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# Parking Brake Parking Brake

## Overview

**Please note this is a sealed unit and no attempt must be made to open the actuator as it will invalidate the warranty claim.**

For information on the operation of the system.
Parking Brake

## Inspection and Verification

11 . Verify the customer concern.

22 . Visually inspect for obvious mechanical or electrical faults.

| Mechanical | Electrical |
|---|---|
| • Parking brake cable(s) condition and fitment<br>• Parking brake shoes condition and fitment<br>• Parking brake drums (integrated into rear brake discs)<br>• Parking brake actuator module condition and fitment | • Parking brake indicators<br>• Fuses Fuse box - engine compartment - fuse 11E Fuse box - engine compartment - fuse 8E Fuse box - passenger compartment - fuse 40P Fuse box - passenger compartment - fuse 41P<br>• Wiring harness/electrical connectors Check for bent/corroded pins<br>• Controller area network (CAN) circuits<br>• Parking brake switch<br>• Parking brake actuator module |

33 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

44 . Use the approved diagnostic system or a scan tool to retrieve any DTCs before moving onto the symptom chart or DTC index.

Make sure that all DTCs are cleared following rectification.

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## Symptom Chart

| Symptom | Possible causes | Action |
|---|---|---|
| Parking brake will not engage or release | • Parking brake cables fouled, trapped or damaged<br>• Parking brake cables incorrectly routed or fixed<br>• Parking brake shoes, linings worn/contaminated<br>• Parking brake drums (integrated into rear brake discs)<br>• Parking brake shoes incorrectly adjusted following replacement<br>• Parking brake actuator module malfunction | Check the parking brake cables for fouling, trapping or damage. Check the cables for correct routing. Check that the cable end fitting connector(s) are correctly fitted to the operating lever(s). Inspect the parking brake shoes and drums for condition/wear/contamination, Brake Disc (70.12.33) Parking Brake Shoes (70.40.09) Check the parking brake shoes for correct adjustment. Parking Brake Shoe and Lining Adjustment (70.40.11) Check the operation of the parking brake actuator module, check for damage and/or excessive noise during operation. Check for parking brake actuator module DTCs. |
| Low parking brake efficiency/parking brake sticking/binding | | |

## DTC index

**NOTENOTE:**

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).

| DTC | Description | Possible causes | Action |
|---|---|---|---|
| C110468 | Brake bedding-in mode | • Event information | 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, Parking Brake Shoes Bedding-In (70.40.12) |
| C1A0000 | Control module failure | • 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. |
| C1A0016 | Parking brake actuator module, voltage low | • Battery voltage below 8.3V at parking brake actuator module<br>• Charging system under charging<br>• Parking brake actuator module supply circuit: short circuit to ground<br>• Parking brake actuator module supply circuit: open circuit<br>• Parking brake actuator module ground circuit: short circuit to power<br>• Parking brake actuator module ground circuit: open circuit | Check the charging system, charging voltage and battery condition. Check the parking brake actuator power and ground circuits. Refer to the electrical guides. Clear DTCs, complete drive cycle 3 to test for normal operation, refer to the relevant drive cycle shown below this table. |
| C1A0017 | Parking brake actuator module, voltage high | • Vehicle started using a booster pack<br>• Battery voltage at parking brake actuator module has been greater than 17V<br>• Charging system over charging<br>• Parking brake actuator module supply circuit: short circuit to power | Check the charging system and charging voltage. Check the parking brake actuator power circuits. Refer to the electrical guides. Clear DTCs, complete drive cycle 3 to test for normal operation, refer to the relevant drive cycle shown below this table. |
| C1A004B | Control module | **NOTENOTE:**<br>This is not a fault.<br>• Parking brake actuator module temperature protection invoked, typically due to overuse where there have been more than 15 apply and release cycles continuously | If the red parking brake warning indicator flashes the fault is the result of short term protection (message displayed). Allow the parking brake to cool for 60 seconds and retest for functionality. If the parking brake does not apply, check for other DTCs. Rectify as necessary. Clear DTCs, complete drive cycle 3 to test for normal operation, refer to the relevant drive cycle shown below this table. |
| C1A4001 | Longitudinal acceleration sensor - general electrical failure | **NOTENOTE:**<br>The longitudinal acceleration sensor is part of the parking brake actuator module<br>• Longitudinal acceleration sensor fault | Clear DTCs and check if the fault reoccurs when the vehicle is stationary. 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. |
| | Longitudinal acceleration | **NOTENOTE:**<br>The longitudinal acceleration sensor is part of the parking brake | Clear DTCs and check if the fault reoccurs when the vehicle is stationary. Calibrate the longitudinal acceleration sensor. To calibrate the sensor make sure the vehicle is on a level surface and run the calibration routine from the configuration menu of the approved diagnostic |

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| C1A4002 | sensor - general signal failure | actuator module<br>• Longitudinal acceleration sensor plausibility failure | system. If calibration was not successful check that the parking brake actuator module is correctly installed. Refer to the warranty policy and procedures manual if a module is suspect. Clear DTCs, complete drive cycle 2 to test for normal operation, refer to the relevant drive cycle shown below this table. |
| C1A4054 | Longitudinal acceleration sensor - missing calibration | **NOTENOTE:**<br>The longitudinal acceleration sensor is part of the parking brake actuator module<br>• Longitudinal acceleration sensor not calibrated | Clear DTCs and calibrate the longitudinal acceleration sensor. To calibrate the sensor make sure the vehicle is on a level surface and run the calibration routine from the configuration menu of the approved diagnostic system. Retest for functionality. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. |
| C1A4101 | Clutch pedal sensor circuit - general electrical failure | • Clutch pedal sensor circuit : open circuit<br>• Clutch pedal sensor circuit: short circuit to ground<br>• Clutch pedal sensor circuit: short circuit to power<br>• Clutch pedal sensor fault | Check the clutch pedal sensor and circuits. Refer to the electrical guides. Install a new clutch pedal sensor as necessary. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. |
| C1A4102 | Clutch pedal sensor circuit - general signal failure | • Clutch pedal sensor circuit : open circuit<br>• Clutch pedal sensor circuit: short circuit to ground<br>• Clutch pedal sensor circuit: short circuit to power<br>• Clutch pedal sensor fault | Check the clutch pedal sensor and circuits. Refer to the electrical guides. Install a new clutch pedal sensor as necessary. Clear DTCs, complete drive cycle 2 to test for normal operation, refer to the relevant drive cycle shown below this table. |
| C1A4300 | Motor supply circuit | **NOTENOTE:**<br>The electric motor is part of the parking brake actuator module<br>• Brake cables loose/broken/damaged<br>• Brake shoes worn/damaged<br>• Electric motor jammed | Check that the brake cables are connected correctly and are not loose/damaged. If the cables need to be re-connected use the approved diagnostic system to drive the cables to the "mount" position so that maximum cable length is available. Check the parking brake shoes adjustment and condition, Parking Brake Shoe and Lining Adjustment (70.40.11) Brake Disc (70.12.33) Parking Brake Shoes (70.40.09) If the parking brake actuator module is stuck, re-cycle the ignition. If the parking brake actuator module cannot be operated from the switch then use the approved diagnostic system to drive the parking brake actuator module using the "unjam" application in the set-up and configuration menu. Retest for functionality. 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. |
| C1A4301 | Motor supply circuit | **NOTENOTE:**<br>The electric motor is part of the parking brake actuator module<br>• 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. |
| C1A4662 | Parking brake actuator module plausibility check | • Parking brake cables fouled, trapped or damaged<br>• Parking brake shoes, linings worn<br>• Parking brake shoes incorrectly adjusted following replacement<br>• Parking brake actuator module circuit(s): short | Check the parking brake cables for fouling, trapping or damage. Check the parking brake shoes for correct adjustment, Parking Brake Shoe and Lining Adjustment (70.40.11) Inspect the parking brake shoes for excessive wear. Brake Disc (70.12.33) Parking Brake Shoes (70.40.09) Check the |

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| | | circuit to ground, short circuit to power, high resistance<br>• Parking brake actuator module fault | parking brake actuator module circuits. Refer to the electrical guides. Refer to the warranty policy and procedures manual if a module is suspect. |
| C1A4701 | Force sensor - general electrical failure | **NOTENOTE:**<br>The force sensor is part of the parking brake actuator module<br>• Internal force sensor electrical 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. |
| C1A4702 | Force sensor - general signal failure | **NOTENOTE:**<br>The force sensor is part of the parking brake actuator module<br>• 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. |
| C1A4754 | Force sensor - missing calibration | **NOTENOTE:**<br>The force sensor is part of the parking brake actuator module<br>• 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. |
| C1A4801 | Warning lamp circuit - general electrical failure | • Parking brake actuator module to instrument cluster warning lamp circuit: open circuit<br>• Parking brake actuator module to instrument cluster warning lamp circuit: short circuit to ground<br>• Parking brake actuator module to instrument cluster warning lamp circuit: short circuit to power<br>• Parking brake actuator module fault<br>• Instrument cluster fault | Check the parking brake actuator module to instrument cluster warning lamp circuit. Refer to the electrical guides. 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. |
| C1A5368 | Manual emergency release activated - automatic parking brake actuator module cable re-engagement (latching) failed, | • Emergency release cable activated and stuck/damaged<br>• Parking brake cables seized/damaged<br>• 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 Parking Brake |
| C1A5564 | Ignition switch input circuit - signal plausibility failure | • Parking brake actuator module ignition supply circuits: short circuit to ground, short circuit to power, high resistance<br>• Parking brake actuator module key in supply circuit: short circuit to ground, short circuit to power, high resistance | Check the parking brake actuator module ignition and key in circuits. Refer to the electrical guides. Rectify as necessary. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. |

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| | | • Ignition switch fault | |
| U007388 | Parking brake actuator module communication bus off | • Controller area network (CAN) circuit: open circuit<br>• CAN circuit: short circuit to each other<br>• CAN circuit: short circuit to power<br>• CAN circuit: short circuit to earth<br>• Parking brake actuator module fault | Carry out a complete vehicle read for DTCs indicating a CAN or module fault. Check the CAN circuits. 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. |
| U010087 | Lost communication with engine control module (ECM) - missing message | • Invalid data transmitted by ECM<br>• Controller area network (CAN) circuit: open circuit<br>• CAN circuit: short circuit to each other<br>• CAN circuit: short circuit to power<br>• CAN circuit: short circuit to earth<br>• ECM fault<br>• CAN control module fault | Carry out a complete vehicle read for DTCs indicating a CAN or module fault. Lost communication codes indicate that a module is not receiving CAN information from another module, but that its own transmissions are OK. Check for related "invalid data" DTCs in other modules and other ECM DTCs. Rectify as necessary. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. If DTC resets carry out a network integrity test. Review the DTCs to identify any trends such as a number of modules reporting having lost communication with a particular module. Rectify as necessary. This DTC may occur after/during cranking if battery capacity is low. 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. |
| U010187 | Lost communication with transmission control module (TCM) or transfer box control module - missing message | • Invalid data transmitted by TCM<br>• Invalid data transmitted by transfer box control module<br>• Controller area network (CAN) circuit: open circuit<br>• CAN circuit: short circuit to each other<br>• CAN circuit: short circuit to power<br>• CAN circuit: short circuit to earth<br>• TCM fault<br>• Transfer box control module fault<br>• CAN control module fault | Carry out a complete vehicle read for DTCs indicating a CAN or module fault. Lost communication codes indicate that a module is not receiving CAN information from another module, but that its own transmissions are OK. Check for related "invalid data" DTCs in other modules and other ECM DTCs. Rectify as necessary. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. If DTC is still present after clear down carry out a network integrity test. Review the DTCs to identify any trends such as a number of modules reporting having lost communication with a particular module. Rectify as necessary. This DTC may occur after/during cranking if battery capacity is low. 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. |
| U012287 | Lost communication with vehicle dynamics control module - missing message | • Invalid data transmitted by vehicle dynamics control module<br>• Controller area network (CAN) circuit: open circuit<br>• CAN circuit: short circuit to each other<br>• CAN circuit: short circuit to power<br>• CAN circuit: short circuit to earth<br>• Vehicle dynamics control module fault<br>• CAN control module fault | Carry out a complete vehicle read for DTCs indicating a CAN or module fault. Lost communication codes indicate that a module is not receiving CAN information from another module, but that its own transmissions are OK. Check for related "invalid data" DTCs in other modules and other dynamic control module DTCs. Rectify as necessary. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. If DTC resets carry out a network integrity test. Review the DTCs to identify any trends such as a number of modules reporting having lost communication with a particular module. Rectify as necessary. This DTC may occur after/during cranking if battery capacity is low. Refer to the warranty policy and procedures manual if a module is suspect. Clear |

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| | | | DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. |
| U015587 | Lost communication with instrument cluster - missing message | • Invalid data transmitted by instrument cluster<br>• Controller area network (CAN) circuit: open circuit<br>• CAN circuit: short circuit to each other<br>• CAN circuit: short circuit to power<br>• Instrument cluster fault<br>• CAN control module fault | Carry out a complete vehicle read for DTCs indicating a CAN or module fault. Lost communication codes indicate that a module is not receiving CAN information from another module, but that its own transmissions are OK. Check for related "invalid data" DTCs in other modules and other instrument cluster DTCs. Rectify as necessary. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. If DTC resets carry out a network integrity test. Review the DTCs to identify any trends such as a number of modules reporting having lost communication with a particular module. Rectify as necessary. This DTC may occur after/during cranking if battery capacity is low. 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. |
| U030055 | Internal control module software incompatibility | • Parking brake module configuration does not match vehicle configuration<br>• Parking brake actuator module fault | Check that the correct module is fitted to the vehicle. Check that the car configuration file (CCF) is being used. Reprogramme (CCF) as necessary. |
| U1A0300 | Vehicle configuration parameter | • Parking brake module configuration does not match vehicle configuration<br>• Wrong vehicle car configuration file (CCF) | Check for other communication/invalid data DTC's. Rectify as necessary. Check that the correct module is fitted to the vehicle. Check if the correct car configuration file (CCF) is being used. Reprogramme (CCF) as necessary. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. |
| U1A1449 | Controller area network (CAN) initialization failure | • 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. |
| U200201 | Parking brake switch | • Parking brake switch circuit(s): open circuit<br>• Parking brake switch circuit(s): short circuit to ground<br>• Parking brake switch circuit(s): short circuit to power<br>• Parking brake switch circuit(s): short circuit to each other<br>• Parking brake switch fault | Note that this DTC can be set by very slow operation of the parking brake switch. Check the parking brake switch and circuits. With the parking brake switch connected the following resistance should be measured at the parking brake actuator module end: (between 2584 ohms and 2636 ohms) between C2178-B3 & C2178-C4 and (between 2584 ohms and 2636 ohms) between C2178-B4 & C2178-C3. Refer to the electrical guides. Install a new parking brake switch as necessary. Clear DTCs, complete drive cycle 1 to test for normal operation, refer to the relevant drive cycle shown below this table. |

**Drive Cycle 1 Description**

- Ignition On
- Make sure that no parking brake activation (diagnostic command or switch input) is attempted for a minimum of 3 seconds
- Retest for functionality

**Drive Cycle 2 Description**

- Ignition On
- Drive vehicle at a constant speed of 20kph (13mph) or slightly above in 2nd gear
- At a constant speed of 20kph (13mph) or slightly above apply the parking brake via the parking brake switch

- Press the brake pedal

**Drive Cycle 3 Description**

- Ignition On
- Make sure that the vehicle is stationary and that the parking brake is released
- Pull the parking brake switch to the apply position and hold in this position until the parking brake motor has stopped (this may take up to 5 seconds)
- Release the parking brake switch to the idle position, leave in the idle position for 2 seconds
- Push the parking brake switch to the release position (with foot on the brake pedal) and keep in this position until the parking brake motor has stopped (this may take up to 5 seconds)
- Release the parking brake switch to the idle position