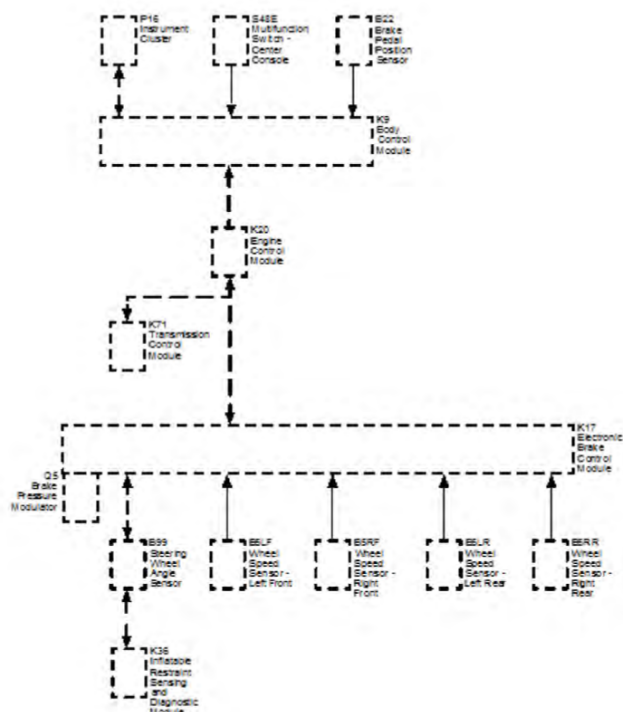


ABS Description and Operation

Antilock Brake System Block Diagram



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- (DA) Serial Data
- (HW) Hard-Wired
- (HW) Hard-Wired
- (DA) Serial Data
- (DA) Serial Data
- (DA) Serial Data
- (DA) Serial Data
- (HW) Hard-Wired
- (HW) Hard-Wired
- (HW) Hard-Wired
- (HW) Hard-Wired
- (P16) P16 Instrument Cluster
- (S48E) S48E Multifunction Switch - Center Console

- (B22) B22 Brake Pedal Position Sensor
- (K9) K9 Body Control Module
- (K20) K20 Engine Control Module
- (K71) K71 Transmission Control Module
- (K17) K17 Electronic Brake Control Module
- (Q5) Q5 Brake Pressure Modulator
- (B99) B99 Steering Wheel Angle Sensor
- (K36) K36 Inflatable Restraint Sensing and Diagnostic Module
- (B5LF) B5LF Wheel Speed Sensor – Left Front
- (B5RF) B5RF Wheel Speed Sensor – Right Front
- (B5LR) B5LR Wheel Speed Sensor – Left Rear
- (B5RR) B5RR Wheel Speed Sensor – Right Rear

This vehicle is equipped with a Bosch ABS 9.0 brake system. The electronic brake control module and the brake pressure modulator valve are serviced separately. The brake pressure modulator valve uses a four circuit configuration to control hydraulic pressure to each wheel independently.

The following vehicle performance enhancement systems are provided.

- ABS
- Brake Assist
- Electronic Brake Distribution
- Electronic stability control
- Hill start assist
- Traction control system

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

- Electronic Brake Control Module – The electronic brake control module controls the system functions and detects failures. It supplies voltage to the solenoid valves and pump motor.
- Brake pressure modulator valve – The brake pressure modulator valve contains the hydraulic valves and pump motor that are controlled electrically by the electronic brake control module. The brake pressure modulator uses a four circuit configuration with a diagonal split. The brake pressure modulator directs fluid from the reservoir of the master cylinder to the left front and right rear wheels and fluid from the other reservoir to the right front and left rear wheels. The diagonal circuits are hydraulically isolated so that a leak or malfunction in one circuit will allow continued braking ability on the other.

The brake pressure modulator contains the following components:

- Brake pressure sensor
- Four inlet valves (one per wheel)
- Four outlet valves (one per wheel)
- Pump motor
- Two traction/stability control supply valves
- Two traction/stability control isolation valves
- Body control module monitors the brake pedal position sensor signal when the brake pedal is applied and sends a high speed serial data message to the electronic brake control module indicating the brake pedal position.
- Brake pressure sensor is used to sense the action of the driver application of the brake pedal. The sensor provides an voltage signal that will increase as the brake pedal is applied. The electronic brake control module monitors the brake pressure sensor which is integral to the brake pressure modulator.
- Instrument cluster - The instrument cluster displays the vehicle speed based on the information from the engine control module. The engine control module sends the vehicle speed information via a high speed serial data to the body control module. The body control

module then sends the vehicle speed information via a low speed serial data to the instrument cluster in order to display the vehicle speed, either in kilometers or miles, based on the vehicle requirements.

- Multi-axis acceleration sensor - The yaw rate, lateral acceleration and longitudinal acceleration sensors are combined into one multi-axis acceleration sensor, internal to the inflatable restraint sensing and diagnostic module. The electronic brake control module receives serial data message inputs from the yaw rate, lateral acceleration and longitudinal acceleration sensor and activates stability control and hill hold start assist function depending on multi-axis acceleration sensor input.
- Multifunction switch - The traction control switch is a multifunction momentary switch. The body control module monitors the signal circuit from the traction control switch and sends a high speed serial data message to the electronic brake control module indicating the switch position. The traction control and stability control are manually disabled or enabled by pressing the traction control switch.
- Steering angle sensor - The electronic brake control module receives serial data message inputs from the steering angle sensor. The steering angle sensor is integrated in the power steering control module. The steering angle sensor signal is used to calculate the desired yaw rate.
- Transmission control module - The electronic brake control module receives high speed serial data message inputs from the transmission control module indicating the gear position of the transmission for hill start assist functions.
- Wheel speed sensors - The wheel speed sensors are Active sensors that receive a 12 V power supply voltage from the electronic brake control module and provides an output signal to the module. As the wheel spins, the wheel speed sensor sends the electronic brake control module a DC square wave signal. The electronic brake control module uses the frequency of the square wave signal to calculate the wheel speed.

Power-Up-Self Test

The electronic brake control module is able to detect many malfunctions whenever the ignition is ON. However, certain failures cannot be detected unless active diagnostic tests are performed on the components. Shorted solenoid coil or motor windings, for example, cannot be detected until the components are commanded ON by the electronic brake control module. Therefore, a power-up self-test is performed to verify correct operation of system components. The electronic brake control module performs the first phase of the power-up self-test when the ignition is first turned ON. This phase consists of internal self-testing of the electronic brake control module along with electrical checks of system sensors and circuits.

Initialization Sequence

The initialization sequence cycles each solenoid valve and the pump motor, as well as the necessary relays, for approximately forty milliseconds to check component 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 16 km/h (10 MPH). If a fault condition is detected the electronic brake control module sets a DTC.

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 electronic brake control module 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 electronic brake control module closes the inlet valve and keeps the outlet valve closed in order to isolate the system when wheel slip occurs. This holds the pressure steady on the brake so that the hydraulic pressure does not increase or decrease.

Pressure Decrease

The electronic brake control module decreases the pressure to individual wheels during a deceleration when wheel slip occurs. The inlet valve is closed and the outlet valve is opened. The excess fluid is stored in the accumulator until the return pump can return the fluid to the master cylinder.

Pressure Increase

The electronic brake control module increases the pressure to individual wheels during a deceleration in order to reduce the speed of the wheel. The inlet valve is opened and the outlet valve is closed. The increased pressure is delivered from the master cylinder.

Brake Assist

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

The electronic brake control module receives inputs from the brake pressure sensor. When the electronic brake control module senses an emergency braking situation, the electronic brake control module will actively increase the brake pressure to a specific maximum.

Electronic Brake Distribution

The electronic brake distribution function is designed to support the driver in emergency braking situations.

The electronic brake distribution is a control system that enhances the hydraulic proportioning function of the mechanical proportioning valve in the base brake system. The electronic brake distribution control system is part of the operation software in the electronic brake control module. The electronic brake distribution uses active control with existing ABS in order to regulate the vehicle's rear brake pressure.

Electronic Stability Control

The electronic stability control adds an additional level of vehicle control to the electronic brake control module.

Yaw rate is the rate of rotation about the vehicles vertical axis. The electronic stability control is activated when the electronic brake control module 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 from the following parameters:

- The speed of the vehicle
- The position of the steering wheel
- The lateral acceleration of the vehicle

The difference between the desired yaw rate and the actual yaw rate is the yaw rate error, which is a measurement of over steer or under steer. If the yaw error becomes too large, the electronic brake control module attempts to correct the vehicles yaw rate motion by applying

differential braking to the appropriate wheel. The amount of differential braking applied to the left or right front wheel is based on both the yaw rate error and side slip rate error.

The electronic stability control activations generally occur during aggressive driving, in turns or on bumpy roads without much use of the accelerator pedal. When braking during electronic stability control activation, the pedal pulsations feel different than the ABS pedal pulsations. The brake pedal pulsates at a higher frequency during vehicle stability enhancement system activation.

Hill Start Assist

When stopped on a hill, the hill start assist feature prevents the vehicle from rolling before driving off, whether facing uphill or downhill by holding the brake pressure during the transition between when the driver releases the brake pedal and starts to accelerate. The electronic brake control module calculates the brake pressure, which is needed to hold the vehicle on an incline or grade greater than 5% and locks that pressure for up to two seconds by commanding the appropriate solenoid valves ON and OFF when the brake pedal is released. The stop lamps will stay illuminated during the hill start assist operation even though the brake pedal is released, this is considered normal operation.

The hill start assist feature is determined by the electronic brake control module using the following inputs:

- Accelerator pedal position
- Brake pedal position sensor
- Brake pressure
- Clutch switch, if equipped
- Engine torque
- Longitudinal acceleration
- Multi-axis acceleration sensor
- Transmission gear information
- Vehicle speed

Traction Control System

When drive wheel slip is noted while the brake is not applied, the electronic brake control module will enter traction control mode.

First, the electronic brake control module requests the engine control module to reduce the amount of torque to the drive wheels via the serial data. The engine control module reduces torque to the drive wheels by retarding spark timing and turning off fuel injectors. The engine control module reports the amount of torque delivered to the drive wheels via the serial data circuit.

- Pressure hold
- Pressure increase
- Pressure decrease

Driver Information Indicator

ABS Warning Indicator

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

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

Brake Warning Indicator

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

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

Traction/Stability Active Control Indicator

The instrument cluster turns the traction/stability active control system 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 electronic brake control module detects a traction control/stability control occurring 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 electronic brake control module 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 electronic stability control by pressing and holding the traction control switch for five seconds. The electronic brake control module sends a serial data message to the instrument cluster requesting illumination.

Traction/Stability Control Indicator

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

- The instrument cluster performs the bulb check.
- The electronic brake control module detects a malfunction which disables the traction control or the electronic stability control and sends a serial data message to the instrument cluster requesting illumination.

DTC B0000

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 B0000

Vehicle Speed Information Circuit

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

Circuit/System Description

The wheel speeds are detected by active wheel speed sensors. Each wheel speed sensor receives ignition voltage from the electronic brake control module and provides an alternating current square wave signal to the electronic brake control module. As the wheel spins, the electronic brake control module uses the frequency of the square wave signal to calculate the wheel speed. The electronic brake control module sends the wheel speed information as a high speed serial data message. Some modules connected to the high speed bus monitor for the wheel speed information. The DTC is set when the wheel speed information has not been received.

Conditions for Running the DTC

Vehicle speed greater than 40 km/h (25 MPH).

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

Specific subsystems will not function or operate in degraded mode.

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](#)

Description and Operation

[ABS Description and Operation](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)

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

Scan Tool Reference

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

[Circuit/System Verification](#)

1. 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 4 km/h (2.5 MPH) of each other.
⇒ **If any parameter is not within 4 km/h (2.5 MPH) of each other**
Refer to Circuit/System Testing.
- ↓ **If each parameter is within 4 km/h (2.5 MPH) of each other**
3. All OK.

[Circuit/System Testing](#)

1. Ignition ON.
2. Verify that DTC U0121, U2099, C0035, C0040, C0045, or C0050 is not set.
⇒ **If any of the DTCs are set**
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).
- ↓ **If none of the listed DTCs are set**
3. Replace the K17 Electronic Brake Control Module.
4. Verify the DTC does not set while operating the vehicle within the Conditions for Running the DTC.
⇒ **If the DTC sets**
Replace the module that set the DTC.
- ↓ **If the DTC does not set**
5. All OK.

[Repair Instructions](#)

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

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

DTC B2745 (With 9C3)

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 is inoperative.				

Circuit/System Description

The body control module monitors the signal circuit from 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. 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

- When the condition for setting the DTC is no longer present.
- 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

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[Component Connector End Views](#)**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 traction control switch.
⇒ **If the parameter does not change**
Refer to Circuit/System Testing.
- ⇓ **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 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 1 and ground.
⇒ **If 5 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. Test for less than 2 Ω in the ground circuit end to end.
⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
⇒ If less than 2 Ω , repair the open/high resistance in the ground connection.
- ⇓ **If less than 5 Ω**
3. Ignition ON.
4. Verify the scan tool Body Control Module Traction Control Switch parameter is Inactive.
⇒ **If not Inactive**
 - 4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 - 4.2. 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 3 and ground circuit terminal 1.
6. Verify the scan tool Traction Control Switch parameter is Active.
⇒ **If not Active**
 - 6.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 - 6.2. 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

6.3. Test for less than 2 Ω in the signal circuit end to end.

⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.

⇒ If less than 2 Ω , 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 3 and the ground terminal 1 with the switch in the open position.

⇒ **If less than infinite resistance**

Replace the S75 Traction Control Switch.

3. Test for less than 2 Ω between the signal terminal 3 and the ground terminal 1 with the switch in the closed position.

⇒ **If 2 Ω or greater**

Replace the S75 Traction Control Switch.

⇓ **If less than 2 Ω**

4. All OK.

Repair Instructions

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

- [Front Floor Console Accessory Switch Mount Plate Replacement](#)
- [Control Module References](#) for Body Control Module replacement, programming and setup

DTC B2745 (Without 9C3)

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 is inoperative.				

Circuit/System Description

The body control module monitors the signal circuit from 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. 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

- When the condition for setting the DTC is no longer present.
- 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

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[Component Connector End Views](#)**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 traction control switch.
⇒ **If the parameter does not change**
Refer to Circuit/System Testing.
- ↓ **If the parameter changes**
3. All OK.

[Circuit/System Testing](#)

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S148E Multifunction Switch — Center Console. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 5 Ω between the ground circuit terminal 9 and ground.
⇒ **If 5 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. Test for less than 2 Ω in the ground circuit end to end.
⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
⇒ If less than 2 Ω , repair the open/high resistance in the ground connection.
- ↓ **If less than 5 Ω**
3. Ignition ON.
4. Verify the scan tool Body Control Module Traction Control Switch parameter is Inactive.
⇒ **If not Inactive**
 - 4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 - 4.2. 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 5 and ground circuit terminal 9.
6. Verify the scan tool Traction Control Switch parameter is Active.
⇒ **If not Active**
 - 6.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

- 6.2. 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
- 6.3. Test for less than 2 Ω in the signal circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than 2 Ω , replace the K9 Body Control Module.

⇓ **If Active**

7. Test or replace the S148E Multifunction Switch — Center Console.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S148E Multifunction Switch — Center Console.
2. Test for infinite resistance between the signal terminal 5 and the ground terminal 9 with the switch in the open position.
 - ⇒ **If less than infinite resistance**
Replace the S75 Traction Control Switch.
3. Test for less than 2 Ω between the signal terminal 5 and the ground terminal 9 with the switch in the closed position.
 - ⇒ **If 2 Ω or greater**
S148E Multifunction Switch — Center Console.
 - ⇓ **If less than 2 Ω**
4. All OK.

Repair Instructions

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

- [Front Floor Console Accessory Switch Mount Plate Replacement](#)
- [Control Module References](#) for Body Control Module replacement, programming and setup

DTC B274A

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 B274A 03

Sport Mode Switch Circuit Low Voltage

DTC B274A 05

Sport Mode Switch Circuit High Voltage/Open

DTC B274A 5A

Sport Mode Switch Circuit Not Plausible

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal	B274A 03	B274A 05	B274A 05	B274A 5A
Ground	—	B274A 05	—	—
SPORT Mode Switch Indicator Control	1	2	2	—
TOUR Mode Switch Indicator Control	3	4	4	—
1. SPORT mode indicator always ON 2. SPORT mode indicator always OFF 3. TOUR mode indicator always ON 4. TOUR mode indicator always OFF				

Circuit/System Description

The body control module monitors the signal circuit from the traction control switch, the SPORT (+) Mode Switch and the TOUR (-) Mode Switch. When the traction control switch is pressed twice within five seconds the performance traction mode is available and entered into Performance Traction Control Mode 2-Dry. The SPORT (+) Mode Switch is used to select modes 2-5 and the TOUR (-) Mode Switch is used to deselect modes 5-1. Based on the driver selection and skill, one of the five track modes will integrate multiple calibrations in the powertrain and chassis electronics controlling the engine speed while modulating engine torque for maximum acceleration once the vehicle is moving.

The body control module then sends a serial data message to the suspension control module to modify the shock damper rates which will change the ride and handling characteristics of the vehicle. The body control module then sends a serial data message to the instrument cluster via serial data to turn the traction control off indicator and stability control off indicator

ON to notify the driver of the deactivation and the driver information center will display a message indicating the driver selected performance traction control mode.

Conditions for Running the DTC

Ignition ON.

Conditions for Setting the DTC

B274A 03

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

B274A 05

The body control module detects a short to voltage or a open/high resistance on the switch signal circuit.

B274A 5A

If the switch signal is active for greater than 30 s, the switch will be considered stuck and the body control module will set this DTC.

Action Taken When the DTC Sets

- If entering the performance traction mode, the body control module will default to mode 2.
- If exiting the performance traction mode, the body control module will default to the last known state.

Conditions for Clearing the DTC

- A current DTC will clear on the next consecutive malfunction-free ignition cycle.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

- [Antilock Brake System Schematics](#)
- [Electronic Suspension Control Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

Description and Operation

- [ABS Description and Operation](#)
- [Electronic Suspension Control 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 Sport Mode Switch parameter change states while switching between SPORT and TOUR modes.

⇒ **If the parameter does not change**

Refer to Circuit/System Testing.

⇓ **If the parameter changes**

3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle system OFF, disconnect the harness connector at the S73 Suspension Mode Switch (V5B). It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 10 Ω between the switch harness connector ground terminal 6 and ground.

⇒ **If 10 Ω or greater**

2.1. Ignition OFF.

2.2. Test for less than 2 Ω in the ground circuit end to end.

⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.

⇒ If less than 2 Ω , repair the open/high resistance in the ground connection.

⇓ **If less than 10 Ω**

3. Ignition ON.

4. Verify the scan tool Sport Mode Switch parameter is Malfunction.

⇒ **If not Malfunction**

4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.

4.2. 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 Malfunction**

5. Install a 3 A fused jumper wire between the signal circuit terminal 4 and ground circuit terminal 6.

6. Verify the scan tool Body Control Module Sport Mode Switch parameter is Active.

⇒ **If not Active**

6.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

6.2. 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

6.3. Test for less than 2 Ω in the signal circuit end to end.

⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.

⇒ If less than 2 Ω , replace the K9 Body Control Module.

⇓ **If Active**

7. Test or replace the S73 Suspension Mode Switch (V5B).

Component Testing

1. Ignition OFF, disconnect the harness connector at the S73 Suspension Mode Switch (V5B).

2. Test for infinite resistance between the signal terminal 4 and the ground terminal 6 with the switch in the open position.

⇒ **If less than infinite resistance**

Replace the S73 Suspension Mode Switch (V5B).

3. Test for less than $2\ \Omega$ between the signal terminal 4 and the ground terminal 6 with the switch in the closed position.

⇒ **If $2\ \Omega$ or greater**

Replace the S73 Suspension Mode Switch (V5B).

⇓ **If less than $2\ \Omega$**

4. All OK.

Repair Instructions

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

- [Ride Control Switch Replacement](#)
- [Control Module References](#) for Body Control Module replacement, programming and setup

DTC C003A, C003B, C0035, C0040, C0045, C0050, or C0055

[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 C003A 67

Front Wheel Speed Sensors Circuits Incorrect Assembly

DTC C0035 00

Left Front Wheel Speed Sensor Circuit Malfunction

DTC C0035 08

Left Front Wheel Speed Sensor Circuit Performance – Signal Invalid

DTC C0035 0F

Left Front Wheel Speed Sensor Circuit Signal Erratic

DTC C0035 27

Left Front Wheel Speed Sensor Circuit High Frequency

DTC C0035 5A

Left Front Wheel Speed Sensor Circuit Not Plausible

DTC C0040 00

Right Front Wheel Speed Sensor Circuit Malfunction

DTC C0040 08

Right Front Wheel Speed Sensor Circuit Performance – Signal Invalid

DTC C0040 0F

Right Front Wheel Speed Sensor Circuit Signal Erratic

DTC C0040 27

Right Front Wheel Speed Sensor Circuit High Frequency

DTC C0040 5A

Right Front Wheel Speed Sensor Circuit Not Plausible

DTC C0045 00

Left Rear Wheel Speed Sensor Circuit Malfunction

DTC C0045 08

Left Rear Wheel Speed Sensor Circuit Performance – Signal Invalid

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DTC C0045 0F

Left Rear Wheel Speed Sensor Circuit Signal Erratic

DTC C0040 27

Left Rear Wheel Speed Sensor Circuit High Frequency

DTC C0045 5A

Left Rear Wheel Speed Sensor Circuit Not Plausible

DTC C0050 00

Right Rear Wheel Speed Sensor Circuit Malfunction

DTC C0050 08

Right Rear Wheel Speed Sensor Circuit Performance – Signal Invalid

DTC C0050 0F

Right Rear Wheel Speed Sensor Circuit Signal Erratic

DTC C0050 27

Right Rear Wheel Speed Sensor Circuit High Frequency

DTC C0050 5A

Right Rear Wheel Speed Sensor Circuit Not Plausible

DTC C0055 67

Rear Wheel Speed Sensors Circuits Incorrect Assembly

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal High – Left Front	C0035 00	C0035 00	C0245 00	C003A 67, C0035 08, C0035 0F, C0035 27, C0035 5A
Signal Low – Left Front	C0035 00	C0035 00	C0035 00	C003A 67, C0035 08, C0035 0F, C0035 27, C0035 5A
Signal High – Right Front	C0040 00	C0040 00	C0245 00	C003A 67, C0040 08, C0040 0F, C0040 27, C0040 5A
Signal Low – Right Front	C0040 00	C0040 00	C0040 00	C003A 67, C0040 08, C0040 0F, C0040 27, C0040 5A

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal High – Left Rear	C0045 00	C0045 00	C0245 00	C0045 08, C0045 0F, C0045 27, C0045 5A, C0055 67
Signal Low – Left Rear	C0045 00	C0045 00	C0045 00	C0045 08, C0045 0F, C0045 27, C0045 5A, C0055 67
Signal High – Right Rear	C0050 00	C0050 00	C0245 00	C0050 08, C0050 0F, C0050 27, C0050 5A, C0055 67
Signal Low – Right Rear	C0050 00	C0050 00	C0050 00	C0050 08, C0050 0F, C0050 27, C0050 5A, C0055 67

Component	Condition	DTC Symptom Byte
Wheel Speed Sensor	- 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, 27, or 5A

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 speed.

Conditions for Running the DTC

C003A 67, or C0055 67

Vehicle speed is greater than 70 km/h (43.5 MPH) while driving around a curve with a yaw-rate of 3° per second for greater than 0.4 sec.

C0035 00 – C0050 00, C0035 08 – C0050 08, or C0035 27 – C0050 27

Ignition ON

C0035 0F – C0050 0F or C0035 5A – C0050 5A

Vehicle speed is greater than 60 km/h (37 MPH).

Conditions for Setting the DTC**C003A 67**

The yaw rate calculated from the steering angle and the yaw rates calculated from the wheel speed sensors at both axles are compared to a predetermined value. If the calculations do not match the module detects a wrong mounted wheel speed sensor at the front axle.

C0055 67

The yaw rate calculated from the steering angle and the yaw rates calculated from the wheel speed sensors at both axles are compared to a predetermined value. If the calculations do not match the module detects a wrong mounted wheel speed sensor at the rear axle.

C0035 00, C0040 00, C0045 00, or C0050 00

- A short to ground, or open/high resistance on the wheel speed sensor signal high circuit is detected for 0.2 sec.
- A short to voltage, short to ground, or open/high resistance on the wheel speed sensor signal low circuit is detected for 0.2 sec.

C0035 08, C0040 08, C0045 08, or C0050 08

- A incompatible or wrong wheel speed sensor is installed.

C0035 0F, C0040 0F, C0045 0F, or C0050 0F

- Incorrectly mounted wheel speed sensor.
- Debris on the wheel speed sensor or the tone ring.
- Missing tooth or teeth on the wheel speed sensor tone ring.
- Air gap between the wheel speed sensor and the encoder ring.
- Electrical magnetic interference with the wheel speed sensor harness.

C0035 27, C0040 27, C0045 27, or C0050 27

- Debris on the wheel speed sensor tone ring.
- Missing tooth or teeth on the wheel speed sensor tone ring.
- Air gap between the wheel speed sensor and the encoder ring too large.

C0035 5A, C0040 5A, C0045 5A, or C0050 5A

- An invalid wheel speed sensor signal is detected.
- No wheel speed signal is detected with vehicle speed.
- A difference between the fastest and the slowest wheel speed is greater than 5%.

Action Taken When the DTC Sets

- The ABS indicator turns ON.
- The traction/stability control indicator turns ON.

- A driver information center message may be displayed.
- The electronic brake control module disables the ABS, the traction control, and the electronic stability program for the duration of the ignition cycle.

Conditions for Clearing the DTC

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

Diagnostic Aids

- Do not use a magnet to clean the encoder ring.
- Inspect the wheel encoder ring for rust or corrosion.
- Inspect the wheel speed sensors and components for the correct parts.
- If two or more wheel speed sensors are inoperative, diagnose each wheel speed sensor individually.
- If symptom code 0F, 27, or 5A is 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](#)

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

Circuit/System Testing

1. Inspect the appropriate B5 Wheel Speed Sensor and encoder ring for contamination, metallic particles, physical damage, incorrect installation and the correct component.

⇒ **If contamination, physical damage, incorrect installation, or the wrong component is diagnosed**

Repair or replace the applicable component.

⇓ **If no contamination, physical damage, incorrect installation, or the wrong component is not diagnosed**

2. Ignition OFF and all vehicle systems OFF, disconnect the harness connectors at the appropriate B5 Wheel Speed Sensor and the harness connector at the K17 Electronic Brake Control Module, ignition ON.

3. Test for less than 1 V between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:

- B5LF Wheel Speed Sensor – Left Front — terminal 8 and terminal 19
- B5LR Wheel Speed Sensor – Left Rear — terminal 18 and terminal 31
- B5RF Wheel Speed Sensor – Right Front — terminal 4 and terminal 16
- B5RR Wheel Speed Sensor – Right Rear — terminal 2 and terminal 3

⇒ **If 1 V or greater**

Repair the short to voltage on the circuit.

⇓ **If less than 1 V**

4. Ignition OFF.

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

- B5LF Wheel Speed Sensor – Left Front — terminal 8 and terminal 19
- B5LR Wheel Speed Sensor – Left Rear — terminal 18 and terminal 31
- B5RF Wheel Speed Sensor – Right Front — terminal 4 and terminal 16
- B5RR Wheel Speed Sensor – Right Rear — terminal 2 and terminal 3

⇒ **If less than infinite resistance**

Repair the short to ground on the circuit.

⇓ **If infinite resistance**

6. Test for less than 2 Ω between the B5 Wheel Speed Sensor harness connector terminal 1 and the K17 Electronic Brake Control Module harness connector terminal listed below:

- B5LF Wheel Speed Sensor – Left Front — terminal 19
- B5LR Wheel Speed Sensor – Left Rear — terminal 31
- B5RF Wheel Speed Sensor – Right Front — terminal 16
- B5RR Wheel Speed Sensor – Right Rear — terminal 3

⇒ **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

⇓ **If less than 2 Ω**

7. Test for less than 2 Ω between the B5 Wheel Speed Sensor harness connector terminal 2 and the K17 Electronic Brake Control Module harness connector terminal listed below:

- B5LF Wheel Speed Sensor – Left Front — terminal 8
- B5LR Wheel Speed Sensor – Left Rear — terminal 18
- B5RF Wheel Speed Sensor – Right Front — terminal 4
- B5RR Wheel Speed Sensor – Right Rear — terminal 2

⇒ **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

⇓ **If less than 2 Ω**

8. Replace the B5 Wheel Speed Sensor.

9. Verify the DTC does not set while operating the vehicle within Conditions for Running the DTC.

⇒ **If the DTC sets**

Replace the K17 Electronic Brake Control Module.

⇓ **If the DTC does not set**

10. All OK.

Repair Instructions

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

- [Front Wheel Speed Sensor Replacement](#)
- [Rear Wheel Speed Sensor Replacement](#)
- [Control Module References](#) for electronic brake control module replacement, programming and setup

DTC C0060-C0095, C0121, C0141, C0146, C0151, or C0156

[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 C0060

Left Front Dump Solenoid Valve Circuit

DTC C0065

Left Front Isolation Solenoid Valve Circuit

DTC C0070

Right Front Dump Solenoid Valve Circuit

DTC C0075

Right Front Isolation Solenoid Valve Circuit

DTC C0080

Left Rear Dump Solenoid Valve Circuit

DTC C0085

Left Rear Isolation Solenoid Valve Circuit

DTC C0090

Right Rear Dump Solenoid Valve Circuit

DTC C0095

Right Rear Isolation Solenoid Valve Circuit

DTC C0121

Valve Relay Circuit

DTC C0141

Front Prime Solenoid Valve Circuit

DTC C0146

Front Isolation Solenoid Valve Circuit

DTC C0151

Rear Prime Solenoid Valve Circuit

DTC C0156

Rear Isolation Solenoid Valve Circuit

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

Circuit/System Description

The valve relay is located within the electronic brake control module and supplies battery voltage to all of the solenoid valves when commanded ON. The solenoid valves are integral parts of the brake pressure modulator. The brake pressure modulator contains an isolation solenoid valve and a dump solenoid valve for each wheel. It also contains a traction/stability control prime solenoid valve and isolation solenoid valve for each brake circuit. The solenoid valves are not engaged during normal system operation. When the ABS, the traction control or stability control operation is required the module turns the required solenoid valves ON or OFF.

Conditions for Running the DTC

- The valve relay is commanded ON.
- The ignition voltage is greater than 10 V.

Conditions for Setting the DTC

- The electronic brake control module detects a valve or solenoid malfunction.
- The electronic brake control module detects an open in the B+ circuit to the valve relay.

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 system and the electronic stability control for the duration of the ignition cycle.

Conditions for Clearing the DTC

- When the condition for setting the DTC is no longer present.
- 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](#)

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 C0060, C0065, C0070, C0075, C0080, C0085, C0090, C0095, C0121, C0141, C0146, C0151, or C0156 is not set.

⇒ **If any of the DTCs are set**

- 2.1. Replace the K17 Electronic Brake Control Module.
- 2.2. Verify the DTC does not set while operating the vehicle within the Conditions for Running the DTC.
 - ⇒ If the DTC sets, replace the Q5 Brake Pressure Modulator.
 - ↓ If the DTC does not set
- 2.3. All OK.

↓ **If none of the DTCs are 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 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 03

Pump Motor Low Voltage

DTC C0110 04

Pump Motor Open

DTC C0110 07

Pump Motor High Voltage

DTC C0110 39

Pump Motor Circuit Internal Malfunction

DTC C0110 59

Pump Motor Circuit Protection Time-Out

DTC C0110 61

Pump Motor Stuck

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	C0110 03	C0110 00, C0110 04	C0110 07	C0110 39, C0110 59
Ground	—	C0110 00, C0110 04	—	—

Component	Condition	DTC
Pump Motor	• Wear • Damage • Lock	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, the traction control or the electronic stability control operation is required, the module activates the pump motor relay and turns the pump motor on.

Conditions for Running the DTC

C0110 00, or C0110 04

- Ignition ON
- The pump motor is commanded ON.

C0110 03, or C0110 07

- Ignition ON
- Vehicle speed is greater than 30 km/h (18.6 MPH) for 7 s.

C0110 39, C0110 59, or C0110 61

- Ignition ON
- Vehicle speed is greater than 60 km/h (37.3 MPH) for 5 s.

Conditions for Setting the DTC

C0110 00

An open/high resistance is detected on the pump motor switch circuit.

C0110 03

Worn out pump motor brushes are detected.

C0110 04

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

C0110 07

A short to voltage is detected on the pump motor ground circuit.

C0110 39

A shorted circuit is detected in the pump motor circuit.

C0110 59

The pump motor is overheating.

C0110 61

- The pump motor is mechanically blocked.
- The pump motor is actuated but no generated motor voltage is detected.

Action Taken When the DTC Sets

- The ABS indicator turns ON.
- The red brake indicator turns ON.
- The traction/stability control indicator turns ON.
- The driver information center may display a message.
- 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

- When the condition for setting the DTC is no longer present.
- 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](#)

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 Motor On and Off with a scan tool.
 - ⇒ **If the pump motor does not turn On and Off**
Refer to Circuit/System Testing.
 - ⇓ **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 min for all vehicle systems to power down.
2. Test for less than 10 Ω between ground circuit terminal 13 and ground.
 - ⇒ **If 10 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. Test for less than 2 Ω in the ground circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than 2 Ω , repair the open/high resistance in the ground connection.
 - ⇓ **If less than 10 Ω**
3. 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**
 - 4.1. Ignition OFF, remove the test lamp.
 - 4.2. Test for less than 2 Ω in the B+ circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance the in the circuit.

⇒ If less than $2\ \Omega$, 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**

4.1. Ignition OFF, remove the test lamp.

4.2. 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 Q5 Brake Pressure Modulator.

↓ **If the test lamp illuminates**

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 C0115

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 C0115 61

Pump Motor Stuck

Diagnostic Fault Information

Component	Condition	DTCs
Pump Motor	• Wear • Damage • Lock	C0115 61

Circuit/System Description

The pump motor is an integral part of the brake pressure modulator valve, 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, the traction control or the stability control 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.
- Vehicle speed is greater than 60 km/h (37.3 MPH) for 5 s.

Conditions for Setting the DTC

- The pump motor is mechanically blocked.
- The pump motor is actuated but no generated motor voltage is detected.

Action Taken When the DTC Sets

- The ABS indicator turns ON.
- The red brake indicator turns ON.
- The traction/stability control indicator turns ON.
- The driver information center may display a message.
- 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 in the next ignition cycle.

[Diagnostic Aids](#)

DTC C0115 61 may set due to extended operation of the ABS, the traction control or the stability control, review with the customer the conditions under which the DTC set.

[Reference Information](#)

Schematic Reference

[Antilock Brake System Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 DTC C0110 is not set.
⇒ **If DTC C0110 is set**
Refer to [DTC C0110](#).
↓ **If DTC C0110 is not set**
3. Verify that DTC C0115 does not set while driving the vehicle under normal braking conditions.
⇒ **If DTC C0115 sets**
Replace the Q5 Brake Pressure Modulator.
↓ **If DTC C0115 does not set**
4. 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

Antilock Braking System Pressure Circuit Malfunction

DTC C0131 04

Antilock Braking System Pressure Circuit Open

DTC C0131 08

Antilock Braking System Pressure Circuit Performance - Signal Invalid

DTC C0131 58

Antilock Braking System Pressure Circuit Performance

DTC C0131 1A

Antilock Braking System Pressure Circuit Performance - Bias Level Out of Range

DTC C0131 4B

Antilock Braking System Pressure Circuit Calibration Not Learned

Circuit/System Description

The brake pressure sensor is integral to the brake pressure modulator valve. The electronic brake control module monitors the brake pressure sensor supply voltage and the signal voltage. The body control module sends a serial data message when the brake pedal is applied. The electronic brake control module uses input from the master cylinder pressure sensor for more accurate control during a vehicle stability enhancement system event.

Conditions for Running the DTC

DTC C0131 00, or C0131 04

- Ignition ON.
- The brakes are not applied.

C0131 08, or C0131 1A

Drive the vehicle straight ahead while accelerating up to 60 km/h (37.3 MPH) and maintain this speed for at least 5 s.

DTC C0131 58, or C0131 4B

- The brakes are not applied.
- Operating the vehicle at a speed greater than 10 km/h (7 MPH).

Conditions for Setting the DTC

C0131 00

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The electronic brake control module detects an invalid or erratic brake pressure sensor signal.

C0131 04

The brake pressure sensor circuit is open.

C0131 08, or C0131 1A

The offset value of the pressure sensor is out of the specified range.

C0131 58

The brake pressure sensor signal is not plausible with the vehicle acceleration or deceleration.

C0131 4B

The brake pressure sensor is not calibrated.

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, the stability control and the hill start assist 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 in the next ignition cycle.
- 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](#)

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 C0131 4B is not set.
⇒ **If DTC C0131 4B is set**
Perform the [Brake Pressure Modulator Valve Pressure Sensor Calibration](#).
⇓ **If DTC C0131 4B is not set**

3. Verify the brake pedal position sensor or the brake pedal is not binding causing residual brake pressure to be detected.

⇒ **If a condition is found**

Repair or replace the applicable component.

⇓ **If a condition is not found**

4. Verify that DTC C0131 does not set while operating the vehicle under the Conditions for Running the DTC.

⇒ **If DTC C0131 sets**

4.1. Replace the Q5 Brake Pressure Modulator.

4.2. Verify the DTC does not set while driving the vehicle under normal braking conditions.

⇒ If the DTC sets, replace the K17 Electronic Brake Control Module.

⇓ If the DTC does not set.

4.3. All OK.

⇓ **If DTC C0131 does not set**

5. 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 Descriptors

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 control event.

Conditions for Running the DTC

- Ignition ON.
- DTCC0131 is not present.
- The brake is applied and the brake pressure is greater than 10 Bar (145 psi) for 1 s.

Conditions for Setting the DTC

- The brake pedal position sensor signal is not plausible with the brake pressure sensor.
- The electronic brake control module detects that the brake pedal is permanently applied.

Conditions for Clearing the DTC

A current DTC clears when the diagnostic runs and passes.

Action Taken When the DTC Sets

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

Diagnostic Aids

- If the brake pedal position sensor is not correctly mounted.
- This DTC may set when the brake pedal is applied while accelerating, such as two footed driving.
- Verify the brake pedal position sensor or the brake pedal are not binding causing residual brake pressure to be detected.

Reference Information

Schematic Reference

[Antilock Brake System Schematics](#)

Connector End View Reference

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[Component Connector End Views](#)**Description and Operation**[ABS Description and Operation](#)**Electrical Information Reference**

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- [Wiring Repairs](#)

Scan Tool Reference

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

[Circuit/System Verification](#)

1. Ignition ON.
2. Verify the Body Control Module Brake Pedal Position Sensor Learned Released Position parameter is Yes.
⇒ **If the parameter is not Yes**
Refer to [Brake Pedal Position Sensor Calibration](#).
↓ **If the parameter is Yes**
3. Verify the stop lamps operate properly when applying and releasing the brake pedal.
⇒ **If the stop lamps do not operate properly**
Refer to [Symptoms - Lighting](#).
↓ **If the stop lamps operate properly**
4. Verify that DTC B0655, C0277, or P0703 is not set.
⇒ **If any listed DTCs is set**
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).
↓ **If none listed DTC is set**
5. All OK, refer to Diagnostic Aids.

[Repair Instructions](#)

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

DTC C0186, C0196, 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

Lateral Acceleration Sensor Signal

DTC C0196

Yaw Rate Signal

DTC C0287

Longitudinal Acceleration Sensor Signal

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, internal to the inflatable restraint sensing and diagnostic module. 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 inflatable restraint sensing and diagnostic module uses the multi-axis acceleration sensor to determine if the vehicle is in a roll over or near collision incident.

Conditions for Running the DTC

C0186 00, C096 00, C0287 00, C0287 11, or C0287 42

Ignition ON

C0186 08, or C0287 08

Drive the vehicle straight ahead for a distance at least 5 km (3.1 mi), the vehicle speed does not matter.

C0186 11, or C0287 5A

Drive the vehicle straight ahead with constant velocity greater than 30 km/h (18.6 MPH), then turn right and then turn left.

C0186 71, C0186 72, C0186 74, C0196 71, C0196 74, C0287 71, C0287 72, or C0287 74

Engine running

C0196 08, C0196 09, C0196 11, or C0196 5A

Vehicle at standstill for 10 s, then drive the vehicle straight ahead with constant velocity greater than 20 km/h (12.4 MPH).

C0287 0A

Drive the vehicle straight ahead while accelerating up to 60 km/h (37.3 MPH) and maintain this speed for at least 5 s.

Conditions for Setting the DTC

C0186 00

- An internal fault in multi-axis acceleration sensor will set this DTC.
- Improperly mounted or loose inflatable restraint sensing and diagnostic module may set this DTC.

C0186 08

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

C0186 11

The lateral acceleration value is higher than calculated.

C0186 71

The electronic brake control module has detected invalid lateral acceleration signal coming from the inflatable restraint sensing and diagnostic module.

C0186 72

The yaw rate sensor sends more or less messages than expected to the electronic brake control module.

C0186 74

The electronic brake control module has detected the lateral acceleration protection value is out of specification.

C0186 5A

- An internal fault in multi-axis acceleration sensor.
- Improperly mounted or loose inflatable restraint sensing and diagnostic module.
- The lateral acceleration signal is not plausible with the lateral acceleration signal, the steering wheel angle sensor signal and the vehicle speed.

C0196 00

The yaw rate signal is out of the specified range.

C0196 08

The yaw rate signal offset is out of the specified range.

C0196 09

The yaw rate signal is changing faster than physically possible.

C0196 11

The yaw rate signal is above the maximum threshold.

C0196 5A

- Improperly mounted or loose inflatable restraint sensing and diagnostic module may set this DTC.
- The yaw rate signal is not plausible with the lateral acceleration signal, the steering wheel angle sensor signal and the vehicle speed.

C0196 71

The electronic brake control module has detected invalid yaw rate signal coming from the inflatable restraint sensing and diagnostic module.

C0287 00

The longitudinal acceleration signal is out of the specified range.

C0287 08

The longitudinal acceleration signal offset is out of the specified range.

C0287 0A

The longitudinal acceleration signal rate of change is below the threshold.

C0287 11

The longitudinal acceleration signal is above the maximum specification.

C0287 42

The longitudinal acceleration sensor is not calibrated.

C0287 5A

- An internal fault in multi-axis acceleration sensor will set this DTC.
- The longitudinal acceleration signal is not plausible with the vehicle acceleration.

C0287 71

The electronic brake control module has detected invalid longitudinal acceleration signal coming from the inflatable restraint sensing and diagnostic module.

C0287 72

The longitudinal acceleration sensor sends more or less messages than expected to the electronic brake control module.

C0287 74

The electronic brake control module has detected the longitudinal acceleration protection value is out of specification.

Action Taken When the DTC Sets

- The air bag indicator turns ON.
- The traction/stability control indicator turns ON.
- The electric brake control module disables the electronic stability control and the hill start assist 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.

Reference Information**Schematic Reference**

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- [Wiring Repairs](#)

Scan Tool Reference

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

[Circuit/System Verification](#)

1. Verify the K36 Inflatable Restraint Sensing and Diagnostic Module is installed correctly.
⇒ **If loose or incorrect installation**
Correct the installation or replace the component.
↓ **If correct installation**
2. Verify DTC C0186, C0196, or C0287 is not set in the K36 Inflatable Restraint Sensing and Diagnostic Module.
⇒ **If any of the DTCs are set**
Perform the [Vehicle Yaw Sensor Learn](#).
↓ **If none of the DTCs are set**
3. Verify DTC C0186, C0196, or C0287 is not set in the K17 Electronic Brake Control Module.
⇒ **If any of the DTCs are set**
 - 3.1. Replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
 - 3.2. 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
 - 3.3. All OK.
- ↓ **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 Inflatable Restraint Sensing and Diagnostic Module replacement, programming and setup

DTC C0242 or 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 Descriptors

DTC C0242 00

Powertrain Control Module Indicated Traction Control Malfunction

DTC C0242 58

Powertrain Control Module Indicated Traction Control Performance

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 engine 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 stability/traction 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

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

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- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Verification

1. Ignition ON.
2. Verify that no other DTCs are set except for C0242 or P0856.
⇒ **If any other DTCs are set**
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).
⇓ **If no other DTCs are set**
3. Replace the K20 Engine Control Module.
4. Verify that DTC C0242 or P0856 does not set while operating the vehicle within the Conditions for Running the DTC.
⇒ **If DTC C0242 or P0856 sets**
Replace the K17 Electronic Brake Control Module.
⇓ **If DTC C0242 or P0856 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 Engine Control Module replacement, programming, and setup

DTC C0245

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 C0245 00

Wheel Speed Sensor Frequency Malfunction

DTC C0245 03

Wheel Speed Sensor Frequency Low Voltage

DTC C0245 08

Wheel Speed Sensor Frequency Performance – Signal Invalid

DTC C0245 0F

Wheel Speed Sensor Frequency Signal Erratic

DTC C0245 1F

Wheel Speed Sensor Frequency Erratic

DTC C0245 58

Wheel Speed Sensor Frequency Performance

DTC C0245 5A

Wheel Speed Sensor Frequency Not Plausible

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Signal High – Left Front	C0035 00	C0035 00	C0245 00, C0245 03	C0245 08, C0245 0F, C0245 1F, C0245 5A, C0245 58
Signal Low – Left Front	C0035 00	C0035 00	C0035 00	C0245 08, C0245 0F, C0245 1F, C0245 5A, C0245 58
Signal High – Right Front	C0040 00	C0040 00	C0245 00, C0245 03	C0245 08, C0245 0F, C0245 1F,

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
				C0245 5A, C0245 58
Signal Low – Right Front	C0040 00	C0040 00	C0040 00	C0245 08, C0245 0F, C0245 1F, C0245 5A, C0245 58
Signal High – Left Rear	C0045 00	C0045 00	C0245 00, C0245 03	C0245 08, C0245 0F, C0245 1F, C0245 5A, C0245 58
Signal Low – Left Rear	C0045 00	C0045 00	C0045 00	C0245 08, C0245 0F, C0245 1F, C0245 5A, C0245 58
Signal High – Right Rear	C0050 00	C0050 00	C0245 00, C0245 03	C0245 08, C0245 0F, C0245 1F, C0245 5A, C0245 58
Signal Low – Right Rear	C0050 00	C0050 00	C0050 00	C0245 08, C0245 0F, C0245 1F, C0245 5A, C0245 58

Component	Condition	DTC Symptom Byte
Wheel Speed Sensor	- 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 or 5A

[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 speed.

Conditions for Running the DTC

- DTC C0035, C0040, C0045, or C0050 is not present.
- Vehicle speed is between 20 km/h (13 MPH) and 50 km/h (31 MPH).
- While driving a curve with a yaw-rate of 3° per second for greater than 9 seconds.

Conditions for Setting the DTC

- A electrical magnetic interference with the wheel speed sensor harness.
- A short to voltage on any one of the wheel speed sensor high signal circuits.
- The electronic brake control module cannot determine a specific wheel speed sensor signal.
- If two or more wheel speed sensor faults are detected without the ABS warning lamp being turned ON.

Action Taken When the DTC Sets

- The stability/traction control indicator turns ON.
- A message may be displayed on the driver information center.
- 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

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

Diagnostic Aids

- Do not use a magnet to clean the encoder ring.
- Inspect the wheel encoder ring for rust or corrosion.
- Inspect the wheel speed sensors and components for the correct parts.
- Check for electrical magnetic interference with the wheel speed sensor harness.
- If two or more wheel speed sensors are inoperative, diagnose each wheel speed sensor individually.
- If symptom code 0F or 5A is 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.
- 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 electronic stability control system to function normally, tires need to be a uniform size and rolling diameter.

Reference Information

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Scan Tool Reference

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

[Circuit/System Verification](#)

1. Verify that all tires have the proper air pressure.
 - ⇒ **If not the proper air pressure**
Adjust all tire air pressures to the stated cold air pressure as identified on the tire placard or specification.
 - ↓ **If the proper air pressure**
2. Verify that all tires are of uniform size and matching brand.
 - ⇒ **If not of uniform size or matching brand**
 - 2.1. Replace the mis-sized or non-matching brand tire.
 - 2.2. Ignition ON.
 - 2.3. Verify the DTC does not set while operating the vehicle within the Conditions for Running the DTC.
 - ⇒ If the DTC set, replace the K17 Electronic Brake Control Module.
 - ↓ If the DTC does not set
 - 2.4. All OK.
 - ↓ **If all tires are of uniform size and matching brand**
3. Drive the vehicle in a straight line at a speed greater than 40 km/h (25 MPH).
4. 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.
 - ↓ **If each parameter is within 1.6 km/h (1 MPH) of each other.**
5. All OK.

[Circuit/System Testing](#)

1. Verify DTC C0245 58 is not set.
 - ⇒ **If the DTC is set**
Reprogram the K17 Electronic Brake Control Module.
 - ↓ **If the DTC is not set**
2. Inspect the appropriate B5 Wheel Speed Sensor and encoder ring for contamination, metallic particles, physical damage, incorrect installation and the correct component.

⇒ **If contamination, physical damage, incorrect installation, or the wrong component is diagnosed**

Repair or replace the applicable component.

⇓ **If no contamination, physical damage, incorrect installation, or the wrong component is not diagnosed**

3. Ignition OFF and all vehicle systems OFF, disconnect the harness connectors at the appropriate B5 Wheel Speed Sensor and the harness connector at the K17 Electronic Brake Control Module, ignition ON.

4. Test for less than 1 V between the K17 Electronic Brake Control Module harness connector terminals listed below and ground:

- B5LF Left Front Wheel Speed Sensor – terminal 8 and terminal 19
- B5RF Right Front Wheel Speed Sensor – terminal 4 and terminal 16
- B5LR Left Rear Wheel Speed Sensor – terminal 18 and terminal 31
- B5RR Right Rear Wheel Speed Sensor – terminal 17 and terminal 29

⇒ **If 1 V or greater**

Repair the short to voltage on the circuit.

⇓ **If less than 1 V**

5. Ignition OFF.

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

- B5LF Left Front Wheel Speed Sensor – terminal 8 and terminal 19
- B5RF Right Front Wheel Speed Sensor – terminal 4 and terminal 16
- B5LR Left Rear Wheel Speed Sensor – terminal 18 and terminal 31
- B5RR Right Rear Wheel Speed Sensor – terminal 17 and terminal 29

⇒ **If less than infinite resistance**

Repair the short to ground on the circuit.

⇓ **If infinite resistance**

7. Test for less than 2 Ω between the B5 Wheel Speed Sensor harness connector terminal 1 and the K17 Electronic Brake Control Module harness connector terminal listed below:

- B5LF Left Front Wheel Speed Sensor terminal 19
- B5RF Right Front Wheel Speed Sensor terminal 16
- B5LR Left Rear Wheel Speed Sensor terminal 31
- B5RR Right Rear Wheel Speed Sensor terminal 17

⇒ **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

⇓ **If less than 2 Ω**

8. Test for less than 2 Ω between the B5 Wheel Speed Sensor harness connector terminal 2 and the K17 Electronic Brake Control Module harness connector terminal listed below:

- B5LF Left Front Wheel Speed Sensor terminal 8
- B5RF Right Front Wheel Speed Sensor terminal 4
- B5LR Left Rear Wheel Speed Sensor terminal 18
- B5RR Right Rear Wheel Speed Sensor terminal 29

⇒ **If 2 Ω or greater**

Repair the open/high resistance in the circuit.

⇓ **If less than 2 Ω**

9. Replace the B5 Wheel Speed Sensor.

[Repair Instructions](#)

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

- [Front Wheel Speed Sensor Replacement](#)
- [Rear Wheel Speed 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 Descriptors

DTC C0280

Stability System Active Too Long Malfunction

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

Circuit/System Description

The solenoid valves are integral parts of the brake pressure modulator valve. The brake pressure modulator valve contains an isolation solenoid valve and a dump solenoid valve for each wheel and a traction/ stability control supply solenoid valve and isolation solenoid valve for each brake circuit. The solenoid valves are not engaged during normal system operation. When the ABS, the traction control or the stability control operation is required the electronic brake control module turns the required solenoid valves ON.

Conditions for Running the DTC

- Ignition ON
- Vehicle speed is greater than 22 km/h (13.7 MPH).

Conditions for Setting the DTC

Calculated solenoid valve temperature is greater than threshold.

Action Taken When the DTC Sets

- The ABS indicator turns ON.
- The traction/stability control indicator turns ON.
- A driver information center message may be displayed.
- The electronic brake control module disables the ABS, the traction control, the stability control, and the hill start assist 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 system.

Reference Information

Schematic Reference

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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, C0196, 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 hydraulic brake modulator valve to cool down to ambient temperature, ignition ON.
4. Verify the DTC does not set while driving the vehicle under normal braking conditions.
⇒ **If the DTC sets**
 - 4.1. Replace the Q5 Brake Pressure Modulator.
 - 4.2. Verify DTC C0280 does not set while driving the vehicle under normal braking conditions.
⇒ If the DTC does set, replace the K17 Electronic Brake Control Module.
⇓ If the DTC does not set.
 - 4.3. All OK.
⇓ **If the DTC does not set**
5. 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 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.

DTC Descriptor

DTC C0710 00

Steering Position Signal Malfunction

DTC C0710 08

Steering Position Signal Performance - Signal Invalid

DTC C0710 09

Steering Position Signal Too Fast Transitions

DTC C0710 0A

Steering Position Signal Too Slow Transitions

DTC C0710 11

Steering Position Signal High Input

DTC C0710 42

Steering Position Signal Calibration Not Programmed

DTC C0710 5A

Steering Position Signal Not Plausible

DTC C0710 71

Steering Position Signal Invalid Data

DTC C0710 72

Steering Position Signal Message Counter Incorrect

DTC C0710 74

Steering Position Signal Bus Signal Checksum Error

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
12 V Reference	U0125, U0126	U0125, U0126	—	—
High Serial Data	U0073, U0074,	U0073, U0074,	U0073, U0074,	C0710 00, C0710 08, C0710 09,

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
	U0125, U0126	U0125, U0126	U0125, U0126	C0710 0A, C0710 11, C0710 42, C0710 5A C0710 71, C0710 72, C0710 74
Low Serial Data	U0073, U0074, U0125, U0126	U0073, U0074, U0125, U0126	U0073, U0074, U0125, U0126	C0710 00, C0710 08, C0710 09, C0710 0A, C0710 11, C0710 42, C0710 5A C0710 71, C0710 72, C0710 74
Ground	—	U0126	—	—

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

C0710 00, or C0710 42

Ignition ON

C0710 08

Drive the vehicle straight ahead for a distance at least 5 km (3.1 mi), the vehicle speed does not matter.

C0710 09, or C0710 11

Drive the vehicle straight ahead with constant velocity greater than 30 km/h (18.6 MPH), then turn right and then turn left.

C0710 0A

Vehicle stopped with engine running turn the steering wheel through its entire range of motion from right to left.

C0710 5A

- Drive the vehicle straight ahead with constant velocity greater than 30 km/h (18.6 MPH), then turn right and then turn left.
- Drive the vehicle straight ahead while accelerating up to 70 km/h (43.5 MPH) and maintain this speed for at least 5 s.

C0710 71, C0710 72, or C0710 74

Engine running

Conditions for Setting the DTC

C0710 00

The control module received an invalid steering angle sensor signal.

C0710 08, or C0710 71

The steering wheel angle sensor signal is invalid.

C0710 09

The steering wheel angle sensor signal rate of change is too fast greater than 30°.

C0710 0A

The steering wheel angle sensor signal has not changed.

C0710 11

The steering wheel angle sensor signal is above the maximum specification.

C0710 42

The steering wheel angle sensor is not calibrated.

C0710 5A

The steering wheel angle sensor signal is not plausible with the yaw rate sensor signal.

C0710 72

The steering wheel angle sensor sends more than three or less than one message in 0.2 s to the electronic brake control module.

C0710 74

The electronic brake control module has detected the steering wheel angle sensor protection value is out of specification.

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

- 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

- 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 mismatched 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.

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- [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 Column Position parameter corresponds to the actual steering position as the steering wheel is turned through its entire range of motion.
⇒ **If the parameter does not correspond with the steering wheel position or the reading is erratic**
Refer to Circuit/System Testing.
- ↓ **If the parameter reading corresponds with the steering wheel position**
3. All OK.

[Circuit/System Testing](#)

1. Ignition ON.
2. Verify that DTC U0073, U0074, U0125 or U0126 is not set.
⇒ **If DTC U0073, U0074, U0125 or U0126 is set**
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).
↓ **If DTC U0073, U0074, 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**
Refer to [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 5 Ω between the ground circuit terminal 6 and ground.
⇒ **If 5 Ω or greater**
 - 6.1. Ignition OFF.
 - 6.2. Test for less than 2 Ω in the ground circuit end to end.
⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, repair the open/high resistance in the ground connection.

↓ **If less than $5\ \Omega$**

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**

8.1. Ignition OFF, disconnect the harness connector at the K17 Electronic Brake Control Module.

8.2. Test for infinite resistance between 12 V reference circuit and ground.

⇒ If less than infinite resistance, repair the short to ground on the circuit.

↓ If infinite resistance

8.3. Test for less than $2\ \Omega$ in the 12 V reference circuit end to end.

⇒ If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.

⇒ If less than $2\ \Omega$, 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 C0914

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 C0914 00

Control Module Voltage Output 1 Circuit Malfunction

DTC C0914 03

Control Module Voltage Output 1 Circuit Low Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition Voltage	U0126, C0914 03	U0126, C0914 00	—	—
Ground	—	U0126	—	—

Conditions for Running the DTC

- Ignition ON
- The ignition voltage is greater than 10 V.

Conditions for Setting the DTC

The electronic brake control module has detected a short to ground or open in the steering wheel angle sensor ignition circuit.

Action Taken When the DTC Sets

- The ABS indicator turns ON.
- The red brake indicator turns ON.
- The traction/stability control indicator turns ON.
- The Service Brake Assist message is displayed on the driver information center.
- The electronic brake control module disables the ABS, the traction control system and the electronic stability control for the duration of the drive 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.

Reference Information

Schematic Reference

[Antilock Brake System Schematics](#)

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Connector End View Reference

[Component Connector End Views](#)

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 OFF and all vehicle systems OFF, disconnect the harness connector at the B99 Steering Wheel Angle Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 6 and ground.
⇒ **If 10 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. Test for less than 2 Ω in the ground circuit end to end.
⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
⇒ If less than 2 Ω , repair the open/high resistance in the ground connection.
⇓ **If less than 10 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the ignition circuit terminal 5 and ground.
⇒ **If the test lamp does not illuminate**
 - 4.1. Ignition OFF, disconnect the harness connector at the K17 Electronic Brake Control Module.
 - 4.2. Test for infinite resistance between the ignition circuit and ground.
⇒ If less than infinite resistance, repair the short to ground on the circuit.
⇓ If infinite resistance
 - 4.3. Test for less than 2 Ω in the ignition circuit end to end.
⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
⇒ If less than 2 Ω , replace the K17 Electronic Brake Control Module.
⇓ **If the test lamp illuminates**
5. 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 C124F or C1250-C1254

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 C124F

Lateral Acceleration Sensor Circuit Low Voltage

DTC C1250

Lateral Acceleration Sensor Circuit High Voltage

DTC C1251

Lateral Acceleration Sensor Performance

DTC C1252

Longitudinal Acceleration Sensor Circuit Low Voltage

DTC C1253

Longitudinal Acceleration Sensor Circuit High Voltage

DTC C1254

Longitudinal 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, internal to the inflatable restraint sensing and diagnostic module. The multi-axis acceleration sensor communicates with the electronic brake control module and trans control module via serial data. The electronic brake control module activates the stability control function depending on the multi-axis acceleration sensor input. The inflatable restraint sensing and diagnostic module uses the multi-axis acceleration sensor to determine if the vehicle is in a roll over or near collision incident. The transmission control module sets these DTCs.

Conditions for Running the DTC

Vehicle speed is greater than 16 km/h (10 MPH).

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 air bag indicator turns ON.
- The traction/stability control indicator turns ON.

- The electronic brake control module disables the stability control and the hill hold 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 ignition cycles have occurred.

Reference Information

Schematic Reference

[Antilock Brake System Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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.
⇒ **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 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**
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 P2548

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 P2548

Vehicle Dynamics System Torque Request Signal Message Counter Incorrect

Circuit/System Description

The electronic brake control module and the engine control module simultaneously control the vehicle performance launch. During a performance launch the electronic brake control module sends a serial data message to the engine control module requesting torque reduction. If the engine control module receives corrupt data from the electronic brake control module, DTC P2548 will set in the engine control module. The engine control module then sends a serial data message to the electronic brake control module that torque reduction is not allowed.

Conditions for Running the DTC

- The ignition is ON.
- Ignition voltage is greater than 8 V.

Conditions for Setting the DTC

The engine control module detects a corrupted data message from the electronic brake control module.

Action Taken When the DTC Sets

- The ABS remains functional.
- The traction/stability control indicator turns ON.
- A message may be displayed on the driver information center.

Conditions for Clearing the DTC

DTC P2548 is a Type B DTC.

Diagnostic Aids

Inspect the serial data circuits and connections at the engine control module and the electronic brake control module. They should be free from sources of electromagnetic interference and the connections should be clean and tight.

Reference Information

Schematic Reference

[Antilock Brake System Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

Description and Operation

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[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](#)**Note:**

- DTC P2548 is an informational DTC.
- Diagnose all other engine control module DTCs prior to DTC P2548.

1. Verify that no other DTCs are set except for DTC P2548.

⇒ **If any other DTCs are set**

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

⇓ **If only DTC P2548 is set**

2. Replace the K17 Electronic Brake 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 K20 Engine 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](#)
- [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 the ABS indicator ON for 5 s after the ignition is turned ON, or when the electronic brake control module detects a fault it sends a serial data message to the instrument cluster commanding the indicator ON.

Reference Information

Schematic Reference

[Antilock Brake System Schematics](#)

Connector End View Reference

[Component Connector End Views](#)

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 DTCs are set.
⇒ **If any DTCs are set**
Refer to [Diagnostic Trouble Code \(DTC\) List - Vehicle](#).
↓ **If no DTCs are set**
3. Verify the Instrument Cluster ABS indicator turns ON and OFF when commanding the All Indicators ON and OFF with a scan tool.
⇒ **If ABS indicator does not turn ON and OFF**
Replace the P16 Instrument Cluster.
↓ **If the ABS indicator turns ON and OFF**
4. Verify the ABS indicator turns OFF 5 s 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**

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5. 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 (With 9C3)

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. Traction control switch is inoperative.				

Circuit/System Description

The instrument cluster illuminates the traction control/stability control-active indicator for five seconds after ignition ON. The electronic brake control module will request the instrument cluster via serial data to turn the traction control/stability control-active indicator ON (flashing) when the system is in traction control or stability control mode. When the electronic brake control module detects a fault it sends a serial data message to the instrument cluster commanding the traction control/stability control-active indicator ON.

The body control module monitors the stability 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. When the traction control switch is pressed for five seconds, the body control module will request the electronic brake control module to disable the stability control. The electronic brake control module will request the instrument cluster via serial data to turn the traction control off indicator 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](#)

Description and Operation

[ABS Description and Operation](#)

Electrical Information Reference

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

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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 control off indicator
 - Stability control off indicator
 - Traction/stability control indicator
 - Traction control/stability control-active indicator
- ⇒ **If any indicator does not turn ON and OFF**
Replace the P16 Instrument Cluster.
- ↓ **If all indicators 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 traction control switch.
- ⇒ **If the parameter does not change**
Refer to Circuit/System Testing.
- ↓ **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 min for all vehicle systems to power down.
 2. Test for less than 5 Ω between the ground circuit terminal 1 and ground.
- ⇒ **If 5 Ω or greater**
- 2.1. Ignition OFF.
 - 2.2. Test for less than 2 Ω in the ground circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than 2 Ω , repair the open/high resistance in the ground connection.
- ↓ **If less than 5 Ω**
3. Ignition ON.
 4. Verify the scan tool Body Control Module, Traction Control Switch parameter is Inactive.
- ⇒ **If not Inactive**
- 4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 - 4.2. 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 3 and ground circuit terminal 1.
 6. Verify the scan tool Traction Control Switch parameter is Active.
- ⇒ **If not Active**
- 6.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 - 6.2. 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

6.3. Test for less than 2 Ω in the signal circuit end to end.

⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.

⇒ If less than 2 Ω , 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 3 and the ground terminal 1 with the switch in the open position.

⇒ **If less than infinite resistance**

Replace the S75 Traction Control Switch.

3. Test for less than 2 Ω between the signal terminal 3 and the ground terminal 1 with the switch in the closed position.

⇒ **If 2 Ω or greater**

Replace the S75 Traction Control Switch.

⇓ **If less than 2 Ω**

4. All OK.

Repair Instructions

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

- [Front Floor Console Accessory Switch Mount Plate Replacement](#)
- [Control Module References](#) for Body Control Module replacement or Instrument Cluster, programming and setup

Traction Control/Stability Control Indicator Malfunction (Without 9C3)

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. Traction control switch is inoperative.

Circuit/System Description

The instrument cluster illuminates the traction control/stability control-active indicator for five seconds after ignition ON. The electronic brake control module will request the instrument cluster via serial data to turn the traction control/stability control-active indicator ON (flashing) when the system is in traction control or stability control mode. When the electronic brake control module detects a fault it sends a serial data message to the instrument cluster commanding the traction control/stability control-active indicator ON.

The body control module monitors the stability 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. When the traction control switch is pressed for five seconds, the body control module will request the electronic brake control module to disable the stability control. The electronic brake control module will request the instrument cluster via serial data to turn the traction control off indicator 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](#)

Description and Operation

[ABS Description and Operation](#)

Electrical Information Reference

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

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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 control off indicator
 - Stability control off indicator
 - Traction/stability control indicator
 - Traction control/stability control-active indicator
- ⇒ **If any indicator does not turn On and Off**
Replace the P16 Instrument Cluster.
- ⇓ **If all indicators 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 traction control switch.
- ⇒ **If the parameter does not change**
Refer to Circuit/System Testing.
- ⇓ **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 S148E Multifunction Switch — Center Console. It may take up to 2 min for all vehicle systems to power down.
 2. Test for less than 5 Ω between the ground circuit terminal 9 and ground.
 - ⇒ **If 5 Ω or greater**
 - 2.1. Ignition OFF.
 - 2.2. Test for less than 2 Ω in the ground circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than 2 Ω , repair the open/high resistance in the ground connection.
- ⇓ **If less than 5 Ω**
3. Ignition ON.
 4. Verify the scan tool Body Control Module Traction Control Switch parameter is Inactive.
 - ⇒ **If not Inactive**
 - 4.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 - 4.2. 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 5 and ground circuit terminal 9.
 6. Verify the scan tool Traction Control Switch parameter is Active.
 - ⇒ **If not Active**
 - 6.1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

- 6.2. 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
- 6.3. Test for less than 2 Ω in the signal circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than 2 Ω , replace the K9 Body Control Module.

⇓ **If Active**

7. Test or replace the S148E Multifunction Switch — Center Console.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S148E Multifunction Switch — Center Console.
2. Test for infinite resistance between the signal terminal 5 and the ground terminal 9 with the switch in the open position.
 - ⇒ **If less than infinite resistance**
Replace the S148E Multifunction Switch — Center Console.
3. Test for less than 2 Ω between the signal terminal 5 and the ground terminal 9 with the switch in the closed position.
 - ⇒ **If 2 Ω or greater**
Replace the S148E Multifunction Switch — Center Console.
 - ⇓ **If less than 2 Ω**
4. All OK.

Repair Instructions

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

- [Front Floor Console Accessory Switch Mount Plate Replacement](#)
- [Control Module References](#) for Body Control Module replacement or Instrument Cluster, programming and setup

Antilock Brake System Automated Bleed

Danger: To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed and strap the vehicle to the hoist.

Warning: Refer to [Safety Glasses Warning](#).

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

Warning: Refer to [Brake Fluid Irritant Warning](#).

Caution: Refer to [Brake Fluid Effects on Paint and Electrical Components Caution](#).

Note: Before performing the Antilock Brake System Automated Bleed Procedure, first perform a pressure bleed of the base brake system. Refer to [Hydraulic Brake System 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 hydraulic modulator assembly.

The Antilock Brake System 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 calipers.

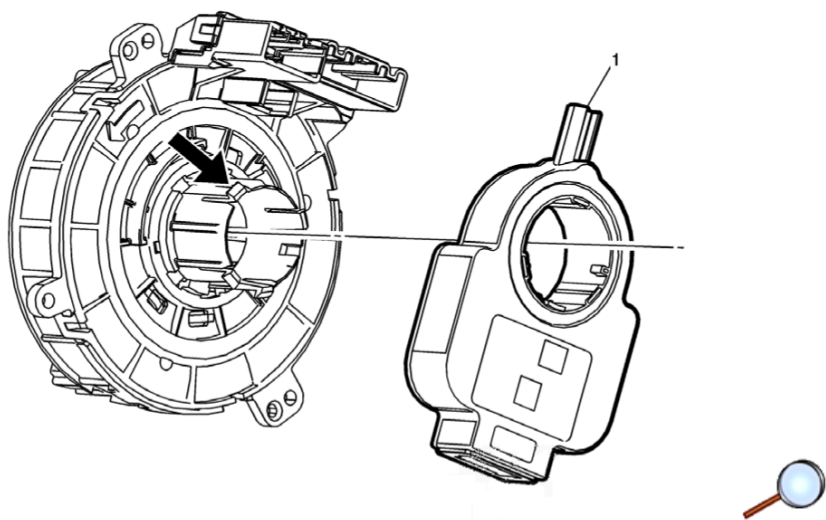
Performing the Automated Bleed Procedure

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 wheels. Refer to [Tire and Wheel Removal and Installation](#).
3. Inspect the brake system for leaks and visual damage. Refer to [Symptoms - Hydraulic Brakes](#), 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 key to the ignition ON, engine OFF position.
8. With the scan tool, establish communications with the ABS system. Select Special Functions. Select Automated Bleed from the Special 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](#).
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](#).
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



Steering Angle Sensor Replacement

Callout	Component Name
Preliminary Procedure Remove the steering wheel airbag coil. Refer to Steering Wheel Airbag Coil Replacement .	
1	Steering Angle Sensor Procedure 1. Press in the retaining clips on the steering wheel airbag coil and remove the steering angle sensor. 2. After the installation is complete, center the steering angle sensor. Refer to Steering Angle Sensor Centering.

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Steering Angle Sensor Centering

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

- Wheel alignment
- Steering gear replacement
- Steering column replacement
- Steering angle sensor replacement
- Collision or other physical damage
- Electronic brake control module replacement

The 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 Park.
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 reset 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 Electronic Brake Control Module Configuration/Reset Functions list.
10. Follow the scan tool directions to complete the Learn procedure.
11. Clear any DTCs that may be set.

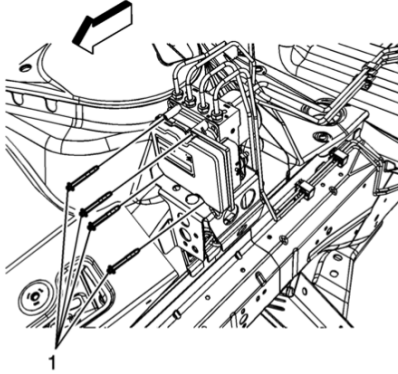
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Electronic Brake Control Module Replacement

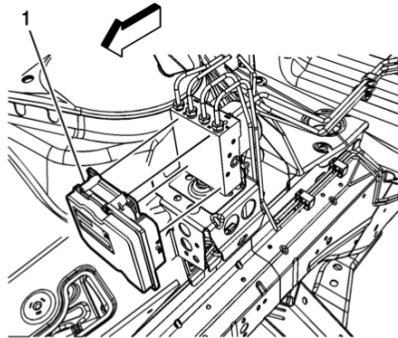
Removal Procedure

Caution: To prevent equipment damage, never connect or disconnect the wiring harness connection from the EBCM with the ignition switch in the ON position.

1. Place the ignition switch in the OFF position.



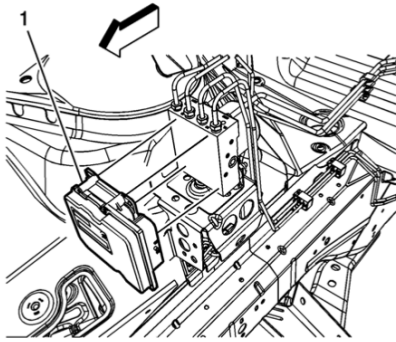
2. Thoroughly clean the area around the electronic brake control module (EBCM) of all dirt and debris.
3. Disconnect the EBCM electrical connector.
4. Remove the EBCM bolts (1).



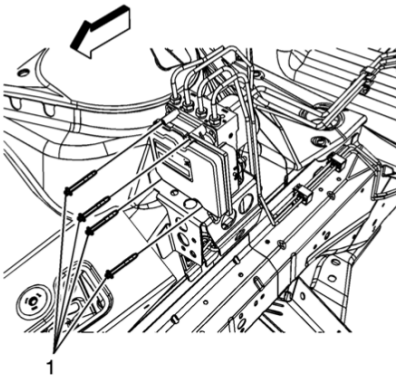
Note: Do not attempt to pry or lever against the EBCM.

5. Carefully separate the EBCM (1) from the brake pressure modulator valve (BPMV) by pulling straight away from the BPMV.
Do not force the components apart.
6. Inspect the EBCM isolator for damage and replace, if necessary.

Installation Procedure



1. Clean the sealing surfaces of the EBCM and the BPMV with denatured alcohol and allow to dry.
2. Install the EBCM (1) to the BPMV.



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

3. Install the EBCM bolts (1) and tighten in a cross pattern to **3 N·m (27 lb in)**.
4. Connect the EBCM electrical connector.
5. Program the EBCM. Refer to [Control Module References](#).
6. Perform the [Diagnostic System Check - Vehicle](#).

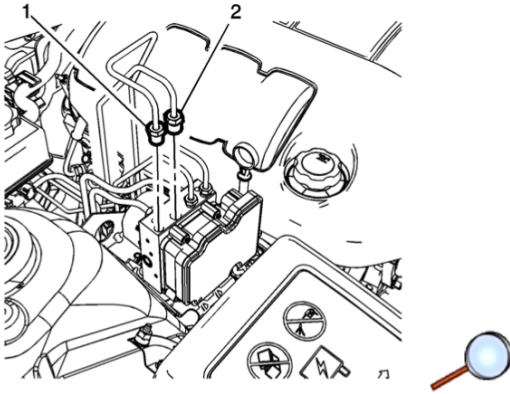
Brake Pressure Modulator Valve Replacement

Removal Procedure

Warning: Refer to [Brake Fluid Irritant Warning](#).

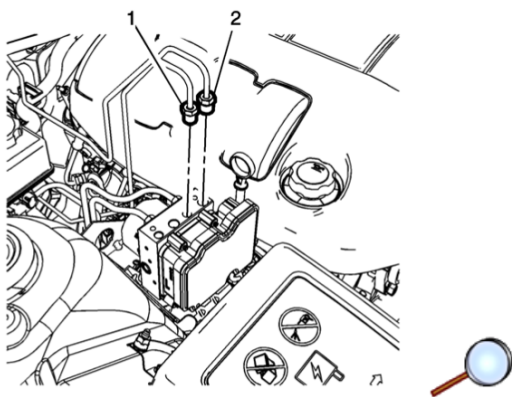
Caution: Refer to [Brake Fluid Effects on Paint and Electrical Components Caution](#).

Caution: To prevent equipment damage, never connect or disconnect the wiring harness connection from the EBCM with the ignition switch in the ON position.

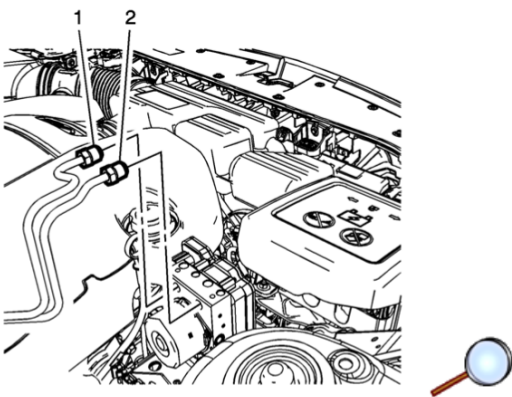


1. Place the ignition switch in the OFF position.
2. Thoroughly clean the area around the electronic brake control module (EBCM) of all dirt and debris.
3. Thoroughly clean the area around the brake pressure modulator valve (BPMV) brake pipe fittings of all dirt and debris.
4. Disconnect the EBCM electrical connector.
5. Disconnect the right rear brake pipe fitting (1) from the BPMV.
6. Cap the brake pipe fitting and plug the BPMV outlet port to prevent brake fluid loss and contamination.
7. Disconnect the left rear brake pipe fitting (2) from the BPMV.
8. Cap the brake pipe fitting and plug the BPMV outlet port to prevent brake fluid loss and contamination.

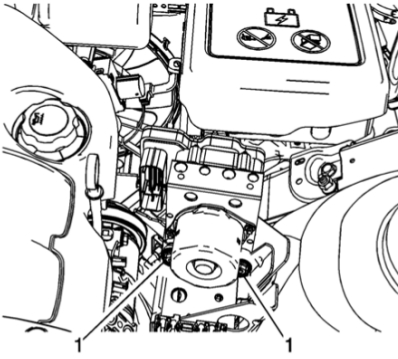
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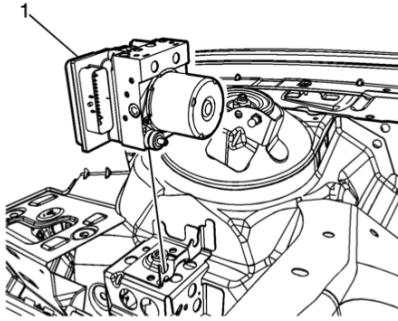
9. Disconnect the left front brake pipe fitting (1) from the BPMV.
10. Cap the brake pipe fitting and plug the BPMV outlet port to prevent brake fluid loss and contamination.
11. Disconnect the right front brake pipe fitting (2) from the BPMV.
12. Cap the brake pipe fitting and plug the BPMV outlet port to prevent brake fluid loss and contamination.



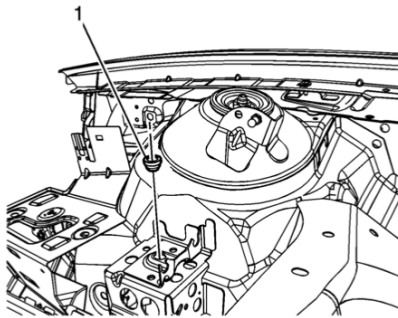
13. Disconnect the master cylinder secondary brake pipe fitting (1) from the BPMV.
14. Cap the brake pipe fitting and plug the BPMV inlet port to prevent brake fluid loss and contamination.
15. Disconnect the master cylinder primary brake pipe fitting (2) from the BPMV.
16. Cap the brake pipe fitting and plug the BPMV inlet port to prevent brake fluid loss and contamination.



17. Remove the BPMV nuts (1).

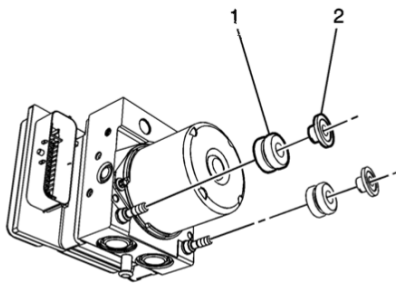


18. Remove the BPMV (1).



19. Remove the BPMV lower insulator (1).

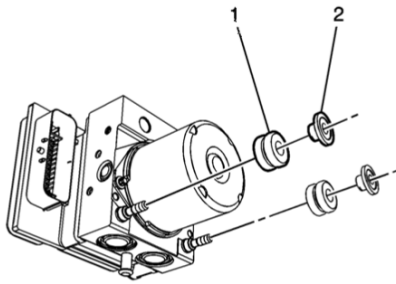




20. Remove the BPMV insulators (1) and bushings (2).

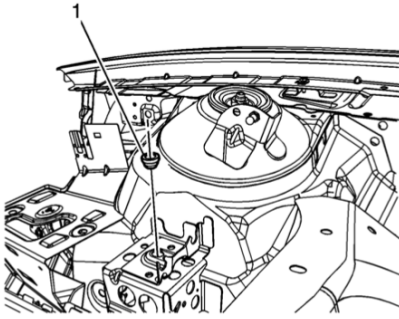
21. Remove the EBCM. Refer to [Electronic Brake Control Module Replacement](#).

Installation Procedure

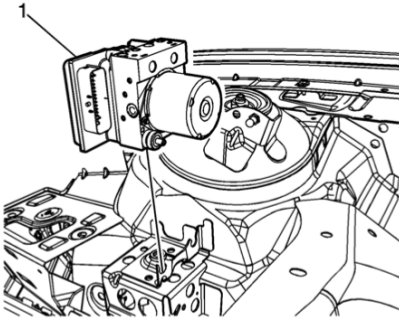


1. Install the EBCM. Refer to [Electronic Brake Control Module Replacement](#).

2. Install the BPMV insulators (1) and bushings (2).

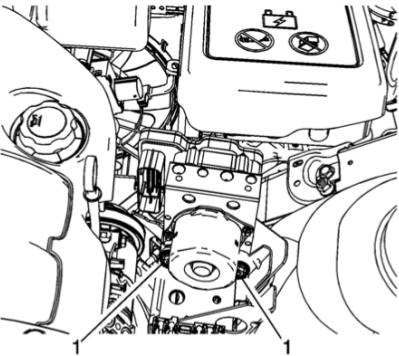


3. Install the BPMV lower insulator (1).



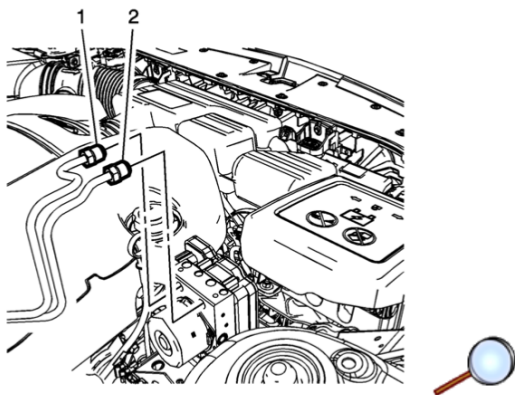
Note: Ensure the BPMV is fully seated in the lower insulator.

4. Install the BPMV (1).

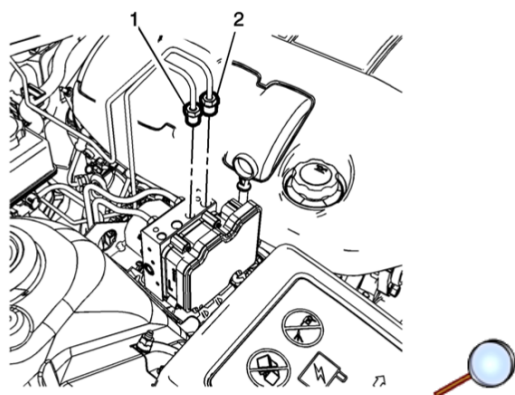


Caution: Refer to [Fastener Caution](#).

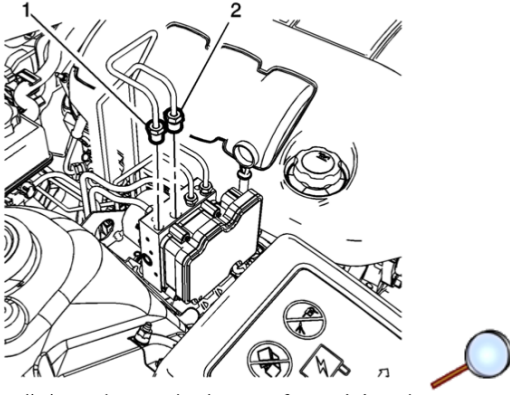
5. Install the BPMV nuts (1) and tighten to **8 N·m (71 lb in)**.



6. Install the master cylinder secondary brake pipe fitting (1) to the BPMV and tighten the fitting to **23 N•m (17 lb ft)**.
7. Install the master cylinder primary brake pipe fitting (2) to the BPMV and tighten the fitting to **23 N•m (17 lb ft)**.



8. Install the left front brake pipe fitting (1) to the BPMV and tighten the fitting to **16 N•m (12 lb ft)**.
9. Install the right front brake pipe fitting (2) to the BPMV and tighten the fitting to **16 N•m (12 lb ft)**.



10. Install the right rear brake pipe fitting (1) to the BPMV and tighten the fitting to **16 N•m (12 lb ft)**.
11. Install the left rear brake pipe fitting (2) to the BPMV and tighten the fitting to **16 N•m (12 lb ft)**.
12. Connect the EBCM electrical connector.
13. Bleed the hydraulic brake system. Refer to [Hydraulic Brake System Bleeding](#).
14. Perform the [Diagnostic System Check - Vehicle](#).
15. Observe the brake pedal feel after performing the diagnostic system check. If the pedal now feels spongy, air may have been in the secondary hydraulic circuit of the brake modulator which may have been introduced into the primary circuit. If the pedal feels spongy, perform the [Antilock Brake System Automated Bleed](#).

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.

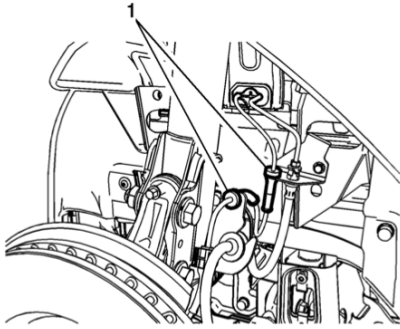
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Front Wheel Speed Sensor Replacement

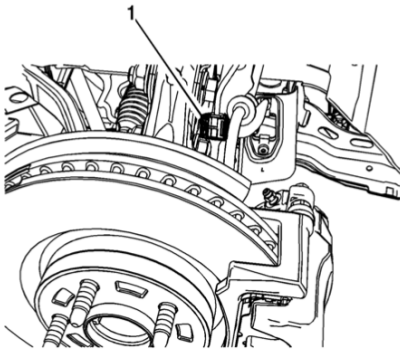
Removal Procedure

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

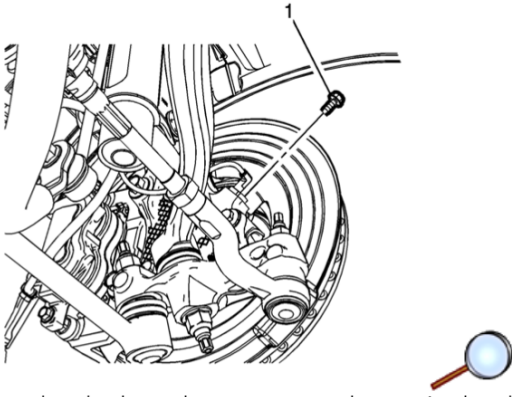
1. From inside the engine compartment, disconnect the front wheel speed sensor electrical connector.
2. Feed the wheel speed sensor electrical connector and harness through the wheel house panel closeout.
3. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
4. Remove the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).



5. Release the wheel speed sensor harness grommets (1) from the brake hose bracket and the suspension strut.

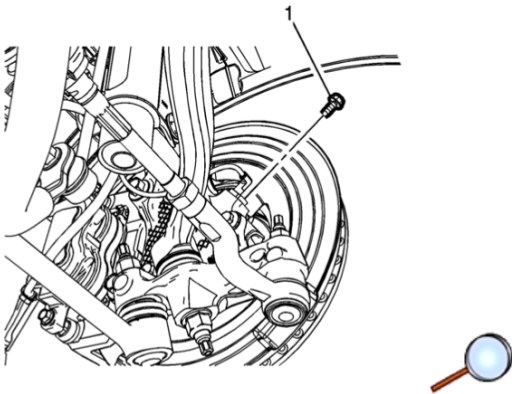


6. Release the wheel speed sensor harness from the clip (1) on the suspension strut.

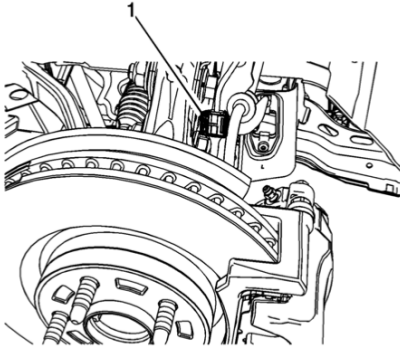


7. Clean the wheel speed sensor area on the steering knuckle of any accumulated dirt and debris.
8. Remove the wheel speed sensor bolt (1).
9. Remove the wheel speed sensor assembly from the steering knuckle by pulling straight out.

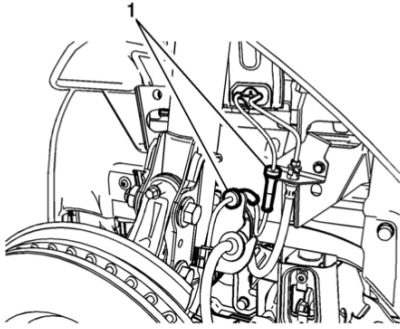
Installation Procedure



1. Install the wheel speed sensor assembly to the steering knuckle.
- Caution:** Refer to [Fastener Caution](#).
2. Install the wheel speed sensor bolt (1) and tighten to **9 N•m (80 lb in)**.



3. Secure the wheel speed sensor harness to the clip (1) on the suspension strut.

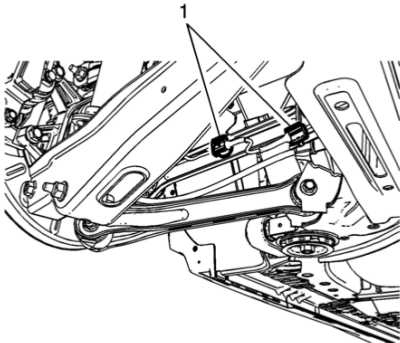


4. Secure the wheel speed sensor harness grommets (1) to the brake hose bracket and the suspension strut.
5. Feed the wheel speed sensor electrical connector and harness through the wheel house panel closeout.
6. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
7. Lower the vehicle.
8. From inside the engine compartment, connect the front wheel speed sensor electrical connector.
9. Perform the [Diagnostic System Check - Vehicle](#).

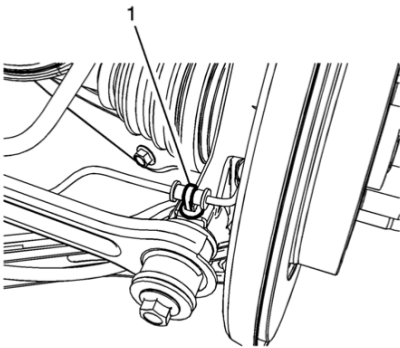
Rear Wheel Speed Sensor Replacement

[Removal Procedure](#)

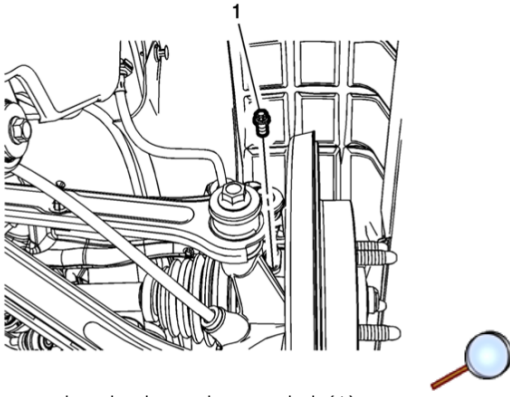
Warning: Refer to [Brake Dust Warning](#).



1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
3. Disconnect the rear wheel speed sensor electrical connector and release the harness clips (1).

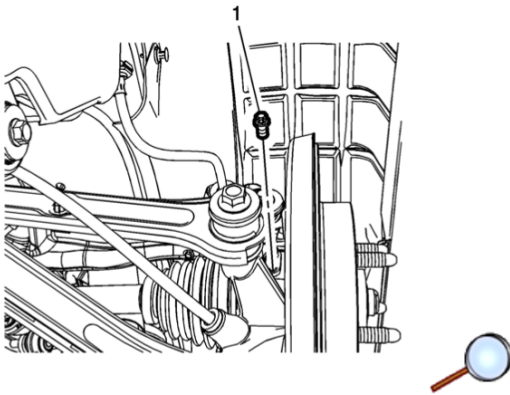


4. Release the wheel speed sensor harness from the clip (1) on the rear suspension knuckle.
5. Clean the wheel speed sensor area on the suspension knuckle of any accumulated dirt and debris.

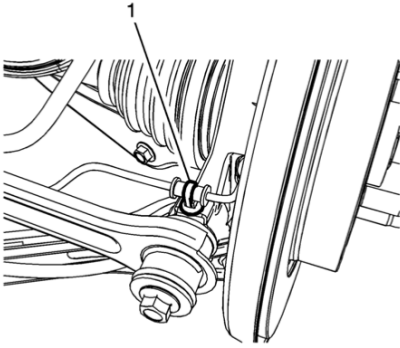


6. Remove the wheel speed sensor bolt (1).
7. Remove the wheel speed sensor assembly from the suspension knuckle by pulling straight out.

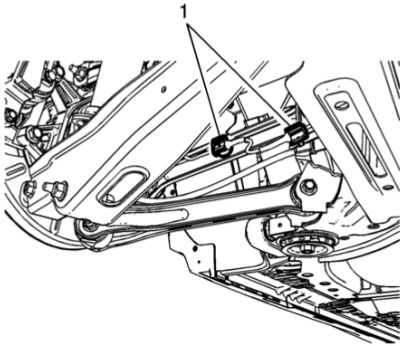
Installation Procedure



1. Install the wheel speed sensor assembly to the suspension knuckle.
- Caution:** Refer to [Fastener Caution](#).
2. Install the wheel speed sensor bolt (1) and tighten to **9 N·m (80 lb in)**.



3. Secure the wheel speed sensor harness to the clip (1) on the rear suspension knuckle.



4. Connect the rear wheel speed sensor electrical connector and secure the harness clips (1).
5. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
6. Perform the [Diagnostic System Check - Vehicle](#).

Vehicle Yaw Sensor Learn

The yaw rate sensor learn 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 Learn in the Electronic Brake Control Module Configuration/Reset Functions list.
6. Follow the scan tool directions to complete the calibration procedure.
7. Clear any DTCs that may be set.

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Fastener Tightening Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Brake Pipe Fitting	16 N•m	12 lb ft
Brake Pipe Fitting - Master Cylinder Brake Pipe	23 N•m	17 lb ft
Brake Pressure Modulator Valve Nut	8 N•m	71 lb in
Electronic Brake Control Module Bolt	3 N•m	27 lb in
Wheel Speed Sensor Bolt - Front and Rear	9 N•m	80 lb in

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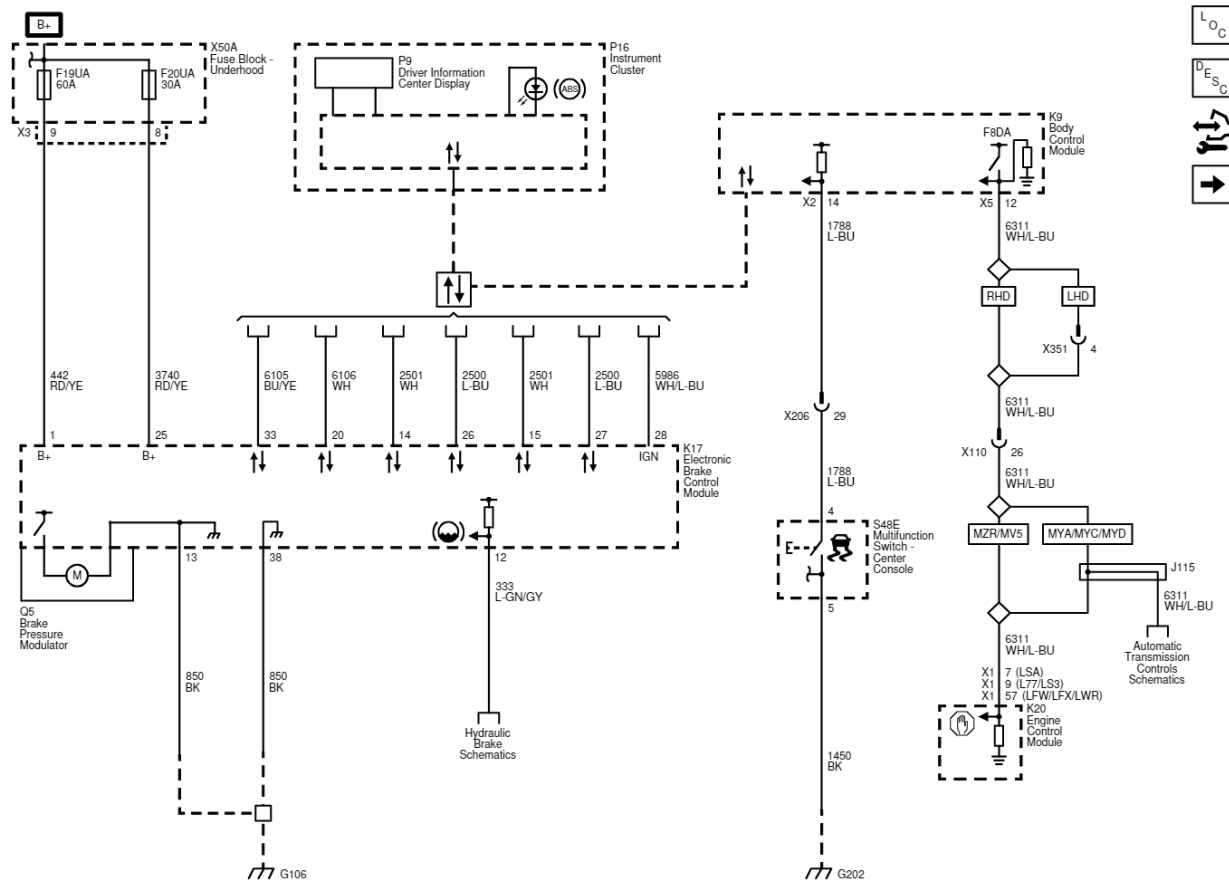
Antilock Brake System Schematics

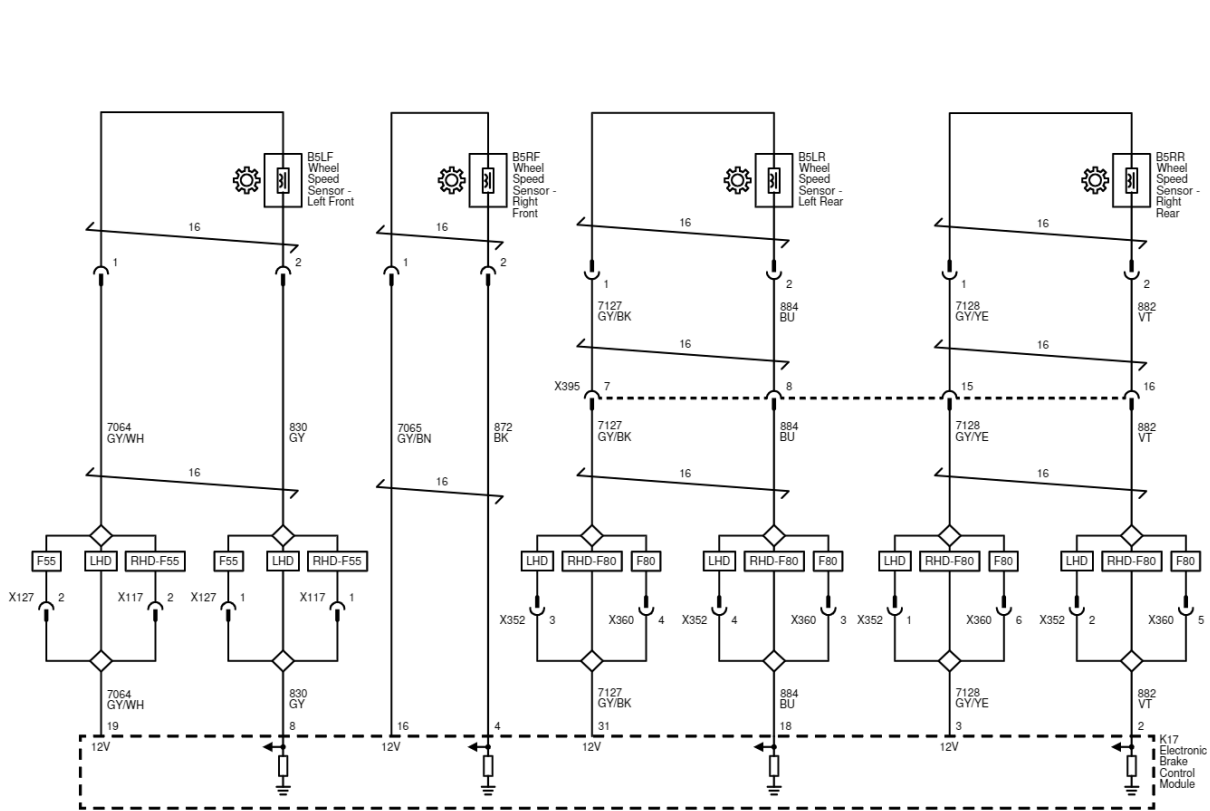
Figure 1: [Module Power, Ground, Serial Data, and Traction Control](#)

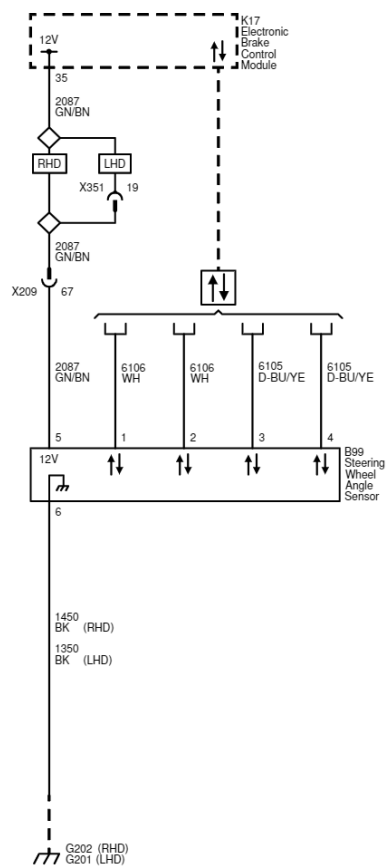
Figure 2: [Wheel Speed Sensors](#)

Figure 3: [Stability Controls](#)

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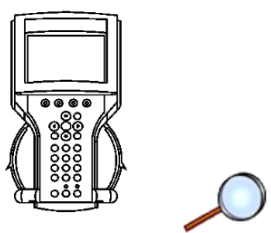


LOG

DES



Special Tools

Illustration	Tool Number/Description
	700086I Scan Tool Used for diagnosis of vehicle electrical system.

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