

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

2013 BRAKES

Antilock Brake System - Cruze

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Brake Pipe Fitting	18 N.m	13 lb ft
Brake Pressure Modulator Valve (BPMV) Bracket Bolt	20 N.m	15 lb ft
Electronic Brake Control Module (EBCM) Bolt	3 N.m	27 lb in
Front Wheel Speed Sensor Bolt	6 N.m	53 lb in
Rear Wheel Speed Sensor Bolt	6 N.m	53 lb in
Traction Control Module to Brake Pressure Module Bolt	10 N.m	89 lb in
Yaw Sensor Nut	9 N.m	80 lb in

SCHEMATIC WIRING DIAGRAMS

ANTILOCK BRAKE SYSTEM WIRING SCHEMATICS

Power, Ground, Serial Data, and Traction Control Wiring Schematics

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

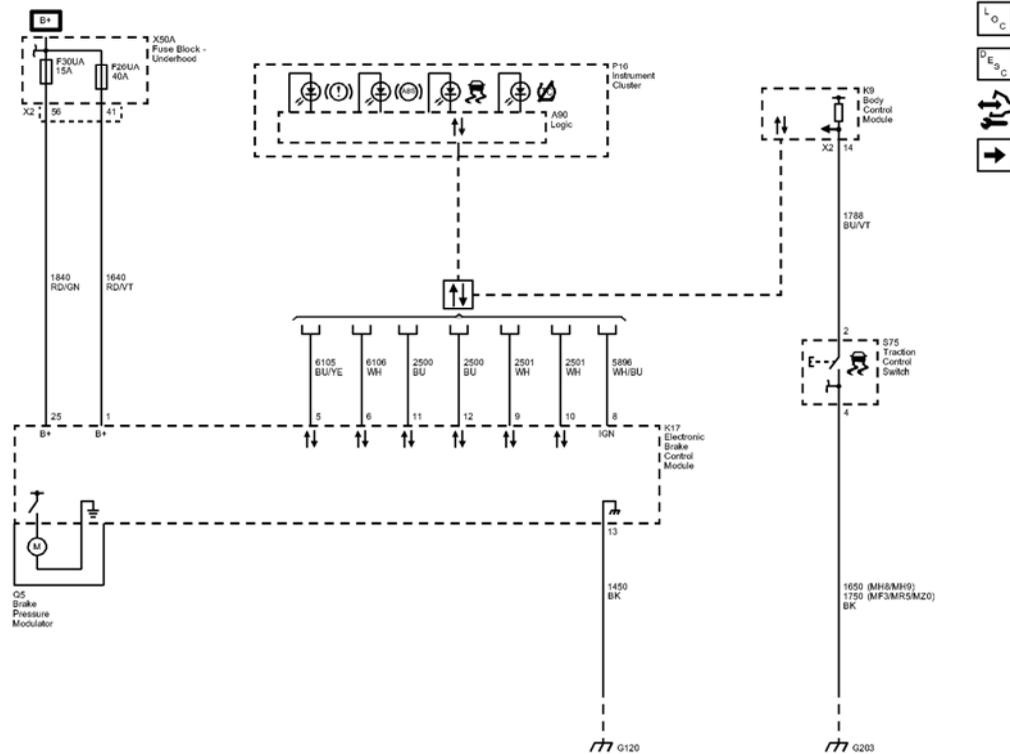


Fig. 1: Power, Ground, Serial Data, and Traction Control Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1840	Battery Positive Voltage
1840 RD/GN	1840 RD/GN
CAV_25	25
CAV_56	56
CONN_X2	X2
1640	Battery Positive Voltage
1640_RD/VT	1640 RD/VT
CAV_1	1
CAV_41	41
SD	Serial Data
Data_Communication_Schematics_REF	Data Communication Schematics
6105	High Speed GMLAN Serial Data (+) (2)
6105_BU/YE	6105 BU/YE
CAV_5	5
6106	High Speed GMLAN Serial Data (-) (2)

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

6106_WH	6106 WH
CAV_6	6
2500	High Speed GMLAN Serial Data (+) (1)
2500_BU	2500 BU
CAV_11	11
2500_BU	2500 BU
CAV_12	12
2501	High Speed GMLAN Serial Data (-) (1)
2501_WH	2501 WH
CAV_9	9
2501_WH	2501 WH
CAV_10	10
5896	Driver Seat Bolster Motor Position Sensor Voltage Reference
5896_WH/BU	5896 WH/BU
CAV_8	8
1750	Ground
1750_BK	1750 BK
CAV_4	4
1650	1650
MH8	TRANSMISSION-AUTO 6 SPD, HMD, X23F
MH9	TRANSMISSION-AUTO 6 SPD, HMD, X24F
1450	Ground
1450 BK	1450 BK
CAV_13	13
1788	Traction Control Switch Signal (1)
1788_BU/VT	1788 BU/VT
CAV_2	2
CAV_14	14
CONN_X2	X2
MF3	TRANSMISSION-MAN 6 SPD, OPEL, 76.5 MM, 4.273 1ST, 2.158 2ND, 1.302 3RD, 0.959 4TH, 0.744 5TH, 0.614 6TH, M32-6 WR
	TRANSMISSION-MAN 6 SPD, OPEL, 76.5 MM, 4.273 1ST,

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

MR5	2.353 2ND, 1.475 3RD, 1.067 4TH, 0.875 5TH, 0.744 6TH, M32-6 WR
MZ0	TRANSMISSION-MAN 6 SPD, OPEL, 76.5 MM, 3.82 1ST, 0.74 6TH, (M32 WR)
G120	G120
G203	G203
F30UA	F30UA 15A
F26UA	F26UA 40A
P16	
K9	
S75	(FX3)
X50A	
Q5	
A90	Logic
K17	

Wheel Speed Sensors Wiring Schematics

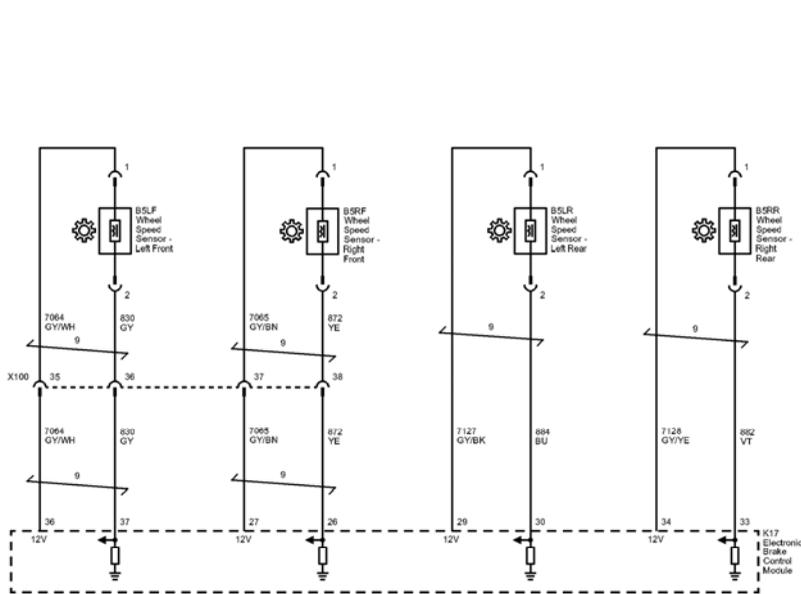


Fig. 2: Wheel Speed Sensors Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

Callout	Component Name
7064	Wheel Speed Sensor Supply Voltage Left Front
7064_GY/WH	7064 GY/WH
CAV_36	36
830	Wheel Speed Sensor Signal Left Front
830_GY	830 GY
CAV_37	37
7065	Wheel Speed Sensor Supply Voltage Right Front
7065_GY/BN	7065 GY/BN
CAV_27	27
872	Wheel Speed Sensor Signal Right Front
872_YE	872 YE
CAV_1	1
CAV_1	1
CAV_2	2
CAV_2	2
7127	Wheel Speed Sensor Supply Voltage Left Rear
7127_GY/BK	7127 GY/BK
CAV_29	29
884	Wheel Speed Sensor Signal Left Rear
884_BU	884 BU
CAV_30	30
7064_GY/WH	7064 GY/WH
830_GY	830 GY
7065_GY/BN	7065 GY/BN
872_YE	872 YE
CAV_2	2
CAV_1	1
7128	Wheel Speed Sensor Supply Voltage Right Rear
7128_GY/YE	7128 GY/YE
CAV_34	34
882	Wheel Speed Sensor Signal Right Rear
882_VT	882 VT
CAV_33	33
CAV_2	2
CAV_1	1
CAV_26	26
X100	X100
CAV_35	35
CAV_36	36
CAV_37	37

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

	38
TWIST_9	9
X100	X100
B5LF	
B5RF	
B5LR	
B5RR	
K17	

Stability Control Wiring Schematics

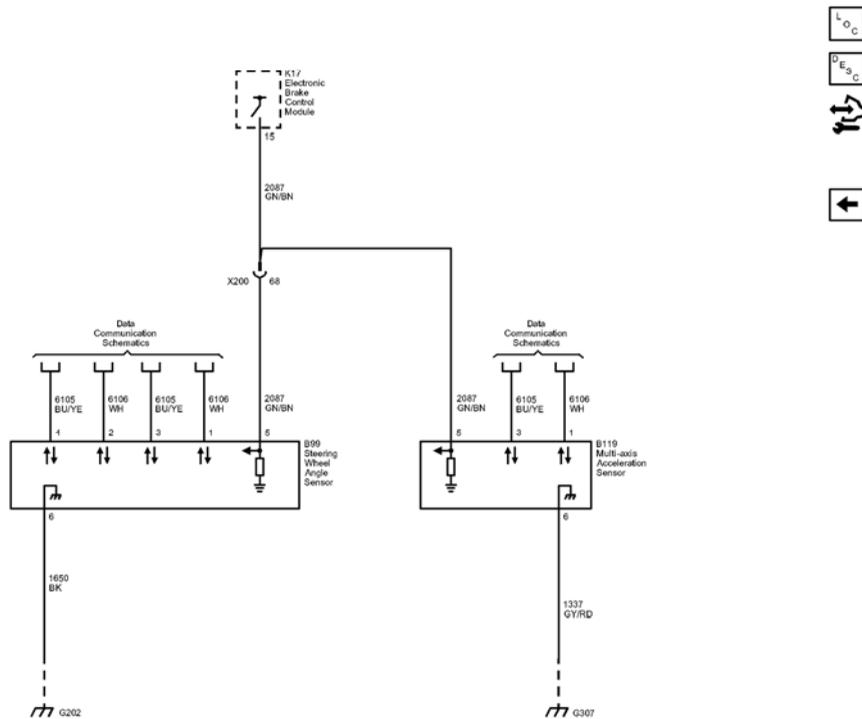


Fig. 3: Stability Control Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
2087	Combined Vehicle Inertial

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

	Sensor Supply Voltage
2087_GN/BN	2087 GN/BN
CAV_5	5
CAV_15	15
2087_GN/BN	2087 GN/BN
CAV_5	5
2087_GN/BN	2087 GN/BN
CAV_68	68
6106	High Speed GMLAN Serial Data (-) (2)
6106_WH	6106 WH
CAV_2	2
6105	High Speed GMLAN Serial Data (+) (2)
6105_BU/YE	6105 BU/YE
CAV_3	3
6106_WH	6106 WH
CAV_1	1
6105_BU/YE	6105 BU/YE
CAV_4	4
1650	Ground
1650_BK	1650 BK
CAV_6	6
6105_BU/YE	6105 BU/YE
CAV_3	3
6106_WH	6106 WH
CAV_1	1
1337	Yaw Rate Sensor Volt Reference
1337_GY/RD	1337 GY/RD
CAV_6	6
X200	X200
G202	G202
G307	G307
B119	(FX3)
B99	(FX3)
K17	
Data_Communication_Schematics_REF	Data Communication Schematics
Data_Communication_Schematics_REF	Data Communication Schematics

DIAGNOSTIC INFORMATION AND PROCEDURES**DIAGNOSTIC CODE INDEX****DIAGNOSTIC CODE INDEX**

DTC	Description
<u>DTC B2745</u>	DTC B2745 02 Traction Control Switch Circuit Short to Ground
<u>DTC C0035, C0040, C0045, or C0050</u>	DTC C0035 06 Left Front Wheel Speed Sensor Circuit Low Voltage/Open DTC C0035 0F Left Front Wheel Speed Sensor Circuit Signal Erratic DTC C0035 18 Left Front Wheel Speed Sensor Circuit Low Signal Amplitude DTC C0035 5A Left Front Wheel Speed Sensor Circuit Not Plausible DTC C0040 06 Right Front Wheel Speed Sensor Circuit Low Voltage/Open DTC C0040 0F Right Front Wheel Speed Sensor Circuit Signal Erratic DTC C0040 18 Right Front Wheel Speed Sensor Circuit Low Signal Amplitude DTC C0040 5A Right Front Wheel Speed Sensor Circuit Not Plausible DTC C0045 06 Left Rear Wheel Speed Sensor Circuit Low Voltage/Open DTC C0045 0F Rear Wheel Speed Sensor Circuit Signal Erratic DTC C0045 18 Left Rear Wheel Speed Sensor Circuit Low Signal Amplitude DTC C0045 5A Left Rear Wheel Speed Sensor Circuit Not Plausible DTC C0050 06 Right Rear Wheel Speed Sensor Circuit Low Voltage/Open DTC C0050 0F Right Rear Wheel Speed Sensor Circuit Signal Erratic DTC C0050 18 Right Rear Wheel Speed Sensor Circuit Low Signal Amplitude DTC C0050 5A Right Rear Wheel Speed Sensor Circuit Not Plausible
<u>DTC C0110</u>	DTC C0110 00 Pump Motor Circuit Malfunction DTC C0110 04 Pump Motor Circuit Open DTC C0110 61 Pump Motor Stuck
<u>DTC C0131</u>	DTC C0131 00 Traction Control System Pressure Circuit Malfunction DTC C0131 4B Traction Control System Pressure Circuit Calibration Not Learned

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

	DTC C0131 5A Traction Control System Pressure Circuit Not Plausible
<u>DTC C0161</u>	DTC C0161 5A Antilock Braking System Brake Switch Circuit Not Plausible
<u>DTC C0186, C018B, C0196, C019B, or C0287</u>	<p>DTC C0186 5A Lateral Acceleration Sensor Circuit Not Plausible</p> <p>DTC C0186 71 Lateral Acceleration Sensor Circuit Invalid Data</p> <p>DTC C018B 5A Multi-Axis Acceleration Sensor Signal Not Plausible</p> <p>DTC C0196 00 Yaw Rate Circuit Malfunction</p> <p>DTC C0196 5A Yaw Rate Signal Not Plausible</p> <p>DTC C0196 71 Yaw Rate Signal Invalid Data</p> <p>DTC C019B 5A Yaw Rate Signal Not Plausible</p> <p>DTC C0287 4B Longitudinal Acceleration Sensor Circuit Calibration Not Learned</p> <p>DTC C0287 5A Longitudinal Acceleration Sensor Circuit Not Plausible</p> <p>DTC C0287 71 Longitudinal Acceleration Sensor Circuit Invalid Data</p>
<u>DTC C0280</u>	DTC C0280 54 Stability System Active Too Long High Temperature
<u>DTC C0710</u>	<p>DTC C0710 00 Steering Position Signal Malfunction</p> <p>DTC C0710 42 Steering Position Signal Calibration Not Programmed</p> <p>DTC C0710 71 Steering Position Signal Invalid Data</p> <p>DTC C0710 5A Steering Position Signal Not Plausible</p>
<u>DTC C1207-C1210, C1221-C1228, or C1232-C1235</u>	<p>DTC C1207 00 Left Front Wheel Speed Sensor Circuit High Input</p> <p>DTC C1208 00 Right Front Wheel Speed Sensor Circuit High Input</p> <p>DTC C1209 00 Left Rear Wheel Speed Sensor Circuit High Input</p> <p>DTC C1210 00 Right Rear Wheel Speed Sensor Circuit High Input</p> <p>DTC C1221 00 Left Front Wheel Speed Sensor Circuit Malfunction</p> <p>DTC C1222 00 Right Front Wheel Speed Sensor Circuit Malfunction</p> <p>DTC C1223 00 Left Rear Wheel Speed Sensor Circuit Malfunction</p> <p>DTC C1224 00 Right Rear Wheel Speed Sensor Circuit Malfunction</p>
	DTC C1251 Lateral Acceleration Sensor

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

<u>DTC C1251</u>	Performance
<u>DTC P0856</u>	DTC P0856 Traction Control Torque Request Circuit

DTC B2745

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 Descriptor

DTC B2745 02

Traction Control Switch Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	B2745 02	1	1	-
Ground	-	1	-	-

1. Traction control switch inoperative

Circuit/System Description

The body control module monitors the traction control switch. When the traction control switch is pressed once, the body control module will request the electronic brake control module via serial data to disable the traction control. The electronic brake control module will request the instrument cluster via serial data to turn the traction control off indicator ON to notify the driver of the deactivation.

When the traction control switch is pressed and held for five seconds, the body control module will request the electronic brake control module to disable the electronic stability control. The electronic brake control module will request the instrument cluster via serial data to turn the traction control off and stability control off indicator ON to notify the driver of the deactivation.

Conditions for Running the DTC

Ignition ON.

Conditions for Setting the DTC

The body control module detects a short to ground on the signal circuit.

Action Taken When the DTC Sets

The body control module ignores the traction control switch signal input.

Conditions for Clearing the DTC

A current DTC clears when the diagnostic runs and passes.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 Body Control Module, Traction Control Switch parameter changes between Active and Inactive when pressing and releasing the S75 Traction Control Switch.

- **If the parameter does not change**

Refer to Circuit/System Testing below.

- **If the parameter changes**

3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S75 Traction Control Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the ground circuit terminal 4 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON
4. Verify the scan tool Body Control Module, Traction Control Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 14 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the ground circuit terminal 4.
6. Verify the scan tool Traction Control Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
7. Test or replace the S75 Traction Control Switch.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S75 Traction Control Switch.
2. Test for infinite resistance between the signal terminal 2 and the ground terminal 4 with the switch in the open position.
 - **If less than infinite resistance**

Replace the S75 Traction Control Switch.
 - **If infinite resistance**

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

3. Test for less than 2 ohms between the signal terminal 2 and the ground terminal 4 with the switch in the closed position.
 - **If 2 ohms or greater**

Replace the S75 Traction Control Switch.
 - **If less than 2 ohms**
4. All OK.

Repair Instructions

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

- **Instrument Panel Accessory Bezel Replacement**
- **Control Module References** for Body Control Module replacement, programming and setup

DTC C0035, C0040, C0045, OR C0050

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 C0035 06

Left Front Wheel Speed Sensor Circuit Low Voltage/Open

DTC C0035 0F

Left Front Wheel Speed Sensor Circuit Signal Erratic

DTC C0035 18

Left Front Wheel Speed Sensor Circuit Low Signal Amplitude

DTC C0035 5A

Left Front Wheel Speed Sensor Circuit Not Plausible

DTC C0040 06

Right Front Wheel Speed Sensor Circuit Low Voltage/Open

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

DTC C0040 0F

Right Front Wheel Speed Sensor Circuit Signal Erratic

DTC C0040 18

Right Front Wheel Speed Sensor Circuit Low Signal Amplitude

DTC C0040 5A

Right Front Wheel Speed Sensor Circuit Not Plausible

DTC C0045 06

Left Rear Wheel Speed Sensor Circuit Low Voltage/Open

DTC C0045 0F

Rear Wheel Speed Sensor Circuit Signal Erratic

DTC C0045 18

Left Rear Wheel Speed Sensor Circuit Low Signal Amplitude

DTC C0045 5A

Left Rear Wheel Speed Sensor Circuit Not Plausible

DTC C0050 06

Right Rear Wheel Speed Sensor Circuit Low Voltage/Open

DTC C0050 0F

Right Rear Wheel Speed Sensor Circuit Signal Erratic

DTC C0050 18

Right Rear Wheel Speed Sensor Circuit Low Signal Amplitude

DTC C0050 5A

Right Rear Wheel Speed Sensor Circuit Not Plausible

Diagnostic Fault Information

	Short to	Open/High	Short to	
--	-----------------	------------------	-----------------	--

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

Circuit	Ground	Resistance	Voltage	Signal Performance
Left Front Wheel Speed Sensor Signal	C0035 06	C0035 06	C0035 06	C0035 0F, C0035 18, C0035 5A
Left Front Wheel Speed Sensor Low Reference	-	C0035 06	-	C0035 0F, C0035 18, C0035 5A
Right Front Wheel Speed Sensor Signal	C0040 06	C0040 06	C0040 06	C0040 0F, C0040 18, C0040 5A
Right Front Wheel Speed Sensor Low Reference	-	C0040 06	-	C0040 0F, C0040 18, C0040 5A
Left Rear Wheel Speed Sensor Signal	C0045 06	C0045 06	C0045 06	C0045 0F, C0045 18, C0045 5A
Left Rear Wheel Speed Sensor Low Reference	-	C0045 06	-	C0045 0F, C0045 18, C0045 5A
Right Rear Wheel Speed Sensor Signal	C0050 06	C0050 06	C0050 06	C0050 0F, C0050 18, C0050 5A
Right Rear Wheel Speed Sensor Low Reference	-	C0050 06	-	C0050 0F, C0050 18, C0050 5A

Component	Condition	DTC Symptom Bytes
Wheel Speed Sensor	<ul style="list-style-type: none"> • Physical damage • Debris on the wheel speed sensor or the encoder ring • Loose or worn wheel bearing • Loose or improperly mounted sensor • Air gap between the wheel speed sensor and the encoder ring too large • Water intrusion in the wiring harness 	0F, 18 or 5A

Circuit/System Description

The wheel speeds are detected by active wheel speed sensors and encoder rings. The encoder ring consists of permanent magnets. Each wheel speed sensor receives ignition voltage through the signal circuit from the electronic brake control module. As the wheel spins, the wheel speed sensor produces square wave signal on the signal circuit to the electronic brake control module. The electronic brake control module uses the frequency of the square wave signal to calculate the actual wheel speed.

Conditions for Running the DTC

C0035 06 - C0050 06

Ignition ON.

C0035 0F - C0050 0F

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

- Ignition ON.
- Vehicle speed is greater than 35 km/h (22 MPH).

C0035 18 - C0050 18

- Ignition ON.
- Vehicle speed is greater than 10 km/h (6 MPH).

C0035 5A - C0050 5A

- Ignition ON.
- Vehicle speed is greater than 20 km/h (13 MPH).

Conditions for Setting the DTC

C0035 06 - C0050 06

- A short to voltage, is detected on the wheel speed sensor signal circuit.
- A short to ground or an open/high resistance is detected on the wheel speed sensor signal circuit.
- An open/high resistance is detected in the wheel speed sensor low reference circuit.

C0035 0F - C0050 0F

An erratic wheel speed sensor signal is detected.

C0035 18 - C0050 18

A missing wheel speed sensor signal is detected.

C0035 5A - C0050 5A

The difference between the fastest and the slowest wheel speed is greater than 50%.

Action Taken When the DTC Sets

- The ABS indicator turns ON.
- A message may be displayed.
- The traction/stability control indicator turns ON.
- The electronic brake control module disables the ABS, the traction control, and the electronic stability control for the duration of the ignition cycle.

Conditions for Clearing the DTC

- The condition for setting the DTC is no longer present.
- The history DTC will clear after 40 consecutive fault-free drive cycles have occurred.

Diagnostic Aids

- Do not use a magnet to clean the encoder ring.
- Inspect the wheel hub bearing encoder ring for rust or corrosion.
- If two or more wheel speed sensors are inoperative, diagnose each wheel speed sensor individually.
- If any of the symptom codes 0F, 18 or 5A are set, refer to the Diagnostic Fault Information table for possible mechanical faults or conditions.
- If the customer comments that the ABS indicator is ON only during moist environmental conditions (rain, snow, vehicle wash, etc.), inspect the wheel speed sensor wiring for signs of water intrusion.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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. Test drive the vehicle in a straight line at a speed greater than 40 km/h (25 MPH).
2. Verify all scan tool Wheel Speed Sensor parameters are within 1.6 km/h (1 MPH) of each other.
 - **If any parameter is not within 1.6 km/h (1 MPH) of each other**

Refer to Circuit/System Testing below

- **If each parameter is within 1.6 km/h (1 MPH) of each other**
3. All OK.

Circuit/System Testing

NOTE: If any of the symptom codes 0F, 18 or 5A are set, refer to the Diagnostic Fault Information table for possible mechanical faults or conditions.

1. Ignition OFF, disconnect the harness connector at the appropriate B5 Wheel Speed Sensor. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the low reference circuit terminal 2 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF, disconnect the harness connector at the K17 Electronic Brake Control Module.
 2. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K17 Electronic Brake Control Module.
 - **If less than 5 ohms**
3. Ignition ON.
4. Test for greater than 11 V between the signal circuit terminal 1 and ground.
 - **If less than 11 V**
 1. Ignition OFF, disconnect the harness connector at the K17 Electronic Brake Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance.
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K17 Electronic Brake Control Module.
 - **If 11 V or greater**
5. Install a 3 A fused jumper wire at the signal circuit terminal 1, ignition ON.
6. Verify the scan tool Wheel Speed Sensor parameter changes while rapidly tapping the fused jumper wire to the low reference circuit terminal 2.
 - **If the parameter does not change**
 1. Ignition OFF, disconnect the harness connector at the K17 Electronic Brake Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Replace the K17 Electronic Brake Control Module.
 - **If the parameter changes**
7. Test or replace the B5 Wheel Speed Sensor.

Repair Instructions

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

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

- **Front Wheel Speed Sensor Replacement**
- **Rear Wheel Speed Sensor Replacement (Disc Brake)**, **Rear Wheel Speed Sensor Replacement (Drum Brake)**
- **Control Module References** for Electronic Brake Control Module replacement, programming and setup

DTC C0110

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 C0110 00

Pump Motor Circuit Malfunction

DTC C0110 04

Pump Motor Circuit Open

DTC C0110 61

Pump Motor Stuck

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	C0110 00, C0110 04	C0110 00, C0110 04	-	C0110 61
Ground	-	U0121	-	-

Component	Condition	DTCs
Pump Motor	<ul style="list-style-type: none">• Wear• Damage• Lock	C0110 00 or C0110 61

Circuit/System Description

The pump motor is an integral part of the brake pressure modulator, while the pump motor relay is integral to

the electronic brake control module. The pump motor relay is not engaged during normal system operation. When the ABS, and the traction/stability operation is required, the electronic brake control module activates the pump motor relay and turns the pump motor ON.

Conditions for Running the DTC

Ignition ON.

Conditions for Setting the DTC

- A faulty pump motor or pump motor relay is detected.
- A short to ground or an open/high resistance circuit is detected.

Action Taken When the DTC Sets

- The ABS indicator turns ON.
- The traction/stability control indicator turns ON.
- The electronic brake control module disables the ABS, the traction control, and the stability control for the duration of the ignition cycle.

Conditions for Clearing the DTC

- A current DTC clears when the diagnostic runs and passes.
- The electronic brake control module will turn off the indicators and enable the system functions in the next ignition cycle after driving at a speed of greater than 16 km/h (10 MPH) with no faults detected.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 ABS Pump Motor turns ON and OFF when commanding the ABS Pump Motor Increase and Decrease with a scan tool.

- **If the pump motor does not turn ON and OFF**

Refer to Circuit/System Testing below.

- **If the pump motor turns ON and OFF**

3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the K17 Electronic Brake Control Module. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the ground circuit terminal 13 and ground.

- **If 10 ohms or greater**

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

- **If less than 10 ohms**

3. Ignition ON.
4. Verify that a test lamp illuminates between the 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 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, 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.

5. Replace the Q5 Brake Pressure Modulator.

6. Verify the DTC 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 the DTC does not set**
7. All OK.

Repair Instructions

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

- **Brake Pressure Modulator Valve Replacement**
- **Control Module References** for Electronic Brake Control Module replacement, programming and setup

DTC C0131**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 C0131 00**

Traction Control System Pressure Circuit Malfunction

DTC C0131 4B

Traction Control System Pressure Circuit Calibration Not Learned

DTC C0131 5A

Traction Control System Pressure Circuit Not Plausible

Circuit/System Description

The electronic brake control module monitors the brake pressure sensor which is integral to the brake pressure modulator. The body control module monitors the brake pedal position sensor signal when the brake pedal is applied and sends a serial data message to the electronic brake control module indicating the brake pedal position. The electronic brake control module compares the brake pressure to the brake pedal position and uses this information for vehicle stability control.

Conditions for Running the DTC

Ignition ON.

Conditions for Setting the DTC**C0131 00**

The electronic brake control module detects the brake pressure is out of the specified range.

C0131 4B

The electronic brake control module detects the brake pressure sensor is not calibrated.

C0131 5A

- The electronic brake control module detects an invalid or erratic brake pressure.
- The brake pressure is not plausible with the vehicle acceleration or deceleration.
- The brake pressure is not plausible with the brake pedal position sensor signal.

Action Taken When the DTC Sets

- The traction/stability control indicator turns ON.
- The electronic brake control module disables the traction control and stability control for the duration of the ignition cycle.

Conditions for Clearing the DTC

- A current DTC clears when the diagnostic runs and passes.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Diagnostic Aids

- Diagnose all other stop lamp DTCs or Symptoms prior to performing this diagnostic procedure.
- This DTC may set if the electronic brake control module is loosely attached to the hydraulic unit. The fasteners should be checked for proper torque.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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

DTC C0131 4B

1. Ignition ON.
2. Verify that DTC C0131 4B is not set.
 - **If the DTC is set**
 1. Perform the **Brake Pressure Modulator Valve Pressure Sensor Calibration**.
 2. Verify the DTC does not set.
 - If the DTC sets, replace the Q5 Brake Pressure Modulator.
 - If the DTC does not set.
 - 3. All OK.
 - **If the DTC is not set**
3. All OK.

DTC C0131 00 or C0131 5A

1. Ignition ON.
2. Verify that DTCs C0131 00 or C0131 5A are not set.
 - **If either DTC is set**
 1. Replace the Q5 Brake Pressure Modulator.
 2. Ignition ON.
 3. Verify the DTC does not set.
 - If the DTC sets, replace the K17 Electronic Brake Control Module.
 - If the DTC does not set.
 - 4. All OK.
 - **If the DTCs are not set**
3. All OK.

Repair Instructions

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

- **Brake Pressure Modulator Valve Replacement**
- **Control Module References** for Electronic Brake Control Module replacement, programming and setup

DTC C0161**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 Descriptor**DTC C0161 5A**

Antilock Braking System Brake Switch Circuit Not Plausible

Circuit/System Description

When the brake pedal is applied, the body control module sends a serial data message to the electronic brake control module in reference to the brake pedal positions. The electronic brake control module compares the correlation between the brake pedal position and the amount of brake pressure it senses from the brake pressure sensor, which is internal to the brake pressure modulator. It uses this information to control the vehicle during an stability event.

Conditions for Running the DTC

Ignition ON.

Conditions for Setting the DTC

- The electronic brake control module detects four accelerations from standstill to a vehicle speed greater 40 km/h (26 MPH) without any brake pedal position signal changes.
- The electronic brake control module detects the vehicle speed is greater than 20 km/h (13 MPH), the brake pedal is applied for six minutes, and brake pressure is less than 15 bar (218 PSI).

Conditions for Clearing the DTC

A current DTC clears when the diagnostic runs and passes.

Action Taken When the DTC Sets

No actions are taken

Diagnostic Aids

This DTC may set if the brake pedal is applied while accelerating.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 C0277 or C0890 is not set.
 - **If either DTC is set**

Refer to DTC C0277 or C0890 .
 - **If either DTC is not set**
3. Verify the brake pedal position sensor or the brake pedal is not binding causing residual brake pressure to be detected, while the brake lights operate properly.
 - **If a condition is found**

Repair or replace the applicable component.
 - **If a condition is not found**

4. Verify the scan tool Electronic Brake Control Module Brake Pedal Position Sensor parameter changes between Active and Inactive while applying and releasing the brake pedal.

- **If the parameter does not change between Active and Inactive**

Refer to Symptoms - Lighting .

- **If the parameter changes between Active and Inactive**

5. Refer to Diagnostic Aids, All OK.

DTC C0186, C018B, C0196, C019B, OR C0287

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 C0186 5A

Lateral Acceleration Sensor Circuit Not Plausible

DTC C0186 71

Lateral Acceleration Sensor Circuit Invalid Data

DTC C018B 5A

Multi-Axis Acceleration Sensor Signal Not Plausible

DTC C0196 00

Yaw Rate Circuit Malfunction

DTC C0196 5A

Yaw Rate Signal Not Plausible

DTC C0196 71

Yaw Rate Signal Invalid Data

DTC C019B 5A

Yaw Rate Signal Not Plausible

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

DTC C0287 4B

Longitudinal Acceleration Sensor Circuit Calibration Not Learned

DTC C0287 5A

Longitudinal Acceleration Sensor Circuit Not Plausible

DTC C0287 71

Longitudinal Acceleration Sensor Circuit Invalid Data

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
12V Reference	U0125, U0126	U0125, U0126	-	-
CAN Bus High Serial Data	U0073, U0100, U0101, U0125, U0126, U0140	U0073, U0100, U0101, U0125, U0126, U0140	U0073, U0100, U0101, U0125, U0126, U0140	C0186 5A, C0186 71, C018B 5A, C0196 00, C0196 5A, C0196 71, C019B 5A, C0287 5A, C0287 71
CAN Bus Low Serial Data	U0073, U0100, U0101, U0125, U0126, U0140	U0073, U0100, U0101, U0125, U0126, U0140	U0073, U0100, U0101, U0125, U0126, U0140	C0186 5A, C0186 71, C018B 5A, C0196 00, C0196 5A, C0196 71, C019B 5A, C0287 5A, C0287 71
Ground	-	U0125	-	-

Circuit/System Description

The yaw rate and lateral acceleration sensors are combined into one multi-axis acceleration sensor module, external to the electronic brake control module. The electronic brake control module supplies a 12 V reference voltage to the multi-axis acceleration sensor module. The multi-axis acceleration sensor module communicates with the electronic brake control module via serial data circuit. The electronic brake control module activates the stability control function depending on multi-axis acceleration sensor module input.

Conditions for Running the DTC

Ignition ON.

Conditions for Setting the DTC

C0186 5A

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

The lateral acceleration sensor signal is not plausible with the yaw rate sensor signal, steering angle sensor signal and vehicle speed for 0.5-2 s.

C0186 71

The lateral acceleration sensor signal offset is out of specified range.

C018B 5A

The multi-axis acceleration sensor signal is not plausible.

C0196 00

The yaw rate sensor signal is out specified range.

C0196 5A or C019B 5A

The yaw rate sensor signal is not plausible with the lateral acceleration sensor signal, steering angle sensor signal and vehicle speed. for 0.25-2 s.

C0196 71

The yaw rate sensor offset is out of specified range.

C0287 4B

The longitudinal acceleration sensor is not calibrated.

C0287 5A

The longitudinal acceleration sensor signal is not plausible with the vehicle speed.

C0287 71

The longitudinal acceleration sensor offset is out of specified range.

Action Taken When the DTC Sets

- The electronic brake control module disables the stability control for the duration of the ignition cycle.
- The traction control/stability control-active indicator turns ON.

Conditions for Clearing the DTC

- A current DTC clears when the diagnostic runs and passes.
- The electronic brake control module will turn OFF the indicator in the next ignition cycle.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 Testing

1. Ignition ON
2. Verify that DTC C0287 4B is not set.
 - **If the DTC is set**

Perform the **Vehicle Yaw Sensor Learn**.
 - **If the DTC is not set**
3. Verify the B119 Multi-axis Acceleration Sensor is installed correctly.
 - **If loose or incorrect installation**

Correct the installation of the component.
 - **If installed correctly**
4. Ignition OFF, scan tool disconnected, and all vehicle systems OFF, disconnect the harness connector at the B119 Multi-axis Acceleration Sensor. It may take up to 2 minutes for all vehicle systems to power down.
5. Test for less than 10 ohms between the ground circuit terminal 6 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
6. Ignition ON.
7. Verify a test lamp illuminates between the 12 V reference circuit terminal 5 and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connector at the B99 Steering Wheel Angle Sensor and the K17 Electronic Brake Control Module.
 2. Test for infinite resistance between the 12 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the 12 V reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K17 Electronic Brake Control Module.
 - **If the test lamp illuminates**
8. Replace the B119 Multi-axis Acceleration Sensor.

Repair Instructions

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

- **Vehicle Yaw Sensor Replacement**
- **Control Module References** for Electronic Brake Control Module replacement, programming and setup.

DTC C0280

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 Descriptor

DTC C0280 54

Stability System Active Too Long High Temperature

Circuit/System Description

The solenoid valves are integral parts of the brake pressure modulator. The modulator contains an isolation solenoid valve and a dump solenoid valve for each wheel along with a traction/stability control supply solenoid

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

valve and isolation solenoid valve for each brake circuit. The solenoid valves are not engaged during normal system operation. When the ABS, traction control or stability control operation is required the electronic brake control module turns the required solenoid valves ON. The electronic brake control module detects an over temperature condition with one or more of the solenoids due to an extended ABS, traction control or stability control event lasting more than fifteen seconds.

Conditions for Running the DTC

Ignition ON

Conditions for Setting the DTC

Stability control is active for more than 15 seconds.

Action Taken When the DTC Sets

- The ABS indicator turns ON.
- A Brakes Overheated message may be displayed.
- The traction/stability control indicator turns ON, if equipped with electronic stability control.
- The electronic brake control module disables the ABS, the traction control system and the electronic stability control system for the duration of the ignition cycle.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Diagnostic Aids

This DTC may set due to extended operation of the ABS, the traction control or the stability control.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 Testing

NOTE: Since most occurrences of this DTC are caused by excessive ABS, traction control or stability control usage, review with the customer the conditions under which the DTC set.

1. Ignition ON.
2. Verify that DTC C0186, C018B, C0196, C019B, C0287, or C0710 is not set.
 - If any of the DTCs are set

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

- If none of the DTCs are set
3. Ignition OFF, allow the Q5 Brake Pressure Modulator to cool down to ambient temperature, ignition ON.
4. Verify that DTC C0280 54 does not set while driving the vehicle under normal braking conditions.
 - If the DTC is set

Replace the K17 Electronic Brake Control Module.

- If the DTC is not set
5. All OK.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for Electronic Brake Control Module replacement, programming and setup

DTC C0710

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.

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

DTC Descriptors

DTC C0710 00

Steering Position Signal Malfunction

DTC C0710 42

Steering Position Signal Calibration Not Programmed

DTC C0710 71

Steering Position Signal Invalid Data

DTC C0710 5A

Steering Position Signal Not Plausible

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
12 V Reference	U0125, U0126	U0125, U0126	-	-
Ground	-	U0125, U0126, C0710 5A	-	-

Circuit/System Description

The steering wheel angle sensor receives a 12 V reference voltage from the electronic brake control module. The electronic brake control module receives serial data inputs from the steering wheel angle sensor identifying the position and direction of the steering wheel rotation. The module utilizes this signal to calculate the driver intended driving direction.

Conditions for Running the DTC

- Ignition ON.
- Vehicle speed is greater than 20 km/h (13 MPH).

Conditions for Setting the DTC

C0710 00

The steering angle signal is invalid.

C0710 42

The steering wheel angle sensor is not calibrated.

C0710 5A

- No steering angle signal
- The steering angle signal is not plausible with the yaw rate signal.
- The steering wheel angle sensor offset is out of the specified range.

Action Taken When the DTC Sets

- The traction/stability control indicator turns ON.
- The electronic brake control module disables the traction control, the stability control and the hill start assist for the duration of the ignition cycle.

Conditions for Clearing the DTC

- The DTC clears the DTC when the diagnostic runs and passes.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Diagnostic Aids

- Improperly mounted or loose steering wheel angle sensor.
- The car should not pull in either direction causing the steering wheel to be off center while driving in a straight line on a level surface.
- Confirm that all tires are of the proper size and that all are matching brands. Check and adjust all tires to the stated cold air pressure as identified on the tire placard. If a mis-sized or non-matching brand tire is present, inform the customer that in order for the vehicle stability enhanced system to function normally, tires need to be a uniform size and rolling diameter.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 Steering Wheel Angle parameter value constantly changes from +550 to -550° as the steering wheel is turned through its entire range from left to right.
 - **If the parameter does not change**

Refer to Circuit/System Testing below.

- **If the parameter changes**
3. All OK.

Circuit/System Testing

1. Ignition ON.
2. Verify that DTC U0125 or U0126 is not set.
 - **If DTC U0125 or U0126 is set**
3. Verify that DTC C0710 42 or C0710 5A is not set.
 - **If DTC C0710 42 or C0710 5A is set**

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

- **If DTC U0125 or U0126 is not set**
3. Verify that DTC C0710 42 or C0710 5A is not set.
 - **If DTC C0710 42 or C0710 5A is set**
- Perform the **Steering Angle Sensor Centering**.
- **If DTC C0710 42 or C0710 5A is not set**
4. Verify the B99 Steering Wheel Angle Sensor is installed correctly.
 - **If loose or incorrect installation**

Correct the installation or replace the component.

- **If correct installation**
5. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B99 Steering Wheel Angle Sensor. It may take up to 2 minutes for all vehicle systems to power down.
 6. Test for less than 10 ohms between the ground circuit terminal 6 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
7. Ignition ON.
8. Verify a test lamp illuminates between the 12 V reference circuit terminal 5 and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the harness connector at the B119 Multi-axis Acceleration Sensor and the K17 Electronic Brake Control Module.
 2. Test for infinite resistance between the 12 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the 12 V reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K17 Electronic Brake Control Module.
 - **If the test lamp illuminates**
 - 9. Replace the B99 Steering Wheel Angle Sensor.

Repair Instructions

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

- **Steering Angle Sensor Replacement**
- **Control Module References** for Electronic Brake Control Module replacement, programming and setup

DTC C1207-C1210, C1221-C1228, OR C1232-C1235

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 C1207 00

Left Front Wheel Speed Sensor Circuit High Input

DTC C1208 00

Right Front Wheel Speed Sensor Circuit High Input

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

DTC C1209 00

Left Rear Wheel Speed Sensor Circuit High Input

DTC C1210 00

Right Rear Wheel Speed Sensor Circuit High Input

DTC C1221 00

Left Front Wheel Speed Sensor Circuit Malfunction

DTC C1222 00

Right Front Wheel Speed Sensor Circuit Malfunction

DTC C1223 00

Left Rear Wheel Speed Sensor Circuit Malfunction

DTC C1224 00

Right Rear Wheel Speed Sensor Circuit Malfunction

Circuit/System Description

Each Wheel Speed Sensor receives ignition voltage through the signal high circuit from the Electronic Brake Control Module. Wheel speeds are detected by Active Wheel Speed Sensors and Encoder Rings. The Magnetic Encoder Rings consists of multiple North and South Pole pairs surrounding the outer circumference. When the Encoder Ring rotates and passes by the Wheel Speed Sensor; it generates a sign wave in the Wheel Speed Sensor. The sensor converts the signal to a digital square wave; the square wave values switch between 7mA (Low) and 14mA (High) DC current. As the wheel spins, the module uses the frequency of the square wave signal to calculate the wheel speeds.

Conditions for Running the DTC

Vehicle speed is greater than 12.9 km/h (8 MPH).

Conditions for Setting the DTC

A supervised periodic message indicates the wheel speed serial data has not been received.

Action Taken When the DTC Sets

- The Traction/stability Control indicator turns ON.
- The Electric Brake Control Module disables the traction control, the stability control and the Hill Start Assist for the duration of the ignition cycle.

Conditions for Clearing the DTC

- The DTC clears when the diagnostic runs and passes.
- The history DTC will clear after 40 consecutive fault-free drive cycles have occurred.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 DTC C0035, C0040, C0045, or C0050 is not set.
 - **If any of the DTCs are set**

Refer to **DTC C0035, C0040, C0045, or C0050.**

- **If none of the DTCs are set**
2. Replace the K17 Electronic Brake Control Module.
3. Verify DTC C1207, C1208, C1209, C1210, C1221, C1222, C1223, or C1224 does not set while operating the vehicle within the Conditions for Running the DTC.
 - **If any of the DTCs are set**

Replace the module that set the DTC.

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

4. All OK.

Repair Instructions

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

Control Module References for Electronic Brake Control Module or module replacement, programming and setup

DTC C1251

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 C1251

Lateral Acceleration Sensor Performance

For symptom byte information refer to **Symptom Byte List** .

Circuit/System Description

The yaw rate, lateral acceleration and longitudinal acceleration sensors are combined into one multi-axis acceleration sensor, external to the electronic brake control module. The electronic brake control module supplies ignition voltage to the multi-axis acceleration sensor. The multi-axis acceleration sensor communicates with the electronic brake control module via serial data. The electronic brake control module activates the stability control function depending on the multi-axis acceleration sensor input. The transmission control module sets this DTC.

Conditions for Running the DTC

Engine running

Conditions for Setting the DTC

The transmission control module detects a fault that prevents it from performing a hill hold start assist function.

Action Taken When the DTC Sets

- The traction/stability control indicator turns ON.
- The electronic brake control module disables the traction control and the stability control for the duration

of the ignition cycle.

Conditions for Clearing the DTC

- The DTC clears when the diagnostic runs and passes.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 no other DTCs are set except for C1251 is set.
 - **If any other DTCs are set**

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

- **If no other DTCs are set**
3. Replace the K71 Transmission Control Module.
4. Verify that DTC C1251 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 the DTC does not set**

5. All OK.

Repair Instructions

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

Control Module References for Electronic Brake Control Module or Transmission Control Module replacement, programming and setup

DTC P0856

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 Descriptor

DTC P0856

Traction Control Torque Request Circuit

Circuit/System Description

When traction control is active, the electronic brake control module sends a serial data message to the engine control module requesting torque reduction. When certain electronic brake control module DTCs are set, the engine control module will not be able to perform the torque reduction for traction control. A serial data message is sent to the electronic brake control module indicating that traction control is not allowed.

Conditions for Running the DTC

Engine running.

Conditions for Setting the DTC

The engine control module detects a fault that prevents it from performing a traction control function and sends a serial data message to the electronic brake control module indicating that torque reduction is not allowed.

Action Taken When the DTC Sets

- The traction/stability control indicator turns ON.
- The electronic brake control module disables the traction control and stability control for the duration of the ignition cycle.

Conditions for Clearing the DTC

- A current DTC clears when the diagnostic runs and passes.
- The electronic brake control module will turn OFF the indicator in the next ignition cycle.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 Testing

1. Verify that no other DTCs are set except for P0856.
 - **If any other DTCs are set**

Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
 - **If only DTC P0856 is set**
2. Replace the K20 Engine Control Module.
3. Verify the DTC does not set while operating the vehicle within the Conditions for Running the DTC.
 - **If DTC sets**

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

4. All OK.

Repair Instructions

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

Control Module References for Electronic Brake Control Module and Engine Control Module replacement, programming and setup

SYMPTOMS - ANTILOCK BRAKE SYSTEM

NOTE: The following steps must be completed before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** before using the symptom tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
2. Review the system description and operation in order to familiarize yourself with the system functions. Refer to **ABS Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the ABS. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components, for obvious damage or conditions, which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

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

- **ABS Indicator Malfunction**
- **Brake Warning Indicator Malfunction**
- **Traction Control/Stability Control Indicator Malfunction**

ABS INDICATOR MALFUNCTION

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.

Circuit/System Description

The instrument cluster turns On the ABS indicator for five seconds after the ignition is ON or when the electronic brake control module detects a fault and sends a serial data message to the instrument cluster commanding the ABS indicator ON.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 Instrument Cluster ABS Indicator turns On and Off when commanding the All Indicators On and Off with a scan tool.
 - **If the ABS indicator does not turn On and Off**

Replace the P16 Instrument Cluster.
 - **If the ABS indicator turns On and Off**
3. Verify the ABS Indicator turns Off five seconds after the ignition is turned On.

- **If the ABS indicator does not turn Off**

Replace the K17 Electronic Brake Control Module.

- **If the ABS indicator turns Off**

4. All OK.

Repair Instructions

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

Control Module References for Electronic Brake Control Module or Instrument Cluster replacement, programming and setup

TRACTION CONTROL/STABILITY CONTROL INDICATOR MALFUNCTION

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.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	B2745 02	1	1	-
Ground	-	1	-	-
1. Stability Control Switch Malfunction				

Circuit/System Description

The body control module monitors the traction control switch. When the traction control switch is pressed once, the body control module will request the electronic brake control module via serial data to disable the traction control. The electronic brake control module will request the instrument cluster via serial data to turn the traction control off indicator ON to notify the driver of the deactivation.

When the traction control switch is pressed and held for five seconds, the body control module will request the electronic brake control module to disable the electronic stability control. The electronic brake control module will request the instrument cluster via serial data to turn the traction control off and stability control off indicator ON to notify the driver of the deactivation.

Reference Information

Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

ABS Description and Operation

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 instrument cluster indicators listed below turn ON and OFF when commanding the All Indicators ON and OFF with a scan tool.
 - Traction/stability Control indicator
 - Traction Control Off indicator
 - Stability Control Off indicator
 - **If any indicator does not turn ON and OFF**

Replace the P16 Instrument Cluster.
 - **If all indicator turn ON and OFF**
3. Verify the scan tool Body Control Module, Traction Control Switch parameter changes between Active and Inactive when pressing and releasing the S75 Traction Control Switch.
 - **If the parameter does not change**

Refer to Circuit/System Testing below.
 - **If the parameter changes**
4. All OK.

Circuit/System Testing

NOTE: Circuit/System Verification must be performed before Circuit/System Testing.

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S75 Traction Control Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the ground circuit terminal 4 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. Verify the scan tool Body Control Module, Traction Control Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 body control module.
 2. Test for infinite resistance between the signal circuit terminal 14 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and ground.
6. Verify the scan tool Traction Control Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
7. Test or replace the S75 Traction Control Switch.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S75 Traction Control Switch.
2. Test for infinite resistance between the signal circuit terminal 2 and the ground circuit terminal 4 with the switch in the open position.
 - **If less than infinite resistance**

Replace the S75 Traction Control Switch.

- **If infinite resistance**
- 3. Test for less than 2 ohms between the signal circuit terminal 2 and the ground circuit terminal 4 with the switch in the closed position.
 - **If 2 ohms or greater**

Replace the S75 Traction Control Switch.
- **If less than 2 ohms**
- 4. All OK.

Repair Instructions

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

- **Instrument Panel Accessory Bezel Replacement**
- **Instrument Cluster Replacement**
- **Control Module References** for Body Control Module or Instrument Cluster replacement, programming and setup

REPAIR INSTRUCTIONS

ANTILOCK BRAKE SYSTEM AUTOMATED BLEED

WARNING: Refer to **Brake Fluid Irritant Warning** .

CAUTION: Refer to **Brake Fluid Effects on Paint and Electrical Components Caution** .

NOTE: Before performing the ABS Automated Bleed Procedure, first perform a pressure bleed of the base brake system. Refer to **Hydraulic Brake System Bleeding (Manual Bleeding)** , **Hydraulic Brake System Bleeding (Pressure Bleeding)** . The automated bleed procedure is recommended when one of the following conditions exist:

- Base brake system bleeding does not achieve the desired pedal height or feel
- Extreme loss of brake fluid has occurred
- Air ingestion is suspected in the secondary circuits of the brake modulator assembly

The ABS Automated Bleed Procedure uses a scan tool to cycle the system solenoid valves and run the pump in order to purge any air from the secondary circuits. These circuits are normally closed off, and are only opened

during system initialization at vehicle start up and during ABS operation. The automated bleed procedure opens these secondary circuits and allows any air trapped in these circuits to flow out toward the brake corners.

Performing the Automated Bleed Procedure

CAUTION: The Auto Bleed Procedure may be terminated at any time during the process by pressing the EXIT button. No further Scan Tool prompts pertaining to the Auto Bleed procedure will be given. After exiting the bleed procedure, relieve bleed pressure and disconnect bleed equipment per manufacturers instructions. Failure to properly relieve pressure may result in spilled brake fluid causing damage to components and painted surfaces.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove all four tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .
3. Inspect the brake system for leaks and visual damage. Repair or replace components as needed.
4. Lower the vehicle.
5. Inspect the battery state of charge. Refer to **Battery Inspection/Test** .
6. Install a scan tool.
7. Turn the ignition ON, with the engine OFF.
8. With the scan tool, establish communications with the ABS system. Select Control Functions. Select Automated Bleed from the Control Functions menu.
9. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
10. Following the directions given on the scan tool, pressure bleed the base brake system. Refer to **Hydraulic Brake System Bleeding (Manual Bleeding)** , **Hydraulic Brake System Bleeding (Pressure Bleeding)** .
11. Follow the scan tool directions until the desired brake pedal height is achieved.
12. If the bleed procedure is aborted, a malfunction exists. Perform the following steps before resuming the bleed procedure:
 - If a DTC is detected, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** , and diagnose the appropriate DTC.
 - If the brake pedal feels spongy, perform the conventional brake bleed procedure again. Refer to **Hydraulic Brake System Bleeding (Manual Bleeding)** , **Hydraulic Brake System Bleeding (Pressure Bleeding)** .
13. When the desired pedal height is achieved, press the brake pedal to inspect for firmness.
14. Lower the vehicle.
15. Remove the scan tool.
16. Install the tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .
17. Inspect the brake fluid level. Refer to **Master Cylinder Reservoir Filling** .
18. Road test the vehicle while inspecting that the pedal remains high and firm.

STEERING ANGLE SENSOR REPLACEMENT

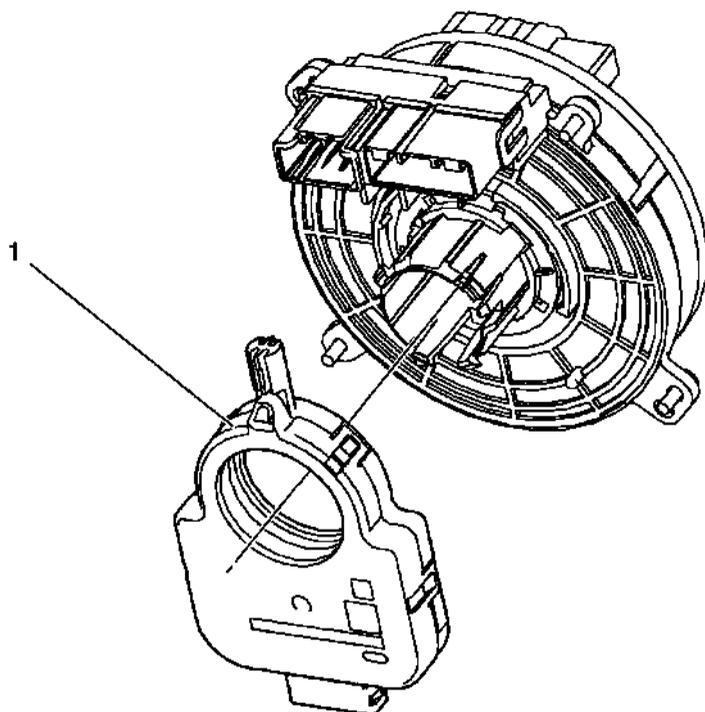


Fig. 4: View Of Steering Wheel Position Sensor
 Courtesy of GENERAL MOTORS COMPANY

Steering Angle Sensor Replacement

Callout	Component Name
Preliminary Procedures Remove the steering wheel inflatable restraint module coil. Refer to <u>Steering Wheel Airbag Coil Replacement</u> .	
1	Steering Wheel Position Sensor WARNING: Never rotate the steering angle sensor. Rotating the steering angle sensor could limit the operation of the electronic power steering (EPS) system, and result in personal injury. Procedure 1. Press in the clip on the inflatable restraint steering wheel module clock-spring coil to remove the sensor. 2. Calibrate the steering angle sensor. Refer to <u>Steering Angle Sensor Centering</u> .

STEERING ANGLE SENSOR CENTERING

WARNING: An inaccurate or not centered steering angle sensor could limit the

operation of the electric power steering (EPS) and result in personal injury.

For vehicles WITHOUT electronic stability control program and INTERNAL Steering Angle Sensor

Refer to the Steering Angle Centering procedure in **Power Steering Control Module Calibration** .

For vehicles WITH electronic stability control program and EXTERNAL Steering Angle Sensor

The external, column mounted, steering angle sensor does not require a centering often. Centering of the external steering angle sensor might be required after certain service procedures are performed. Some of these procedures are as follows:

- Electronic brake control module (EBCM) replacement
- Steering angle sensor replacement
- Steering gear replacement
- Steering column replacement
- Collision or other physical damage

The external steering angle sensor centering procedure can be completed with a scan tool using the following steps:

1. Using the steering wheel, align the front wheels forward.
2. Apply the parking brake, or set the transmission in the P position.
3. Install the scan tool to the data link connector.
4. Ignition ON, engine OFF
5. Select Steering Wheel Angle Sensor Reset in the Steering Wheel Angle Sensor Module Configuration/Reset Functions list.
6. Follow the scan tool directions to complete the learn procedure.
7. Select Steering Wheel Angle Sensor Learn in the Steering Wheel Angle Sensor Module Configuration/Reset Functions list.
8. Follow the scan tool directions to complete the learn procedure.
9. Select Steering Wheel Angle Sensor Learn in the EBCM Configuration/Reset Functions list.
10. Follow the scan tool directions to complete the learn procedure.
11. If the vehicle is equipped with electronic power steering, perform the Software Endstop Learning procedure. Refer to **Power Steering Control Module Calibration** .
12. Clear any DTCs that may be set.

ELECTRONIC BRAKE CONTROL MODULE REPLACEMENT

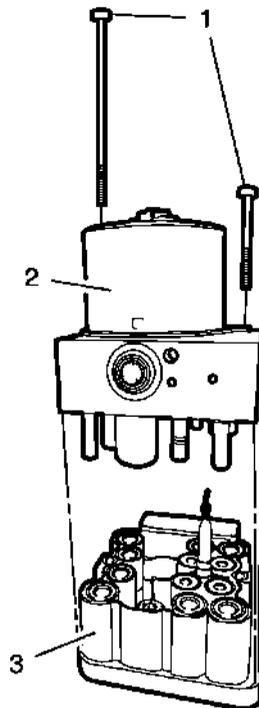


Fig. 5: Electronic Brake Control Module, Modulator Valve & Bolts
 Courtesy of GENERAL MOTORS COMPANY

Electronic Brake Control Module Replacement

Callout	Component Name
<p>WARNING: Refer to <u>Brake Fluid Irritant Warning</u> .</p> <p>CAUTION: Refer to <u>Brake Fluid Effects on Paint and Electrical Components Caution</u> .</p> <p>CAUTION: Always connect or disconnect the wiring harness connector from the EBCM/EBTCM with the ignition switch in the OFF position. Failure to observe this precaution could result in damage to the EBCM/EBTCM.</p> <p>Preliminary Procedures</p> <ol style="list-style-type: none"> 1. Prepare electronic brake control module for replacement. Refer to <u>Control Module References</u> . 2. Disconnect the battery. Refer to <u>Battery Negative Cable Disconnection and Connection</u> . 3. Remove the BPMV from BPMV bracket. Refer to <u>Brake Pressure Modulator Valve Replacement</u>. 	
	Electronic Brake Control Module Bolt (Qty: 2)

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

1	CAUTION: Refer to <u>Fastener Caution</u> . Tighten 3 N.m (26 lb in)
2	Brake Pressure Modulator Valve Electronic Brake Control Module
3	Procedure <ol style="list-style-type: none">1. Carefully separate the EBCM from the BPMV, do not pry the components apart.2. Clean the sealing surface of the BPMV with denatured alcohol and a clean shop cloth and allow to dry.3. Fill the master cylinder reservoir.4. Program the EBCM, IF installing a new EBCM. Refer to <u>Electronic Brake Control Module Programming and Setup</u> .5. Bleed the brake system. Refer to <u>Hydraulic Brake System Bleeding (Manual Bleeding)</u> , <u>Hydraulic Brake System Bleeding (Pressure Bleeding)</u> .6. Perform the automated brake bleed. Refer to <u>Antilock Brake System Automated Bleed</u>.7. Perform a diagnostic system check. Refer to <u>Diagnostic System Check - Vehicle</u> .8. If equipped, calibrate the brake pedal position sensor. Refer to <u>Brake Pedal Position Sensor Calibration</u> .9. Centering the steering angle sensor. Refer to <u>Steering Angle Sensor Centering</u>.

BRAKE PRESSURE MODULATOR VALVE REPLACEMENT

Removal Procedure

WARNING: Refer to **Brake Fluid Irritant Warning** .

CAUTION: Refer to **Brake Fluid Effects on Paint and Electrical Components Caution** .

1. Prepare electronic brake control module for replacement. Refer to **Control Module References** .
2. Turn the ignition to the OFF position.

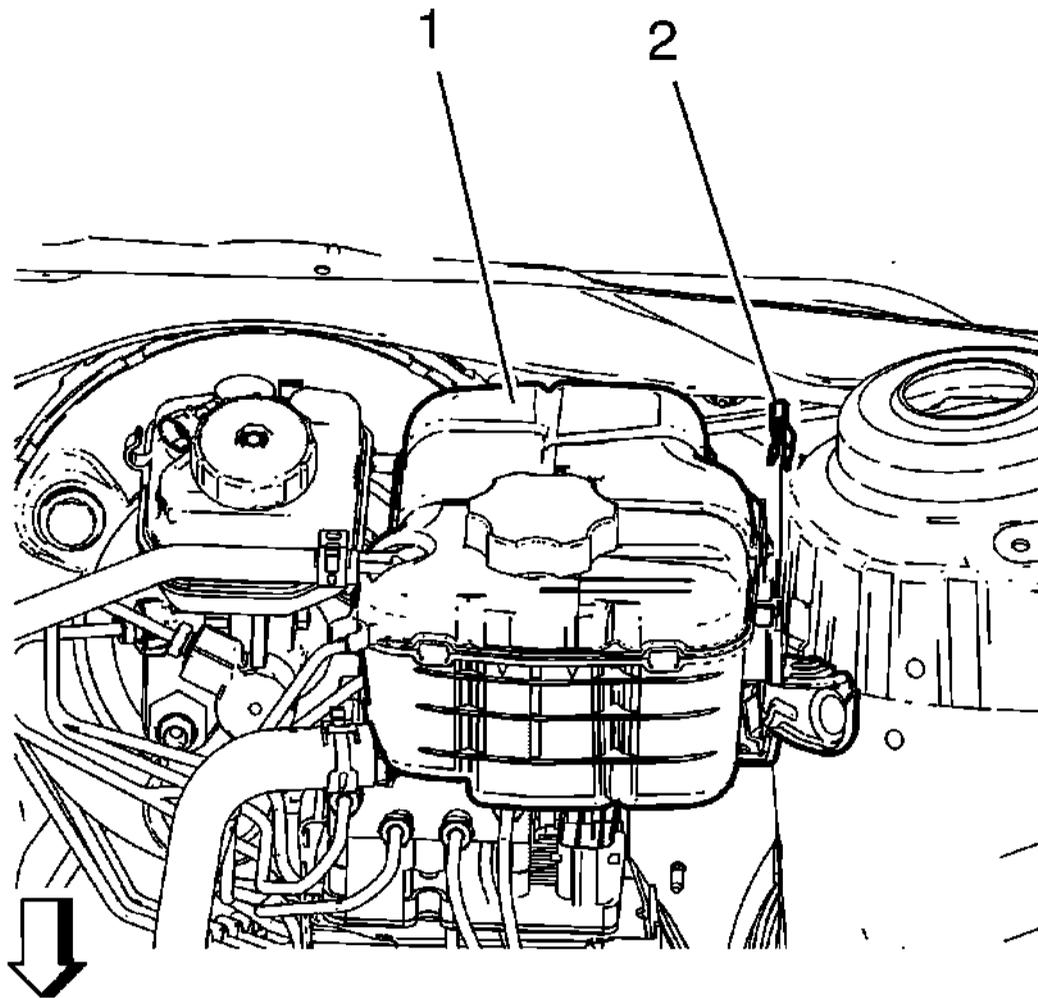


Fig. 6: View Of Radiator Surge Tank And Radiator Surge Tank Clip
Courtesy of GENERAL MOTORS COMPANY

NOTE: Do NOT disconnect engine coolant hoses.

3. Remove the radiator surge tank clip (2).
4. Remove the radiator surge tank (1).

Position the radiator surge tank (1) aside.

CAUTION: Always connect or disconnect the wiring harness connector from the EBCM/EBTCM with the ignition switch in the OFF position. Failure to observe this precaution could result in damage to the EBCM/EBTCM.

5. Disconnect the electrical connector from the EBCM/EBTCM.

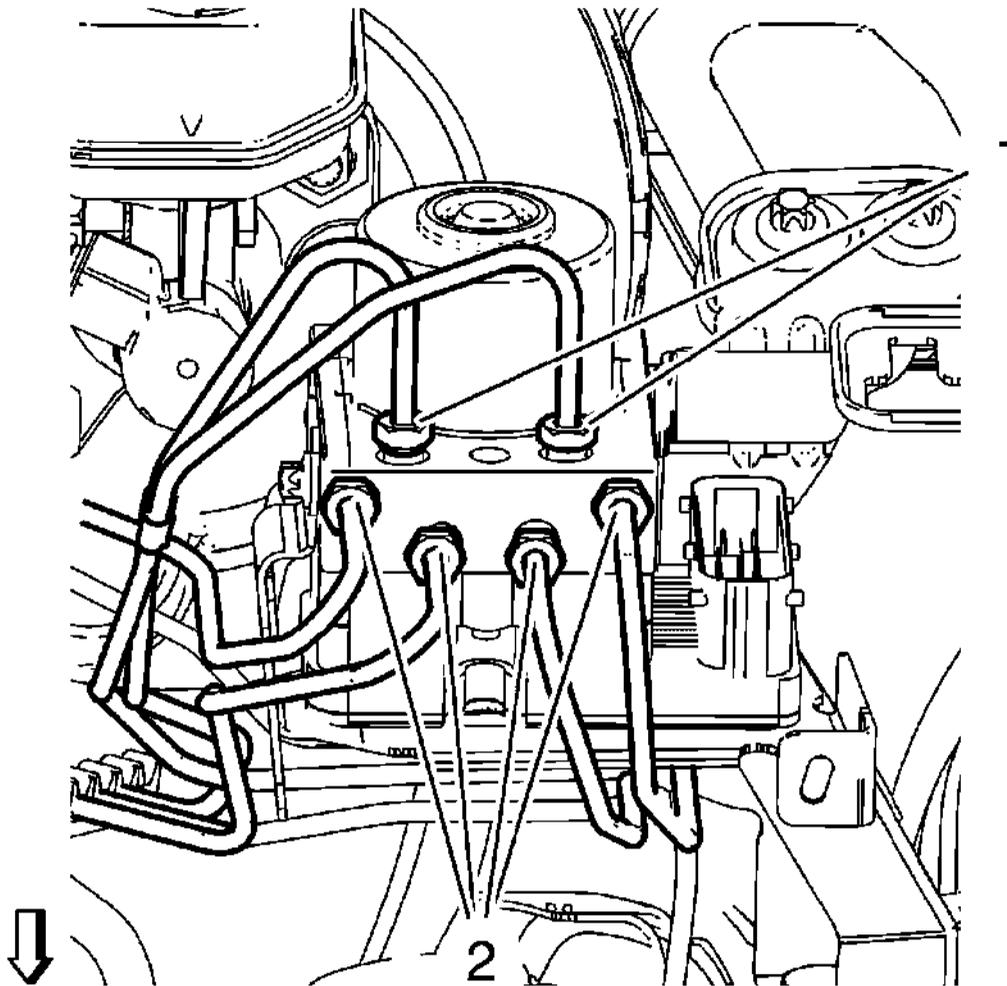


Fig. 7: Brake Pipe Fittings At BPMV
Courtesy of GENERAL MOTORS COMPANY

NOTE: Cap the brake pipe fittings to prevent brake fluid loss and contamination.

6. Remove the 6 brake pipes (1, 2) from the BPMV.

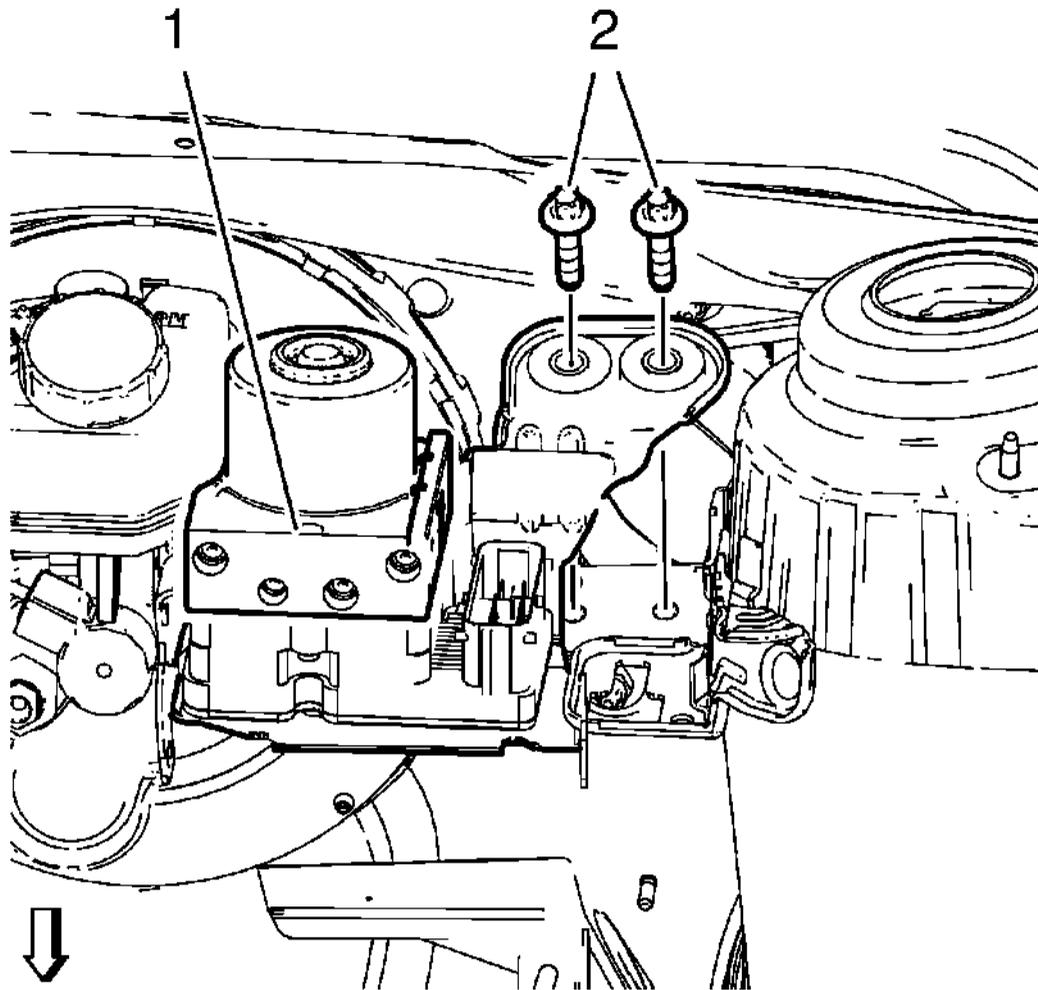


Fig. 8: BPMV and BPMV Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

7. Remove the 2 BPMV bracket bolts (2).
8. Remove the BPMV bracket assembly (1).

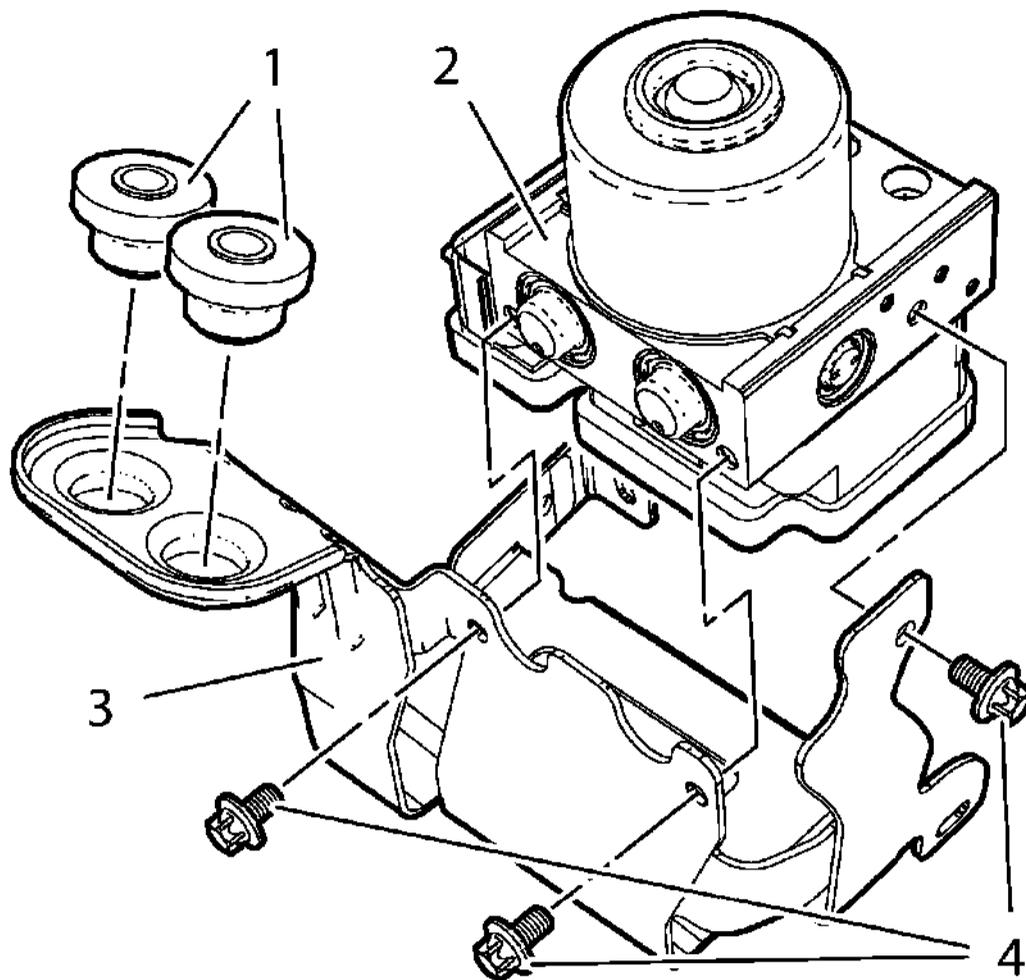


Fig. 9: BPMV and BPMV Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

9. Remove the 3 BPMV bracket bolts.
10. Remove the BPMV (2).
11. Remove the BPMV insulator (1) from the BPMV bracket (3).

Installation Procedure

WARNING: Refer to Brake Fluid Irritant Warning .

CAUTION: Refer to Brake Fluid Effects on Paint and Electrical Components Caution .

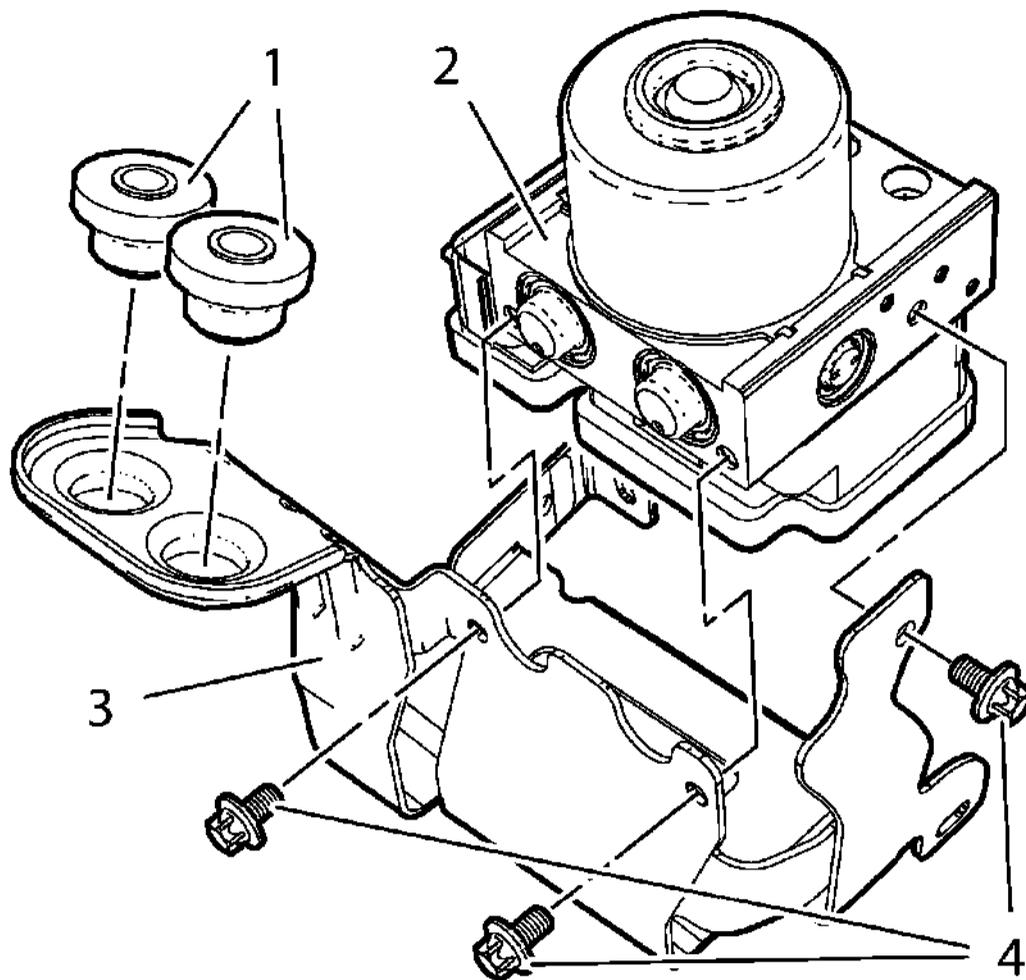


Fig. 10: BPMV and BPMV Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Install the BPMV insulator (1) to the BPMV bracket (3).
2. Install the BPMV (2).

CAUTION: Refer to Fastener Caution .

3. Install the 3 BPMV bracket bolts (4) and tighten to 10 N.m(89 lb in).

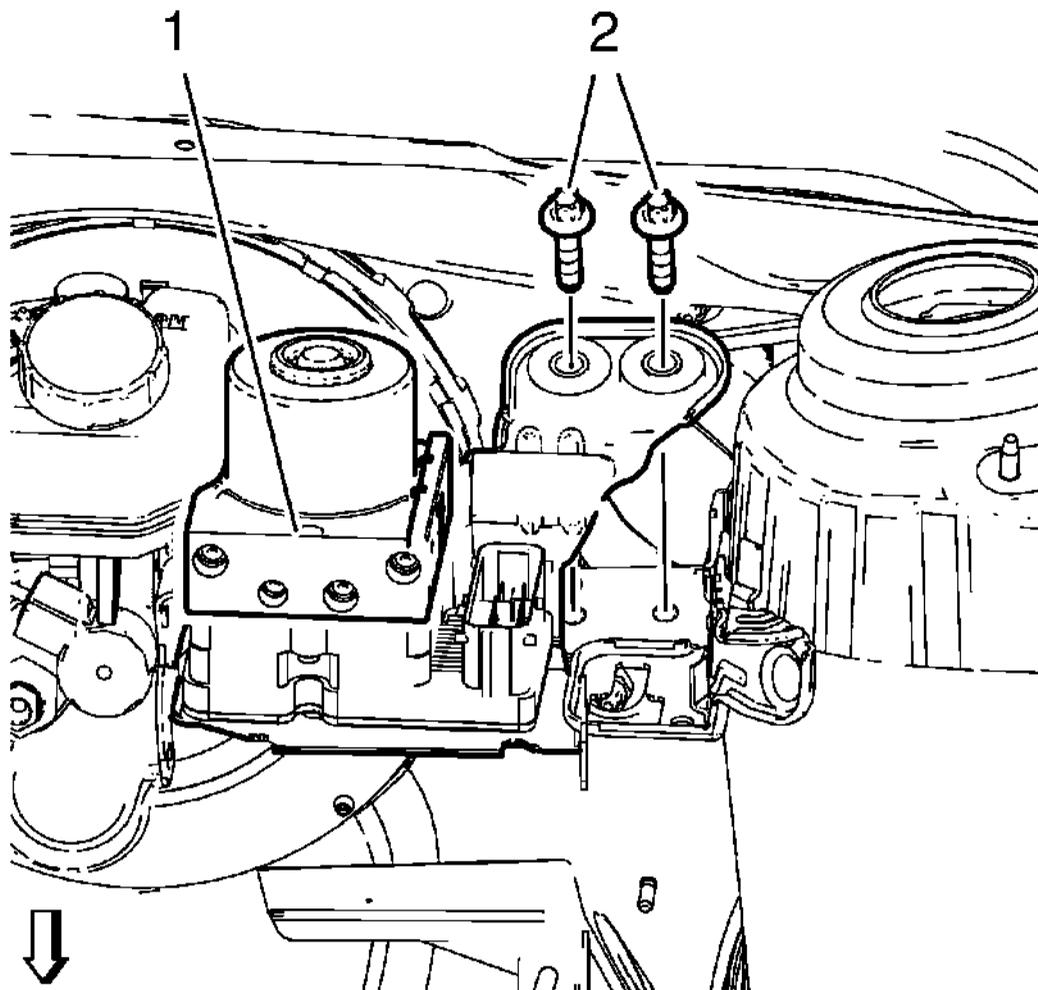


Fig. 11: BPMV and BPMV Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

4. Install the BPMV bracket assembly (1).
5. Install the 2 BPMV bracket bolts (2) and tighten to 20 N.m(15 lb ft).

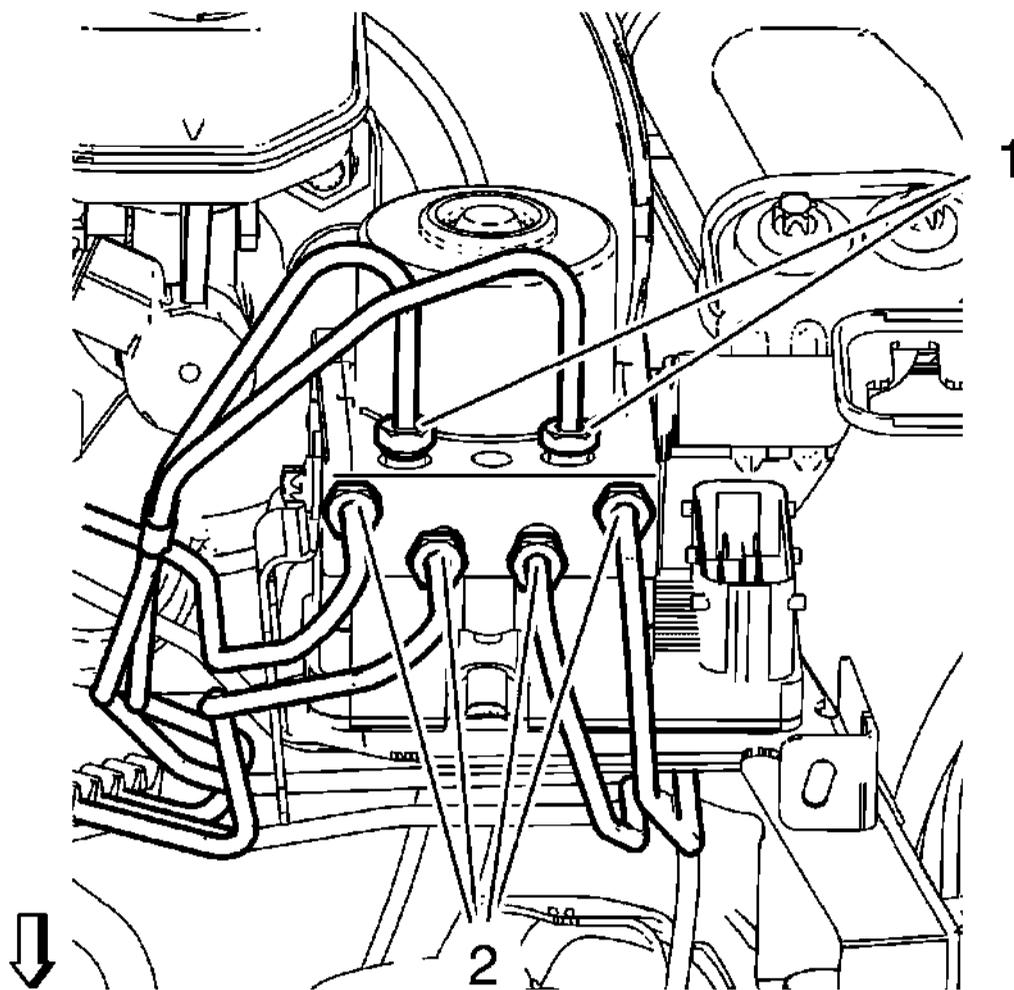


Fig. 12: Brake Pipe Fittings At BPMV
Courtesy of GENERAL MOTORS COMPANY

6. Install the 6 brake pipes (1, 2) to the BPMV and tighten to 18 N.m(14 lb ft).
7. Connect the electrical connector to the EBCM/EBTCM.

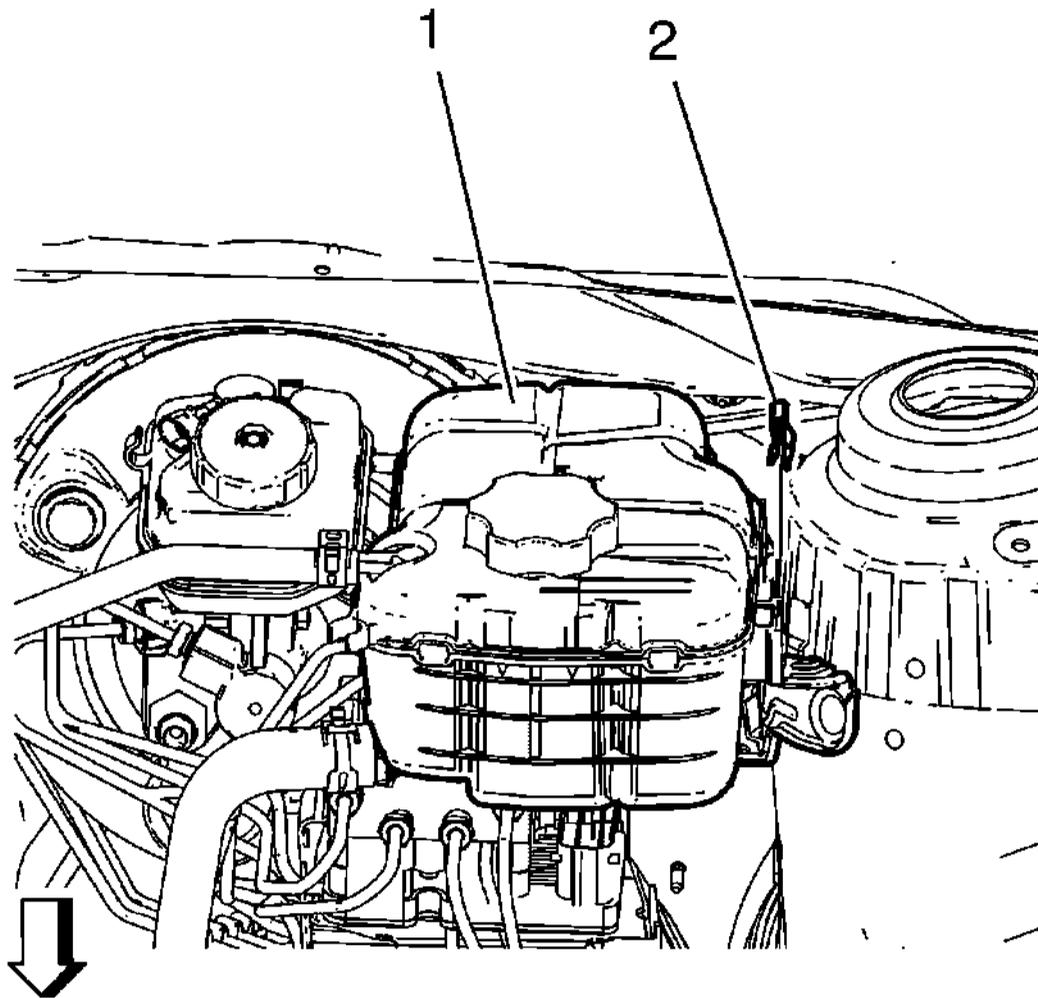


Fig. 13: View Of Radiator Surge Tank And Radiator Surge Tank Clip
Courtesy of GENERAL MOTORS COMPANY

8. Install the radiator surge tank (1).
9. Install the radiator surge tank clip (2).
10. Program the EBCM. Refer to **Electronic Brake Control Module Programming and Setup** .
11. Perform the diagnostic system check - Vehicle. Refer to **Diagnostic System Check - Vehicle** .
12. Calibrate the brake pressure modulator valve pressure sensor. Refer to **Brake Pressure Modulator Valve Pressure Sensor Calibration**.

CAUTION: Only use products that comply with GM specifications and check manufacturer information respectively. We recommend the use of GM genuine products. Instructions must be followed at all times. The use of any type of fluid other than the recommended type of brake fluid, may cause contamination which could result in damage to the internal rubber seals and/or rubber linings of hydraulic brake system

components.

13. Bleed the hydraulic brake system. Refer to **Hydraulic Brake System Bleeding (Manual Bleeding)** , **Hydraulic Brake System Bleeding (Pressure Bleeding)** .
14. Center the steering angle sensor. Refer to **Steering Angle Sensor Centering**.

BRAKE PRESSURE MODULATOR VALVE PRESSURE SENSOR CALIBRATION

The brake pressure sensor does not require calibration often. Calibration of the brake pressure sensor might be required after certain service procedures are performed. Some of these procedures are as follows:

- Electronic brake control module (EBCM) replacement
- Brake pressure modulator valve assembly replacement

The Brake Pressure Sensor Calibration procedure can be completed with a scan tool using the following steps:

1. Apply the parking brake, or set the transmission in the P position.
2. Release the brake pedal.
3. Install the scan tool to the data link connector.
4. Ignition ON, engine OFF
5. Select Brake Pressure Sensor Calibration in the EBCM Configuration/Reset Functions list.
6. Follow the scan tool directions to complete the calibration procedure.
7. Clear any DTCs that may be set.

BRAKE PRESSURE MODULATOR VALVE BRACKET REPLACEMENT

Removal Procedure

WARNING: Refer to **Brake Fluid Irritant Warning** .

CAUTION: Refer to **Brake Fluid Effects on Paint and Electrical Components Caution** .

1. Turn the ignition to the OFF position.

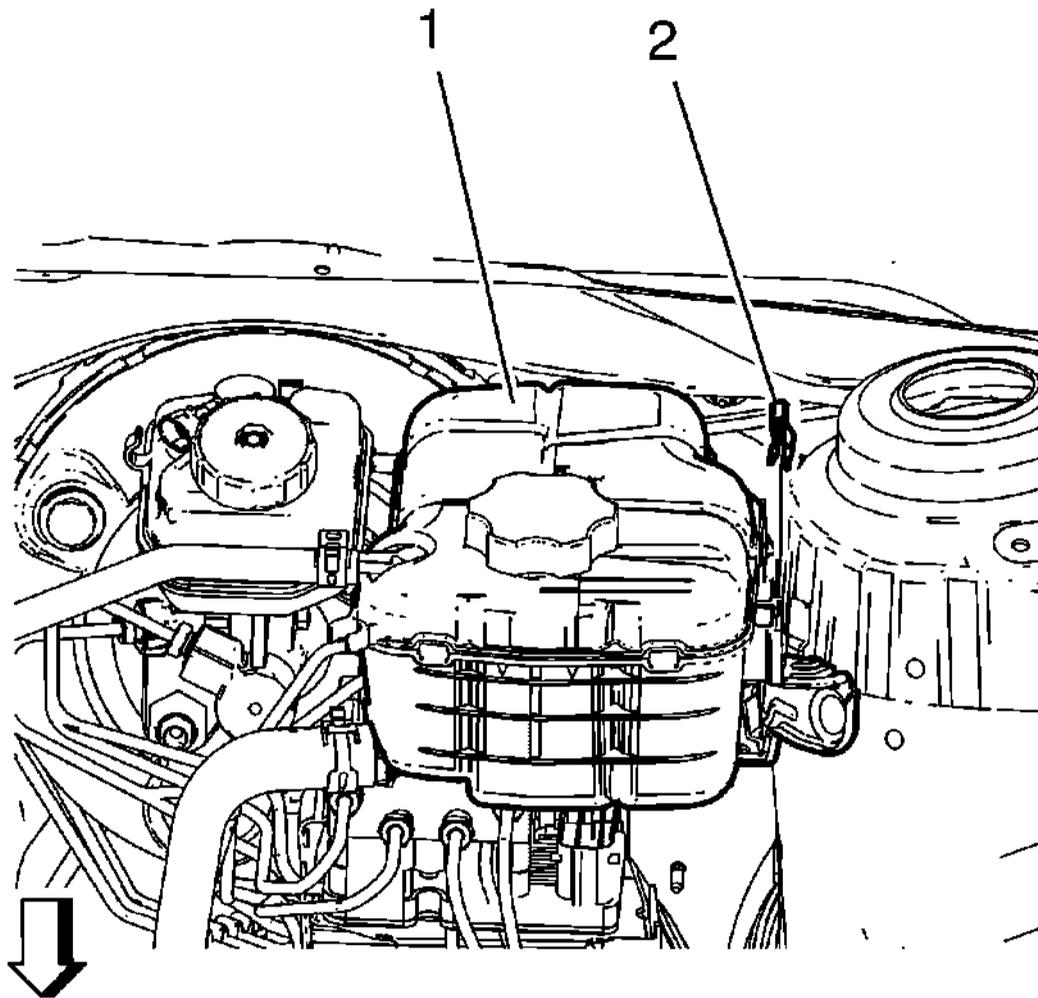


Fig. 14: View Of Radiator Surge Tank And Radiator Surge Tank Clip
Courtesy of GENERAL MOTORS COMPANY

NOTE: Do NOT disconnect engine coolant hoses.

2. Remove the radiator surge tank clip (2).
3. Remove the radiator surge tank (1).

Position the radiator surge tank (1) aside.

CAUTION: Always connect or disconnect the wiring harness connector from the EBCM/EBTCM with the ignition switch in the OFF position. Failure to observe this precaution could result in damage to the EBCM/EBTCM.

4. Disconnect the electrical connector from the EBCM/EBTCM.

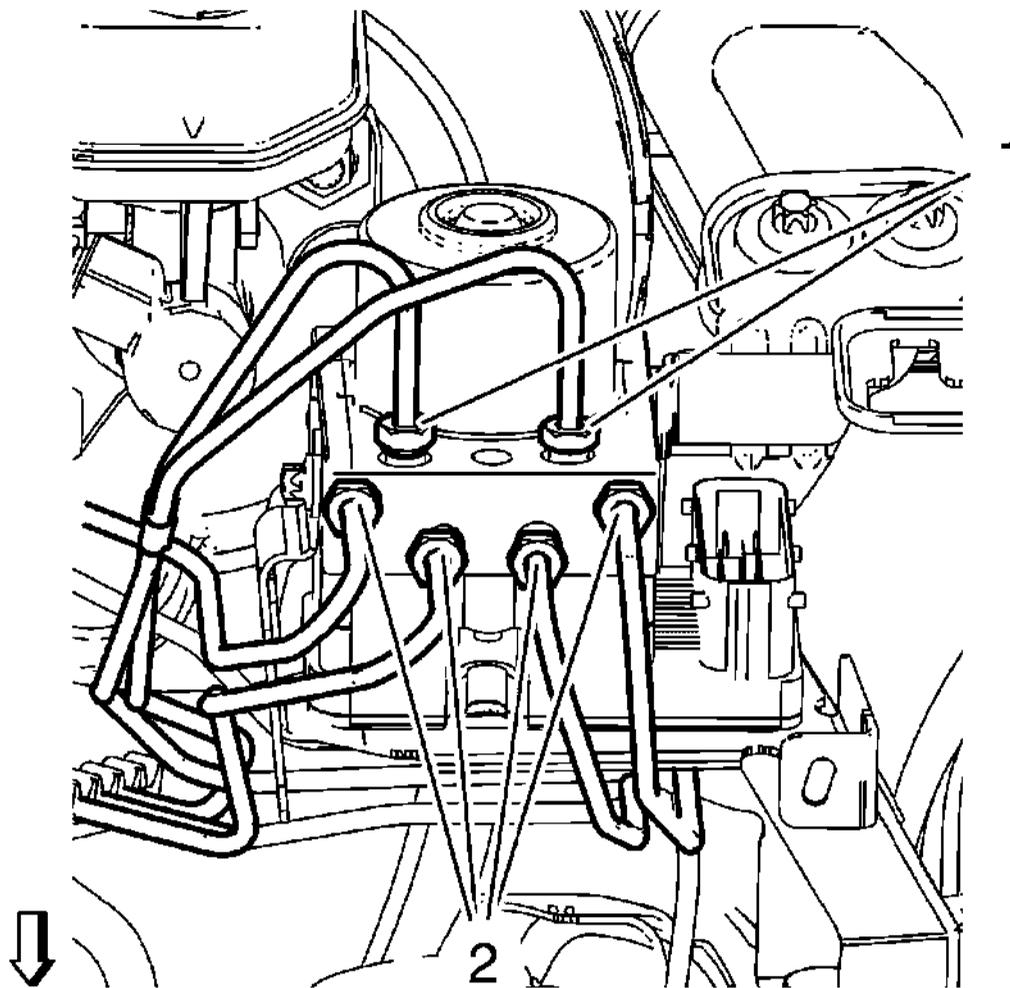


Fig. 15: Brake Pipe Fittings At BPMV
Courtesy of GENERAL MOTORS COMPANY

NOTE: Cap the brake pipe fittings to prevent brake fluid loss and contamination.

5. Remove the 6 brake pipes (1, 2) from the BPMV.

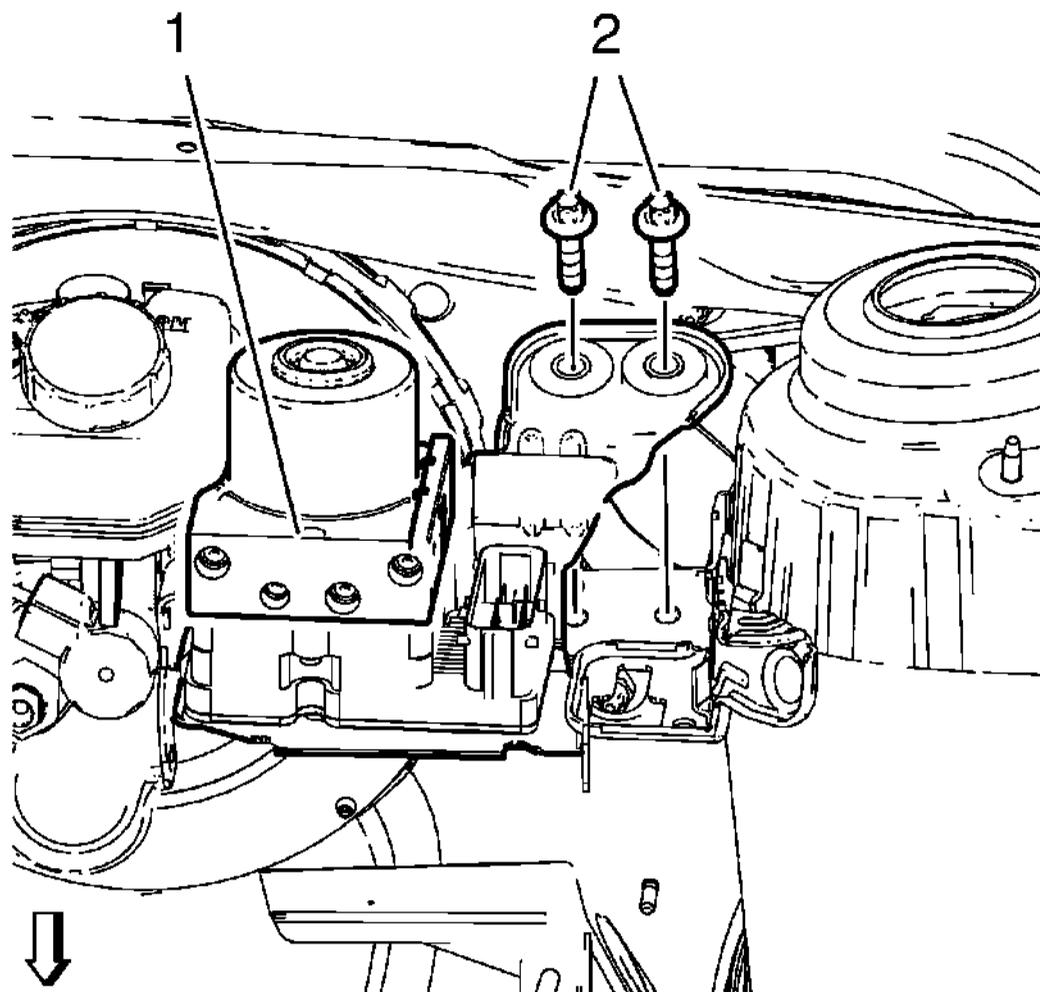


Fig. 16: BPMV and BPMV Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

6. Remove the 2 BPMV bracket bolts (2).
7. Remove the BPMV bracket assembly (1).

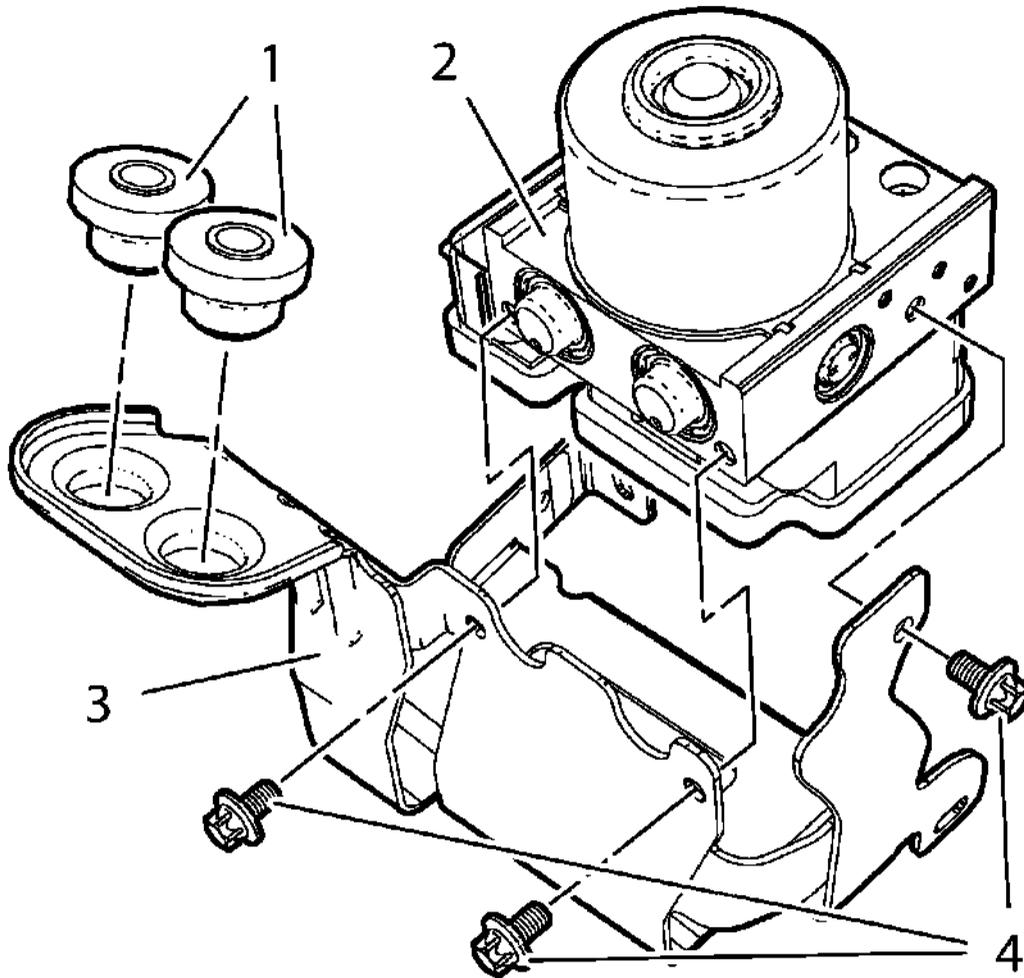


Fig. 17: BPMV and BPMV Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

8. Remove the 3 BPMV bracket bolts.
9. Remove the BPMV (2).
10. Remove the BPMV insulator (1) from the BPMV bracket (3).

Installation Procedure

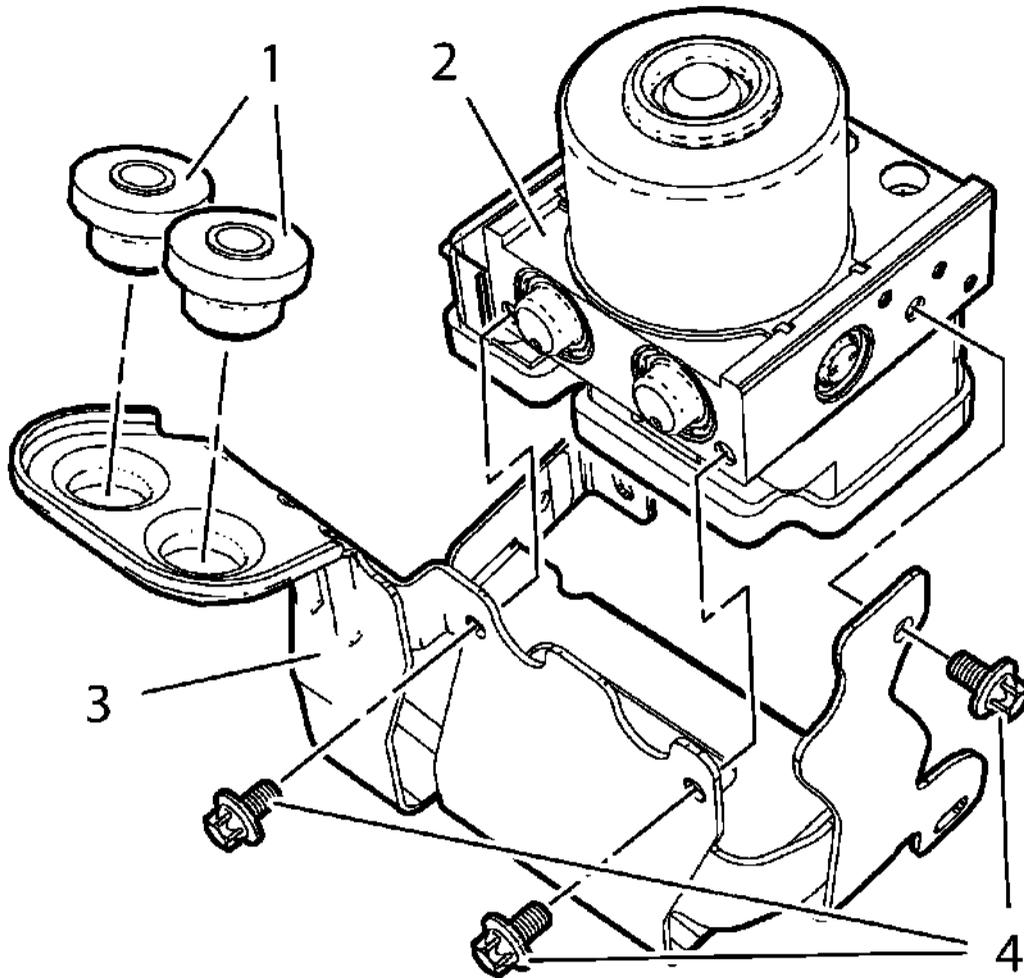


Fig. 18: BPMV and BPMV Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Install the BPMV insulator (1) to the BPMV bracket (3).
2. Install the BPMV (2).

CAUTION: Refer to Fastener Caution .

3. Install the 3 BPMV bracket bolts (4). Tighten the BPMV bracket bolts 10 N.m (89 lb in).

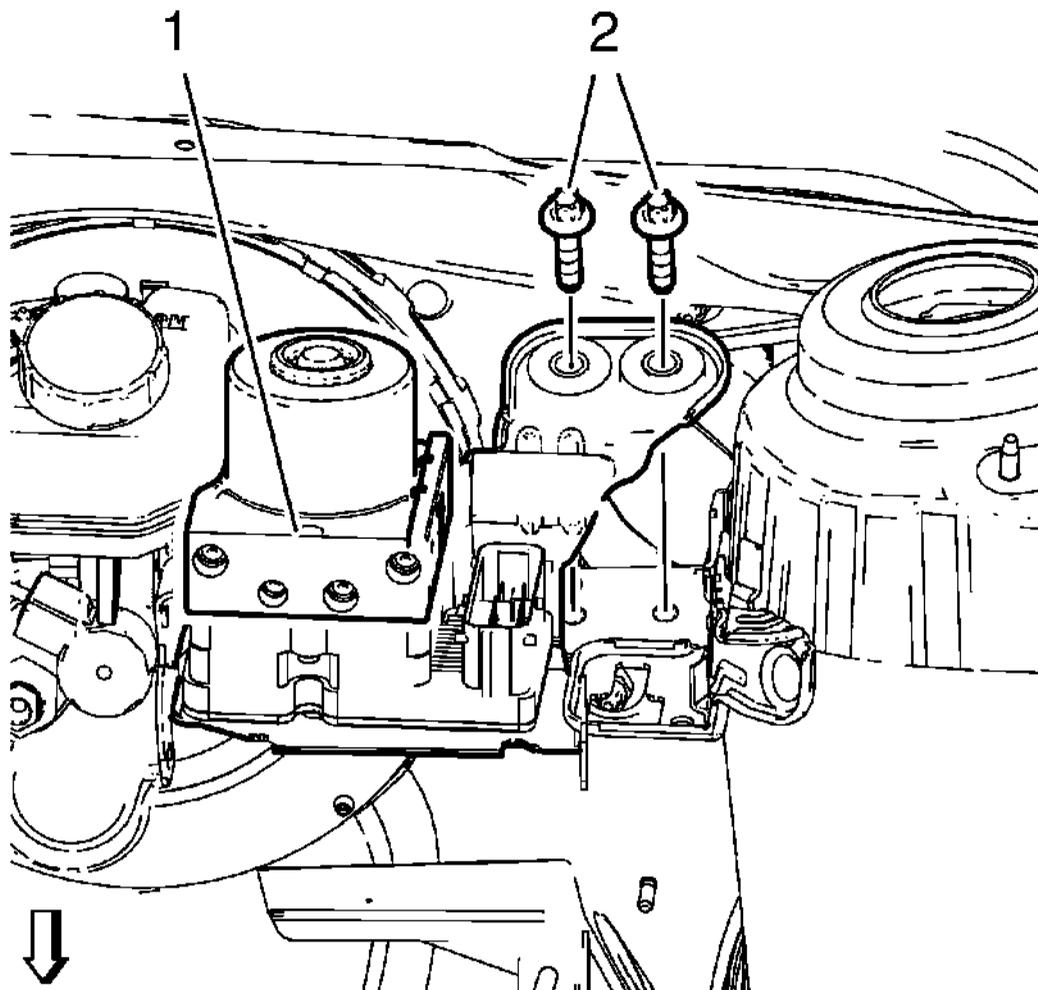


Fig. 19: BPMV and BPMV Bracket Bolts
Courtesy of GENERAL MOTORS COMPANY

4. Install the BPMV bracket assembly (1).
5. Install the 2 BPMV bracket bolts (2) and tighten to 20 N.m (15 lb ft).

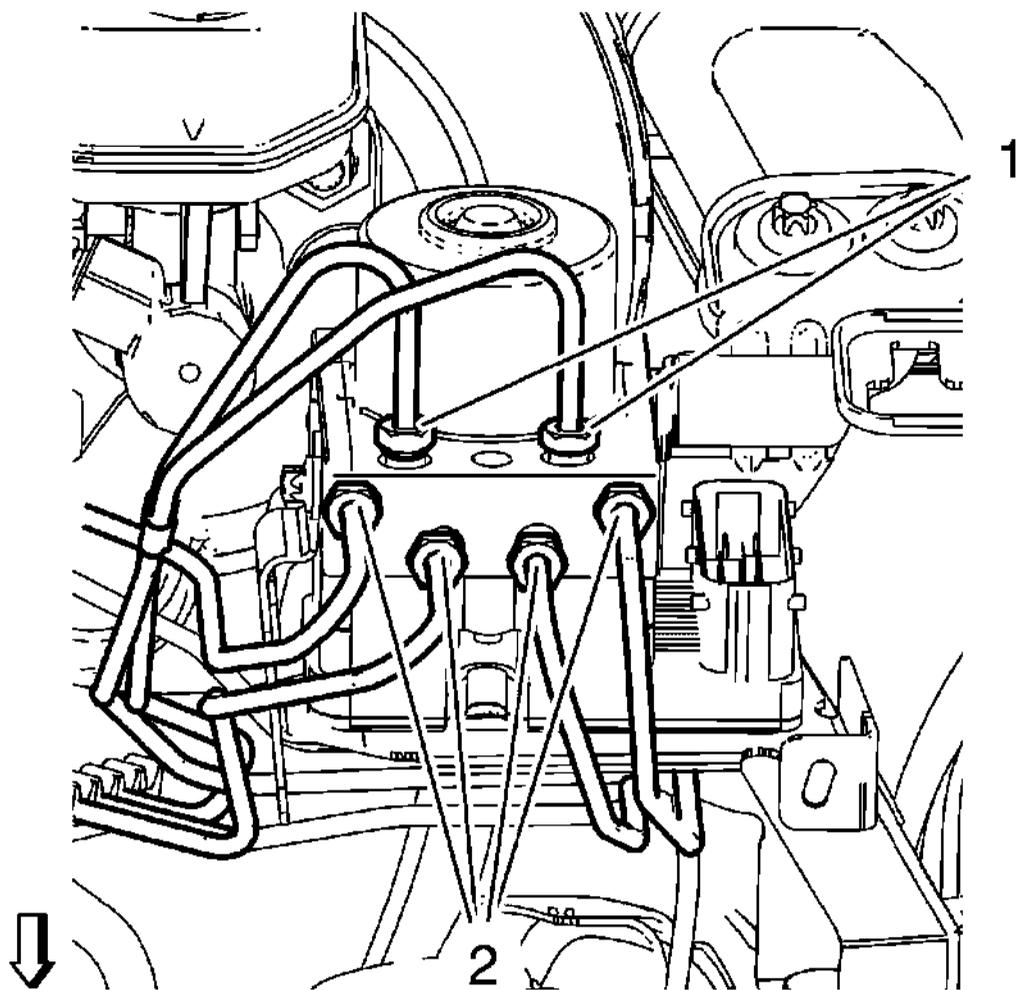


Fig. 20: Brake Pipe Fittings At BPMV
Courtesy of GENERAL MOTORS COMPANY

6. Install the 6 brake pipes (1, 2) to the BPMV and tighten to 18 N.m (14 lb ft).
7. Connect the electrical connector to the EBCM/EBTCM.

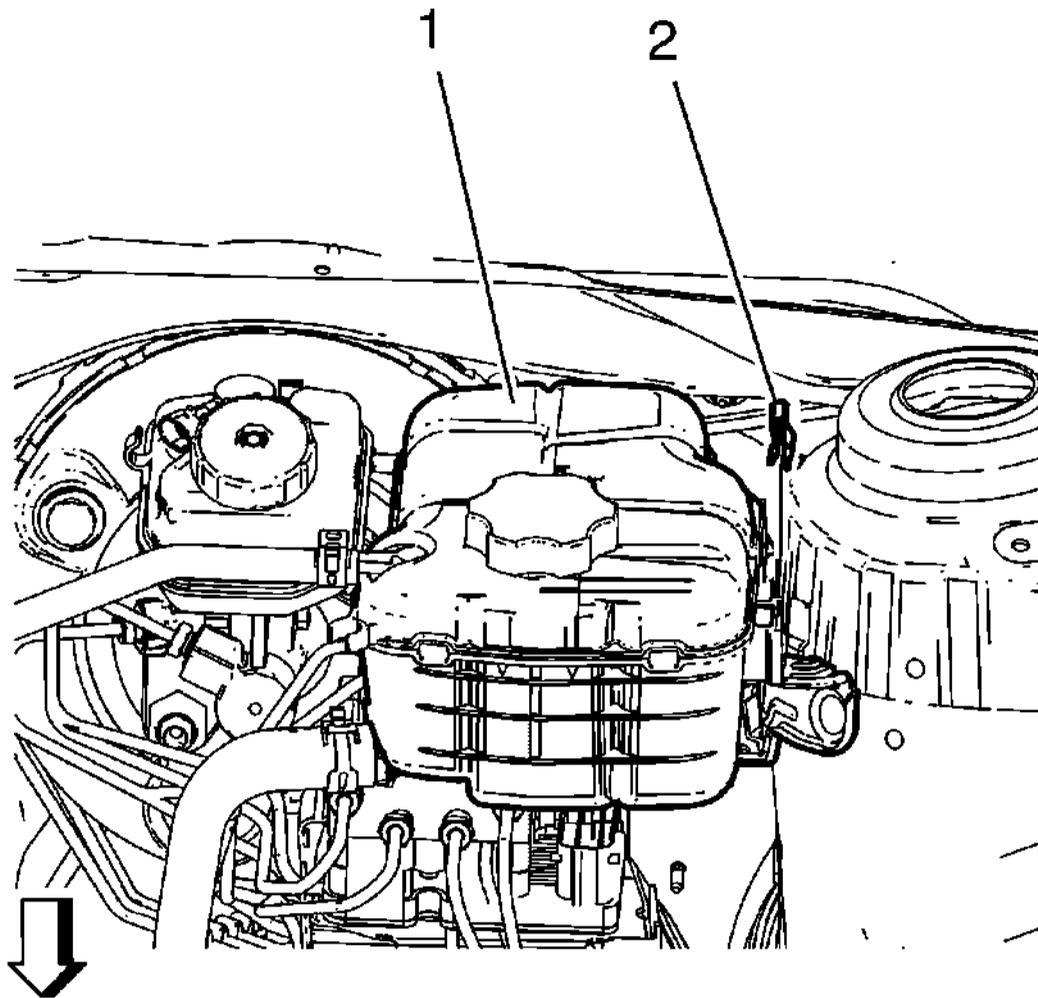


Fig. 21: View Of Radiator Surge Tank And Radiator Surge Tank Clip
Courtesy of GENERAL MOTORS COMPANY

8. Install the radiator surge tank (1).
9. Install the radiator surge tank clip (2).
10. Program the EBCM. Refer to **Electronic Brake Control Module Programming and Setup** .
11. Perform the diagnostic system check - Vehicle. Refer to **Diagnostic System Check - Vehicle** .
12. Calibrate the brake pressure modulator valve pressure sensor. Refer to **Brake Pressure Modulator Valve Pressure Sensor Calibration**.

CAUTION: When adding fluid to the brake master cylinder reservoir, use only GM approved or equivalent DOT-3 brake fluid from a clean, sealed brake fluid container. The use of any type of fluid other than the recommended type of brake fluid may cause contamination which could result in damage to the internal rubber seals and/or rubber linings of hydraulic brake system components.

13. Bleed the hydraulic brake system. Refer to **Hydraulic Brake System Bleeding (Manual Bleeding)** , **Hydraulic Brake System Bleeding (Pressure Bleeding)** .
14. Center the steering angle sensor. Refer to **Steering Angle Sensor Centering**.

FRONT WHEEL SPEED SENSOR REPLACEMENT

Removal Procedure

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** .

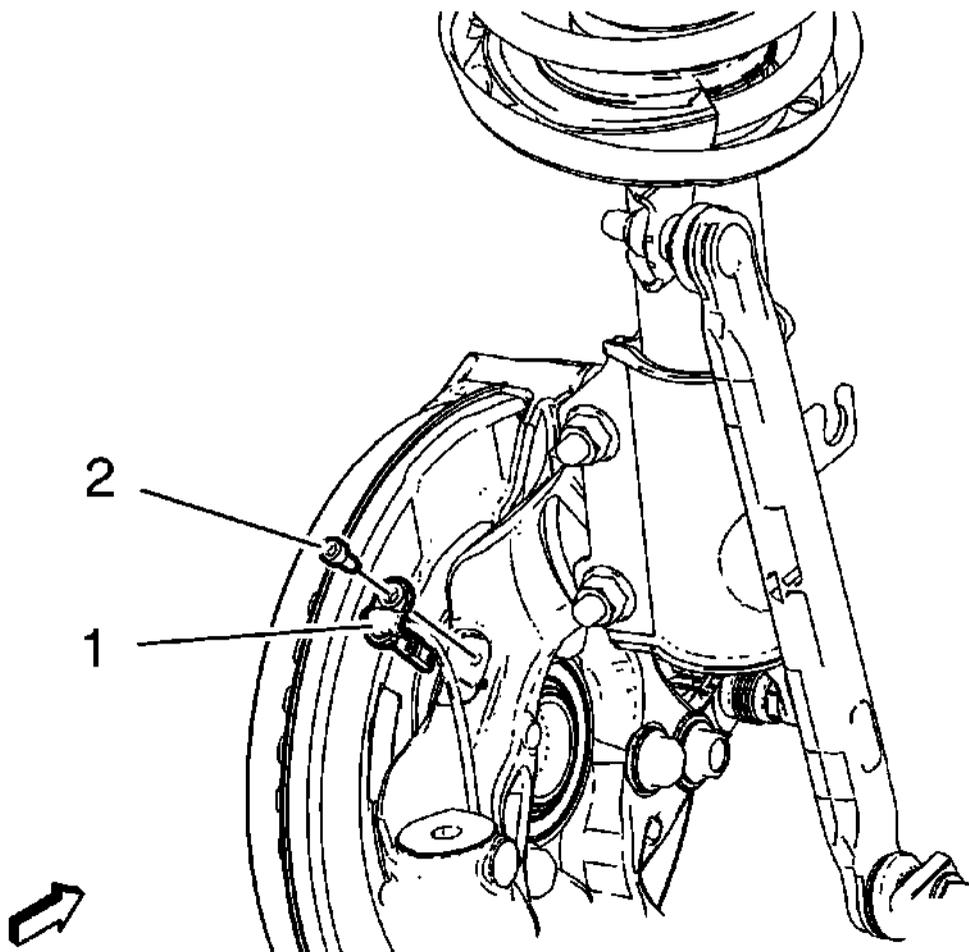


Fig. 22: Wheel Speed Sensor And Wheel Speed Sensor Screw
Courtesy of GENERAL MOTORS COMPANY

3. Remove the wheel speed sensor screw (2) from the steering knuckle.
4. Remove the wheel speed sensor (1).

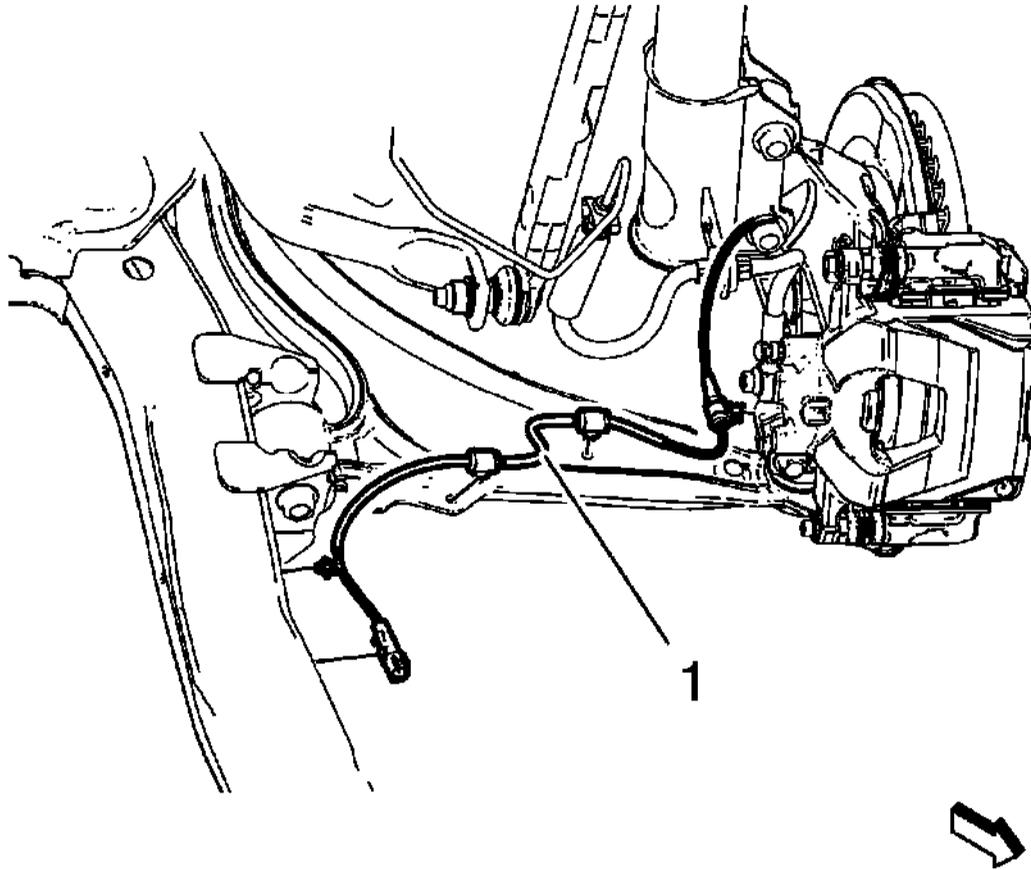


Fig. 23: Wheel Speed Sensor Wiring Harness
Courtesy of GENERAL MOTORS COMPANY

5. Remove the wiring harness retainers from the frame.
6. Disconnect the electrical connector.
7. Remove wheel speed sensor (1) from the vehicle.

Installation Procedure

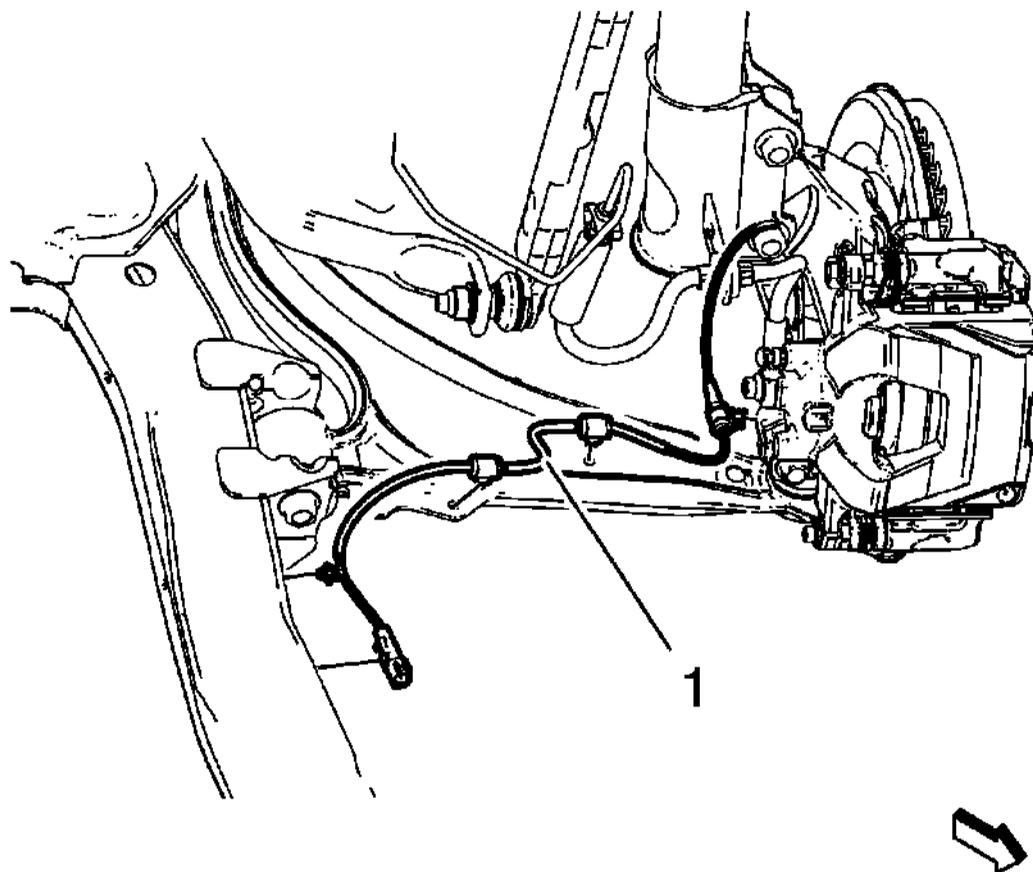


Fig. 24: Wheel Speed Sensor Wiring Harness
Courtesy of GENERAL MOTORS COMPANY

1. Install the wheel speed sensor (1) to the vehicle.
2. Connect the electrical connector.
3. Install the wiring harness retainers to the frame.

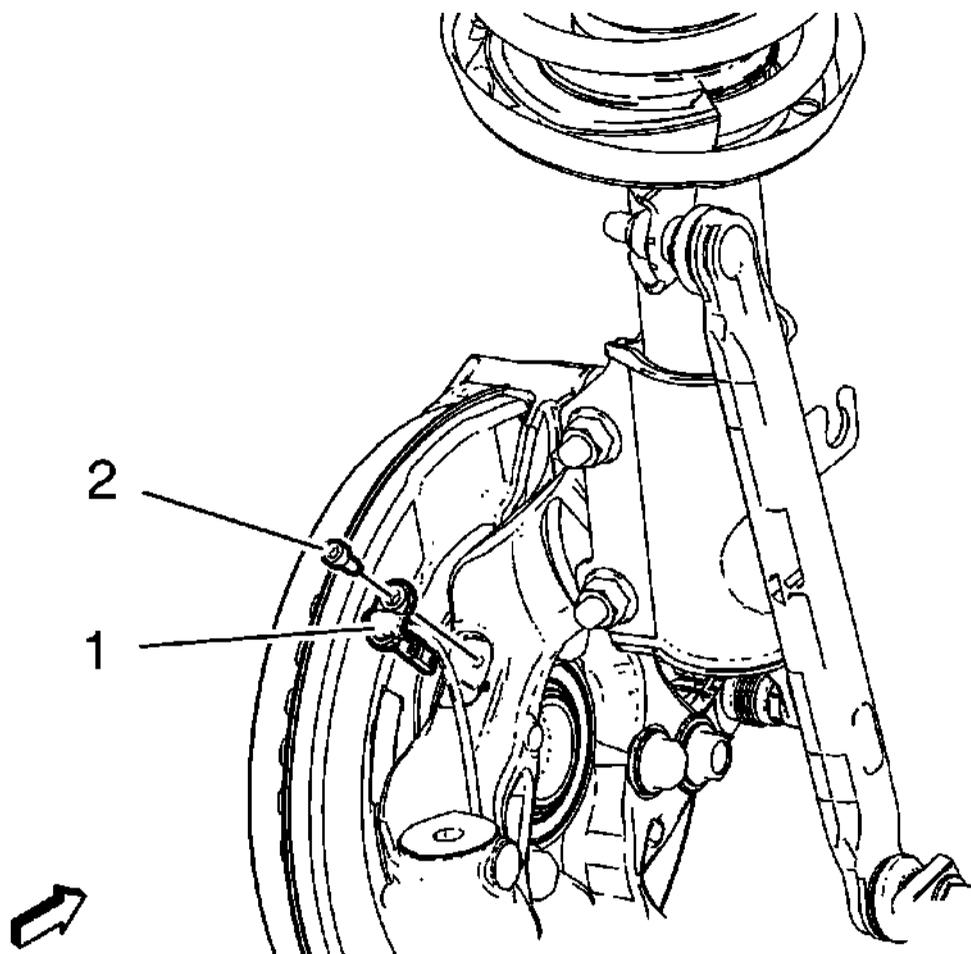


Fig. 25: Wheel Speed Sensor And Wheel Speed Sensor Screw
Courtesy of GENERAL MOTORS COMPANY

4. Install the wheel speed sensor (1) to the steering knuckle.

CAUTION: Refer to Fastener Caution .

5. Install the wheel speed sensor screw (2) and tighten to 6 N.m (53 lb in).
6. Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .

REAR WHEEL SPEED SENSOR REPLACEMENT (DISC BRAKE)

Removal Procedure

1. Remove rear wheelhouse panel liner. Refer to Rear Wheelhouse Liner Replacement .

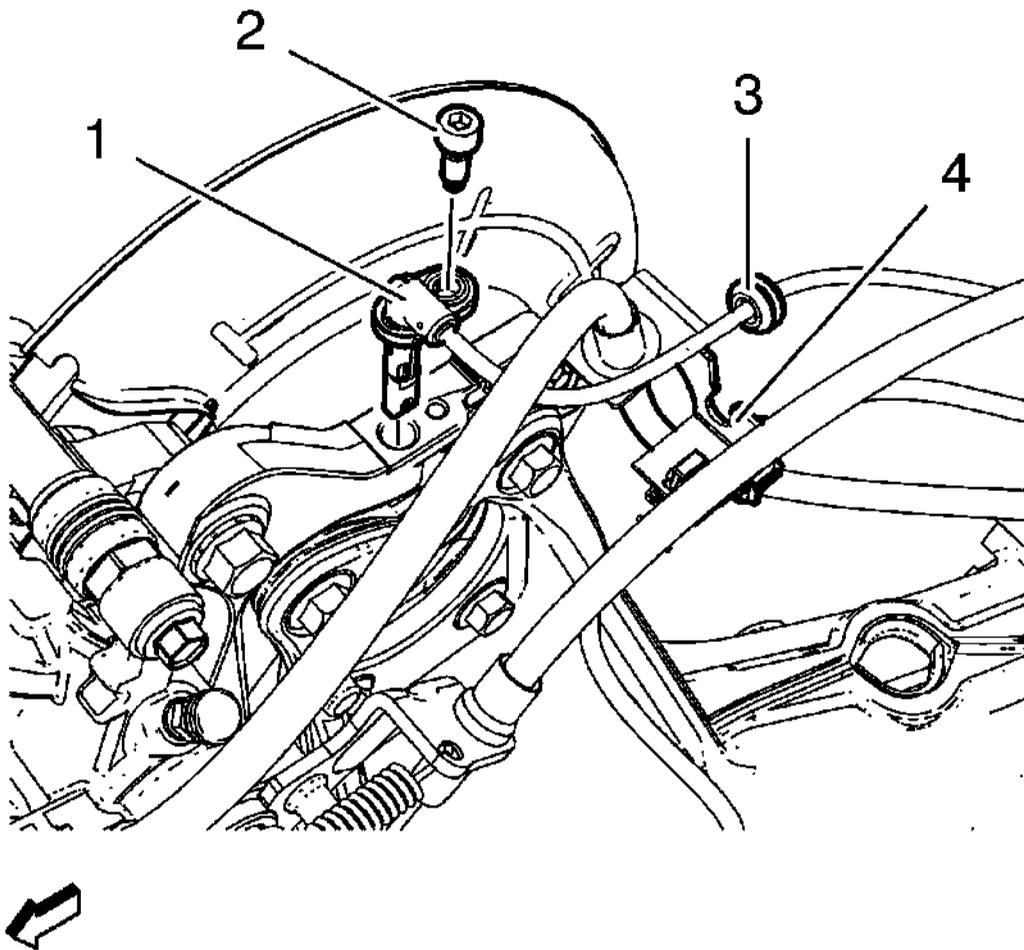


Fig. 26: Wheel Speed Sensor And Wheel Speed Sensor Screw
Courtesy of GENERAL MOTORS COMPANY

2. Remove the wheel speed sensor screw (2) from the steering knuckle.
3. Remove the wheel speed sensor (1).
4. Remove the wiring harness (3) from the bracket (4).

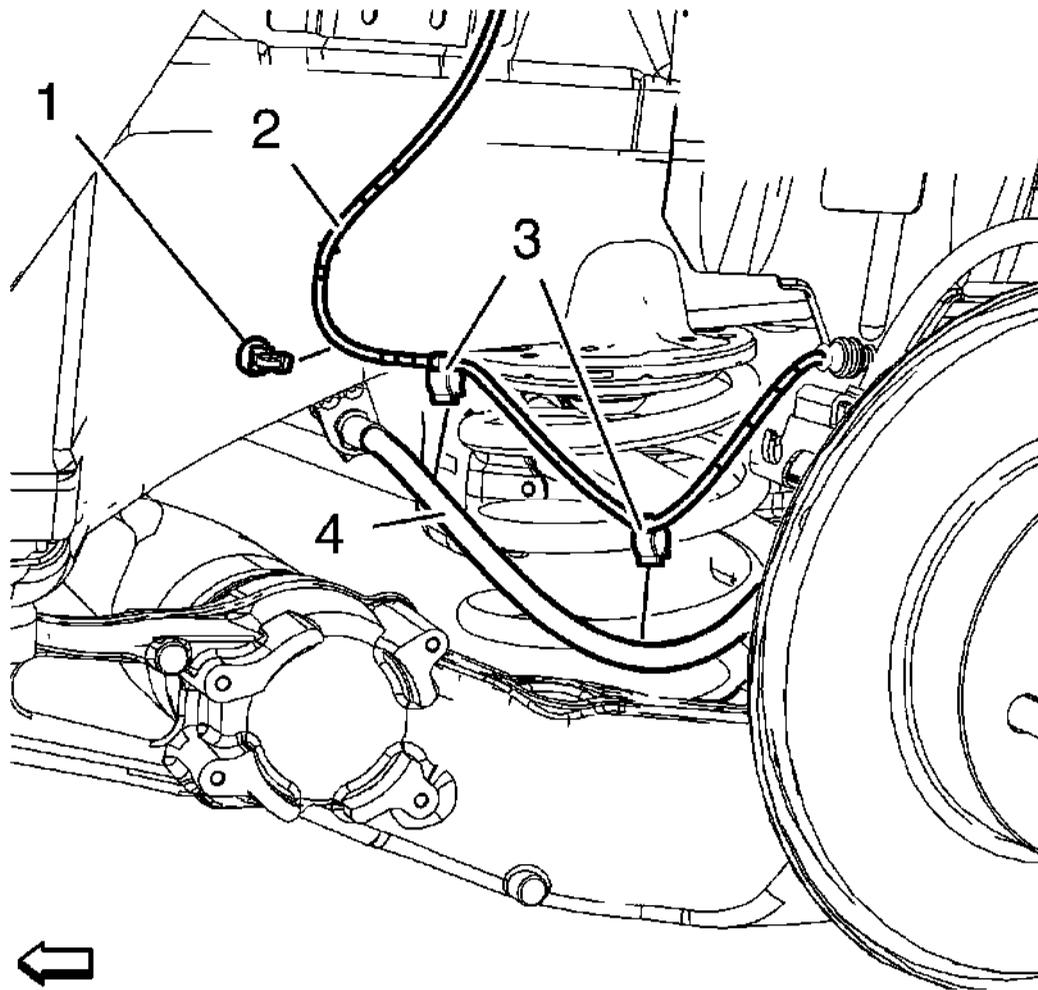


Fig. 27: Wheel Speed Sensor Wiring Harness
Courtesy of GENERAL MOTORS COMPANY

5. Remove the wiring harness (2) retainers (3) from the brake hose (4).
6. Remove the wiring harness (2) from the body retainer (1).
7. Replace the body retainer (1).

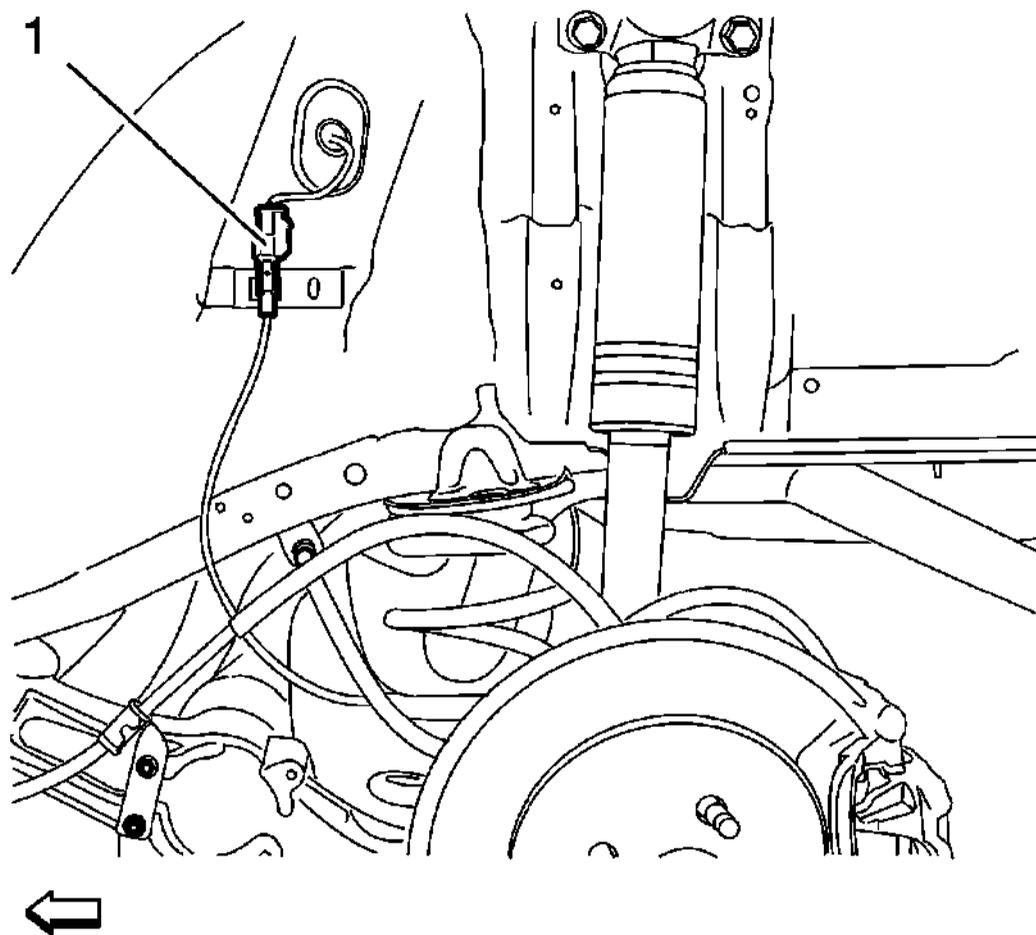


Fig. 28: Wheel Speed Sensor Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

8. Disconnect the electrical connector (1).
9. Remove wheel speed sensor from the vehicle.

Installation Procedure

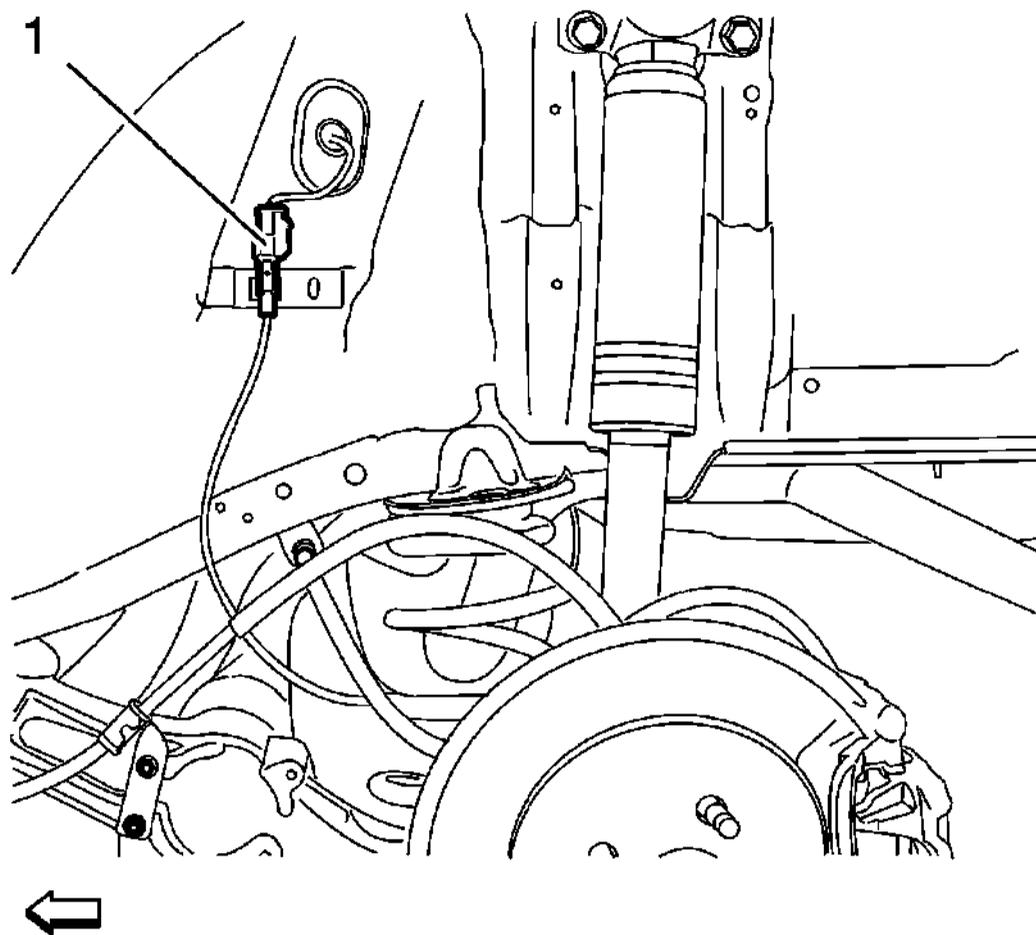


Fig. 29: Wheel Speed Sensor Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

1. Install the wheel speed sensor to the vehicle.
2. Connect the electrical connector (1).

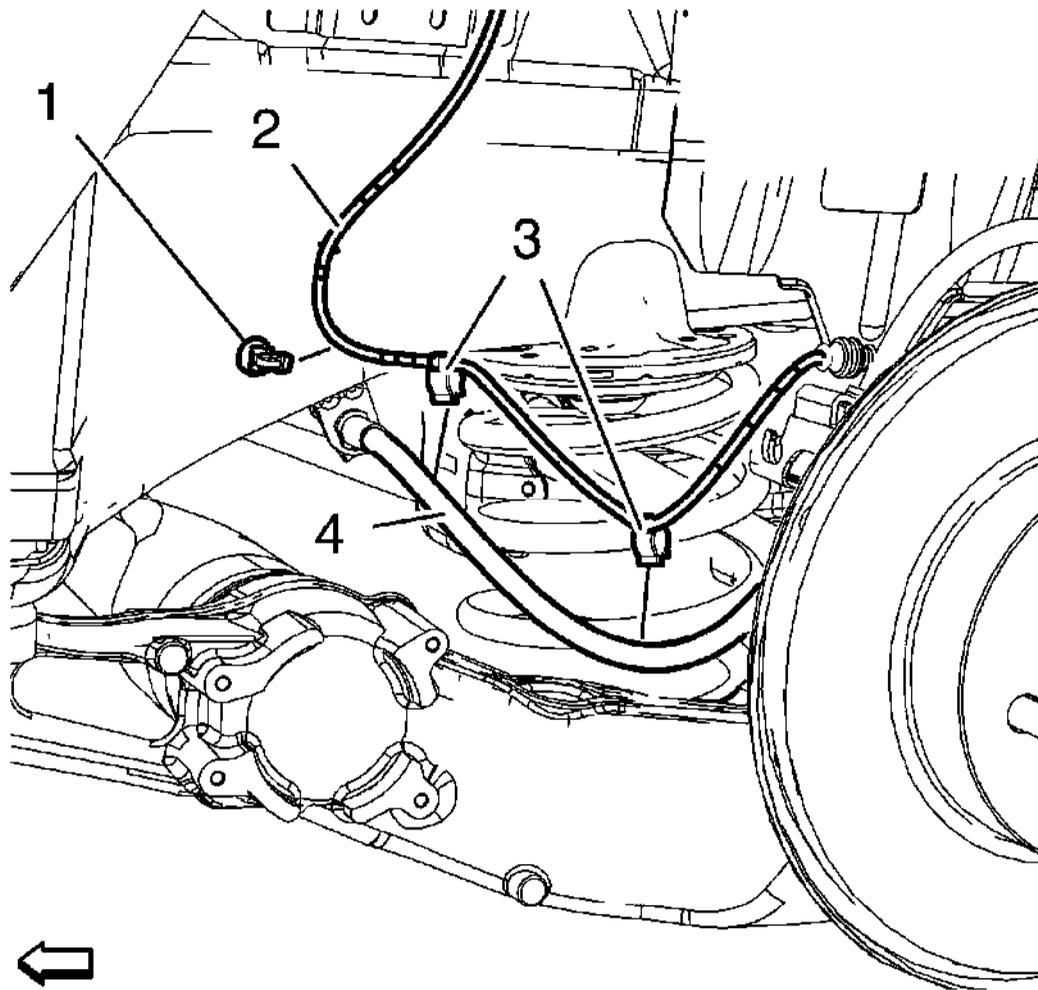


Fig. 30: Wheel Speed Sensor Wiring Harness
Courtesy of GENERAL MOTORS COMPANY

3. Install the wiring harness (2) retainers (3) to the TOP SIDE of brake hose (4), using the marking points of old wiring harness.
4. Install the wiring harness (2) to the NEW body retainer (1).

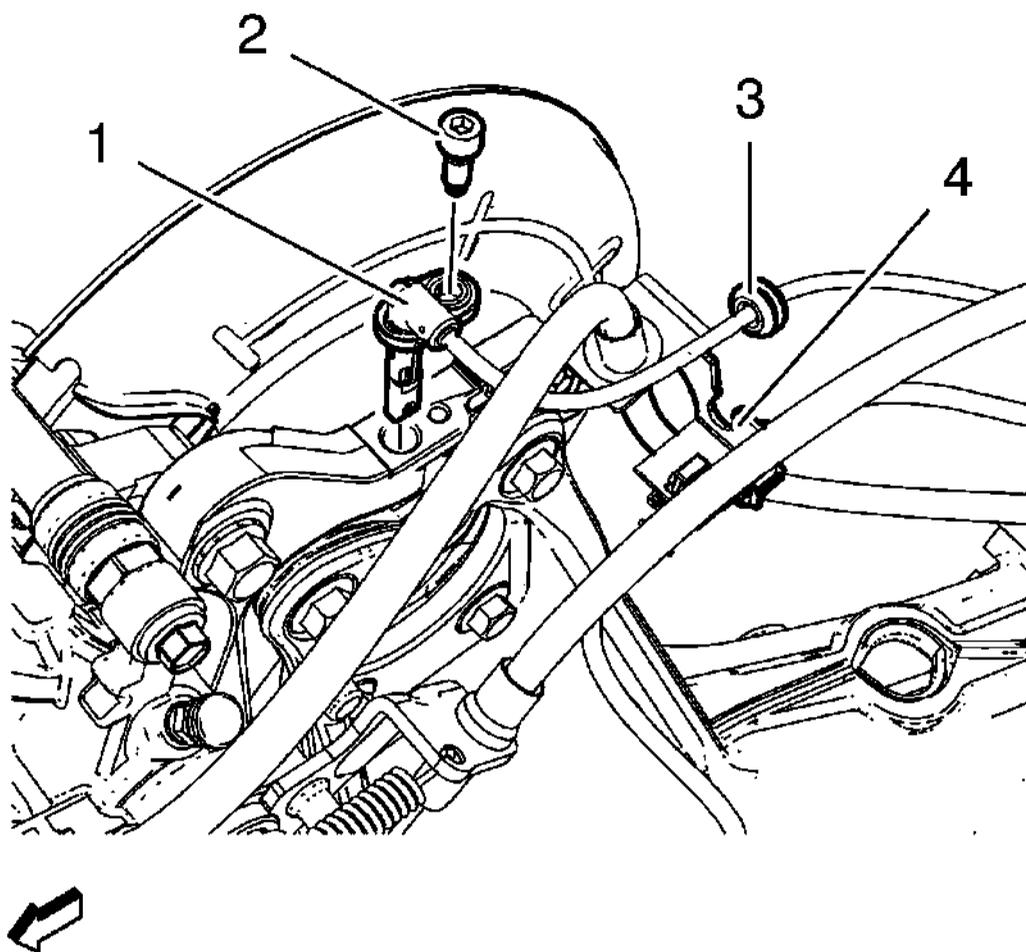


Fig. 31: Wheel Speed Sensor And Wheel Speed Sensor Screw
Courtesy of GENERAL MOTORS COMPANY

5. Install the wheel speed sensor (1) to the steering knuckle.
6. Install the wiring harness (3) at the bracket (4).

CAUTION: Refer to Fastener Caution .

7. Install the wheel speed sensor screw (2) and tighten to 6 N.m (53 lb in).

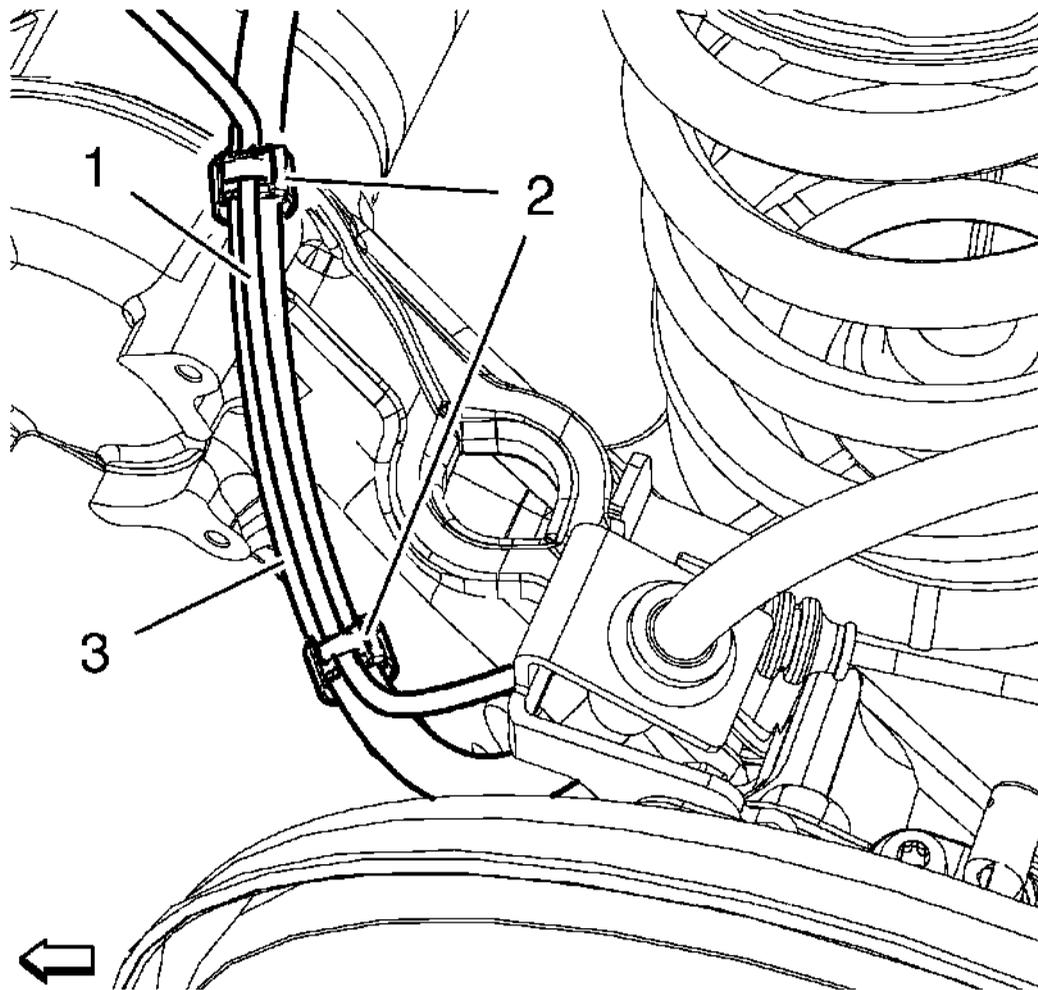


Fig. 32: Wheel Speed Sensor Wiring Harness Retainers

Courtesy of GENERAL MOTORS COMPANY

8. Check the correct installation position of the wiring harness (1). The wiring harness **MUST** be routed on top of the brake hose. If necessary adjust retainers (2) to the marking positions on the brake hose.
9. Apply tension to the wiring harness (1) between the retainers (2) for the correct routing.
10. Push down the brake hose by hand, to assure the correct installation position.
11. Install the rear wheelhouse panel liner. Refer to **Rear Wheelhouse Liner Replacement** .

REAR WHEEL SPEED SENSOR REPLACEMENT (DRUM BRAKE)

Removal Procedure

1. Remove rear wheelhouse panel liner. Refer to **Rear Wheelhouse Liner Replacement** .
2. Remove the rear brake hose from the wheel cylinder and the rear backing plate. Refer to **Rear Brake Hose Replacement (Drum Brake)** , **Rear Brake Hose Replacement (Disc Brake)**

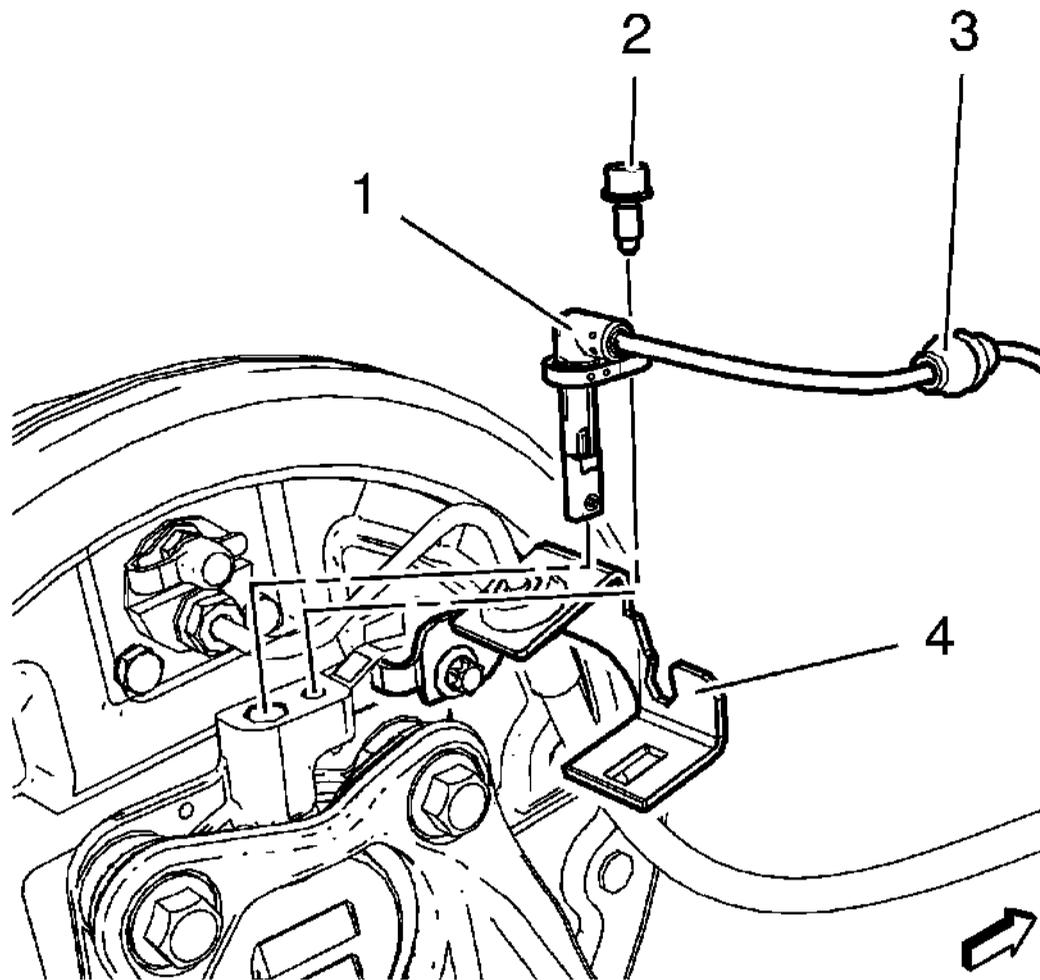


Fig. 33: Wheel Speed Sensor And Wheel Speed Sensor Screw
Courtesy of GENERAL MOTORS COMPANY

3. Remove the wheel speed sensor screw (2) from the steering knuckle.
4. Remove wheel speed sensor (1).
5. Remove wiring harness (3) from bracket (4).

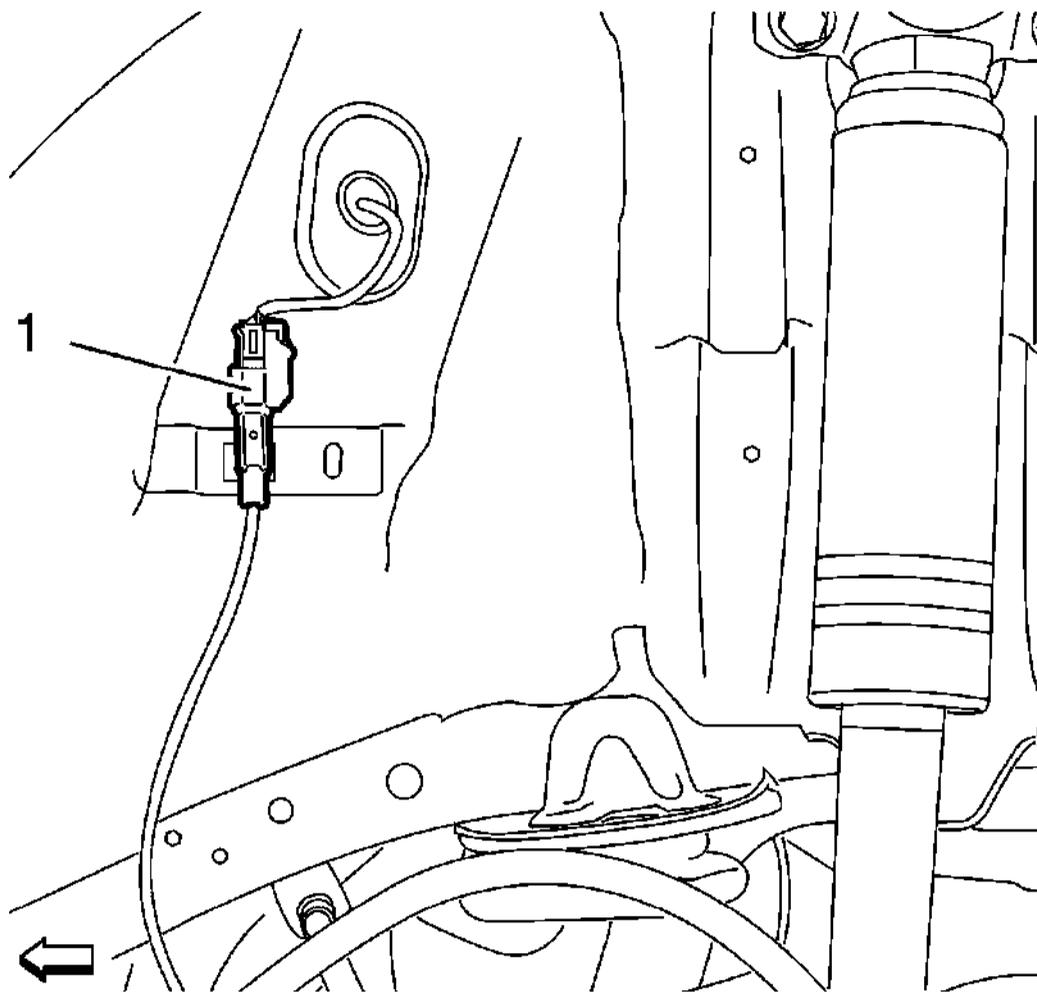


Fig. 34: Wheel Speed Sensor Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

6. Disconnect the electrical connector (1).
7. Remove wheel speed sensor from vehicle.

Installation Procedure

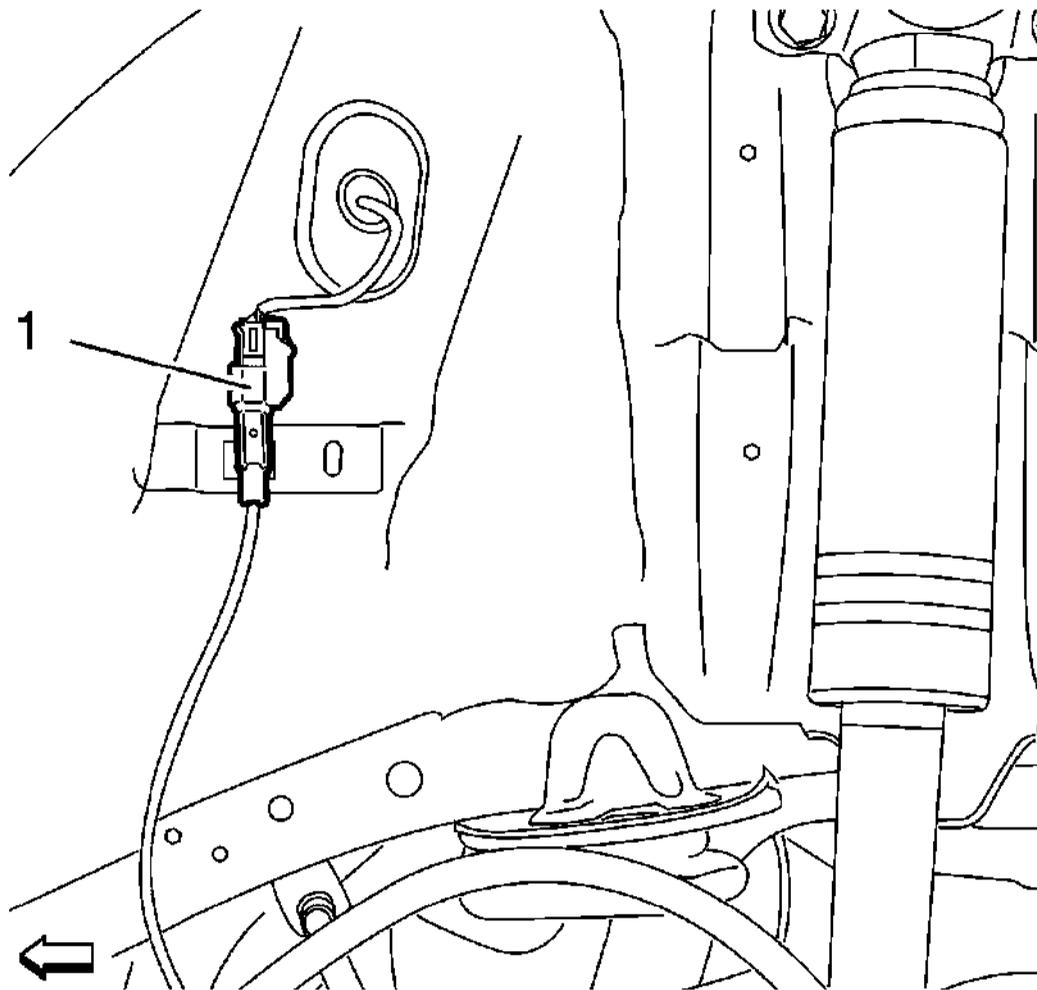


Fig. 35: Wheel Speed Sensor Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

1. Install the wheel speed sensor to the vehicle.
2. Connect the electrical connector (1).

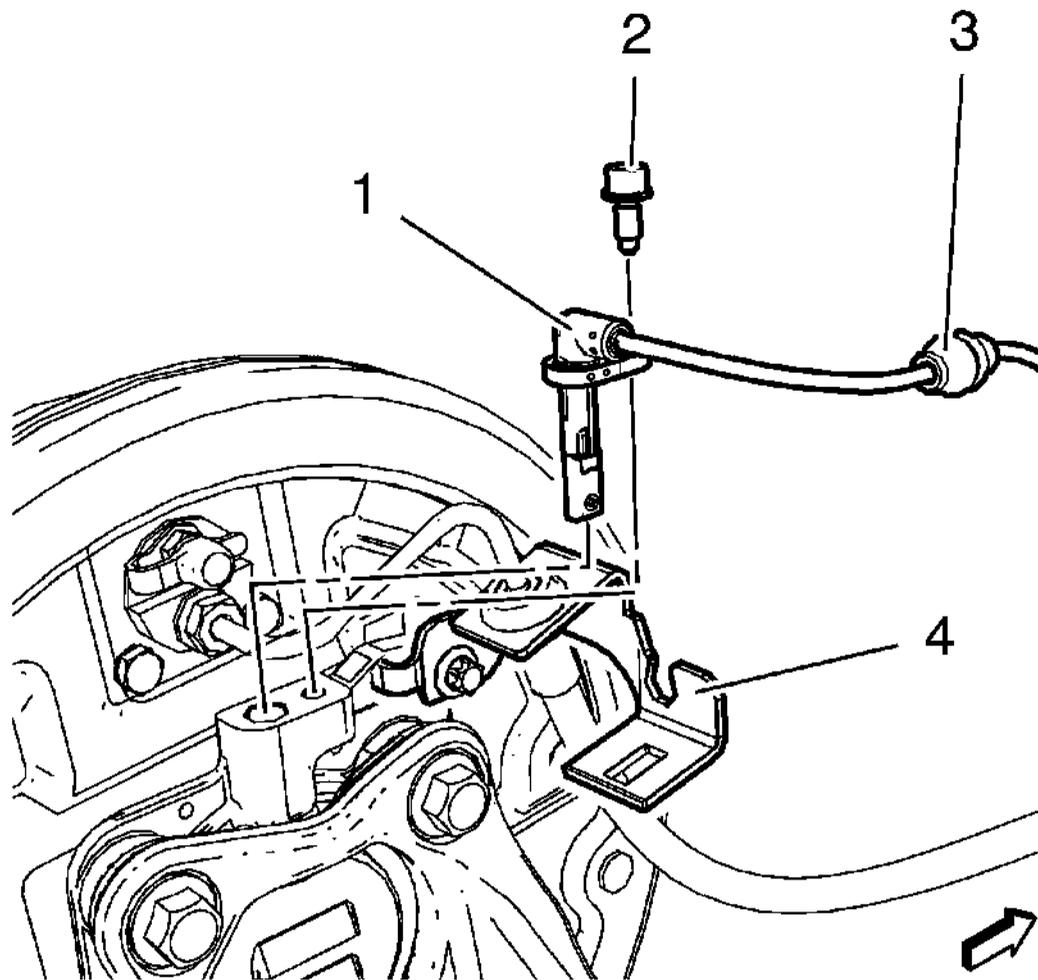


Fig. 36: Wheel Speed Sensor And Wheel Speed Sensor Screw
Courtesy of GENERAL MOTORS COMPANY

3. Install the wheel speed sensor (1) to steering knuckle.
4. Install wiring harness (3) at the bracket (4).

CAUTION: Refer to Fastener Caution .

5. Install the wheel speed sensor screw (2) and tighten to 6 N.m (53 lb in).
6. Install the rear brake hose to the wheel cylinder and the rear backing plate. Refer to Rear Brake Hose Replacement (Drum Brake) , Rear Brake Hose Replacement (Disc Brake)
7. Install rear wheelhouse panel liner. Refer to Rear Wheelhouse Liner Replacement .

VEHICLE YAW SENSOR LEARN

The yaw sensor does not require calibration often. Calibration of the yaw rate sensor might be required after certain service procedures are performed. Some of these procedures are as follows:

- Electronic brake control module (EBCM) replacement
- Multi-axis acceleration sensor replacement

The yaw rate sensor calibration procedure can be completed with a scan tool using the following steps:

1. Place vehicle on a level surface
2. Apply the parking brake, or set the transmission in the P position.
3. Install the scan tool to the data link connector.
4. Ignition ON, engine OFF.
5. Select Yaw Rate Sensor Reset in the Multi-axis Acceleration Sensor Module Configuration/Reset Functions list.
6. Follow the scan tool directions to complete the calibration procedure.
7. Select Yaw Rate Sensor Learn in the Multi-axis Acceleration Sensor Module Configuration/Reset Functions list.
8. Follow the scan tool directions to complete the calibration procedure.
9. Select Yaw Rate Sensor Learn in the EBCM Configuration/Reset Functions list.
10. Follow the scan tool directions to complete the calibration procedure.
11. Clear any DTCs that may be set.

VEHICLE YAW SENSOR REPLACEMENT

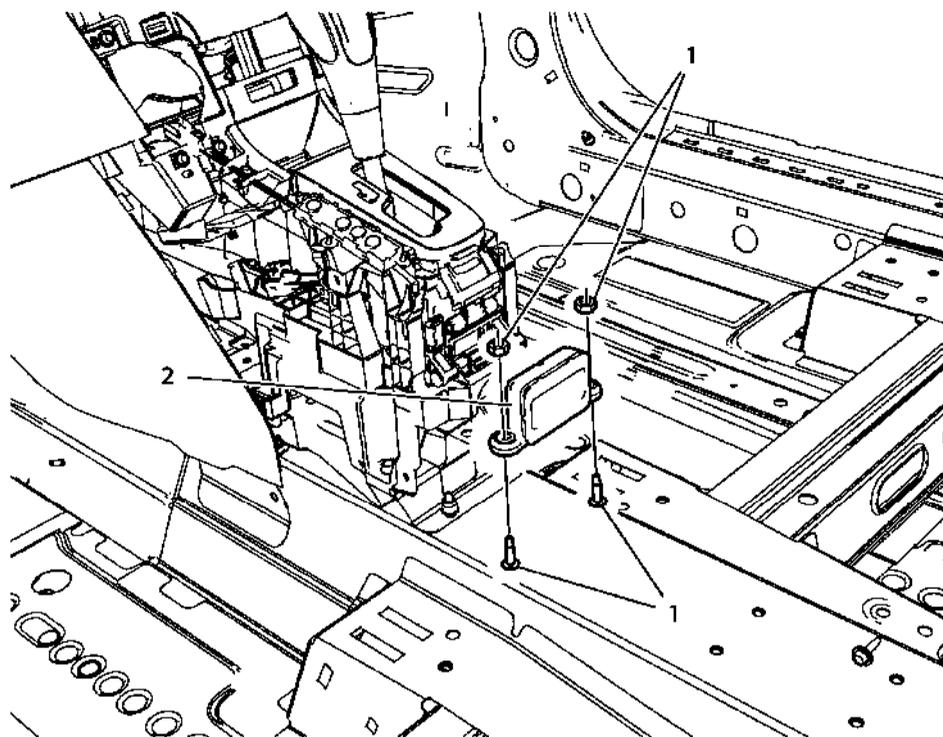


Fig. 37: Vehicle Yaw Sensor
 Courtesy of GENERAL MOTORS COMPANY

Vehicle Yaw Sensor Replacement

Callout	Component Name
Preliminary Procedure Remove the front floor console. Refer to Front Floor Console Replacement .	
1	Vehicle Yaw Sensor Nut (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 9 N.m (80 lb in)
2	Vehicle Yaw Sensor Procedure <ol style="list-style-type: none"> 1. Disconnect the electrical connector. 2. After the installation is complete, perform the yaw sensor learn procedure. Refer to Vehicle Yaw Sensor Learn

DESCRIPTION AND OPERATION

ABS DESCRIPTION AND OPERATION

This vehicle is equipped with a Continental Teves Mk60/Mk70 brake system. The electronic brake control module (EBCM) and the brake pressure modulator valve assembly are serviced separately. The brake pressure modulator valve assembly uses a 4 circuit configuration to control hydraulic pressure to each wheel independently.

Depending on options, the following vehicle performance enhancement systems are provided.

- Antilock brake system (ABS)
- Traction control
- Stability control
- Dynamic rear proportioning
- Hydraulic brake assist

The following components are involved in the operation of the above systems:

- EBCM - The EBCM controls the system functions and detects failures. It supplies voltage to the solenoid valves and pump motor.
- Brake pressure modulator valve assembly - The brake pressure modulator valve assembly contains the following components:
 - Hydraulic pump with pump motor
 - Four isolation valves
 - Four dump valves
 - Two traction control/stability control supply valves
 - Two traction control/stability control isolation valves
 - Pressure sensor
 - High pressure accumulator
 - Low pressure accumulator
- Multi-axis acceleration sensor - The yaw rate and lateral acceleration sensors are combined into one multi-axis acceleration sensor, external to the EBCM. The EBCM receives serial data message inputs from the yaw rate and lateral acceleration sensor and activates stability control depending on multi-axis acceleration sensor input.
- Steering angle sensor - The EBCM receives serial data message inputs from the steering angle sensor. The steering angle sensor signal is used to calculate the desired yaw rate.
- Traction control switch - Traction control and stability control are manually disabled or enabled by pressing the traction control switch.
- Wheel speed sensors - The EBCM sends a 12 V reference voltage to each wheel speed sensor. As the wheel spins, the wheel speed sensor produces an alternating current square wave signal. The EBCM uses the frequency of the square wave signal to calculate the wheel speed.

Initialization Sequence

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

The initialization sequence cycles each solenoid valve and the pump motor, as well as the necessary relays, for approximately 30 milliseconds to check component operation. The electronic brake control module sets a DTC if any error is detected. The initialization sequence may be heard and felt while it is taking place, and is considered part of normal system operation. The active test is initiated by the electronic brake control module at the start of the ignition cycle and the speed of the fastest wheel exceeds 8 km/h (5 MPH).

ABS

When wheel slip is detected during a brake application, an ABS event occurs. During ABS braking, hydraulic pressure in the individual wheel circuits is controlled to prevent any wheel from slipping. A separate hydraulic line and specific solenoid valves are provided for each wheel. The ABS can decrease, hold, or increase hydraulic pressure to each wheel. The ABS does not, however, increase hydraulic pressure above the amount which is transmitted by the master cylinder during braking.

During ABS braking, a series of rapid pulsations is felt in the brake pedal. These pulsations are caused by the rapid changes in position of the individual solenoid valves as the EBCM responds to wheel speed sensor inputs and attempts to prevent wheel slip. These pedal pulsations are present only during ABS braking and stop when normal braking is resumed or when the vehicle comes to a stop. A ticking or popping noise may also be heard as the solenoid valves cycle rapidly. During ABS braking on dry pavement, intermittent chirping noises may be heard as the tires approach slipping. These noises and pedal pulsations are considered normal during ABS operation.

Vehicles equipped with ABS may be stopped by applying normal force to the brake pedal. Brake pedal operation during normal braking is no different than that of previous non ABS systems. Maintaining a constant force on the brake pedal provides the shortest stopping distance while maintaining vehicle stability. The typical ABS activation sequence is as follows.

Pressure Hold

The EBCM closes the isolation valve and keeps the dump valve closed in order to isolate the slipping wheel when wheel slip occurs. This holds the pressure steady on the brake so that the hydraulic pressure does not increase or decrease.

Pressure Decrease

If a pressure hold does not correct the wheel slip condition, a pressure decrease occurs. The EBCM decreases the pressure to individual wheels during deceleration when wheel slip occurs. The isolation valve is closed and the dump valve is opened. The excess fluid is stored in the accumulator until the pump can return the fluid to the master cylinder or fluid reservoir.

Pressure Increase

After the wheel slip is corrected, a pressure increase occurs. The EBCM increases the pressure to individual wheels during deceleration in order to reduce the speed of the wheel. The isolation valve is opened and the dump valve is closed. The increased pressure is delivered from the master cylinder.

Traction Control

When drive wheel slip is noted, the EBCM will enter traction control mode.

First, the EBCM requests the engine control module (ECM) to reduce the amount of torque to the drive wheels via a serial data message. The ECM reduces torque to the drive wheels and reports the amount of delivered torque.

If the engine torque reduction does not reduce drive wheel slip, the EBCM will actively apply the brakes on the slipping drive wheel. During traction control braking, hydraulic pressure in each drive wheel circuit is controlled to prevent the drive wheels from slipping. The EBCM commands the pump motor and appropriate solenoid valves ON and OFF to apply brake pressure to the slipping wheel.

Traction control can be manually disabled or enabled by pressing the traction control switch.

Stability Control

Stability control provides added stability during aggressive maneuvers. Yaw rate is the rate of rotation about the vehicle's vertical axis. The stability control is activated when the EBCM determines that the desired yaw rate does not match the actual yaw rate as measured by the yaw rate sensor.

The desired yaw rate is calculated by the EBCM using the following inputs:

- Steering wheel position
- Vehicle speed
- Lateral acceleration

The difference between the desired yaw rate and the actual yaw rate is the yaw rate error, which is a measurement of oversteer or understeer. When a yaw rate error is detected, the EBCM attempts to correct the vehicle's yaw motion by applying brake pressure to one or more of the wheels. The amount of brake pressure which is applied varies, depending on the correction required. The engine torque may be reduced also, if it is necessary to slow the vehicle while maintaining stability.

Stability control activations generally occur in turns during aggressive driving. When braking during stability control activation, the brake pedal may pulsate.

Stability control can be manually disabled or enabled by pressing the traction control switch for 5 s.

Dynamic Rear Proportioning

The dynamic rear proportioning is a control system that replaces the mechanical proportioning valve. Under certain driving conditions the EBCM will reduce the rear wheel brake pressure by commanding the appropriate solenoid valves ON and OFF.

Hydraulic Brake Assist

The hydraulic brake assist function is designed to support the driver in emergency braking situations.

The EBCM receives inputs from the brake pressure sensor. When the EBCM senses an emergency braking

situation, the EBCM will actively increase the brake pressure to a specific maximum.

Driver Information Indicators

Brake Warning Indicator

The instrument cluster turns the brake warning indicator ON when the following occurs:

- The instrument cluster performs the bulb check.
- The EBCM detects a fault and sends a serial data message to the instrument cluster requesting illumination.
- The body control module (BCM) detects that the park brake is engaged. The instrument cluster receives a serial data message from the BCM requesting illumination.

ABS Indicator

The instrument cluster turns the ABS indicator ON when the following occurs:

- The instrument cluster performs the bulb check.
- The EBCM detects a malfunction which disables the ABS and sends a serial data message to the instrument cluster requesting illumination.

Traction Control/Stability Control Active Indicator

The instrument cluster turns the traction control/stability control-active indicator ON when the following occurs:

- The instrument cluster performs the bulb check.
- The ABS system is in traction control or stability control mode.
- The EBCM detects a malfunction which disables the traction control or stability control and sends a serial data message to the instrument cluster requesting illumination.

Traction Control Off Indicator

The instrument cluster turns the traction control off indicator ON when the following occurs:

- The instrument cluster performs the bulb check.
- The driver manually disables the traction control by pressing the traction control switch. The EBCM sends a serial data message to the instrument cluster requesting illumination.

Stability Control Off Indicator

The instrument cluster turns the stability control off indicator ON when the following occurs:

- The instrument cluster performs the bulb check.
- The driver manually disables the stability control by pressing the traction control switch. The EBCM

2013 Chevrolet Cruze

2013 BRAKES Antilock Brake System - Cruze

sends a serial data message to the instrument cluster requesting illumination.