

**Electric Parking Brake (EPB) Actuator –
DTCs C1784, C1785, C1786, C1799, C1801,
C1802, C1803 – Diagnostics**MODEL 2004-05 MY
XJ range

VIN G00001-G49700

Issue:

This bulletin has been issued for information only, to aid dealers in diagnosing electric parking brake (EPB) actuator issues.

The only DTCs that indicate an EPB actuator fault are:

C1784: EPB motor output short to ground (page 3)

C1785: EPB motor output open circuit (page 3)

C1786: EPB motor output battery short to ground (page 5)

C1799: Hall effect sensor plausibility failure (page 6)

C1801: Motor engage current reached before full apply travel reached (under-travel) (page 8)

C1802: Motor engage current not reached or traveled too far on apply (over-travel) (page 8)

C1803: Motor disengage full travel distance not reached (EPB failed to fully release) (page 8)

If a DTC has been logged and one or more of the DTCs listed above is present, this may indicate an EPB actuator fault, but it could also indicate a fault external to the EPB actuator. Should a customer express concern, follow the Diagnostic Procedure outlined below.

Diagnostic Procedure**DETERMINE WHETHER THE FAULT IS PERMANENT OR INTERMITTENT.**

DTCs can be logged because of permanent faults or intermittent faults. Start any diagnosis by checking for permanent faults in the following way:

Note: Ensure Worldwide Diagnostic System (WDS) is loaded with software release JTP 759/41 or later.

1. Make a note of any DTCs stored.

NOTE: THE INFORMATION IN TECHNICAL BULLETINS IS INTENDED FOR USE BY TRAINED, PROFESSIONAL TECHNICIANS WITH THE KNOWLEDGE, TOOLS, AND EQUIPMENT TO DO THE JOB PROPERLY AND SAFELY. IT INFORMS THESE TECHNICIANS OF CONDITIONS THAT MAY OCCUR ON SOME VEHICLES, OR PROVIDES INFORMATION THAT COULD ASSIST IN PROPER VEHICLE SERVICE. THE PROCEDURES SHOULD NOT BE PERFORMED BY "DO-IT-YOURSELFERS." DO NOT ASSUME THAT A CONDITION DESCRIBED AFFECTS YOUR CAR. CONTACT A JAGUAR DEALER TO DETERMINE WHETHER THE BULLETIN APPLIES TO YOUR VEHICLE.

2. Clear all stored DTCs.
3. Carry out an ignition cycle, and if one of the logged DTCs is C1799 carry out a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01).

 **Warning:** Ensure the vehicle cannot roll away when the parking brake is released. Chock the road wheels, and on automatic vehicles ensure the gear selector is in park.

4. Apply and release the parking brake five times using the apply/release switch.
5. Recheck the failure memory for DTCs.

DTCs that return are permanent faults. DTCs that have cleared and not returned are intermittent faults.

DIAGNOSIS OF MULTIPLE FAULTS

Diagnosis should initially concentrate on rectifying permanent faults. After these have been repaired, an attempt should be made to trace any intermittent faults.

The order that EPB release actuator DTCs should be diagnosed is:

1. First Priority: C1784, C1785, C1786,.
2. Second Priority: C1799.
3. Third Priority: C1801, C1802, C1803.

After repairing any EPB actuator fault, the EPB must be re-calibrated. To do this, set the system into 'Calibration Mode' by doing a battery reset. Then, with ignition 'ON' and the vehicle brakes at room temperature, lightly press the brake pedal and apply the parking brake.

DTC C1784 – EPB MOTOR OUTPUT SHORT TO GROUND.

The EPB system continuously monitors for DTC C1784. If it is suspected that this fault is intermittent, it may be traced by switching the ignition 'ON' and flexing the wiring between the EPB module and the EPB actuator.

To trace a short to ground, carry out the following process:

Note: Intermittent wiring faults may exist. When carrying out the tests below, flex the wiring where possible to provoke intermittent faults.

1. Disconnect the EPB actuator connector from the body harness (connector CV7).
2. On the EPB actuator side of connector CV7 (under the vehicle), check resistance between the following points:
 - Pin CV7-1 and ground (pass value: open circuit = resistance above 10 megaohm).
 - Pin CV7-6 and ground (pass value: open circuit = resistance above 10 megaohm).

The EPB actuator should be replaced if any of the above tests fail. When replacing the EPB actuator, do NOT replace the secondary parking brake cables unless they are worn or damaged. The actuator primary cable should be uncoupled at the compensator. There is no need to uncouple the secondary cables. Unnecessary uncoupling can damage the cable retaining lugs.

3. Reconnect connector CV7 and disconnect EPB module connector CR50 (4-way connector).
4. On the harness side of connector CR50 (located in the luggage compartment), check resistance between the following points:
 - Pin CR50-3 and ground
(pass value: open circuit = resistance above 10 megaohm).
 - Pin CR50-2 and ground
(pass value: open circuit = resistance above 10 megaohm).

If any of the above tests fail, it will be necessary to trace where the fault is on the link harnesses between the EPB module and the body connector. There are three links in the harness. Intermediate connectors between the EPB module and the EPB actuator are FP2 and CV1. Short circuit to ground checks should therefore be carried out on all sections of the link harness.

If no faults can be found with the EPB actuator or with the wiring/connectors between the EPB actuator and the EPB module, the EPB module may be faulty.

After repairing any EPB actuator fault, the EPB must be re-calibrated. To do this; set the system into 'Calibration Mode' by doing a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01). Then, with ignition 'ON' and the vehicle brakes at room temperature, lightly press the brake pedal and apply the parking brake.

DTC C1785 – EPB MOTOR OUTPUT OPEN CIRCUIT.

This fault can only be detected while the EPB motor is running. If the fault is intermittent, try flexing any accessible wiring while the parking brake is being applied or released.

To trace an EPB motor open circuit, carry out the following process:

Note: Intermittent wiring faults may exist. When carrying out the tests below, flex the wiring where possible to provoke intermittent faults.

1. Disconnect the EPB actuator connector from the body harness (connector CV7).
2. On the EPB actuator side of connector CV7, check resistance between the following points:
Pin CV7-1 and pin CV7-6 (pass value 0.1 ohms to 0.2 ohms).

The EPB actuator should be replaced if any of the above tests fail. When replacing the EPB actuator, do NOT replace the secondary parking brake cables unless they are worn or damaged. The EPB actuator primary cable should be uncoupled at the compensator.

There is no need to uncouple the secondary cables. Unnecessary uncoupling can damage the cable retaining lugs.

3. With connector CV7 disconnected, also disconnect EPB module connector CR50 (4-way connector).
4. Check resistance between the following points:
 - Pin CR50-3 and pin CV7-1 (pass value: less than 5 ohms).
 - Pin CR50-2 and pin CV7-6 (pass value: less than 5 ohms).
5. If any of the above tests fail, it will be necessary to trace where the fault is on the link harnesses between the EPB module and the body connector. There are three links in the harness. Intermediate connectors between the EPB module and the EPB actuator are FP2 and CV1. Open circuit checks should therefore be carried out on all sections of the link harness. Check for:
 - Corrosion or water ingress in the connector.
 - Loss of connector pin clamp load.

Note: Wire breaks may not always be visible. The wire may be broken under the insulation. There may be a poor joint between the wire and the connector pin. Use a DVM to check for continuity while flexing the wire.

- Wire breaks.
6. If the EPB actuator and link harness are not faulty, the fault may be in the EPB module connector CR50. Check the connector for:
 - Corrosion or water ingress in the connector.
 - Loss of connector pin clamp load.

If no faults can be found with the EPB actuator or with the wiring/connectors between the EPB actuator and the EPB module, the EPB module may be faulty.

After repairing any EPB actuator fault, the EPB must be re-calibrated. To do this, set the system into 'Calibration Mode' by doing a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01).

Then, with ignition 'ON' and the vehicle brakes at room temperature, lightly press the brake pedal and apply the parking brake.

DTC C1786 – EPB MOTOR (+) OR MOTOR (-) SHORT TO POWER.

This fault can only be detected while the EPB motor is running. If the fault is intermittent, try flexing any accessible wiring while the parking brake is being applied or released.

To trace an EPB motor short to power, carry out the following process:

Note: Intermittent wiring faults may exist. When carrying out the tests below, flex the wiring where possible to provoke intermittent faults.

1. Disconnect the EPB actuator connector from the body harness (connector CV7) and disconnect the EPB module connector CR50.
2. Switch the ignition to 'ON' and then on the harness side of connector CR50 check voltage between the following points:
 - Pin CR50-3 and Ground (pass value: No voltage detected).
 - Pin CR50-2 and Ground (pass value: No voltage detected).

If voltage is detected, there is a short to power in the harness which must be traced and repaired.

There are three links in the harness between the EPB module and EPB actuator. Intermediate connectors are FP2 and CV1. Short to power checks should therefore be carried out on all sections of the link harness.

If no voltage is detected, proceed to step 3.

3. Reconnect connector CV7.
4. With ignition still switched 'ON', on the harness side of connector CR50 check voltage between the following points:
 - Pin CR50-3 and Ground (pass value: No voltage detected).
 - Pin CR50-2 and Ground (pass value: No voltage detected).

If voltage is detected, there is a short in the EPB actuator. In this case, the EPB actuator should be replaced (see Global Technical Reference GTR Workshop Manual, section: 206-05). When replacing the EPB actuator, do NOT replace the secondary parking brake cables unless they are worn or damaged. The actuator primary cable should be uncoupled at the compensator. There is no need to uncouple the secondary cables. Unnecessary uncoupling can damage the cable retaining lugs.

If no voltage was detected in any of the above tests but the fault is persistent, the EPB module may be faulty.

After repairing any EPB actuator fault, the EPB must be re-calibrated. To do this, set the system into 'Calibration Mode' by doing a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01). Then, with ignition 'ON' and the vehicle brakes at room temperature, lightly press the brake pedal and apply the parking brake.

DTC C1799 – HALL EFFECT SENSOR FAILURE.

This fault can only be detected while the EPB motor is running. If the fault is intermittent, try flexing any accessible wiring while the parking brake is being applied or released.

Note: Intermittent wiring faults may exist. When carrying out the tests below, flex the wiring where possible to provoke intermittent faults.

Note: After clearing DTC C1799, it is necessary to carry out a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01) to fully reset the system and extinguish all warning lamps.

Note: DTC C1799 may have been set because of a EPB actuator power or ground fault. If any of the DTCs: C1784, C1785 and C1786 were set along with C1799, these should be diagnosed and repaired. DTC C1799 should then be cleared and the parking brake extensively tested before proceeding. If C1799 is not set during this testing, it is likely that the hall-effect sensor is not faulty and no further action is required.

To trace a hall-effect sensor failure, carry out the following process:

1. Disconnect the EPB actuator connector from the body harness (connector CV7).

Note: Battery voltage must be no lower than 12.3 volts for this test.

2. With ignition 'ON', check the voltage between pins CV7-3 and CV7-5 on the harness side of the connector (pass value: above 9.0 volts).
3. Switch the ignition 'OFF' and disconnect the EPB module connector CR32. Check the condition of connectors CR32 and CV7 and check for:
 - Corrosion or water ingress in the connector.
 - Loss of connector pin clamp load.
 - Disconnect the EPB switch connector (TL82).
4. Carry out wiring integrity tests (continuity, short circuit to other pins in the connector, short to ground or short to battery) on the link harness between the EPB module and the EPB actuator body connector. Test the harness between the following connector pins:
 - CR32-10 to CV7-3
 - CR32-4 to CV7-4
 - CR32-12 to CV7-5

The link harness between the EPB module and the body connector should be repaired or replaced if there are any connector or wiring integrity problems.

Any problems relating to shorts to battery in step 27 circuit integrity CR32-12 to CV7-5 circuit integrity may be due to issues between the EPB apply/release switch connector TL82 and wire splice CRS33.

If there are no circuit integrity problems but the test in step 4 still fails, the EPB module may be faulty.

5. Check the EPB actuator for wiring continuity to the hall-effect sensor. Do this by measuring resistance between the following pins on the EPB actuator connector:
 - CV7-3 to CV7-5 (pass value: Above 10 megaohm).
 - CV7-4 to CV7-5 (pass value: Above 10 megaohm).
 - CV7-3 to CV7-4 (pass value: Above 10 megaohm).

Failures in the tests above may indicate a hall-effect sensor failure inside the EPB actuator. In this case, the EPB actuator should be replaced (see Global Technical Reference GTR Workshop Manual, section: 206-05). When replacing the EPB actuator, do NOT replace the secondary parking brake cables unless they are worn or damaged. The actuator primary cable should be uncoupled at the compensator. There is no need to uncouple the secondary cables. Unnecessary uncoupling can damage the cable retaining lugs.

After repairing any EPB actuator fault, the EPB must be re-calibrated. To do this, set the system into 'Calibration Mode' by doing a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01). Then, with ignition 'ON' and the vehicle brakes at room temperature, lightly press the brake pedal and apply the parking brake.

DTCS C1801, C1802, C1803:

C1801 - Motor engage current reached before full apply travel reached (under-travel).

C1802 - Motor engage current not reached or travelled too far on apply (over-travel).

C1803 - Motor disengage full travel distance not reached (EPB failed to fully release).

DTCs C1801 and C1802 may have been set because of an actuator power or ground fault or because of a hall-effect sensor fault. If any combination of DTCs: C1784, C1785, C1786 and C1799 have been set along with any combination of C1801 and C1802, the cause of power, ground or hall-effect sensor faults should first be diagnosed and repaired.

After repairing any EPB actuator fault, the EPB must be re-calibrated. To do this, set the system into 'Calibration Mode' by doing a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01). Then, with ignition 'ON' and the vehicle brakes at room temperature, lightly press the brake pedal and apply the parking brake.

C1801 and C1802 should then be cleared and the parking brake extensively tested before proceeding. If C1801 and C1802 are not set during this testing, it is likely that the actuator is not faulty and no further action is required.

To trace DTCs C1801, C1802 and C1803, carry out the following process:

1. Release the EPB actuator to the 'parking brake service position' using the 'parking brake release to service position' diagnostic application in WDS with software release JTP 759/41 or later. This application is located under the 'Set-up and Configuration' option on the 'Vehicle Configuration Main Menu'.
2. If the unit will not release, see Global Technical Reference GTR Workshop Manual, section: 206-05 - Parking Brake Cable Tension Release.
3. If it still will not release, disconnect the primary cable so that there is no load on the actuator. In order to disconnect the primary cable it may be necessary to release the load from it. This should be done by cutting one of the secondary cables. It is recommended that if possible, the left-hand cable is cut close to the caliper. With the primary cable disconnected, try releasing the actuator to the 'parking brake release to service position' using the WDS application or, if that does not work, the 'service release tool'.
4. If the EPB actuator still will not power to its release position, it may be faulty, the EPB actuator should be replaced (see Global Technical Reference GTR Workshop Manual, section: 206-05). Do NOT replace the secondary parking brake cables unless they are worn or damaged or had to be cut in order to release the parking brake. The EPB actuator primary cable should be uncoupled at the compensator. There is no need to uncouple the secondary cables. Unnecessary uncoupling can damage the cable retaining lugs.

After repairing any EPB actuator fault, the EPB must be re-calibrated. To do this, set the system into 'Calibration Mode' by doing a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01).

Then, with ignition 'ON' and the vehicle brakes at room temperature, lightly press the brake pedal and apply the parking brake.

If the EPB actuator has powered to its release position, then proceed to step 5.

Note: On Supercharged vehicles check the parking brake caliper. On Normally Aspirated vehicles check the integrated caliper.

5. Check that the rear calipers are not seized and that when the parking brake is not applied, the parking brake lever on the caliper freely returns to its stop.

Note: On Supercharged vehicles, operate the parking brake caliper lever by hand. On Normally Aspirated vehicles, press the foot brake.

5. Check the rear caliper adjustment and operation of the adjuster mechanism. Do this by de-adjusting the mechanism to allow clearance between the brake pads and disc, and then reassemble and apply the brake enough times for the adjuster to take up the clearance.
7. Check the EPB cable routing and installation.
Assure the following:
 - No kinks.
 - Cable moves freely within the outer sheathing.
 - Blue bushing at the primary cable is free of any debris.
 - No cable damage.
 - Cables are properly routed and installed at the brake caliper.
 - Cable deflectors (wedges) are fitted to the top of the rear stabilizer bar links.

If there are any faults with the calipers or cables, these must be rectified before proceeding any further. After rectifying these faults, reassemble the parking brake system ready for use and proceed to next step.

8. Clear all DTCs.
9. If the parking brake is not already in 'Calibration Mode', carry out a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01) to put it into 'Calibration Mode'. When in 'Calibration Mode' the instrument pack will display the message 'Apply Parkbrake'.
10. The parking brake must now be calibrated. To do this, start the engine, and lightly apply the foot brake. With the foot brake lightly applied, use the drivers EPB switch to apply the parking brake. The parking brake should now be calibrated and should no longer be in 'Calibration Mode'.
11. Carry out ten parking brake applies and releases (using the apply/release switch). Wait for the EPB to complete its operation after each switch input. Wait for five seconds in between each apply or release.
12. Recheck for logged DTCs.

If any of DTCs: C1801, C1802 and C1803 have returned then it is likely that the EPB actuator has an internal fault and should be replaced (see Global Technical Reference GTR Workshop Manual, section: 206-05).

When replacing the EPB actuator, do NOT replace the secondary parking brake cables unless they are worn or damaged. The EPB actuator primary cable should be uncoupled at the compensator. There is no need to uncouple the secondary cables. Unnecessary uncoupling can damage the cable retaining lugs.

After repairing any EPB actuator fault, the EPB must be re-calibrated. To do this, set the system into 'Calibration Mode' by doing a battery disconnect/reconnect (see Global Technical Reference GTR Workshop Manual, section: 414-01).

Then, with ignition 'ON' and the vehicle brakes at room temperature, lightly press the brake pedal and apply the parking brake.