SUSPENSION

Automatic Level Control - Escalade, Suburban, Tahoe, Yukon

SPECIFICATIONS

FASTENER SPECIFICATIONS

Application	Specification	
	Metric	English
Air Compressor Filter to Air Compressor Screw	3 N.m	27 lb in
Air Compressor to Frame Nuts	15 N.m	11 lb ft
Air Line Tube Repair Nut	8 N.m	70 lb in
Insulator Mounting Screw	5 N.m	44 lb in
Position Sensor Bracket Bolt	17 N.m	13 lb ft
Position Sensor Servo Arm Bracket Bolt	12 N.m	106 lb in

SCHEMATIC WIRING DIAGRAMS

AUTOMATIC LEVEL CONTROL WIRING SCHEMATICS

Automatic Level Control (Z85)

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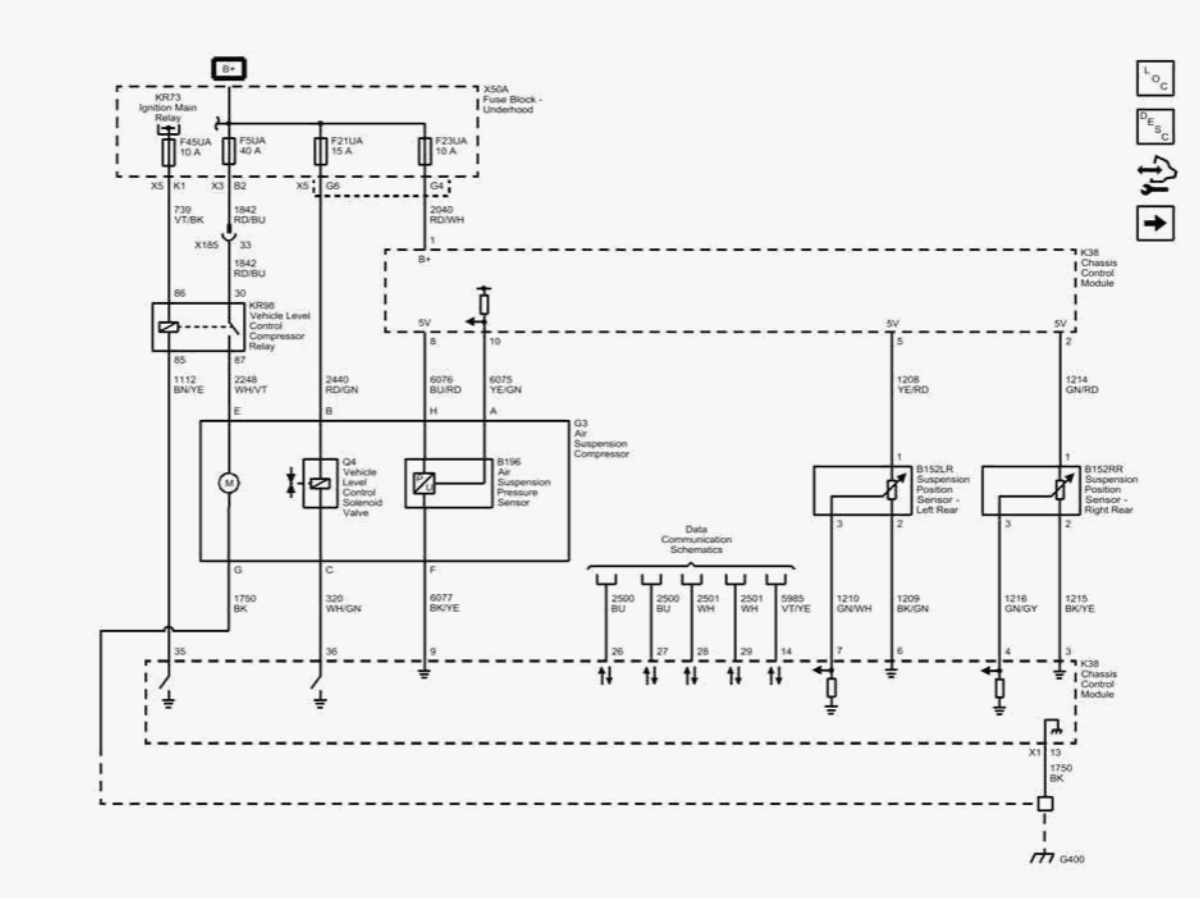

Fig. 1: Automatic Level Control (Z85)
Courtesy of GENERAL MOTORS COMPANY

Automatic Level Control (Z95)

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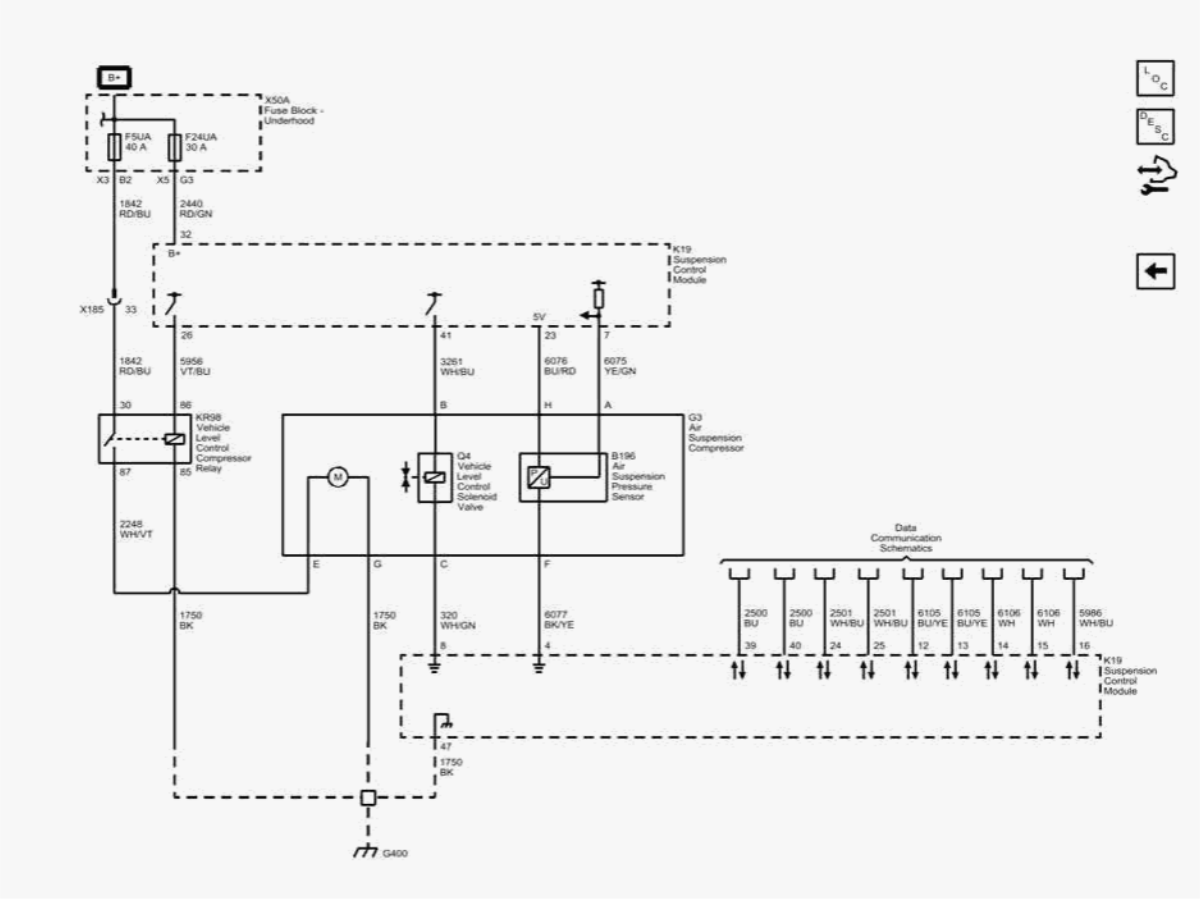

Fig. 2: Automatic Level Control (Z95)
Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC C0625 OR C0630: LEFT REAR POSITION SENSOR CIRCUIT/RIGHT REAR POSITION SENSOR CIRCUIT (WITH Z85)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

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DTC Descriptors

DTC C0625

Left Rear Position Sensor Circuit

DTC C0630

Right Rear Position Sensor Circuit

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left Rear Position Sensor 5V Reference	C0625 06	C0625 06	C0625 01	C0625 55
Left Rear Position Sensor Signal	C0625 06	C0625 06	C0625 01	C0625 55
Left Rear Position Sensor Low Reference	-	C0625 06	C0625 01	C0625 55
Right Rear Position Sensor 5V Reference	C0630 06	C0630 06	C0630 01	C0630 55
Right Rear Position Sensor Signal	C0630 06	C0630 06	C0630 01	C0630 55
Right Rear Position Sensor Low Reference	-	C0630 06	C0630 01	C0630 55

Circuit/System Description

The chassis control module supplies a 5 V reference signal to each suspension position sensor. The suspension position sensors supply a signal of 0.35-4.75 V to the chassis control module which represents the position between the body and the wheel.

Conditions for Running the DTC

- Battery voltage is between 9-16 V.
- Ignition is ON.

Conditions for Setting the DTC

C0625 01 or C0630 01

The chassis control module measures a position sensor signal greater than 4.75 V.

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C0625 06 or C0630 06

The chassis control module measures a position sensor signal less than 0.35 V.

C0625 55 or C0630 55

The chassis control module does not measure the expected number of transitions from a position sensor.

Action Taken When the DTC Sets

The chassis control module sends a message to the instrument panel cluster to display SERVICE SUSPENSION SYSTEM message.

Conditions for Clearing the DTC

A history DTC will clear after 40 consecutive ignition cycles if the condition for the malfunction is no longer present.

Reference Information

Schematic Reference

Automatic Level Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Level Control Description and Operation (With Z85)

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

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Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the appropriate scan tool Suspension Position Sensor parameter varies between 0.35-4.75 V while the vehicle is jounced.
    - **If not between 0.35-4.75 V**

      Refer to Circuit/System Testing

    - **If between 0.35-4.75 V**
3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF. Disconnect the harness connector at the appropriate B152 Suspension Position Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 2 and ground.
    - **If 10 Ω or greater**
    1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module.
    2. Test for less than 2 Ω in the low reference circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K38 Chassis Control Module.
    - **If less than 10 Ω**
3. Ignition ON.
4. Test for 4.8-5.2 V between the 5 V reference circuit terminal 1 and ground.
    - **If less than 4.8 V**
    1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module.
    2. Test for infinite resistance between the 5 V reference circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
    3. Test for less than 2 Ω in the 5 V reference circuit end to end.

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- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the K38 Chassis Control Module.

- **If greater than 5.2 V**

1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module, ignition ON.
2. Test for less than 1 V between the 5 V reference circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K38 Chassis Control Module.

- **If within 4.8-5.2 V**

5. Verify the appropriate scan tool Suspension Position Sensor parameter is less than 0.6 V

- **If 0.6 V or greater**

1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 3 and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K38 Chassis Control Module

- **If less than 0.6 V**

6. Install a 3 A fused jumper wire between the signal circuit terminal 3 and the 5 V reference circuit terminal 1.
7. Verify the scan tool Suspension Position Sensor parameter is greater than 2.8 V.

- **If less than 2.8 V**

1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module.
2. Test for infinite resistance between the signal circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the signal circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K38 Chassis Control Module.

- **If greater than 2.8 V**

8. Replace the B152 Suspension Position Sensor.

Repair Instructions

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

- Refer to **Electronic Suspension Rear Position Sensor Replacement - Left Side** , or **Electronic Suspension Rear Position Sensor Replacement - Right Side**
- Refer to **Control Module References** for K38 Chassis Control Module replacement, programming and setup.

DTC C0660: LEVEL CONTROL EXHAUST SOLENOID VALVE CIRCUIT (WITH Z95)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

DTC Descriptors

DTC C0660

Level Control Exhaust Solenoid Valve Circuit

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control terminal B	C0660 02	C0660 05	-	C0660 11
Control terminal C	C0660 02	C0660 05	C0660 05	C0660 11

Circuit Description

The Suspension Control Module adjusts the vehicle suspension ride height. The Suspension Control Module determines the height of the vehicle based on signals from the position sensors. The Suspension Control Module raises and lowers the vehicle in order to keep the vehicle level by controlling the vehicle level control solenoid valve and air compressor control circuits.

Conditions for Running the DTC

- Battery voltage is between 9-16 V.

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- The vehicle level control solenoid valve is commanded ON.

Conditions for Setting the DTC

- The vehicle level control solenoid valve control circuit is shorted to ground, shorted to voltage, or open when solenoid activation is commanded ON for 2.5 s.

Action Taken When the DTC Sets

- The automatic leveling control system will be inoperative.
- The SERVICE LEVELING SYSTEM message will be displayed.

Conditions for Clearing the DTC

- DTC C0660 will change from a current DTC to a history DTC on the next ignition cycle.
- DTC C0660 will be cleared from history after 40 ignition cycles.

Diagnostic Aids

First check for any air leaks or disconnected lines.

Reference Information

Schematic Reference

Automatic Level Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Level Control Description and Operation (With Z95)

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**

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- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the Q4 Vehicle Level Control Solenoid Valve turns ON and OFF when the Exhaust Valve is commanded On and Off with the scan tool.
   - **If the valve does not turn ON and OFF with each command**

     Refer to Circuit/System Testing

   - **If the valve turns ON and OFF with each command**
3. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connectors at the Q4 Vehicle Level Control Solenoid Valve and K19 Suspension Control Module, ignition ON.
2. Test for less than 1 V between the Q4 Vehicle Level Control Solenoid Valve circuits listed below and ground.
   - Control circuit terminal C
   - Control ignition circuit terminal B
   - **If 1 V or greater**

     Repair the short to voltage on the circuit.

   - **If less than 1 V**
3. Ignition OFF.
4. Test for infinite resistance between the Q4 Vehicle Level Control Solenoid Valve circuits listed below and ground.
   - Control circuit terminal C
   - Control circuit terminal B
   - **If less than infinite resistance**

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Repair the short to ground on the circuit.

- **If infinite resistance**

5. Test for less than 2 Ω in the controls listed below end to end.
   - Q4 Vehicle Level Control Solenoid Valve control circuit terminal C and K19 Suspension Control Module terminal 22.
   - Q4 Vehicle Level Control Solenoid Valve control circuit terminal B and K19 Suspension Control Module terminal 41.
   - **If 2 Ω or greater**

     Repair the open/high resistance in the circuit.

   - **If less than 2 Ω**
6. Test or replace the Q4 Vehicle Level Control Solenoid Valve.
7. Verify the DTC does not set while operating the vehicle within the Conditions for Running the DTC.
   - **If DTC is set**

     Replace the K19 Suspension Control Module.

   - **If the DTC is not set**
8. All OK.

Component Testing

1. Ignition OFF, disconnect the harness connector at the Q4 Vehicle Level Control Solenoid Valve.
2. Test for 18-45 Ω between the control terminal B and the ignition terminal B.
   - **If not between 18-45 Ω**

     Replace the Q4 Vehicle Level Control Solenoid Valve.

   - **If between 18-45 Ω**
3. Test for infinite resistance between the control terminal C and ground.
   - **If less than infinite resistance**

     Replace the Q4 Vehicle Level Control Solenoid Valve.

   - **If infinite resistance**

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4. All OK.

Repair Instructions

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

- Refer to **Automatic Level Control Air Compressor Replacement**
- Refer to **Control Module References** for K19 Suspension Control Module replacement, programming and setup.

DTC C0660: LEVEL CONTROL EXHAUST SOLENOID VALVE CIRCUIT (WITH Z85)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

DTC Descriptors

DTC C0660

Level Control Exhaust Solenoid Valve Circuit

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	C0660 00	C0660 00	-	C0660 56
Control	C0660 00	C0660 00	C0660 00	C0660 56

Circuit Description

The chassis control module adjusts the vehicle suspension ride height. The chassis control module determines the height of the vehicle based on signals from the position sensors. The chassis control module raises and lowers the vehicle in order to keep the vehicle level by controlling the vehicle level control solenoid valve and air compressor control circuits.

Conditions for Running the DTC

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- Battery voltage is between 9-16 V.
- The vehicle level control solenoid valve is commanded ON.

Conditions for Setting the DTC

C0660 00

- The vehicle level control solenoid valve control circuit is shorted to ground, shorted to voltage, or open when solenoid activation is commanded ON.
- The vehicle level control solenoid valve B+ circuit is shorted to ground, or open when solenoid activation is commanded ON.

C0660 56

The vehicle level control solenoid valve transitions events have been exceeded.

Action Taken When the DTC Sets

- The chassis control system will be inoperative.
- The SERVICE LEVELING SYSTEM message will be displayed.

Conditions for Clearing the DTC

- DTC C0660 will change from a current DTC to a history DTC on the next ignition cycle.
- DTC C0660 will be cleared from history after 44 ignition cycles.

Diagnostic Aids

First check for any air leaks or disconnected lines.

Reference Information

Schematic Reference

Automatic Level Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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Description and Operation

Automatic Level Control Description and Operation (With Z85)

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, engine running.
2. Verify the Q4 Vehicle Level Control Solenoid Valve turns ON and OFF when the Exhaust Valve is commanded On and Off with the scan tool.
   - **If the valve does not turn ON and OFF with each command**

     Refer to Circuit/System Testing

   - **If the valve turns ON and OFF with each command**
3. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connectors at the Q4 Vehicle Level Control Solenoid Valve, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal B and ground.
   - **If the test lamp does not illuminate and the circuit fuse is good**
   1. Ignition OFF, remove the test lamp.
   2. Test for less than 2 Ω in the B+ circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.

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- **If the test lamp does not illuminate and the circuit fuse is open**

1. Ignition OFF, remove the test lamp.
2. Test for infinite resistance between the B+ circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance, replace the G3 Air Suspension Compressor

- **If the test lamp does illuminates**

3. Connect a test lamp between the control circuit terminal C and the B+ circuit terminal B, ignition ON engine running.
4. Verify the test lamp turns ON and OFF when commanding the Q4 Vehicle Level Control Solenoid Valve On and Off with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K38 Chassis Control Module, ignition ON.
2. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K38 Chassis Control Module.
    - **If the test lamp is always ON**
3. Ignition OFF, remove the test lamp, disconnect the harness connector at the K38 Chassis Control Module.
4. Test for infinite resistance between the control circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance, replace the K38 Chassis Control Module
    - **If the test lamp turns ON and OFF**
5. Replace the Q4 Vehicle Level Control Solenoid Valve.

Repair Instructions

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

- Refer to **Automatic Level Control Air Compressor Replacement** for Q4 Vehicle Level Control Solenoid Valve
- Refer to **Control Module References** for K38 Chassis Control Module replacement, programming and setup.

DTC C0711: LEVEL CONTROL AIR PRESSURE SENSOR (WITH Z85)

Diagnostic Instructions

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- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

DTC Descriptors

DTC C0711 00

Level Control Air Pressure Sensor

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	C0711	C0711	C0711	-
Signal	C0711	C0711	C0711	C0711
Low Reference	-	C0711	-	-

Circuit Description

The automatic level control (ALC) pressure sensor monitors the pressure in the level control system. The chassis control module supplies a 5 V reference and a low reference circuit to the pressure sensor. The pressure sensor supplies a voltage signal in relation to the pressure in the level control system to the chassis control module.

Conditions for Running the DTC

Battery voltage is between 9-16 volts.

Conditions for Setting the DTC

The chassis control module detects that the supplied 5 volt reference voltage circuit for the pressure sensor falls below 4.75 volts or exceeds 5.25 volts.

The chassis control module detects that the signal voltage circuit for the pressure sensor falls below.5 volt or exceeds 4.75 volts.

Action Taken When the DTC Sets

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- The air suspension system will be inoperative.
- The SERVICE SUSPENSION SYSTEM message will be displayed.

Conditions for Clearing the MIL/DTC

- When the fault is no longer present, DTC C0711 will change from a current DTC to a history DTC on the next ignition cycle.
- DTC C0711 will be cleared from history after 50 ignition cycles.

Reference Information

Schematic Reference

Automatic Level Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Level Control Description and Operation (With Z85)

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for Scan Tool Information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B196 Air Suspension Pressure Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal F and ground.

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- **If 10 Ω or greater**

1. Disconnect the harness connector at the K38 Chassis Control Module.
2. Test for less than 2 Ω in the low reference circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K38 Chassis Control Module.

- **If less than 10 Ω**

3. Ignition ON.
4. Test for 4.8-5.2 V between the 5 V reference circuit terminal H and ground.

- **If less than 4.8 V**

1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module.
2. Test for infinite resistance between the 5 V reference circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the 5 V reference circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K38 Chassis Control Module.

- **If greater than 5.2 V**

1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module, ignition ON.
2. Test for less than 1 V between the 5 V reference circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V, replace the K38 Chassis Control Module.

- **If between 4.8-5.2 V**

5. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module, ignition ON.
6. Test for less than 1 V between the B196 Air Suspension Pressure Sensor signal circuit terminal A and ground.

- **If greater than 1 V**

  Repair the short to voltage on the circuit.

- **If less than 1 V**

7. Ignition OFF.

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8. Test for infinite resistance between the B196 Air Suspension Pressure Sensor signal circuit terminal A and ground.
    - **If less than infinite resistance**

      Repair the short to ground on the circuit.

    - **If infinite resistance**
9. Test for less than 2 Ω between the B196 Air Suspension Pressure Sensor signal circuit terminal A and the K38 Chassis Control Module signal circuit terminal 10.
    - **If 2 Ω or greater**

      Repair the open/high resistance in the circuit.

    - **If less than 2 Ω**
10. Replace the B196 Air Suspension Pressure Sensor.
11. Verify the DTC does not set while operating the vehicle under Conditions for Running the DTC.
    - **If the DTC sets**

      Replace the K38 Chassis Control Module.

    - **If the DTC does not set**
12. All OK.

Repair Instructions

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

- Refer to **Automatic Level Control Air Compressor Replacement**
- Refer to **Control Module References** for suspension control module. replacement, setup and programming

DTC C0711: LEVEL CONTROL AIR PRESSURE SENSOR MALFUNCTION SIGNAL INVALID (WITH Z95)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

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DTC Descriptors

DTC C0711 00

Level Control Air Pressure Sensor Malfunction Signal Invalid

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5 V Reference	C0711	C0711	C0711	-
Signal	C0711	C0711	C0711	C0711
Low Reference	-	C0711	-	-

Circuit Description

The automatic level control (ALC) pressure sensor monitors the pressure in the level control system. The suspension control module supplies a 5 V reference and a low reference circuit to the pressure sensor. The pressure sensor supplies a voltage signal in relation to the pressure in the level control system to the chassis control module.

Conditions for Running the DTC

Battery voltage is between 9-16 volts.

Conditions for Setting the DTC

The suspension control module detects that the supplied 5 volt reference voltage circuit for the pressure sensor falls below 4.75 volts or exceeds 5.25 volts.

The suspension control module detects that the signal voltage circuit for the pressure sensor falls below 0.15 volt or exceeds 4.85 volts.

Action Taken When the DTC Sets

- The air suspension system will be inoperative.
- The SERVICE SUSPENSION SYSTEM message will be displayed.

Conditions for Clearing the MIL/DTC

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- When the fault is no longer present, DTC C0711 will change from a current DTC to a history DTC on the next ignition cycle.
- DTC C0711 will be cleared from history after 40 ignition cycles.

Reference Information

Schematic Reference

Automatic Level Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Level Control Description and Operation (With Z95)

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for Scan Tool Information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B196 Air Suspension Pressure Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 1 and ground.
    - **If 10 Ω or greater**
    1. Disconnect the harness connector at the K19 Suspension Control Module.
    2. Test for less than 2 Ω in the low reference circuit end to end.

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- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, replace the K19 Suspension Control Module.

- **If less than 10 Ω**

3. Ignition ON.
4. Test for 4.8-5.2 V between the 5 V reference circuit terminal 3 and ground.
   - **If less than 4.8 V**
   1. Ignition OFF, disconnect the harness connector at the K19 Suspension Control Module.
   2. Test for infinite resistance between the 5 V reference circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance
   3. Test for less than 2 Ω in the 5 V reference circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, replace the K19 Suspension Control Module.
   - **If greater than 5.2 V**
   1. Ignition OFF, disconnect the harness connector at the K19 Suspension Control Module, ignition ON.
   2. Test for less than 1 V between the 5 V reference circuit and ground.
      - If 1 V or greater, repair the short to voltage on the circuit.
      - If less than 1 V, replace the K19 Suspension Control Module.
   - **If between 4.8-5.2 V**
5. Ignition OFF, disconnect the harness connector at the K19 Suspension Control Module, ignition ON.
6. Test for less than 1 V between the B196 Air Suspension Pressure Sensor signal circuit terminal 2 and ground.
   - **If greater than 1 V**

     Repair the short to voltage on the circuit.

   - **If less than 1 V**
7. Ignition OFF.
8. Test for infinite resistance between the B196 Air Suspension Pressure Sensor signal circuit terminal 2 and ground.
   - **If less than infinite resistance**

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Repair the short to ground on the circuit.

- **If infinite resistance**

9. Test for less than 2 Ω between the B196 Air Suspension Pressure Sensor signal circuit terminal 2 and the K19 Suspension Control Module signal circuit terminal 7.
   - **If 2 Ω or greater**

     Repair the open/high resistance in the circuit.

   - **If less than 2 Ω**
10. Replace the B196 Air Suspension Pressure Sensor.
11. Verify the DTC does not set while operating the vehicle under Conditions for Running the DTC.
    - **If the DTC sets**

      Replace the K19 Suspension Control Module.

    - **If the DTC does not set**
12. All OK.

Repair Instructions

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

- Refer to **Automatic Level Control Air Compressor Replacement**
- Refer to **Control Module References** for suspension control module. replacement, setup and programming

DTC C0712: VEHICLE LEVEL CONTROL COMPRESSOR RELAY (WITH Z95)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

DTC Descriptor

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DTC C0712

Vehicle Level Control Compressor Relay

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Relay B+	2	2	-	-
Relay Control	C0712 02	C0712 02	C0712 01	C0712 11
Relay Ground	-	2	-	-
Compressor Control	2	2	1	-
1. Compressor Always ON 2. Compressor Always OFF				

Circuit/System Description

The automatic level control system maintains a desired rear suspension position under all types of loading condition. The Suspension Control Module determines the height of the vehicle based on the voltage from the suspension position sensors. The module supplies B+ to the vehicle level control compressor relay to raise and lower the vehicle in order to keep the vehicle level.

Conditions for Running the DTC

The Suspension Control Module is commanding the compressor ON

Conditions for Setting the DTC

C0712 01

The relay control circuit is shorted to voltage.

C0712 02

The relay control circuit is open or shorted to ground.

C0712 11

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The relay control circuit is above a maximum threshold.

Action Taken When the DTC Sets

- The automatic level control system will be inoperative.
- The SERVICE SUSPENSION SYSTEM message will be displayed.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Reference Information

Schematic Reference

Automatic Level Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Level Control Description and Operation (With Z95)

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the KR99 Air Suspension Relay. It may take up to 2 min for all vehicle systems to power

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down.

2. Test for less than 10 Ω between the ground circuit terminal 85 and ground.
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.
    - **If the test lamp does not illuminate and the circuit fuse is good**
    1. Ignition OFF, remove the test lamp.
    2. Test for less than 2 Ω in the B+ circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.
    - **If the test lamp does not illuminate and the circuit fuse is open**
    1. Ignition OFF, remove the test lamp.
    2. Test for infinite resistance between the B+ circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance,
    3. Disconnect the harness at the G3 Air Suspension Compressor.
    4. Test for infinite resistance between the control circuit terminal 87 and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, test or replace the G3 Air Suspension Compressor.
    - **If the test lamp illuminates**
5. Connect a test lamp between the control circuit terminal 86 and the ground circuit terminal 85.
6. Disconnect the harness connector at the K19 Suspension Control Module.
7. Verify the test lamp turns ON and OFF when connecting and disconnecting a 3A fused jumper wire between the control circuit terminal 26 and B+.

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- **If the test lamp is always OFF**

1. Ignition OFF, remove the test lamp.
2. Test for infinite resistance between the control circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance
3. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.

- **If the test lamp is always ON**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K19 Suspension Control Module.
2. Test for less than 1 V between the control circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.

- **If the test lamp turns ON and OFF**

8. Verify a test lamp does not illuminate between the control circuit terminal 87 and ground.
    - **If the test lamp illuminates**

      Repair the short to voltage on the circuit.

    - **If the test lamp does not illuminate**
9. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the G3 Air Suspension Compressor. It may take up to 2 min for all vehicle systems to power down.
10. Test for less than 10 Ω between the G3 Air Suspension Compressor ground circuit terminal G and ground.
    - **If 10 Ω or greater**

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

    - **If less than 10 Ω**
11. Connect the harness connector at the G3 Air Suspension Compressor.
12. Ignition ON, remove test lamp and connect a 40 A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87.
13. Verify the G3 Air Suspension Compressor is activated.

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- **If the G3 Air Suspension Compressor does not activate**

1. Ignition OFF, remove the jumper wire.
2. Test for less than 2 Ω in the control circuit terminal 87 end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, test or replace the G3 Air Suspension Compressor.

- **If the G3 Air Suspension Compressor activates**

14. Remove jumper wire, connect the KR99 Air Suspension Relay.
15. Ignition ON, connect a 3 A fused jumper wire between the control circuit terminal 26 and ground.
16. Verify the G3 Air Suspension Compressor is activated.
    - **If the G3 Air Suspension Compressor does not activate**

      Test or replace the KR99 Air Suspension Relay.

    - **If the G3 Air Suspension Compressor activates**
17. Replace the K19 Suspension Control Module.

Component Testing

Relay Test

1. Ignition OFF, remove the KR99 Air Suspension Relay.
2. Test for 70-150 Ω between terminals 85 and 86.
    - **If less than 70 Ω or greater than 150 Ω**

      Replace the KR99 Air Suspension Relay.

    - **If between 70-150 Ω**
3. Test for infinite resistance between the terminals listed below:
    - 30 and 86
    - 30 and 87
    - 30 and 85
    - 85 and 87
    - **If less than infinite resistance**

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Replace the KR99 Air Suspension Relay.

- **If infinite resistance**

4. Install a 30 A fused jumper wire between relay terminal 86 and 12 V. Install a jumper wire between relay terminal 85 and ground.
5. Test for less than 10 Ω between terminals 30 and 87.
    - **If 10 Ω or greater**

      Replace the KR99 Air Suspension Relay.

    - **If less than 10 Ω**
6. All OK.

Repair Instructions

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

- Refer to **Automatic Level Control Air Compressor Replacement**
- Refer to **Control Module References** for K19 Suspension Control Module. replacement, programming and setup

DTC C0712: VEHICLE LEVEL CONTROL COMPRESSOR RELAY (WITH Z85)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

DTC Descriptor

DTC C0712

Vehicle Level Control Compressor Relay

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

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Relay B+	2	2	-	-
Relay Ignition	2	2	-	-
Relay Control	C0712 02	C0712 02	C0712 01	C0712 11
Compressor Control	2	2	1	-
Compressor Ground	-	2	-	-
1. Compressor Always ON 2. Compressor Always OFF				

Circuit/System Description

The automatic level control system maintains a desired rear suspension position under all types of loading condition. The chassis control module determines the height of the vehicle based on the voltage from the suspension position sensors. The module supplies B+ to the vehicle level control compressor relay to raise and lower the vehicle in order to keep the vehicle level.

Conditions for Running the DTC

The Suspension Control Module is commanding the compressor ON

Conditions for Setting the DTC

C0712 01

The relay control circuit is shorted to voltage.

C0712 02

The relay control circuit is open or shorted to ground.

C0712 11

The relay control circuit is above a maximum threshold.

Action Taken When the DTC Sets

- The automatic level control system will be inoperative.

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- The SERVICE SUSPENSION SYSTEM message will be displayed.

The automatic level control system will be inoperative.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Reference Information

Schematic Reference

Automatic Level Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Level Control Description and Operation (With Z85)

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the G3 Air Suspension Compressor turns ON and OFF when commanding the compressor On and Off with a scan tool.
    - **If the G3 Air Suspension Compressor does not turn ON and OFF**

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Refer to Circuit/System Testing.

- **If the G3 Air Suspension Compressor turn ON and OFF**

3. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the KR99 Air Suspension Relay, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 30 circuit terminal and ground.
   - **If the test lamp does not illuminate and the circuit fuse is good**
   1. Ignition OFF, remove the test lamp.
   2. Test for less than 2 Ω in the B+ circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.
   - **If the test lamp does not illuminate and the circuit fuse is open**
   1. Ignition OFF, remove the test lamp.
   2. Test for infinite resistance between the B+ circuit and ground.
      - If less than infinite resistance, repair the short to ground on the circuit.
      - If infinite resistance,
   3. Disconnect the G3 Air Suspension Compressor.
   4. Test for infinite resistance between the control circuit terminal 87 and ground.
      - If less than infinite resistance repair the short to ground on the circuit.
      - If infinite resistance, test or replace the G3 Air Suspension Compressor.
   - **If the test lamp illuminates**
3. Verify a test lamp illuminates between the ignition circuit terminal 86 and ground.
   - **If the test lamp does not illuminate and the circuit fuse is good**
   1. Ignition OFF, remove the test lamp.
   2. Test for less than 2 Ω in the ignition circuit end to end.
      - If 2 Ω or greater, repair the open/high resistance in the circuit.
      - If less than 2 Ω, refer to **Power Mode Mismatch (With BTM)** **Power Mode Mismatch (Without BTM)**

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- **If the test lamp does not illuminate and the circuit fuse is open**

1. Ignition OFF, remove the test lamp.
2. Test for infinite resistance between the ignition circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance, test or replace the KR99 Air Suspension Relay.

- **If the test lamp illuminates**

4. Connect a test lamp between the ignition circuit terminal 86 and the control circuit terminal 85.
5. Verify the test lamp turns ON and OFF when commanding the KR99 Air Suspension Relay On and Off with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module, ignition ON.
2. Test for less than 1 V between the control circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V
3. Ignition OFF.
4. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K38 Chassis Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module.
2. Test for infinite resistance between the control circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance, replace the K38 Chassis Control Module

- **If the test lamp turns ON and OFF**

6. Verify a test lamp does not illuminate between the control circuit terminal 87 and ground.

- **If the test lamp illuminates**

  Repair the short to voltage on the circuit.

- **If the test lamp does not illuminate**

7. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the G3 Air Suspension Compressor. It may take up to 2 min for

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all vehicle systems to power down.

8. Test for less than 10 Ω between the G3 Air Suspension Compressor ground circuit terminal G and ground.
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**
9. Connect the harness connector at the G3 Air Suspension Compressor.
10. Ignition ON, connect a 30 A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87.
11. Verify the G3 Air Suspension Compressor is activated.
    - **If the G3 Air Suspension Compressor does not activate**
    1. Ignition OFF, remove the jumper wire.
    2. Test for less than 2 Ω in the control circuit terminal 87 end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, test or replace the G3 Air Suspension Compressor.
    - **If the G3 Air Suspension Compressor activates**
12. Test or replace the KR99 Air Suspension Relay.

Component Testing

Relay Test

1. Ignition OFF, remove the KR99 Air Suspension Relay.
2. Test for 70-150 Ω between terminals 85 and 86.
    - **If less than 70 Ω or greater than 150 Ω**

      Replace the KR99 Air Suspension Relay.

    - **If between 70-150 Ω**
3. Test for infinite resistance between the terminals listed below:

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- 30 and 86
- 30 and 87
- 30 and 85
- 85 and 87
- **If less than infinite resistance**

  Replace the KR99 Air Suspension Relay.

- **If infinite resistance**

4. Install a 30 A fused jumper wire between relay terminal 86 and 12 V. Install a jumper wire between relay terminal 85 and ground.
5. Test for less than 10 Ω between terminals 30 and 87.
   - **If 10 Ω or greater**

     Replace the KR99 Air Suspension Relay.

   - **If less than 10 Ω**
6. All OK.

Repair Instructions

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

- Refer to **Automatic Level Control Air Compressor Replacement**
- Refer to **Relay Replacement (Attached to Wire Harness)** **Relay Replacement (Within an Electrical Center)**
- Refer to **Control Module References** for control module replacement, programming and setup

SYMPTOMS - AUTOMATIC LEVEL CONTROL

Review the system operation in order to familiarize yourself with the system functions. Refer to **Automatic Level Control Description and Operation (With Z85)** **Automatic Level Control Description and Operation (With Z95)**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the automatic level control suspension. Refer to **Checking Aftermarket Accessories** .

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- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect for binding or damaged shock absorbers.

Intermittent

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

Symptom List

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

- **Air Compressor Leak Test**
- **Automatic Level Control System Leak Test**
- **Rear of Vehicle High (with Z85)**
- **Rear of Vehicle Low (with Z85)**

AIR COMPRESSOR LEAK TEST

Special Tools

- **J 22124-B** Pressure Gauge (0-300 psi)
- **J 22124-91** Pressure Gauge Adapter

1. Attach the **J 22124-91** pressure gauge adapter to the air dryer.
2. Attach the **J 22124-B** pressure gauge to the **J 22124-91** pressure gauge adapter with the toggle valve on the opposite side of the air compressor. Close the toggle valve.
3. Apply air pressure at the schrader valve. Pressurize until the **J 22124-B** pressure gauge reads 690 kPa (100 psi).
4. Check the following areas using soap bubbles:
    - Solenoid valve
    - Air dryer to compressor head O-ring
    - Air dryer cover
    - Air compressor head gasket
    - Air compressor head cover - If necessary, tighten the cover bolts to 5.6 N.m (50 lb in).

If a leak is found, replace the air compressor. Refer to **Automatic Level Control Air Compressor Replacement**.

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AUTOMATIC LEVEL CONTROL SYSTEM LEAK TEST

Special Tools

J 22124-B Pressure Gauge (0-300 psi)

1. Disconnect the air tube from the air dryer.
2. Attach the air tube to the **J 22124-B** pressure gauge on the side opposite the toggle valve.
3. Close the toggle valve.
4. Apply service air pressure to the service valve and pressurize until the **J 22124-B** pressure gauge reads 550 kPa (80 psi).
5. Verify that the system maintains pressure for at least 1 minute.
    - If the system does not maintain the specified pressure for the specified amount of time, check the shock absorber air sleeves, air tubes, and all connections for air leaks using a soapy water solution. Repair or replace any leaking components.

Repair Instructions

- Refer to **Shock Absorber Replacement (Z56, Z71, ZW7)** **Shock Absorber Replacement (Heavy Duty)**

REAR OF VEHICLE HIGH (WITH Z85)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	C0660 00	C0660 00	-	C0660 56
Control	C0660 00	C0660 00	C0660 00	C0660 56

Circuit Description

The chassis control module adjusts the vehicle suspension ride height. The chassis control module determines the height of the vehicle based on signals from the position sensors. The chassis control module raises and lowers the vehicle in order to keep the vehicle level by controlling the

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vehicle level control solenoid valve and air compressor control circuits.

Reference Information

Schematic Reference

Automatic Level Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Level Control Description and Operation (With Z85)

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, engine running.
2. Verify the Q4 Vehicle Level Control Solenoid Valve turns ON and OFF when the Exhaust Valve is commanded On and Off with the scan tool.
    - **If the valve does not turn ON and OFF with each command**

      Refer to Circuit/System Testing

    - **If the valve turns ON and OFF with each command**
3. All OK.

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Circuit/System Testing

1. Ignition OFF, disconnect the harness connectors at the Q4 Vehicle Level Control Solenoid Valve, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal B and ground.
    - **If the test lamp does not illuminate and the circuit fuse is good**
    1. Ignition OFF, remove the test lamp.
    2. Test for less than 2 Ω in the B+ circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.
    - **If the test lamp does not illuminate and the circuit fuse is open**
    1. Ignition OFF, remove the test lamp.
    2. Test for infinite resistance between the B+ circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance
3. Connect a test lamp between the control circuit terminal C and B+ circuit terminal B.
4. Verify the test lamp turns ON and OFF when commanding the Q4 Vehicle Level Control Solenoid Valve On and Off with a scan tool.
    - **If the test lamp is always OFF**
    1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K38 Chassis Control Module, ignition ON.
    2. Test for less than 2 Ω in the control circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, replace the K38 Chassis Control Module.
        - **If the test lamp is always ON**
    3. Ignition OFF, remove the test lamp, disconnect the harness connector at the K38 Chassis Control Module.
    4. Test for infinite resistance between the control circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance, replace the K38 Chassis Control Module
        - **If the test lamp turns ON and OFF**
    5. Replace the Q4 Vehicle Level Control Solenoid Valve.

Component Testing

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1. Ignition OFF, disconnect the harness connector at the Q4 Vehicle Level Control Solenoid Valve.
2. Test for 18-45 Ω between the control terminal C and the ignition terminal B.
    - **If not between 18-45 Ω**

      Replace the Q4 Vehicle Level Control Solenoid Valve.

    - **If between 18-45 Ω**
3. Test for infinite resistance between the control terminal C and ground.
    - **If less than infinite resistance**

      Replace the Q4 Vehicle Level Control Solenoid Valve.

    - **If infinite resistance**
4. All OK.

Repair Instructions

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

- Refer to **Automatic Level Control Air Compressor Replacement** for Q4 Vehicle Level Control Solenoid Valve
- Refer to **Control Module References** for K38 Chassis Control Module replacement, programming and setup.

REAR OF VEHICLE LOW (WITH Z85)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Relay B+	2	2	-	-
Relay Ignition	2	2	-	-

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Relay Control	C0712 02	C0712 02	C0712 01	C0712 11
Compressor Control	2	2	1	-
Compressor Ground	-	2	-	-
1. Compressor Always ON 2. Compressor Always OFF				

Circuit/System Description

The automatic level control system maintains a desired rear suspension position under all types of loading condition. The chassis control module determines the height of the vehicle based on the voltage from the suspension position sensors. The module supplies B+ to the vehicle level control compressor relay to raise and lower the vehicle in order to keep the vehicle level.

Diagnostic Aids

Inspect for the following conditions:

- Leaking lines or components - Perform the **Automatic Level Control System Leak Test**, and **Air Compressor Leak Test** as necessary.
- Performing the **Suspension Position Calibration (With Z85)** procedure may correct the condition.

Reference Information

Schematic Reference

Automatic Level Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Level Control Description and Operation (With Z85)

Electrical Information Reference

- **Circuit Testing**

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the G3 Air Suspension Compressor turns ON and OFF when commanding the compressor On and Off with a scan tool.
    - **If the G3 Air Suspension Compressor does not turn ON and OFF**

      Refer to Circuit/System Testing.

    - **If the G3 Air Suspension Compressor turn ON and OFF**
3. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the KR98 Vehicle Level Control Compressor Relay, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal 30 circuit terminal and ground.
    - **If the test lamp does not illuminate and the circuit fuse is good**
    1. Ignition OFF, remove the test lamp.
    2. Test for less than 2 Ω in the B+ circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, verify the fuse is not open and there is voltage at the fuse.
    - **If the test lamp does not illuminate and the circuit fuse is open**
    1. Ignition OFF, remove the test lamp.
    2. Test for infinite resistance between the B+ circuit and ground.
        - If less than infinite resistance, repair the short to ground on the circuit.
        - If infinite resistance,

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3. Disconnect the G3 Air Suspension Compressor.
4. Test for infinite resistance between the control circuit terminal 87 and ground.
    - If less than infinite resistance repair the short to ground on the circuit.
    - If infinite resistance, test or replace the G3 Air Suspension Compressor.

- **If the test lamp illuminates**

3. Verify a test lamp illuminates between the ignition circuit terminal 86 and ground.

- **If the test lamp does not illuminate and the circuit fuse is good**

1. Ignition OFF, remove the test lamp.
2. Test for less than 2 Ω in the ignition circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, refer to **Power Mode Mismatch (With BTM)** **Power Mode Mismatch (Without BTM)**

- **If the test lamp does not illuminate and the circuit fuse is open**

1. Ignition OFF, remove the test lamp.
2. Test for infinite resistance between the ignition circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance, test or replace the KR98 Vehicle Level Control Compressor Relay.

- **If the test lamp illuminates**

4. Connect a test lamp between the ignition circuit terminal 86 and the control circuit terminal 85.
5. Verify the test lamp turns ON and OFF when commanding the KR98 Vehicle Level Control Compressor Relay On and Off with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module, ignition ON.
2. Test for less than 1 V between the control circuit and ground.
    - If 1 V or greater, repair the short to voltage on the circuit.
    - If less than 1 V
3. Ignition OFF.
4. Test for less than 2 Ω in the control circuit end to end.
    - If 2 Ω or greater, repair the open/high resistance in the circuit.
    - If less than 2 Ω, replace the K38 Chassis Control Module.

- **If the test lamp is always ON**

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1. Ignition OFF, disconnect the harness connector at the K38 Chassis Control Module.
2. Test for infinite resistance between the control circuit and ground.
    - If less than infinite resistance, repair the short to ground on the circuit.
    - If infinite resistance, replace the K38 Chassis Control Module

- **If the test lamp turns ON and OFF**

6. Verify a test lamp does not illuminate between the control circuit terminal 87 and ground.
    - **If the test lamp illuminates**

      Repair the short to voltage on the circuit.

    - **If the test lamp does not illuminate**
7. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the G3 Air Suspension Compressor. It may take up to 2 min for all vehicle systems to power down.
8. Test for less than 10 Ω between the G3 Air Suspension Compressor ground circuit terminal G and ground.
    - **If 10 Ω or greater**
    1. Ignition OFF.
    2. Test for less than 2 Ω in the ground circuit end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, repair the open/high resistance in the ground connection.
    - **If less than 10 Ω**
9. Connect the harness connector at the G3 Air Suspension Compressor.
10. Ignition ON, connect a 30 A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87.
11. Verify the G3 Air Suspension Compressor is activated.
    - **If the G3 Air Suspension Compressor does not activate**
    1. Ignition OFF, remove the jumper wire.
    2. Test for less than 2 Ω in the control circuit terminal 87 end to end.
        - If 2 Ω or greater, repair the open/high resistance in the circuit.
        - If less than 2 Ω, test or replace the G3 Air Suspension Compressor.
    - **If the G3 Air Suspension Compressor activates**
12. Test or replace the KR98 Vehicle Level Control Compressor Relay.

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Component Testing

Relay Test

1. Ignition OFF, remove the KR98 Vehicle Level Control Compressor Relay.
2. Test for 70-150 Ω between terminals 85 and 86.
   - **If less than 70 Ω or greater than 150 Ω**

     Replace the KR98 Vehicle Level Control Compressor Relay.

   - **If between 70-150 Ω**
3. Test for infinite resistance between the terminals listed below:
   - 30 and 86
   - 30 and 87
   - 30 and 85
   - 85 and 87
   - **If less than infinite resistance**

     Replace the KR98 Vehicle Level Control Compressor Relay.

   - **If infinite resistance**
4. Install a 30 A fused jumper wire between relay terminal 86 and 12 V. Install a jumper wire between relay terminal 85 and ground.
5. Test for less than 10 Ω between terminals 30 and 87.
   - **If 10 Ω or greater**

     Replace the KR98 Vehicle Level Control Compressor Relay.

   - **If less than 10 Ω**
6. All OK.

Repair Instructions

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

- Refer to **Automatic Level Control Air Compressor Replacement**

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- Refer to **Control Module References** for K19 Suspension Control Module. replacement, programming and setup

REPAIR INSTRUCTIONS

SUSPENSION POSITION CALIBRATION (WITH Z95)

Suspension Position Sensor Trim Height Calibration

The Suspension Position Sensor Trim Height Calibration must be performed anytime a Suspension Position Sensor is either removed/reinstalled or replaced.

1. Remove any excess weight from vehicle.
2. Connect scan tool
3. From scan tool menu, select Suspension Control Module,
4. Select Configuration/Reset Functions
5. Select Suspension Position Sensor Trim Height and follow the on screen instructions

SUSPENSION POSITION CALIBRATION (WITH Z85)

Suspension Position Calibration

The Suspension Position Sensor Trim Height Calibration must be performed anytime a Suspension Position Sensor is either removed/reinstalled or replaced, or the Chassis Control Module is reprogrammed or replaced.

1. Place the vehicle on a flat level surface. Ensure that the suspension is in the normal resting position.
2. Remove any excess weight from vehicle.
3. Connect scan tool
4. From scan tool menu, select Chassis Control Module,
5. Select Configuration/Reset Functions
6. Select Suspension Position Sensor Trim Height and follow the on screen instructions

AUTOMATIC LEVEL CONTROL AIR COMPRESSOR REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

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2. Before removing the air tubes, perform the following steps:
    - Turn the ignition On, with the engine OFF.
    - Install a scan tool.
    - With the scan tool, exhaust the air from the system for at least 60 seconds.

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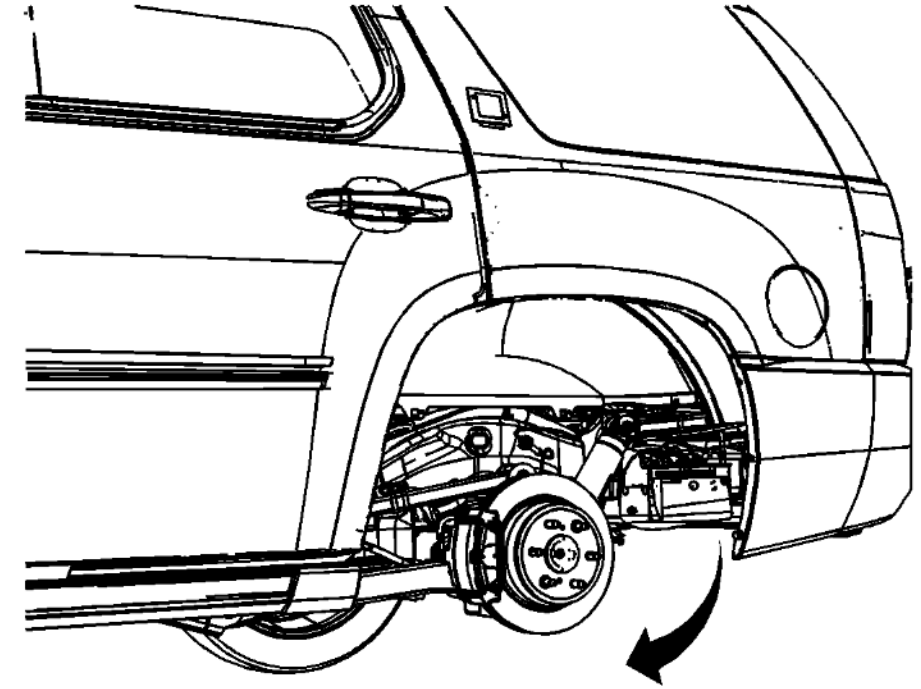

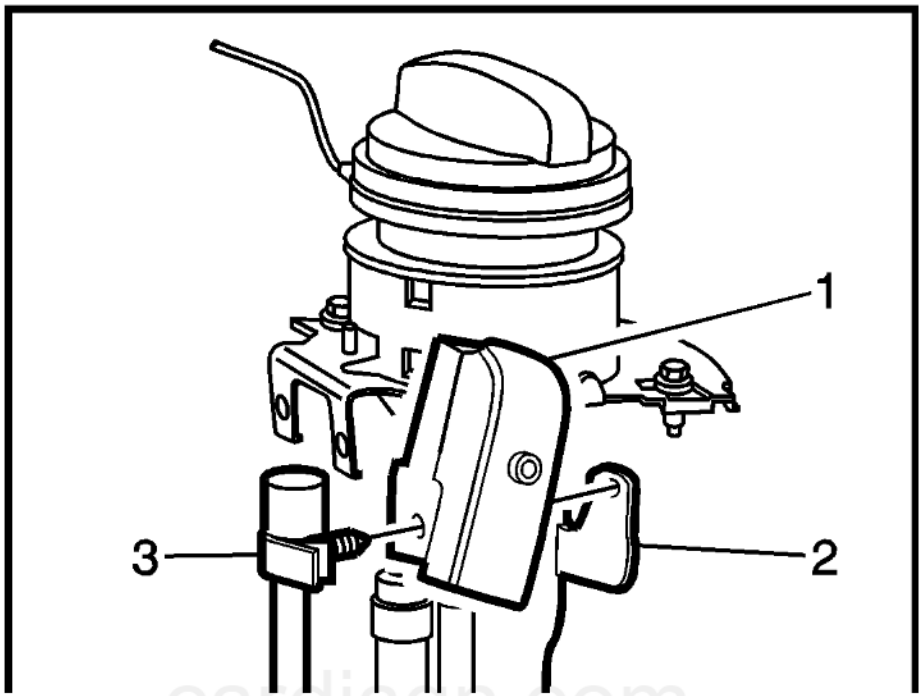

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Fig. 3: Fuel Filler Neck Bracket, Air Inlet Hose & Clip
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Clean the components and the surrounding area to prevent dirt from entering the air system.**

NOTE: **There will be a minimal amount still in the air tubes.**

3. Disconnect the air inlet hose (1) from the fuel filler neck bracket (2) and discard the clip (3).

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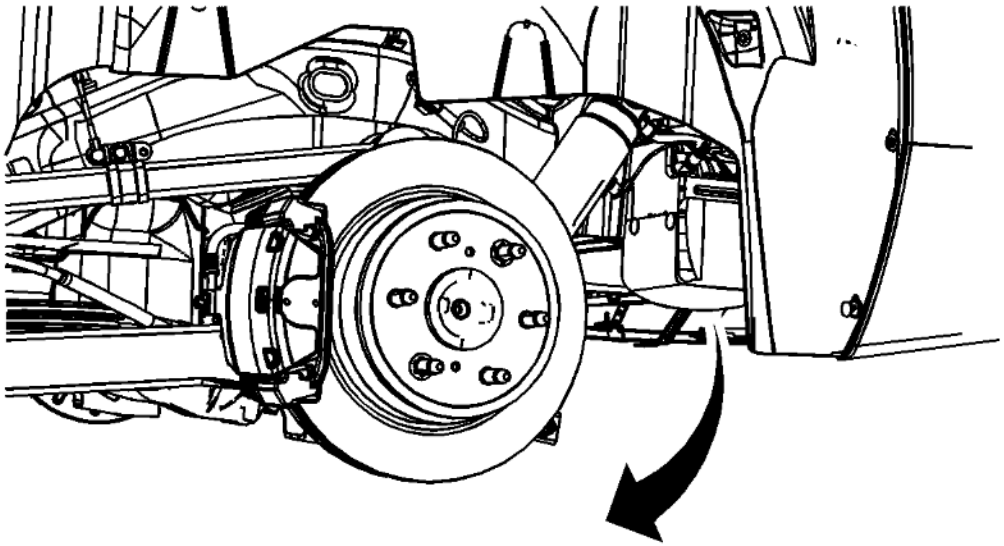

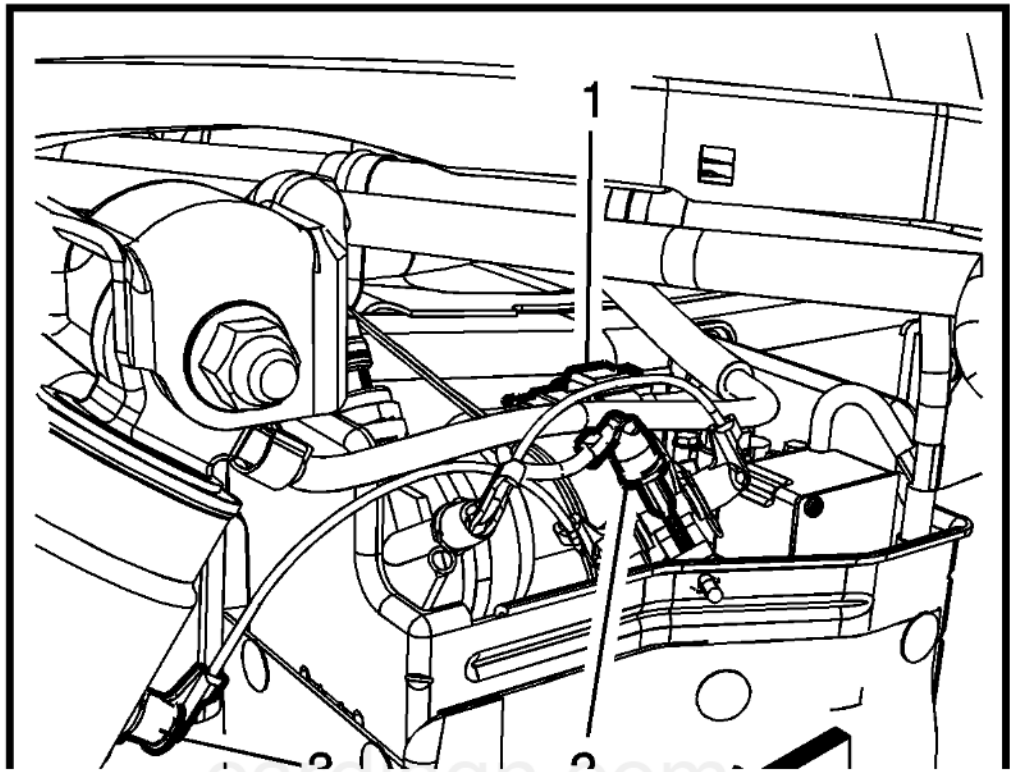

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Fig. 4: Right & Left Side Air Tubes With Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Clean the components and the surrounding area to prevent dirt from entering the air system.**

NOTE: **There will be a minimal amount still in the air tubes.**

4. Disconnect the electrical connection (1) from the compressor. Disconnect the right side air tube (2) from the compressor and the left side air tube (3) from the shock absorber.

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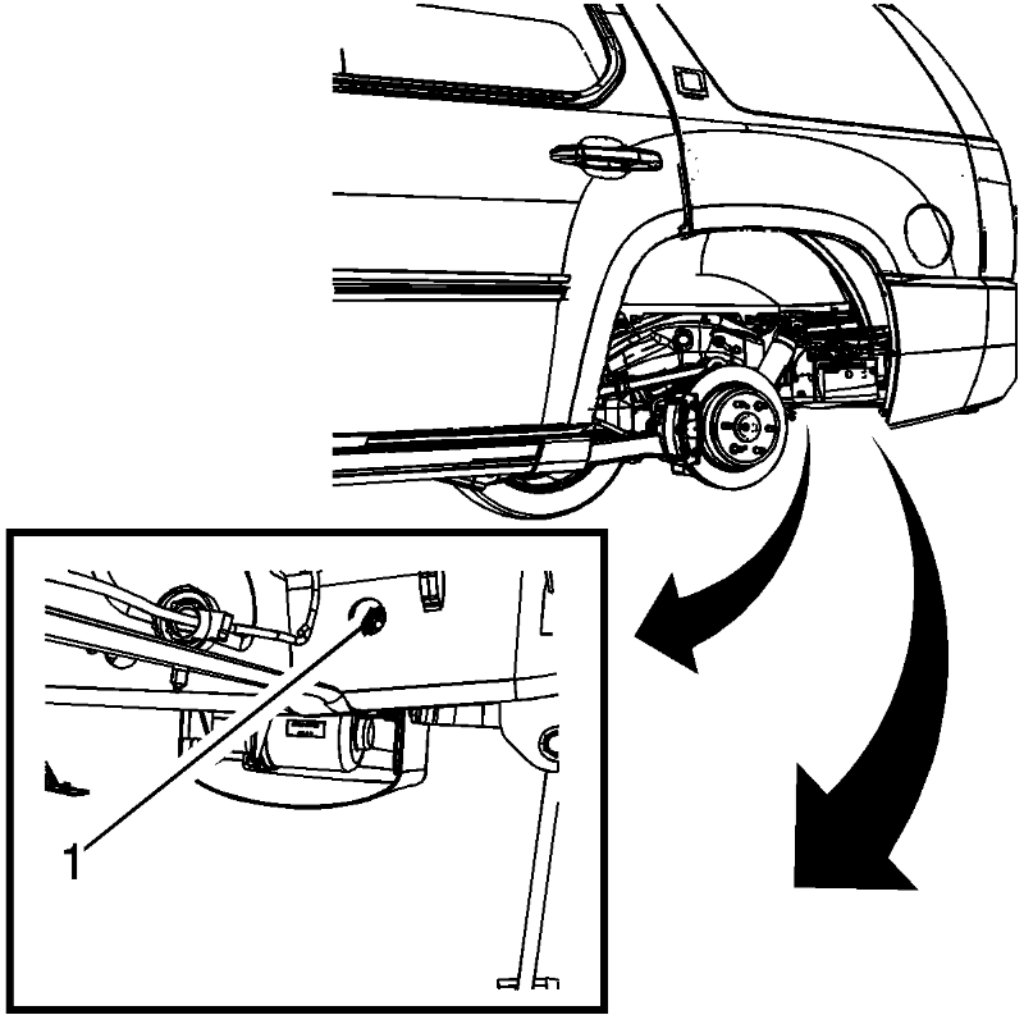

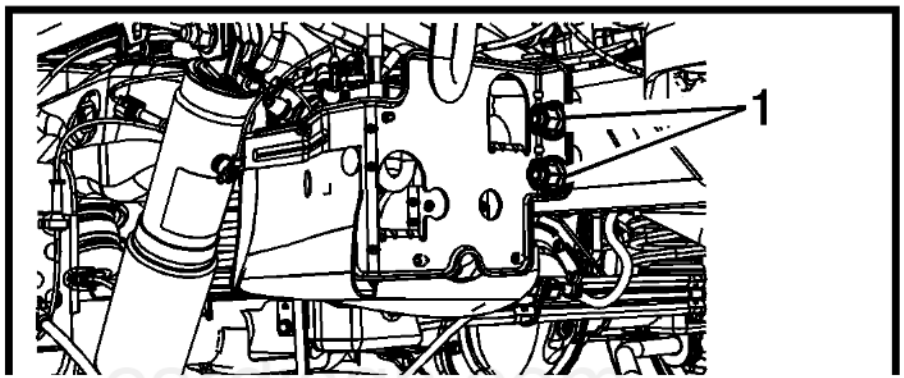

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Fig. 5: Air Compressor Mounting Nuts
Courtesy of GENERAL MOTORS COMPANY

5. Loosen the mounting nuts (1).

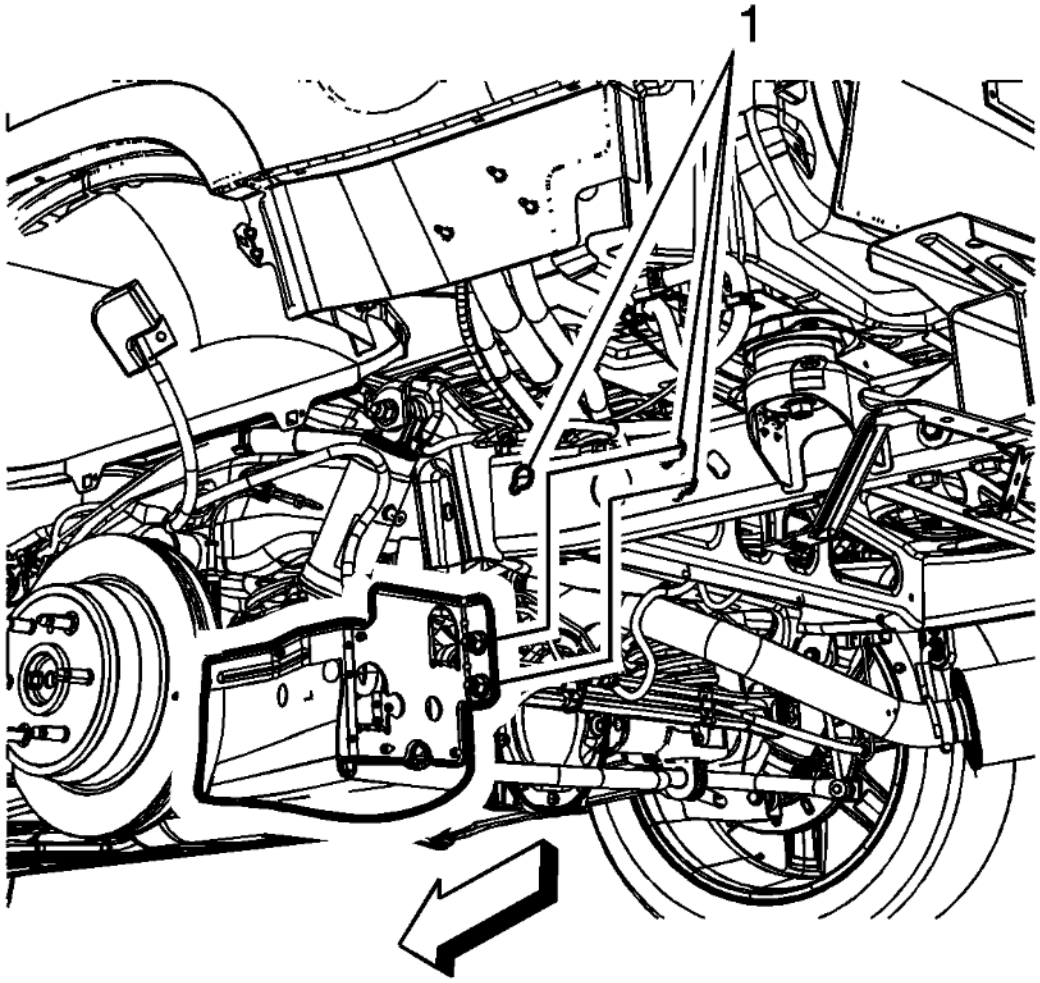

Fig. 6: Air Compressor Frame Slots
Courtesy of GENERAL MOTORS COMPANY

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6. Slide the air compressor rearward and up at a 45 degree angle to clear the frame slots (1).
7. Remove the air compressor from the vehicle.

Installation Procedure

1. Install the air compressor to the vehicle.

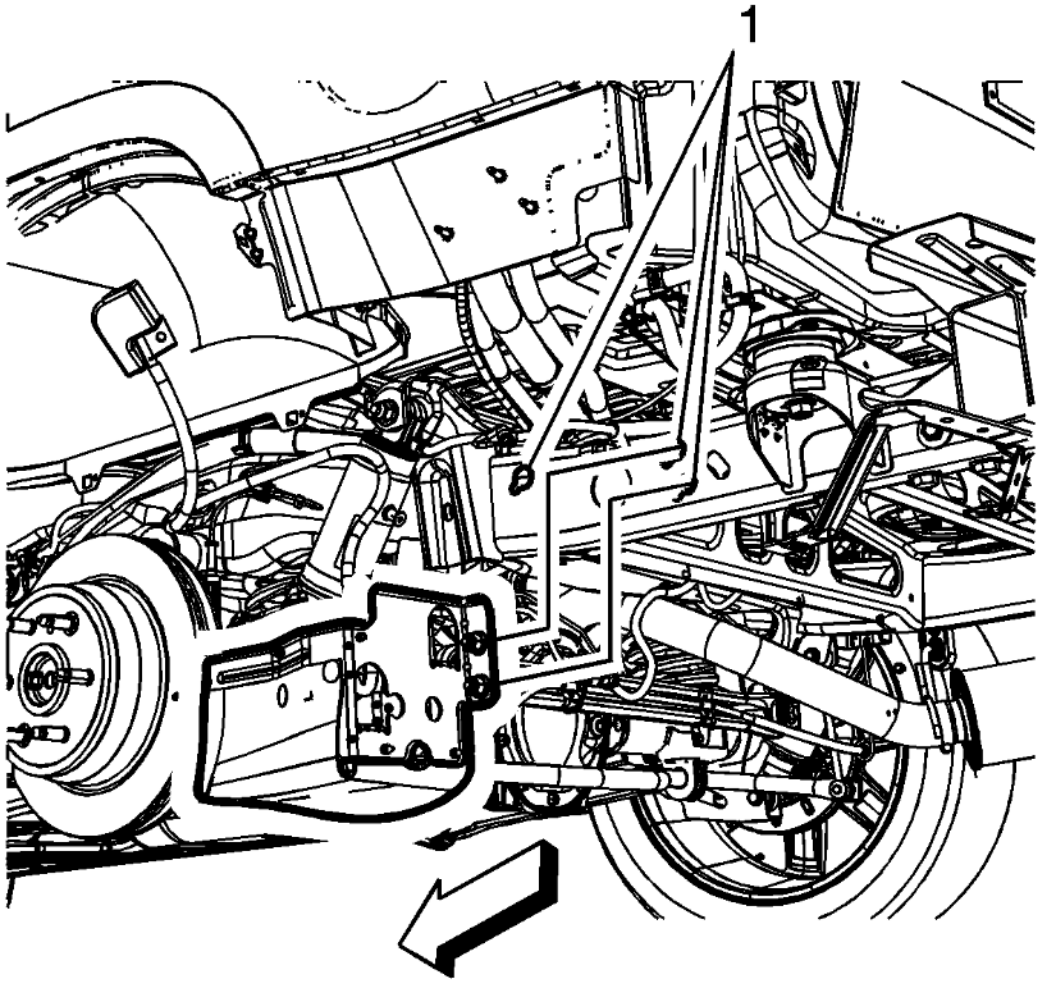

Fig. 7: Air Compressor Frame Slots

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Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

2. Slide the air compressor forward to secure the fasteners into the frame slots (1). Tighten the mounting nuts to 15 N.m (11 lb ft)

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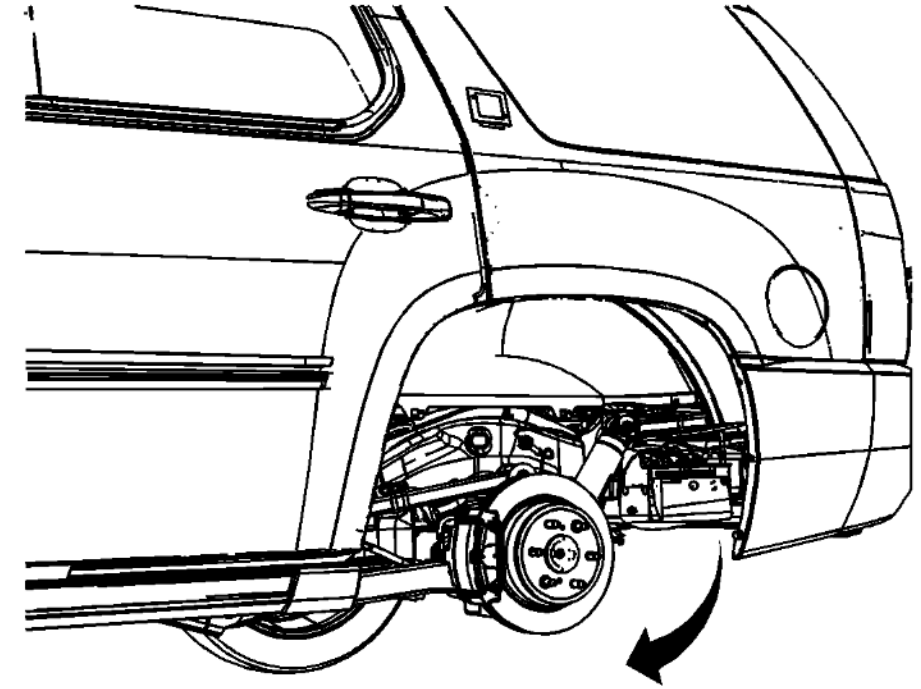

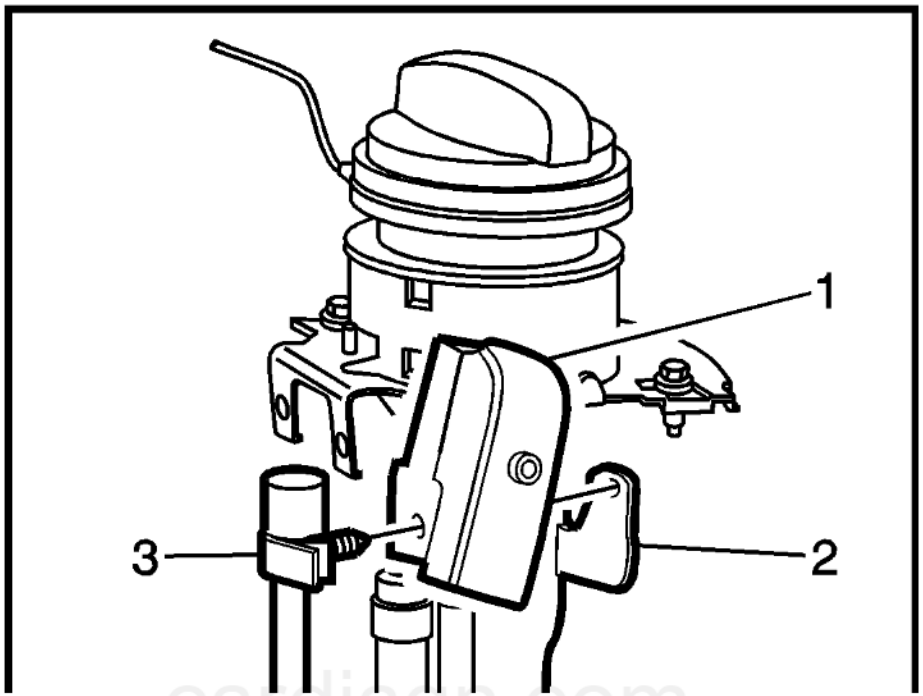

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Fig. 8: Fuel Filler Neck Bracket, Air Inlet Hose & Clip
Courtesy of GENERAL MOTORS COMPANY

3. Using a NEW Clip (3) install the air inlet hose (1) to the fuel filler neck bracket (2).
4. Ensure the air tube connection is secure by pushing the air tube on to the shock until it clicks and then push and pull on the connection to insure connection is secure.

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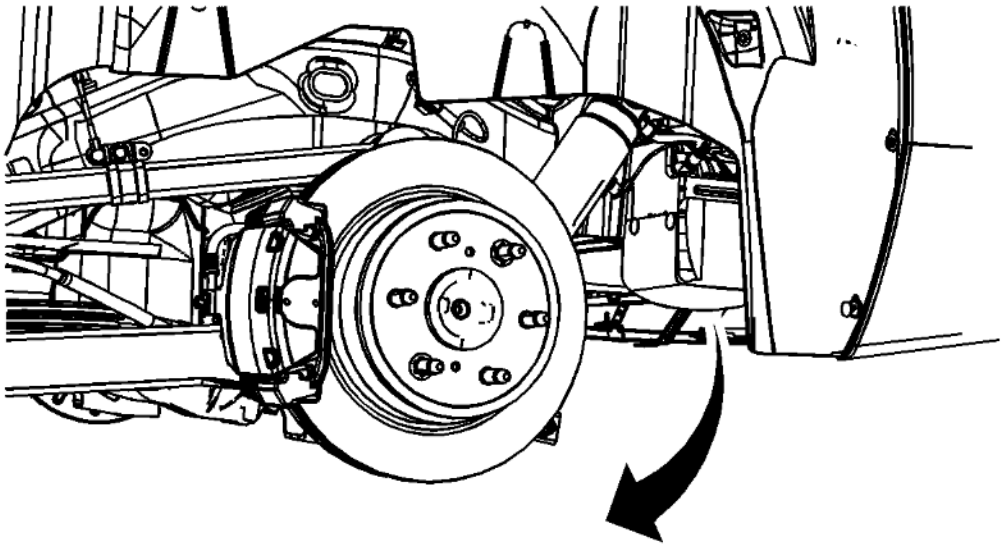

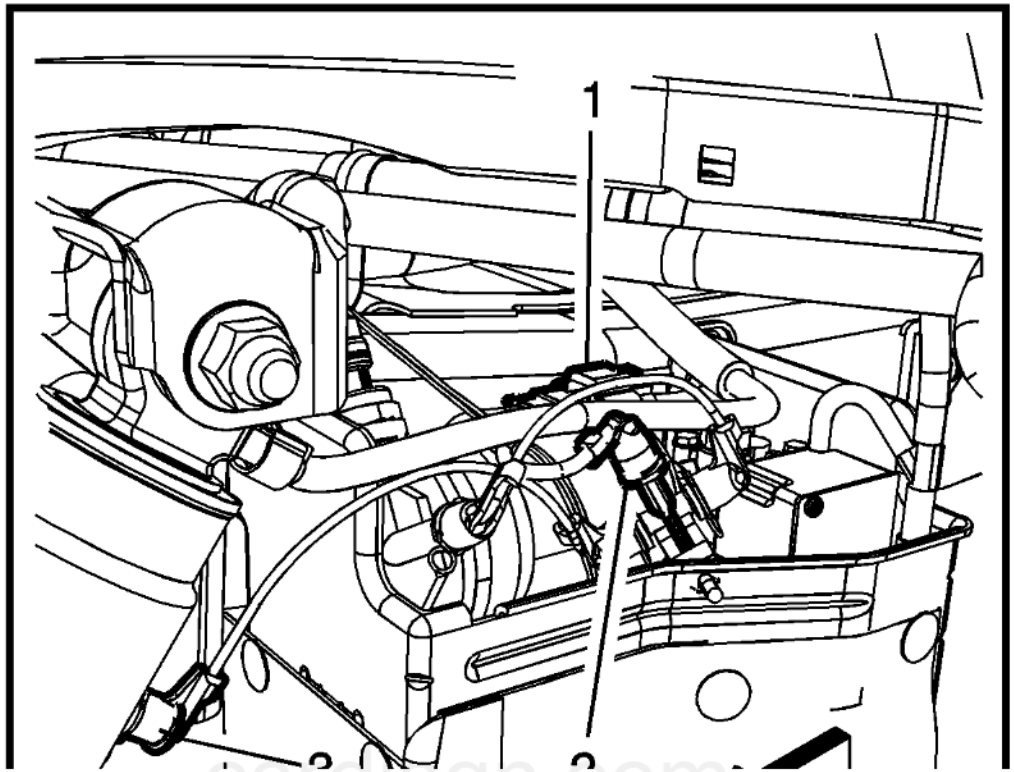

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Fig. 9: Right & Left Side Air Tubes With Electrical Connector
Courtesy of GENERAL MOTORS COMPANY

5. Connect the electrical connection (1). Connect the right side air tube to the compressor (2) and the left side air tube (3) to the shock absorber.

CAUTION: Do NOT pressurize the air springs/shocks under load or damage to the air spring/shocks will occur. Always pressurize the system with the wheels of the vehicle off the ground.

6. Lower the vehicle, but DO NOT allow the 4 tire assemblies to contact the ground.
7. Perform the following procedure after the air compressor has been replaced.
   - Turn the ignition ON, with the engine OFF.
   - Install a scan tool
   - With the scan tool, operate the air compressor for 15 seconds or until the rear of the vehicle begins to rise.
   - Remove the scan tool.
   - Cycle the ignition OFF, then back ON, with the engine ON to allow the air suspension system to regain the desired rear suspension position.
8. Continue to lower the vehicle.
9. Start the vehicle and run for approximately (1) minute to ensure the air compressor is functioning properly and the system is completely pressurized.

AUTOMATIC LEVEL CONTROL AIR COMPRESSOR INSULATOR REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle**

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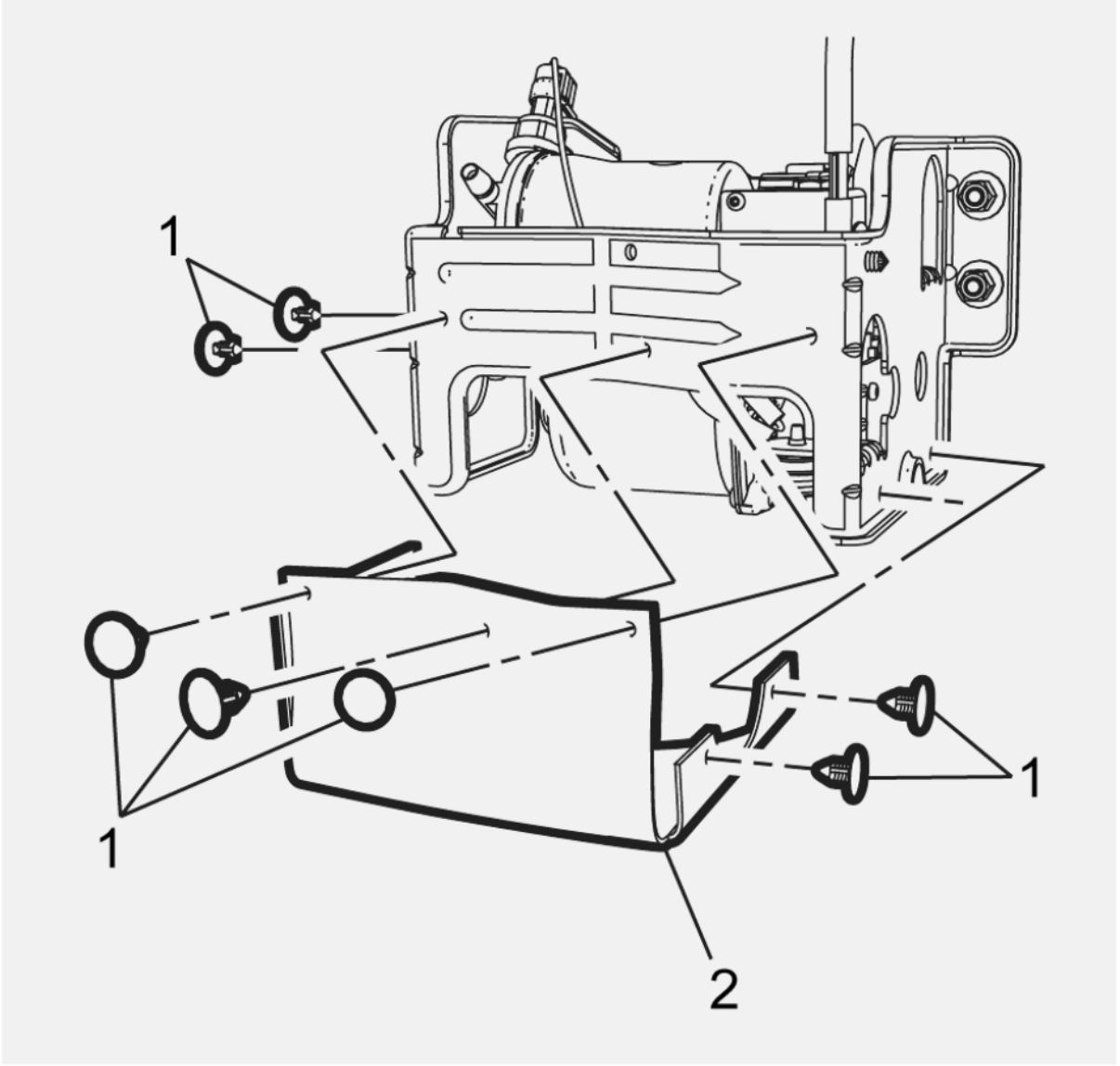

Fig. 10: Protective Shield Clips
Courtesy of GENERAL MOTORS COMPANY

2. Remove the protective shield clips (1) and reposition the protective shield (2).

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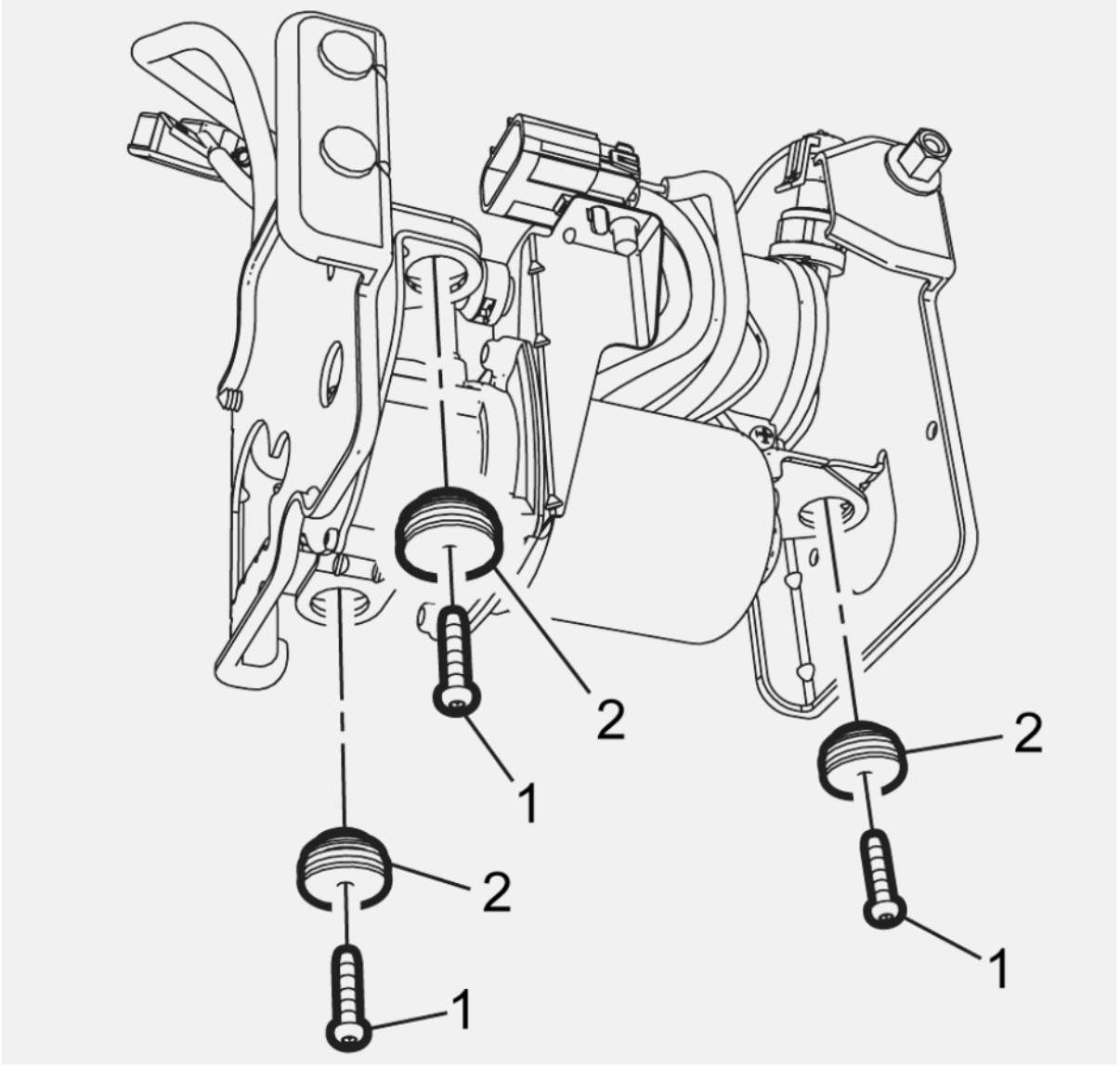

Fig. 11: Insulator Mounting Screws
Courtesy of GENERAL MOTORS COMPANY

3. Remove the insulator mounting screws (1) and the insulators (2).

Installation Procedure

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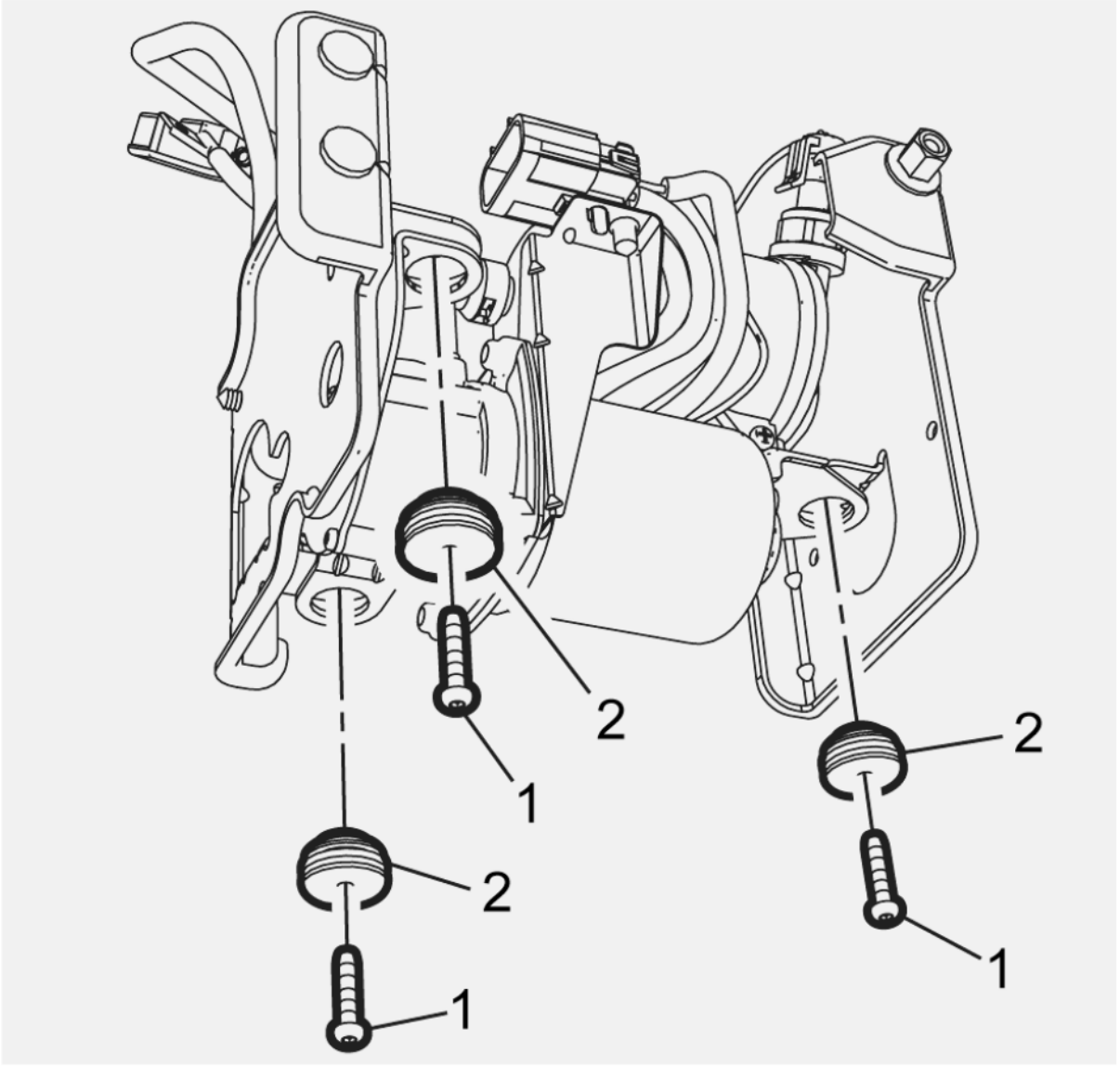

Fig. 12: Insulator Mounting Screws
Courtesy of GENERAL MOTORS COMPANY

1. Install the insulator mounting screws (1) and the insulators (2).

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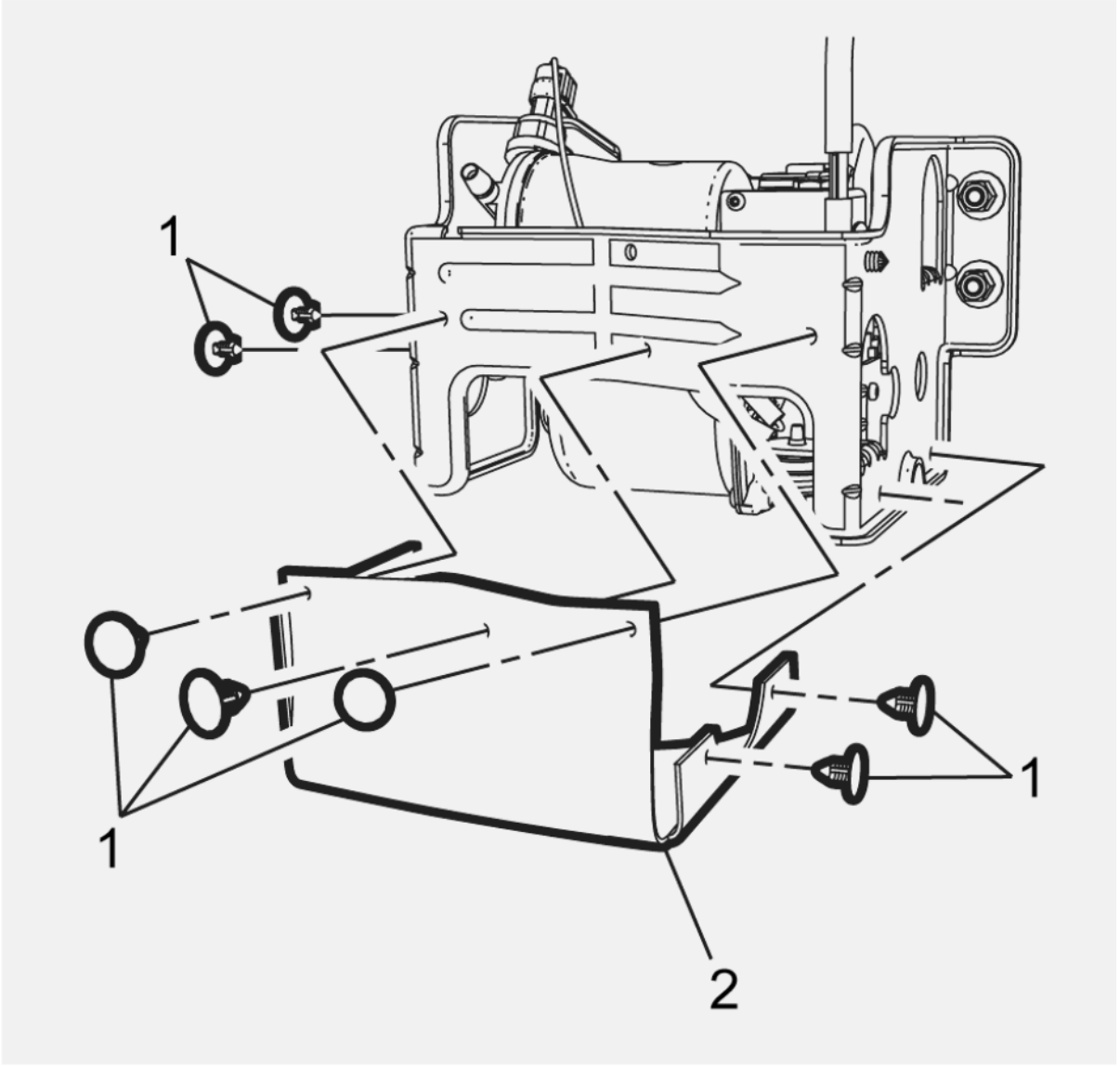

Fig. 13: Protective Shield Clips
Courtesy of GENERAL MOTORS COMPANY

2. Reposition the protective shield (2) and install the protective shield clips (1).
3. Lower the vehicle.

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AUTOMATIC LEVEL CONTROL AIR COMPRESSOR FILTER REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the auto level control air compressor. Refer to **Automatic Level Control Air Compressor Replacement**.

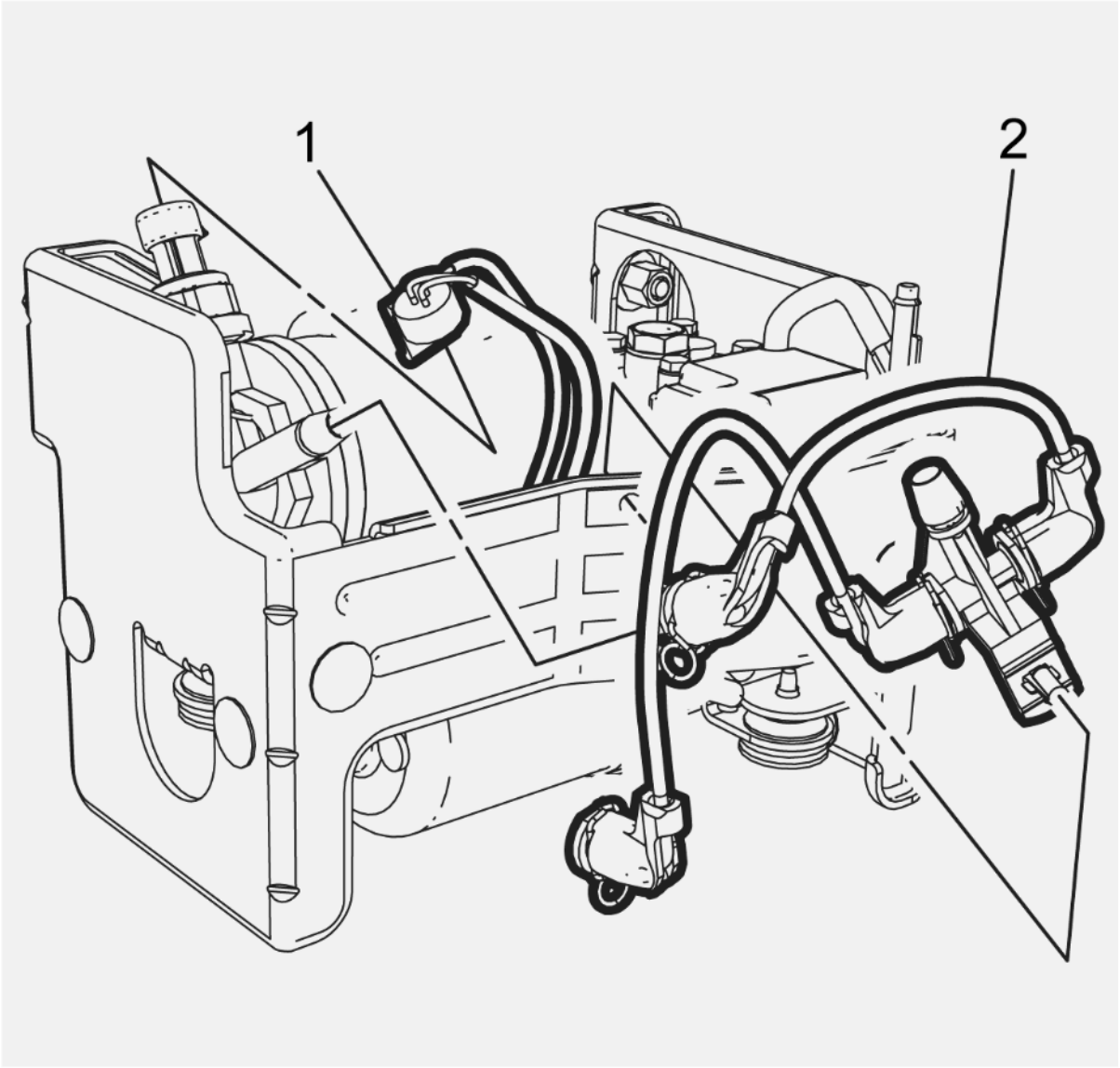

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Fig. 14: Auto Level Control Pressure Sensor Connector
Courtesy of GENERAL MOTORS COMPANY

3. Disconnect the auto level control pressure sensor connector (1) disconnect the auto level control air tube assembly (2) and remove.

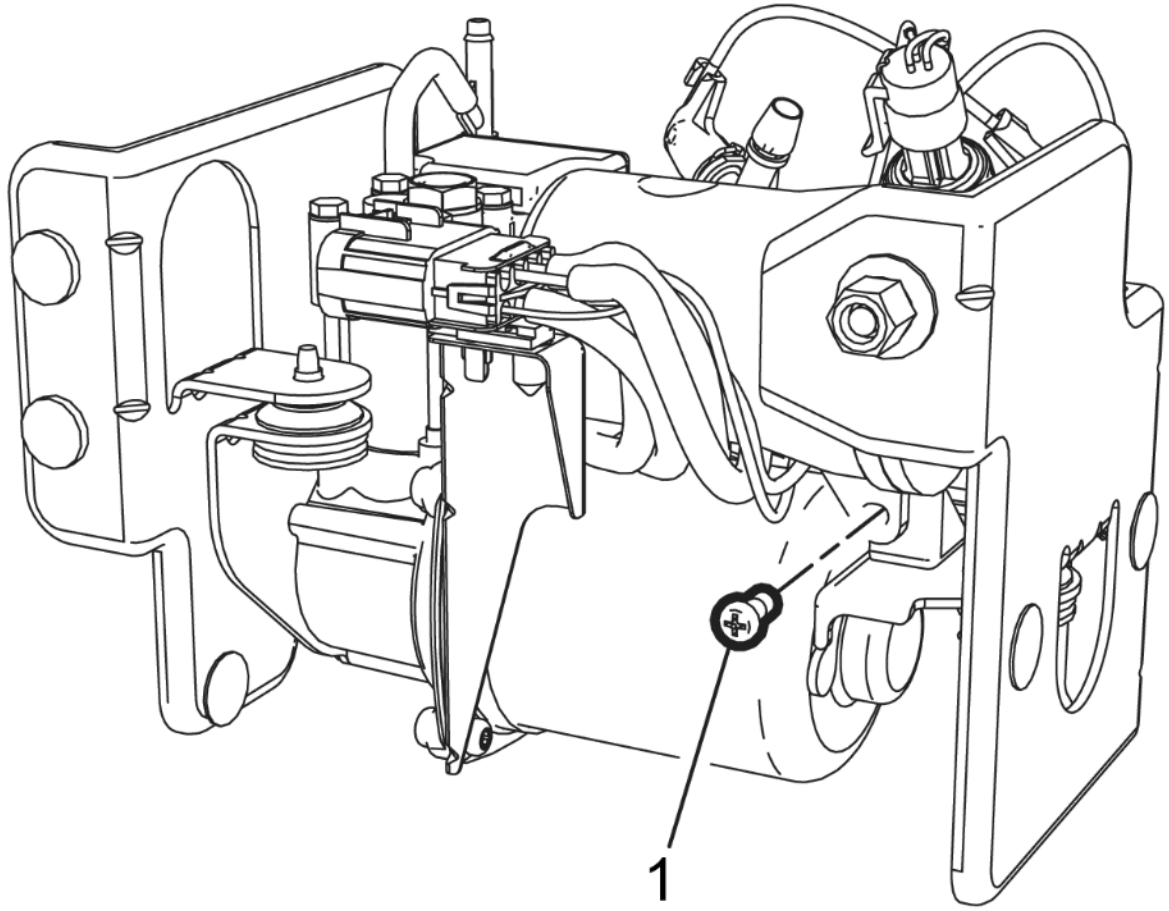

Fig. 15: Auto Air Level Air Compressor Filter Retaining Screw

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Courtesy of GENERAL MOTORS COMPANY

4. Remove the auto air level air compressor filter retaining screw (2).

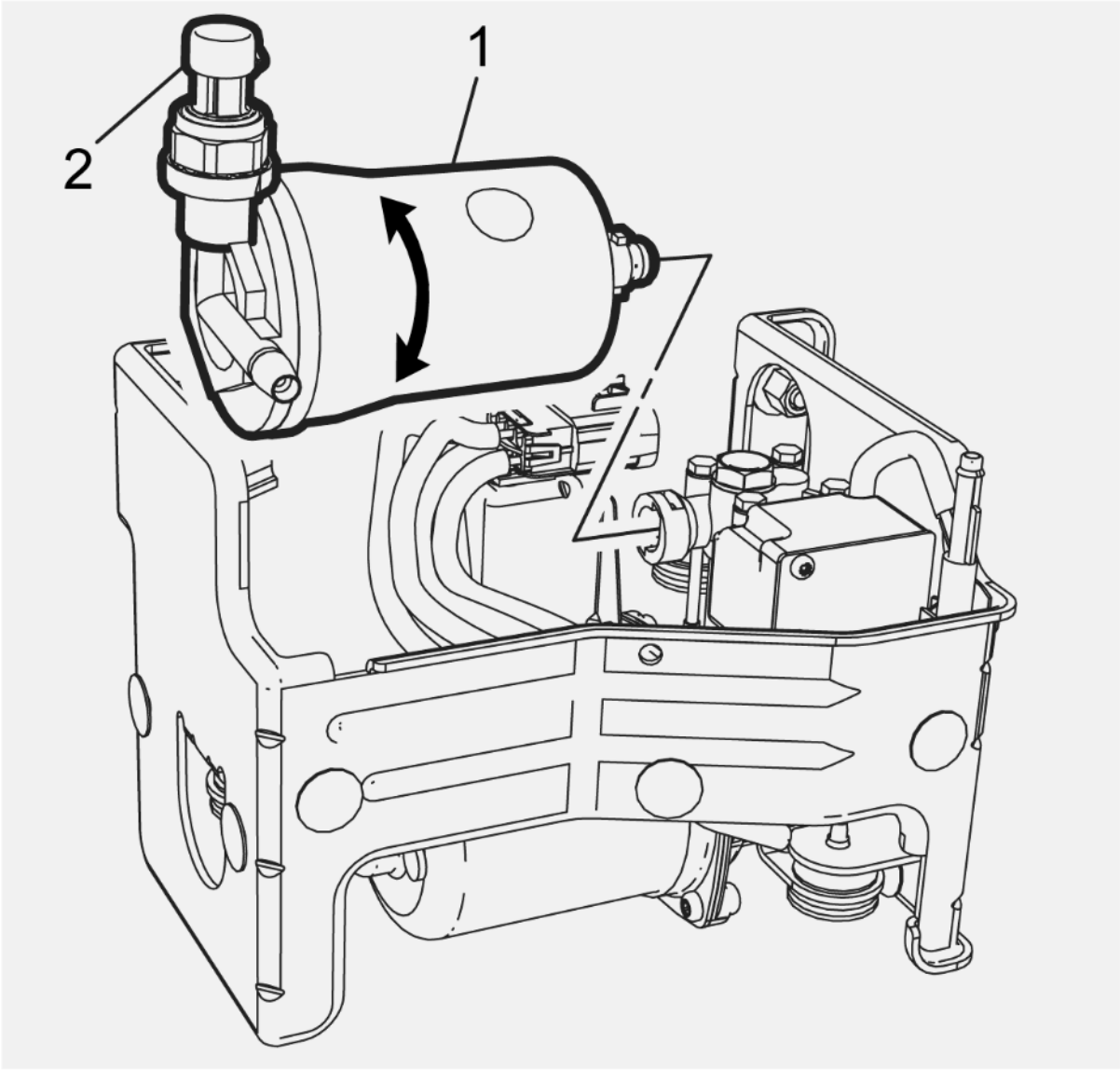

Fig. 16: Auto Level Control Air Compressor Air Filter
Courtesy of GENERAL MOTORS COMPANY

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NOTE: **Clean debris and dirt from the sealing area of the filter.**

5. Remove the auto level control air compressor air filter (1) by rotating the pressure sensor (2) toward the outboard of the bracket.
6. Remove the auto level control air compressor filter (1).

Installation Procedure

NOTE: **Make sure the sealing surface of the filter "O" ring is clear of debris.**

1. Install the auto level control air compressor filter (1).

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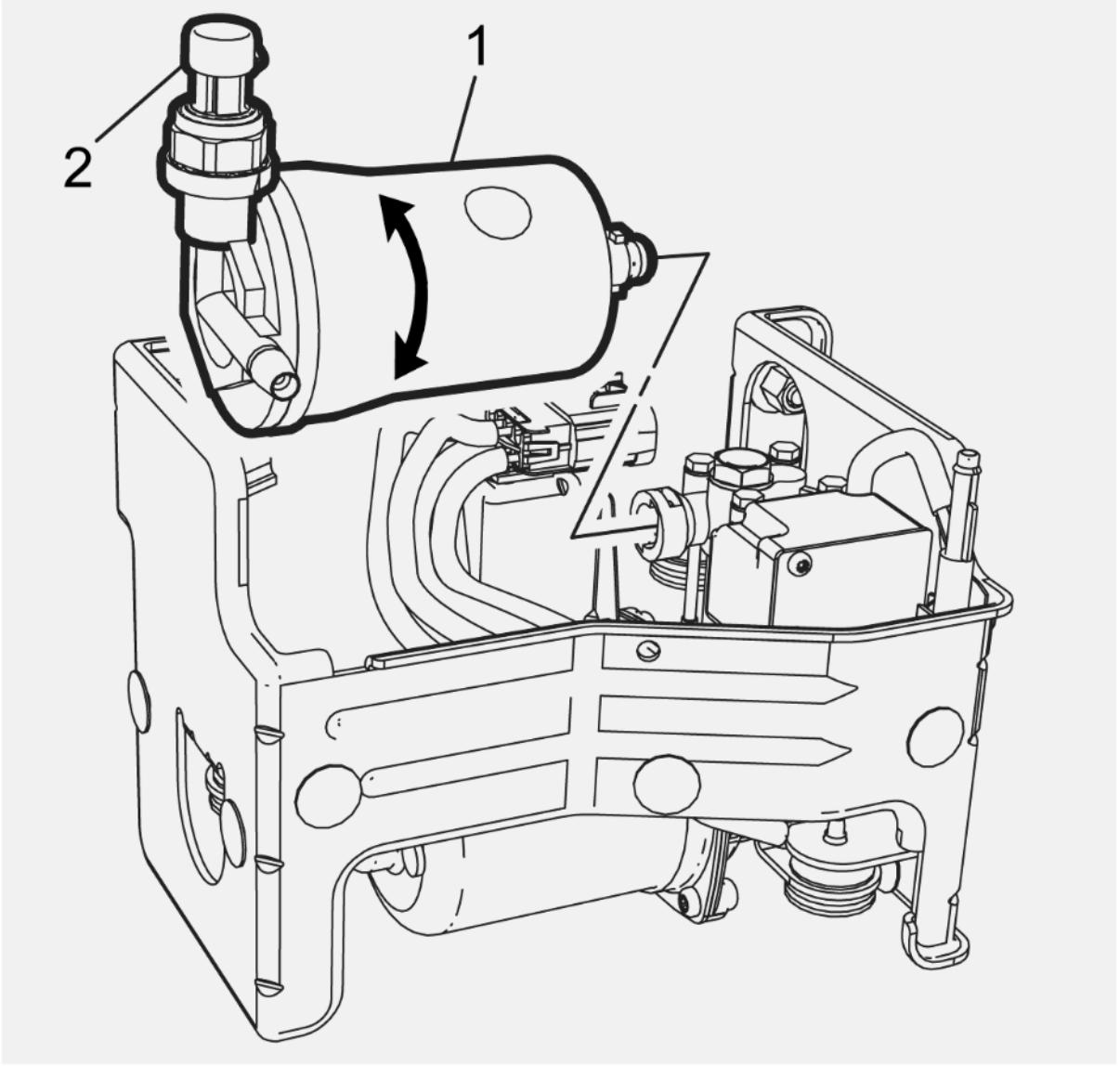

Fig. 17: Auto Level Control Air Compressor Air Filter
Courtesy of GENERAL MOTORS COMPANY

2. Install the auto level control air filter (1) by rotating the pressure sensor (2) toward inboard side of the bracket vehicle.

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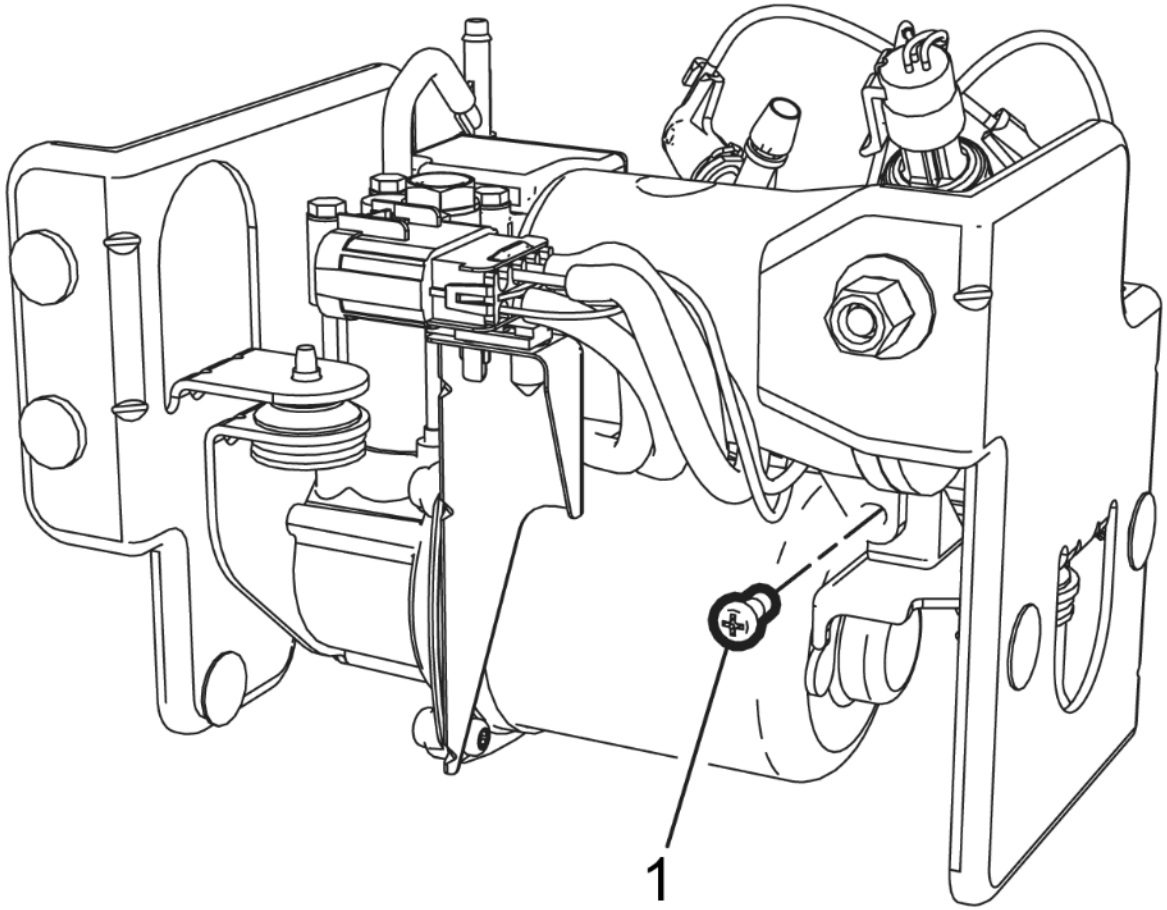

Fig. 18: Auto Air Level Air Compressor Filter Retaining Screw
Courtesy of GENERAL MOTORS COMPANY

3. Install the auto level control air compressor retaining screw (1).

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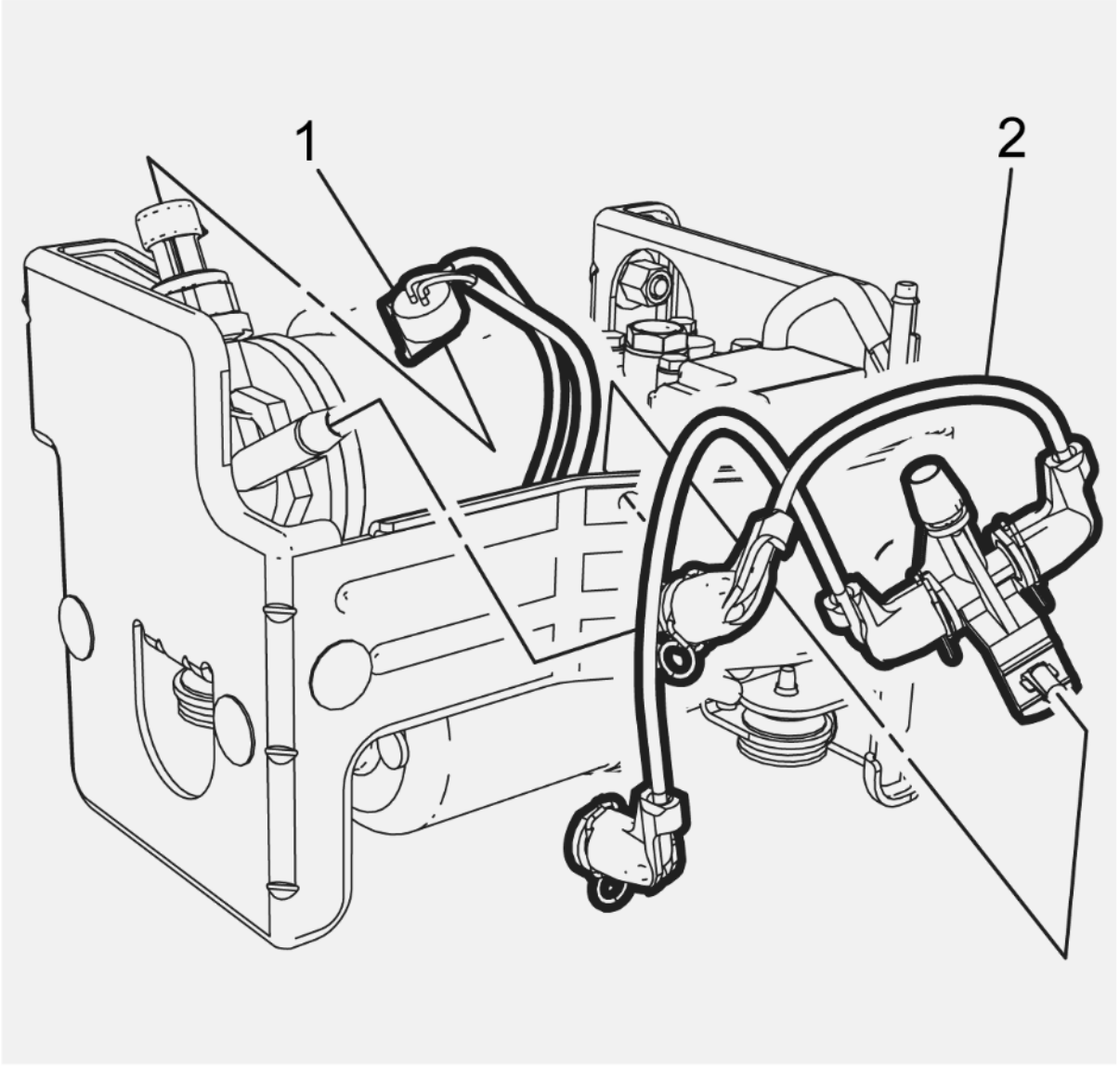

Fig. 19: Auto Level Control Pressure Sensor Connector
Courtesy of GENERAL MOTORS COMPANY

4. Install the auto level control air tube assembly (2) and reconnect the auto level control pressure sensor connector (2).
5. Reinstall the auto level control air compressor. Refer to **Automatic Level Control Air Compressor Replacement**.
6. Remove the support and lower the vehicle.

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AUTOMATIC LEVEL CONTROL AIR COMPRESSOR INLET TUBE REPLACEMENT

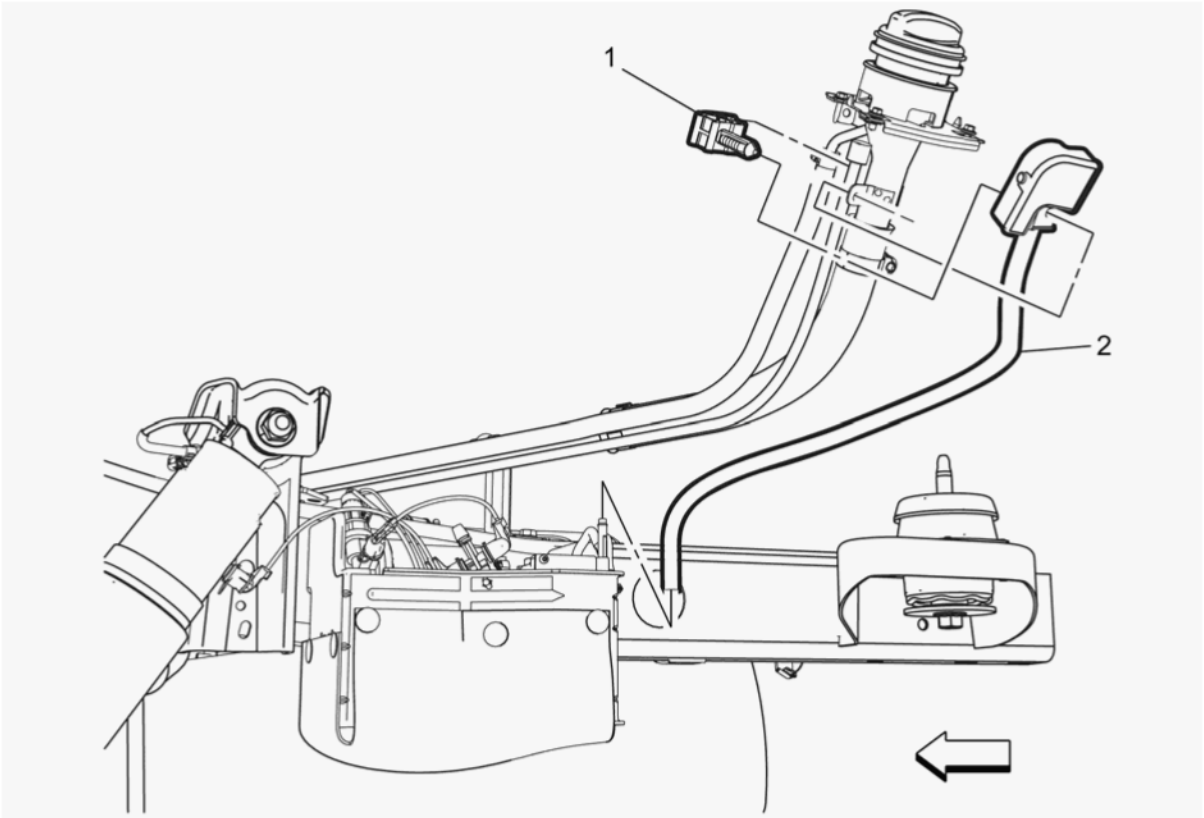

Fig. 20: Automatic Level Control Air Compressor Inlet Tube
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle**	
1	Automatic Level Control Inlet Tube Clip **NOTE:** **Replace the clip after removing.**

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Callout	Component Name
2	Automatic Level Control Inlet Tube **NOTE:** **Clean the area around the inlet tube to compressor fitting, so that debris does not enter the compressor.**

DESCRIPTION AND OPERATION

AUTOMATIC LEVEL CONTROL DESCRIPTION AND OPERATION (WITH Z85)

Automatic Level Control

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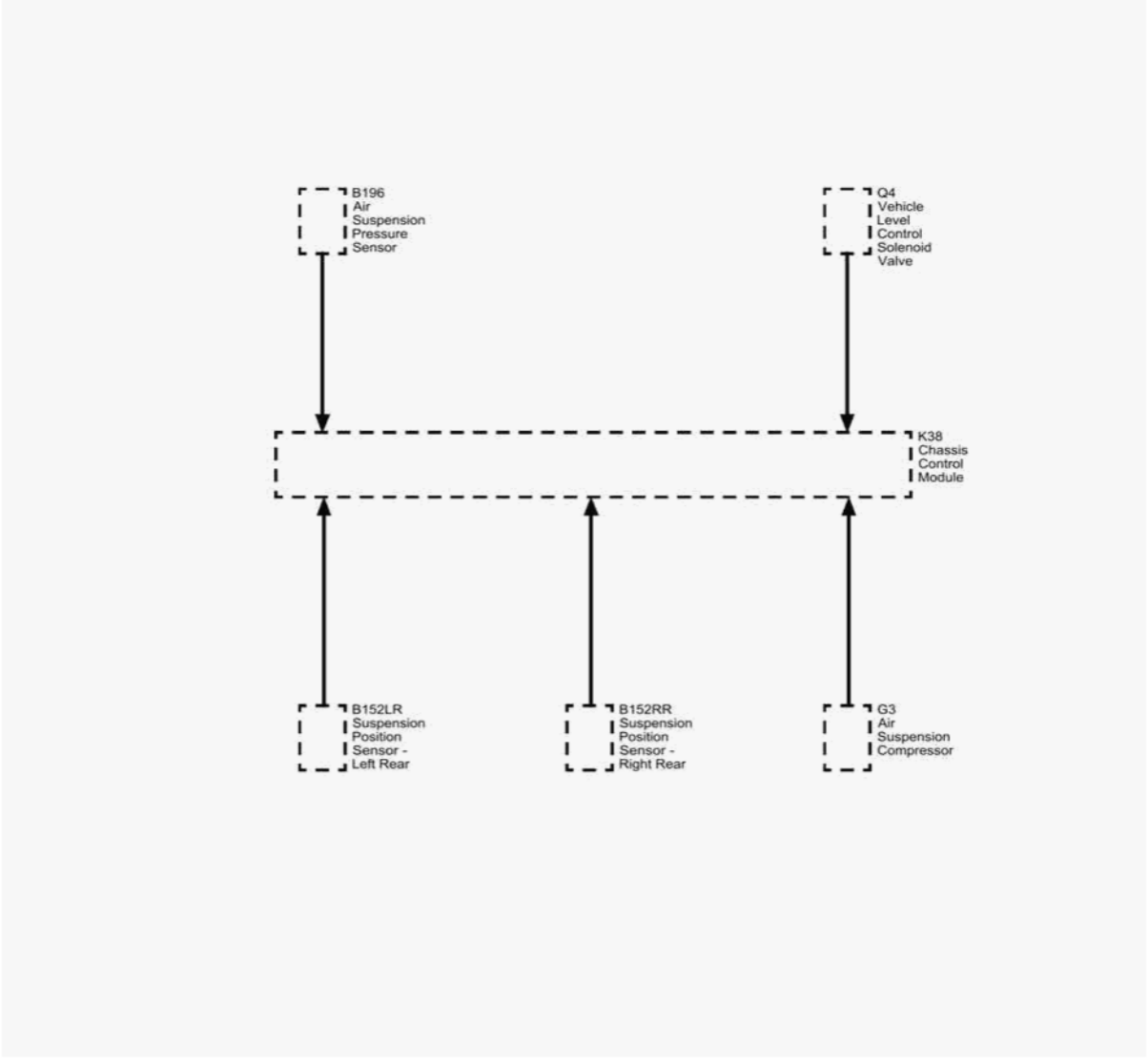

Fig. 21: Automatic Level Control Block Diagram (With Z85)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
B196	B196 Air Suspension Pressure Sensor
Q4	Q4 Vehicle Level Control Solenoid Valve
K38	K38 Chassis Control Module

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Callout	Component Name
G3	G3 Air Suspension Compressor
B152RR	B152RR Suspension Position Sensor - Right Rear
B152LR	B152LR Suspension Position Sensor - Left Rear

The automatic level control system maintains a desired rear suspension position under all types of towing and loading conditions.

The system uses the chassis control module, automatic level control relay, compressor assembly, air lines, LR and RR shock absorbers with integral air chambers, suspension position sensors, air pressure sensor, vehicle level control solenoid valve, driver information center, and the serial data circuit to perform the system functions.

The system is activated when the ignition key is turned to ON/RUN and will automatically adjust vehicle height thereafter. The system may exhaust (lower vehicle height) for up to 10 minutes after the ignition key has been turned off. When the vehicle is unloaded the rear suspension is at a desired position, which is monitored by the chassis control module using its LR and RR suspension position sensor signal voltage inputs. As weight is added to the rear of the vehicle the position sensor's signal voltage inputs increase. If the chassis control module detects a steady substantial change in position sensor signal voltage, it responds by commanding on the automatic level control relay, which activates the compressor causing the air pressure in both rear shock absorber chambers to inflate. This inflation raises the rear of the vehicle to regain the desired suspension position. When weight is removed, the chassis control module responds by commanding on the exhaust valve to release air from the system causing the air pressure in the shock absorber chambers to deflate. This deflation lowers the rear of the vehicle to regain the desired suspension position.

The compressor is a positive displacement piston air pump driven by a 12 volt DC permanent magnet motor. The compressor draws filtered air through an intake line attached to an under body rail. The compressed air is then run through a dryer containing a moisture-absorbing chemical that dries the compressed air before it is sent to the shock absorber chambers. The chassis control module also limits the amount of compressor run time to protect the compressor components from thermal damage.

The chassis control module has the ability to detect malfunctions within the automatic level control system. Any malfunctions detected will cause the driver information center to display the SERVICE LEVELING SYSTEM message.

AUTOMATIC LEVEL CONTROL DESCRIPTION AND OPERATION (WITH Z95)

Electronic Suspension Control

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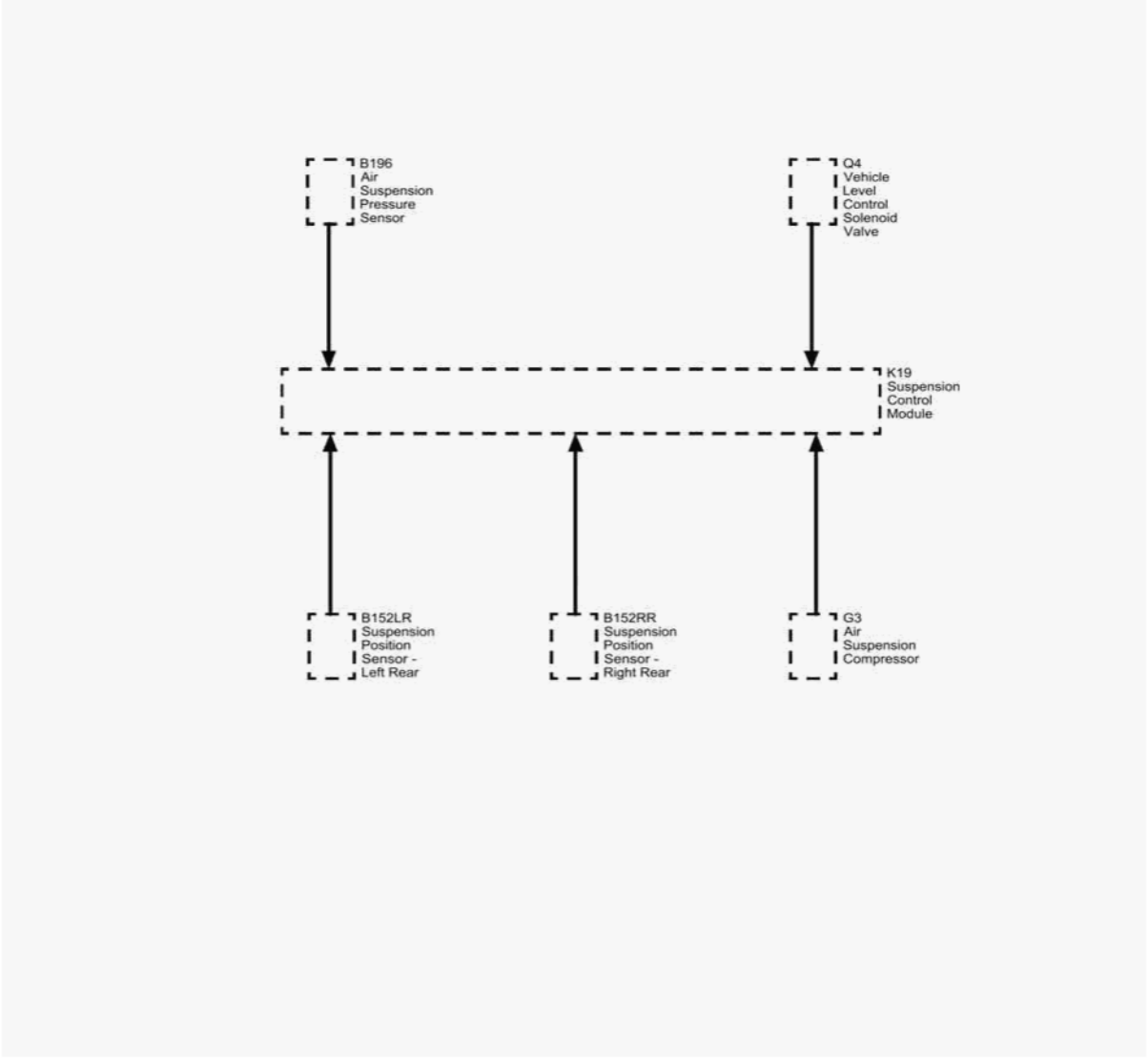

Fig. 22: Electronic Suspension Control Block Diagram (With Z95)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
B196	B196 Air Suspension Pressure Sensor
Q4	Q4 Vehicle Level Control Solenoid Valve
K19	K19 Suspension Control Module

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Callout	Component Name
G3	G3 Air Suspension Compressor
B152RR	B152RR Suspension Position Sensor - Right Rear
B152LR	B152LR Suspension Position Sensor - Left Rear

The automatic level control (ALC) system maintains a desired rear suspension position under all types of loading conditions

When the vehicle is unloaded, the rear suspension is at a desired position, which is monitored by the ESCM using the position sensor signal voltage inputs. As weight is added to the rear of the vehicle, the position sensor's signal voltage inputs change. When the ESCM detects a steady substantial change in the position sensor signal voltages for at least 10 seconds, it responds by commanding ON the compressor relay, which activates the compressor causing the air pressure in the air spring to inflate. This inflation raises the rear of the vehicle to regain the desired suspension position. When weight is removed from the vehicle, the ESCM responds by commanding ON the exhaust valve causing the air pressure in the air spring to deflate. This deflation lowers the vehicle to regain the desired suspension position.

The compressor is a positive displacement piston air pump driven by a 12-volt DC permanent magnet motor. The compressor draws filtered air through an intake line attached to an under body rail. The compressed air is then run through a dryer containing a moisture-absorbing chemical that dries the compressed air before it is sent to the air springs. Each time the compressor is activated, the ESCM commands ON the exhaust valve for 1.5 seconds to release air from the compression chamber in the compressor's cylinder head ensuring low motor current draw upon compressor activation. The ESCM also limits the amount of compressor run time to 180 seconds to protect the compressor components from thermal damage.

The ESCM has the ability to detect malfunctions within the ALC system. Any malfunctions detected will cause the DIC to display the SERVICE LEVELING SYSTEM message.

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