

## 2004 SUSPENSION

### Electronic Suspension Control (ESC) - Corvette

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS


#### Fastener Tightening Specifications

Application	Specification	
	Metric	English
Front Position Sensor Mounting Bolt	3 N.m	26 lb in
Rear Position Sensor Mounting Bolt	7 N.m	62 lb in

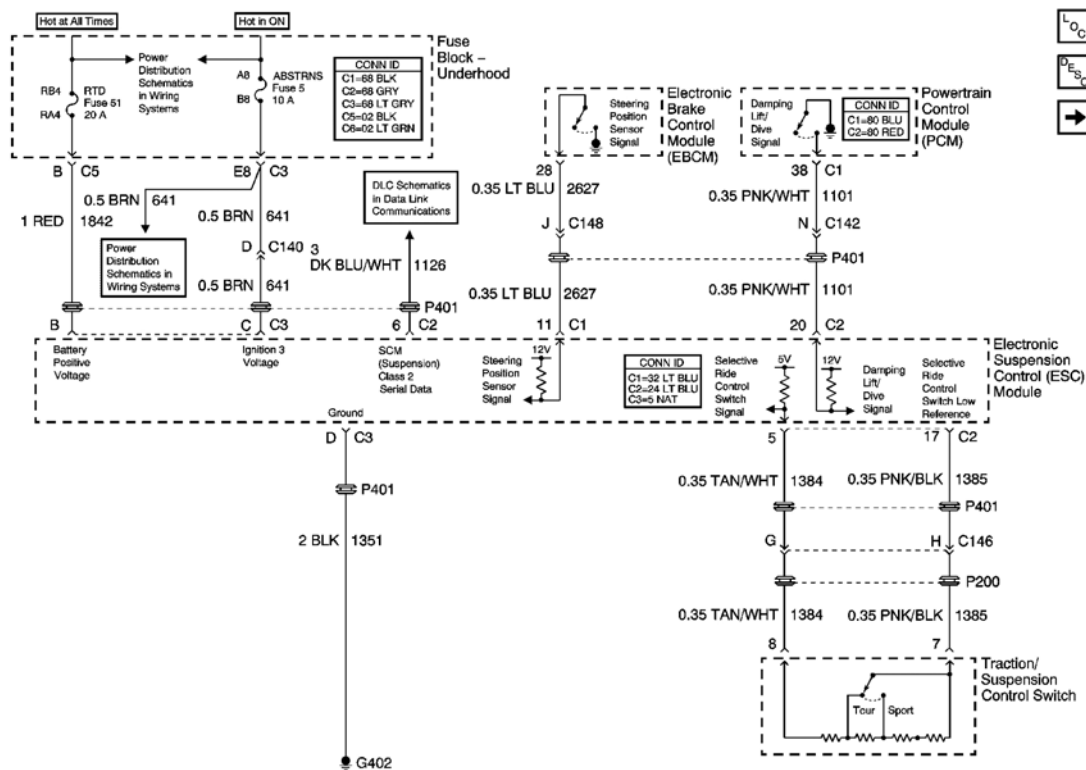
## SCHEMATIC AND ROUTING DIAGRAMS

### SUSPENSION CONTROLS SCHEMATIC ICONS

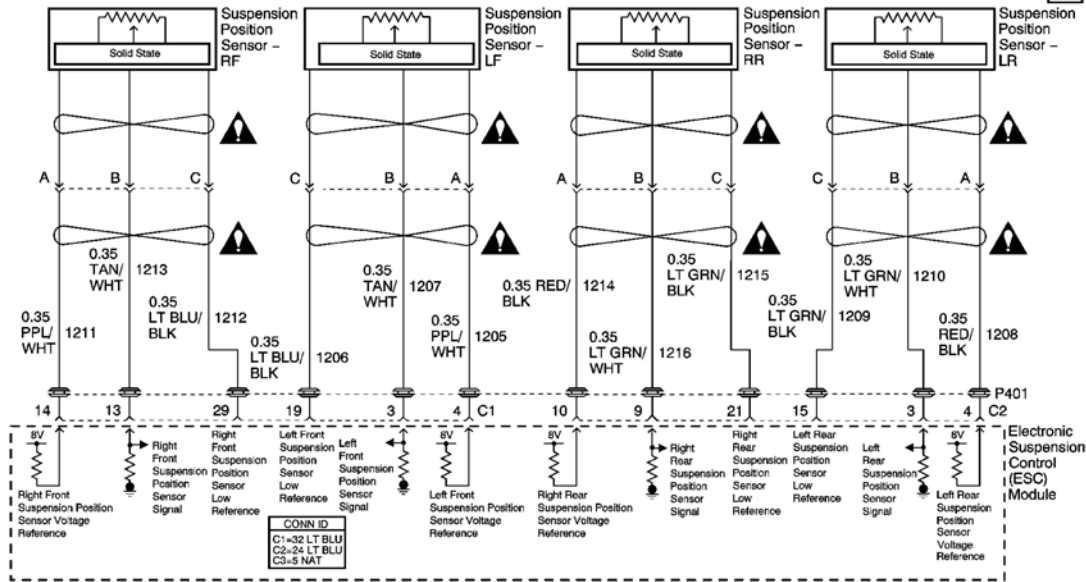
#### Suspension Controls Schematic Icons

Icon	Icon Definition
	<p><b>IMPORTANT:</b> Twisted-pair wires provide an effective shield that helps protect sensitive electronic components from electrical interference. If the wires were covered with shielding, install new shielding. In order to prevent electrical interference from degrading the performance of the connected components, you must maintain the proper specification when making any repairs to the twisted-pair wires shown :</p> <ul style="list-style-type: none"><li>• The wires must be twisted a minimum of 15 turns per 31 cm (12 in) as measured anywhere along the length of the wires</li><li>• The outside diameter of the twisted wires must not exceed 6.0 mm (0.25 in)</li></ul>

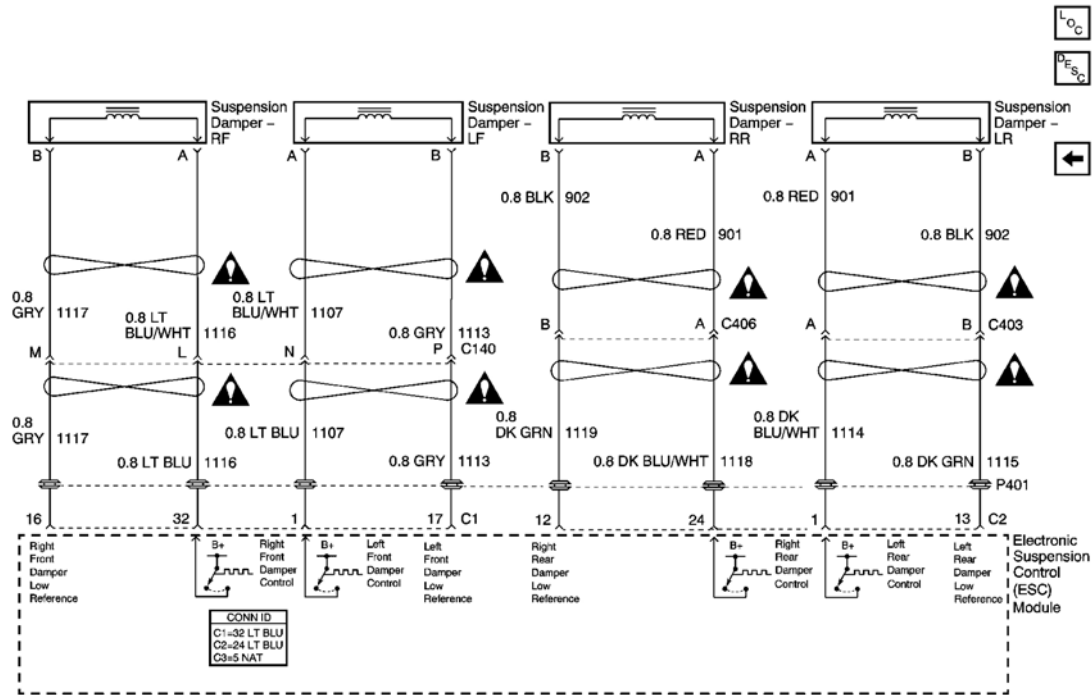
# SUSPENSION CONTROLS SCHEMATICS



**Fig. 1: Power, Ground, DLC, And Controls Schematics**  
 Courtesy of GENERAL MOTORS CORP.



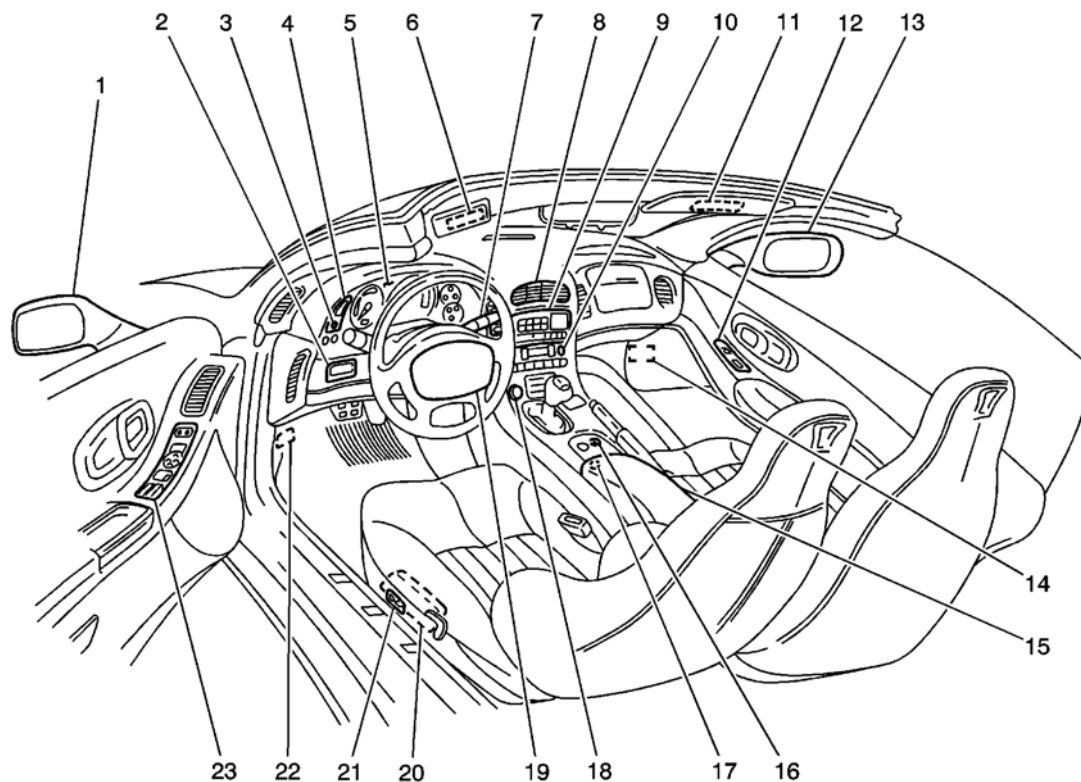
**Fig. 2: Suspension Position Sensors Schematics**  
 Courtesy of GENERAL MOTORS CORP.



**Fig. 3: Suspension Dampers Schematics**  
 Courtesy of GENERAL MOTORS CORP.

## COMPONENT LOCATOR

### SUSPENSION CONTROLS COMPONENT VIEWS

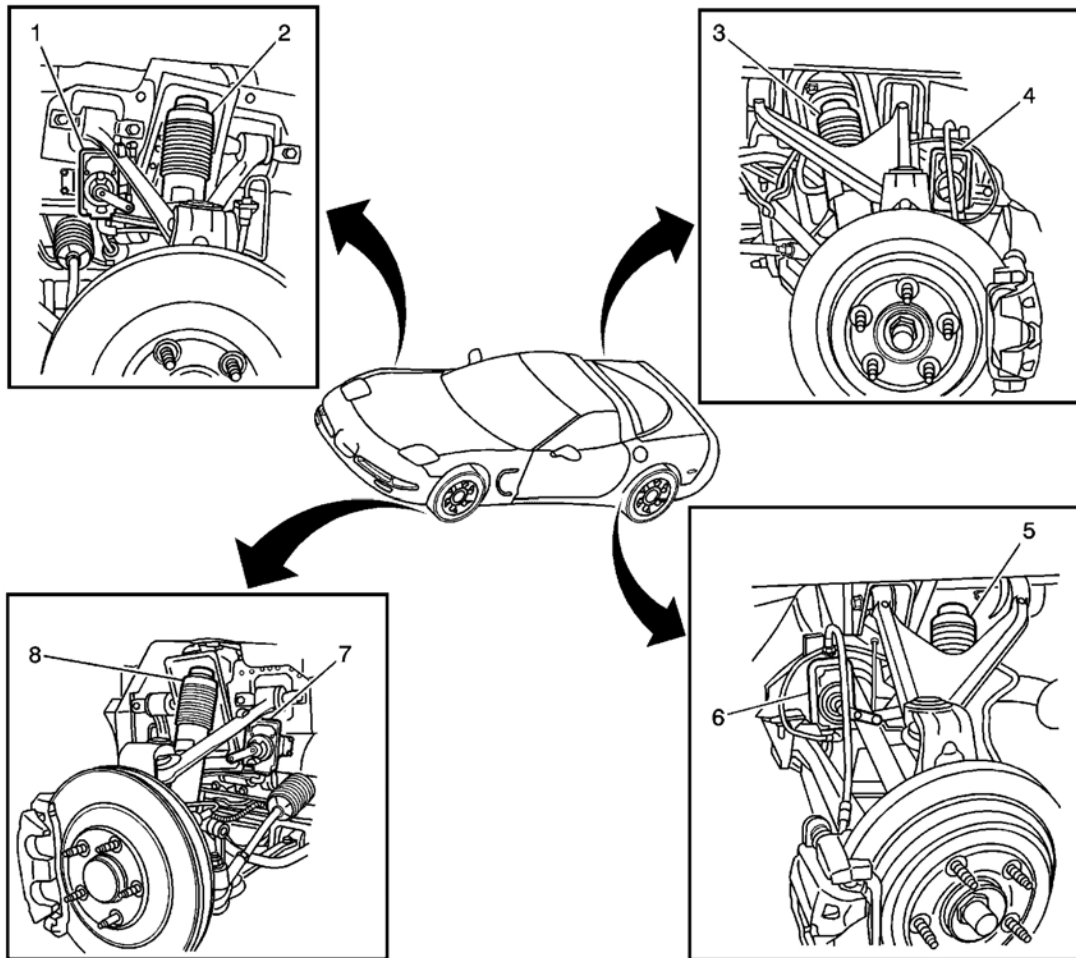


**Fig. 4: Cockpit Component View**  
 Courtesy of GENERAL MOTORS CORP.

**Callouts For Fig. 4**

Callout	Component Name
1	Outside Rearview Mirror-Driver
2	Fog Lamp/Rear Compartment Lid Release Switch (Domestic), Fog Lamp Switch (Export)
3	Dimmer Switch
4	Dimmer/Head Up Display (HUD) Switch
5	Instrument Panel Cluster (IPC)
6	Vanity Mirror Lamp-Left
7	Driver Information Center (DIC) Switch-Right
8	Hazard Switch
9	Radio
10	HVAC Control Module
11	Vanity Mirror Lamp-Right
12	Door Switch-Passenger
13	Outside Rearview Mirror-Passenger
14	Footwell Courtesy Lamp-Right
15	Fuel Door Lock Release Switch (Domestic), Rear Compartment Lid/Fuel Door Lock Release

	Switch (Export)
16	Traction/Suspension Control Switch
17	Auxiliary Power Outlet Connector
18	Cigar Lighter
19	Horn Switch
20	Seat Control Module (SCM)-Driver (W/Memory Seats), Seat Relay Center-Driver (W/O Memory Seats)
21	Seat Adjuster Switch-Driver
22	Footwell Courtesy Lamp-Left
23	Door Switch-Driver

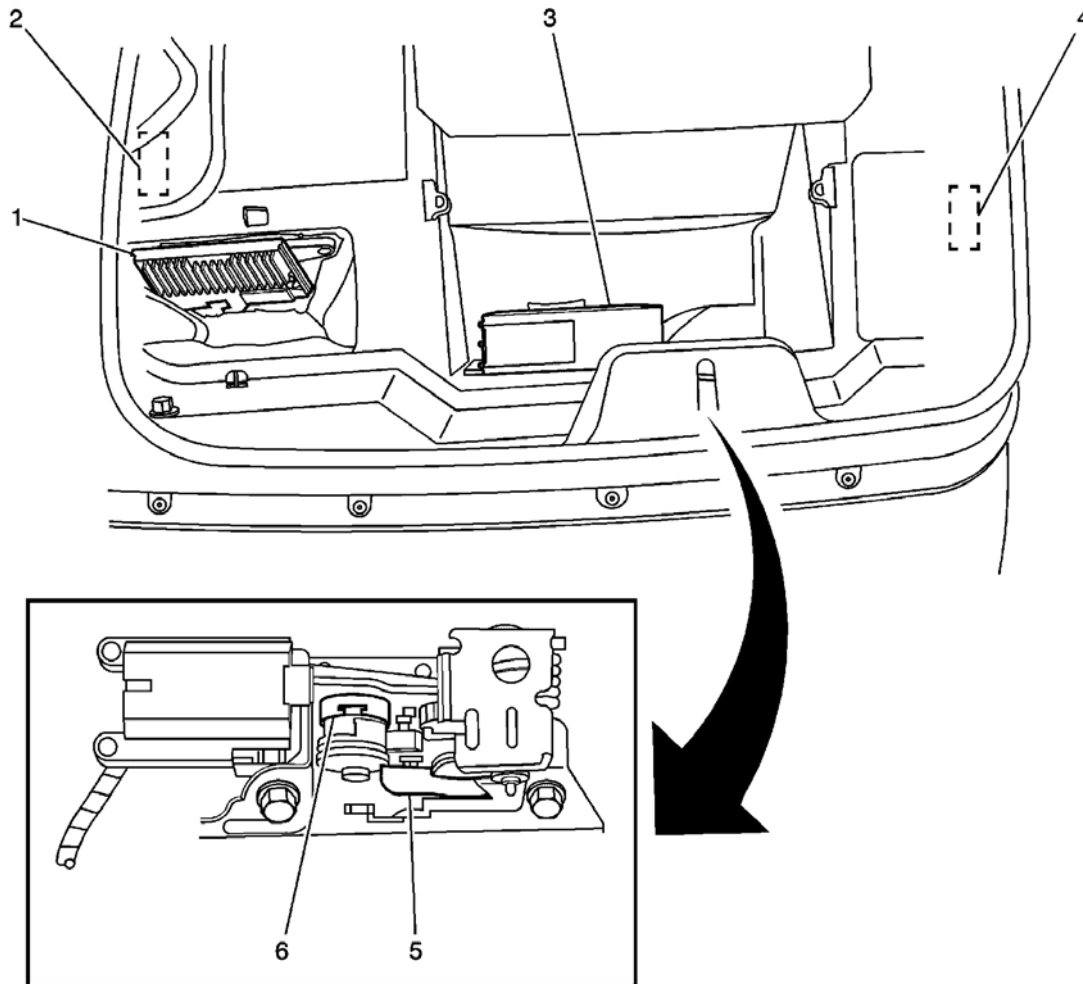


**Fig. 5: Suspension Components Component View - Sensors And Dampers**  
 Courtesy of GENERAL MOTORS CORP.

**Callouts For Fig. 5**

Callout	Component Name
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1	Suspension Position Sensor - RF
2	Suspension Damper - RF
3	Suspension Damper - RR
4	Suspension Position Sensor - RR
5	Suspension Damper - LR
6	Suspension Position Sensor - LR
7	Suspension Position Sensor - LF
8	Suspension Damper - LF



**Fig. 6: Luggage Compartment Component View**  
 Courtesy of GENERAL MOTORS CORP.

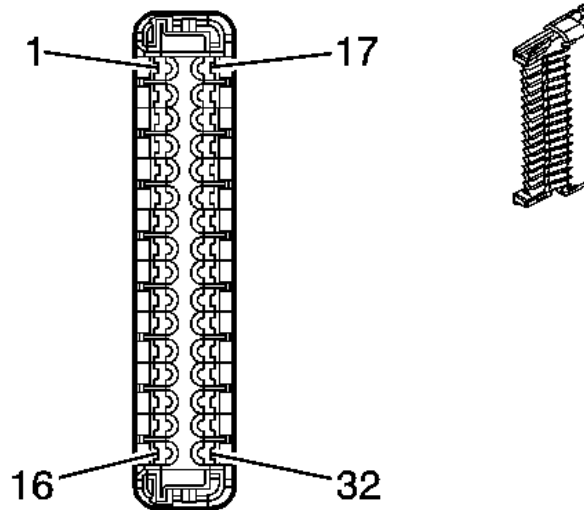
**Callouts For Fig. 6**

Callout	Component Name
1	Electronic Suspension Control (ESC) Module

2	Rear Compartment Courtesy Lamp - Left
3	Remote Playback Device - CD Changer
4	Rear Compartment Courtesy Lamp - Right
5	Rear Compartment Lid Ajar Switch
6	Rear Compartment Lid Latch (Hardtop/Convertible)

## SUSPENSION CONTROLS CONNECTOR END VIEWS

### Electronic Suspension Control (ESC) Module Terminal Identification C1

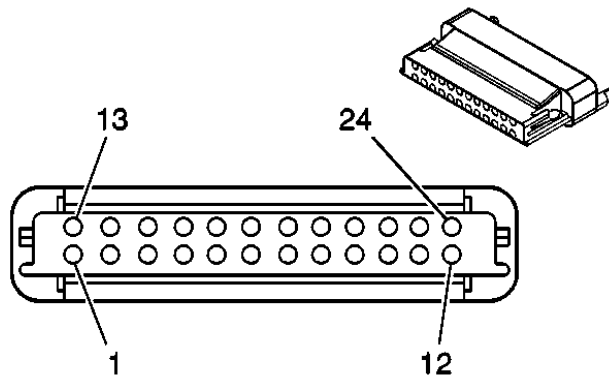


Connector Part Information		<ul style="list-style-type: none"> <li>• 12129025</li> <li>• 32-Way F Micro-Pack 100 Series (GRY)</li> </ul>	
Pin	Wire Color	Circuit No.	Function
1	LT BLU	1107	Left Front Damper Control
2	-	-	Not Used
3	TAN/WHT	1207	Left Front Suspension Position Sensor Signal
4	PPL/WHT	1205	Left Front Suspension Position Sensor Voltage Reference
5 - 10	-	-	Not Used
11	LT BLU	2627	Steering Position Sensor Signal
12	-	-	Not Used
13	TAN/WHT	1213	Right Front Suspension Position Sensor Signal
14	PPL/WHT	1211	Right Front Suspension Position Sensor Voltage Reference
15	-	-	Not Used
16	GRY	1117	Right Front Damper Low Reference



17	GRY	1113	Left Front Damper Low Reference
18	-	-	Not Used
19	LT BLU/BLK	1206	Left Front Suspension Position Sensor Low Reference
20 - 28	-	-	Not Used
29	LT BLU/BLK	1212	Right Front Suspension Position Sensor Low Reference
30- 31	-	-	Not Used
32	LT BLU	1116	Right Front Damper Control

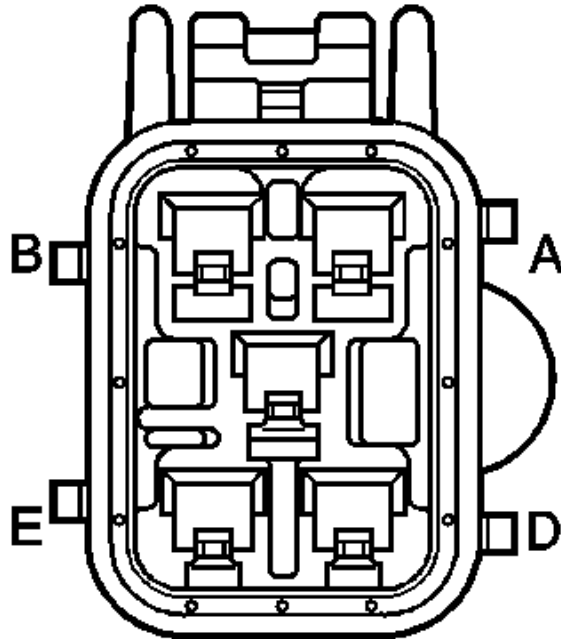
### Electronic Suspension Control (ESC) Module Terminal Identification C2



Connector Part Information		<ul style="list-style-type: none"> <li>• 12129225</li> <li>• 24 Way F Micro-Pack 100 Series (BLK)</li> </ul>	
Pin	Wire Color	Circuit No.	Function
1	DK BLU/WHT	1114	Left Rear Damper Control
2	-	-	Not Used
3	LT GRN/WHT	1210	Left Rear Suspension Position Sensor Signal
4	RED/BLK	1208	Left Rear Suspension Position Sensor Voltage Reference
5	TAN/WHT	1384	Selective Ride Control Switch Signal
6	DK BLU/WHT	1126	SCM (Suspension) Class 2 Serial Data
7 - 8	-	-	Not Used
9	LT GRN/WHT	1216	Right Rear Suspension Position Sensor Signal
10	RED/BLK	1214	Right Rear Suspension Position Sensor Voltage Reference
11	-	-	Not Used
12	DK GRN	1119	Right Rear Damper Low Reference
13	DK GRN	1115	Left Rear Damper Low Reference
14	-	-	Not Used
15	LT GRN/BLK	1209	Left Rear Suspension Position Sensor Low Reference
16	-	-	Not Used
17	PNK/BLK	1385	Selective Ride Control Switch Low Reference

18 - 19	-	-	Not Used
20	PNK/WHT	1101	Damping Lift/Dive Signal
21	LT GRN/BLK	1215	Right Rear Suspension Position Sensor Low Reference
22 - 23	-	-	Not Used
24	DK BLU/WHT	1118	Right Rear Damper Control

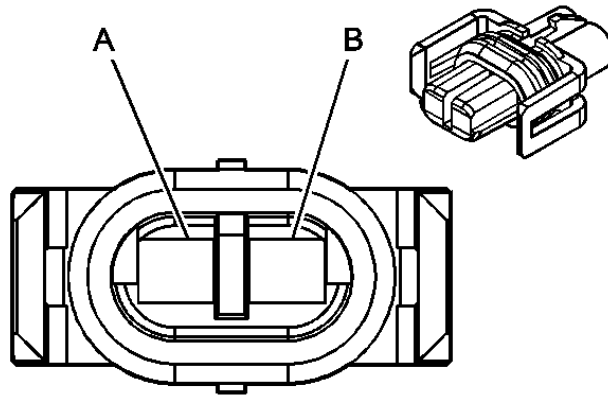
### Electronic Suspension Control (ESC) Module Terminal Identification C3



<b>Connector Part Information</b>		<ul style="list-style-type: none"> <li>• 12146741</li> <li>• 5-Way F Metri-Pack 280 Series (NAT)</li> </ul>	
<b>Pin</b>	<b>Wire Color</b>	<b>Circuit No.</b>	<b>Function</b>
A	-	-	Not Used
B	RED	1842	Battery Positive Voltage
C	BRN	641	Ignition 3 Voltage
D	BLK	1351	Ground
E	-	-	Not Used

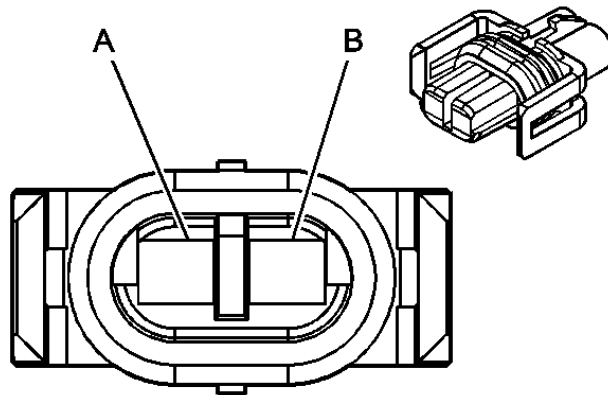
### Suspension Damper Terminal Identification - LF

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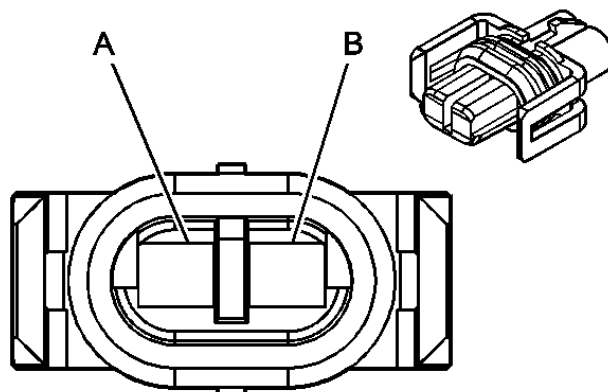
<b>Connector Part Information</b>		<ul style="list-style-type: none"> <li>• 15305168</li> <li>• 2-Way F Metri-Pack 150 Series (GRY)</li> </ul>	
Pin	Wire Color	Circuit No.	Function
A	LT BLU/WHT	1107	Left Front Damper Control
B	GRY	1113	Left Front Damper Low Reference

#### Suspension Damper Terminal Identification - RF



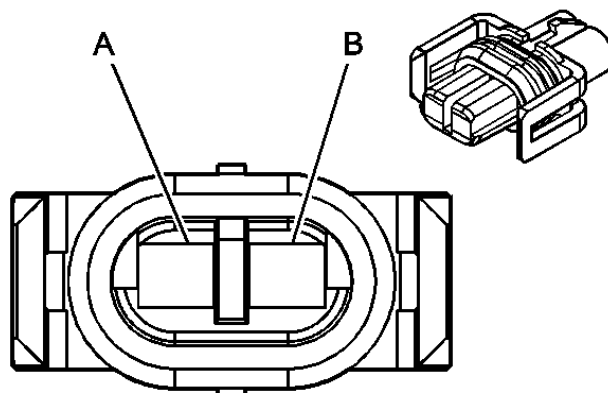
<b>Connector Part Information</b>		<ul style="list-style-type: none"> <li>• 15305168</li> <li>• 2-Way F Metri-Pack 150 Series (GRY)</li> </ul>	
Pin	Wire Color	Circuit No.	Function
A	LT BLU/WHT	1116	Right Front Damper Control
B	GRY	1117	Right Front Damper Low Reference

### Suspension Damper Terminal Identification - LR



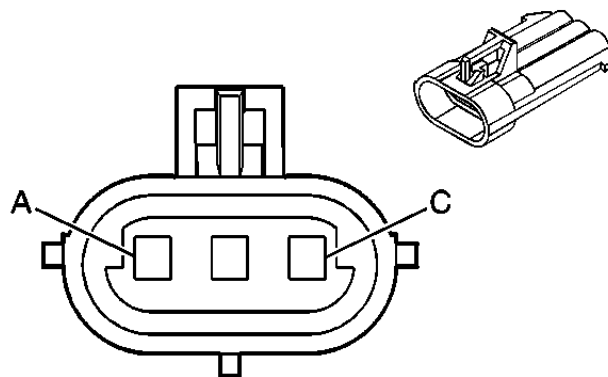
<b>Connector Part Information</b>		<ul style="list-style-type: none"> <li>• 15305168</li> <li>• 2-Way F Metri-Pack 150 Series (BLK)</li> </ul>	
Pin	Wire Color	Circuit No.	Function
A	RED	901	Left Rear Damper Control
B	BLK	902	Left Rear Damper Low Reference

### Suspension Damper Terminal Identification - RR



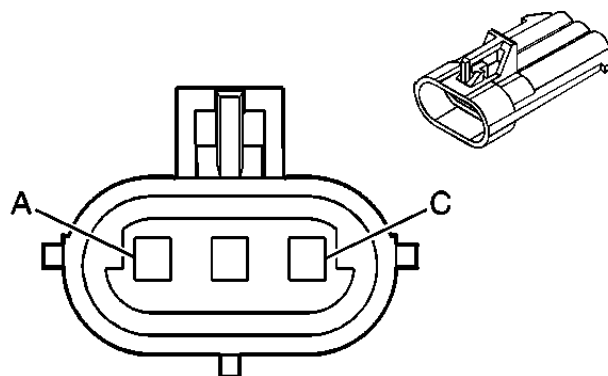
<b>Connector Part Information</b>		<ul style="list-style-type: none"> <li>• 15305168</li> <li>• 2-Way F Metri-Pack 150 Series (BLK)</li> </ul>	
Pin	Wire Color	Circuit No.	Function
A	RED	901	Right Rear Damper Control
B	BLK	902	Right Rear Damper Low Reference

### Suspension Position Sensor Terminal Identification - LF



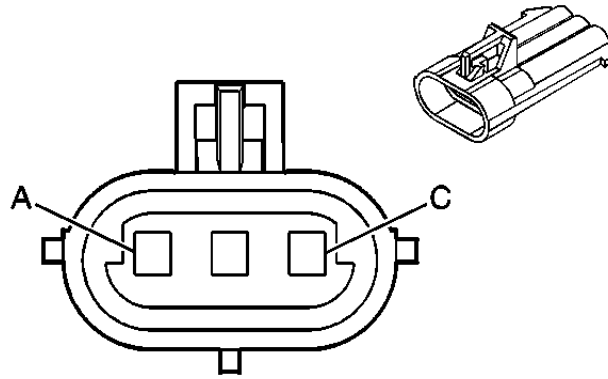
<b>Connector Part Information</b>		<ul style="list-style-type: none"> <li>• 12129615</li> <li>• 3-Way M Metri-Pack 150 Series (BLK)</li> </ul>	
Pin	Wire Color	Circuit No.	Function
A	PPL/WHT	1205	Left Front Suspension Position Sensor Voltage Reference
B	TAN/WHT	1207	Left Front Suspension Position Sensor Signal
C	LT BLU/BLK	1206	Left Front Suspension Position Sensor Low Reference

### Suspension Position Sensor Terminal Identification - RF



<b>Connector Part Information</b>		<ul style="list-style-type: none"> <li>• 12129615</li> <li>• 3-Way M Metri-Pack 150 Series (BLK)</li> </ul>	
Pin	Wire Color	Circuit No.	Function
A	PPL/WHT	1211	Right Front Suspension Position Sensor Voltage Reference
B	TAN/WHT	1213	Right Front Suspension Position Sensor Signal

### Suspension Position Sensor Terminal Identification - LR

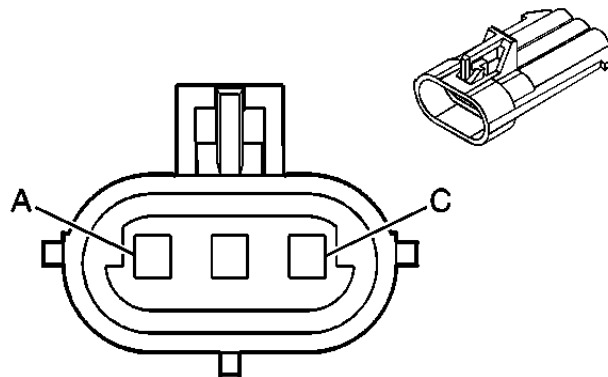


#### Connector Part Information

- 12129615
- 3-Way M Metri-Pack 150 Series (BLK)

Pin	Wire Color	Circuit No.	Function
A	RED/BLK	1208	Left Rear Suspension Position Sensor Voltage Reference
B	LT GRN/WHT	1210	Left Rear Suspension Position Sensor Signal
C	LT GRN/BLK	1209	Left Rear Suspension Position Sensor Low Reference

### Suspension Position Sensor Terminal Identification - RR



#### Connector Part Information

- 12129615
- 3-Way M Metri-Pack 150 Series (BLK)

Pin	Wire Color	Circuit No.	Function

A	RED/BLK	1214	Right Rear Suspension Position Sensor Voltage Reference
B	LT GRN/WHT	1216	Right Rear Suspension Position Sensor Signal
C	LT GRN/BLK	1215	Right Rear Suspension Position Sensor Low Reference

## DIAGNOSTIC INFORMATION AND PROCEDURES

### DIAGNOSTIC STARTING POINT - ELECTRONIC SUSPENSION CONTROL

Begin the system diagnosis with the **Diagnostic System Check - Electronic Suspension Control**. The Diagnostic System Check will provide the following information:

- The identification of the control module(s) which command the system.
- The ability of the control module(s) to communicate through the serial data circuit.
- The identification of any stored diagnostic trouble codes (DTCs) and their status.

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

### DIAGNOSTIC SYSTEM CHECK - ELECTRONIC SUSPENSION CONTROL

#### Test Description

The numbers below refer to the step numbers on the diagnostic table.

**2:** Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

**4:** The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

#### Diagnostic System Check - Electronic Suspension Control

Step	Action	Yes	No
1	Install a scan tool. Does the scan tool power up?	Go to <b>Step 2</b>	Go to <b>Scan Tool Does Not Power Up</b> in Data Link Communications
2	<ol style="list-style-type: none"> <li>1. Turn ON the ignition, with the engine OFF.</li> <li>2. Attempt to establish communication with the following modules: <ul style="list-style-type: none"> <li>• Electronic Suspension Control (ESC) Module</li> </ul> </li> </ol>		

	<ul style="list-style-type: none"> <li>• Electronic Brake Control Module (EBCM)</li> <li>• Powertrain Control Module (PCM)</li> </ul> <p>Does the scan tool communicate with all of the listed control modules?</p>	Go to <b>Step 3</b>	Go to <b><u>Scan Tool Does Not Communicate with Class 2 Device</u></b> in Data Link Communications
3	<p>Select the display DTCs function on the scan tool for the following modules:</p> <ul style="list-style-type: none"> <li>• ESC Module</li> <li>• Electronic Brake Control Module (EBCM)</li> <li>• Powertrain Control Module (PCM)</li> </ul> <p>Does the scan tool display any DTCs?</p>	Go to <b>Step 4</b>	Go to <b><u>Symptoms - Electronic Suspension Control</u></b>
4	Does the scan tool display any DTCs which begin with a "U"?	Go to <b><u>Scan Tool Does Not Communicate with Class 2 Device</u></b> in Data Link Communications	Go to <b>Step 5</b>
5	Does the scan tool display any PCM DTCs?	Go to <b><u>Diagnostic Trouble Code (DTC) List</u></b> in Engine Controls	Go to <b>Step 6</b>
6	Does the scan tool display any EBCM DTCs?	Go to <b><u>Diagnostic Trouble Code (DTC) List</u></b> in ABS Traction Control	Go to <b>Step 7</b>
7	Does the scan tool display DTC C0550?	Go to <b><u>DTC C0550</u></b>	Go to <b>Step 8</b>
8	Does the scan tool display DTC C0563?	Go to <b><u>DTC C0563</u></b>	Go to <b>Step 9</b>
9	Does the scan tool display DTC C0578, C0583, C0588 or C0593?	Go to <b><u>DTC C0578, C0583, C0588, or C0593</u></b>	Go to <b>Step 10</b>
10	Does the scan tool display DTC C0690, C0691 or C0693?	Go to <b><u>DTC C0690, C0691, or C0693</u></b>	Go to <b><u>Diagnostic Trouble Code (DTC) List</u></b>

## SCAN TOOL OUTPUT CONTROLS

A scan tool may be used in order to command the shock absorbers ON or OFF, without the need for input



information from other components. This can be very helpful in determining if a certain portion of a circuit or a component is in working order. The table below lists the tests that are available for the electronic suspension control system. The tests are listed in alphabetical order.

Using a scan tool, select the ESC Special Functions from the scan tool menu. The status of the output being cycled will be shown on the scan tool's display screen. The shock absorbers can be cycled to turn ON or OFF by selecting ESC Special Functions on the scan tool.

Using the LF shock absorber as an example, commanding the LF shock absorber ON can indicate whether the ESC system is able to correctly operate the LF shock absorber. This can determine if a DTC that pertains to that shock absorber is able to reset, and if the ESC module's internal circuitry is able to operate the LF shock absorber. For example, suppose the ESC system sets an intermittent DTC C0577, which is LF Shock Absorber Solenoid Short to Ground. In order to diagnose this condition using a scan tool, select the ESC special Functions. Then, cycle the LF shock absorber solenoid while moving the suspected wiring/connector. Attempt to duplicate the malfunction conditions. This scan tool feature allows checks that could not be performed while driving the vehicle. This example can be applied to the other shock absorbers.

### Suspension Control Module

Scan Tool Output Control	Additional Menu Selection(s)	Description
All Shock Solenoids	Shock Solenoid Tests	Commands the shock solenoids ON and OFF.
Chassis Pitch	Chassis Pitch Signal	Commands the PCM to send the chassis pitch signal to allow shock absorbers to set at firm setting.
Left Front Shock Solenoid	Shock Solenoid Tests	Commands the left front shock solenoid ON and OFF.
Left Rear Shock Solenoid	Shock Solenoid Tests	Commands the left rear shock solenoid ON and OFF.
Right Front Shock Solenoid	Shock Solenoid Tests	Commands the right front shock solenoid ON and OFF.
Right Rear Shock Solenoid	Shock Solenoid Tests	Commands the right rear shock solenoid ON and OFF.

### SCAN TOOL DATA LIST

The ESC Scan Tool Data List contains all the electronic suspension control system related parameters that are available on the scan tool. The parameters in the list are arranged in alphabetical order. The column, "Data List," indicates the location of the parameter within the scan tool menu selections.

Use the ESC Scan Tool Data List as directed by a diagnostic table or in order to supplement the diagnostic procedures. Begin all of the diagnostic procedures with the Vehicle Diagnostic System Check.

Use the ESC Scan Tool Data List only after the following is determined:

- There is no published DTC procedure nor published symptom procedure for the customer concern.

- The DTC or symptom diagnostic procedure indicated by the diagnostic system check does not resolve the customer concern.

The Typical Data Values are obtained from a properly operating vehicle under the conditions specified in the first row of the Scan Tool Data List table. Comparison of the parameter values from the suspect vehicle with the Typical Data Values may reveal the source of the customer concern.

A scan tool must be used in diagnosing system malfunctions before removing or replacing any of the components. Become familiar with the scan tool diagnostic capabilities and thoroughly understand each of the diagnostic features described before attempting any diagnostic procedures. The scan tool is capable of displaying data and input/output information from all of the systems connected to the serial data line. The scan tool is also capable of commanding the shock absorbers ON or OFF without the need for any input information.

### Data Display

The scan tool's input display function can be helpful in determining if the ESC module is receiving the correct input status. This can assist in determining if the ESC system is actually commanding a shock absorber. For example, the ESC system requires the input status from the ride control switch in order to determine the ride settings. A starting point might be to select the ride control switch data display function from the scan tool menu. The input status should change when the switch is manually operated. If no change occurred, then the problem is current and the input could be stuck. A shorted, open or malfunctioning switch or related wiring might cause the input to be stuck. If the change did occur, the problem is intermittent. In order to diagnose this condition using a scan tool, select the scan tool's input function. Then, watch the ride control switch input while moving the suspected wiring/connector. Try to duplicate the malfunction conditions. This scan tool feature allows checks that could not be performed while driving the vehicle.

### RTD Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
<b>Turn the Ignition ON, Engine OFF//Vehicle Trim Height within Specifications</b>			
Battery Voltage	Data Display	Volts	B+
Chassis Pitch Input Change	Data Display	Change/No Change	Varies
Chassis Pitch Input Status	Data Display	Active/Inactive	Varies
DSP Software Version ID	ID Information	Version Number	Varies
EEPROM Calibration ID	ID Information	Calibration Number	Varies
GM Part Number	ID Information	Part Number	Varies
GMSCM Software Version	ID Information	Version Number	Varies
Left Front Position Sensor	Data Display	0-5 Volts	0.35-4.75 Volts
Left Front Shock Level	Data Display	0-100%	0-90%
Left Rear Position Sensor	Data Display	0-5 Volts	0.35-4.75 Volts
Left Rear Shock Level	Data Display	0-100%	0-90%
Right Front Position Sensor	Data Display	0-5 Volts	0.35-4.75 Volts
Right Front Shock Level	Data Display	0-100%	0-90%
Right Rear Position Sensor	Data Display	0-5 Volts	0.35-4.75 Volts
Right Rear Shock Level	Data Display	0-100%	0-90%

Suspension Control Select Switch	Data Display	0-5 Volts	0.5-4.5 Volts
Steering Position PWM	Data Display	0-10 ms	Varies
Vehicle Speed	Data Display	km/h (mph)	Varies

## SCAN TOOL DATA DEFINITIONS

### ESC Scan Tool Data Definitions

The ESC Scan Tool Data Definitions contain a brief description of all the scan tool parameters. This list is in alphanumeric order.

#### All Shock Solenoids

The scan tool displays 0-100%. This percentage represents the commanded state of the shock absorber solenoids. When the ESC special functions is selected on the scan tool menu and the all shock solenoids is commanded ON, the percentage will increase. When the all shock solenoids is commanded OFF, the percentage will decrease.

#### Battery Voltage

The scan tool displays 0-26.0 volts. The battery voltage represents the system voltage measured at the controller battery input.

#### Chassis Pitch Input Change

The scan tool displays Changed or Unchanged. The ESC system receives chassis pitch input from the PCM. When there is a change in chassis pitch status, the scan tool will display Changed. If there is not change, the scan tool will display Unchanged.

#### Chassis Pitch Input Status

The scan tool displays Active or Inactive. The ESC system receives chassis pitch input from the PCM. The scan tool will display Active when the ESC system detects a change in chassis pitch status. When there is no change in chassis pitch, the scan tool will display Inactive.

#### Chassis Pitch Signal

The ESC receives chassis pitch input from the PCM. When the ESC Special Functions is selected on the scan tool menu and the chassis pitch signal is commanded ON, the PCM sends the chassis pitch signal to the ESC system which allows the shock absorbers to set at the firm setting.

#### DSP Software Version

The scan tool displays the controller DSP software version number for service identification.

#### EEPROM Calibration ID

The scan tool displays the controller EEPROM calibration ID number for service identification.

### **GM Part Number**

The scan tool displays the controller part number for service identification.

### **GMSCM Software Version**

The scan tool displays the controller GMSCM software version number for service identification.

### **Left Front Position Sensor**

The scan tool displays 0-5.0 volts. The position sensor is a variable resistor which changes with vehicle trim height. The ESC system uses this voltage reading to determine different road and driving conditions. The ESC system adjusts the damping level in each shock absorber based upon the voltage level received back from all 4 position sensors.

### **Left Front Shock Level**

The scan tool displays 0-100%. This percentage represents the commanded state of the shock absorbers. When the ESC system commands the shock absorbers ON, the percentage will increase. When the ESC system commands the shock absorbers OFF, the percentage will decrease.

### **Left Front Shock Solenoid**

The scan tool displays 0-100%. This percentage represents the commanded state of the shock absorber solenoid. When the ESC special functions is selected on the scan tool menu and the left front shock solenoid is commanded ON, the percentage will increase. When the left front shock solenoid is commanded OFF, the percentage will decrease.

### **Left Rear Position Sensor**

The scan tool displays 0-5.0 volts. The position sensor is a variable resistor which changes with vehicle trim height. The ESC system uses this voltage reading to determine different road and driving conditions. The ESC system adjusts the damping level in each shock absorber based upon the voltage level received back from all 4 position sensors.

### **Left Rear Shock Level**

The scan tool displays 0-100%. This percentage represents the commanded state of the shock absorbers. When the ESC system commands the shock absorbers ON, the percentage will increase. When the ESC system commands the shock absorbers OFF, the percentage will decrease.

### **Left Rear Shock Solenoid**

The scan tool displays 0-100%. This percentage represents the commanded state of the shock absorber solenoid. When the ESC special functions is selected on the scan tool menu and the left rear shock

solenoid is commanded ON, the percentage will increase. When the left rear shock solenoid is commanded OFF, the percentage will decrease.

### **Steering Position PWM**

The scan tool displays 0-10 ms. This PWM signal is sent by the ABS system which changes when the steering wheel is turned. The ESC system uses this PWM signal to determine the shock absorber control levels and will command a more firm setting if the vehicle is turning.

### **Right Front Position Sensor**

The scan tool displays 0-5.0 volts. The position sensor is a variable resistor which changes with vehicle trim height. The ESC system uses this voltage reading to determine different road and driving conditions. The ESC system adjusts the damping level in each shock absorber based upon the voltage level received back from all four position sensors.

### **Right Front Shock Level**

The scan tool displays 0-100%. This percentage represents the commanded state of the shock absorbers. When the ESC system commands the shock absorbers ON, the percentage will increase. When the ESC system commands the shock absorbers OFF, the percentage will decrease.

### **Right Front Shock Solenoid**

The scan tool displays 0-100%. This percentage represents the commanded state of the shock absorber solenoid. When the ESC special functions is selected on the scan tool menu and the right front shock solenoid is commanded ON, the percentage will increase. When the right front shock solenoid is commanded OFF, the percentage will decrease.

### **Right Rear Position Sensor**

The scan tool displays 0-5.0 volts. The position sensor is a variable resistor which changes with vehicle trim height. The ESC system uses this voltage reading to determine different road and driving conditions. The ESC system adjusts the damping level in each shock absorber based upon the voltage level received back from all four position sensors.

### **Right Rear Shock Level**

The scan tool displays 0-100%. This percentage represents the commanded state of the shock absorbers. When the ESC system commands the shock absorbers ON, the percentage will increase. When the ESC system commands the shock absorbers OFF, the percentage will decrease.

### **Right Rear Shock Solenoid**

The scan tool displays 0-100%. This percentage represents the commanded state of the shock absorber solenoid. When the ESC special functions is selected on the scan tool menu and the right rear shock solenoid is commanded ON, the percentage will increase. When the right rear shock solenoid is

commanded OFF, the percentage will decrease.

## Vehicle Speed

The scan tool displays 0-255 km/h (0-159 mph). The ESC system obtains vehicle speed data from the PCM on a dedicated input. The PCM is responsible for calculating correct vehicle speed data.

## DIAGNOSTIC TROUBLE CODE (DTC) LIST

### Diagnostic Trouble Code (DTC) List

<b>DTC</b>	<b>Module</b>
<b><u>B2795</u></b>	ESC
<b><u>B3577</u></b>	ESC
<b><u>C0550</u></b>	ESC
<b><u>C0563</u></b>	ESC
<b><u>C0577, C0579, C0582, C0584, C0587, C0589, C0592 or C0594</u></b>	ESC
<b><u>C0578, C0583, C0588 or C0593</u></b>	ESC
<b><u>C0615, C0620, C0625 or C0630</u></b>	ESC
<b><u>C0665</u></b>	ESC
<b><u>C0690, C0691 or C0693</u></b>	ESC
<b><u>C0695</u></b>	ESC
<b><u>C0710</u></b>	ESC
<b><u>P1652</u></b>	PCM
<b><u>U1000 and U1255</u></b>	ESC
<b><u>U1001-U1254</u></b>	ESC

### DTC B2795

#### Circuit Description

The ESC module supplies 5 volts and a ground to the suspension control switch's voltage divider circuit. The suspension control switch changes the resistance value of the switch circuit which alters the voltage level received by the ESC module on the suspension control signal circuit. There are two possible voltage levels, and each voltage level corresponds to a switch selection position. The two switch positions are TOUR and SPORT. The ESC module monitors the voltage level on the suspension control switch signal circuit, and will set a DTC if the detected voltage level is not within the calibrated amount.

#### Conditions for Running the DTC

- The ignition ON.
- The ESC function enabled.

#### Conditions for Setting the DTC

- The ESC module detects that the suspension control switch signal voltage level is under 0.5 volts or over 4.5 volts.
- The condition must be detected for 5 seconds in 4 consecutive ignition cycles.

#### Action Taken When the DTC Sets

- Stores a DTC B2795 in the ESC memory.
- Provides shock absorber solenoid control based on the TOUR setting.
- Sends a message to the IPC to display the SERVICE RIDE CONTROL message.

#### Conditions for Clearing the DTC

- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- The ESC module detects that the suspension control switch signal voltage level is between 0.5-4.5 volts.
- Use the IPC clearing DTC feature.
- Using a scan tool.

#### Diagnostic Aids

- The following conditions may cause an intermittent malfunction to occur:
  - An intermittent open or short in the suspension control switch circuit.
  - An internal open or short in the suspension control switch.
- The ESC module uses an ignition cycle counter diagnostic approach to set this DTC. This requires the ESC module to detect the malfunction 4 times before setting the DTC. To disable this feature, use a scan tool to clear all DTCs before performing diagnostic procedures.
- If the DTC is a history DTC, the problem may be intermittent. Using a scan tool, monitor the suspension control switch voltage while moving the wiring and the connectors. This can often cause the malfunction to appear.

#### Test Description

The numbers below refer to the step numbers on the diagnostic table.

**2:** This tests the suspension control switch voltage range in various switch positions using a scan tool. Normal switch voltage range is between 0.5-2.5 volts.

**3:** This tests the suspension control switch signal voltage range using a scan tool with the sensor disconnected. Normal signal voltage range with the sensor disconnected is approximately 5.0 volts.

**4:** This tests the suspension control switch signal voltage range using a scan tool with the switch jumpered to ground. Normal signal voltage range with the switch jumpered to ground is approximately 0.5 volts.

#### DTC B2795

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Step	Action	Value (s)	Yes	No
<b>Schematic Reference:</b> <u>Suspension Controls Schematics</u> <b>Connector End View Reference:</b> <u>Suspension Controls Connector End Views</u>				
1	Did you perform the ESC Diagnostic System Check?	-	Go to <b>Step 2</b>	Go to <b>Diagnostic System Check - Electronic Suspension Control</b>
2	<ol style="list-style-type: none"> <li>1. Install a scan tool.</li> <li>2. Turn ON the ignition, engine OFF.</li> <li>3. With a scan tool, observe the Suspension Control Select Switch parameter in the ESC data list in the following switch positions: <ul style="list-style-type: none"> <li>• SPORT</li> <li>• TOUR</li> </ul> </li> </ol> <p>Does the scan tool indicate that the Suspension Control Select Switch parameter is within the specified range?</p>	SPORT: 0.5-1.5 V TOUR: 1.5-2.5 V	Go to Diagnostic Aids	Go to <b>Step 3</b>
3	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Disconnect the suspension control switch.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> <li>4. With a scan tool, observe the Suspension Control Select Switch data parameter.</li> </ol> <p>Does the scan tool indicate that the Suspension Control Select Switch data parameter is greater than the specified value?</p>	4.5 V	Go to <b>Step 4</b>	Go to <b>Step 5</b>
4	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Connect a 3 amp fused jumper wire between the signal circuit of the suspension control switch and the ground circuit of the suspension control switch.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> <li>4. With a scan tool, observe the Suspension Control Select Switch parameter.</li> </ol> <p>Does the scan tool indicate that the Suspension Control Select Switch parameter is less than the specified value?</p>	0.5 V	Go to <b>Step 8</b>	Go to <b>Step 6</b>
5	Test the signal circuit of the suspension control switch for a short to ground. Refer to <b>Circuit</b>	-		



	<b>Testing and Wiring Repairs</b> in Wiring Systems. Did you find and correct the condition?		Go to <b>Step 12</b>	Go to <b>Step 9</b>
6	Test the signal circuit of the suspension control switch for a short to voltage, a high resistance, or an open. Refer to <b>Circuit Testing and Wiring Repairs</b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 12</b>	Go to <b>Step 7</b>
7	Test the ground circuit of the suspension control switch for a high resistance or an open. Refer to <b>Circuit Testing and Wiring Repairs</b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 12</b>	Go to <b>Step 9</b>
8	Inspect for poor connections at the harness connector of the suspension control switch. Refer to <b>Testing for Intermittent Conditions and Poor Connections</b> and <b>Connector Repairs</b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 12</b>	Go to <b>Step 10</b>
9	Inspect for poor connections at the harness connector of the ESC module. Refer to <b>Testing for Intermittent Conditions and Poor Connections</b> and <b>Connector Repairs</b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 12</b>	Go to <b>Step 11</b>
10	Replace the Suspension Control Select switch. Did you complete the replacement?	-	Go to <b>Step 12</b>	-
11	Replace the ESC. Refer to <b>Electronic Suspension Control Module Replacement</b> . Did you complete the replacement?	-	Go to <b>Step 12</b>	-
12	<ol style="list-style-type: none"> <li>1. Use the scan tool in order to clear the DTCs.</li> <li>2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.</li> </ol> Does the DTC reset?	-	Go to <b>Step 2</b>	System OK

## DTC B3577

### Circuit Description

The ESC module supplies 5 volts and a ground to the suspension control switch's voltage divider circuit. The suspension control switch changes the resistance value of the switch circuit which alters the voltage level received by the ESC module on the suspension control signal circuit. There are two possible voltage levels, and each voltage level corresponds to a switch selection position. The two switch positions are TOUR and SPORT. The ESC module monitors the voltage level on the suspension control switch signal circuit, and will set a DTC if the detected voltage level is not within the calibrated amount.

### **Conditions for Running the DTC**

- The ignition ON.
- The ESC function enabled.

### **Conditions for Setting the DTC**

- The ESC module detects that the suspension control switch signal voltage level is 2.5-4.5 volts.
- The condition must be detected for 10 seconds in 4 consecutive ignition cycles.

### **Action Taken When the DTC Sets**

- Stores a DTC B3577 in the ESC memory.
- Provides shock absorber solenoid control based on the TOUR setting.
- Sends a message to the IPC to display the SERVICE RIDE CONTROL message.

### **Conditions for Clearing the DTC**

- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- The ESC module detects that the suspension control switch signal voltage level is less than 2.5 volts.
- Use the IPC clearing DTC feature.
- Using a scan tool.

### **Diagnostic Aids**

- The following conditions may cause an intermittent malfunction to occur:
  - There is an intermittent short or open in the suspension control switch circuit.
  - The suspension control switch is in between switch positions.
- A DTC B3577 may set if the suspension control switch terminals are making poor contact to the switch, or if there is a small amount of corrosion on the terminals. Check for these conditions first before attempting to use the diagnostic table, as this may correct the condition.
- The ESC module uses an ignition cycle counter diagnostic approach to set this DTC. This requires the ESC module to detect the malfunction 4 times before setting the DTC. To disable this feature, use a scan tool to clear all DTCs before performing diagnostic procedures.
- If the DTC is a history DTC, the problem may be intermittent. Using a scan tool, monitor the suspension control switch voltage while moving the wiring and the connectors. This can often cause the malfunction to appear.

### **Test Description**

The numbers below refer to the step numbers on the diagnostic table.

**2:** This tests the suspension control switch voltage range in various switch positions using a scan tool.

Normal switch voltage range is between 0.5-2.5 volts.

**3:** This tests the suspension control switch signal voltage range using a scan tool with the sensor disconnected. Normal signal voltage range with the sensor disconnected is approximately 5.0 volts.

**4:** This tests the suspension control switch signal voltage range using a scan tool with the switch jumpered to ground. Normal signal voltage range with the switch jumpered to ground is approximately 0.5 volts.

### DTC B3577

Step	Action	Value (s)	Yes	No
<b>Schematic Reference: Suspension Controls Schematics</b> <b>Connector End View Reference: Suspension Controls Connector End Views</b>				
1	Did you perform the ESC Diagnostic System Check?	-	Go to <b>Step 2</b>	Go to <b>Diagnostic System Check - Electronic Suspension Control</b>
2	<ol style="list-style-type: none"> <li>1. Install a scan tool.</li> <li>2. Turn ON the ignition, engine OFF.</li> <li>3. With a scan tool, observe the Suspension Control Select Switch parameter in the ESC data list in the following switch positions: <ul style="list-style-type: none"> <li>• SPORT</li> <li>• TOUR</li> </ul> </li> </ol> <p>Does the scan tool indicate that the Suspension Control Select Switch parameter is within the specified range?</p>	SPORT: 0.5-1.5 V TOUR: 1.5-2.5 V	Go to Diagnostic Aids	Go to <b>Step 3</b>
3	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Disconnect the suspension control switch.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> <li>4. With a scan tool, observe the Suspension Control Select Switch data parameter.</li> </ol> <p>Does the scan tool indicate that the Suspension Control Select Switch data parameter is greater than the specified value?</p>	4.5 V	Go to <b>Step 4</b>	Go to <b>Step 5</b>
4	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Connect a 3 amp fused jumper wire between the signal circuit of the suspension control switch and the ground circuit of the suspension control switch.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> </ol>	0.5 V		

	<p>4. With a scan tool, observe the Suspension Control Select Switch parameter.</p> <p>Does the scan tool indicate that the Suspension Control Select Switch parameter is less than the specified value?</p>		Go to <b>Step 8</b>	Go to <b>Step 6</b>
5	<p>Test the signal circuit of the suspension control switch for a short to ground. Refer to <b>Circuit Testing</b> and <b>Wiring Repairs</b> in Wiring Systems. Did you find and correct the condition?</p>	-	Go to <b>Step 12</b>	Go to <b>Step 9</b>
6	<p>Test the signal circuit of the suspension control switch for a short to voltage, a high resistance, or an open. Refer to <b>Circuit Testing</b> and <b>Wiring Repairs</b> in Wiring Systems. Did you find and correct the condition?</p>	-	Go to <b>Step 12</b>	Go to <b>Step 7</b>
7	<p>Test the ground circuit of the suspension control switch for a high resistance or an open. Refer to <b>Circuit Testing</b> and <b>Wiring Repairs</b> in Wiring Systems. Did you find and correct the condition?</p>	-	Go to <b>Step 12</b>	Go to <b>Step 9</b>
8	<p>Inspect for poor connections at the harness connector of the suspension control switch. Refer to <b>Testing for Intermittent Conditions and Poor Connections</b> and <b>Connector Repairs</b> in Wiring Systems. Did you find and correct the condition?</p>	-	Go to <b>Step 12</b>	Go to <b>Step 10</b>
9	<p>Inspect for poor connections at the harness connector of the ESC module. Refer to <b>Testing for Intermittent Conditions and Poor Connections</b> and <b>Connector Repairs</b> in Wiring Systems. Did you find and correct the condition?</p>	-	Go to <b>Step 12</b>	Go to <b>Step 11</b>
10	<p>Replace the Suspension Control Select switch. Did you complete the replacement?</p>	-	Go to <b>Step 12</b>	-
11	<p>Replace the ESC. Refer to <b>Electronic Suspension Control Module Replacement</b> . Did you complete the replacement?</p>	-	Go to <b>Step 12</b>	-
12	<p>1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.</p> <p>Does the DTC reset?</p>	-	Go to <b>Step 2</b>	System OK

## DTC C0550

### Circuit Description

When the ignition switch is turned ON, the ESC module monitors communications between its internal microprocessors and performs self-diagnostic tests. If an internal malfunction is detected, the ESC module will store a DTC C0550 in its memory.

### **Conditions for Running the DTC**

The ignition ON.

### **Conditions for Setting the DTC**

- The ESC module detected an internal malfunction.
- The malfunction must be detected when the ignition switch is first turned ON.

### **Action Taken When the DTC Sets**

- Stores a DTC C0550 in the ESC memory
- Depending on which internal circuitry was affected by this malfunction, the ESC module will command one of the following actions:
  - Command 0% PWM duty cycle in order to disable all four shock absorber solenoids.
  - Ignore the steering position input.
  - Provide shock absorber solenoid control based on the vehicle speed only.
  - Sends a message to the IPC to display the SERVICE RIDE CONTROL message.
  - Sends a message to the IPC to display the SHOCKS INOPERATIVE message.
- If the disable all four shock absorber solenoids action was taken, the ESC module sends a message to the PCM to limit the speed. The PCM then sends a message to the IPC to display the MAXIMUM SPEED 129 km/h (80 mph) message.

### **Conditions for Clearing the DTC**

- Under all fault conditions, the ignition must be cycled before this DTC can change from current to history.
- The ESC module no longer detects any internal malfunctions when the ignition is first turned to the ON position.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- Use the IPC clearing DTC feature.
- Using a scan tool.

### **Diagnostic Aids**

- Since DTC C0550 is an internal malfunction to the ESC module, there is no repair procedure and the ESC module must be replaced.
- The ESC module tests for multiple internal malfunctions and will store a DTC C0550 if one or more internal malfunctions are detected. Therefore, depending on which malfunction was detected, and what

internal circuitry was affected, this DTC may cause various symptoms.

### Test Description

The number below refers to the step number on the diagnostic table.

**2:** This DTC requires ESC module replacement.

### DTC C0550

Step	Action	Yes	No
<b>Schematic Reference: Suspension Controls Schematics</b>			
<b>Connector End View Reference: Suspension Controls Connector End Views</b>			
1	Did you perform the Electronic Suspension Control Diagnostic System Check?	Go to <b>Step 2</b>	Go to <b>Diagnostic System Check - Electronic Suspension Control</b>
2	Replace the ESC module. Refer to <b>Electronic Suspension Control Module Replacement</b> . Did you complete the replacement?	System OK	-

### DTC C0563

#### Circuit Description

The ESC system calibrations are stored in the EEPROM. When the ignition switch is first turned to the ON position, the ESC module performs internal tests on the EEPROM and can determine the integrity of the EEPROM's non-volatile memory. The ESC module compares the previously stored checksum with the checksum calculated when the ignition switch is first turned ON. If the two checksums do not match, the ESC module will indicate that a calibration malfunction, which is a checksum error is current.

#### Conditions for Running the DTC

The ignition ON.

#### Conditions for Setting the DTC

- The stored checksum does not match the calculated checksum.
- The ESC module detects an internal memory malfunction, which is a checksum error.
- The malfunction must be detected when the ignition switch is first turned to the ON position. The ignition switch must be OFF first for 10 seconds.

#### Action Taken When the DTC Sets

- Stores a DTC C0563 in the ESC memory.
- Depending on which internal circuitry was affected by this malfunction, the ESC module will command one of the following actions:
  - Command 0% PWM duty cycle in order to disable all four shock absorber solenoids.

- Ignore the steering position input.
- Provide shock absorber solenoid control based on the vehicle speed only.
- Sends a message to the IPC to display the SERVICE RIDE CONTROL message.
- Sends a message to the IPC to display the SHOCKS INOPERATIVE message.
- If the disable all four shock absorber solenoids action was taken, the ESC module sends a message to the PCM to limit the speed. The PCM then sends a message to the IPC to display the MAXIMUM SPEED 129 km/h (80 mph) message.

### Conditions for Clearing the DTC

- Under all fault conditions, the ignition must be cycled before this DTC can change from current to history.
- The ESC module no longer detects an internal memory malfunction, which is a checksum error condition when the ignition is cycled from OFF to ON.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- Use the IPC clearing DTC feature.
- Using a scan tool.

### Diagnostic Aids

- Since DTC C0563 is an internal malfunction to the ESC module, there is no repair procedure, and the module must be replaced.
- The ESC module tests for multiple internal malfunctions, and will store a DTC C0563 if one or more internal malfunctions are detected. Therefore, depending on which malfunction was detected, and what internal circuitry was affected, this DTC may cause various symptoms.

### Test Description

The number below refers to the step number on the diagnostic table.

**2:** This DTC requires ESC module replacement.

### DTC C0563

Step	Action	Yes	No
<b>Schematic Reference: Suspension Controls Schematics</b>			
<b>Connector End View Reference: Suspension Controls Connector End Views</b>			
1	Did you perform the Electronic Suspension Control Diagnostic System Check?	Go to <b>Step 2</b>	Go to <b><u>Diagnostic System Check - Electronic Suspension Control</u></b>
2	Replace the ESC module. Refer to <b><u>Electronic Suspension Control Module Replacement</u></b> . Did you complete the replacement?	System OK	-

**DTC C0577, C0579, C0582, C0584, C0587, C0589, C0592, OR C0594**

## **Circuit Description**

The ESC module uses the Pulse-Width Modulation (PWM) method in order to control each shock absorber actuator. Switching the voltage ON and OFF at each shock absorber actuator, or pulse width modulating, limits the amount of current supplied to that particular actuator. The ESC module periodically commands each shock absorber to a set PWM duty cycle in order to override the normal PWM command. During this set PWM duty cycle, the ESC module is able to perform a diagnostic test on each shock absorber actuator, and can determine if a malfunction is present. The ESC module is only able to detect certain malfunctions during a given state, which are ON or OFF.

**C0577, C0579, C0582, C0584, C0587, C0589, C0592 or C0594**

In order to test for the conditions that set a DTC C0577, C0579, C0582, C0584, C0587, C0589, C0592 or C0594, the ESC module must first command the actuator ON. The ESC module must be in a command ON state. If a low voltage level is detected in the actuator control circuit during the ON state, the test is again repeated. If the ESC module determines that the voltage levels detected in both tests are lower than expected, a malfunction is present and a DTC will set.

### **Conditions for Running the DTC**

**C0577, C0579, C0582, C0584, C0587, C0589, C0592 or C0594**

The following conditions must be present to run the DTC:

- The ignition ON.
- The ESC module in command ON state.
- The ESC function enabled.

### **Conditions for Setting the DTC**

**C0577, C0582, C0587 or C0592**

The ESC module detects a low voltage level, which is a short to ground on the actuator control circuit during two diagnostic tests performed.

**C0579, C0584, C0589 or C0594**

The ESC module detects a low voltage level, which is an open circuit on the actuator control circuit during two diagnostic tests performed.

### **Action Taken When the DTC Sets**

**C0577, C0582, C0587 or C0592**

The following actions will occur when a DTC sets:

- Stores a DTC C0577, C0582, C0587 or C0592 in the ESC memory.



- Commands 0% PWM duty cycle in order to disable all 4 actuators.
- Sends a message to the IPC to display the SERVICE RIDE CONTROL and SHOCKS INOPERATIVE messages.
- Sends a message to the PCM to limit the speed. The PCM then sends a message to the IPC to display the MAXIMUM SPEED 129 km/h (80 mph) message.

#### **C0579, C0584, C0589 or C0594**

The following actions will occur when a DTC sets:

- Stores a DTC C0579, C0584, C0589 or C0594 in the ESC memory.
- Commands 0% PWM duty cycle in order to disable the actuator.
- Sends a message to the IPC to display the SERVICE RIDE CONTROL message.

#### **Conditions for Clearing the DTC**

#### **C0577, C0582, C0587 or C0592**

The following conditions must exist to clear the DTC:

- The ignition must be cycled before this DTC can change from current to history even if the malfunction is no longer present.
- The ESC module no longer detects a low voltage level, which is a short to ground on the actuator control circuit during two diagnostic tests.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- Use the IPC clearing DTC feature.
- Using a scan tool.

#### **C0579, C0584, C0589 or C0594**

The following conditions must exist to clear the DTC:

- The ignition must be cycled before this DTC can change from current to history even if the malfunction is no longer present.
- The ESC module no longer detects a low voltage level, which is an open circuit on the actuator control circuit during two diagnostic tests.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- Use the IPC clearing DTC feature.
- Using a scan tool.

#### **Diagnostic Aids**

## C0577, C0582, C0587 or C0592

The following condition may cause an intermittent malfunction to occur:

- There is an intermittent short to ground on the actuator control circuit.
- There is an internal shock absorber actuator short.
- If the conditions for a DTC C0577, C0582, C0587 or C0592 are current, the ESC module will disable all four actuators by commanding 0% duty cycle, and the RTD relay. The vehicle will experience a soft ride condition on the side of the vehicle.
- The RTD relay provides supply voltage to all four shock absorber actuators; therefore, multiple shock absorber actuator DTCs which are open or short to ground may also be stored along with a DTC C0550. Always diagnose a DTC C0550 first before attempting to diagnose multiple shock absorber actuator DTCs.
- If a short to ground is present on the actuator supply circuit, the RTD fuse will open and DTC C0550 may set.
- If the DTC is a history DTC, the problem may be intermittent. Using a scan tool, cycle the shock absorber actuator while moving the wiring and the connectors. This can often cause the malfunction to occur.

## C0579, C0584, C0589 or C0594

The following conditions may cause an intermittent malfunction to occur:

- There is an intermittent open on the actuator control or supply circuits.
- There is an internal shock absorber actuator open or high resistance value.
- If the conditions for a DTC C0579, C0584, C0589 or C0594 are current, the ESC module will disable the actuator by commanding 0% duty cycle and the vehicle will experience a soft ride condition on the side of the vehicle.
- If the DTC is a history DTC, the problem may be intermittent. Using a scan tool, cycle the shock absorber actuator while moving the wiring and the connectors. This can often cause the malfunction to occur.

### Test Description

The numbers below refer to the step numbers on the diagnostic table.

**3:** This step tests for short to ground and short to B+ on the control circuit.

**4:** This step tests for continuity from the ESC module on the control circuit and the low reference circuit.

## DTC C0577, C0579, C0582, C0584, C0587, C0589, C0592, or C0594

Step	Action	Value (s)	Yes	No
<b>Schematic Reference: Suspension Controls Schematics</b> <b>Connector End View Reference: Suspension Controls Connector End Views</b>				
1	Did you perform the Electronic Suspension Control Diagnostic System Check?	-	Go to	Go to <b>Diagnostic System Check -</b>

			<b>Step 2</b>	<b>Electronic Suspension Control</b>
2	<ol style="list-style-type: none"> <li>1. Disconnect the shock absorber connector.</li> <li>2. Measure the resistance of the shock absorber actuator.</li> </ol> <p>Does the resistance measure within the specified value?</p>	0.5-2.0 ohm	Go to <b>Step 3</b>	Go to <b>Step 07</b>
3	<p>Test the damper control circuit of the actuator for a short to ground and short to battery. Refer to <b>Circuit Testing</b> and <b>Wiring Repairs</b> in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to <b>Step 9</b>	Go to <b>Step 4</b>
4	<ol style="list-style-type: none"> <li>1. Disconnect the ESC module.</li> <li>2. Check continuity from the ESC module to the damper actuator connector on both the control circuit and the reference low circuit. Refer to <b>Circuit Testing</b> and <b>Wiring Repairs</b> in Wiring Systems.</li> </ol> <p>Did you find and correct the condition?</p>	-	Go to <b>Step 9</b>	Go to <b>Step 5</b>
5	<p>Inspect for poor connections at the actuator. Refer to <b>Testing for Intermittent Conditions and Poor Connections</b> and <b>Connector Repairs</b> in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to <b>Step 9</b>	Go to <b>Step 6</b>
6	<p>Inspect for poor connections at the harness connector to the ESC module. Refer to <b>Testing for Intermittent Conditions and Poor Connections</b> and <b>Connector Repairs</b> in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to <b>Step 9</b>	Go to <b>Step 8</b>
7	<p>Replace the applicable shock absorber. Refer to <b>Shock Absorber Replacement (w/o F55)</b> or <b>Shock Absorber Replacement (W/F55)</b> in Front Suspension or <b>Shock Absorber Replacement (W/O F55)</b> or <b>Shock Absorber Replacement (W/F55)</b> in Rear Suspension.</p> <p>Did you complete the replacement?</p>	-	Go to <b>Step 9</b>	-
8	<p>Replace the ESC module. Refer to <b>Electronic Suspension Control Module Replacement</b>.</p> <p>Did you complete the replacement?</p>	-	Go to <b>Step 9</b>	-
9	<ol style="list-style-type: none"> <li>1. Use the scan tool in order to clear the DTCs.</li> <li>2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.</li> </ol> <p>Does the DTC reset?</p>	-	Go to <b>Step 2</b>	System OK

**DTC C0578, C0583, C0588, OR C0593**

**Circuit Description**

The Electronic Suspension Control (ESC) module will detect ESC driver over current fault conditions and set DTC C0578, C0583, C0588 or C0593 by disabling the damper control relay. Although the ESC module will set these DTCs, each one represents a failure of the damper ESC driver within the ESC module which requires replacement of the ESC module.

### **Conditions for Running the DTC**

The ignition ON.

### **Conditions for Setting the DTC**

- The ESC module detected an internal malfunction.
- The malfunction must be detected when the ignition switch is first turned ON.

### **Action Taken When the DTC Sets**

- Stores a DTC C0578, C0583, C0588 or C0593 in the ESC memory.
- Depending on which internal circuitry was affected by this malfunction, the ESC module will command one of the following actions:
  - Command 0% PWM duty cycle in order to disable all four shock absorber solenoids.
  - Ignore the steering position input.
  - Provide shock absorber solenoid control based on the vehicle speed only.
  - Sends a message to the IPC to display the SERVICE RIDE CONTROL message.
  - Sends a message to the IPC to display the SHOCKS INOPERATIVE message.
- If the disable all four shock absorber solenoids action was taken, the ESC module sends a message to the PCM to limit the speed. The PCM then sends a message to the IPC to display the MAXIMUM SPEED 129 km/h (80 mph) message.

### **Conditions for Clearing the DTC**

- Under all fault conditions, the ignition must be cycled before this DTC can change from current to history.
- The ESC module no longer detects any internal malfunctions when the ignition is first turned to the ON position.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- Use the IPC clearing DTC feature.
- Using a scan tool.

### **Diagnostic Aids**

- Since DTC C0578, C0583, C0588 or C0593 is an internal damper driver malfunction to the ESC module, there is no repair procedure and the ESC module must be replaced.
- The ESC module tests for multiple internal malfunctions and will store a DTC C0578, C0583, C0588 or

C0593 if one or more internal malfunctions are detected. Therefore, depending on which malfunction was detected, and what internal circuitry was affected, this DTC may cause various symptoms.

### Test Description

The number below refer to the step number on the diagnostic table.

**2:** This DTC requires ESC module replacement.

### DTC C0578, C0583, C0588, or C0593

Step	Action	Yes	No
<b>Schematic Reference:</b> <u>Suspension Controls Schematics</u> <b>Connector End View Reference:</b> <u>Suspension Controls Connector End Views</u>			
1	Did you perform the Electronic Suspension Control Diagnostic System Check?	Go to <b>Step 2</b>	Go to <b>Diagnostic System Check - Electronic Suspension Control</b>
2	Replace the ESC module. Refer to <b>Electronic Suspension Control Module Replacement</b> . Did you complete the replacement?	System OK	-

### DTC C0615, C0620, C0625 OR C0630

#### Circuit Description

The ESC module supplies 8 volts to the position sensors. The position sensors use the supplied 8 volts to produce an analog output range of 0-5 volts. The ESC module calculates vehicle suspension settings based upon the voltage levels received back from the position sensors. The ESC model monitors for an out of range condition.

#### Conditions for Running the DTC

- The ignition ON.
- The ESC function enabled.

#### Conditions for Setting the DTC

- The ESC module senses position sensor output voltage under 0.35 or over 4.75 volts.
- The condition must be detected for 1 second in 4 consecutive ignition cycles.

#### Action Taken When the DTC Sets

- Stores a DTC C0615, C0620, C0625 or C0630 in the ESC memory.
- Provides shock absorber solenoid control based on the vehicle speed only.
- Sends a message to the IPC to display the SERVICE RIDE CONTROL message.

#### Conditions for Clearing the DTC

- The ESC module senses the correct position sensor output voltage between 0.35-4.75 volts.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- Use the IPC clearing DTC feature.
- Using a scan tool.

### Diagnostic Aids

- The following conditions may cause an intermittent malfunction to occur:
  - There is an intermittent open or short in the position sensor circuit.
  - Bent, disconnected, or damaged position sensor linkage.
- When using a scan tool in order to read position sensor voltage, always make sure the vehicle is sitting with the full vehicle weight on its wheels. Measuring position sensor voltage with the vehicle raised and the wheels hanging may lead to incorrect diagnosis.
- An intermittent DTC C0615, C0620, C0625 or C0630 may produce a random firm/soft ride condition.
- The ESC module uses an ignition cycle counter diagnosis approach to set this DTC. This requires the ESC module to detect a malfunction 4 times before setting the DTC. To disable this feature, use a scan tool to clear all DTCs before performing diagnosis procedures.
- If the DTC is a history DTC, the problem may be intermittent. Using a scan tool, monitor the position sensor voltage while test driving the vehicle or moving the wiring and connectors. This can often cause the malfunction to occur.

### Test Description

The numbers below refer to the step numbers on the diagnostic table.

**2:** This step tests the position sensor signal voltage range using a scan tool. Normal signal voltage is between 0.35-4.75 volts.

**3:** This step tests the position sensor signal voltage range using a scan tool with the sensor disconnected. Normal signal voltage range with the sensor disconnected is approximately 0 volts.

**4:** This step tests for the proper operation of the circuit in the high voltage range. If the fuse in the jumper opens when you perform this test, the signal circuit is shorted to ground.

**5:** This step tests for a short to voltage in the 8-volt reference circuit.

**6:** This step tests for high resistance or an open in the ground circuit.

**11:** This step tests for an open or high resistance in the position sensor ground circuit.

### DTC C0615, C0620, C0625 or C0630

Step	Action	Value (s)	Yes	No
<b>Schematic Reference:</b> <u>Suspension Controls Schematics</u>				
<b>Connector End View Reference:</b> <u>Suspension Controls Connector End Views</u>				
	Did you perform the Electronic Suspension Control Diagnostic System Check?			Go to <b>Diagnostic System Check -</b>

1		-	Go to <b>Step 2</b>	<b>Electronic Suspension Control</b>
2	<ol style="list-style-type: none"> <li>1. Install a scan tool.</li> <li>2. Turn ON the ignition, with the engine OFF.</li> <li>3. With the scan tool, observe the Position Sensor data parameter in the ESC data list.</li> </ol> <p>Does the scan tool indicate that the Position Sensor data parameter is within the specified range?</p>	0.35 - 4.75 V	Go to Diagnostic Aids	Go to <b>Step 3</b>
3	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Disconnect the position sensor.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> <li>4. With a scan tool, observe the Position Sensor data parameter.</li> </ol> <p>Does the scan tool indicate that the Position Sensor data parameter is less than the specified value?</p>	0.35 V	Go to <b>Step 4</b>	Go to <b>Step 10</b>
4	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Connect a 3-amp fused jumper wire between the 8-volt reference circuit of the position sensor and the signal circuit of the position sensor.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> <li>4. With a scan tool, observe the Position Sensor data parameter.</li> </ol> <p>Does the scan tool indicate the Position Sensor data parameter is greater than the specified value?</p>	4.75 V	Go to <b>Step 5</b>	Go to <b>Step 8</b>
5	<ol style="list-style-type: none"> <li>1. Disconnect the fused jumper wire.</li> <li>2. Measure the voltage between the 8-volt reference circuit of the position sensor and the ground circuit of the position sensor.</li> </ol> <p>Does the voltage measure less than the specified value?</p>	8 V	Go to <b>Step 6</b>	Go to <b>Step 7</b>
6	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Measure the resistance from the ground circuit of the position sensor to a good ground.</li> </ol> <p>Does the resistance measure less than the specified value?</p>	5 ohm	Go to <b>Step 12</b>	Go to <b>Step 11</b>
	Test the 8-volt reference circuit of the position			

7	sensor for a short to voltage. Refer to <b><u>Circuit Testing</u></b> and <b><u>Wiring Repairs</u></b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 16</b>	Go to <b>Step 13</b>
8	Test the 8-volt reference circuit of the position sensor for a short to ground, a high resistance, or an open. Refer to <b><u>Circuit Testing</u></b> and <b><u>Wiring Repairs</u></b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 16</b>	Go to <b>Step 9</b>
9	Test the signal circuit of the position sensor for a short to ground, a high resistance, or an open. Refer to <b><u>Circuit Testing</u></b> and <b><u>Wiring Repairs</u></b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 16</b>	Go to <b>Step 13</b>
10	Test the signal circuit of the position sensor for a short to voltage. Refer to <b><u>Circuit Testing</u></b> and <b><u>Wiring Repairs</u></b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 16</b>	Go to <b>Step 13</b>
11	1. Disconnect the ESC module. 2. Test the ground circuit of the position sensor for a high resistance or an open. Refer to <b><u>Circuit Testing</u></b> and <b><u>Wiring Repairs</u></b> in Wiring Systems.  Did you find and correct the condition?	-	Go to <b>Step 16</b>	Go to <b>Step 13</b>
12	Inspect for poor connections at the harness connector of the position sensor. Refer to <b><u>Testing for Intermittent Conditions and Poor Connections</u></b> and <b><u>Connector Repairs</u></b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 16</b>	Go to <b>Step 14</b>
13	Inspect for poor connections at the harness connector of the ESC module. Refer to <b><u>Testing for Intermittent Conditions and Poor Connections</u></b> and <b><u>Connector Repairs</u></b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 16</b>	Go to <b>Step 15</b>
14	Replace the applicable position sensor. Refer to <b><u>Front Position Sensor Replacement - Electronic Suspension</u></b> or <b><u>Rear Position Sensor Replacement - Electronic Suspension</u></b> . Did you complete the replacement?	-	Go to <b>Step 16</b>	-
15	Replace the ESC module. Refer to <b><u>Electronic Suspension Control Module Replacement</u></b> . Did you complete the replacement?	-	Go to <b>Step 16</b>	-
	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the			



16	supporting text. Does the DTC reset?	-	Go to <b>Step 2</b>	System OK
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## DTC C0665

### Circuit Description

The ESC module receives a chassis pitch angle information from the PCM on the chassis pitch angle signal circuit. Under normal conditions, this signal is 5 volt (+/- 0.5 volt) ref. The PCM then grounds the chassis pitch signal circuit when the vehicle is accelerating rapidly or braking hard. When the PCM grounds the chassis pitch angle signal circuit, the circuit goes low to about 0 volts, the ESC module commands all 4 shock absorber solenoids to a firm position. The PCM calculates the chassis pitch information based on the engine torque and the vehicle braking force. The ESC module also performs a test on the chassis pitch angle circuit when the ignition switch is turned to RUN. The ESC module sends a chassis pitch request to the PCM on the serial data line. The PCM then grounds the chassis pitch input circuit, pulling the circuit low for 5 seconds and returns to normal operation.

### Conditions for Running the DTC

- The ignition ON.
- The ESC function enabled.

### Conditions for Setting the DTC

- After the ignition is turned to RUN, the ESC module does not detect a low to high transition on the chassis pitch angle signal circuit from the PCM.
- The ESC module will continue to send a request every 4 minutes to the PCM in order to retest for a chassis pitch circuit malfunction.
- The condition must be detected within 31 seconds.

### Action Taken When the DTC Sets

- Stores a DTC C0665 in the ESC memory.
- Ignores the chassis pitch angle.
- Sends a message to the IPC to display the SERVICE RIDE CONTROL message.

### Conditions for Clearing the DTC

- After the ignition is cycled, or after 4 minutes, the ESC module detects a low to high transition on the chassis pitch angle signal circuit from the PCM within 31 seconds.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- Use the IPC clearing DTC feature.
- Using a scan tool.

## Diagnostic Aids

- The following conditions may cause an intermittent malfunction to occur:
  - An intermittent open or short on the chassis pitch angle signal circuit.
  - An intermittent open or short to ground on the serial data line.
- An intermittent short to ground or open on the chassis pitch angle signal circuit may cause a random firm/soft ride condition.
- If the DTC is a history DTC, the problem may be intermittent. Using a scan tool, monitor the Chassis Pitch Angle while moving the wiring and the connectors. This can often cause the malfunction to appear.
- The scan tool can command the PCM to ground the chassis pitch input circuit. This can be used for diagnostic purposes.

## Test Description

The numbers below refer to the step numbers on the diagnostic table.

**2:** Tests the normal state of the chassis pitch angle using a scan tool. The scan tool will display normal state as Inactive, and Active with chassis pitch angle detected.

**3:** Tests if the PCM is supplying a constant ground on the chassis pitch angle signal circuit.

**4:** Tests if the ESC module is able to detect a change in chassis pitch angle. With the chassis pitch angle signal circuit jumpered to ground, the scan tool will display Chassis Pitch Angle status as Active.

## DTC C0665

Step	Action	Yes	No
<b>Schematic Reference:</b> <u>Suspension Controls Schematics</u> <b>Connector End View Reference:</b> <u>Suspension Controls Connector End Views</u>			
1	Did you perform the Electronic Suspension Control Diagnostic System Check?	Go to <b>Step 2</b>	Go to <b>Diagnostic System Check - Electronic Suspension Control</b>
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With a scan tool, observe the Chassis Pitch Angle parameter in the ESC data list.  Does the scan tool display Inactive?	Go to <b>Step 4</b>	Go to <b>Step 3</b>
3	1. Turn OFF the ignition. 2. Disconnect the PCM. Refer to <b>Powertrain Control Module (PCM) Replacement</b> in Engine Controls. 3. Turn ON the ignition, with the engine OFF. 4. With a scan tool, observe the Chassis Pitch Angle parameter.	Go to	

	Does the scan tool display Inactive?	<b>Step 8</b>	Go to <b>Step 6</b>
4	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Disconnect the PCM connectors. Refer to <b><u>Powertrain Control Module (PCM) Replacement</u></b> in Engine Controls.</li> <li>3. Connect a 3-amp fused jumper wire between the chassis pitch angle circuit at the PCM connector and a good ground.</li> <li>4. Turn ON the ignition, with the engine OFF.</li> <li>5. With a scan tool, observe the Chassis Pitch Angle data parameter.</li> </ol>	Go to <b>Step 8</b>	Go to <b>Step 5</b>
	Does the scan tool display Active?	<b>Step 8</b>	Go to <b>Step 5</b>
5	<p>Test the Chassis Pitch Angle circuit for an open or short to voltage. Refer to <b><u>Circuit Testing</u></b> and <b><u>Wiring Repairs</u></b> in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	Go to <b>Step 11</b>	Go to <b>Step 7</b>
6	<p>Test the Chassis Pitch Angle circuit for a short to ground. Refer to <b><u>Circuit Testing</u></b> and <b><u>Wiring Repairs</u></b> in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	Go to <b>Step 11</b>	Go to <b>Step 7</b>
7	<p>Inspect for poor connections at the harness connector of the ESC module. Refer to <b><u>Testing for Intermittent Conditions and Poor Connections</u></b> and <b><u>Connector Repairs</u></b> in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	Go to <b>Step 11</b>	Go to <b>Step 9</b>
8	<p>Inspect for poor connections at the harness connector of the PCM. Refer to <b><u>Testing for Intermittent Conditions and Poor Connections</u></b> and <b><u>Connector Repairs</u></b> in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	Go to <b>Step 11</b>	Go to <b>Step 10</b>
9	<p>Replace the ESC module. Refer to <b><u>Electronic Suspension Control Module Replacement</u></b> .</p> <p>Did you complete the replacement?</p>	Go to <b>Step 11</b>	-
10	<p><b>IMPORTANT:</b> <b>Perform the set up procedure for the PCM.</b></p> <p>Replace the PCM. Refer to <b><u>Powertrain Control Module (PCM) Replacement</u></b> in Engine Controls. Did you complete the replacement?</p>	Go to <b>Step 11</b>	-
11	<ol style="list-style-type: none"> <li>1. Use the scan tool in order to clear the DTCs.</li> <li>2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.</li> </ol> <p>Does the DTC reset?</p>	Go to <b>Step 2</b>	System OK

## **DTC C0690, C0691, OR C0693**

### **Circuit Description**

The damper control relay is located within the Electronic Suspension Control (ESC) module. Although the module will set DTC C0690, C0691 or C0693, each one represents a failure of the damper control relay within the ESC module which requires replacement of the ESC module.

### **Conditions for Running the DTC**

The ignition ON.

### **Conditions for Setting the DTC**

- The ESC module detected an internal malfunction.
- The malfunction must be detected when the ignition switch is first turned ON.

### **Action Taken When the DTC Sets**

- Stores a DTC C0690, C0691 or C0693 in the ESC memory
- Depending on which internal circuitry was affected by this malfunction, the ESC module will command one of the following actions:
  - Command 0% PWM duty cycle in order to disable all four shock absorber solenoids.
  - Ignore the steering position input.
  - Provide shock absorber solenoid control based on the vehicle speed only.
  - Sends a message to the IPC to display the SERVICE RIDE CONTROL message.
  - Sends a message to the IPC to display the SHOCKS INOPERATIVE message.
- If the disable all four shock absorber solenoids action was taken, the ESC module sends a message to the PCM to limit the speed. The PCM then sends a message to the IPC to display the MAXIMUM SPEED 129 km/h (80 mph) message.

### **Conditions for Clearing the DTC**

- Under all fault conditions, the ignition must be cycled before this DTC can change from current to history.
- The ESC module no longer detects any internal malfunctions when the ignition is first turned to the ON position.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- Use the IPC clearing DTC feature.
- Using a scan tool.

### **Diagnostic Aids**

- Since DTC C0690, C0691 or C0693 is an internal damper control relay malfunction to the ESC module, there is no repair procedure and the ESC module must be replaced.
- The ESC module tests for multiple internal damper control relay malfunctions and will store a DTC C0690, C0691 or C0693 if one or more internal malfunctions are detected. Therefore, depending on which malfunction was detected, and what internal circuitry was affected, this DTC may cause various symptoms.

### Test Description

The number below refer to the step number on the diagnostic table.

**2:** This DTC requires ESC module replacement.

### DTC C0690, C0691, or C0693

Step	Action	Yes	No
<b>Schematic Reference:</b> <u>Suspension Controls Schematics</u>			
<b>Connector End View Reference:</b> <u>Suspension Controls Connector End Views</u>			
1	Did you perform the Electronic Suspension Control Diagnostic System Check?	Go to <b>Step 2</b>	Go to <b>Diagnostic System Check - Electronic Suspension Control</b>
2	Replace the ESC module. Refer to <b>Electronic Suspension Control Module Replacement</b> . Did you complete the replacement?	System OK	-

### DTC C0695

#### Circuit Description

The ESC module provides a common regulated power supply of about 8 volts to all of the position sensors. The ESC module monitors this power supply for a malfunction that could prevent it from correctly regulating the supply voltage.

#### Conditions for Running the DTC

The ignition ON.

#### Conditions for Setting the DTC

- The ESC module senses position sensor supply voltage under 6 volts or over 9 volts.
- The condition must be detected for 1 second in 4 consecutive ignition cycles.

#### Action Taken When the DTC Sets

- Stores a DTC C0695 in the ESC memory.
- Provides shock absorber actuator control based only on the vehicle speed.
- Sends a message to the IPC to display the SERVICE RIDE CONTROL message.

## Conditions for Clearing the DTC

- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- The ESC module senses the correct sensor supply voltage (6-9 volts).
- The IPC clearing DTCs feature
- Using a scan tool

## Diagnostic Aids

- The following conditions may cause an intermittent malfunction to occur:
  - An intermittent short to ground is detected on any of the position sensor supply circuits.
  - An intermittent short to voltage is detected on any of the position sensor supply circuits.
- The ESC module uses a common power supply in order to provide voltage to all of the position sensors. Therefore, a position sensor overcurrent code may be set if a malfunction is detected on any position sensor supply circuit.
- The ESC module uses an ignition cycle counter diagnostic approach to set this DTC. This requires the ESC module to detect the malfunction 4 times before setting the DTC. To disable this feature, use a scan tool to clear all DTCs before performing diagnostic procedures.
- If any position sensor supply circuit is shorted to ground, the scan tool will indicate all of the position sensor voltage readings as zero.
- If any position sensor is shorted to voltage, the position sensor will still function properly and the scan tool will display a valid position sensor voltage reading.
- An intermittent DTC C0695 may produce a random firm/soft condition.

## Test Description

The numbers below refer to the step numbers on the diagnostic table.

**2:** This tests the position sensor signal voltage range using a scan tool. The scan tool will display 0 volts for all position sensors if any position sensor 8 volt reference circuit is shorted to ground.

**3:** This tests if any position sensor is shorted to ground.

**4:** This tests determines which position sensor is shorted to ground.

**5:** Tests for a short to ground in the position sensor 8 volt reference circuits.

**6:** Tests for a short to voltage in the position sensor 8 volt reference circuits.

## DTC C0695

Step	Action	Value (s)	Yes	No
<b>Schematic Reference:</b> <u>Suspension Controls Schematics</u> <b>Connector End View Reference:</b> <u>Suspension Controls Connector End Views</u>				
1	Did you perform the Electronic Suspension Control Diagnostic System Check?	-	Go to	Go to <b>Diagnostic System Check - Electronic</b>

			<b>Step 2</b>	<b>Suspension Control</b>
<b>2</b>	<ol style="list-style-type: none"> <li>1. Install a scan tool.</li> <li>2. Turn ON the ignition, with the engine OFF.</li> <li>3. With the scan tool, observe all four Position Sensor data parameters in the ESC data list.</li> </ol> <p>Does the scan tool indicate that all four Position Sensor data parameters are within the specified range?</p>	0-0.2 V	Go to <b>Step 3</b>	Go to <b>Step 6</b>
<b>3</b>	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Disconnect all four position sensors.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> <li>4. Use the scan tool in order to clear the DTCs.</li> </ol> <p>Does the DTC reset?</p>	-	Go to <b>Step 5</b>	Go to <b>Step 4</b>
<b>4</b>	<p>Reconnect each position sensor one at a time and observe if the DTC resets after each sensor is reconnected.</p> <p>Does the DTC reset?</p>	-	Go to <b>Step 7</b>	System OK
<b>5</b>	<p>Test the 8 volt reference circuit of all position sensors for a short to ground. Refer to <b>Circuit Testing</b> and <b>Wiring Repairs</b> in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to <b>Step 9</b>	Go to <b>Step 8</b>
<b>6</b>	<p>Test the 8 volt reference circuit of all position sensors for a short to voltage. Refer to <b>Circuit Testing</b> and <b>Wiring Repairs</b> in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to <b>Step 9</b>	Go to Diagnostic Aids
<b>7</b>	<p>Replace the applicable position sensor. Refer to <b>Front Position Sensor Replacement - Electronic Suspension</b> or <b>Rear Position Sensor Replacement - Electronic Suspension</b> .</p> <p>Did you complete the replacement?</p>	-	Go to <b>Step 9</b>	-
<b>8</b>	<p>Replace the ESC module. Refer to <b>Electronic Suspension Control Module Replacement</b> .</p> <p>Did you complete the replacement?</p>	-	Go to <b>Step 9</b>	-
<b>9</b>	<ol style="list-style-type: none"> <li>1. Use the scan tool in order to clear the DTCs.</li> <li>2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.</li> </ol> <p>Does the DTC reset?</p>	-	Go to <b>Step 2</b>	System OK

## DTC C0710

### Circuit Description

The ESC module receives a steering position PWM signal from the Electronic Brake Control Module (EBCM) on the steering position sensor signal circuit. The ESC module uses this signal in order to determine the shock absorber control levels and will command a more firm setting if the vehicle is in a turn. The ESC module monitors the steering position circuit and can determine if a valid signal is sent from the EBCM.

#### **Conditions for Running the DTC**

- The ignition ON.
- Steering angle determination function enabled.

#### **Conditions for Setting the DTC**

- The ESC module detects an invalid steering position PWM signal from the EBCM.
- The condition must be detected for 5 seconds in 4 consecutive ignition cycles.

#### **Action Taken When the DTC Sets**

- Stores a DTC C0710 in the ESC memory.
- Ignores the steering position PWM input.
- Will continue to control the shock absorbers using the lateral acceleration data sent from the EBCM on the serial data line.
- Sends a message to the IPC to display the SERVICE RIDE CONTROL message.

#### **Conditions for Clearing the DTC**

- The ESC module detects a valid steering position PWM signal from the EBCM.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.
- The IPC clearing DTCs feature.
- Using a scan tool.

#### **Diagnostic Aids**

- The following conditions may cause an intermittent malfunction:
  - An intermittent open, or short to ground or voltage on the steering position sensor signal circuit.
  - Intermittent operation of the EBCM.
- If the ESC module does not receive a valid steering position PWM signal from the EBCM, the ESC system will still function, but will ignore the steering position PWM signal. The ESC system uses lateral acceleration data sent from the EBCM on the serial data line in order to substitute for a loss of the steering position PWM signal.
- The ESC module uses an ignition cycle counter diagnostic approach to set this DTC. This requires the ESC module to detect the malfunction 4 times before setting the DTC. To disable this feature, use a scan tool to clear all DTCs before performing diagnostic procedures.
- An intermittent open, or short to ground or voltage on the steering position PWM circuit may cause a



random firm/soft ride condition.

- If the DTC is a history DTC, the problem may be intermittent. Using a scan tool, monitor the steering position sensor circuit while moving the related wiring and connectors. This can often cause the malfunction to appear.

### Test Description

The numbers below refer to the step numbers on the diagnostic table.

**2:** Tests for steering position sensor DTC stored in the EBCM. Always diagnose and repair all EBCM steering position sensor DTCs first before diagnosing a DTC C0710.

**3:** Test the steering position sensor data using a scan tool.

**4:** Tests the EBCM steering position sensor output voltage range.

### DTC C0710

Step	Action	Value (s)	Yes	No
<b>Schematic Reference: Suspension Controls Schematics</b>				
<b>Connector End View Reference: Suspension Controls Connector End Views</b>				
1	Did you perform the Electronic Suspension Control Diagnostic System Check?	-	Go to <b>Step 2</b>	Go to <b>Diagnostic System Check - Electronic Suspension Control</b>
2	<ol style="list-style-type: none"> <li>1. Install a scan tool.</li> <li>2. Turn ON the ignition, with the engine OFF.</li> <li>3. Select ABS display DTC function on the scan tool.</li> </ol> <p>Does the scan tool display DTC C1281, C1286, or C1287?</p>	-	Go to <b>Diagnostic System Check - ABS</b> in Antilock Brake System	Go to <b>Step 3</b>
3	<p>With the scan tool, observe the Steering Position PWM data parameter in the ESC data list while turning the steering wheel.</p> <p>Does the scan tool indicate that the Steering Position PWM parameter is within the specified range when the steering wheel is turned?</p>	0-10 ms	Go to Diagnostic Aids	Go to <b>Step 4</b>
4	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Disconnect the ESC module.</li> <li>3. Turn ON the ignition, with the engine OFF.</li> <li>4. Measure the voltage from the steering</li> </ol>	10.0-13.0 V		

	position sensor signal circuit and to a good ground.  Does the voltage measure within the specified range?		Go to <b>Step 6</b>	Go to <b>Step 5</b>
5	Test the signal circuit of the steering position sensor for an open, short to ground or short to voltage. Refer to <b>Circuit Testing</b> and <b>Wiring Repairs</b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 10</b>	Go to <b>Step 7</b>
6	Inspect for poor connections at the harness connector of the ESC module. Refer to <b>Testing for Intermittent Conditions and Poor Connections</b> and <b>Connector Repairs</b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 10</b>	Go to <b>Step 8</b>
7	Inspect for poor connections at the harness connector of the EBCM. Refer to <b>Testing for Intermittent Conditions and Poor Connections</b> and <b>Connector Repairs</b> in Wiring Systems. Did you find and correct the condition?	-	Go to <b>Step 10</b>	Go to <b>Step 9</b>
8	Replace the ESC module. Refer to <b>Electronic Suspension Control Module Replacement</b> . Did you complete the replacement?	-	Go to <b>Step 10</b>	-
9	Replace the EBCM. Refer to <b>Electronic Brake Control Module Replacement</b> in Antilock Brake System. Did you complete the replacement?	-	Go to <b>Step 10</b>	-
10	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.  Does the DTC reset?	-	Go to <b>Step 2</b>	System OK

## DTC P1652

### Circuit Description

The powertrain control module (PCM) controls the powertrain induced chassis pitch by grounding the control circuit via an internal switch called a driver. The primary function of the driver is to supply the ground for the controlled component. The driver has a fault line which is monitored by the PCM. When the PCM commands a component ON, the voltage of the control circuit should be low, near 0 volts. When the PCM commands the control circuit to a component OFF, the voltage potential should be a high 5 volts (4.5-5.5 volts). If the fault

detection circuit senses a voltage other than what the system expects, the fault line status changes causing the DTC to set.

The PCM receives an 5 volt (4.5-5.5 volts) reference signal from the electronic suspension control (ESC) module on the powertrain induced chassis pitch circuit. The PCM grounds this circuit when the vehicle accelerates rapidly or brakes hard. When the chassis pitch input circuit goes low to about 0 volts, the ESC module commands all four shock absorber solenoids to a firm position. The PCM calculates the chassis pitch information based on the engine torque and the vehicle braking force.

#### **Conditions for Running the DTC**

- Engine speed greater than 400 RPM.
- The system voltage is greater than 6 volts but less than 18 volts.

#### **Conditions for Setting the DTC**

- The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.
- The condition must exist for a minimum of 5.0 seconds.

#### **Action Taken When the DTC Sets**

- The PCM stores the DTC information into memory when the diagnostic runs and fails.
- The malfunction indicator lamp (MIL) will not illuminate.
- The PCM records the operating conditions at the time the diagnostic fails. The PCM stores this information in the Failure Records.

#### **Conditions for Clearing the DTC**

- A last test failed, or current DTC, clears when the diagnostic runs and does not fail.
- A history DTC will clear after 40 consecutive warm-up cycles, if no failures are reported by this or any other non-emission related diagnostic.
- Use a scan tool in order to clear the DTC.

#### **Diagnostic Aids**

**IMPORTANT:** Remove any debris from the PCM connector surfaces before servicing the PCM. Inspect the PCM connector gaskets when diagnosing/replacing the module. Ensure that the gaskets are installed correctly. The gaskets prevent contaminate intrusion into the PCM.

**For any test that requires probing the PCM or a component harness connector, use the J 35616 Connector Test Adapter Kit. Using this kit prevents damage to the harness/component terminals. Refer to Using Connector Test Adapters in Wiring Systems.**

- Ensure that the vehicle is equipped with electronic suspension control (ESC). This DTC sets when the body control module (BCM) is programmed if the regular production option (RPO) for the ESC is selected as active and the vehicle is not equipped with ESC.
- For an intermittent condition refer to **Symptoms - Engine Controls** in Engine Controls-5.7L.

### Test Description

The numbers below refer to the step numbers on the diagnostic table.

**2:** This step determines if the Powertrain Induced Chassis Pitch control circuit is shorted to ground.

**3:** This step determines if the Powertrain Induced Chassis Pitch control circuit is open or, the PCM is unable to control the Powertrain Induced Chassis Pitch control circuit.

### DTC P1652

Step	Action	Yes	No
<b>Schematic Reference: Suspension Controls Schematics</b>			
<b>Connector End View Reference: Suspension Controls Connector End Views</b>			
1	Did you perform the Engine Controls Diagnostic System Check?	Go to <b>Step 2</b>	Go to <b>Diagnostic System Check - Engine Controls</b> in Engine Controls
2	<ol style="list-style-type: none"> <li>1. Turn OFF the ignition.</li> <li>2. Install a scan tool.</li> <li>3. Disconnect the ESC module connector C2. Refer to <b>Electronic Suspension Control Module Replacement</b>.</li> <li>4. Pull the terminal in the position 20 out of the C2 connector.</li> <li>5. Connect the C2 connector back into the ESC module.</li> <li>6. Turn ON the ignition leaving the engine OFF.</li> <li>7. Probe the Powertrain Induced Chassis Pitch Control circuit at the ESC terminal end using the test lamp <b>J 35616-200</b> connected to B+. Refer to <b>Using Connector Test Adapters</b> in Wiring Systems.</li> </ol> <p>Does the test lamp illuminate?</p>	Go to <b>Step 4</b>	Go to <b>Step 3</b>
3	<p>Command the Chassis Pitch Signal ON using the scan tool.</p> <p>Does the test lamp illuminate?</p>	Go to <b>Diagnostic System Check - Electronic Suspension Control</b>	Go to <b>Step 5</b>
	1. Test the Chassis Pitch Control circuit for a		

4	<p>short to ground. Refer to <b>Testing for Continuity</b> in Wiring Systems.</p> <p>2. If you find a grounded circuit, repair the circuit as necessary. Refer to <b>Wiring Repairs</b> in Wiring Systems.</p>		
	Did you find and correct the condition?	Go to <b>Step 8</b>	Go to <b>Step 7</b>
5	<p>1. Test the Chassis Pitch Control circuit for an open. Refer to <b>Testing for Continuity</b> in Wiring Systems.</p> <p>2. If you find an open circuit, repair the circuit as necessary. Refer to <b>Wiring Repairs</b> in Wiring Systems.</p>		
	Did you find and correct the condition?	Go to <b>Step 8</b>	Go to <b>Step 6</b>
6	<p>1. Inspect for a poor connection at the PCM. Refer to <b>Testing for Intermittent Conditions and Poor Connections</b> in Wiring Systems.</p> <p>2. If you find a poor connection, repair the terminal as necessary. Refer to <b>Wiring Repairs</b> in Wiring Systems.</p>		
	Did you find and correct the condition?	Go to <b>Step 8</b>	Go to <b>Step 7</b>
7	<p>Replace the PCM. Refer to <b>Powertrain Control Module (PCM) Replacement</b> in Engine Controls - 5.7L.</p> <p>Did you complete the replacement?</p>	Go to <b>Step 8</b>	-
8	<p>1. Use the scan tool in order to clear the DTCs.</p> <p>2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text.</p>		
	Does the DTC reset?	Go to <b>Step 2</b>	System OK

## SYMPTOMS - ELECTRONIC SUSPENSION CONTROL

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

1. Perform the **Diagnostic System Check - Electronic Suspension Control** before using the symptom table 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 operation in order to familiarize yourself with the system functions. Refer to Electronic Suspension Control Description and Operation .**

**Visual/Physical Inspection**

- Inspect for aftermarket devices which could affect the operation of the ESC System. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect the connectors to be properly seated and free of corrosion.

**Intermittent**

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

**Symptom List**

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

**Soft and Non-Uniform Ride**

**SOFT AND NON-UNIFORM RIDE**

**Soft and Non-Uniform Ride**

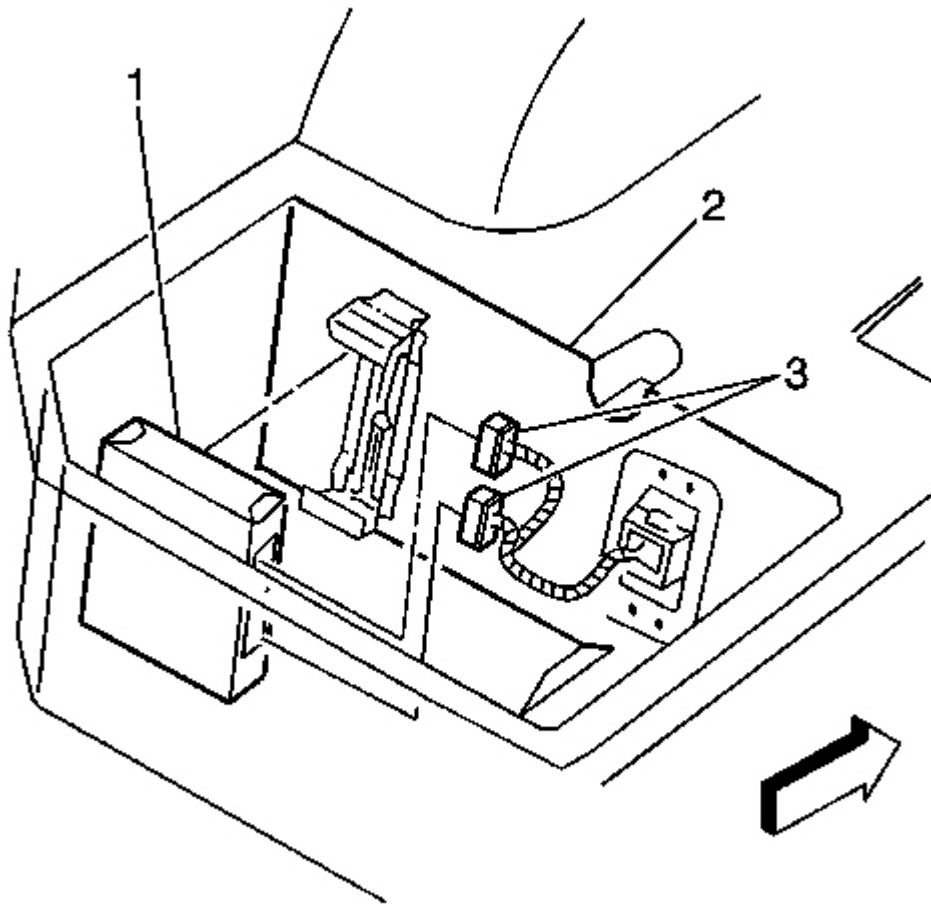
Step	Action	Yes	No
<b>Schematic Reference: <u>Suspension Controls Schematics</u></b>			
<b><u>Suspension Controls Connector End Views</u></b>			
1	Did you perform the ESC Diagnostic System Check?	Go to <b>Step 2</b>	Go to <b><u>Diagnostic System Check - Electronic Suspension Control</u></b>
2	Verify the fault is present by performing the following steps:  1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. Using a scan tool, access the ESC Data List menu and observe the voltage level of each individual position sensor while pushing down and releasing at each corner.		

	Does the voltage increase and decrease as the vehicle responds to the pushing down and releasing?	Go to <b>Testing for Intermittent Conditions and Poor Connections</b> in Wiring Systems	Go to <b>Step 3</b>
3	Replace the appropriate position sensor. Refer to <b>Front Position Sensor Replacement - Electronic Suspension</b> or <b>Rear Position Sensor Replacement - Electronic Suspension</b> . Did you complete the replacement?	Go to <b>Step 4</b>	-
4	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to <b>Step 2</b>

## REPAIR INSTRUCTIONS

### ELECTRONIC SUSPENSION CONTROL MODULE REPLACEMENT

#### Removal Procedure

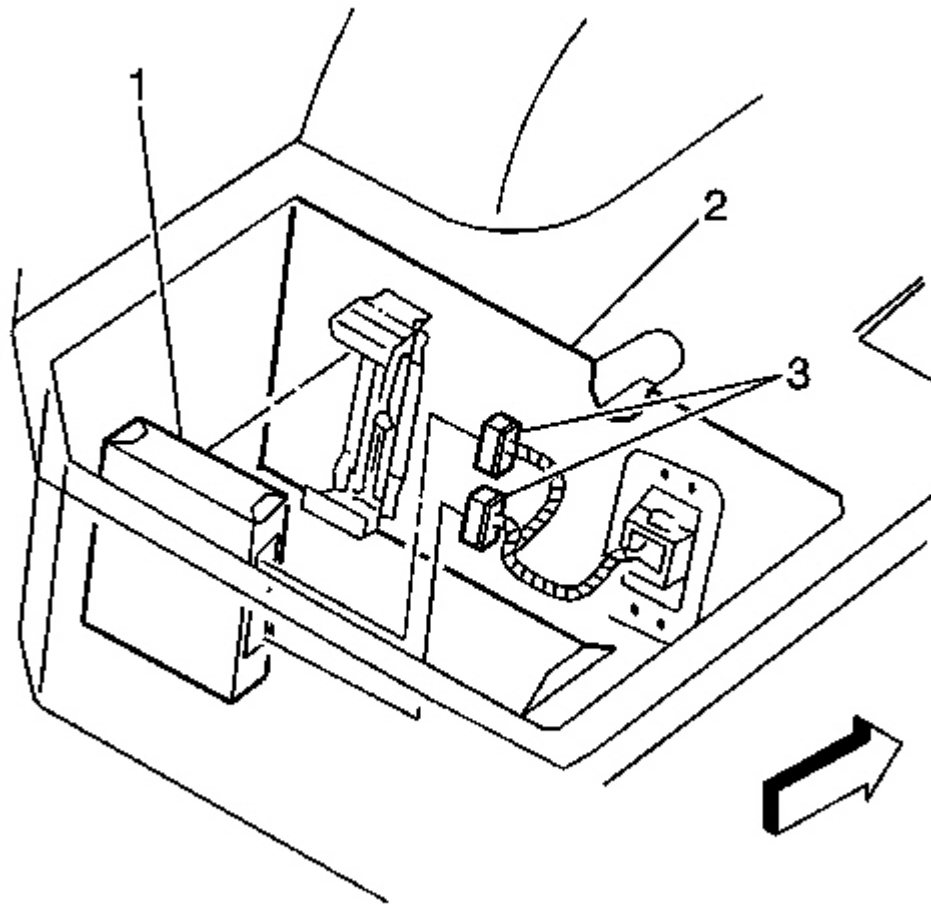


**Fig. 7: LR Floor Compartment, ESC Module, ESC Module Connectors**  
Courtesy of GENERAL MOTORS CORP.

1. Raise the LR floor compartment (2) lid.
2. Gently push down on the ESC module (1) in order to remove from the mounting bracket.
3. Disconnect the ESC module connectors (3).

#### **Installation Procedure**





**Fig. 8: LR Floor Compartment, ESC Module, ESC Module Connectors**  
Courtesy of GENERAL MOTORS CORP.

1. Connect the ESC module connectors (3).
2. Install the ESC module (1) into the mounting bracket.
3. Secure the LR floor compartment (2) lid.

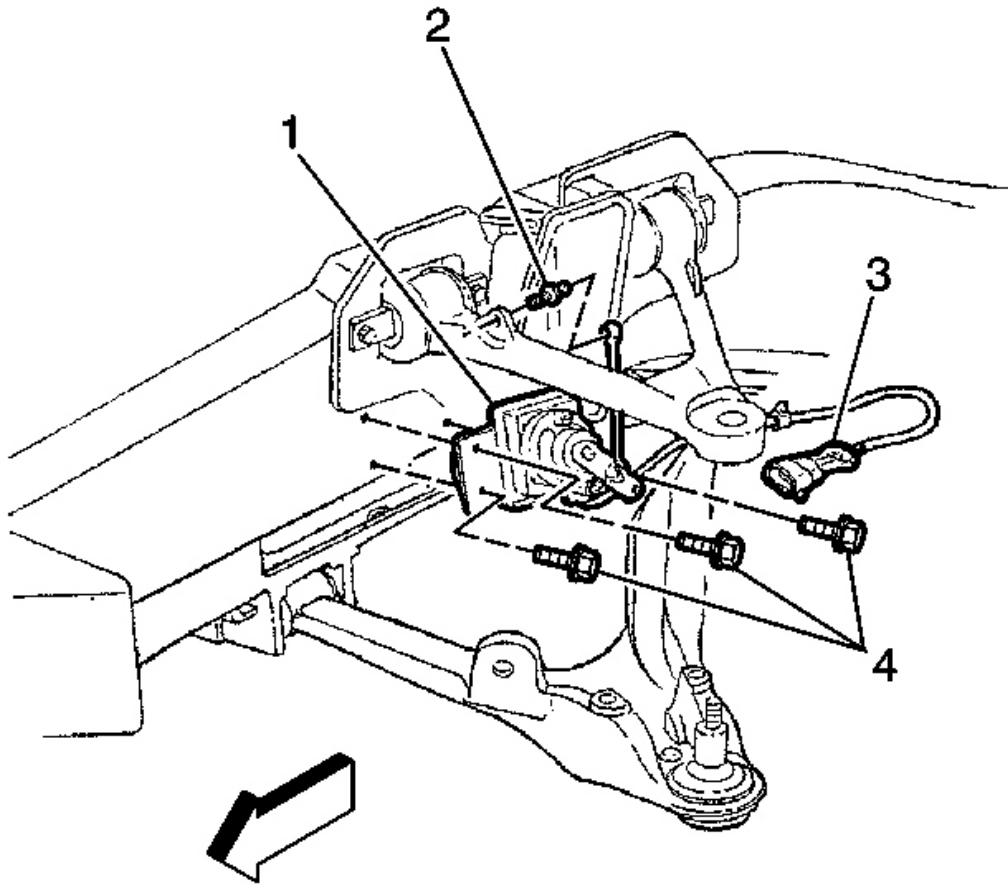
## **FRONT POSITION SENSOR REPLACEMENT - ELECTRONIC SUSPENSION**

### **Removal Procedure**

1. Turn OFF the ignition switch.
2. Raise the vehicle on a suitable safety stand. Refer to **Lifting and Jacking the Vehicle** in General

Information.

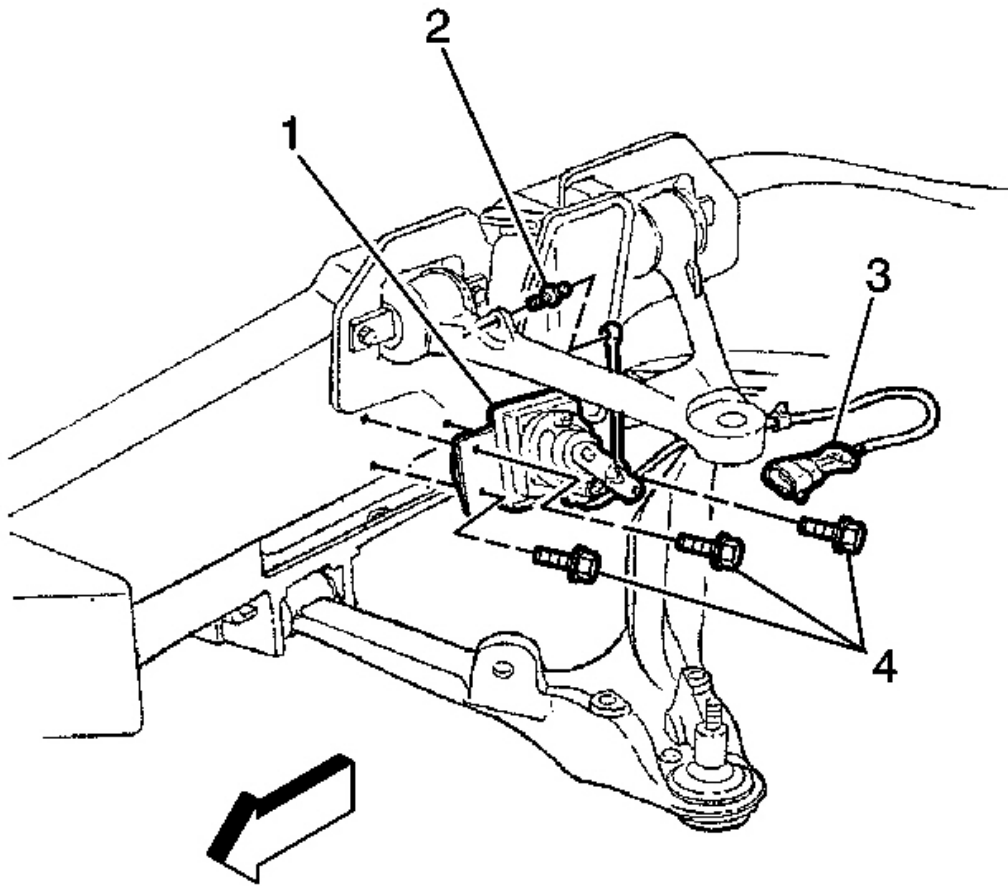
3. Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.



**Fig. 9: Front Position Sensor Connector & Mounting Bolts**  
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the position sensor connector (3).
5. Remove the position sensor harness retainers.
6. Remove the position sensor link from the control arm link stud (2).
7. Remove the position sensor mounting bolts (4).
8. Remove the position sensor (1) from the vehicle.

**Installation Procedure**



**Fig. 10: Front Position Sensor Connector & Mounting Bolts**  
Courtesy of GENERAL MOTORS CORP.

1. Install the position sensor (1) in the vehicle.

**NOTE:** Refer to Fastener Notice in Cautions and Notices.

2. Install the position sensor mounting bolts (4).

**Tighten:** Tighten the bolts to 3 N.m (26 lb in).

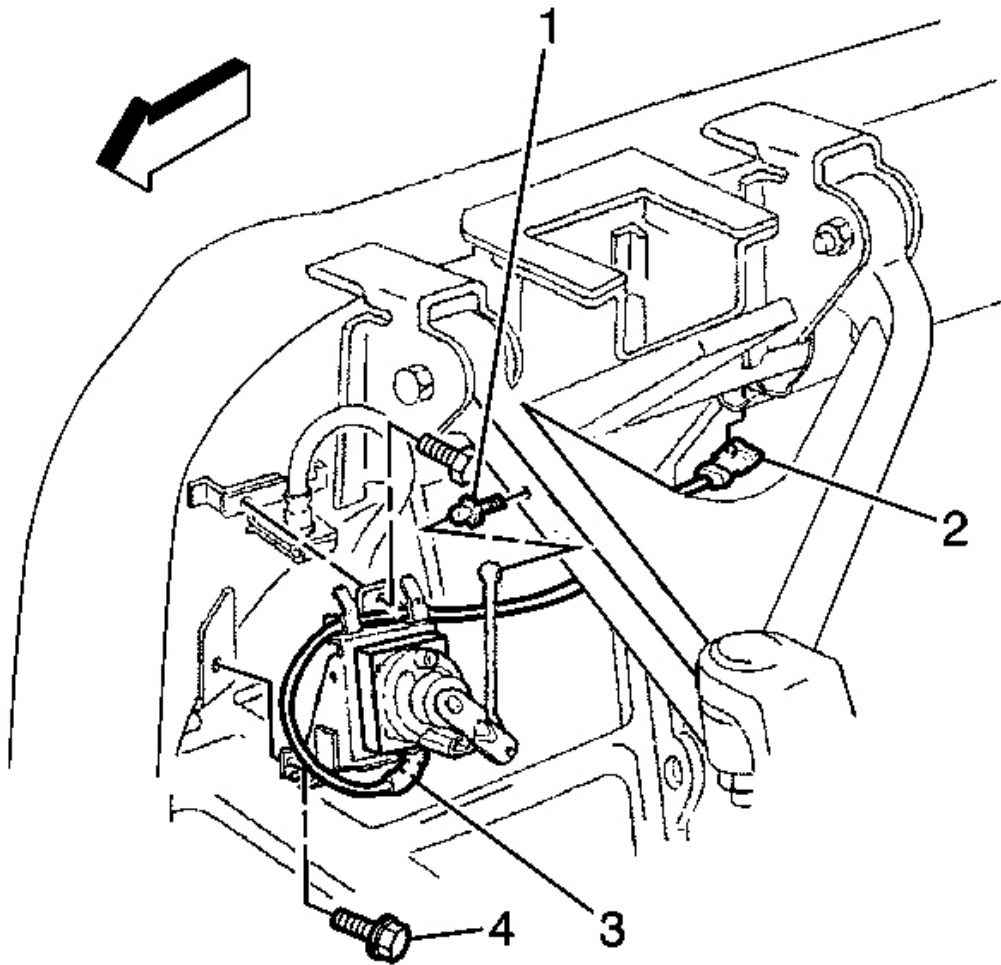
3. Install the position sensor link to the control arm link stud (2).
4. Connect the position sensor electrical connector (3).
5. Secure the position sensor harness with the retainers.

6. Install the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
7. Lower the vehicle.

## **REAR POSITION SENSOR REPLACEMENT - ELECTRONIC SUSPENSION**

### **Removal Procedure**

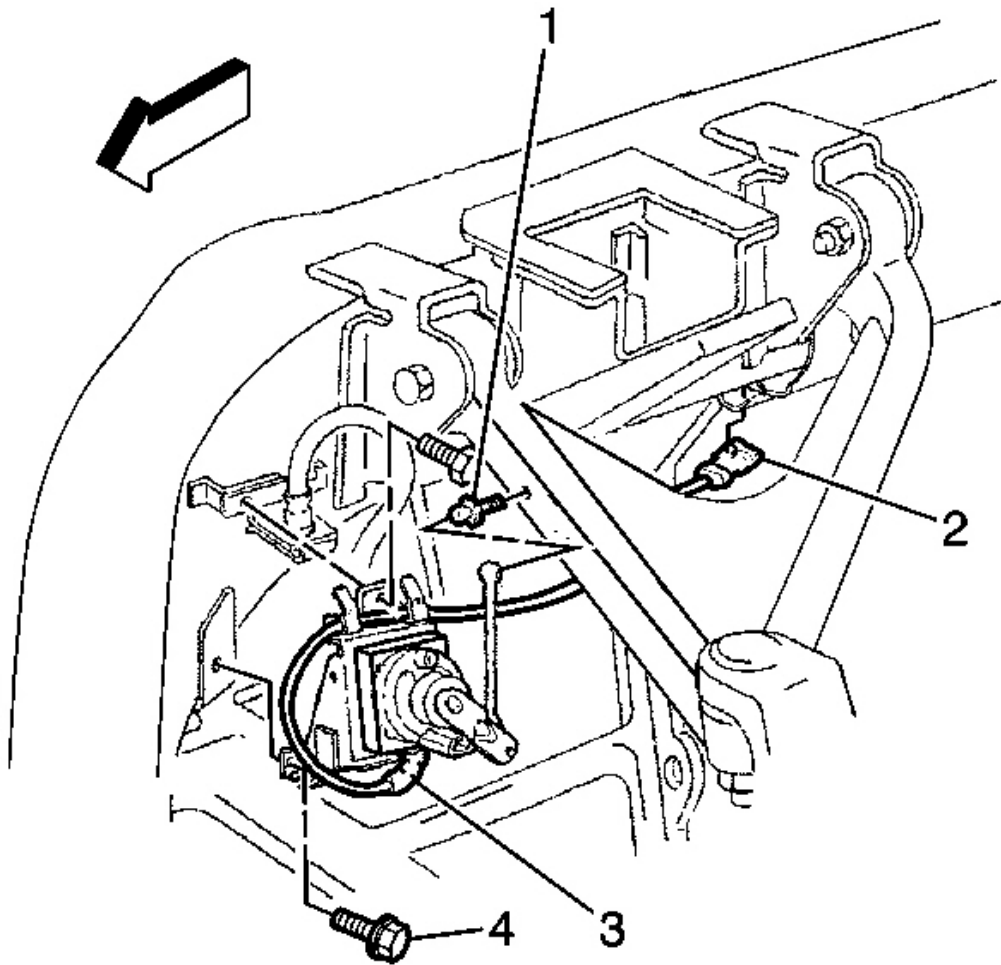
1. Turn OFF the ignition switch.
2. Raise the vehicle on a suitable safety stand. Refer to **Lifting and Jacking the Vehicle** in General Information.
3. Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.



**Fig. 11: Rear Position Sensor Connector & Mounting Bolts**  
**Courtesy of GENERAL MOTORS CORP.**

4. Disconnect the position sensor connector (2).
5. Remove the position sensor harness retainers.
6. Remove the position sensor link from the control arm link stud (1).
7. Remove the position sensor mounting bolts (4).
8. Remove the position sensor (3) from the vehicle.

**Installation Procedure**



**Fig. 12: Rear Position Sensor Connector & Mounting Bolts**  
Courtesy of GENERAL MOTORS CORP.

1. Install the position sensor (3) in the vehicle.

**NOTE:** Refer to Fastener Notice in Cautions and Notices.

2. Install the position sensor mounting bolts (4).

**Tighten:** Tighten the bolts to 7 N.m (62 lb in).

3. Install the position sensor link to the control arm link stud (1).

4. Connect the position sensor connector (2).
5. Secure the position sensor harness with the retainers.
6. Install the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
7. Lower the vehicle.

## **DESCRIPTION AND OPERATION**

### **ELECTRONIC SUSPENSION CONTROL DESCRIPTION AND OPERATION**

#### **Electronic Suspension Control Description**

The Electronic Suspension Control system, also known as the Magneto-Rheological Real Time Damping (MRRTD) system independently controls the fluid viscosity in each of the four shock absorbers in order to control the vehicle ride characteristics. The ESC system is capable of making these changes within milliseconds. The ESC system consists of the following major components:

- The electronic suspension (ESC) module
- The front/rear position sensors
- The front/rear adjustable shock absorbers
- The shock absorber electrical actuators, which are integrated within the shock absorbers.

The ESC controls the damping mode selection according to the following factors:

- The vehicle speed
- The chassis pitch input
- The steering position
- The body to wheel displacement

The ESC 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.

#### **Electronic Suspension Control Module**

The ESC module provides electronic control logic and output drive for each shock absorber. The ESC module makes decisions due to road and driving conditions based on various inputs. The ESC module receives input information by sensors that are directly connected to the ESC module or by other systems through the serial data line.

The ESC module uses these inputs in order to independently control the shock absorbers at each corner. The ESC module is located in the LH rear storage.

#### **Electronic Suspension Control Position Sensors**

The ESC position sensors provide the ESC module with the body to wheel displacement input. The ESC module uses this and other inputs in order to control the position of the shock absorber. If any body or wheel motion is detected, the ESC module will determine how soft or firm each shock absorber should be to provide the best ride. The ESC position sensors are mounted at each corner of the vehicle between the control arm and the body.

### **Electronic Suspension Control Shock Absorber or Strut**

The ESC shock absorbers are monotube type which provide damping by increasing magnetic flux to magnetic particles to resist suspension movement. The ESC shock absorber has the capability of providing multiple modes or values of damping forces, in both compression and rebound direction. The damping forces are achieved by increasing or decreasing the magnetic flux to shock absorbers.

The front ESC actuator connector is located at the base of the shock absorber. The rear ESC actuator connector is at the top of the shock absorber. Both front and rear shock absorbers have jumper harnesses for ease of maintenance.

### **Electronic Suspension Control Operation**

The ESC system uses the information from other systems in order to execute certain functions.

The ESC system does not have a malfunction indicator lamp, but instead uses the Instrument Panel Cluster (IPC) for the display functions. When the ESC system detects a malfunction that sets a DTC, the ESC system sends a message on the serial data line directly or through the PCM to the IPC, which will display one of the following messages:

- SHOCKS INOPERATIVE
- SERVICE RIDE CONTROL
- MAXIMUM SPEED

The SHOCKS INOPERATIVE message will only be displayed if the ESC system detects a malfunction that sets a DTC and causes the ESC system to disable all four shock absorbers. The ESC system will send a message on the serial data line to the IPC to display this message.

The SERVICE RIDE CONTROL message will only be displayed if the ESC system detects any malfunction that sets a DTC. The ESC system will send a message on the serial data line to the IPC to display this message.

The MAXIMUM SPEED message will only be displayed if the ESC system detects a malfunction that sets a DTC and causes the ESC system to disable all four shock absorbers. The ESC system will send a message on the serial data line to the PCM indicating that all four shock absorbers were disabled. The PCM then sends a message to the IPC to display this message.

The ESC module has the ability to store Diagnostic Trouble Codes (DTCs) as current or history codes. Most ESC system malfunctions will display a message in the IPC and set a DTC. The message will remain ON until the RESET button is pressed on the Driver Information Center (DIC). As long as the DTC is current, the message will be displayed after every ignition cycle and the RESET button must be pressed to bypass the message.



The ESC system uses an ignition cycling diagnostic approach in order to reduce the occurrence of false or intermittent DTCs that do not affect the functionality of the ESC system. This allows for the fail-soft actions to be taken whenever a malfunction condition is current, but requires the malfunction to be current for a certain number of ignition cycles before the corresponding malfunction code and message will be stored or displayed.

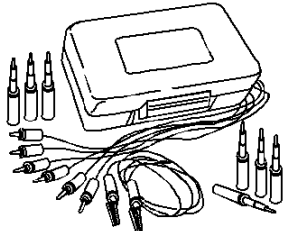
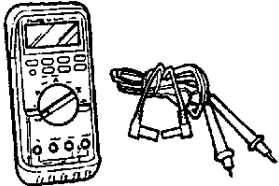
If the ESC detects a malfunction, the ESC system defaults with a fail-soft action. A fail-soft action refers to any specific action the ESC system takes in order to compensate for a detected malfunction. A typical ESC fail-soft action would be if the ESC system detects a malfunction with the ride control switch, the ESC system will ignore this input and fail-soft to the TOUR ride setting.

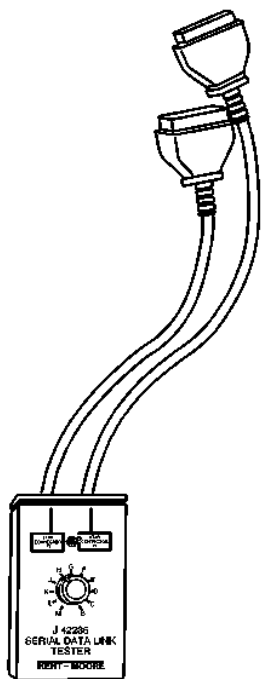
It is possible for a suspension position sensor to become stuck. This fault would not be detected by the ESC module, therefore a DTC would not be set and no message would be displayed by the IPC. This fault is addressed under Symptoms - Electronic Suspension Control.

## SPECIAL TOOLS AND EQUIPMENT

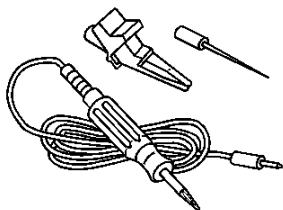
### SPECIAL TOOLS

#### Special Tools

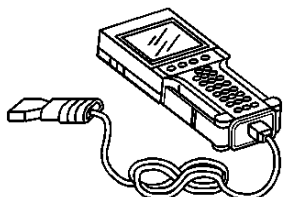
Illustration	Tool Number/Description
	<p data-bbox="932 925 1289 991">J 35616-A Connector Test Adapter Kit</p>
	<p data-bbox="987 1277 1230 1343">J 39200 Digital Multimeter</p>



J 42236-A  
Serial Data Link Tester



J 34142-B  
Test Light



7000081  
Tech 2 Kit