

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

2010 SUSPENSION

Electronic Suspension Control - SRX

SCHEMATIC AND ROUTING DIAGRAMS

ELECTRONIC SUSPENSION CONTROL SCHEMATICS

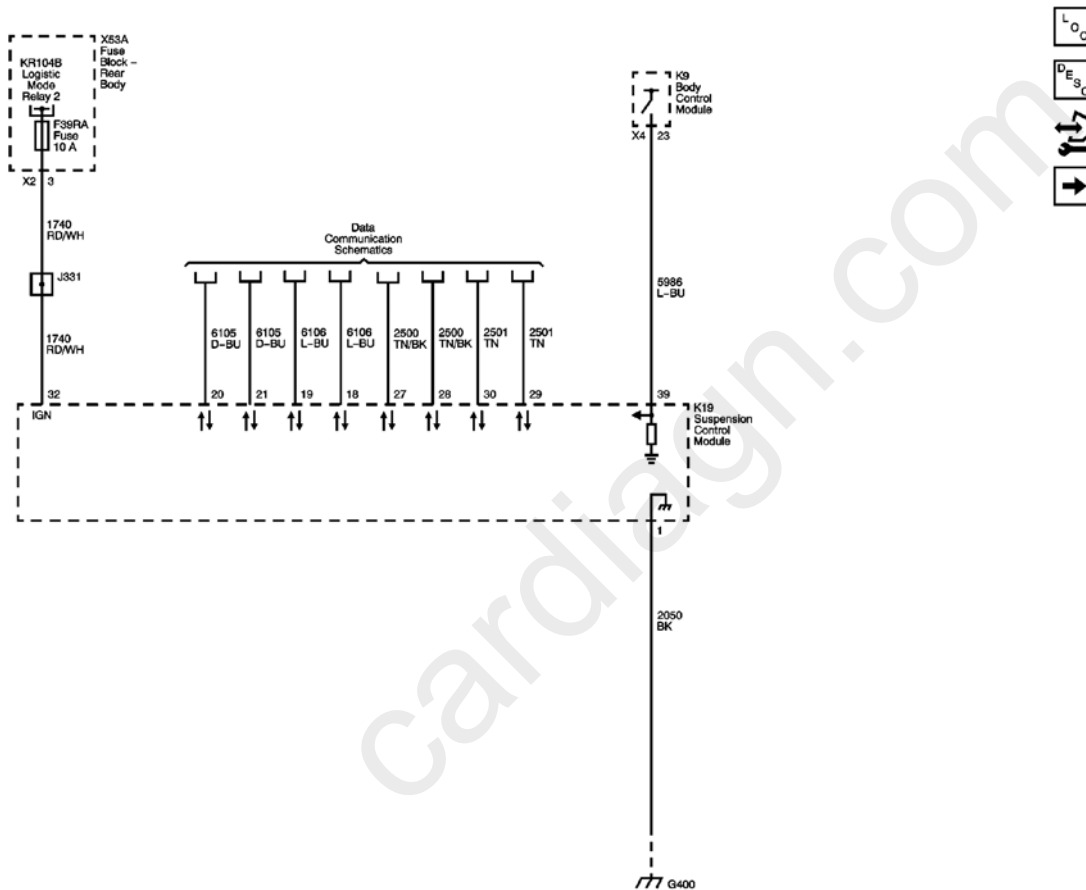


Fig. 1: Power & Ground & Communication Circuit Schematic
Courtesy of GENERAL MOTORS CORP.

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

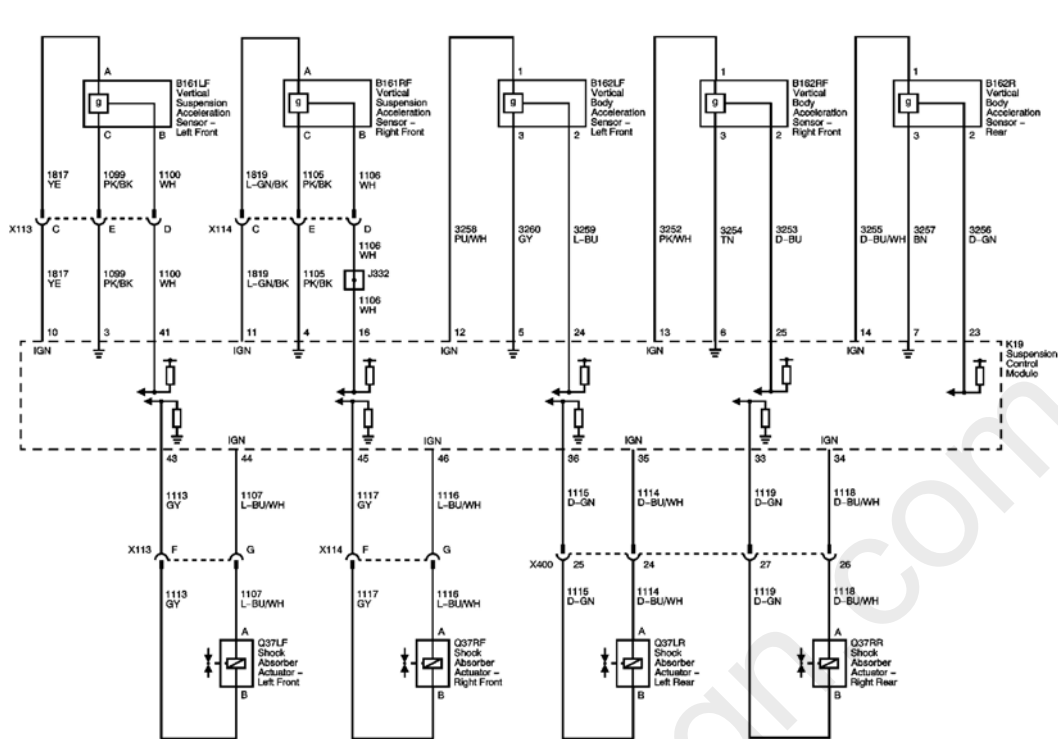


Fig. 2: Sensors □ Actuators Circuit Schematic
Courtesy of GENERAL MOTORS CORP.

DIA□NOSTIC INFOR□ATION AND PROCEDURES

DIAGNOSTIC CODE INDE□

DIAGNOSTIC CODE INDE□

DTC	Description
DTC C0000	C0000 71: Vehicle Speed Information Circuit Invalid Data
DTC C0□7□□C0□80□C0□8□□ or C0□□0	C0575 02: Left Front Damper Actuator Circuit Short to Ground C0575 04: Left Front Damper Actuator Circuit Open C0575 0F: Left Front Damper Actuator Circuit Signal Erratic C0580 02: Right Front Damper Actuator Circuit Short to Ground C0580 04: Right Front Damper Actuator Circuit Open C0580 0F: Right Front Damper Actuator Circuit Signal Erratic C0585 02: Left Rear Damper Actuator Circuit Short to Ground C0585 04: Left Rear Damper Actuator Circuit Open C0585 0F: Left Rear Damper Actuator Circuit Signal Erratic C0590 02: Right Rear Damper Actuator Circuit Short to Ground C0590 04: Right Rear Damper Actuator Circuit Open C0590 0F: Right Rear Damper Actuator Circuit Signal Erratic
DTC C0□□□□C0□00□or C0□0□	C0595 02: Left Front Acceleration Sensor Circuit Short to Ground C0595 05: Left Front Acceleration Sensor Circuit High Voltage/Open

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

	C0595 0A: Left Front Acceleration Sensor Circuit Too Slow Transitions C0600 02: Right Front Acceleration Sensor Circuit Short to Ground C0600 05: Right Front Acceleration Sensor Circuit High Voltage/Open C0600 0A: Right Front Acceleration Sensor Circuit Too Slow Transitions C0605 02: Left Rear Acceleration Sensor Circuit Short to Ground C0605 05: Left Rear Acceleration Sensor Circuit High Voltage/Open C0605 0A: Left Rear Acceleration Sensor Circuit Too Slow Transitions
<u>DTC C0700 or C0701</u>	C0670 02: Left Front Acceleration or Position Sensor Circuit Short to Ground C0670 05: Left Front Acceleration or Position Sensor Circuit High Voltage/Open C0670 0A: Left Front Acceleration or Position Sensor Circuit Too Slow Transitions C0675 02: Right Front Acceleration or Position Sensor Circuit Short to Ground C0675 05: Right Front Acceleration or Position Sensor Circuit High Voltage/Open C0675 0A: Right Front Acceleration or Position Sensor Circuit Too Slow Transitions
<u>DTC C0720</u>	C0720 71: Engine Torque Management Feedback Signal Invalid Data
<u>DTC C0870</u>	C0870 03: Control Module Voltage Reference Output Circuit Low Voltage C0870 07: Control Module Voltage Reference Output Circuit High Voltage

DTC C0000

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 C0000 71

Vehicle Speed Information Circuit Invalid Data

Circuit/System Description

The wheel speeds are detected by active wheel speed sensors. Each wheel speed sensor receives a 12 V reference voltage from the electronic brake control module (EBCM) and provides an alternating current square wave signal to the EBCM. As the wheel spins, the EBCM uses the frequency of the square wave signal to calculate the wheel speed. The EBCM sends the wheel speed information as a high speed controller area network (CAN) serial data message. Modules connected to the high speed CAN circuit monitor for the vehicle

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

speed information.

Conditions for Running the DTC

System voltage is between 9-16 V.

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

The electronic suspension control is disabled for the duration of the ignition cycle.

Conditions for Clearing the DTC

A current DTC clears when the diagnostic runs and passes.

Reference Information

Schematic Reference

Electronic Suspension Control Schematics

Connector End View Reference

Component Connector End Views

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

Circuit/System Verification

Ignition ON, observe the scan tool EBCM Wheel Speed Sensor parameters. The parameters displayed should be within 1.6 km/h (1 MPH) on all sensors when driving in a straight line at a speed greater than 20 km/h (13

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

MPH).

Circuit/System Testing

1. Ignition ON, verify that DTC C0035, C0040, C0045, or C0050 is not present in the K17 EBCM.
 - o If any listed DTC is present, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
2. Replace the K19 Suspension Control Module and verify the DTC does not reset.
 - o If the DTC resets, replace the K17 electronic brake control module (EBCM).

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

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

DTC C0□7□□C0□80□C0□8□□OR C0□□0

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 C0□7□02

Left Front Damper Actuator Circuit Short to Ground

DTC C0□7□0□

Left Front Damper Actuator Circuit Open

DTC C0□7□0F

Left Front Damper Actuator Circuit Signal Erratic

DTC C0□80 02

Right Front Damper Actuator Circuit Short to Ground

DTC C0□80 0□

Right Front Damper Actuator Circuit Open

DTC C0□80 0F

2010 Cadillac SRX**2010 SUSPENSION Electronic Suspension Control - SRX**

Right Front Damper Actuator Circuit Signal Erratic

DTC C0802

Left Rear Damper Actuator Circuit Short to Ground

DTC C0800

Left Rear Damper Actuator Circuit Open

DTC C080F

Left Rear Damper Actuator Circuit Signal Erratic

DTC C0002

Right Rear Damper Actuator Circuit Short to Ground

DTC C0000

Right Rear Damper Actuator Circuit Open

DTC C000F

Right Rear Damper Actuator Circuit Signal Erratic

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Front Damper Actuator Control High	C0575 02	C0575 04	C0575 02	C0575 0F
Right Front Damper Actuator Control High	C0580 02	C0580 04	C0580 02	C0580 0F
Left Rear Damper Actuator Control High	C0585 02	C0585 04	C0585 02	C0585 0F
Right Rear Damper Actuator Control High	C0590 02	C0590 04	C0590 02	C0590 0F
Left Front Damper Actuator Control Low	C0575 02	C0575 04	C0575 04	C0575 0F
Right Front Damper Actuator Control Low	C0580 02	C0580 04	C0580 04	C0580 0F
Left Rear Damper Actuator Control Low	C0585 02	C0585 04	C0585 04	C0585 0F
Right Rear Damper Actuator Control Low	C0590 02	C0590 04	C0590 04	C0590 0F

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

Circuit/System Description

The suspension control module commands variable levels of current to each shock absorber actuator in response to rough road, braking or abrupt steering maneuver driving conditions. The current variation is performed by pulse width modulation (PWM) of the system voltage. The suspension control module continuously measures the actual current of each actuator. When a deviation between commanded and actual current is detected, a DTC is set.

Conditions for Running the DTC

System voltage is between 9-16 V.

Conditions for Setting the DTC

C0702C08002C0802 and C00002

- A short to voltage or short to ground on the control high circuit is detected.
- A short to ground on the control low circuit is detected.

C0700C0800C0800 and C00000

- An open circuit on the control high or control low circuit is detected.
- A short to voltage on the control low circuit is detected.

C070FC080FC080F and C0000F

An erratic current on the actuator circuit is detected.

Action Taken When the DTC Sets

- The electronic suspension control is disabled for the duration of the ignition cycle.
- The driver information center displays the SERVICE SUSPENSION SYSTEM message.

Conditions for Clearing the DTC

- A present DTC will clear on the next consecutive malfunction-free ignition cycle.
- A history DTC will clear after 41 consecutive malfunction-free ignition cycles.

Reference Information

Schematic Reference

Electronic Suspension Control Schematics

Connector End View Reference

Component Connector End Views

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

Ignition ON, with a scan tool, command the Damper Actuator Increase and Decrease while observing the Damper Actuator Command parameter. The parameter should vary between 0-1000 mA. Listen/feel the Q37 shock absorber actuator. The component should activate when changing between the commanded states.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the appropriate Q37 shock absorber actuator.
2. Perform this setup step in the following order:
 1. Connect a test lamp and ammeter in series between both Q37 shock absorber actuator harness connector control circuit terminals.
 2. Ignition ON, with a scan tool, attempt to clear all K19 suspension control module DTC's (codes may not clear).
3. With a scan tool, command the Damper Actuator to Increase the amperage to approximately 400 mA and Decrease to 0 mA while comparing the ammeter displayed values and scan tool Damper Actuator Command parameter displayed values. Verify the following:
 - The test lamp is illuminated.
 - The ammeter displayed values and scan tool Damper Actuator Command parameter displayed values change and are simultaneously within 15 mA of each other.
 - If the test lamp is not illuminated and/or the values are not within the specified range, test both control circuits for a short to voltage, short to ground, or open/high resistance. If all circuits test normal, replace the K19 suspension control module.
4. If all circuits test normal, test or replace the Q37 shock absorber actuator.

Component Testing

Static Test

1. Ignition OFF, disconnect the harness connector at the appropriate Q37 shock absorber actuator.

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

2. Test for 2-3 ohms between the Q37 shock absorber actuator control terminals.
 - If not within the specified range, replace the Q37 shock absorber actuator.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Strut** **Strut Component** **or Spring Replacement**
- **Shock Absorber Replacement**
- **Control Module References** for suspension control module replacement, setup, and programming

DTC C0 C0 00 OR C0 0

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 C0 02

Left Front Acceleration Sensor Circuit Short to Ground

DTC C0 0

Left Front Acceleration Sensor Circuit High Voltage/Open

DTC C0 0A

Left Front Acceleration Sensor Circuit Too Slow Transitions

DTC C0 00 02

Right Front Acceleration Sensor Circuit Short to Ground

DTC C0 00 0

Right Front Acceleration Sensor Circuit High Voltage/Open

DTC C0 00 0A

Right Front Acceleration Sensor Circuit Too Slow Transitions

DTC C0 0 02

2010 Cadillac SRX**2010 SUSPENSION Electronic Suspension Control - SRX**

Left Rear Acceleration Sensor Circuit Short to Ground

DTC C00000

Left Rear Acceleration Sensor Circuit High Voltage/Open

DTC C0000A

Left Rear Acceleration Sensor Circuit Too Slow Transitions

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Front Body Acceleration Sensor 5V Reference	C0870 03	C0595 05	C0870 07	-
Right Front Body Acceleration Sensor 5V Reference	C0870 03	C0600 05	C0870 07	-
Rear Body Acceleration Sensor 5V Reference	C0870 03	C0605 05	C0870 07	-
Left Front Body Acceleration Sensor Signal	C0595 02	C0595 05	C0595 05, C0870 07	C0595 0A
Right Front Body Acceleration Sensor Signal	C0600 02	C0600 05	C0600 05, C0870 07	C0600 0A
Rear Body Acceleration Sensor Signal	C0605 02	C0605 05	C0605 05, C0870 07	C0605 0A
Left Front Body Acceleration Sensor Low Reference	-	C0595 05	-	-
Right Front Body Acceleration Sensor Low Reference	-	C0600 05	-	-
Rear Body Acceleration Sensor Low Reference	-	C0605 05	-	-

Circuit/System Description

The suspension control module supplies a 5 V reference voltage and a low reference to each body acceleration sensor. The body acceleration sensors supply a signal of 0.5-4.5 V to the suspension control module.

Conditions for Running the DTC

System voltage is between 9-16 V

Conditions for Setting the DTC

C00002, C000 02 and C000 02

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

The signal voltage is less than 0.5 V for 1.5 s

C0□□0□C0□00 0□and C0□0□0□

The signal voltage is greater than 4.5 V for 1.5 s

C0□□0A□C0□00 0A□and C0□0□0A

- The number of signal changes is less than specified value for 2.5 s.
- Vehicle speed is greater than 30 km/h (19 MPH)

Action Taken When the DTC Sets

- The electronic suspension control is disabled for the duration of the ignition cycle.
- The driver information center displays the SERVICE SUSPENSION SYSTEM message.

Conditions for Clearing the DTC

- A present DTC will clear on the next consecutive malfunction-free ignition cycle.
- A history DTC will clear after 41 consecutive malfunction-free ignition cycles.

Reference Information

Schematic Reference

Electronic Suspension Control Schematics

Connector End View Reference

Component Connector End Views

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

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

Circuit/System Verification

Ignition ON, observe the scan tool Vertical □ody Acceleration parameters. The parameters should be 0 m/s².

Circuit/System Testing

1. Ignition ON, verify that DTC C0870 is not present.
 - If the DTC is present, refer to **DTC C0870** to diagnose that DTC prior to this diagnostic.
2. Ignition OFF, disconnect the harness connector at the appropriate □162 vertical body acceleration sensor.
3. Ignition OFF, open/close doors, and wait 60 seconds. Test for less than 5 ohms between the low reference circuit terminal 3 and ground.
 - If greater than the specified value, test the low reference circuit for short to voltage or an open/high resistance. If the circuit tests normal, replace the K19 suspension control module.
4. Ignition ON, test for 4.8-5.2 V between the 5 V reference circuit terminal 1 and ground.
 - If less than the specified range, test the 5 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K19 suspension control module.
 - If greater than the specified range, test the 5 V reference circuit for a short to voltage. If the circuit tests normal, replace the K19 suspension control module.
5. Verify the scan tool Vertical □ody Acceleration parameter is less than -3 m/s².
 - If greater than the specified value, test the signal circuit for a short to ground. If the circuit tests normal, replace the K19 suspension control module.
6. Install a fused □umper wire between the signal circuit terminal 2 and the low reference circuit terminal 3.
7. Verify the scan tool Vertical □ody Acceleration parameter is greater than 3 m/s².
 - If less than the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K19 suspension control module.
8. If all circuits test normal, replace the □162 vertical body acceleration sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Electronic Suspension Front Vertical Accelerometer Replacement - Upper**
- **Electronic Suspension Rear Position Sensor Replacement**
- **Control Module References** for suspension control module replacement, setup and programming

DTC C0□70 OR C0□7□

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.

2010 Cadillac SRX**2010 SUSPENSION Electronic Suspension Control - SRX****DTC Descriptors****DTC C0~~7~~0 02**

Left Front Acceleration or Position Sensor Circuit Short to ☐round

DTC C0~~7~~0 0☐

Left Front Acceleration or Position Sensor Circuit High Voltage/Open

DTC C0~~7~~0 0A

Left Front Acceleration or Position Sensor Circuit Too Slow Transitions

DTC C0~~7~~☐02

Right Front Acceleration or Position Sensor Circuit Short to ☐round

DTC C0~~7~~☐0☐

Right Front Acceleration or Position Sensor Circuit High Voltage/Open

DTC C0~~7~~☐0A

Right Front Acceleration or Position Sensor Circuit Too Slow Transitions

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Front ☐ heel Acceleration Sensor 5V Reference	C0870 03	C0670 05	C0870 07	-
Right Front ☐ heel Acceleration Sensor 5V Reference	C0870 03	C0675 05	C0870 07	-
Left Front ☐ heel Acceleration Sensor Signal	C0670 02	C0670 05	C0670 05, C0870 07	C0670 0A
Right Front ☐ heel Acceleration Sensor Signal	C0675 02	C0675 05	C0675 05, C0870 07	C0675 0A
Left Front ☐ heel Acceleration Sensor Low Reference	-	C0670 05	-	-
Right Front ☐ heel Acceleration Sensor Low Reference	-	C0675 05	-	-

Circuit/System Description

The suspension control module supplies a 5 V reference voltage and a low reference to each vertical wheel

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

acceleration sensor. The vertical wheel acceleration sensors supply a signal of 0.5-4.5 V to the suspension control module.

Conditions for Running the DTC

System voltage is between 9-16 V.

Conditions for Setting the DTC

C070 02 and C070 02

The signal voltage is less than 0.5 V for 1.5 s.

C070 00 and C070 00

The signal voltage is greater than 4.5 V for 1.5 s.

C070 0A and C070 0A

- The number of signal changes is less than specified value for 2.5 s.
- Vehicle speed is greater than 30 km/h (19 mph).

Action Taken When the DTC Sets

- The electronic suspension control is disabled for the duration of the ignition cycle.
- The driver information center displays the SERVICE SUSPENSION SYSTEM message.

Conditions for Clearing the DTC

- A present DTC will clear on the next consecutive malfunction-free ignition cycle.
- A history DTC will clear after 41 consecutive malfunction-free ignition cycles.

Reference Information

Schematic Reference

Electronic Suspension Control Schematics

Connector End View Reference

Component Connector End Views

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

Ignition ON, observe the scan tool Vertical ☐ heel Acceleration parameters. The parameters should be 0 m/s² when the vehicle is parked on a level surface.

Circuit/System Testing

1. Ignition ON, verify that DTC C0870 is not present.
 - If the DTC is present, refer to **DTC C0870** to diagnose that DTC prior to this diagnostic.
2. Ignition OFF, disconnect the harness connector at the appropriate ☐161 vertical suspension acceleration sensor.
3. Ignition OFF, open/close doors, and wait 60 seconds. Test for less than 5 ohms between the low reference circuit terminal C and ground.
 - If greater than the specified value, test the low reference circuit for short to voltage or an open/high resistance. If the circuit tests normal, replace the K19 Suspension Control Module.
4. Ignition ON, test for 4.8-5.2 V between the 5 V reference circuit terminal A and ground.
 - If less than the specified range, test the 5 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K19 suspension control module.
 - If greater than the specified range, test the 5 V reference circuit for a short to voltage. If the circuit tests normal, replace the K19 suspension control module.
5. Test for 4.8-5.2 V between the signal circuit terminal ☐ and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K19 suspension control module.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K19 suspension control module.
6. If all circuits test normal, replace the ☐161 vertical suspension acceleration sensor. Verify the DTC does not reset. If the DTC resets, replace the K19 suspension control module

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Electronic Suspension Front Vertical Accelerometer Replacement - Lower**
- **Control Module References** for suspension control module replacement, setup and programming

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

DTC C0720

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 C0720 71

Engine Torque Management Feedback Signal Invalid Data

Circuit/System Description

The suspension control module receives high speed controller area network (CAN) message inputs from the engine control module (ECM) identifying the actual engine torque. The suspension control module utilizes this signal to control the vehicle ride characteristics.

Conditions for Running the DTC

System voltage is between 9-16 V

Conditions for Setting the DTC

The suspension control module received invalid serial data from the ECM.

Action Taken When the DTC Sets

The electronic suspension control is disabled for the duration of the ignition cycle.

Conditions for Clearing the DTC

- The condition for setting the DTC is no longer present.
- A history DTC will clear after 41 consecutive malfunction-free ignition cycles.

Reference Information

Schematic Reference

Electronic Suspension Control Schematics

Connector End View Reference

Component Connector End Views

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 Testing

1. Verify that no DTCs are present in the ECM.
 - If any DTC is present, refer to Diagnostic Trouble Code (DTC) List - Vehicle to diagnose that DTC prior to this diagnostic.
2. Replace the K19 suspension control module and verify the DTC does not reset.
 - If the DTC resets replace the K20 engine control module (ECM).

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for control module replacement, setup and programming

DTC C0870

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 C0870 03

Control Module Voltage Reference Output Circuit Low Voltage

DTC C0870 07

Control Module Voltage Reference Output Circuit High Voltage

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5V Reference	C0870 03	C0595 05, C0600 05, C0605 05, C0670 05, C0675 05	C0870 07	-
Low Reference	-	C0595 05, C0600 05, C0605 05, C0670 05, C0675 05	-	-

Circuit/System Description

The suspension control module supplies a 5 V reference voltage and a low reference to each body acceleration sensor and vertical suspension acceleration sensor. The body acceleration sensors and vertical suspension acceleration sensors supply a signal of 0.5-4.5 V to the suspension control module.

Conditions for Running the DTC

System voltage is between 9-16 V.

Conditions for Setting the DTC

C0870 03

The suspension control module detected a short to ground on the 5 V reference circuit for 1.5 s.

C0870 07

The suspension control module detected a short to voltage on the 5 V reference circuit for 1.5 s.

Action Taken When the DTC Sets

- The electronic suspension control is disabled for the duration of the ignition cycle.
- The driver information center displays the SERVICE SUSPENSION SYSTEM message.

Conditions for Clearing the DTC

- A present DTC will clear on the next consecutive malfunction-free ignition cycle.
- A history DTC will clear after 41 consecutive malfunction-free ignition cycles.

Reference Information

Schematic Reference**Electronic Suspension Control Schematics****Connector End View Reference****Component Connector End Views****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**

Ignition ON, observe the scan tool Suspension Position Sensor 5 V Reference parameter. The parameter should be 4.8-5.2 V.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connectors at all 5 vertical body and suspension acceleration sensors.
2. Ignition ON, test for 4.8-5.2 V between any one of the 5 V reference circuits terminal and ground.
 - If less than the specified range, test all of the 5 V reference circuits for a short to ground. If the circuits test normal, replace the K19 suspension control module.
 - If greater than the specified range, test all of the 5 V reference circuits for a short to voltage. If the circuits test normal, replace the K19 suspension control module.
3. Test for 4.8-5.2 V between all 5 vertical body and suspension acceleration sensor signal circuits terminals and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K19 suspension control module.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K19 suspension control module.
4. Reconnect each acceleration sensor, one at a time, cycling the ignition OFF and then ON between each connection while observing the scan tool Suspension Position Sensor 5 V Reference parameter. Verify

the parameter is between 4.8-5.2 V.

- If not within the specified range when a particular acceleration sensor is connected, replace that sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Electronic Suspension Front Vertical Accelerometer Replacement - Upper**
- **Electronic Suspension Front Vertical Accelerometer Replacement - Lower**
- **Electronic Suspension Rear Position Sensor Replacement**
- **Control Module References** for suspension control module replacement, setup and programming

REPAIR INSTRUCTIONS

ELECTRONIC SUSPENSION FRONT VERTICAL ACCELEROMETER REPLACEMENT - UPPER

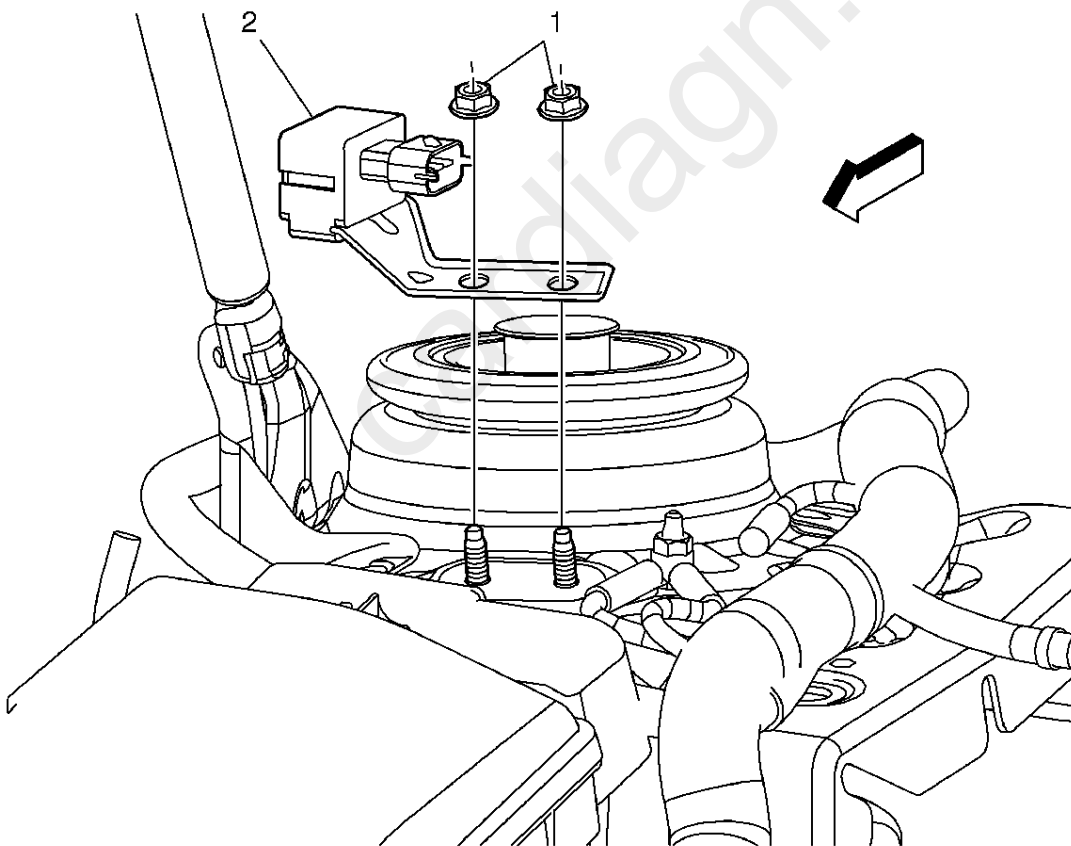


Fig. 3: View Of Electronic Suspension Front Vertical Accelerometer - Upper
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
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2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

1	Electronic Suspension Front Upper Position Sensor Fasteners (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> Tighten: 9 N.m (80 lb in)
2	Electronic Suspension Front Vertical Accelerometer Procedure: Disconnect the connector from the sensor.

ELECTRONIC SUSPENSION FRONT VERTICAL ACCELEROMETER REPLACEMENT - LOWER

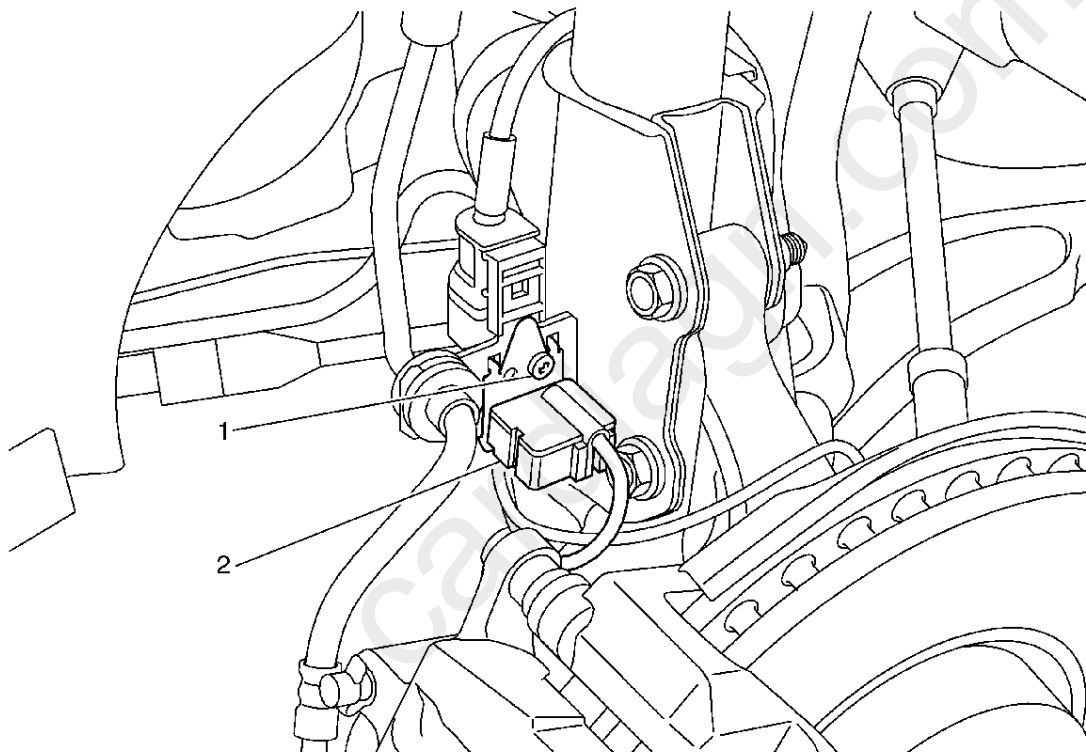


Fig. 4: View Of Electronic Suspension Front Vertical Accelerometer - Lower
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
2. Remove the front tire and wheel assemblies.	
1	Electronic Suspension Front Position Sensor Fastener CAUTION: Refer to <u>Fastener Caution</u>

2010 Cadillac SRX

2010 SUSPENSION Electronic Suspension Control - SRX

Tighten: 9 N.m (80 lb in)

Electronic Suspension Front Vertical Accelerometer

2

Procedure

1. Remove the connector from the strut.
2. Disconnect the connector from the sensor, the connector has a secondary locking that should be released before turning and releasing the connector.

ELECTRONIC SUSPENSION CONTROL MODULE REPLACEMENT

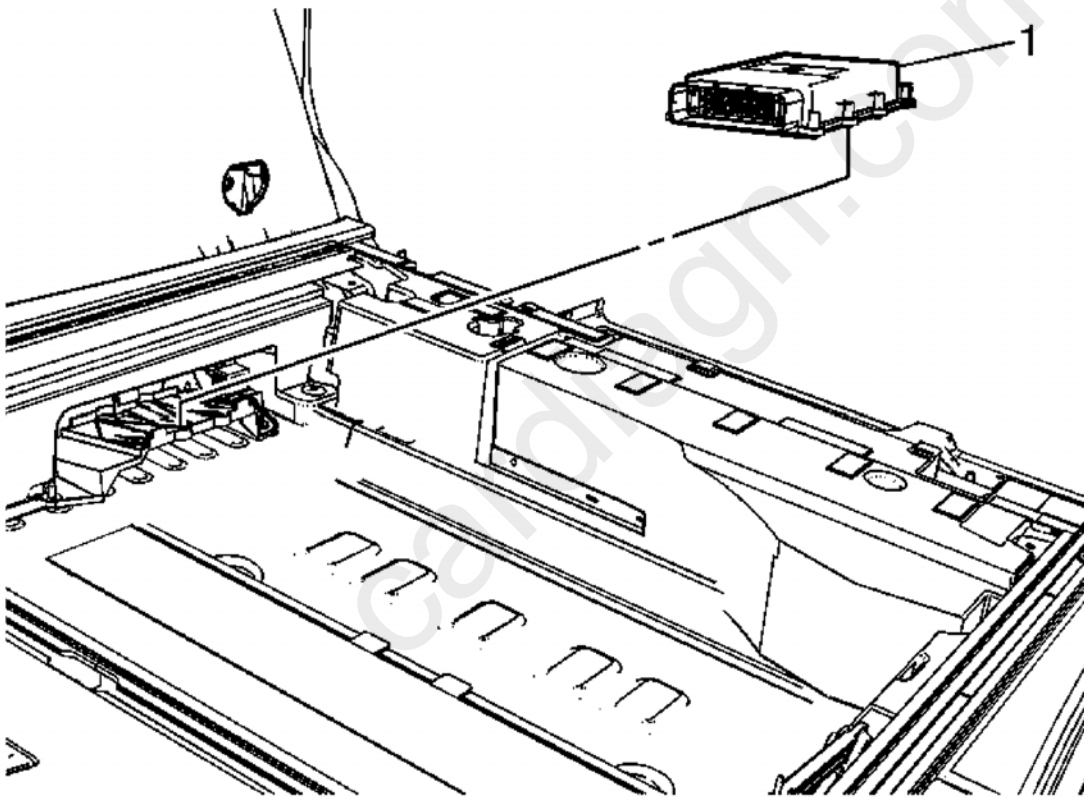


Fig. 5: View Of Electronic Suspension Control Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear compartment floor storage compartment. Refer to <u>Rear Compartment Floor Stowage Compartment Tray Replacement</u>	
1	Electronic Suspension Control Module
	Procedure

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1. Remove the electrical harness from the control module.
2. Remove the control module from the mounting bracket.

ELECTRONIC SUSPENSION REAR POSITION SENSOR REPLACEMENT

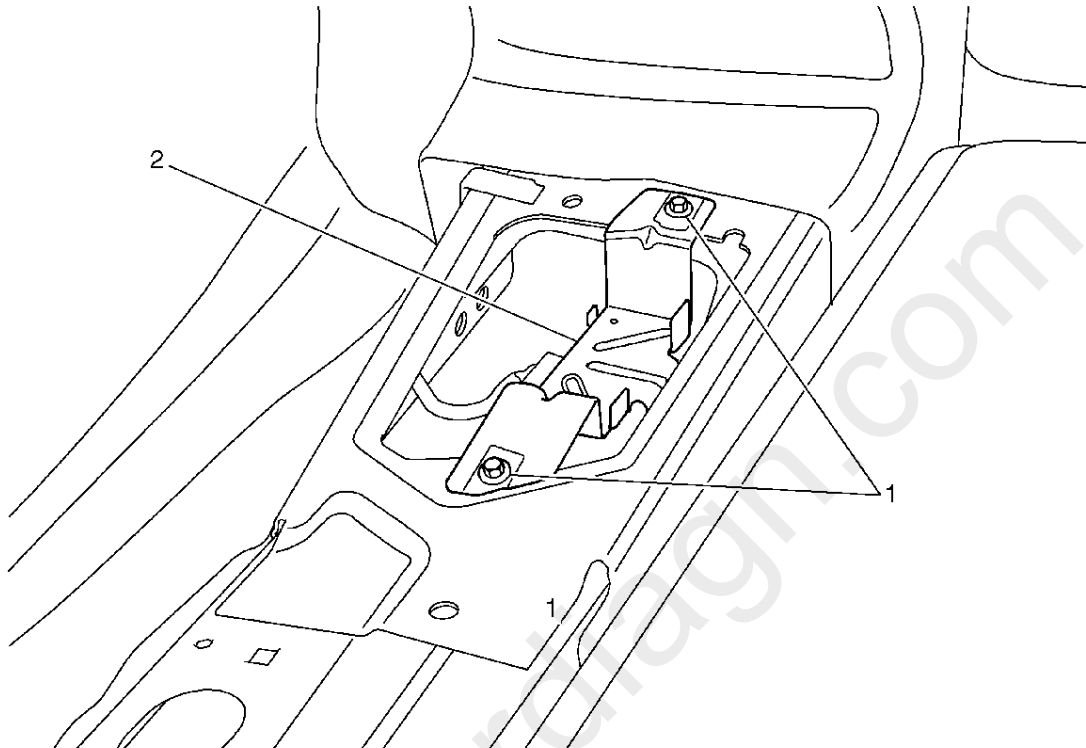


Fig. 6: Identifying Electronic Suspension Rear Position Sensor
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Fold the back on left side of the backseat. 2. Lift the front left side of the luggage compartment trim floor panel and also the damping material.	
1	Electronic Suspension Rear Position Sensor Replacement Fastener (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 6 N.m (53 lb in)
2	Electronic Suspension Rear Position Sensor

DESCRIPTION AND OPERATION

ELECTRONIC SUSPENSION CONTROL DESCRIPTION AND OPERATION

The electronic suspension control system individually controls the damping force of each of the 4 shock absorbers in order to keep the vehicle's body as calm as possible. Changes of the damping forces can be accomplished within milliseconds. Suspension characteristics can be changed at any time by activating the sport mode or tour mode.

The electronic suspension control system consists of the following major components:

- The suspension control module
- Three vertical body acceleration sensors
- Two front vertical suspension acceleration sensors
- Four shock absorber actuators which are integrated within the shock absorbers

The suspension control module controls the damping forces according to the following factors:

- Vehicle speed
- Steering wheel position
- Engine torque
- Brake pressure
- Body and front wheels vertical acceleration

The suspension control module evaluates these inputs in order to separately control the shock absorbers, providing an enhanced ride and comfort level over the widest possible range of operating conditions.

Suspension Control Module

The suspension control module controls the system functions and detects failures. The suspension control module receives input information by vertical acceleration sensors that are directly connected to the module and by other systems through the serial data line. The suspension control module commands variable levels of current to each shock absorber actuator.

Vertical Acceleration Sensors

The suspension control module supplies a common 5 V reference and a ground circuit to each of the five vertical acceleration sensor. The vertical acceleration sensors supply a signal of 0.5-4.5 V to the suspension control module.

The three vertical body acceleration sensors are mounted left front, right front and rear. The two front vertical suspension acceleration sensors are mounted at the strut.

Shock Absorber Actuators

The shock absorber actuators are integrated within the shock absorbers. The electronic suspension control system uses a proportional valve that is located in the external bypass of the displacement module.

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2010 SUSPENSION Electronic Suspension Control - SRX

Adjustment is performed by current control. The current consumption is 0-1.8 A. The actuators respond to commands of the suspension control module within milliseconds.

Driver Information Center Message

The electronic suspension control system does not have a malfunction indicator, but uses the instrument cluster for the display functions instead. When the suspension control module detects a fault that sets a DTC, it sends a message on the serial data line to the instrument cluster, which will display the following message:

SERVICE SUSPENSION SYSTEM

The suspension control module has the ability to store DTCs as current or history codes. Most electronic suspension control system malfunctions will display a message in the instrument cluster and set a DTC. As long as the DTC is present, the message will be displayed.

The suspension control module uses an ignition cycling diagnostic approach. Actions taken when a fault is detected will remain until the ignition is turned OFF, even if the fault condition is not present anymore.

If a fault is no longer present, the DTC will be stored as a history code. After 41 consecutive malfunction-free ignition cycles the DTC will be deleted.