

2017 BRAKES

Park Brake - CT6

SPECIFICATIONS

FASTENER SPECIFICATIONS

Single Use Non-Threaded Fasteners/Components

NOTE:

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application
Seal Ring

Reusable Threaded Fastener Tightening Specifications

NOTE:

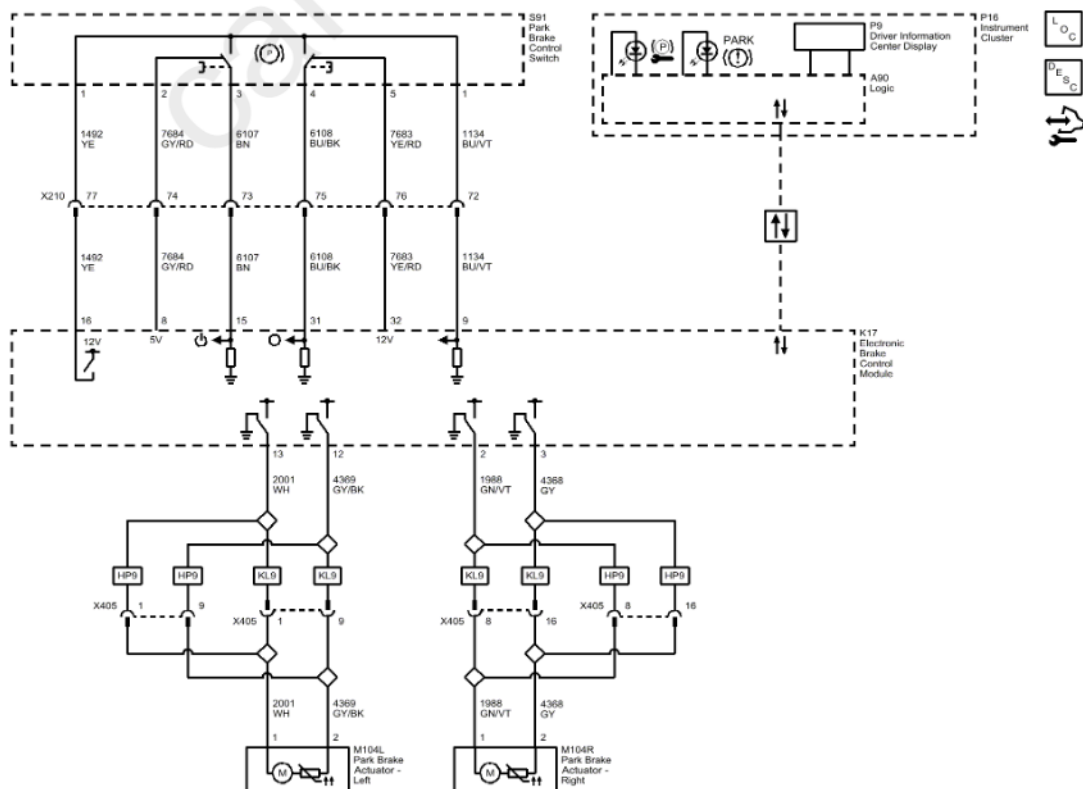
All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Parking Brake Actuator Bolt	12 N.m (106 lb in)

SCHEMATIC WIRING DIAGRAMS

PARK BRAKE SYSTEM WIRING SCHEMATICS

Electric Park Brake



DIAGNOSTIC INFORMATION AND PROCEDURES

DTC C028F: LEFT PARK BRAKE ACTUATOR CIRCUIT

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C028F

Left Park Brake Actuator Circuit

For symptom byte information, refer to [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Park Brake Actuator Apply Control	C028F 04	C028F 04	C028F 04	C028F 00 C028F 0B
Left Park Brake Actuator Release Control	C028F 04	C028F 04	C028F 04	C028F 00 C028F 0B

Circuit/System Description

The Electronic Brake Control Module will diagnose the park brake motor circuits to verify that they are functioning properly. The park brake motor circuits are used to command actuator motor operation, which will apply and release the parking brake. These circuits are used to activate the actuator, which applies or releases pressure on the rear caliper pistons, ultimately applying and releasing the park brake.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release.

Conditions for Running the DTC

- Ignition OFF, ACCESSORY or RUN mode.
- Battery voltage is between 9-16 V

Conditions for Setting the DTC

The Electronic Brake Control Module detects a malfunction in the left park brake actuator or its circuits.

Action Taken When the DTC Sets

- The parking brake is disabled, one release allowed.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.
- The condition for the DTC is no longer present.

Diagnostic Aids

After repairing any fault, the DTC will still be set as current and the park brakes will not function. It is necessary to clear the DTC with a scan tool in order to place the DTC in history and regain park brake function.

Reference Information

Schematic Reference

Park Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Parking Brake Description

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify the M104L Park Brake Actuator - Left apply when pulling the S91 Park Brake Switch.
 - **If the M104L Park Brake Actuator - Left does not apply**
Refer to the Circuit/System Testing.
 - **If the M104L Park Brake Actuator - Left does apply**
2. Verify the M104L Park Brake Actuator - Left release when pressing the S91 Park Brake Switch.
 - **If the M104L Park Brake Actuator - Left does not release**
Refer to the Circuit/System Testing.
 - **If the M104L Park Brake Actuator - Left does release**
3. All OK.

Circuit/System Testing

NOTE: It is necessary to clear the DTC after any repair is made to regain park brake output control and have the DTC to set as history.

1. Ignition OFF, disconnect the harness connector at the M104L Park Brake Actuator - Left and the harness connector at the K17 Electronic Brake Control Module. Ignition ON
2. Test for less than 1 V between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:
 - Terminal 12

- Terminal 13

- **If 1 V or greater**

Repair the short to voltage on the circuit.

- **If less than 1 V**

3. Ignition OFF.

4. Test for infinite resistance between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:

- Terminal 12
- Terminal 13
- **If less than infinite resistance**

Repair the short to ground on the circuit.

- **If infinite resistance**

5. Test for less than 2 Ω between the M104L Park Brake Actuator - Left harness connector terminal 1 and the K17 Electronic Brake Control Module harness connector terminal 13

- **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 Ω**

6. Test for less than 2 Ω between the M104L Park Brake Actuator - Left harness connector terminal 2 and the K17 Electronic Brake Control Module harness connector terminal 12

- **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 Ω**

7. Install a 25 A fused jumper wire between one of the control terminals at the M104L Park Brake Actuator - Left and 12 V. Momentarily install a jumper wire between the other control terminal and ground. Reverse the jumper wires at least two times, the M104L Park Brake Actuator - Left should perform the apply and release function.

- **If the actuator does not perform the apply and release function**

Replace the M104L Park Brake Actuator - Left.

- **If the actuator performs the apply and release function**

8. Replace the K17 Electronic Brake Control Module.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Parking Brake Actuator Replacement](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC C0293: PARK BRAKE CONTROL SWITCH CIRCUIT

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C0293

For symptom byte information, refer to [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park Brake Control Switch Supply Voltage Terminal 16	C0293 02	C0293 04, C0293 05	C0293 01, C0293 05	C0293 08
Park Brake Apply Switch Voltage Reference Terminal 32	C0293 02	C0293 04, C0293 05	C0293 01, C0293 05	C0293 08
Park Brake Release Switch Voltage Reference Terminal 8	C0293 02	C0293 04, C0293 05	C0293 01, C0293 05	C0293 08
Park Brake Control Switch Signal Terminal 9	C0293 02	C0293 04, C0293 05	C0293 01, C0293 05	C0293 08
Park Brake Apply Switch Signal Terminal 31	C0293 02	C0293 04, C0293 05	C0293 01, C0293 05	C0293 08
Park Brake Release Switch Signal Terminal 15	C0293 02	C0293 04, C0293 05	C0293 01, C0293 05	C0293 08

Circuit/System Description

The parking brake function is integrated into the Electronic Brake Control Module. The Electronic Brake Control Module contains the logic for applying and releasing the parking brake when commanded by the Park Brake Control Switch. The Electronic Brake Control Module will perform diagnostics on the Park Brake Control Switch and its wiring harness to verify it is functioning properly.

The Park Brake Control Switch diagnostic checks for failure conditions in the Park Brake Control Switch and associated wiring into the Electronic Brake Control Module.

Conditions for Running the DTC

Ignition OFF, ACCESSORY or RUN mode.

Conditions for Setting the DTC

The Electronic Brake Control Module detects a short to battery, short to ground, open circuit or an internal Parking Brake Control Switch malfunction. The Electronic Brake Control Module detects the apply or release button was activated for more than 90 s.

Action Taken When the DTC Sets

- The parking brake is disabled.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.
- The condition for the DTC is no longer present.
- The Park Brake Control Switch button is INACTIVE using the scan tool without the switch being activated.

Reference Information

Park Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Parking Brake Description

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Park Brake Control Switch parameter changes between Released and Apply while pressing and releasing the S91 Park Brake Control Switch.
 - **If the parameter does not change**
Refer to Circuit/System Test.
 - **If the parameter changes**
3. All OK.

Circuit/System Test

1. Ignition OFF, disconnect the harness connector at the K17 Electronic Brake Control Module. Ignition ON.
2. Test for less than 1 V between each circuit terminals listed below and ground;
 - Terminal 16
 - Terminal 32
 - Terminal 9
 - Terminal 15
 - Terminal 31
 - Terminal 8
 - **If 1 V or greater**
Repair the short to voltage on the circuit.
 - **If less than 1 V**
3. Ignition OFF.
4. Test for infinite resistance between the circuit terminals listed below and ground;
 - Terminal 16
 - Terminal 32
 - Terminal 9
 - Terminal 15
 - Terminal 31

- Terminal 8
- **If less than infinite resistance**

Repair the short to ground on the circuit.

- **If infinite resistance**

5. Test for less than 5 Ω between the circuit terminal 32 and the circuit terminal 31.

- **If 5 Ω or greater**

1. Ignition OFF, disconnect the harness connector at the S91 Park Brake Control Switch.
2. Test for less than 2 Ω in the circuits end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S91 Park Brake Control Switch.

- **If less than 5 Ω**

6. Test for less than 5 Ω between the circuit terminal 8 and the circuit terminal 15.

- **If 5 Ω or greater**

1. Ignition OFF, disconnect the harness connector at the S91 Park Brake Control Switch.
2. Test for less than 2 Ω in the circuits end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S91 Park Brake Control Switch.

- **If less than 5 Ω**

7. Test for less than 5 Ω between the circuit terminal 16 and the circuit terminal 9.

- **If 5 Ω or greater**

1. Ignition OFF, disconnect the harness connector at the S91 Park Brake Control Switch.
2. Test for less than 2 Ω in the circuits end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S91 Park Brake Control Switch.

- **If less than 5 Ω**

8. Test for less than 5 Ω between the circuit terminal 9 and the circuit terminal 31 while closing the switch.

- **If 5 Ω or greater**

Replace the S91 Park Brake Control Switch.

- **If less than 5 Ω**

9. Test for less than 5 Ω between the circuit terminal 9 and the circuit terminal 15 while closing the switch.

- **If 5 Ω or greater**

Replace the S91 Park Brake Control Switch.

- **If less than 5 Ω**

10. Ignition OFF, all access doors closed, all vehicle systems OFF, disconnect the harness connector at the S91 Park Brake Control Switch.

11. Test for less than 10 Ω between the ground circuit terminal 8 at the S91 Park Brake Control Switch and ground.

- **If 10 Ω or greater**

1. Ignition OFF.
2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.

- **If less than 10 Ω**

12. Replace the S91 Park Brake Control Switch.

13. Verify that DTC C0293 does not set while operating the vehicle within the Conditions for Running the DTC.

- **If the DTC sets**

Replace the K17 Electronic Brake Control Module.

- **If DTC does not set**

14. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Parking Brake Actuator Switch Replacement](#)
- [Control Module References](#) for module replacement, programming and setup.

DTC C056E: ELECTRONIC CONTROL UNIT HARDWARE CALIBRATION NOT LEARNED

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C056E 4B

Electronic Control Unit Hardware Calibration Not Learned

Circuit/System Description

The parking brake function is integrated into the Electronic Brake Control Module. The Electronic Brake Control Module contains the logic for applying and releasing the parking brake when commanded by the Park Brake Control Switch. The Electronic Brake Control Module will perform diagnostics on the Park Brake Control Switch and its wiring harness to verify it is functioning properly.

After replacement of the electronic brake control module, the programming procedure must be performed. Park brake calibration is done during the programming procedure.

Conditions for Running the DTC

Ignition ON.

Conditions for Setting the DTC

DTC C056E 4B

This DTC will set if the electronic park brake has not been calibrated during the electronic brake control module programming procedure.

Actions Taken When DTC Sets

- DTC is stored in memory.
- Park brake is degraded or disabled.

Conditions for Clearing the DTC

DTC C056E 4B

A current or history DTC will clear after the electronic park brake has been calibrated.

Reference Information

Schematic Reference

Park Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Parking Brake Description

Electrical Information Reference

- Circuit Testing
- Connector Repairs
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- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

DTC C056E 4B

1. Ignition ON.
2. Verify that DTC C056E 4B is not set.
 - **If the DTC C056E 4B is set**
 1. Perform the Setup and Configuration step of programming the K17 Electronic Brake Control Module.

NOTE: It is not necessary to perform the Programming step in the case of this DTC.

2. Verify the DTC does not set.
 - If the DTC sets, replace the K17 Electronic Brake Control Module.
 - If the DTC does not set
3. All OK.
 - **If the DTC C056E 4B is not set**
3. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Control Module References for control module replacement, programming and setup.

DTC C1138: SUPPLY VOLTAGE

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptors

DTC C1138 03

Supply Voltage Goes Below 7 V

DTC C1138 07

Supply Voltage Goes Above 16.5 V

DTC C1138 58

Signal Performance

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	C1138 03	C1138 03	-	C1138 58
Ground	-	C1138 03	C1138 07	C1138 58

Circuit/System Description

The Electronic Brake Control Module monitors its supply voltage to verify the supply voltage is within the normal operating range

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

DTC C1138 03

The EBCM detects its supply voltage of less than approximately 7 V.

DTC C1138 07

The EBCM detects a supply voltage of more than 16.5 V.

DTC C1138 58

The Park Brake Controller (PBC) loses communication with the EBCM during park brake actuation.

Action Taken When the DTC Sets

- DTC is stored in memory.
- Park brake actuation unavailable.

Conditions for Clearing the DTC

The supply voltage returns to normal operating range.

Diagnostic Aids

- A high or low voltage DTC set or voltage value in multiple modules/sensors indicates a concern in the charging system.
- A possible cause of this DTC could be overcharging with a battery charger or jump starting.

Reference Information

Schematic Reference

Park Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Electronic Parking Brake Description

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Verify that no other DTCs are set.

- **If any other DTCs are set**

Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) .

- **If no other DTCs are set**

2. Vehicle OFF, measure and record the battery voltage at the battery terminals.

3. Verify the battery voltage stabilizes between 12.4 V and 12.8 V within a few minutes of turning the vehicle OFF.

- **If battery voltage is less than 12.4 V or more than 12.8 V**

Refer to [Battery Inspection/Test](#) .

- **If battery voltage is between 12.4 and 12.8 V**

4. Engine running, headlights ON, measure and record the battery voltage at the battery terminals.

5. Verify the voltage is at least 1 V greater than the voltage measured in step 1, but less than 15 V.

- **If the voltage is not at least 1 V greater than the voltage measured in step 2 or is greater than 15 V.**

Refer to [Charging System Test](#) .

- **If the voltage is at least 1 V greater than the voltage measured in step 2, but less than 15 V.**

6. Verify the K17 Electronic Brake Control Module scan tool ignition voltage parameter is within 1 V of the battery voltage.

- **If not within 1 V of the battery voltage**

Refer to Circuit/System Testing.

- **If within 1 V of the battery voltage**

7. All OK.

Circuit/System Testing

NOTE:

- You must perform the Circuit/System Verification before Circuit/System Testing.
- Some control module ground circuits may require up to 20 min after the ignition is turned off before achieving a resistance reading of less than 5 Ω . In most cases the readings will drop below 20 Ω within 1 min indicating the control module is going to sleep.

DTC C1138 03 or DTC C1138 07

1. Ignition OFF and all vehicle systems OFF, disconnect the X1 harness connector at the K17 Electronic Brake Control Module. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between ground circuit terminal 46 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Verify a test lamp illuminates between B+ circuit terminal 1 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the B+ circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K17 Electronic Brake Control Module.
 - **If the test lamp illuminates**
4. Replace the K17 Electronic Brake Control Module.

DTC C1138 58

1. Verify that no other DTCs are set.
 - **If any other DTCs are set**

Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) .
 - **If no other DTCs are set**
2. Using the S91 Park Brake Control Switch, apply and release the park brake.
3. Verify that the DTC does not reset.
 - **If the DTC resets**

Replace the K17 Electronic Brake Control Module.
 - **If the DTC does not reset**
4. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

[Control Module References](#) for control module replacement, programming and setup.

DTC C1148: LEFT PARK BRAKE ACTUATOR CIRCUIT

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC C1148

Left Park Brake Actuator Circuit

For symptom byte information, refer to [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Park Brake Actuator Apply Control	C1148 0C	C1148 04	C1148 0B	C1148 00 C1148 0F
Left Park Brake Actuator Release Control	C1148 0C	C1148 04	C1148 0B	C1148 00 C1148 0F

Circuit/System Description

The Electronic Brake Control Module will diagnose the park brake motor circuits to verify that they are functioning properly. The park brake motor circuits are used to command actuator motor operation, which will apply and release the parking brake. These circuits are used to activate the actuator, which applies or releases pressure on the rear caliper pistons, ultimately applying and releasing the park brake.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release.

Conditions for Running the DTC

- Vehicle ON or in SERVICE MODE.
- Battery voltage is between 9-16 V

Conditions for Setting the DTC

The Electronic Brake Control Module detects a malfunction in the left park brake actuator or its circuits.

Action Taken When the DTC Sets

- The parking brake is disabled, one release allowed.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.
- The condition for the DTC is no longer present.

Diagnostic Aids

After repairing any fault, the DTC will still be set as current and the park brakes will not function. It is necessary to clear the DTC with a scan tool in order to place the DTC in history and regain park brake function.

Reference Information

Schematic Reference

Park Brake System Schematics

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Parking Brake Description

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify the M104L Park Brake Actuator - Left apply when pulling the S91 Park Brake Switch.
 - **If the M104L Park Brake Actuator - Left does not apply**
Refer to the Circuit/System Testing.
 - **If the M104L Park Brake Actuator - Left does apply**
2. Verify the M104L Park Brake Actuator - Left release when pressing the S91 Park Brake Switch.
 - **If the M104L Park Brake Actuator - Left does not release**
Refer to the Circuit/System Testing.
 - **If the M104L Park Brake Actuator - Left does release**
3. All OK.

Circuit/System Testing

NOTE: It is necessary to clear the DTC after any repair is made to regain park brake output control and have the DTC to set as history.

1. Ignition OFF, disconnect the harness connector at the M104L Park Brake Actuator - Left and the harness connector at the K17 Electronic Brake Control Module. Ignition ON
2. Test for less than 1 V between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:
 - Terminal 12
 - Terminal 13
 - **If 1 V or greater**
Repair the short to voltage on the circuit.
 - **If less than 1 V**
3. Ignition OFF.
4. Test for infinite resistance between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:
 - Terminal 12
 - Terminal 13
 - **If less than infinite resistance**
Repair the short to ground on the circuit.

- **If infinite resistance**

5. Test for less than 2 Ω between the M104L Park Brake Actuator - Left harness connector terminal 1 and the K17 Electronic Brake Control Module harness connector terminal 13

- **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 Ω**

6. Test for less than 2 Ω between the M104L Park Brake Actuator - Left harness connector terminal 2 and the K17 Electronic Brake Control Module harness connector terminal 12

- **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 Ω**

7. Install a 25 A fused jumper wire between one of the control terminals at the M104L Park Brake Actuator - Left and 12 V. Momentarily install a jumper wire between the other control terminal and ground. Reverse the jumper wires at least two times, the M104L Park Brake Actuator - Left should perform the apply and release function.

- **If the actuator does not perform the apply and release function**

Replace the M104L Park Brake Actuator - Left.

- **If the actuator performs the apply and release function**

8. Replace the K17 Electronic Brake Control Module.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Parking Brake Actuator Replacement](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC C114C: PARK BRAKE SWITCH CIRCUIT

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C114C

Park Brake Switch Circuit

For symptom byte information, refer to: [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park Brake Switch Supply Voltage Terminal 16	C114C 02	C114C 04	C114C 01	C114C 00 C114C 08
Park Brake Apply Switch Voltage Reference Terminal 32	C114C 02	C114C 04	C114C 01	C114C 00 C114C 08

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park Brake Release Switch Voltage Reference Terminal 8	C114C 02	C114C 04	C114C 01	C114C 00 C114C 08
Park Brake Switch Signal Terminal 9	C114C 02	C114C 04	C114C 01	C114C 00 C114C 08
Park Brake Apply Switch Signal Terminal 31	C114C 02	C114C 04	C114C 01	C114C 00 C114C 08
Park Brake Release Switch Signal Terminal 15	C114C 02	C114C 04	C114C 01	C114C 00 C114C 08

Circuit/System Description

The parking brake function is integrated into the Electronic Brake Control Module. The Electronic Brake Control Module contains the logic for applying and releasing the parking brake when commanded by the Park Brake Switch. The Electronic Brake Control Module will perform diagnostics on the Park Brake Switch and its wiring harness to verify it is functioning properly.

The Park Brake Switch diagnostic checks for failure conditions in the Park Brake Switch and associated wiring into the Electronic Brake Control Module.

Conditions for Running the DTC

Vehicle ON or in SERVICE MODE.

Conditions for Setting the DTC

The Electronic Brake Control Module detects a short to battery, short to ground, open circuit or an internal Parking Brake Control Switch malfunction. The Electronic Brake Control Module detects the apply or release button was activated for more than 90 s.

Action Taken When the DTC Sets

- The parking brake is disabled.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive Vehicle on/off cycles with at least one test pass in each Vehicle cycle and no test fail result.
- The condition for the DTC is no longer present.
- The Park Brake Switch button is INACTIVE using the scan tool without the switch being activated.

Reference Information

Schematic Reference

Park Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Electronic Parking Brake Description

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information.

[Circuit/System Verification](#)

1. Vehicle ON.
2. Verify the scan tool Park Brake Switch parameter changes between Released and Apply while pressing and releasing the S91 Park Brake Switch.
 - **If the parameter does not change**
Refer to Circuit/System Test.
 - **If the parameter changes**
3. All OK.

[Circuit/System Test](#)

1. Vehicle OFF, disconnect the harness connector at the K17 Electronic Brake Control Module. Vehicle ON.
2. Test for less than 1 V between each circuit terminals listed below and ground;
 - Terminal 16
 - Terminal 32
 - Terminal 9
 - Terminal 15
 - Terminal 31
 - Terminal 8
 - **If 1 V or greater**
Repair the short to voltage on the circuit.
 - **If less than 1 V**
3. Vehicle OFF.
4. Test for infinite resistance between the circuit terminals listed below and ground;
 - Terminal 16
 - Terminal 32
 - Terminal 9
 - Terminal 15
 - Terminal 31
 - Terminal 8
 - **If less than infinite resistance**
Repair the short to ground on the circuit.
 - **If infinite resistance**
5. Test for less than 5 Ω between the circuit terminal 32 and the circuit terminal 31.
 - **If 5 Ω or greater**
 1. Vehicle OFF, disconnect the harness connector at the S91 Park Brake Switch.
 2. Test for less than 2 Ω in the circuits end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.

- If less than 2 Ω , replace the S91 Park Brake Switch.
 - **If less than 5 Ω**
6. Test for less than 5 Ω between the circuit terminal 8 and the circuit terminal 15.
 - **If 5 Ω or greater**
 1. Vehicle OFF, disconnect the harness connector at the S91 Park Brake Switch.
 2. Test for less than 2 Ω in the circuits end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S91 Park Brake Switch.
 - **If less than 5 Ω**
 7. Test for less than 5 Ω between the circuit terminal 16 and the circuit terminal 9.
 - **If 5 Ω or greater**
 1. Vehicle OFF, disconnect the harness connector at the S91 Park Brake Switch.
 2. Test for less than 2 Ω in the circuits end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S91 Park Brake Switch.
 - **If less than 5 Ω**
 8. Test for less than 5 Ω between the circuit terminal 9 and the circuit terminal 31 while closing the switch.
 - **If 5 Ω or greater**

Replace the S91 Park Brake Switch.
 - **If less than 5 Ω**
 9. Test for less than 5 Ω between the circuit terminal 9 and the circuit terminal 15 while closing the switch.
 - **If 5 Ω or greater**

Replace the S91 Park Brake Switch.
 - **If less than 5 Ω**
 10. Vehicle OFF, all access doors closed, all vehicle systems OFF, disconnect the harness connector at the S91 Park Brake Switch.
 11. Test for less than 10 Ω between the ground circuit terminal 8 at the S91 Park Brake Switch and ground.
 - **If 10 Ω or greater**
 1. Vehicle OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
 12. Replace the S91 Park Brake Switch.
 13. Verify that DTC C114C does not set while operating the vehicle within the Conditions for Running the DTC.
 - **If the DTC sets**

Replace the K17 Electronic Brake Control Module.
 - **If DTC does not set**
 14. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Parking Brake Actuator Switch Replacement](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC C1586: RIGHT PARK BRAKE ACTUATOR CIRCUIT (WITHOUT HP9)

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C1586

Right Park Brake Actuator Circuit

For symptom byte information, refer to [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Right Park Brake Actuator Apply Control	C1586 04	C1586 04	C1586 04	C1586 00 C1586 0B
Right Park Brake Actuator Release Control	C1586 04	C1586 04	C1586 04	C1586 00 C1586 0B

Circuit/System Description

The Electronic Brake Control Module will diagnose the park brake motor circuits to verify that they are functioning properly. The park brake motor circuits are used to command actuator motor operation, which will apply and release the parking brake. These circuits are used to activate the actuator, which applies or releases pressure on the rear caliper pistons, ultimately applying and releasing the park brake.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release.

Conditions for Running the DTC

- Ignition OFF, ACCESSORY or RUN mode.
- Battery voltage is between 9-16 V

Conditions for Setting the DTC

The Electronic Brake Control Module detects a malfunction in the right park brake actuator or its circuits.

Action Taken When the DTC Sets

- The parking brake is disabled, one release allowed.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.

- The condition for the DTC is no longer present.

Diagnostic Aids

After repairing any fault, the DTC will still be set as current and the park brakes will not function. It is necessary to clear the DTC with a scan tool in order to place the DTC in history and regain park brake function.

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify the M104R Park Brake Actuator - Right apply when pulling the S91 Park Brake Switch.
 - **If the M104R Park Brake Actuator - Right does not apply**
Refer to the Circuit/System Testing.
 - **If the M104R Park Brake Actuator - Right does apply**
2. Verify the M104R Park Brake Actuator - Right release when pressing the S91 Park Brake Switch.
 - **If the M104R Park Brake Actuator - Right does not release**
Refer to the Circuit/System Testing.
 - **If the M104R Park Brake Actuator - Right does release**
3. All OK.

Circuit/System Testing

NOTE: It is necessary to clear the DTC after any repair is made to regain park brake output control and have the DTC to set as history.

1. Ignition OFF, disconnect the harness connector at the M104R Park Brake Actuator - Right and the harness connector at the K17 Electronic Brake Control Module. Ignition ON
2. Test for less than 1 V between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:
 - Terminal 2
 - Terminal 3
 - **If 1 V or greater**

Repair the short to voltage on the circuit.

- **If less than 1 V**

3. Ignition OFF.

4. Test for infinite resistance between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:

- Terminal 2
- Terminal 3
- **If less than infinite resistance**

Repair the short to ground on the circuit.

- **If infinite resistance**

5. Test for less than 2 Ω between the M104R Park Brake Actuator - Right harness connector terminal 1 and the K17 Electronic Brake Control Module harness connector terminal 2

- **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 Ω**

6. Test for less than 2 Ω between the M104R Park Brake Actuator - Right harness connector terminal 2 and the K17 Electronic Brake Control Module harness connector terminal 3

- **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 Ω**

7. Install a 25 A fused jumper wire between one of the control terminals at the M104R Park Brake Actuator - Right and 12 V. Momentarily install a jumper wire between the other control terminal and ground. Reverse the jumper wires at least two times, the M104R Park Brake Actuator - Right should perform the apply and release function.

- **If the actuator does not perform the apply and release function**

Replace the M104R Park Brake Actuator - Right.

- **If the actuator performs the apply and release function**

8. Replace the K17 Electronic Brake Control Module.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Parking Brake Actuator Replacement](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC C1586: RIGHT PARK BRAKE ACTUATOR CIRCUIT (HP9)

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C1586

Right Park Brake Actuator Circuit

For symptom byte information, refer to [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Right Park Brake Actuator Apply Control	C1586 0C	C1586 04	C1586 0B	C1586 00 C1586 0F
Right Park Brake Actuator Release Control	C1586 0C	C1586 04	C1586 0B	C1586 00 C1586 0F

Circuit/System Description

The Electronic Brake Control Module will diagnose the park brake motor circuits to verify that they are functioning properly. The park brake motor circuits are used to command actuator motor operation, which will apply and release the parking brake. These circuits are used to activate the actuator, which applies or releases pressure on the rear caliper pistons, ultimately applying and releasing the park brake.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release.

Conditions for Running the DTC

- Vehicle ON or in SERVICE MODE.
- Battery voltage is between 9-16 V

Conditions for Setting the DTC

The Electronic Brake Control Module detects a malfunction in the right park brake actuator or its circuits.

Action Taken When the DTC Sets

- The parking brake is disabled, one release allowed.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.
- The condition for the DTC is no longer present.

Diagnostic Aids

After repairing any fault, the DTC will still be set as current and the park brakes will not function. It is necessary to clear the DTC with a scan tool in order to place the DTC in history and regain park brake function.

Reference Information

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- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information.

Circuit/System Verification

1. Verify the M104R Park Brake Actuator - Right apply when pulling the S91 Park Brake Switch.
 - **If the M104R Park Brake Actuator - Right does not apply**
Refer to the Circuit/System Testing.
 - **If the M104R Park Brake Actuator - Right does apply**
2. Verify the M104R Park Brake Actuator - Right release when pressing the S91 Park Brake Switch.
 - **If the M104R Park Brake Actuator - Right does not release**
Refer to the Circuit/System Testing.
 - **If the M104R Park Brake Actuator - Right does release**
3. All OK.

Circuit/System Testing

NOTE: It is necessary to clear the DTC after any repair is made to regain park brake output control and have the DTC to set as history.

1. Ignition OFF, disconnect the harness connector at the M104R Park Brake Actuator - Right and the harness connector at the K17 Electronic Brake Control Module. Ignition ON
2. Test for less than 1 V between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:
 - Terminal 2
 - Terminal 3
 - **If 1 V or greater**
Repair the short to voltage on the circuit.
 - **If less than 1 V**
3. Ignition OFF.
4. Test for infinite resistance between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:
 - Terminal 2
 - Terminal 3
 - **If less than infinite resistance**
Repair the short to ground on the circuit.
 - **If infinite resistance**
5. Test for less than 2 Ω between the M104R Park Brake Actuator - Right harness connector terminal 1 and the K17 Electronic Brake Control Module harness connector terminal 2
 - **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 Ω**

6. Test for less than 2 Ω between the M104R Park Brake Actuator - Right harness connector terminal 2 and the K17 Electronic Brake Control Module harness connector terminal 3

- **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

- **If less than 2 Ω**

7. Install a 25 A fused jumper wire between one of the control terminals at the M104R Park Brake Actuator - Right and 12 V. Momentarily install a jumper wire between the other control terminal and ground. Reverse the jumper wires at least two times, the M104R Park Brake Actuator - Right should perform the apply and release function.

- **If the actuator does not perform the apply and release function**

Replace the M104R Park Brake Actuator - Right.

- **If the actuator performs the apply and release function**

8. Replace the K17 Electronic Brake Control Module.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Parking Brake Actuator Replacement](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC C1587: LEFT PARK BRAKE ACTUATOR (WITHOUT HP9)

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C1587

Left Park Brake Actuator

For symptom byte information, refer to [Symptom Byte List](#)

Circuit/System Description

The Electronic Brake Control Module will diagnose the park brake motor circuits to verify that they are functioning properly. The park brake motor circuits are used to command actuator motor operation, which will apply and release the parking brake. These circuits are used to activate the actuator, which applies or releases pressure on the rear caliper pistons, ultimately applying and releasing the park brake.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release.

Conditions for Running the DTC

- Ignition OFF, ACCESSORY or RUN mode.
- Battery voltage is between 9-16 V

Conditions for Setting the DTC

The Electronic Brake Control Module detects a malfunction in the left park brake actuator.

Action Taken When the DTC Sets

- The parking brake is disabled, one release allowed.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.
- The condition for the DTC is no longer present.

Reference Information

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Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC C1587 is not set.
 - **If the DTC is set**
 1. Perform the Park Brake Calibration learn procedure. Refer to **Park Brake Calibration**.
 2. Ignition ON.
 3. Apply and release the park brake.
 4. Verify the DTC is not set.
 - If the DTC is set, replace the M104L Park Brake Actuator - Left.
 - If the DTC is not set
 - 5. All OK.
 - **If the DTC is not set**
3. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Parking Brake Actuator Replacement**

- [Control Module References](#) for control module replacement, programming and setup.

DTC C1587: LEFT PARK BRAKE ACTUATOR (HP9)

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C1587

Left Park Brake Actuator

For symptom byte information, refer to [Symptom Byte List](#)

Circuit/System Description

The Electronic Brake Control Module will diagnose the park brake motor circuits to verify that they are functioning properly. The park brake motor circuits are used to command actuator motor operation, which will apply and release the parking brake. These circuits are used to activate the actuator, which applies or releases pressure on the rear caliper pistons, ultimately applying and releasing the park brake.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release.

Conditions for Running the DTC

- Vehicle ON or in SERVICE MODE.
- Battery voltage is between 9-16 V

Conditions for Setting the DTC

The Electronic Brake Control Module detects a malfunction in the left park brake actuator.

Action Taken When the DTC Sets

- The parking brake is disabled, one release allowed.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.
- The condition for the DTC is no longer present.

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Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Vehicle ON.
2. Verify that DTC C1587 is not set.
 - **If the DTC is set**
 1. Perform the Park Brake Calibration learn procedure. Refer to [Park Brake Calibration](#).
 2. Ignition ON.
 3. Apply and release the park brake.
 4. Verify the DTC is not set.
 - If the DTC is set, replace the M104L Park Brake Actuator - Left.
 - If the DTC is not set
 5. All OK.
 - **If the DTC is not set**
3. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Parking Brake Actuator Replacement](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC C1588: RIGHT PARK BRAKE ACTUATOR (WITHOUT HP9)

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C1588

Right Park Brake Actuator

For symptom byte information, refer to [Symptom Byte List](#)

Circuit/System Description

The Electronic Brake Control Module will diagnose the park brake motor circuits to verify that they are functioning properly. The park brake motor circuits are used to command actuator motor operation, which will apply and release the parking brake. These circuits are used to activate the actuator, which applies or releases pressure on the rear caliper pistons, ultimately applying and releasing the park brake.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause

the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release.

Conditions for Running the DTC

- Ignition OFF, ACCESSORY or RUN mode.
- Battery voltage is between 9-16 V

Conditions for Setting the DTC

The Electronic Brake Control Module detects a malfunction in the right park brake actuator.

Action Taken When the DTC Sets

- The parking brake is disabled, one release allowed.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.
- The condition for the DTC is no longer present.

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- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information.

Circuit/System Verification

1. Ignition ON.
2. Verify that DTC C1588 is not set.
 - **If the DTC is set**
 1. Perform the Park Brake Calibration learn procedure. Refer to [Park Brake Calibration](#).
 2. Ignition ON.
 3. Apply and release the park brake.
 4. Verify the DTC is not set.
 - If the DTC is set, replace the M104R Park Brake Actuator - Right.
 - If the DTC is not set

5. All OK.

- **If the DTC is not set**

3. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Parking Brake Actuator Replacement](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC C1588: RIGHT PARK BRAKE ACTUATOR (HP9)

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provide an overview of each diagnostic category.

DTC Descriptors

DTC C1588

Right Park Brake Actuator

For symptom byte information, refer to [Symptom Byte List](#)

Circuit/System Description

The Electronic Brake Control Module will diagnose the park brake motor circuits to verify that they are functioning properly. The park brake motor circuits are used to command actuator motor operation, which will apply and release the parking brake. These circuits are used to activate the actuator, which applies or releases pressure on the rear caliper pistons, ultimately applying and releasing the park brake.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release.

Conditions for Running the DTC

- Vehicle ON or in SERVICE MODE.
- Battery voltage is between 9-16 V

Conditions for Setting the DTC

The Electronic Brake Control Module detects a malfunction in the right park brake actuator.

Action Taken When the DTC Sets

- The parking brake is disabled, one release allowed.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The Electronic Brake Control Module will clear the DTC after 40 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.
- The condition for the DTC is no longer present.

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Vehicle ON.
2. Verify that DTC C1588 is not set.
 - **If the DTC is set**
 1. Perform the Park Brake Calibration learn procedure. Refer to **Park Brake Calibration**.
 2. Ignition ON.
 3. Apply and release the park brake.
 4. Verify the DTC is not set.
 - If the DTC is set, replace the M104R Park Brake Actuator - Right.
 - If the DTC is not set
 - 5. All OK.
 - **If the DTC is not set**
3. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Parking Brake Actuator Replacement**
- **Control Module References** for control module replacement, programming and setup.

SYMPTOMS - PARK BRAKE

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the park brake system.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

Park Brake Will Not Hold or Release

PARK BRAKE WILL NOT HOLD OR RELEASE

Step	Action	Yes	No
1	Were you sent here from the Park Brake Symptom table?	Go to Step 2	Go to Diagnostic Starting Point - Vehicle
2	Inspect the park brake system for proper operation. Refer to Park Brake System Diagnosis . Did you find and correct a condition?	Go to Step 5	Go to Step 3
3	Inspect the disc brake system for proper operation. Refer to Disc Brake System Diagnosis . Did you find and correct a condition?	Go to Step 5	Go to Step 4
4	Inspect the hydraulic brake system for proper operation. Refer to Hydraulic Brake System Diagnosis . Did you find and correct a condition?	Go to Step 5	Go to Diagnostic Starting Point - Vehicle
5	Road test the vehicle in order to confirm proper operation. Refer to Brake System Vehicle Road Test . Is the condition still present?	Go to Step 2	System OK

PARK BRAKE SYSTEM DIAGNOSIS

Step	Action	Yes	No
DEFINITION: This diagnostic table is designed to diagnose ONLY the mechanical components of the PARK brake system in order to determine if the PARK brake system is operating properly. You will be directed by the appropriate Symptom table to go to other brake system diagnostic tables as appropriate.			
1	Were you sent here from a Hydraulic Brake Symptom table?	Go to Step 4	Go to Step 2
2	Were you sent here from a Park Brake Symptom table?	Go to Step 4	Go to Step 3
3	1. Raise and support the vehicle. Lifting and Jacking the Vehicle 2. With the park brake RELEASED, attempt to rotate the rear wheels to check the rear brakes for a significant amount of drag. Do the rear brakes have a significant amount of drag?	Go to Step 5	Go to Step 4
4	1. Apply the park brake. 2. Attempt to rotate the rear wheels to check the rear brakes for a significant amount of drag. Do the rear brakes have a significant amount of drag?	Go to Step 8	Go to Step 5

Step	Action	Yes	No
5	1. Have an assistant apply the brakes. 2. Attempt to rotate the rear wheels to check the rear brakes for a significant amount of drag. 3. Repeat steps 1-2 for the opposite rear wheel. 4. Rotate the rear wheels to check the brake for a significant reduction of drag. Did the brake calipers apply and release properly?	Go to Step 7	Go to Step 6
6	Replace the appropriate rear brake caliper. Refer to <u>Rear Brake Caliper Replacement</u> Did you complete the replacement?	Go to Step 8	-
7	Inspect the parking brake actuators for proper operation and replace if necessary. Refer to <u>Rear Brake Caliper Replacement</u> Did you complete the replacement?	Go to Step 8	-
8	Connect any components that were disconnected during diagnosis. Did you complete the operation?	Park Brake System OK	-

REPAIR INSTRUCTIONS

PARK BRAKE CALIBRATION

1. Block the drive wheels.
2. Install a scan tool to the vehicle.
3. Turn the ignition switch to the ON/RUN position with the engine OFF.
4. Select Configuration/Reset Functions from the electronic brake control module menu.
5. Perform the parking brake calibration procedure.

PARKING BRAKE ACTUATOR SWITCH REPLACEMENT

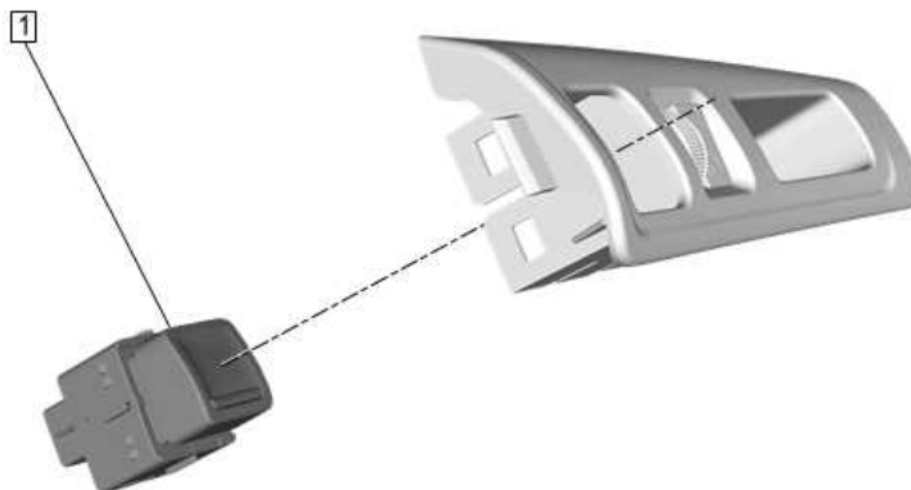


Fig. 2: Parking Brake Actuator Switch
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures <u>Instrument Panel Accessory Bezel Replacement</u>	
1	Parking Brake Actuator Switch

PARKING BRAKE ACTUATOR REPLACEMENT

Removal Procedure

WARNING: **Brake Dust Warning**

1. Set the parking brake in Service Mode.
 1. Install a scan tool.
 2. Turn the ignition ON with the engine OFF.
 3. Select Electronic Brake Control Module.
 4. Select Control Functions.
 5. Select Rear Brake Caliper Piston Retract.

NOTE: Do NOT apply any brake pressure during this step.

2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
4. Disconnect the parking brake actuator electrical connector.
5. Parking Brake Actuator Bolt (1)» Remove [2x]

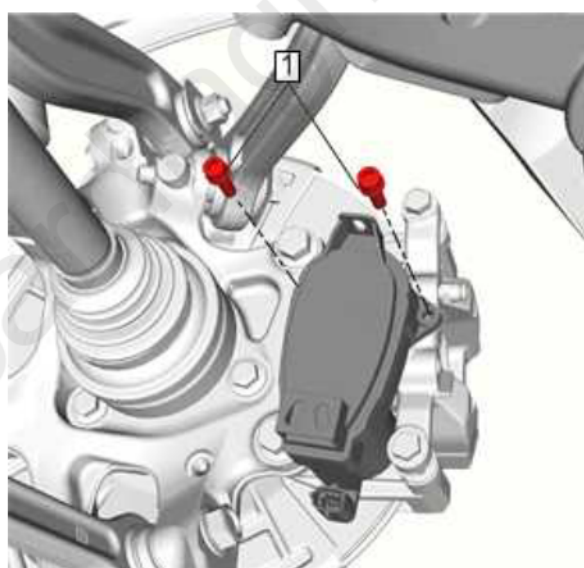


Fig. 3: Parking Brake Actuator Bolt
Courtesy of GENERAL MOTORS COMPANY

NOTE: Trailing arm and brake hose not shown for clarity.

6. Parking Brake Actuator (1)» Remove

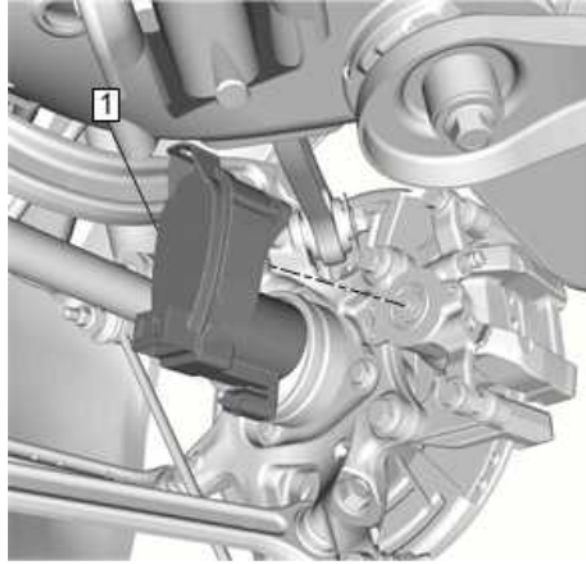


Fig. 4: Parking Brake Actuator
Courtesy of GENERAL MOTORS COMPANY

7. Seal Ring (1) @ Rear Brake Caliper» Remove and DISCARD

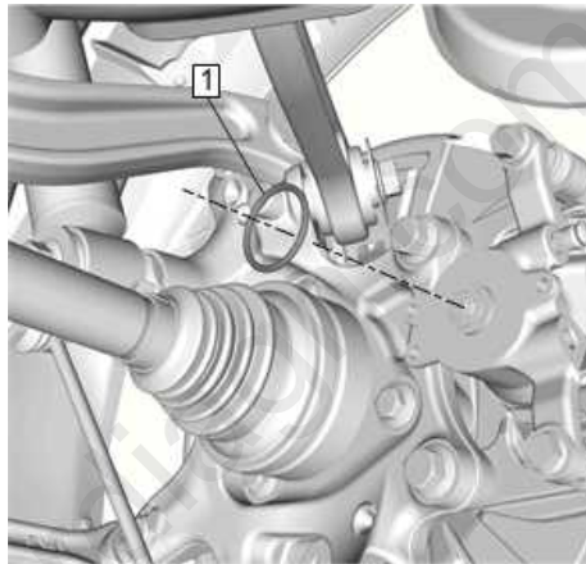


Fig. 5: Seal Ring
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Seal Ring (1) @ Rear Brake Caliper» Install NEW

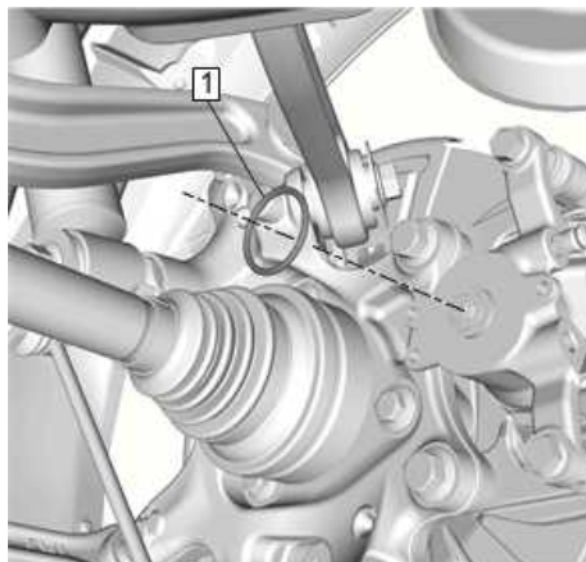


Fig. 6: Seal Ring

Courtesy of GENERAL MOTORS COMPANY

NOTE: The parking brake actuator mounting surfaces of the brake caliper must be clean and free of corrosion and debris.

2. Parking Brake Actuator (1) » Install

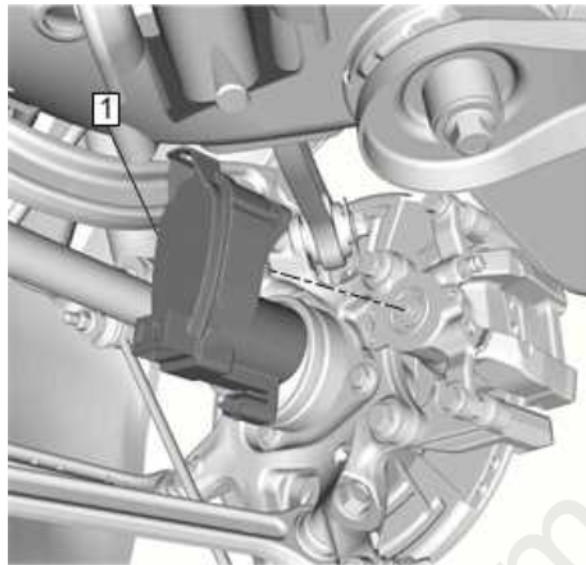


Fig. 7: Parking Brake Actuator

Courtesy of GENERAL MOTORS COMPANY

3. Parking Brake Actuator Bolt (1) » Install and tighten 12 N.m (106 lb in) [2x]

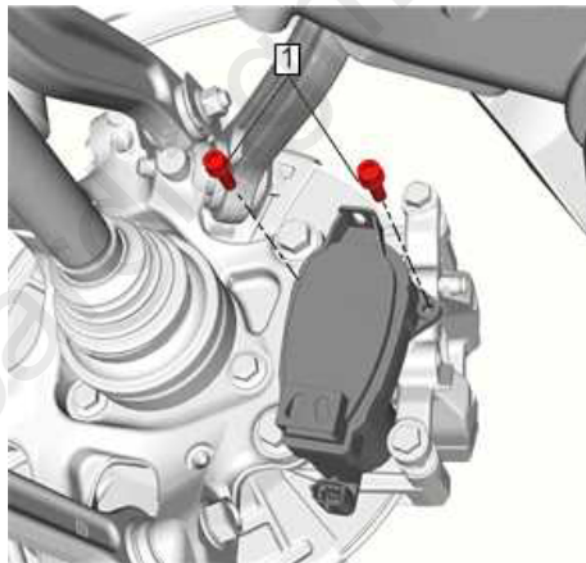


Fig. 8: Parking Brake Actuator Bolt

Courtesy of GENERAL MOTORS COMPANY

CAUTION: Fastener Caution

4. Connect the parking brake actuator electrical connector.
5. Tire and Wheel Removal and Installation » Install
6. Calibrate the park brake. Refer to Park Brake Calibration

DESCRIPTION AND OPERATION

ELECTRONIC PARKING BRAKE DESCRIPTION

Vehicles with the electric parking brake have a switch in the center console or on the dashboard, which takes the place of the manual parking brake system, the foot pedal and release handle. In case of

insufficient electrical power, the electric parking brake cannot be applied or released.

Electronic Brake Control Module

The parking brake function is integrated into the Electronic Brake Control Module. The Electronic Brake Control Module contains the logic for applying and releasing the parking brake when commanded by the Park Brake Switch.

When the Park Brake Switch is pulled, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the apply control circuits and ground to the release control circuits which will cause the left and right park brake actuators to activate causing the park brakes to engage. When the Park Brake Switch is pressed, a signal is sent to the Electronic Brake Control Module which will supply 12 V to the released control circuits and ground to the apply control circuits which will cause the left and right park brake actuators to activate causing the park brakes to release.

Electric Parking Brake Apply

The electric parking brake can be applied any time the vehicle is stopped or in motion. The electric parking brake is applied by momentarily lifting up on the park brake control switch. The red park brake light will momentarily flash while the parking brake is being applied. Once fully applied, the red park brake light will turn on. If the electric parking brake is applied while the vehicle is in motion, a chime will sound and the message "Release Park Brake Switch" will be displayed.

If the red park brake light is flashing, the electric parking brake is only partially applied or released or there is a problem with the electric parking brake. The message "Service Park Brake" will be displayed.

The vehicle may automatically apply the electric parking brake in some situations when the vehicle is not moving. This is normal and is done to periodically check the correct operation of the electric parking brake system.

Electric Parking Brake Release

To release the electric parking brake, turn the ignition switch to the ON or RUN position, apply and hold the brake pedal and push down momentarily on the park brake control switch. When the electric parking brake is released the red park brake light turns off.

The electric parking brake can be used to prevent roll back for vehicles with a manual transmission taking off on a hill. In a situation where no roll back is desired, an applied electric parking brake will allow both feet to be used for the clutch and accelerator pedals in preparation for starting the vehicle moving in the intended direction. In this situation, perform the normal clutch and accelerator actions required to begin moving the vehicle. There is no need to push the switch to release the electric parking brake. To disable this feature lift and hold the park brake control switch while the vehicle is in motion, this will keep the electric parking brake applied.
