer approved diagnostic system check and install the latest relevant level of software to the transmission control switch ▪ Using the manufacturer approved diagnostic system, clear the DTCs and retest. If the fault persists, install a new transmission control switch
P176C-07	Transmission	▪ Gear selector	▪ Check for normal shift

P176C-07	Transmission Range Selector Lock Control Error - Mechanical Failures	▪ Gear selector movement detected while locked. DTC set after 100ms. Park lock failure transmission shift module has detected that the selector has been turned while a lock request has been received from the transmission control module. This is usually due to the driver releasing the brake pedal with the selector in between positions, and does not represent a fault.	▪ Check for normal shift interlock lock/unlock operation, and check for short circuit DTCs. If the transmission shift module locks and unlocks normally, then no further action is required. If the transmission shift module fails to lock normally when fully in the P position, it 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/component
P176C-11	Transmission Range Selector Lock Control Error - Circuit short to ground	▪ Short to ground detected while solenoid active for 100ms.	▪ Suspect transmission shift module, check operation of the shift interlock, 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/component
P176C-12	Transmission Range Selector Lock Control Error - Circuit short to power	Short to power detected for 100ms.	▪ Suspect transmission shift module, check operation of the shift interlock, 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/component

			module/component
P176C-73	Transmission Range Selector Lock Control Error - Actuator stuck closed	▪ Solenoid Unlock Failure. This may be due either to the user applying a prolonged rotational force against the selector lock mechanism while it is attempting to unlock, or due to an internal failure	▪ Check for normal shift interlock lock/unlock operation. If the transmission shift module locks and unlocks normally then no further action is required. If the transmission shift module fails to lock and unlock normally it 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/component
U0001-88	High Speed CAN Communication Bus - Bus off	▪ HS CAN Failure (Bus Off)	▪ Refer to the electrical circuit diagrams and check CAN bus for short, open circuit
U0100-00	Lost Communication With ECM/PCM "A" - Missing message	▪ Lost communication with the engine control module ▪ Engine speed signal not received for 450mS (S3)	▪ Refer to the electrical circuit diagrams and check the CAN Bus connection to the engine control module for short, open circuit. Check the engine control module for related DTCs and refer to the relevant DTC Index
U0100-87	Lost Communication With ECM/PCM "A" - Missing message	▪ Lost communication with the engine control module ▪ Engine speed signal not received for 450mS (S3)	▪ Refer to the electrical circuit diagrams and check CAN connection to Engine Control Module (ECM) for short, open circuit. Check ECM for related DTCs and refer to the relevant DTC Index

U0101-00	Lost Communication with TCM - Missing message	▪ Lost communication with the transmission control module ▪ TCM_PosDisp signal not received for 75mS. (S3)	▪ Refer to the electrical circuit diagrams and check the CAN Bus connection to the transmission control module for short, open circuit. Check the transmission control module for related DTCs and refer to the relevant DTC Index
U0101-87	Lost Communication with Transmission Control Module (TCM) - Missing message	▪ CAN harness link between Gear Shift Control Module (GSM) and Transmission Control Module (TCM) network malfunction	
U0121-00	Lost Communication With Anti-Lock Brake System (ABS) Control Module - Missing message	▪ Lost communication with the anti-lock brake system (ABS) control module ▪ Message containing TCSSwitchSports is not received for 450mS. (S3)	▪ Refer to the electrical circuit diagrams and check the CAN Bus connection to the anti-lock brake system (ABS) control module for short, open circuit. Check the anti-lock brake system (ABS) control module for related DTCs and refer to the relevant DTC Index
U0121-87	Lost Communication With Anti-Lock Brake System (ABS) Control Module - Missing message	▪ CAN harness link between Gear Shift Control Module (GSM) and Anti-Lock Brake System (ABS) Control Module network malfunction	▪ Using the manufacturer approved diagnostic system, check Anti-Lock Brake System (ABS) Control Module for DTCs and refer to the relevant DTC Index. Using the manufacturer approved diagnostic system, carry out network integrity test. Refer to the electrical circuit diagrams and check Anti-Lock Brake System (ABS) Control Module power and ground circuits for open circuit. Check CAN harness between Gear Shift Control

			Gear Shift Control Module (GSM) and Anti-Lock Brake System (ABS) Control Module, repair as necessary
U0140-00	Lost Communication With Body Control Module - No sub type information	▪ CAN harness link between Gear Shift Control Module (GSM) and Body Control Module (BCM) network malfunction	▪ Using the manufacturer approved diagnostic system, check Body Control Module (BCM) for DTCs and refer to the relevant DTC Index. Using the manufacturer approved diagnostic system, carry out network integrity test. Refer to the electrical circuit diagrams and check Body Control Module (BCM) power and ground circuits for open circuit. Check CAN harness between Gear Shift Control Module (GSM) and Body Control Module (BCM), repair as necessary
U0155-00	Lost Communication With Instrument Panel Cluster (IPC) Control Module - Missing message	▪ Lost communication with instrument panel cluster ▪ Message containing Powermode is not received for 350mS. (S3)	▪ Refer to the electrical circuit diagrams and check the CAN Bus connection to the instrument panel cluster for short, open circuit. Check the instrument panel cluster for related DTCs and refer to the relevant DTC Index
U0300-00	Internal Control Module Software Incompatibility - No sub type information	▪ Invalid master configuration ID received	▪ Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test, if DTC remains suspect the transmission shift module. Check and install a new 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
U0401-92	Invalid Data Received From ECM/PCM - Performance or incorrect operation	▪ Jaguar Drive Optimisation Winter/ Performance modes not available. Fault message if a Jaguar Drive Optimization mode switch is pressed ▪ Message received from Engine Control Module indicates it is unable to support Jaguar Drive Optimisation modes.	▪ Check ECM for related DTCs and refer to the relevant DTC Index
U0402-64	Invalid Data Received from Transmission control module - Signal plausibility failure	▪ Implausible lock request received	▪ Unexpected lock data received from Transmission control module. Check for additional communication DTCs and follow relevant service actions. If no other communication DTCs present, check Transmission control module for related DTCs and refer to the relevant DTC Index
Invalid Data Received from Transmission control module - Invalid serial data received	▪ Transmission control module CAN message error: complement fault	▪ Check Transmission control module for DTCs and refer to the relevant DTC Index. If no fault found then refer to the electrical circuit diagrams and check CAN bus for short, open circuit	
U0402-82	Invalid Data Received from Transmission control module - Alive / sequence	▪ Alive Counter fault detected (Stuck, jumps or Fault Flag). More than 1 fault in 200ms.	▪ Check Transmission control module for DTCs and refer to the relevant DTC Index. If no fault found then refer to the electrical

	sequence counter incorrect / not updated		refer to the electrical circuit diagrams and check CAN bus for short, open circuit
U0402-83	Invalid Data Received from Transmission control module - Value of signal protection calculation incorrect	Calculated checksum for Transmission control module message data does not match received checksum. More than 1 fault in 200ms.	▪ Check Transmission control module for DTCs and refer to the relevant DTC Index. If no fault found then refer to the electrical circuit diagrams and check CAN bus for short, open circuit
U0402-92	Invalid Data Received from Transmission control module - Performance or incorrect operation	▪ Message received from Transmission Control Module indicates it is unable to support Jaguar Drive Optimisation modes.	▪ Check Transmission control module for DTCs and refer to the relevant DTC Index
U0415-92	Invalid Data Received From Anti-Lock Brake System (ABS) Control Module - Performance or incorrect operation	▪ Information only. Message received from Anti-Lock Brake System module indicates it is unable to support Jaguar Drive Optimisation modes.	▪ Check ABS module for DTCs and refer to the relevant DTC Index
U0422-08	Invalid Data Received From Body Control Module - Bus Signal / Message Failures	▪ Update bit for powermode signal not received from central junction box. Possible CAN fault	▪ Check central junction box for DTCs and refer to the relevant DTC Index
U0422-81	Invalid Data Received From central junction box - Invalid serial data received	▪ Invalid powermode complement data received from central junction box	▪ Check central junction box for DTCs and refer to the relevant DTC Index
U0422-92	Invalid Data Received From central junction box - Performance or incorrect operation	▪ Message received from power assisted steering module indicates that it is unable to support Jaguar Drive Optimisation modes	▪ Check instrument cluster and central junction box for DTCs and refer to the relevant DTC Index. If no fault found then refer to the electrical circuit diagrams and

			circuit diagrams and check CAN bus for short, open circuit
U0423-92	Invalid Data Received From Instrument Panel Control Module (IPC) - Performance or incorrect operation	▪ CAN signal error	▪ Using the manufacturer approved diagnostic system, check Instrument Panel Control Module (IPC) and Central Junction Box (CJB) for DTCs and refer to the relevant DTC Index. Using the manufacturer approved diagnostic system, carry out network integrity test. Refer to the electrical circuit diagrams and check Instrument Panel Control Module (IPC) and Central Junction Box (CJB) power and ground circuits for open circuit. Check CAN harness between Gear Shift Control Module (GSM) and Instrument Panel Control Module (IPC) and Central Junction Box (CJB), repair as necessary
U043A-92	Invalid Data Received From Suspension Control Module "B" - Performance or incorrect operation	▪ Information only, Suspension Module unable to support Jaguar Drive Optimisation modes(Invalid Data is received from the SUMB)	▪ Check Suspension Control Module "B" for related DTCs and refer to the relevant DTC Index
U101A-86	Lost Communication With Transmission control module (Multiple Bus) - Signal invalid	▪ CAN and LIN bus failed. FOR INFORMATION ONLY - No action necessary if no additional CAN or LIN DTCs present	▪ Check for Transmission control module CAN and/or LIN DTCs present in transmission shift module then refer to actions for these specific DTCs. If no additional Transmission control module CAN and/or LIN DTCs present in

			LIN DTCs present in transmission shift module then no further action required
U1A14-04	CAN Initialization Failure - System Internal Failures	▪ Signal configuration not present / incorrect.	▪ Suspect transmission shift module, 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/component
U2012-4A	Car Configuration Parameter(s) - Incorrect component installed	▪ Mismatch detected between vehicle configuration and installed gear selector variant. Check correct part fitted, and if fault still present, check vehicle configuration	▪ Check correct transmission shift hardware variant is installed for the vehicle configuration - i.e. for supercharged variants, transmission shift modules with dynamic mode switch should be installed only. All other vehicles should contain hardware without the dynamic mode switch. If correct hardware installed then check/amend car configuration parameters using the manufacturer approved diagnostic system
U2100-00	Initial Configuration Not Complete - No sub type information	▪ Transmission shift module not fully configured.	▪ Suspect transmission shift module, 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/component

U3003-16	Battery Voltage - Circuit voltage below threshold	▪ Low voltage detected at Transmission shift module (Battery voltage < 8.5V for 660mS)	▪ Ensure battery is in a fully charged and serviceable condition, refer to the battery care manual. Check ECM for alternator related DTCs, Check battery power feed circuit to Transmission shift module, Clear DTCs, Cycle ignition
U3003-17	Battery Voltage - Circuit voltage above threshold	▪ High voltage detected at Transmission shift module (Battery voltage > 16.5V for 660mS)	▪ Check ECM for alternator/over charging related DTCs, Clear DTCs, Cycle ignition
U3003-62	Battery Voltage - Signal compare failure	▪ Measured voltage different to CAN received voltage (Voltage difference > 2V for > 10s)	▪ Compare vehicle voltage to voltage present at the Transmission shift module, Repair fault, Clear DTCs, Cycle ignition

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

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.

WARNINGS:

- 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.

CAUTION:

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.

GENERAL INFORMATION

DESCRIPTION AND OPERATION

HOW TO USE THIS MANUAL

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

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

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

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

NOTE:

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

WORKSHOP MANUAL ORGANIZATION

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

- **Section 1** - General Information.

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

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

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

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

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

2012.0 RANGE ROVER (LM), 100-00

GENERAL INFORMATION

DESCRIPTION AND OPERATION

INTRODUCTION

Modern vehicles contain many materials and liquids which if not handled

with care can be hazardous to both personal health and the environment. Also, many of the procedures associated with vehicle maintenance and repair involve physical hazards or other risks to health.

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

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

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

WARNING:

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

ACIDS AND ALKALIS

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

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

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

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

Display Eye Hazard sign.

AIR BAGS

Highly flammable, explosive – observe No Smoking policy.

Used within the vehicle as safety restraints.

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

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

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

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

Following any direct contact with Sodium Azide:

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

Air Bags - Do's

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

- Do wash hands after handling deployed air bags.

Air Bags - Do Not

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

AIR SUSPENSION

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

AIR CONDITIONING REFRIGERANT

Highly flammable, combustible – observe No Smoking policy.

Skin contact may result in frostbite.

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

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

AIR CONDITIONING REFRIGERANT

Do Not

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

ADHESIVES AND SEALANTS

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

ANAEROBIC, CYANOACRYLATE (SUPER-GLUES) AND OTHER ACRYLIC ADHESIVES

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

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

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

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

SOLVENT-BASED ADHESIVES/SEALERS - SEE SOLVENTS

Follow manufacturers instructions.

WATER-BASED ADHESIVES/SEALERS

Those based on polymer emulsions and rubber/latex may contain small

amounts of volatile, toxic and harmful chemicals. Skin and eye contact should be avoided and adequate ventilation provided during use.

HOT MELT ADHESIVES

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

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

RESIN-BASED ADHESIVES/SEALERS, FOR EXAMPLE EPOXIDE AND FORMALDEHYDE RESIN-BASED

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

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

Provide adequate ventilation and avoid skin and eye contact.

ISOCYANATE (POLYURETHANE) ADHESIVES/SEALERS

See also Resin-based Adhesives

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

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

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

Splashes entering the eye will cause discomfort and possible damage.

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

Wear appropriate gloves, eye and respiratory protection.

ANTIFREEZE

May be flammable when undiluted.

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

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

BATTERY ACIDS

See also Alkalis and Acids.

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

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

BRAKE PADS AND LININGS

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

BRAKE AND CLUTCH FLUID

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

CHEMICAL MATERIALS

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

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

CHEMICAL MATERIALS – DO'S

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

CHEMICAL MATERIALS – DO NOT

- Do Not mix chemical materials except under the manufacturers instructions; some chemicals can form other toxic or harmful chemicals, give off toxic or harmful fumes or become explosive when mixed together.
- Do Not spray chemical materials, particularly those based on solvents, in

confined spaces, for example when people are inside a vehicle.

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

CORROSION PROTECTION MATERIALS

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

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

DUST

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

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

ELECTRICAL EQUIPMENT

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

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

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

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

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

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

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

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

In cases of electrocution:

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

EXHAUST FUMES

These contain asphyxiating, harmful and toxic chemicals and particles such

as carbon oxides, nitrogen oxides, aldehydes, lead and aromatic hydrocarbons. Engines should be run only under conditions of adequate exhaust extraction or general ventilation and not in confined spaces.

GASOLINE (PETROL) ENGINE

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

GAS OIL (DIESEL ENGINE)

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

FIBRE INSULATION

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

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

FIRE

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

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

Decontaminate and dispose of protective clothing immediately after use.

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

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

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

FIRST AID

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

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

Soiled skin should be washed with soap and water.

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

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

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

FLUOROELASTOMERS (SYNTHETIC RUBBER)

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

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

WARNING:

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

immediately:

Remove any contaminated clothing.

SEEK IMMEDIATE MEDICAL ATTENTION

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

FOAMS – POLYURETHANE

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

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

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

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

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

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

FUELS

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

GASOLINE (PETROL)

Highly flammable - OBSERVE NO SMOKING POLICY.

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

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

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

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

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

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

GAS-OIL (DIESEL FUEL)

Combustible.

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

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

If swallowed, DO NOT induce vomiting - SEEK IMMEDIATE MEDICAL

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

KEROSENE (PARAFFIN)

Used also as heating fuel, solvent and cleaning agent.

Flammable - OBSERVE NO SMOKING POLICY.

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

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

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

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

GAS CYLINDERS

Gases such as oxygen, acetylene, argon and propane are normally stored in cylinders at pressures of up to 138 bar (13800 kPa) (2000 lbf/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, for example acetylene and propane should not be stored in close proximity to oxygen cylinders.

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

Only trained personnel should undertake work involving gas cylinders.

GENERAL WORKSHOP TOOLS AND EQUIPMENT

EQUIPMENT

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

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

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

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

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

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

HIGH PRESSURE AIR, LUBRICATION AND OIL TEST EQUIPMENT

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

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

JACKING

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

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

has sufficient load capacity for the weight of the vehicle.

WARNING:

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

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

LEGAL ASPECTS

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

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

LUBRICANTS AND GREASES

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

USED ENGINE OIL

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

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

HEALTH PROTECTION PRECAUTIONS

- Avoid prolonged and repeated contact with oils, particularly used engine oils.

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

ENVIRONMENTAL PRECAUTIONS

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

Emissions to air

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

Exhaust fumes

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

Solvents

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

Refrigerant

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

Discharges to water

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

Spillages

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

Checklist

Spillage prevention:

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

Spill Kits

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

LAND CONTAMINATION

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

LEGAL COMPLIANCE

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

monitoring carried out by the Water Company.

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

Checklist

Always adhere to the following:

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

WASTE MANAGEMENT

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

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

Handling and storage of waste

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

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

Disposal of waste

Dispose of waste in accordance with the following guidelines:

- **Fuel, hydraulic fluid, anti-freeze and oil:** Keep separate and dispose of to specialist contractors.

- **Refrigerant:** Collect in specialist equipment and reuse.
- **Detergents:** Safe to pour down the foul drain if diluted.
- **Paint, thinners:** Keep separate and dispose of to specialist contractor.
- **Components:** Return to supplier for refurbishment or disassemble and reuse any suitable parts. Dispose of remainder in ordinary waste.
- **Small parts:** Reuse any suitable parts, dispose of the remainder in ordinary waste.
- **Metals:** Can be sold if separate from general waste.
- **Tyres:** Keep separate and dispose of to specialist contractor. DO NOT attempt to dispose of tyres by burning.
- **Components/materials containing asbestos:** Keep separate and dispose of to specialist contractor.
- **Oil and fuel wastes (e.g. rags, used spill kit material):** Keep separate and dispose of to specialist contractors.
- **Air filters:** Keep separate and dispose of to specialist contractors.
- **Rubber/plastics:** Dispose of in ordinary waste.
- **Hoses:** Dispose of in ordinary waste.
- **Batteries:** Keep separate and dispose of to specialist contractors.
- **Air bags - DANGER EXPLOSIVES:** Keep separate and dispose of to specialist contractors.
- **Electrical components:** Return to supplier for refurbishment or disassemble and reuse any suitable components. Dispose of remainder in ordinary waste.
- **Catalytic converters:** May be sold if kept separate from general waste.
- **Packaging:** Compact/recycle as much as possible and dispose of in ordinary waste.

ordinary waste.

- **Office/paper waste:** Recycle paper and toner and ink cartridges, dispose of remainder in ordinary waste.

NOISE

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

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

SOLDER

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

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

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

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

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

SOLVENTS

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

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

Some may be highly flammable or flammable.

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

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

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

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

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

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

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

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

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

SUSPENDED LOADS

CAUTION

CAUTION:

> Never improvise lifting tackle.

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

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

VITON

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

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

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

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

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

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

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

the material may be Viton or any fluoroelastomer.

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

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

WELDING

CAUTION:

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

Welding processes include Resistance Welding (Spot Welding), Arc Welding and Metal Active Gas (MAG) Welding for Steel vehicles, Metal Inert Gas (MIG) for Aluminum vehicles.

RESISTANCE WELDING

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

ARC WELDING

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

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

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

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

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

WARNING SYMBOLS ON VEHICLES

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

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

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GENERAL INFORMATION

DESCRIPTION AND OPERATION

Safety Notice

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

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

GENERAL INFORMATION

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.

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GENERAL INFORMATION

DESCRIPTION AND OPERATION

Road or rolling road testing may be carried out for various reasons and a procedure detailing pre-test checks, through engine starting and stopping,

pre-driving checks, on-test checks to final checks on completion of the test are given.

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

PRE-TEST CHECKS

WARNING:

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

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

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

STARTING THE ENGINE

NOTE:

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

With the ignition switched off, check:

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

With the ignition switched on, check:

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

ON ROAD TEST CHECK:

CAUTION:

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

- The parking brake releases completely.
- Gear changing is smooth, and there are no abnormal noises or vibrations

from the gearbox.

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

BRAKE TESTING

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

CAUTION:

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

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

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

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

After completion of the test, check for:

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

ROLLING ROAD TESTING

Four-Wheel Rolling Road

CAUTION:

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

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

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

Two-Wheel Rolling Road

CAUTION:

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

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GENERAL INFORMATION

DESCRIPTION AND OPERATION

VEHICLE IN WORKSHOP

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

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

- Fender covers are always installed if any work is to be carried out in the engine compartment.
- Where practicable, the battery is disconnected if working on the engine, underneath the vehicle, or if the vehicle is raised.

CAUTIONS:

- Prior to disconnecting the battery, refer to the Electrical Section of this manual - Battery disconnection/connection and the following paragraphs.
- When electric arc welding on a vehicle, always disconnect the generator wiring to prevent the possibility of a surge of current causing damage to the internal components of the generator.

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

BATTERY – GENERAL

WARNING:

It is essential that a period of 10 minutes elapses after the battery is disconnected before any work is undertaken on any part of the SRS.

CAUTIONS:

- After re-connecting the battery, the steering wheel must be turned to full left-hand and right-hand lock (with engine running). This allows the DSC system to relearn the steering wheel position. Failure to do so will result in a variety of instrument warning lights being illuminated.
- Prior to carrying out any procedures which involve disconnecting/connecting the battery, refer to the Electrical Section of this manual - Battery disconnection/connection.

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

Jump Starting a Vehicle

CAUTIONS:

- While it is not recommended that a vehicle is jump started, it is recognized that this may occasionally be the only practical way to mobilize a vehicle. Reference should be made to the following and also to the Electrical Section of this manual - Jump Starting.
- It is advisable not to use starter/charger sets for jump starting but if this is unavoidable, make sure that the sets are not used in the 'START' mode.

- Always make sure that the jumper cables are adequate for the task.
- Always make sure that the slave battery is of the same voltage (12 volts) as the vehicle battery. The batteries must be connected in parallel.
- Make sure that the battery terminals of both batteries are fully tightened.
- Where another vehicle is used to jump start a disabled vehicle, make sure that the two vehicles are not touching.
- It is advisable that the engine of the donor vehicle is switched off during jump starting; take care to make sure that the battery of the donor vehicle does not also become discharged.
- Always make sure that switchable electric circuits are OFF before connecting jump cables. This reduces the risk of arcing occurring when the final connection is made.

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

permanent damage.

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

Trickle charging (defined as voltages <16 volts) may be carried out with the battery connected. Make sure that the battery terminals are fully tightened prior to trickle charging.

CAUTION:

Boost charging may only be carried out with the battery disconnected from the vehicle.

TOWING THE VEHICLE

WARNING:

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

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

GENERAL INSTALLATION INSTRUCTIONS

COMPONENT REMOVAL

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

- Blank off openings exposed by component removal

Blank off openings exposed by component removal.

- Following disconnection, seal fuel, oil or hydraulic lines immediately using suitable blanking plugs or caps.
- Seal open ends of exposed oil ways using suitable tapered hardwood plugs or conspicuous plastic plugs.
- Immediately a component is removed, place it in a suitable container; use a separate container for each component and its associated parts.
- Clean bench and provide marking materials, labels and containers before disassembling components.

DISASSEMBLING

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

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

WARNING:

Suitable eye protection must be worn.

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

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

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

GENERAL INSPECTION OF COMPONENTS

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

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

JOINTS AND JOINT FACES

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

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

CAUTION:

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

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

CAUTION:

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

Do not allow sealant to enter tapped holes or oil ways.

LOCKING DEVICES

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

TAB WASHERS

Always release locking tabs before loosening fixings, do not re-use tab washers.

LOCKNUTS

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

ROLL PINS

Always install new roll pins of the correct size.

CIRCLIPS

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

WOODRUFF KEYS

Woodruff keys may be re-used provided there is no indication of wear or distortion.

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

SPLIT PINS

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

SCREW THREADS

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

NOTE:

> 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.

- Some bolts are coated with a thread locking agent and unless stated otherwise, they must not be re-used. 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 installation.

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

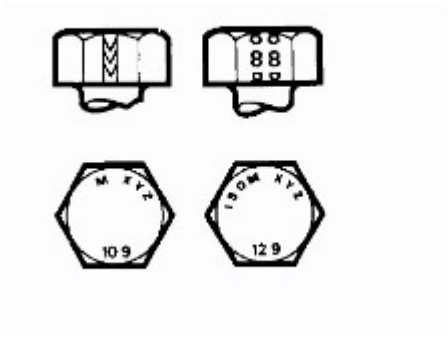
- Check that threads are undamaged.
- Remove all traces of locking agent from the threads.

CAUTION:

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

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

BOLT AND NUT IDENTIFICATION



E48627

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

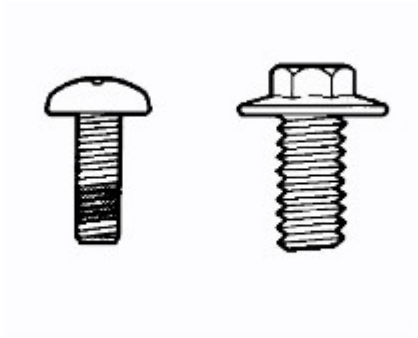
In addition to marks identifying the manufacturer, the top of the bolt head is also marked with symbols indicating the strength grade e.g. 8.8, 10.9, 12.9, 14.9. Alternatively, some bolts and screws have the M and strength grade symbol stamped on the flats of the hexagon.

ENCAPSULATED ('PATCHED') BOLTS AND SCREWS

E48628

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

SELF-LOCKING BOLTS AND SCREWS



E48629

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

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

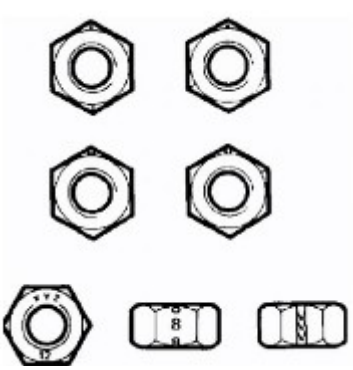
Trilobular bolts have a special thread form which creates a slight interference with the thread of the hole or nut into which it is screwed.

CAUTION:

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

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

NUT IDENTIFICATION



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

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

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

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

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

SELF-LOCKING NUTS

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

AIR SUSPENSION

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

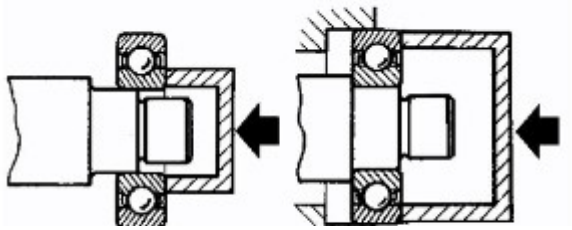
BALL AND ROLLER BEARINGS

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

CAUTION:

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

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



E48560

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

CAUTION:

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

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

CAUTION:

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

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

BRAKE PADS AND LININGS

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

BRAKE HYDRAULICS

Always observe the following recommendations when working on the

braking system:

WARNING:

Do not mix brake fluid of different specifications.

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

PIPES AND HOSES

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

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

WARNING:

Suitable eye protection must be worn.

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

CAUTION:

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

- When installing hoses, make sure that no unnecessary bends are introduced and that hoses are not kinked, twisted or positioned close to potential chafing points.
- When installing pipes, make sure that pipes are positioned and clipped clear of potential chafing points.
- Always replace sealing washers installed to banjo bolts, sealing plugs etc.
- Always use a backing spanner when tightening unions and do not over tighten union nuts or banjo bolts.
- After engagement of 'quick-fit' connection hoses, perform a 'tug' test to make sure connection is secure.

- After any work on hydraulic systems, always check for fluid leaks whilst a second operator applies working pressure to the brake pedal or operates the system that has been worked on.

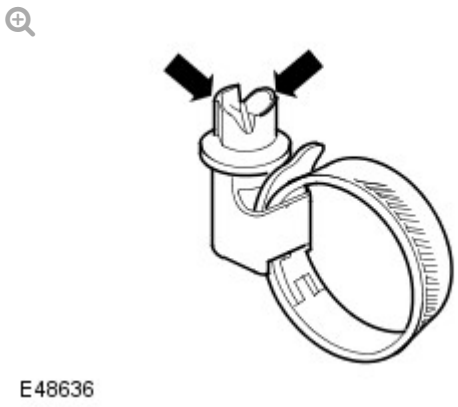
Fuel system hoses

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

WARNING:

Never attempt to repair fuel hoses or rectify leaking 'quick-fit' connectors. The fuel hose and connectors must be replaced as an assembly.

Fuel system hose clips



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

'Quick-fit' connections are also installed to certain fuel hoses. After engagement of 'quick-fit' connections, perform a 'tug' test to make sure connection is secure.

Other fuel system hose clips are of the 'Jubilee' type and there may be a tamper proof cover installed over the screw head. This cover must be carefully removed before slackening the clip and should be replaced after final tightening, ensuring that the internal hexagon on the cover is correctly located on the clip screw.

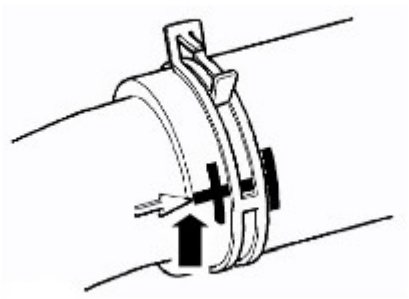
Cooling system hoses

CAUTION:

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

Hose orientation and connection

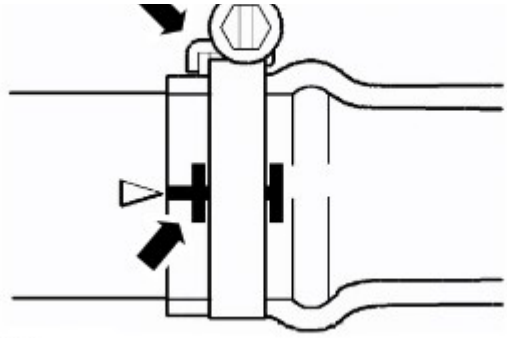
Correct orientation of cooling system hoses is important to make sure that hoses do not become fatigued or damaged through contact with adjacent components.



E48633

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

Hose clips



E48634

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

E48635

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

'Quick-fit' connections are also installed to certain hoses/pipes. Inspect 'quick-fit' connections for damage, prior to connection. Replace if damaged. After engagement of 'quick-fit' connections, perform a 'tug' test to make sure connection is secure.

Heat protection

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

ELECTRICAL PRECAUTIONS

GENERAL

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

EQUIPMENT

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

POLARITY

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

HIGH VOLTAGE CIRCUITS

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

VEHICLES INSTALLED WITH NAVIGATION

CAUTION:

> The following precaution must be observed as failure to comply may result in damage to the navigation system computer hardware.

A minimum period of two minutes must have elapsed from the ignition being switched to the 'OFF' position prior to disconnection of the battery

being switched to the "OFF" position prior to disconnection of the battery.

VEHICLES WITH BI-XENON HEADLAMP BULBS INSTALLED

WARNING:

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

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

CONNECTORS AND HARNESSES

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

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

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

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

BATTERY DISCONNECTION/CONNECTION

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

FUEL HANDLING PRECAUTIONS

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

General precautions

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

Make sure that suitable warning signs are exhibited.

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

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

WARNINGS:

- Do not disassemble or reassemble fuel system components whilst vehicle is over a pit.
- No one should be permitted to repair components associated with fuel without first having specialist training.

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

Fuel tank and system draining

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

WARNINGS:

- Never drain fuel or work on a fuel system while the vehicle is over a pit. Extraction or draining of fuel must be carried out in a well ventilated area.
- Never switch on or operate mobile (cellular) phones in the vicinity of vehicles when operations are being carried out on the fuel system.
- Always attach fuel vapor warning labels to fuel tanks immediately after draining.
- Containers used for storing fuel must be clearly marked with the contents and placed in a safe storage area which meets the requirements of the local authority.

CAUTION:

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

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

FUEL TANK REPAIRS

CAUTION:

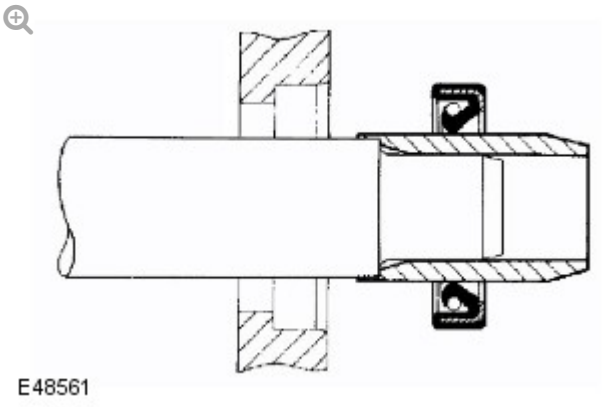
No attempt should be made to repair a plastic fuel tank. If the structure of the tank is damaged, a new tank must be installed.

OIL SEALS

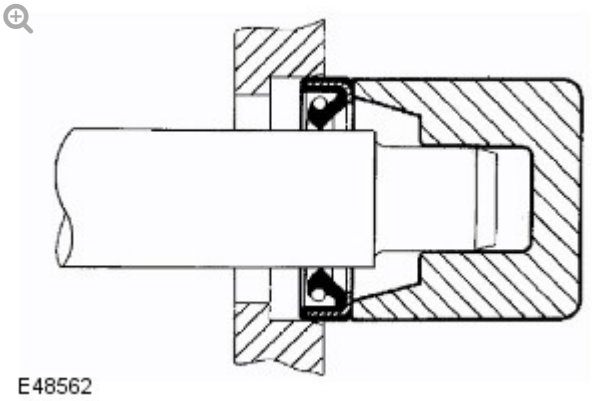
Never use a seal which has been improperly stored or handled.

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

shaft to rest on the seal.



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



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

SUPPLEMENTAL 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:

- **The correct procedures must always be used when working on SRS components.**
- **Persons working on the SRS must be fully trained and have been issued with the safety guidelines.**
- **The air bag 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 safety belt assembly that has withstood the strain of a severe vehicle impact or if the webbing shows signs of fraying.**
- **Allow a period of 10 minutes to elapse after disconnecting the battery before undertaking any work on the SRS.**
- **Always disconnect the vehicle battery before carrying out any electric welding on a vehicle installed with SRS.**

CAUTION:

> Do not expose air bag modules or safety 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. 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:

SRS components; these include but are not limited to:

- Driver air bag, clockspring.
- Passenger air bag.
- Side Air Curtains - front and rear.
- Safety belt pre-tensioners.
- SRS harnesses, link leads and connectors.

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 the battery, earth lead first.
- Wait 10 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 (10 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 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 air bags.**
- **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 air bag 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 air bag modules when installing interior trim components.
- Make sure SRS components are not contaminated by oil or grease.

NOTES:

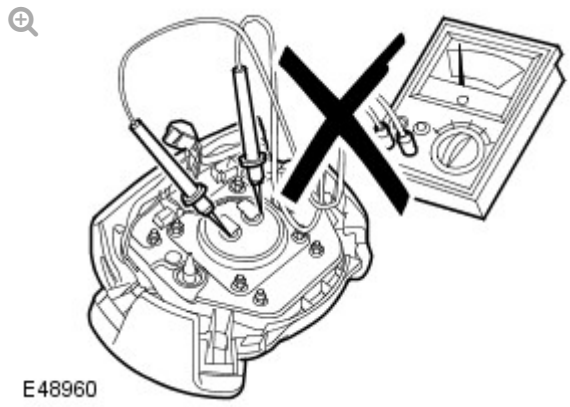
- Following safety belt pre-tensioner deployment, the safety belts can still be used as conventional safety belts but will need to be replaced as soon as possible to make sure full SRS protection.
- If the SRS components are to be replaced, the part number/bar code of the new unit must be recorded.

SRS component testing precautions

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

WARNING:

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

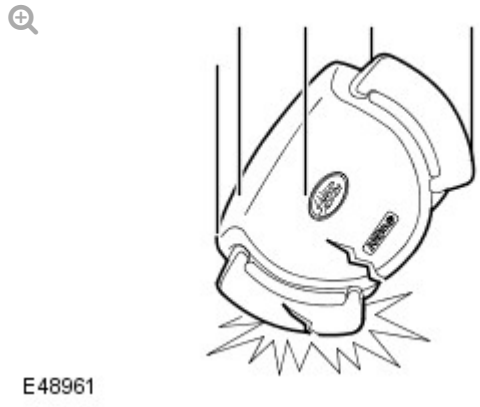


WARNING:

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:



- Never drop an SRS component. The air bag diagnostic control unit is a particularly shock sensitive device and must be handled with extreme care. Air bag modules and safety belt pre-tensioners could deploy if subjected to a strong shock.

subjected to a strong shock.

- Never wrap your arms around an air bag module. If a module has to be