

2017 BRAKES

Park Brake - Impala

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

NOTE:

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

Application	Specification
	Metric (English)
Electronic Parking Brake Control Module Bolt	10 N.m (89 lb in)
Electronic Parking Brake Control Module Nut	10 N.m (89 lb in)
Parking Brake Cable Nut	6 N.m (53 lb in)

SCHEMATIC WIRING DIAGRAMS

PARK BRAKE SYSTEM WIRING SCHEMATICS

Park Brake System

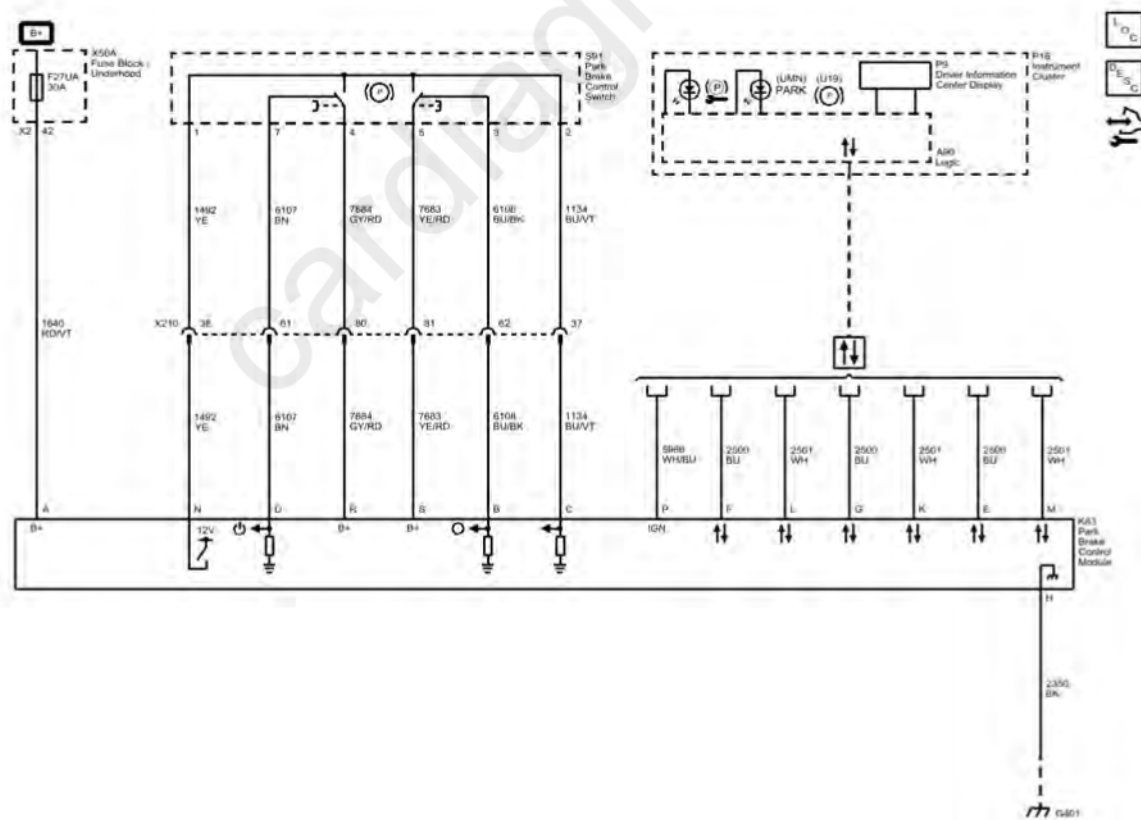


Fig. 1: Park Brake System

Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC C028A, C028B, OR C028F: PARK BRAKE MOTOR CIRCUITS/PARK BRAKE SOLENOID 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C028A

Park Brake Motor Circuit

DTC C028B

Park Brake Motor Position Circuit

DTC C028F

Park Brake Solenoid 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
Park Brake Motor Circuit	C028A 02	C028A 04 C028A 05	C028A 01 C028A 05	C028A 08 C028A 28
Park Brake Motor Position Circuit	-	-	-	-
Park Brake Solenoid Actuator Circuit	C028F 02	-	C028F 01	C028F 08

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the parking brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the control module performs the requested operation.

The parking brake control module will diagnose the internal park brake motor circuit to verify it is functioning properly. The park brake motor circuit is used to command motor operation, apply and release tension on the parking brake cable, which will apply and release the parking brake. The park brake will self diagnose the internal park brake motor circuit. This circuit is used to drive the motor, which pulls on the park brake cable, ultimately applying and releasing the park brake.

The parking brake control module contains an internal park brake motor position sensor which monitors the park brake motor position. The parking brake control module contains an internal park brake solenoid actuator, and performs diagnostics on the solenoid actuator circuitry to verify it is functioning properly.

Conditions for Running the DTC

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

Conditions for Setting the DTC

DTC C028A

The parking brake control module detects an internal motor malfunction.

DTC C028B

The parking brake control module detects an internal motor position sensor signal malfunction.

DTC C028F

The parking brake control module detects an internal park brake solenoid malfunction.

Action Taken When the DTC Sets

DTC C028A

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

DTC C028B

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

OR

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

DTC C028F

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

Conditions for Clearing the DTC

- The parking 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

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. Ignition ON.
2. Verify that DTC C028A, C028B, or C028F is not set.

- **If any of the DTCs are set**

1. Program the K83 Parking Brake Control Module.
2. Ignition ON.
3. Apply and release the park brake.
4. Verify the DTC is not set.

- If the DTC is set, replace the K83 Parking Brake Control Module.
- If the DTC is not set

5. All OK.

- **If none of the DTC are set**

3. All OK.

Repair Instructions

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

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

DTC C027D OR C028D: PARK BRAKE SLIP DETECTED/PARK BRAKE PAD

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C027D 64

Park Brake Slip Detected

DTC C028D 00

Replace Park Brake Pad

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the park brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the parking brake control module performs the requested operation. The parking brake control module checks for rear wheel speeds after applying the parking brake to check for mechanical faults.

Conditions for Running the DTC

Ignition OFF, ACCESSORY, or RUN mode.

Conditions for Setting the DTC

C027D 64

The parking brake control module has detected wheel speed on the rear wheels with the parking brake applied.

C028D 00

The parking brake control module has an internal counter which keeps track of dynamic applies. When the counter reaches the threshold value this DTC will set.

Action Taken When the DTC Sets

A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The parking brake control module will clear the DTC after 100 consecutive ignition on/off cycles with at least one test pass in each ignition cycle and no test fail result.
- Adjust or replace the park brake pads.

Reference Information

Schematic Reference

Park Brake System Schematics

Connector End View Reference

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Electrical Information Reference

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- **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 no additional DTCs are set in other control modules.
 - **If additional DTCs are set**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**
 - **If no additional DTCs are set**
3. Verify that DTC C027D or C028D is not set.
 - **If the DTC is set**
 1. Verify the park brake cable is connected properly. Refer to **Park Brake System Diagnosis**
 2. Check park brake pads for excessive wear. Refer to **Disc Brake System Diagnosis**
 3. Program the K83 Parking Brake Control Module. Refer to **Electronic Parking Brake Control Module Programming and Setup**.
 4. Ignition ON. Apply and release the park brake.
 5. Verify the DTC is not set.
 - If the DTC is set, replace the K83 Parking Brake Control Module.
 - If the DTC is not set
 - **If the DTC is not set**
6. All OK.
 - **If the DTC is not set**

4. All OK.

Repair Instructions

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

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

DTC C028E: PARK BRAKE SOLENOID ACTUATOR CURRENT SENSOR 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C028E 05

Park Brake Solenoid Actuator Current Sensor Circuit Short to Battery or Open Circuit

DTC C028E 08

Park Brake Solenoid Actuator Current Sensor Circuit Performance - Signal Invalid

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the parking brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the control module performs the requested operation.

The parking brake control module will diagnose the internal park brake motor circuit to verify it is functioning properly. The park brake motor circuit is used to command motor operation, apply and release tension on the parking brake cable, which will apply and release the parking brake. The park brake will self diagnose the internal park brake motor circuit. This circuit is used to drive the motor, which pulls on the park brake cable, ultimately applying and releasing the park brake.

The parking brake control module contains an internal park brake motor position sensor which monitors the park brake motor position. The parking brake control module contains an internal park brake solenoid actuator, and performs diagnostics on the solenoid actuator circuitry to verify it is functioning properly.

Conditions for Running the DTC

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

Conditions for Setting the DTC

The parking brake control module detects an internal park brake current sensor malfunction.

Action Taken When the DTC Sets

- The parking brake will apply very slowly to avoid wheel lock up.
- A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The parking 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

Schematic Reference

Park Brake System Schematics

Connector End View Reference

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Description and Operation

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- [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 no additional DTCs are set in other control modules.
 - **If additional DTCs are set**
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#) .
 - **If no additional DTCs are set**
3. Verify DTC C028E is not set.
 - **If the DTC is set**
Refer to Circuit/System Testing.
 - **If the DTC is not set**
4. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness at the K83 Parking 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 the ground circuit terminal H 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 open high/resistance in the ground connection.
 - **If less than 10 Ω**
3. Ignition ON.
4. Verify that a test lamp illuminates between the B+ circuit terminal A 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 the test lamp illuminates**
5. Connect the harness connector at the K83 Parking Brake Control Module.
6. Verify the park brake cable is connected properly. Refer to [Park Brake System Diagnosis](#)
 - **If park brake cable is not connected properly**

Repair as necessary.
 - **If park brake cable is connected properly**
7. Ignition ON.
8. Apply and release the park brake.
9. Verify DTC C028E is not set.
 - **If the DTC set**

Replace the K83 Parking Brake Control Module.
 - **If the DTC is not set**
10. All OK.

Repair Instructions

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

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

DTC C0293: 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C0293 00

Park Brake Switch Circuit Malfunction

DTC C0293 01

Park Brake Switch Circuit Short to Battery

DTC C0293 02

Park Brake Switch Circuit Short to Ground

DTC C0293 04

Park Brake Switch Circuit Open

DTC C0293 08

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park Brake Switch Supply Voltage Terminal N	C0298 08	C0298 08	-	C0293 08, C0298 08
Park Brake Apply Switch Voltage Reference Terminal D	C0293 02	C0293 04	C0293 01	C0293 08, C0298 08
Park Brake Release Switch Voltage Reference Terminal B	C0298 06	C0298 04	C0298 01	C0293 08, C0298 08
Park Brake Switch Signal Terminal C	C0298 08	C0298 08	-	C0293 08, C0298 08
Park Brake Apply Switch Signal Terminal R	C0293 02	C0293 04	C0293 01	C0293 08, C0298 08
Park Brake Release Switch Signal Terminal S	C0298 02	C0298 04	C0298 01	C0293 08, C0298 08

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the parking brake when commanded by the park brake control switch. The parking brake control module will perform diagnostics on the park brake control switch and its wiring harness to verify it is functioning properly. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the control module performs the requested operation.

The park brake control switch diagnostic checks for failure conditions in the park brake control switch and associated wiring into the parking brake control module.

Conditions for Running the DTC

Ignition OFF, ACCESSORY, or RUN mode.

Conditions for Setting the DTC**DTC C0293 00**

The parking brake control module detects an internal malfunction.

DTC C0293 01

The parking brake control module detects a short to battery.

DTC C0293 02

The parking brake control module detects a short to ground.

DTC C0293 04

The parking brake control module detects an open circuit.

DTC C0293 08

The parking brake control module detects the apply or release button was activated for more than 90 seconds.

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 parking 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

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Connector End View Reference

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- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Verification

1. Ignition ON.
2. Verify DTC U0128 is not set.
 - **If the DTC is set**
Refer to [DTC U0100-U02FF](#)
 - **If the DTC is not set**
3. Verify the scan tool Park Brake Status 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**
4. All OK.

Circuit/System Test

1. Ignition OFF, disconnect the harness connector at the K83 Parking Brake Control Module.
2. Test for less than 1 V between the circuit terminals listed below and ground:
 - Terminal B
 - Terminal C

- Terminal D
- Terminal N
- Terminal R
- Terminal S
- **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 B
- Terminal C
- Terminal D
- Terminal N
- Terminal R
- Terminal S
- **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 D and the circuit terminal R.

- **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 B and the circuit terminal S.

- **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 C and the circuit terminal N.

- **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 N and the circuit terminal R 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 N and the circuit terminal S while closing the switch.

- If 5 Ω or greater

Replace the S91 Park Brake Control Switch.

- If less than 5 Ω

10. Replace the K83 Parking Brake Control Module.

Repair Instructions

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

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

DTC C0298: PARK BRAKE UNLATCH 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C0298 00

Park Brake Unlatch Switch Circuit Malfunction

DTC C0298 01

Park Brake Unlatch Switch Circuit Short to Battery

DTC C0298 02

Park Brake Unlatch Switch Circuit Short to Ground

DTC C0298 04

Park Brake Unlatch Switch Circuit Open

DTC C0298 08

Park Brake Unlatch Switch Circuit Performance - Signal Invalid

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Park Brake Switch Supply Voltage Terminal N	C0298 08	C0298 08	-	C0293 08, C0298 08
Park Brake Apply Switch Voltage Reference Terminal D	C0293 02	C0293 04	C0293 01	C0293 08, C0298 08
Park Brake Release Switch Voltage Reference Terminal B	C0298 06	C0298 04	C0298 01	C0293 08, C0298 08
Park Brake Switch Signal Terminal C	C0298 08	C0298 08	-	C0293 08, C0298 08
Park Brake Apply Switch Signal Terminal R	C0293 02	C0293 04	C0293 01	C0293 08, C0298 08
Park Brake Release Switch Signal Terminal S	C0298 02	C0298 04	C0298 01	C0293 08, C0298 08

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the parking brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the control module performs the requested operation.

Conditions for Running the DTC

Ignition OFF, ACCESSORY, or RUN mode.

Conditions for Setting the DTC

DTC C0298 00

The parking brake control module detects an internal malfunction.

DTC C0298 01

The parking brake control module detects a short to battery.

DTC C0298 02

The parking brake control module detects a short to ground.

DTC C0298 04

The parking brake control module detects an open circuit.

DTC C0298 08

The parking brake control module detects the apply or release button was activated for more than 90 seconds.

Action Taken When the DTC Sets

A message and/or a warning indicator may be displayed.

Conditions for Clearing the DTC

- The parking 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.

Diagnostic Aids

Check if the park brake control switch is stuck in the apply or release position which may cause the DTC to set.

Reference Information

Schematic Reference

Park Brake System Schematics

Connector End View Reference

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- [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 DTC U0128 is not set.
 - **If the DTC is set**

Please Refer to [DTC U0100-U02FF](#)
 - **If the DTC is not set**
3. Verify the scan tool Park Brake Status 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**
4. All OK.

Circuit/System Test

1. Ignition OFF, disconnect the harness connector at the K83 Parking Brake Control Module.
2. Test for less than 1 V between the circuit terminals listed below and ground:
 - Terminal B
 - Terminal C
 - Terminal D
 - Terminal N
 - Terminal R
 - Terminal S
 - **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 B
 - Terminal C
 - Terminal D
 - Terminal N
 - Terminal R
 - Terminal S
 - **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 D and the circuit terminal R.
- **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 , test or replace the S91 Park Brake Control Switch.
 - **If less than 5 Ω**
6. Test for less than 5 Ω between the circuit terminal B and the circuit terminal S.
- **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 , test or replace the S91 Park Brake Control Switch.
 - **If less than 5 Ω**
7. Test for less than 5 Ω between the circuit terminal C and the circuit terminal N.
- **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 , test or replace the S91 Park Brake Control Switch.
 - **If less than 5 Ω**
8. Test for less than 5 Ω between the circuit terminal N and the circuit terminal R while closing the switch.
- **If 5 Ω or greater**

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

Test or replace the S91 Park Brake Control Switch.
 - **If less than 5 Ω**
10. Replace the K83 Parking Brake Control Module.

Repair Instructions

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

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

DTC C0558: CALIBRATION DATA

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C0558 55

DTC C0558 5A

Calibration Data Not Plausible

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the parking brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the control module performs the requested operation.

Conditions for Running the DTC

Ignition OFF, ACCESSORY, or RUN mode.

Conditions for Setting the DTC**C0558 55**

The parking brake control module detects a calibration malfunction.

C0558 5A

The parking brake control module detects mechanical problems with the parking brake system.

Action Taken When the DTC Sets**C0558 55**

- The parking brake is disabled, switch command will not be accepted.
- A message and/or a warning indicator may be displayed.

C0558 5A

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

OR

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

Conditions for Clearing the DTC

- The parking 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.
- Calibrate the parking brake control module after mechanical repairs are made.

Diagnostic Aids

- Verify the parking brake control module software and calibrations are the newest available versions.
- Verify the parking brake cable and related hardware is not broken, seized or pinched.

Reference Information

Schematic Reference

Park Brake System Schematics

Connector End View Reference

Description and Operation

Electronic Parking Brake Description

Electrical Information Reference

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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 C0558 55 is not set.
 - **If DTC C0558 55 is set**
 1. Program the K83 Parking Brake Control Module.
 2. Ignition ON.
 3. Apply and release the park brake.
 4. Verify the DTC is not set.
 - If the DTC is set, replace the K83 Parking Brake Control Module.
 - If the DTC is not set
 - 5. All OK.
 - **If DTC C0558 55 is not set**
3. Verify the scan tool Park Brake Cable Position parameter is less than 1251 counts.
 - **If 1251 counts or greater**
 1. Verify the park brake cable is connected properly. Refer to **Park Brake System Diagnosis**
 2. Check park brake pads for excessive wear. Refer to **Disc Brake System Diagnosis**
 - **If less than 1251 counts**
4. All OK.

Repair Instructions

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

Refer to **Control Module References** for control module replacement, programming and setup.

DTC C0561: SYSTEM DISABLED INFORMATION STORED INVALID DATA

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.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

DTC Descriptors

DTC C0561 71

System Disabled Information Stored Invalid Data

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the parking brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the control module performs the requested operation. The parking brake module will verify it has a valid signal from other modules before it performs the requested operation.

Conditions for Running the DTC

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

Conditions for Setting the DTC

The parking brake control module receives an invalid serial data message or does not receive a serial data message from another module.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- The parking 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 parking brake control module receives valid signals from other modules.

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. Ignition ON.
2. Verify no additional DTCs are set in other control modules.

- **If additional DTCs are set**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**

- **If no additional DTCs are set**

3. Verify the scan tool Park Brake Control Module Invalid Signal Identification parameters are all Valid.

- **If any parameter is Invalid**

Refer to the appropriate subsection in which the failure occurred. Refer to [Symptoms - Vehicle](#)

- **If all parameters are Valid**

4. All OK.

Repair Instructions

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

DTC C056D: ELECTRONIC CONTROL UNIT HARDWARE

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C056D 00

Electronic Control Unit Hardware Malfunction

DTC C056D 34

Electronic Control Unit Hardware RAM Malfunction

DTC C056D 35

Electronic Control Unit Hardware ROM Malfunction

DTC C056D 36

Electronic Control Unit Hardware EEPROM Performance/Malfunction

DTC C056D 37

Electronic Control Unit Hardware Software Malfunction

DTC C056D 38

Electronic Control Unit Hardware Supervision Software Malfunction

DTC C056D 39

Electronic Control Unit Hardware Internal Malfunction

DTC C056D 3B

Electronic Control Unit Hardware Internal Self - Test Malfunction

DTC C056D 3C

Electronic Control Unit Hardware Internal Communication Malfunction

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing

the parking brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the control module performs the requested operation. The parking brake module will perform diagnostics on the modules internal hardware to verify it is functioning properly

Conditions for Running the DTC

Ignition OFF, ACCESSORY, or RUN mode.

Conditions for Setting the DTC

The parking brake control module detects an internal hardware malfunction.

Action Taken When the DTC Sets

DTC C056D 00, C056D 34, C056D 35, C056D 36, C056D 37, C056D 38, C056D 3B, or C056D 3C

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

DTC C056D 39

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

Conditions for Clearing the DTC

- The parking 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 latest software and calibrations are programmed into the parking brake control module.

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. Ignition ON.
2. Verify DTC C056D 36 is not set.
 - **If DTC C056D 36 is set**

1. Program the K83 Parking Brake Control Module.
2. Ignition ON.
3. Apply and release the park brake.
4. Verify the DTC is not set.
 - If the DTC is set, replace the K83 Parking Brake Control Module.
 - If the DTC is not set
5. All OK.
- **If DTC C056D 36 is not set**
3. Perform the Parking Brake Motor Reset procedure with a scan tool for the Parking Brake Control Module.
4. Verify DTC C056D is not set.
 - **If DTC C056D is set**

Replace the K83 Parking Brake Control Module.
 - **If DTC C056D is not set**
5. All OK.

Repair Instructions

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

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

DTC C056E: ELECTRONIC CONTROL UNIT SOFTWARE

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C056E 41

Electronic Control Unit Software Not Programmed

DTC C056E 42

Electronic Control Unit Software Calibration Not Programmed

DTC C056E 47

Electronic Control Unit Software VIN Not Programmed

DTC C056E 5A

Electronic Control Unit Software Not Plausible

DTC C056E 71

Electronic Control Unit Software Invalid Data

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the park brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the parking brake control module performs the requested operation.

Conditions for Running the DTC

Ignition OFF, ACCESSORY, or RUN mode.

Conditions for Setting the DTC

The parking brake module has detected missing calibration data, calibration procedure not run or completed, missing VIN, or internal software malfunction.

Actions Taken When DTC Sets

C056E 41 or C056E 5A

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

C056E 42

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

C056E 47 or C056E 71

The parking brake will function normally.

Conditions for Clearing the DTC

- The parking 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 latest software and calibrations are programmed into the parking brake control module.

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. Ignition ON.
2. Verify that DTC C056E is not set.
 - **If the DTC is set**
 1. Program the K83 Parking Brake Control Module.

2. Verify the DTC is not set.

- If the DTC is set, replace the K83 Parking Brake Control Module.
- If the DTC is not set

3. All OK.

- **If the DTC is not set**

3. All OK.

Repair Instructions

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

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

DTC C0574: PRINTED CIRCUIT BOARD TEMPERATURE SENSOR

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC C0574 00

Printed Circuit Board Temperature Sensor Malfunction

DTC C0574 01

Printed Circuit Board Temperature Sensor Short to Battery

DTC C0574 02

Printed Circuit Board Temperature Sensor Short to Ground

DTC C0574 54

Printed Circuit Board Temperature Sensor High

Circuit/System Description

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the parking brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch, the internal circuit board temperature is checked to verify it is within operating range before the control module performs the requested operation.

Conditions for Running the DTC

Ignition OFF, ACCESSORY, or RUN mode.

Conditions for Setting the DTC

C0574 01 or C0574 02

The parking brake control module detects a short to battery or a short to ground.

C0574 00 or C0574 54

The parking brake control module has detected an internal temperature that is above the allowed value.

Action Taken When the DTC Sets

- A message and/or a warning indicator may be displayed.

- The park brake is disabled, one release allowed.

Conditions for Clearing the DTC

- The parking brake control module clears the history DTC when a current DTC is not detected in 40 ignition cycles.
- The parking brake control module is replaced or the internal temperature drops below the allowed temperature.

Diagnostic Aids

- Check for debris on the parking brake control module which may cause the module to overheat.
- Diagnose all other parking brake control module system related faults before performing this diagnostic. Other faults may cause the circuit board to overheat. Do not attempt to apply the park brake.

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. Ignition ON.
2. Verify no additional DTCs are set in other control modules.
 - **If additional DTCs are set**
 Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#)
 - **If no additional DTCs are set**
3. Verify that DTC C0574 01 or C0574 02 is not set.
 - **If DTC C0574 01 or C0574 02 is set**
 1. Ignition OFF. Remove the parking brake control module fuse and reinstall. Ignition ON.
 2. Verify DTC C0574 01 or C0574 02 is not set.
 - If the DTC is set, replace the K83 Parking Brake Control Module.
 - If the DTC is not set
3. All OK.
 - **If DTC C0574 01 or C0574 02 is not set**
4. Allow the K83 Parking Brake Control Module to cool down for 15 minutes.
5. Verify the scan tool Calculated System Temperature parameter is less than 105Å,Å° C.

- If 105Å,Å° C or greater

Replace the K83 Parking Brake Control Module.

- If less than 105Å,Å° C

6. All OK.

Repair Instructions

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

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

SYMPTOMS - PARK BRAKE

IMPORTANT: Review the system operation in order to familiarize yourself with the system functions.

Refer to [Electronic Parking Brake Description](#).

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.			

Step	Action	Yes	No
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 with the rear axle supported by jack stands. Refer to <u>Lifting and Jacking the Vehicle</u>. 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 8	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 14	Go to Step 5
5	Visually inspect the park brake cable connections and the cables that are accessible on the UNDERSIDE of the vehicle for disconnections and/or damage. Were any of the park brake cables disconnected and/or damaged?	Go to Step 6	Go to Step 7
6	Reconnect or replace the park brake cables as necessary. Refer to <u>Parking Brake Cable Replacement</u>. Did you complete the repair and/or replacement?	Go to Step 14	-
7	Is the vehicle equipped with an integral parking brake?	Go to Step 8	Go to Step 10
8	1. Disconnect the rear park brake cables from the equalizer and from the brake caliper piston apply levers. Refer to <u>Parking Brake Cable Replacement</u>. 2. Have an assistant apply and maintain the caliper piston apply lever to apply the caliper piston. 3. Attempt to rotate the rear wheels to check the rear brakes for a significant amount of drag. 4. Release the caliper piston apply lever. 5. Repeat steps 2-4 for the opposite caliper piston apply lever. 6. 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 11	Go to Step 9
9	Replace the appropriate rear brake caliper. Refer to <u>Rear Brake Caliper Replacement</u>. Did you complete the replacement?	Go to Step 14	-
10	Inspect the parking brake adjustment. Did you find and correct a condition?	Go to Step 14	Go to Step 11

Step	Action	Yes	No
11	With the aid of an assistant, apply and release the parking brake while observing the cables for free movement. Did the park brake cables move freely?	Go to Step 13	Go to Step 12
12	Replace any of the park brake cables inspected that do not have free movement. Refer to <u>Parking Brake Cable Replacement</u> . Did you complete the replacement?	Go to Step 14	-
13	Inspect the electronic parking brake control module for proper operation and replace if necessary. Refer to <u>Electronic Parking Brake Control Module Replacement</u> . Did you complete the replacement?	Go to Step 14	-
14	Install or connect any components that were removed or disconnected during diagnosis. Did you complete the operation?	Park Brake System OK	-

REPAIR INSTRUCTIONS

ELECTRONIC PARKING BRAKE CONTROL MODULE REPLACEMENT

Removal Procedure

1. Block the drive wheels.
2. Disable the parking brake cable adjuster. Refer to **Parking Brake Cable Adjuster Disabling**
3. Place the ignition in the OFF position.
4. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
5. Remove the left rear tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
6. Remove the left rear wheelhouse panel liner. Refer to **Rear Wheelhouse Liner Replacement** .

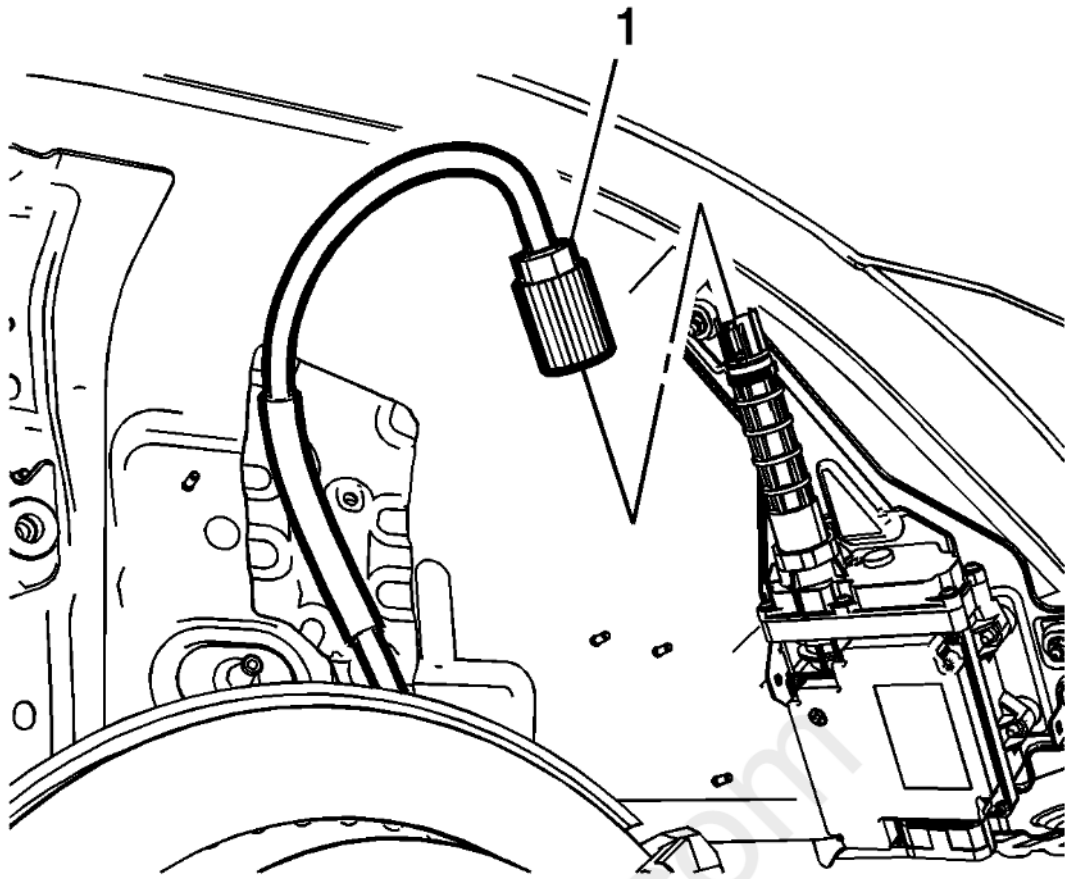


Fig. 2: Parking Brake Cable Nut

Courtesy of GENERAL MOTORS COMPANY

7. Remove the parking brake cable nut (1).
8. Disconnect the electronic parking brake control module electrical connector.

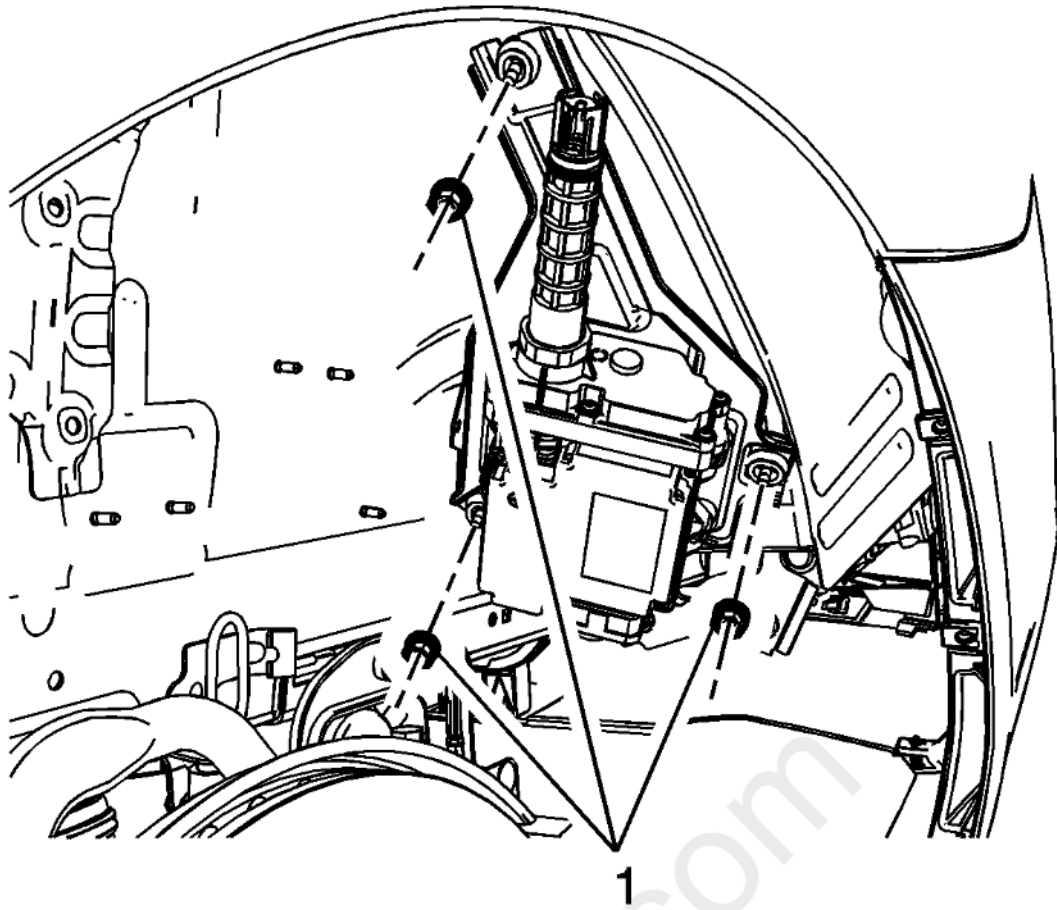


Fig. 3: Electronic Parking Brake Control Module Nuts

Courtesy of GENERAL MOTORS COMPANY

9. Remove the electronic parking brake control module nuts (1).
10. Remove the electronic parking brake control module and bracket assembly.
11. Remove the electronic parking brake control modulator bracket, if necessary. Refer to [**Electronic Parking Brake Control Modulator Bracket Replacement**](#).

Installation Procedure

1. Install the electronic parking brake control modulator bracket, if removed. Refer to [**Electronic Parking Brake Control Modulator Bracket Replacement**](#).
2. Install the electronic parking brake control module to the vehicle.

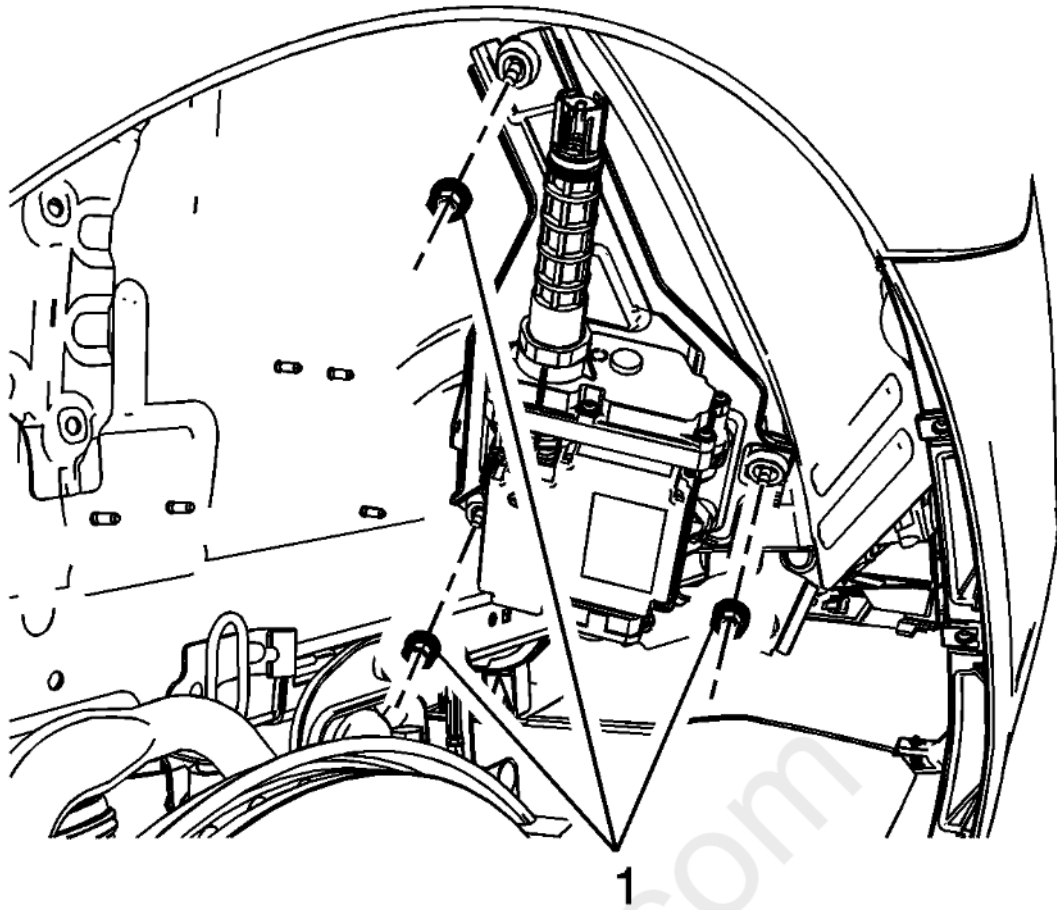


Fig. 4: Electronic Parking Brake Control Module Nuts

Courtesy of GENERAL MOTORS COMPANY

3. Install the electronic parking brake control module and bracket assembly.

CAUTION: Refer to **Fastener Caution** .

4. Install the electronic parking brake control module nuts (1) and tighten to 10 N.m (89 lb in).

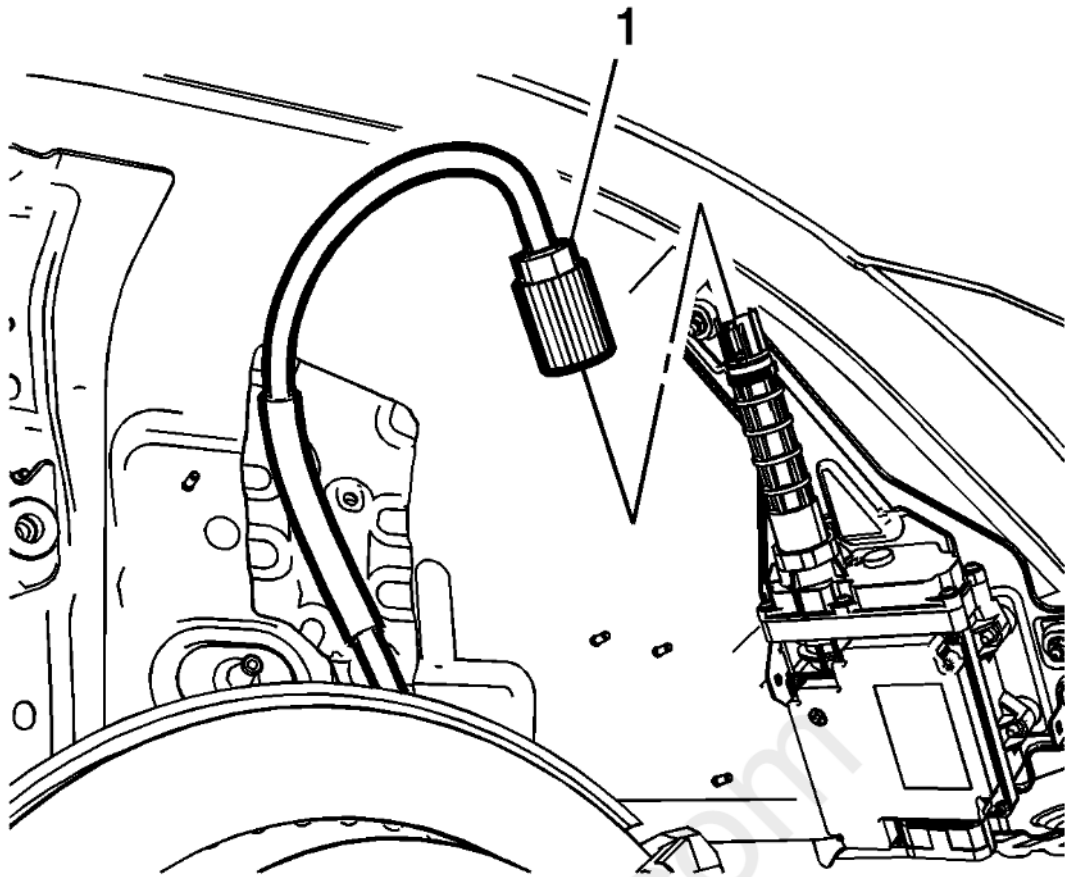


Fig. 5: Parking Brake Cable Nut

Courtesy of GENERAL MOTORS COMPANY

NOTE: When installing the parking brake cable nut to the electronic parking brake control module spindle, hold the spindle housing securely to avoid distorting the housing.

5. Install the parking brake cable nut (1) and tighten to 6 N.m (53 lb in).
6. Connect the electronic parking brake control module electrical connector.
7. Install the left rear wheelhouse panel liner. Refer to [Rear Wheelhouse Liner Replacement](#) .
8. Install the left rear tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#) .
9. Program the electronic parking brake control module. Refer to [Control Module References](#) .

ELECTRONIC PARKING BRAKE CONTROL MODULATOR BRACKET REPLACEMENT

Removal Procedure

1. Remove the electronic parking brake control module. Refer to [Electronic Parking Brake Control Module Replacement](#).

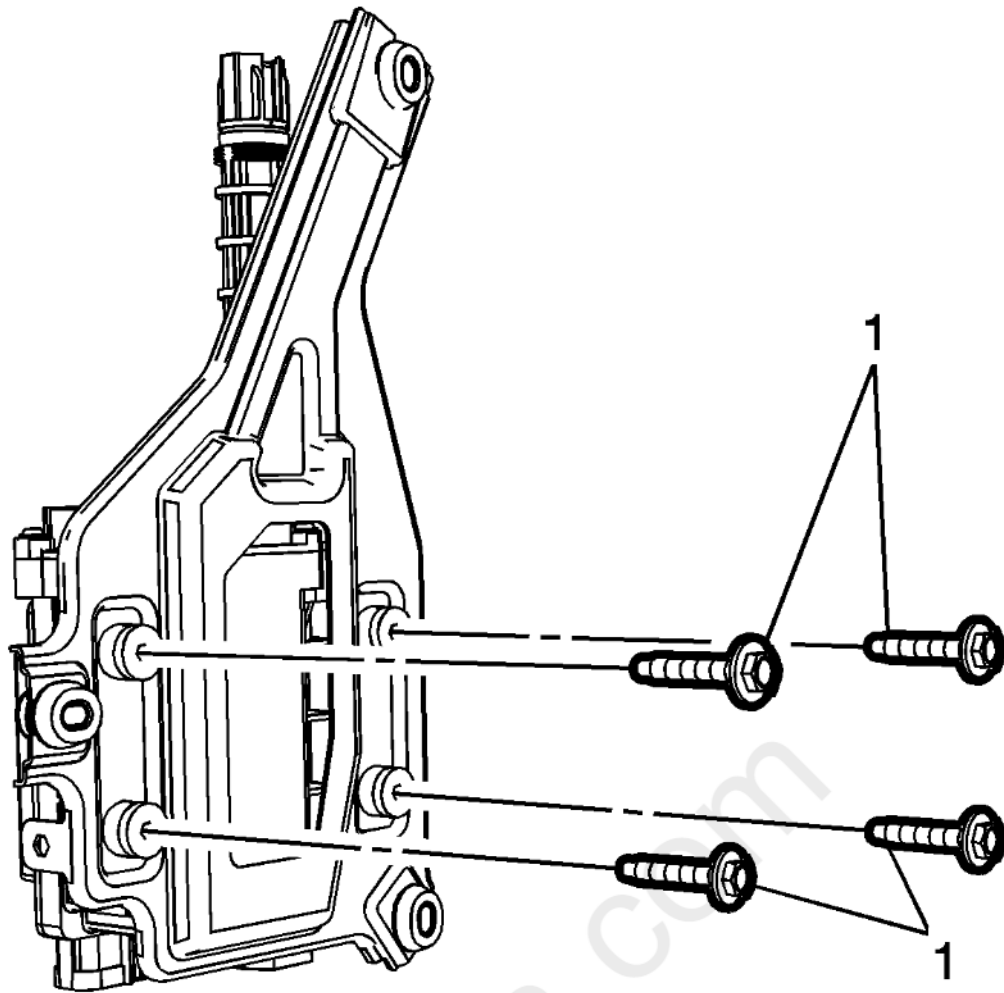


Fig. 6: Electronic Parking Brake Control Module Bolts

Courtesy of GENERAL MOTORS COMPANY

2. Remove the electronic parking brake control module bolts (1).

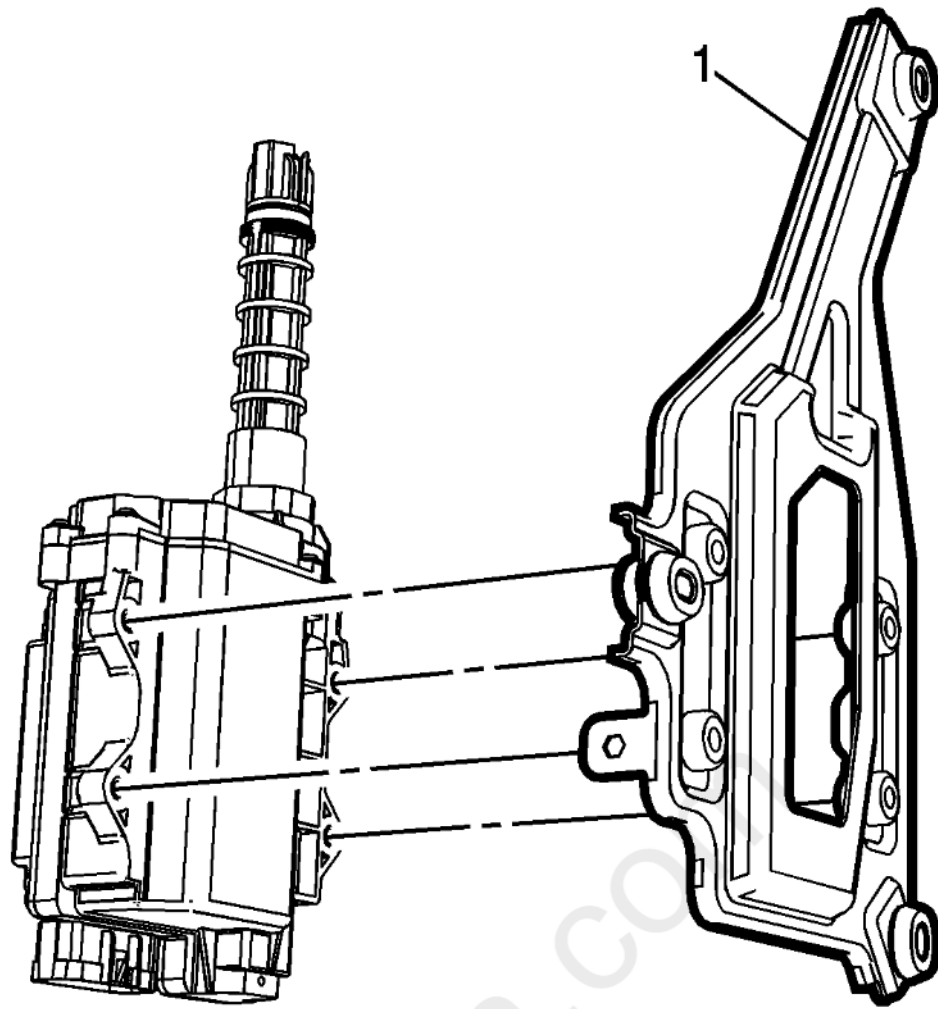


Fig. 7: Electronic Parking Brake Control Modulator Bracket
Courtesy of GENERAL MOTORS COMPANY

3. Remove the electronic parking brake control modulator bracket (1).

Installation Procedure

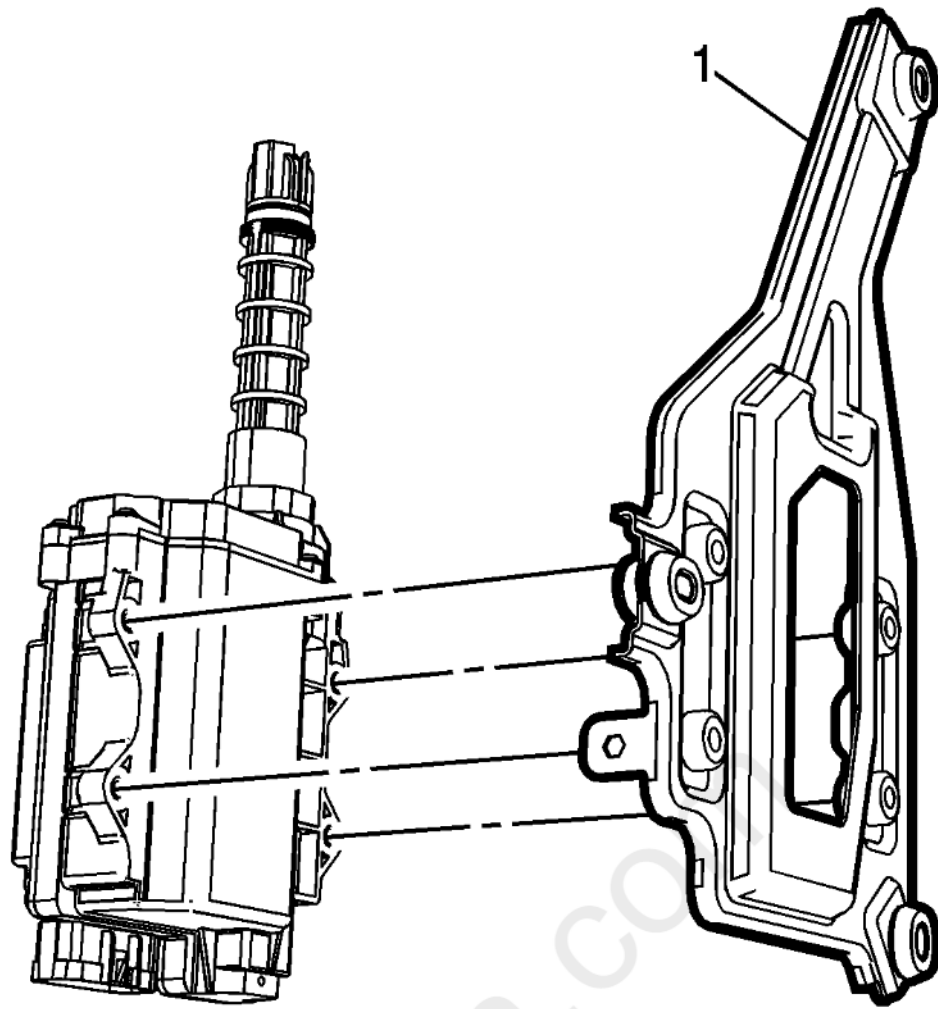


Fig. 8: Electronic Parking Brake Control Modulator Bracket
Courtesy of GENERAL MOTORS COMPANY

1. Install the electronic parking brake control modulator bracket (1).

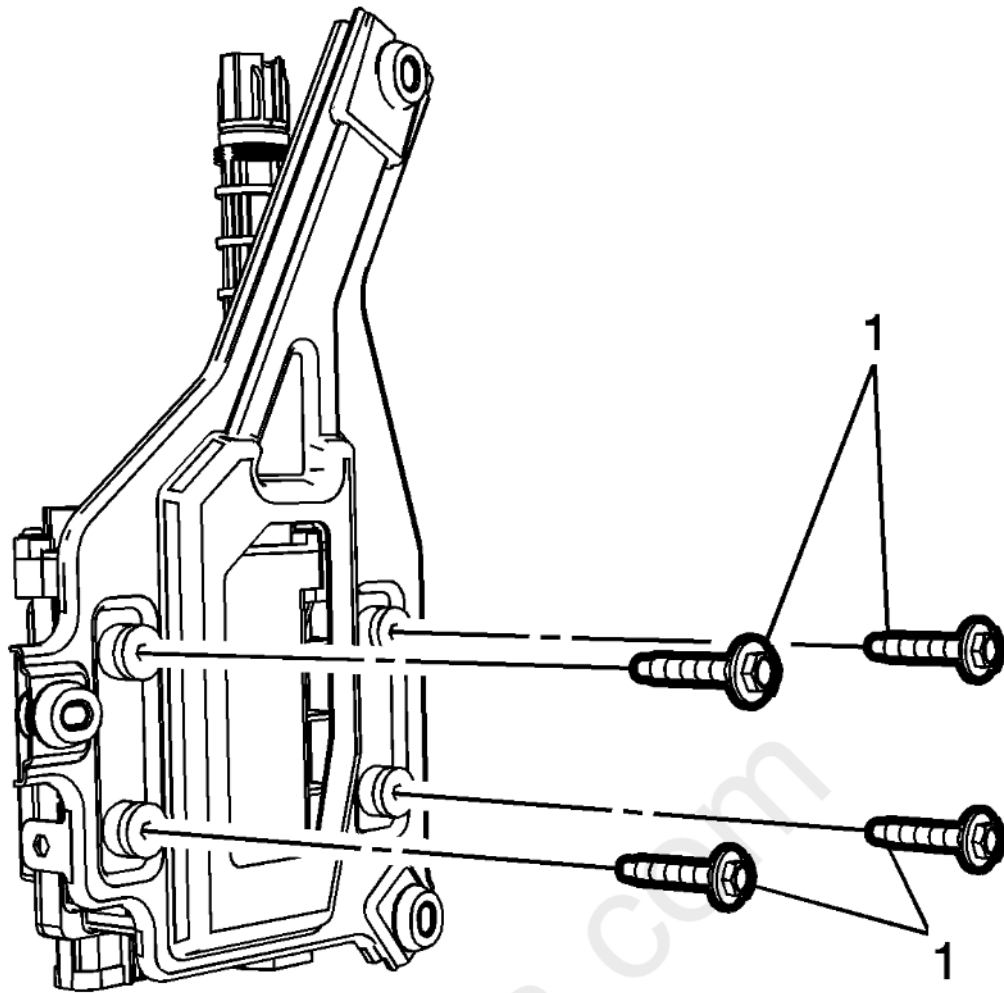


Fig. 9: Electronic Parking Brake Control Module Bolts
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to [Fastener Caution](#) .

2. Install the electronic parking brake control module bolts (1) and tighten to 10 N.m (89 lb in).
3. Install the electronic parking brake control module. Refer to [Electronic Parking Brake Control Module Replacement](#).

PARKING BRAKE CABLE REPLACEMENT

Removal Procedure

WARNING: Refer to [Brake Dust Warning](#) .

1. Disable the parking brake cable adjuster. Refer to [Parking Brake Cable Adjuster Disabling](#).
2. Turn the ignition to the OFF position.
3. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
4. Remove the left rear wheelhouse panel liner. Refer to [Rear Wheelhouse Liner Replacement](#) .

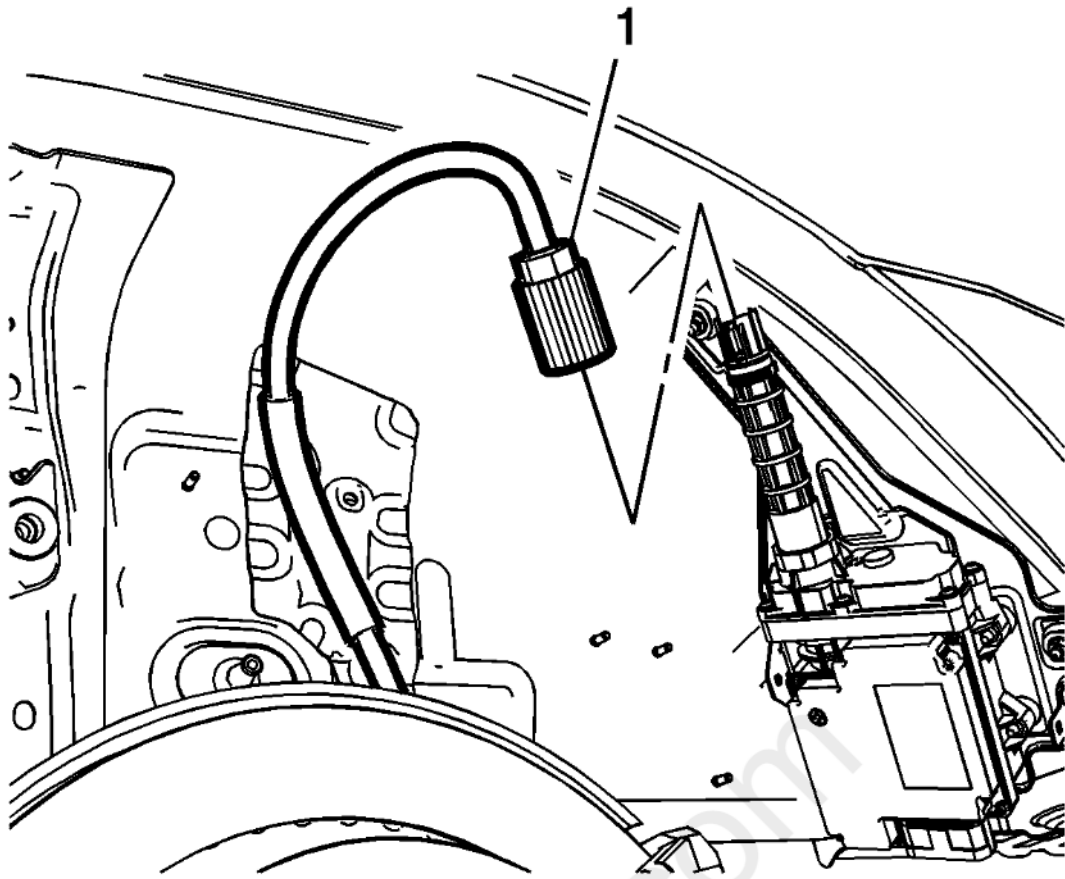


Fig. 10: Parking Brake Cable Nut

Courtesy of GENERAL MOTORS COMPANY

5. Remove the parking brake cable nut (1) from the electronic parking brake control module.

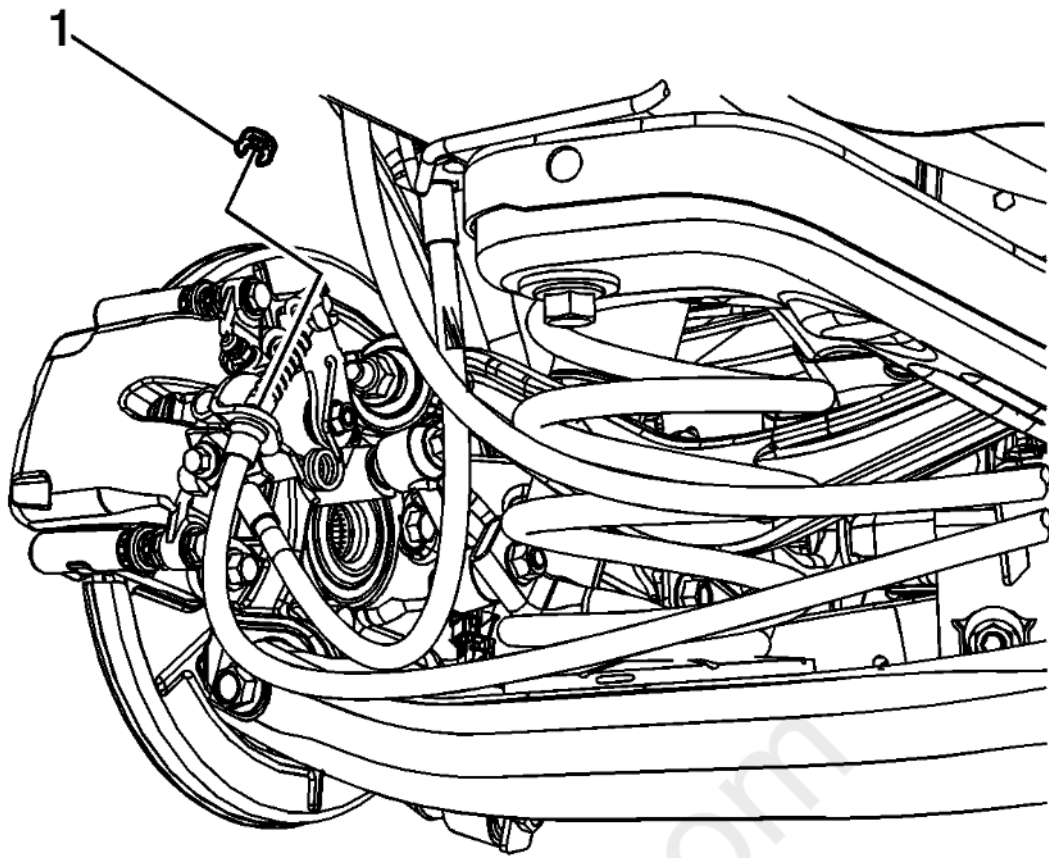


Fig. 11: Left Rear Parking Brake Cable Retainer
Courtesy of GENERAL MOTORS COMPANY

6. Remove the left parking brake cable retainer (1).

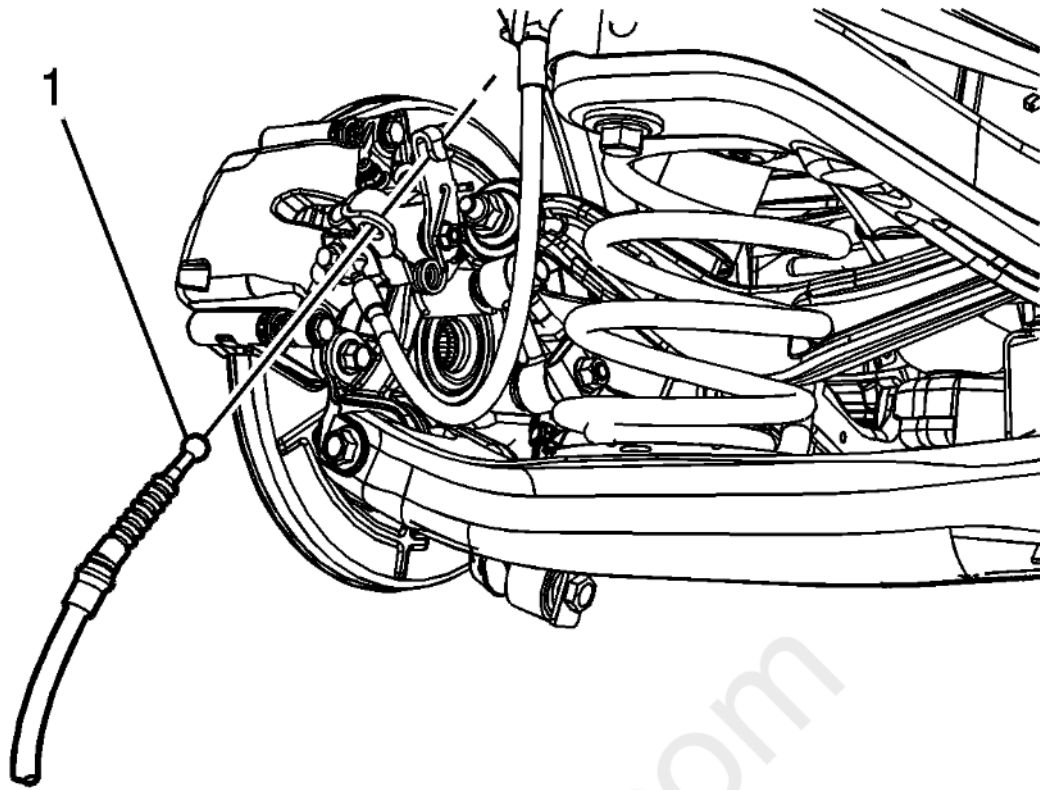


Fig. 12: Rear Parking Brake Cable, Parking Brake Actuator Lever And Left Rear Brake Caliper

Courtesy of GENERAL MOTORS COMPANY

7. Disconnect the parking brake cable (1) from the parking brake actuator lever and remove the cable from the left rear brake caliper.

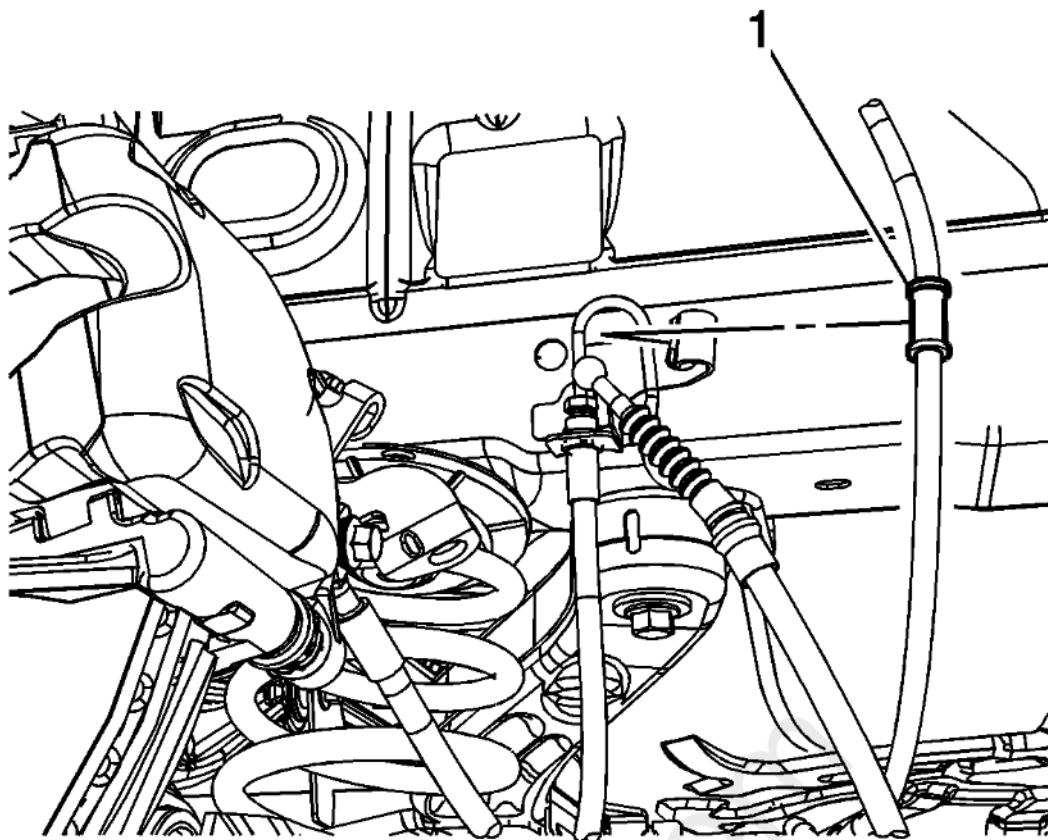


Fig. 13: Rear Parking Brake Cable

Courtesy of GENERAL MOTORS COMPANY

8. Release the parking brake cable (1) from the left rear brake hose bracket.

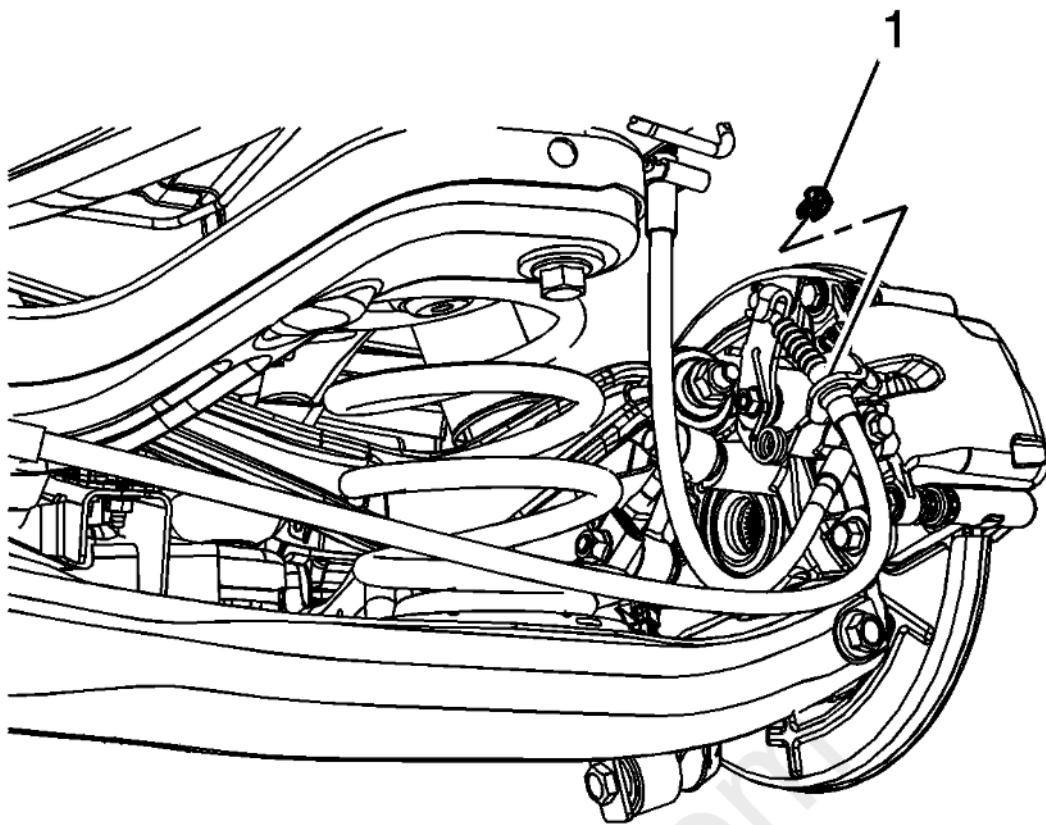


Fig. 14: Right Rear Parking Brake Cable Retainer
Courtesy of GENERAL MOTORS COMPANY

9. Remove the right parking brake cable retainer (1).

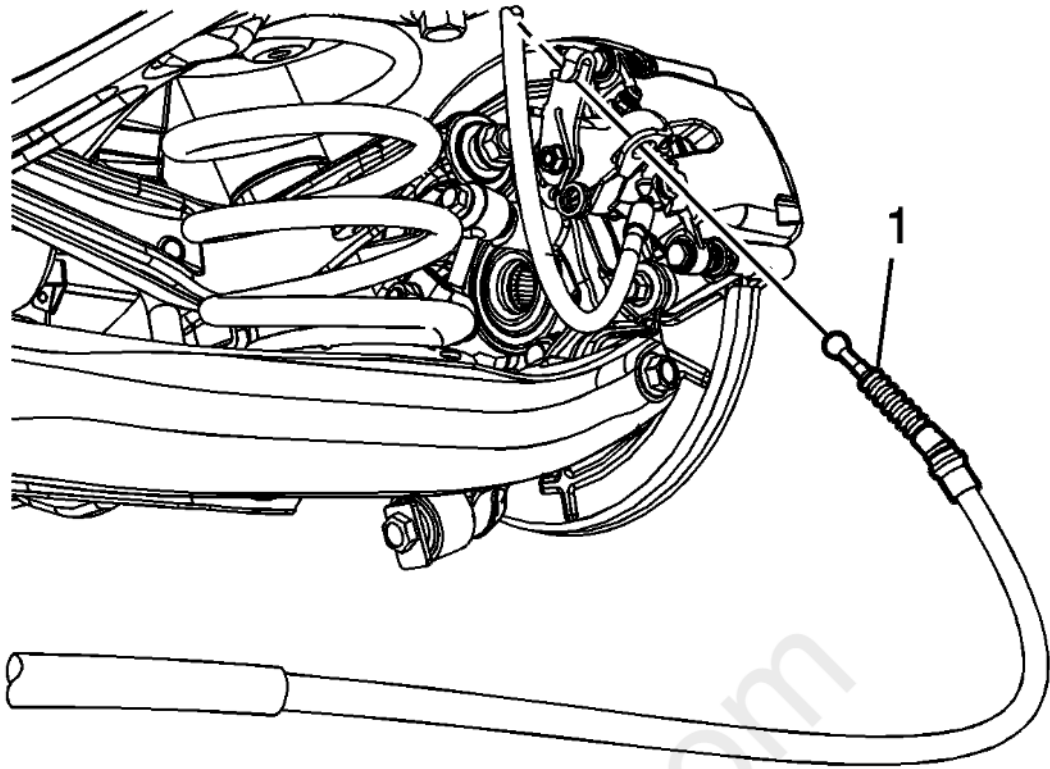


Fig. 15: Rear Parking Brake Cable, Parking Brake Actuator Lever And Right Rear Brake Caliper

Courtesy of GENERAL MOTORS COMPANY

10. Disconnect the parking brake cable (1) from the parking brake actuator lever and remove the cable from the right rear brake caliper.

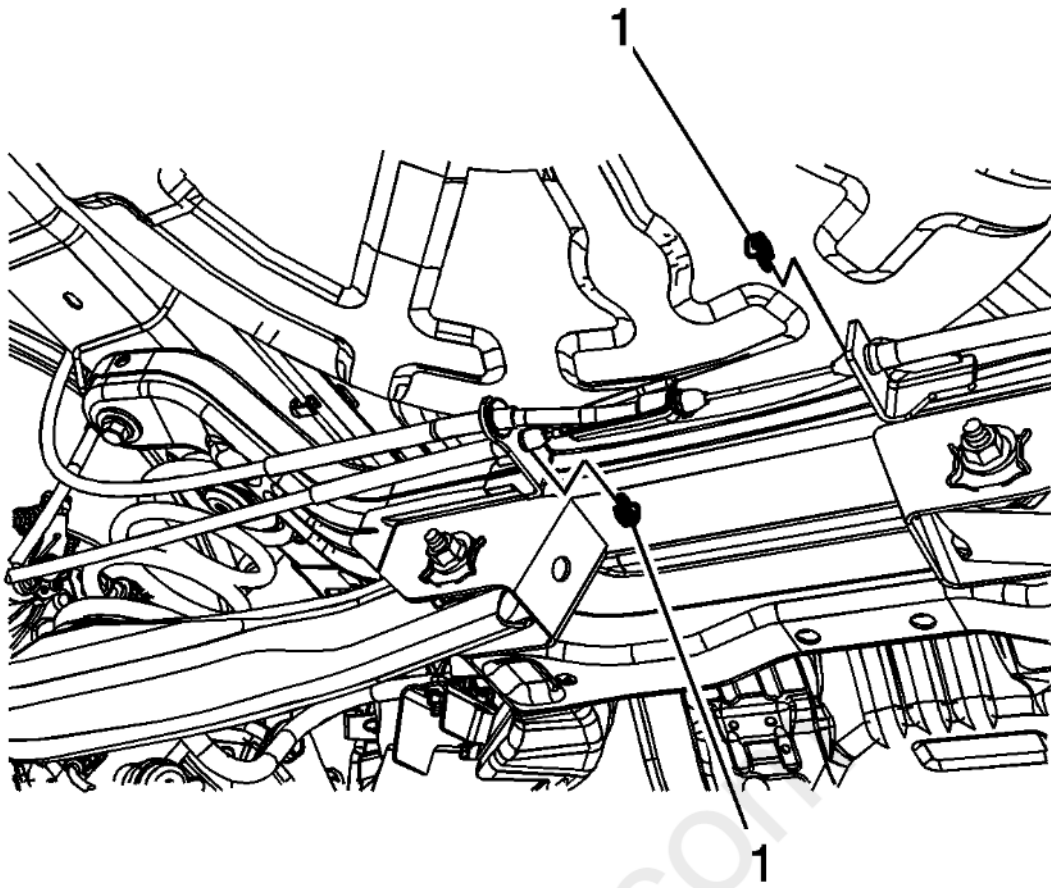


Fig. 16: Rear Parking Brake Cable Retainers And Rear Frame
Courtesy of GENERAL MOTORS COMPANY

11. Remove the parking brake cable retainers (1) on the rear frame.

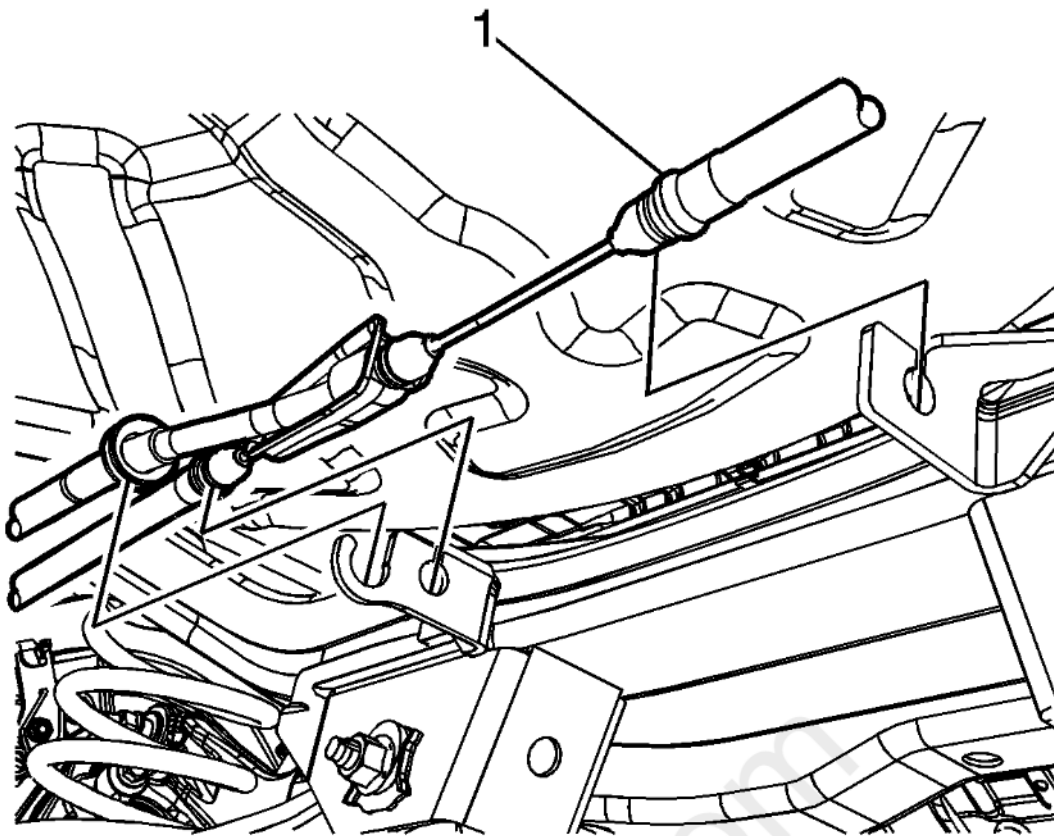


Fig. 17: Rear Parking Brake Cable

Courtesy of GENERAL MOTORS COMPANY

12. Remove the parking brake cable (1).

Installation Procedure

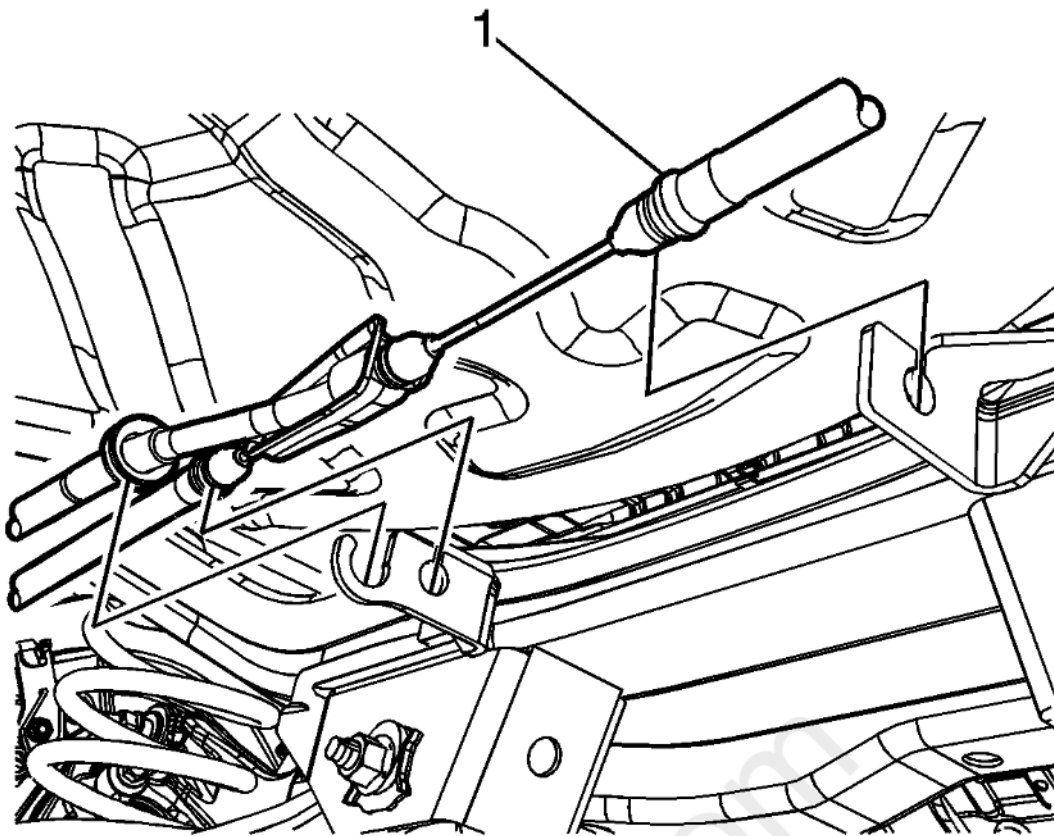


Fig. 18: Rear Parking Brake Cable

Courtesy of GENERAL MOTORS COMPANY

1. Install the parking brake cable (1).

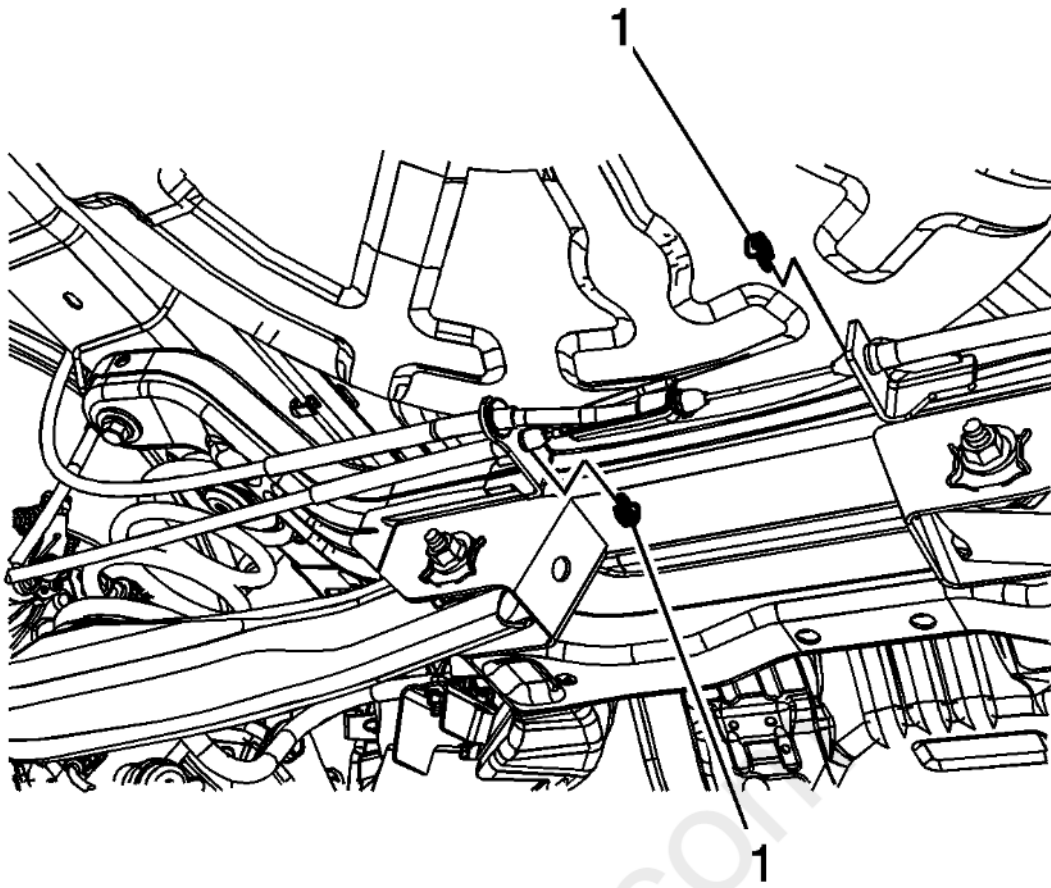


Fig. 19: Rear Parking Brake Cable Retainers And Rear Frame

Courtesy of GENERAL MOTORS COMPANY

2. Install the parking brake cable retainers (1) on the rear frame.

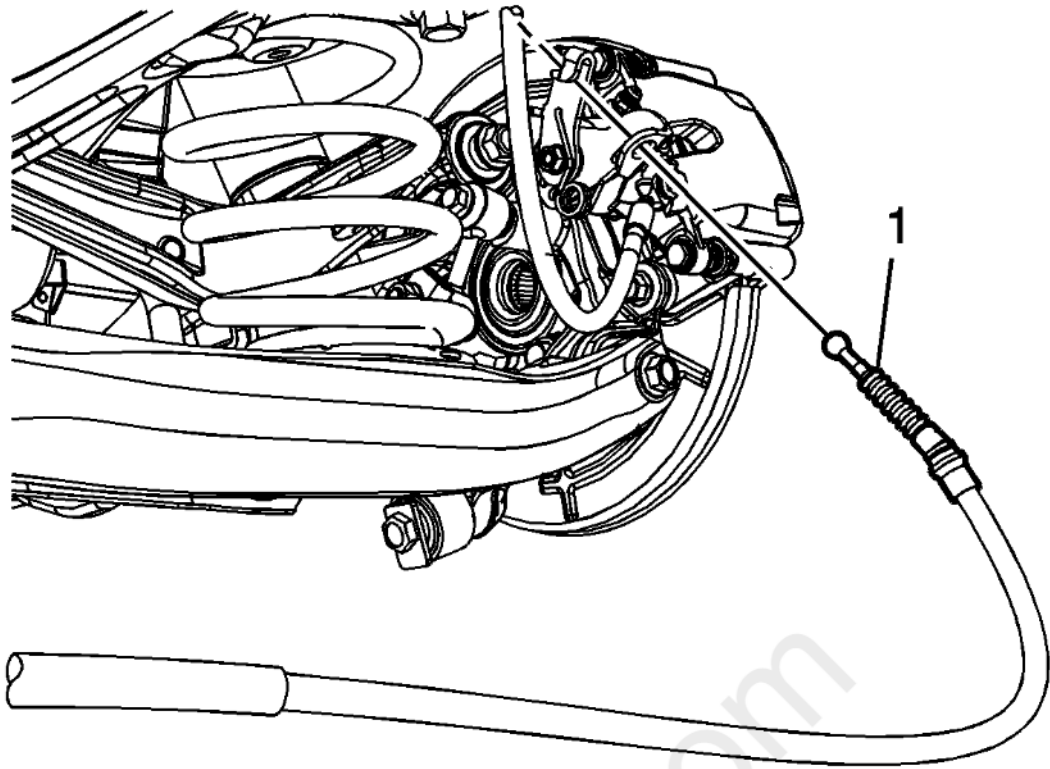


Fig. 20: Rear Parking Brake Cable, Parking Brake Actuator Lever And Right Rear Brake Caliper

Courtesy of GENERAL MOTORS COMPANY

3. Install the parking brake cable (1) to the right rear brake caliper and connect the cable to the parking brake actuator lever.

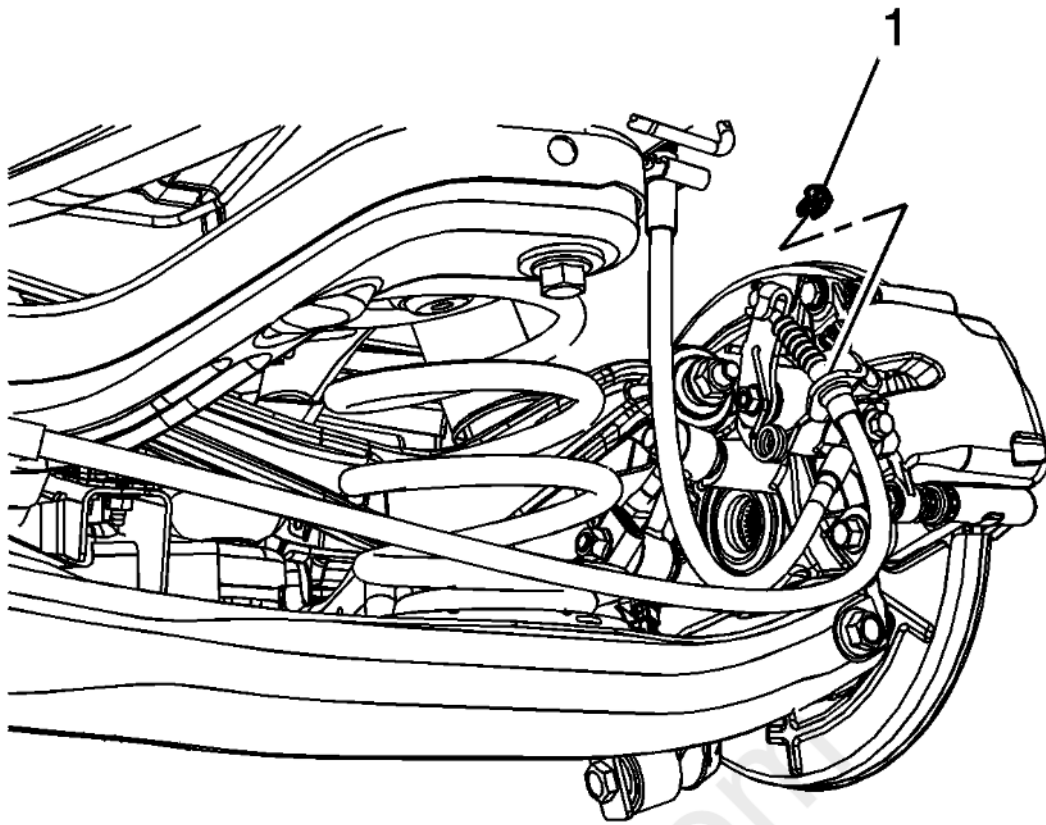


Fig. 21: Right Rear Parking Brake Cable Retainer

Courtesy of GENERAL MOTORS COMPANY

4. Install the right parking brake cable retainer (1).

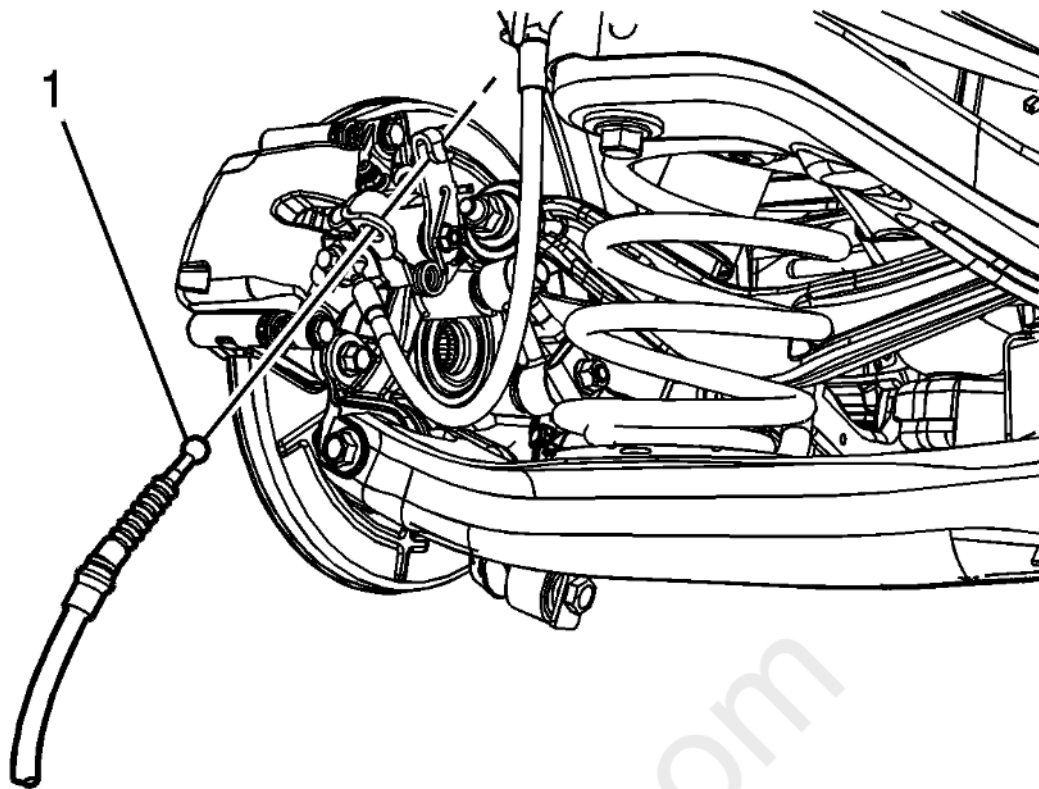


Fig. 22: Rear Parking Brake Cable, Parking Brake Actuator Lever And Left Rear Brake Caliper

Courtesy of GENERAL MOTORS COMPANY

5. Install the parking brake cable (1) to the left rear brake caliper and connect the cable to the parking brake actuator lever.

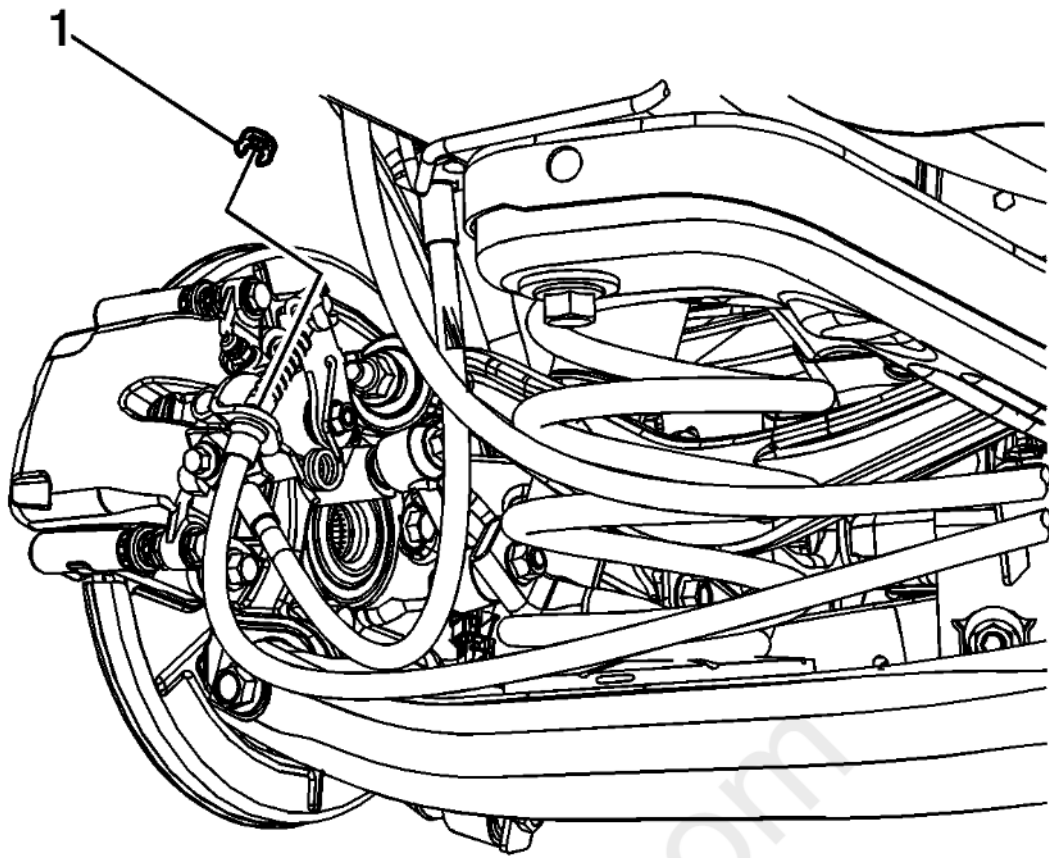


Fig. 23: Left Rear Parking Brake Cable Retainer
Courtesy of GENERAL MOTORS COMPANY

6. Install the left parking brake cable retainer (1).

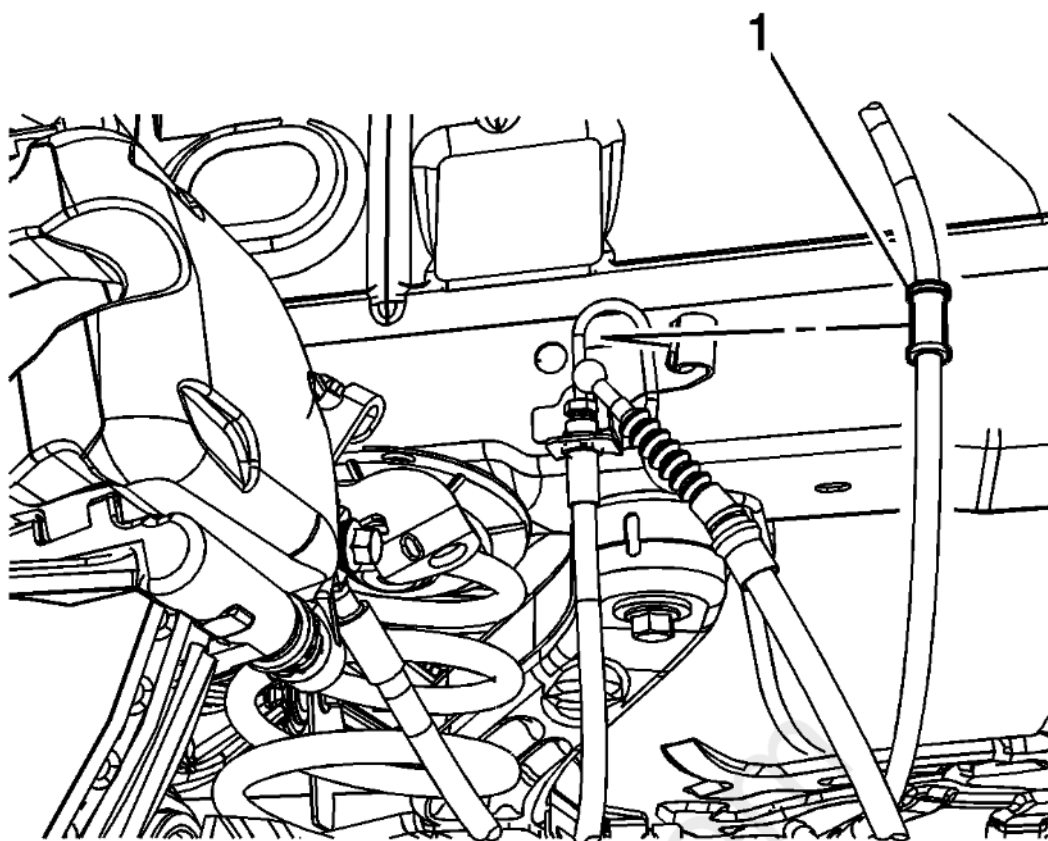


Fig. 24: Rear Parking Brake Cable

Courtesy of GENERAL MOTORS COMPANY

7. Install the parking brake cable (1) to the left rear brake hose bracket.

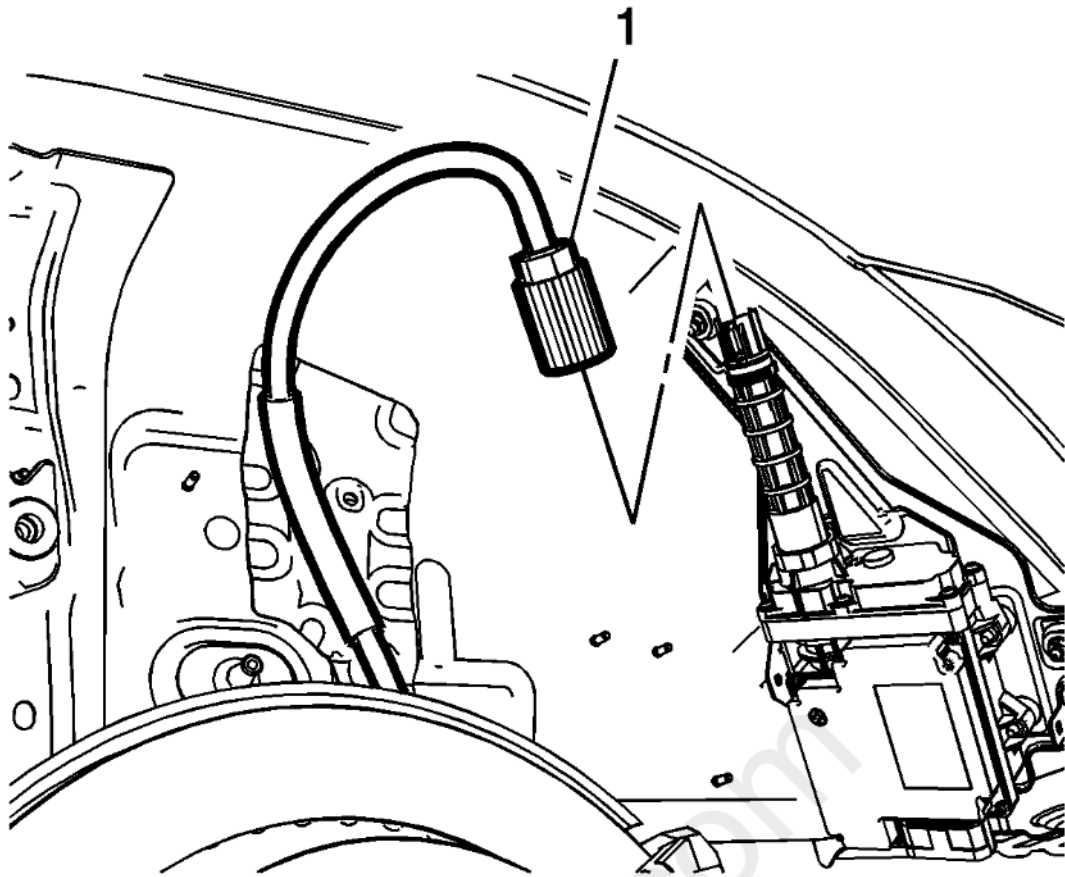


Fig. 25: Parking Brake Cable Nut
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to [Fastener Caution](#) .

NOTE: When installing the parking brake cable nut to the electronic parking brake control module spindle, hold the spindle housing securely to avoid distorting the housing.

8. Install the rear parking brake cable nut (1) to the electronic parking brake control module and tighten to 6 N.m (53 lb in).
9. Install the left rear wheelhouse panel liner. Refer to [Rear Wheelhouse Liner Replacement](#) .
10. Enable the parking brake cable adjuster. Refer to [Parking Brake Cable Adjuster Enabling](#).

PARKING BRAKE CABLE ADJUSTER DISABLING

The park brake cable tension is controlled by the electronic park brake (EPB) module. Tension can be fully released from the park brake cables to allow for service of the park brake system. Perform one of the following three methods to fully release cable tension.

Electronic Parking Brake Cable Tension Release

With Scan Tool - Preferred Method

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 Control Functions from the electronic parking brake control module menu.
5. Follow the instructions on the scan tool.

Without Scan Tool - Optional Method

1. Block the drive wheels.
2. Turn the ignition switch to the ON/RUN position with the engine OFF.
3. Place the automatic transmission in PARK or manual transmission in NEUTRAL, as equipped.
4. Apply and hold the brake pedal. The brake pedal must remain applied throughout the park brake cable tension release process.
5. Press and hold down the electronic park brake (EPB) switch approximately 10 seconds.
6. Observe the PARK BRAKE lamp on the instrument cluster.
7. When the PARK BRAKE lamp flashes, release then immediately press and release the EPB switch.

The parking brake cable tension is fully released.

8. Release the brake pedal.

Manual Parking Brake Cable Tension Release

In the event the above methods to release the parking brake cable tension are unsuccessful, the following procedure may be necessary to release the parking brake cable tension.

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Remove the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#) .
3. Remove the left rear wheelhouse panel liner. Refer to [Rear Wheelhouse Liner Replacement](#) .

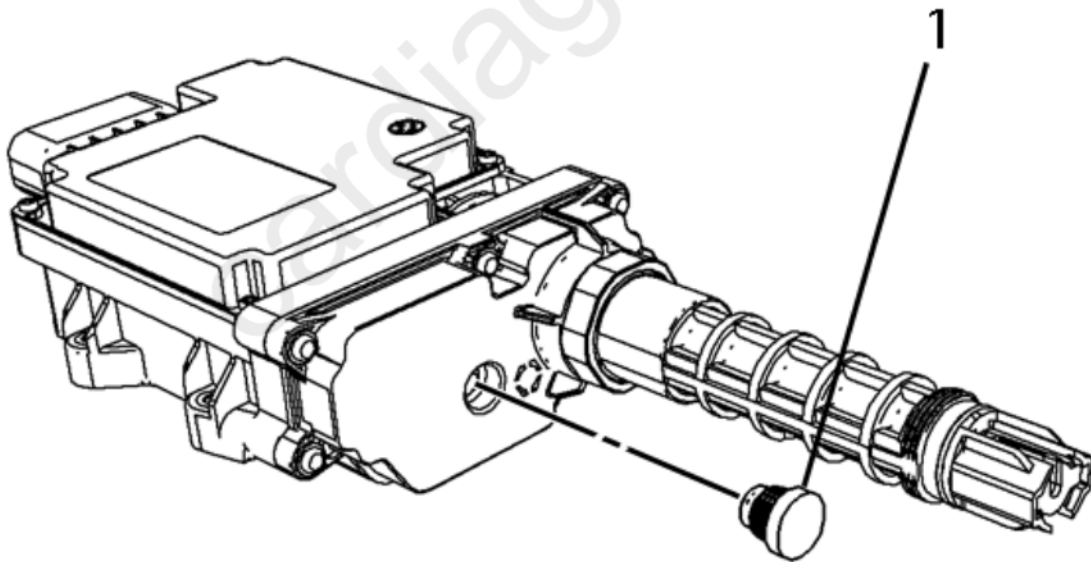


Fig. 26: EPB Manual Release Protective Plug
Courtesy of GENERAL MOTORS COMPANY

NOTE: The protective plug for the manual release is located near the cable spindle.

4. Remove the protective plug (1) from the EPB manual release.

NOTE: Do NOT use power tools to rotate the manual release mechanism. Use of power tools can damage the EPB module gear drive mechanism.

5. Using an appropriate tool, rotate the mechanism clockwise until the tension is fully released from the parking brake cables.

Up to 50 cycles may be required until the parking brake cable tension is fully released.

6. Install the protective plug to the EPB module.

PARKING BRAKE CABLE ADJUSTER ENABLING

The park brake cable tension is controlled by the electronic park brake (EPB) module. Cable tension needs to be set and the EPB module needs to be calibrated following the cable tension disabling procedure. Perform the following procedure to fully restore cable tension.

Electronic Parking Brake Cable Tensioning

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 parking brake control module menu.
5. Perform the parking brake calibration procedure. Refer to [Control Module References](#).

PARKING BRAKE ACTUATOR SWITCH REPLACEMENT

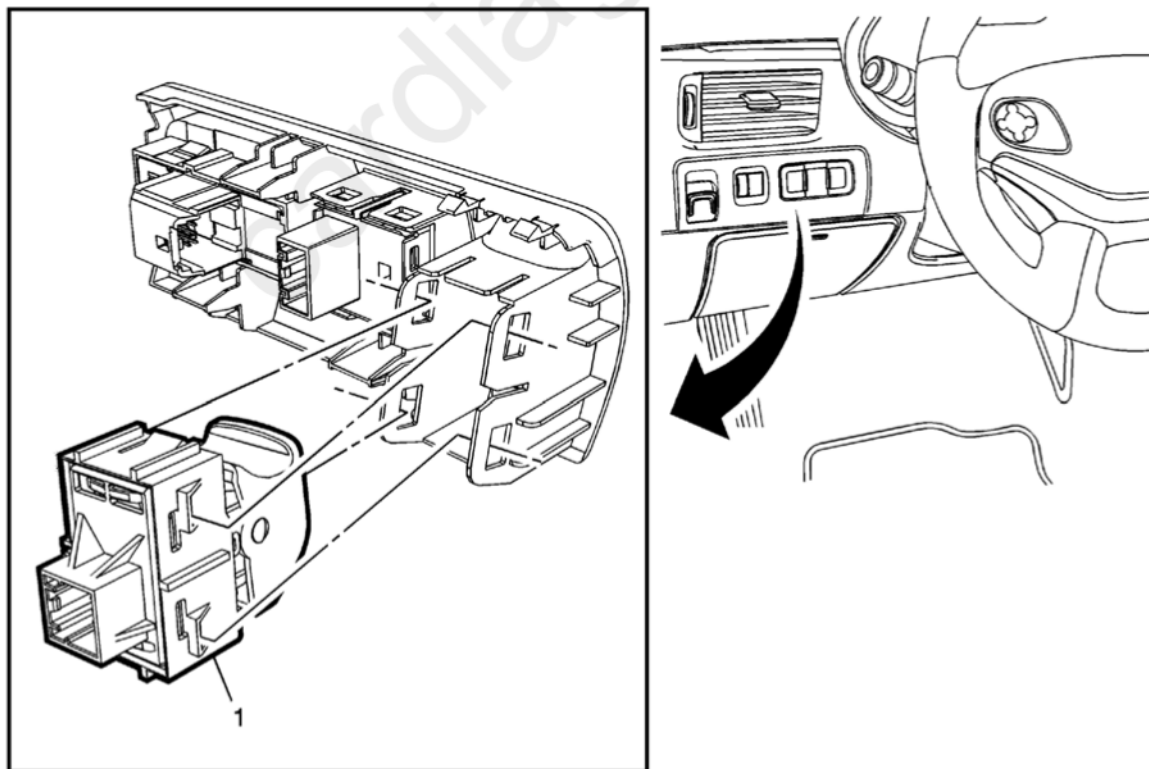


Fig. 27: Parking Brake Actuator Switch

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
Remove the instrument panel trim plate. Refer to Instrument Panel Trim Plate Replacement .	

Callout	Component Name
1	Parking Brake Actuator Switch Procedure Release tabs to remove the switch from the trim plate.

DESCRIPTION AND OPERATION

ELECTRONIC PARKING BRAKE DESCRIPTION

Vehicles with the electric parking brake have a switch in the center console, 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.

Parking Brake Control Module

The parking brake control module has an internal motor, apply actuator, release actuator, and temperature sensor. The parking brake control module also contains the logic for applying and releasing the parking brake when commanded by the park brake control switch. When the parking brake control module receives a signal from the switch the internal circuit board temperature is checked to verify it is within operating range before the control module performs the requested operation.

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.

PARK BRAKE SYSTEM DESCRIPTION AND OPERATION

NOTE: Coated park brake cables do not need periodic lubrication.

Coated park brake cables are used to reduce apply effort and increase corrosion protection. The cables are coated with a plastic material which slides against nylon seals inside the conduit end fittings.

Mechanical Park Brake System

The park brake lever has an indicator switch which closes when the park brake is set, thus illuminating the red BRAKE lamp.

Park brake application is completely independent of the hydraulic brake system. The park brake system is a mechanical system which operates the rear disc brakes through the calipers. The system is activated by pulling the park brake lever upwards, which applies the rear disc brakes via cables. A mechanical stop in the lever will hold the lever in the chosen position. When the park brake is set and the ignition switch is on, the Park Brake warning lamp on the instrument panel will be on. The park brake is released by pushing the knob on the underside of the lever, raise it a few millimeters and then push it downwards to its lowest position. When the lever reaches its lowest position the Park Brake lamp in the instrument cluster will go out.

Electronic Park Brake System

In the electronic park brake (EPB) system the brake cables are pulled by the motor in the electric park brake control module (EPBCM). Refer to [Electronic Parking Brake Description](#).

Instead of a park brake lever there is an electric switch in the mid-console. By pulling the switch upwards the park brake is activated and the park brake warning lamp in the IPC is illuminated. By pushing it downwards the park brake is released and the warning lamp goes out.

The motor in the EPCM pulls the cable to the right-hand rear wheel caliper. An equalizer is mounted on the cable and pulls the cable to the left-hand rear wheel.

The function is divided into:

- Static apply/release
- Dynamic apply/release
- Automatic release

Static Apply/Release

Initial Vehicle Condition	Action Taken	Result
EPB released. Ignition OFF. Remove key and wait at least 30 seconds for the Bus to go to sleep	Lift switch	• EPB applies • Red tell-tale illuminates
EPB applied - Ignition OFF	Press switch	No operation
EPB applied - Ignition OFF, brake pedal applied	Press switch	No operation
EPB applied - Ignition in ACC	Press switch	• EPB does not release • DIC display = Press Brake Pedal to Release Park Brake • Chime sounds
EPB applied - Ignition in ACC, brake pedal applied	Press switch	• EPB releases • Red tell-tale turns off
EPB applied - Ignition ON	Press switch	• EPB does not release • DIC display = Press Brake Pedal to Release Park Brake • Chime sounds
EPB applied - Ignition ON, brake pedal applied	Press switch	• EPB releases • Red tell-tale turns off
EPB released - Ignition ON	Lift switch	• EPB applies • Red tell-tale illuminates

Initial Vehicle Condition	Action Taken	Result
EPB released - Ignition in ACC	Lift switch	• EPB applies • Red tell-tale illuminates
EPB applied - Ignition in ACC	Ignition is OFF	Park Brake Set DIC message disappears after delay
Engine on, speed above 15 km/h	Lift and hold switch	• If cruise control is on, cruise is disabled • ESC controlled deceleration down to 6 km/h (4 mph) • Red tell-tale illuminated • Brake light applied • Continuous chime above 15 km/h (9 mph) • DIC display = Release Park Brake Switch (above 15 km/h (9 mph)) • EPB static apply below 6 km/h (4 mph) • DIC display = Park Brake Set • Red tell-tale remains illuminated
Engine ON, speed between 6 - 15 km/h (4 - 9 mph)	Lift and hold switch	• ESC controlled deceleration down to 6 km/h (4 mph) • Red tell-tale illuminated • Brake light applied • No chime during vehicle motion • No DIC message during vehicle motion • EPB static apply below 6 km/h (4 mph) • DIC display = Park Brake Set • Red tell-tale remains illuminated
Engine ON, speed above 15 km/h (9 mph)	Lift and hold switch for several seconds	ESC controlled stop releases when switch is released. Tell-tale, brake light, chime and DIC go off after brief delay

Initial Vehicle Condition	Action Taken	Result
ESC dynamic deceleration failed, but wheel speed available and pump working, vehicle speed above 15 km/h (9 mph)	Lift and hold switch	• If cruise control is on, cruise is disabled • ESC controlled deceleration down to 6 km/h (4 mph) • Red tell-tale illuminated • Brake light applied • Continuous chime above 15 km/h (9 mph) • DIC display = Release Park Brake Switch (above 15 km/h (9 mph)) • EPB static apply below 6 km/h (4 mph) • DIC display = Park Brake Set • Red tell-tale remains illuminated
No wheel speed signals/ESC bus messages not valid, vehicle speed above 15 km/h (9 mph)	Lift switch and HOLD for at least 5 seconds, then release	• EPB Slow Ramp Up to specified force • Red tell-tale illuminated • Brake light applied • No chime due to missing speed signal • No DIC display • EPB statically applied after 5 seconds of continuous Apply button activation • DIC display = Park Brake Set • Red tell-tale remains illuminated
No brake pedal initial travel achieved signal/signal not valid, vehicle stopped, ignition ON, brake pedal NOT applied. EPB applied.	Press EPB switch for at least 2 seconds	EPB releases after pressing and holding switch for 2 seconds
Manual transmission, engine ON, clutch pedal applied. EPB applied.	Release clutch pedal Press accelerator pedal to drive forward/reverse	EPB releases for a smooth launch. Regulates according to grade.
Automatic transmission in gear, engine ON, brake pedal applied. EPB applied.	Release brake pedal Press accelerator pedal to drive forward/reverse	EPB releases for a smooth launch. Regulates according to grade.