

2006 Buick Rainier

2006 SUSPENSION Air Suspension - Ascender, Envoy, Rainier & TrailBlazer

2006 SUSPENSION

Air Suspension - Ascender, Envoy, Rainier & TrailBlazer

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Air Spring Compressor to Frame Mounting Bolts	20 N.m	15 lb ft
Air Spring Leveling Sensor to Frame Mounting Bolts	8 N.m	71 lb in
Air Supply Lines to Air Spring Compressor	2.25 N.m	20 lb in

SCHEMATIC & ROUTING DIAGRAMS

SUSPENSION CONTROLS SCHEMATICS

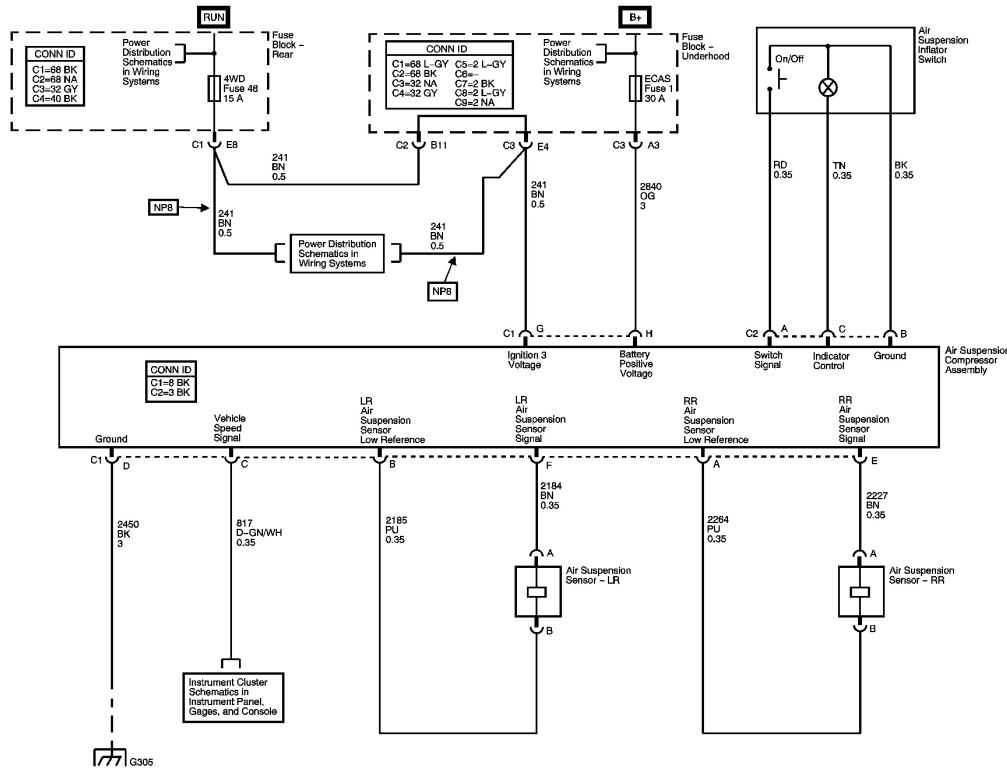


Fig. 1: Suspension Controls Schematic
 Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

SUSPENSION CONTROLS COMPONENT VIEWS

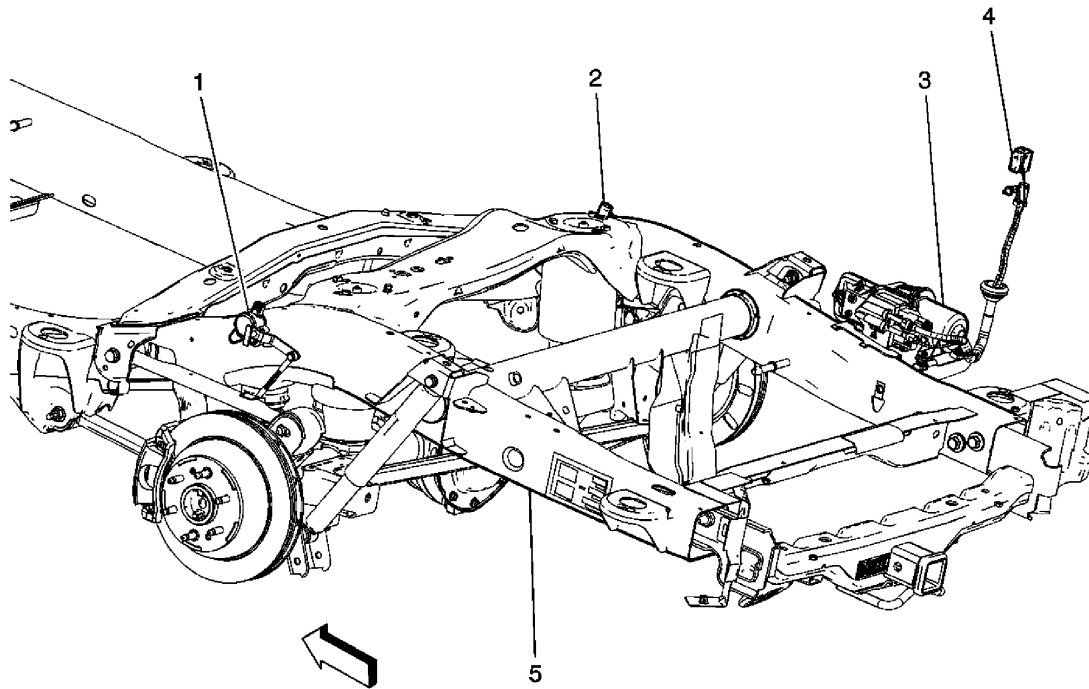


Fig. 2: Rear Frame and Underbody - Short Wheelbase (SWB)
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Air Suspension Sensor - LR
2	Air Suspension Sensor - RR
3	Air Suspension Compressor Assembly
4	Air Suspension Inflator Switch
5	Frame

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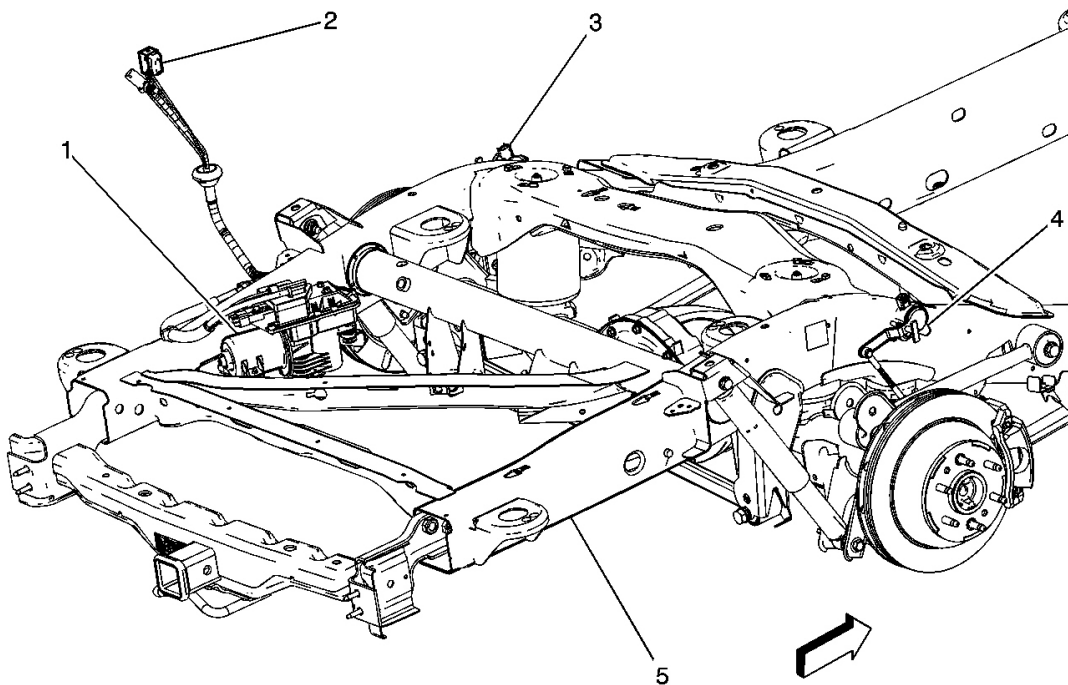


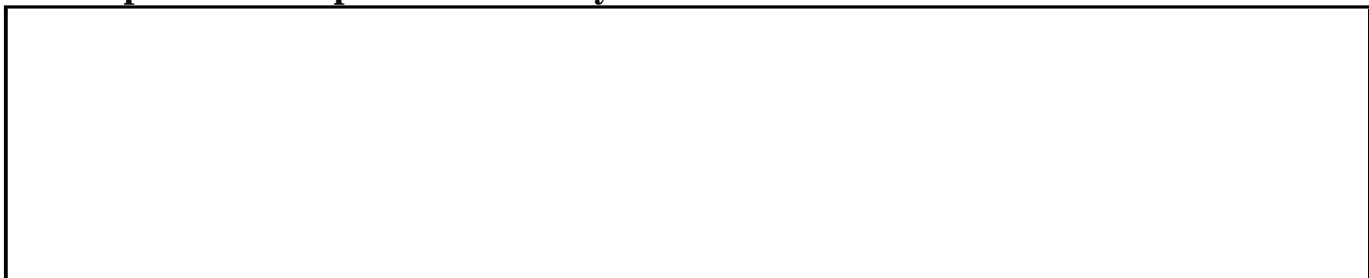
Fig. 3: Rear Frame and Underbody - Long Wheelbase (LWB)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Air Suspension Compressor Assembly
2	Air Suspension Inflator Switch
3	Air Suspension Sensor - LR
4	Air Suspension Sensor - RR
5	Frame

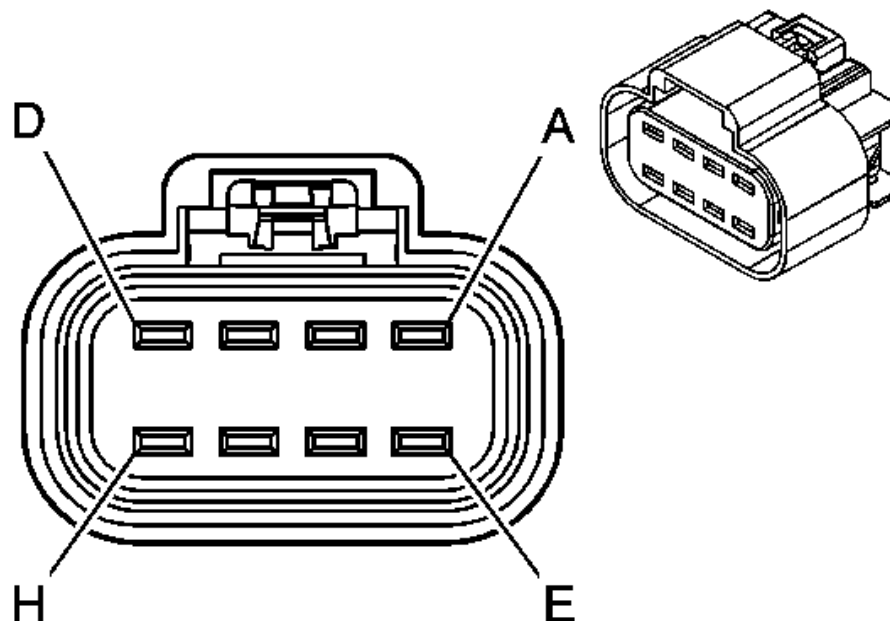
SUSPENSION CONTROLS CONNECTOR END VIEWS

Air Suspension Compressor Assembly C1



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Connector Part Information

- 15326654
- 8-Way F GT 280 Series Sealed (BK)

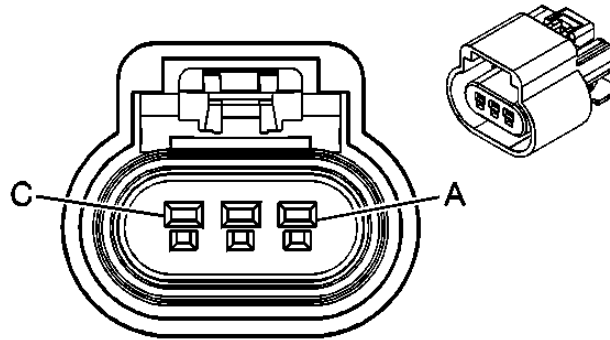
Pin	Wire Color	Circuit No.	Function
A	PU	2264	RR Air Suspension Sensor Low Reference
B	PU	2185	LR Air Suspension Sensor Low Reference
C	D-GN/WH	817	Vehicle Speed Signal
D	BK	2450	Ground
E	BN	2227	RR Air Suspension Sensor Signal
F	BN	2184	LR Air Suspension Sensor Signal
G	BN	241	Ignition 3 Voltage
H	OG	2840	Battery Positive Voltage

Air Suspension Compressor Assembly C2 (Air Suspension Inflator Switch)



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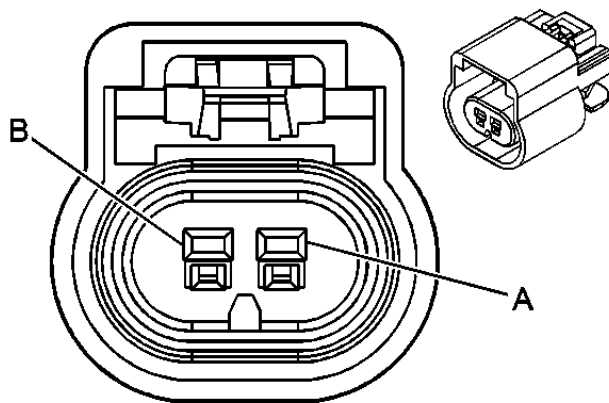


Connector Part Information

- 15326808
- 3-Way F GT 150 Series Sealed (BK)

Pin	Wire Color	Circuit No.	Function
A	RD	-	Switch Signal
B	BK	-	Ground
C	TN	-	Indicator Control

Air Suspension Sensor - LR



Connector Part Information

- 15326801
- 2-Way F GT 150 Series Sealed (BK)

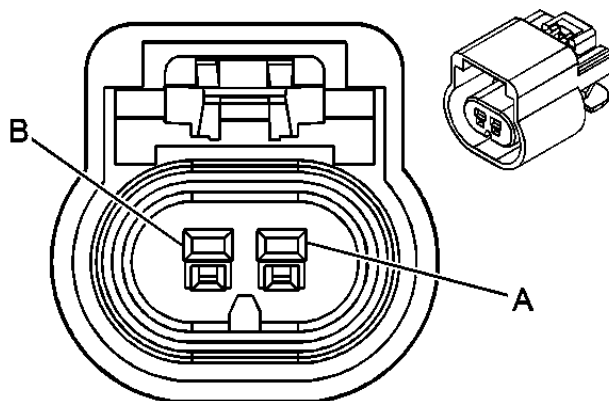
Pin	Wire Color	Circuit No.	Function
A	BN	2184	LR Air Suspension Sensor Signal

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B	PU	2185	LR Air Suspension Sensor Low Reference
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Air Suspension Sensor - RR



Connector Part Information		<ul style="list-style-type: none">• 15326801• 2-Way F GT 150 Series Sealed (BK)	
Pin	Wire Color	Circuit No.	Function
A	BN	2227	RR Air Suspension Sensor Signal
B	PU	2264	RR Air Suspension Sensor Low Reference

DIAGNOSTIC INFORMATION & PROCEDURES

DIAGNOSTIC STARTING POINT - AIR SUSPENSION

Begin the system diagnosis with the **Diagnostic System Check - Vehicle** in Vehicle DTC Information. The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system.
- 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 TROUBLE CODE (DTC) DISPLAYING

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All the Air Suspensions diagnostic trouble codes are displayed with a blink code on the inflator switch LED. The Air Suspension Compressor Assembly shall begin to indicate the code when the condition to cause the code becomes current.

The number of the fault code shall be represented by the number of flashing pulses on the inflator switch LED. The flashing pulses shall have a repetition rate of 0.5 seconds and each code shall be separated by a 3.0 second delay. All codes shall be flashed in the order of occurrence of the fault. The blink code shall take priority over other processes have access to the inflator switch LED.

DIAGNOSTIC TROUBLE CODE (DTC) CLEARING

The Air Suspensions diagnostic trouble codes will clear when the ignition switch has been transitioned from off to on and the conditions that caused the code to set have been removed.

DTC 001

Circuit Description

The air suspension compressor assembly monitors the calibrations in the electrically erasable programmable read-only memory (EEPROM). The module also monitors the compressor, solenoids and internal wiring for faults.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC 001 System Disabled Information Stored

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The air suspension compressor assembly detects an invalid EPROM checksum or internal component failure.

Action Taken When the DTC Sets

Depending on the condition that set the DTC, some or all functions will be disabled.

Conditions for Clearing the DTC

The DTC will automatically clear when the condition for setting the DTC is removed and the

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ignition has cycled from on to off to on.

Diagnostic Aids

The air suspension compressor assembly will set a DTC 001 when any of these conditions are present:

- A checksum error in EEPROM is present.
- The compressor is shorted or open.
- The compressor solenoids are shorted or open.

DTC 001

Step	Action	Yes	No
Schematic Reference: <u>Suspension Controls Schematics</u>			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	Verify the fault is present. Does the system operate normally?	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems	Go to Step 3
3	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the air suspension compressor assembly. 3. Reconnect the air suspension compressor assembly. 4. Turn ON the ignition, with the engine OFF. Does the LED flash DTC 001?	Go to Step 4	Go to Step 5
4	Replace the air suspension compressor assembly. Refer to <u>Air Spring Compressor Replacement</u> . Did you complete the replacement?	Go to Step 5	-

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5	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
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DTC 002

Circuit Description

The air suspension compressor assembly sends a pulse width modulation (PWM) voltage to the left height sensor at 25 ms intervals on the air suspension sensor signal circuit. The air suspension compressor assembly then measures the return voltage on the air suspension sensor low reference circuit and determines the vehicle height.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC 002 Left Rear Position Sensor Circuit

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The air suspension compressor assembly detects a invalid height sensor signal.

Action Taken When the DTC Sets

The air suspension compressor assembly shall disregard the left air suspension sensor input and use the right air suspension sensor to determine the vehicle height.

If both air suspension sensor DTCs are set, the air suspension compressor assembly shall deactivate the compressor, corner solenoids and exhaust solenoids. All leveling functions will be disabled. Inflator functions will not be disabled.

Conditions for Clearing the DTC

The DTC will automatically clear when the condition for setting the DTC is removed.

Diagnostic Aids

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Resistance of the air suspension sensor at room temperature and normal vehicle height is approximately 87 ohms. The resistance range of the sensor is 75-100 ohms.

DTC 002

Step	Action	Values	Yes	No
Schematic Reference: <u>Suspension Controls Schematics</u>				
1	Did you perform the Diagnostic System Check - Vehicle?	-	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	Verify the fault is present. Does the system operate normally?	-	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems	Go to Step 3
3	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the left air suspension sensor. 3. Disconnect the air suspension compressor assembly. 4. Test the air suspension sensor signal circuit for an open, short to voltage and a short to ground. Refer to the following in Wiring Systems: <ul style="list-style-type: none"> • <u>Testing for Continuity</u> • <u>Testing for a Short to Voltage</u> • <u>Testing for Short to Ground</u> 	-	Go to Step 10	Go to Step 4
	Did you find and correct the condition?			
	Test the air suspension return circuit for			

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4	<p>an open, short to voltage and a short to ground. Refer to the following in Wiring Systems:</p> <ul style="list-style-type: none"> • <u>Testing for Continuity</u> • <u>Testing for a Short to Voltage</u> • <u>Testing for Short to Ground</u> <p>Did you find and correct the condition?</p>	-			Go to Step 10	Go to Step 5
5	<p>Measure the resistance of the air suspension sensor. Does the resistance measure within the specified value?</p>	75-100 ohms			Go to Step 6	Go to Step 9
6	<p>Inspect for poor connections at the harness connector of the left air suspension sensor. Did you find and correct the condition?</p>	-			Go to Step 10	Go to Step 7
7	<p>Inspect for poor connections at the harness connector of the air suspension compressor assembly. Did you find and correct the condition?</p>	-			Go to Step 10	Go to Step 8
8	<p>Replace the air suspension compressor assembly. Refer to <u>Air Spring Compressor Replacement</u>. Did you complete the replacement?</p>	-			Go to Step 10	-
9	<p>Replace the left air suspension sensor. Refer to <u>Air Spring Leveling Sensor Replacement</u>. Did you complete the replacement?</p>	-			Go to Step 10	-
10	<p>Operate the system in order to verify the repair. Did you correct the condition?</p>	-			System OK	Go to Step 3

DTC 003

Circuit Description

The air suspension compressor assembly sends a pulse width modulation (PWM) voltage to the

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right height sensor at 25 ms intervals on the air suspension sensor signal circuit. The air suspension compressor assembly then measures the return voltage on the air suspension sensor low reference circuit and determine the vehicle height.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC 003 Right Rear Position Sensor Circuit

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

The air suspension compressor assembly detects a invalid air suspension sensor signal.

Action Taken When the DTC Sets

The air suspension compressor assembly shall disregard the right air suspension sensor input and use the left air suspension sensor to determine the vehicle height.

If both air suspension sensor DTCs are set, the air suspension compressor assembly shall deactivate the compressor, corner solenoids and exhaust solenoids. All leveling functions will be disabled. Inflator functions will not be disabled.

Conditions for Clearing the DTC

The DTC will automatically clear when the condition for setting the DTC is removed.

Diagnostic Aids

Resistance of the air suspension sensor at room temperature and normal vehicle height is approximately 87 ohms. The resistance range of the sensor is 75-100 ohms.

DTC 003

Step	Action	Values	Yes	No
Schematic Reference: <u>Suspension Controls Schematics</u>				
1	Did you perform the Diagnostic System Check - Vehicle?	-		Go to <u>Diagnostic System Check -</u>

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			<u>Vehicle</u> in Vehicle DTC Information
			Go to Step 2
2	Verify the fault is present. Does the system operate normally?	-	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems Go to Step 3
3	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the right air suspension sensor. 3. Disconnect the air suspension compressor assembly. 4. Test the air suspension sensor signal circuit for an open, short to voltage and a short to ground. Refer to the following in Wiring Systems: <ul style="list-style-type: none"> • <u>Testing for Continuity</u> • <u>Testing for a Short to Voltage</u> • <u>Testing for Short to Ground</u> <p>Did you find and correct the condition?</p>	-	Go to Step 10 Go to Step 4
4	<p>Test the air suspension sensor return circuit for an open, short to voltage and a short to ground. Refer to the following in Wiring Systems:</p> <ul style="list-style-type: none"> • <u>Testing for Continuity</u> • <u>Testing for a Short to Voltage</u> • <u>Testing for Short to Ground</u> <p>Did you find and correct the condition?</p>	-	Go to Step 10 Go to Step 5

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5	Measure the resistance of the air suspension sensor. Does the resistance measure within the specified value?	75-100 ohms	Go to Step 6	Go to Step 9
6	Inspect for poor connections at the harness connector of the right air suspension sensor. Did you find and correct the condition?	-	Go to Step 10	Go to Step 7
7	Inspect for poor connections at the harness connector of the air suspension compressor assembly. Did you find and correct the condition?	-	Go to Step 10	Go to Step 8
8	Replace the air suspension compressor assembly. Refer to <u>Air Spring Compressor Replacement</u> . Did you complete the replacement?	-	Go to Step 10	-
9	Replace the right air suspension sensor. Refer to <u>Air Spring Leveling Sensor Replacement</u> . Did you complete the replacement?	-	Go to Step 10	-
10	Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to Step 3

SYMPTOMS - AIR SUSPENSION

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

1. Perform the **Diagnostic System Check - Vehicle** in Vehicle DTC Information, before using the Symptom Tables in order to verify that there are no DTCs set.
2. Review the system description and operation in order to familiarize yourself with the system functions. Refer to **Air Suspension Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Air Suspension System. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions

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which could cause the symptom.

- Inspect the air springs for damage or leaks.
- Inspect the air lines to air springs and inflator valve for leaks, damage or kinks.
- Inspect the air lines and inflator valve fittings for leaks.
- Inspect the inflator valve for leaks.
- Inspect the height sensors and sensor links for any damage or disconnected components.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Electrical Intermittents** in Wiring Systems.

Symptom List

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

- **Rear Air Springs Do Not Inflate**
- **Rear Air Springs Do Not Deflate**
- **Inflator Inoperative**

REAR AIR SPRINGS DO NOT INFLATE

Rear Air Springs Do Not Inflate

Step	Action	Yes	No
Schematic Reference: <u>Suspension Controls Schematics</u>			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	Verify the fault is present. Does the system operate normally?	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems	Go to Step 3
	1. Turn OFF the ignition.		

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3	<p>2. Disconnect the air suspension compressor assembly.</p> <p>3. Turn ON the ignition, with the engine OFF.</p> <p>4. Connect a test lamp between the ground circuit of the air suspension compressor assembly and a battery positive voltage circuit.</p>		
	Does the test lamp illuminate?	Go to Step 4	Go to Step 7
4	<p>Test the battery positive voltage circuit of the air suspension compressor assembly for an open, short to ground and high resistance. Refer to the following in Wiring Systems:</p> <ul style="list-style-type: none"> • <u>Circuit Testing</u> • <u>Testing for Short to Ground</u> • <u>Testing for Intermittent Conditions and Poor Connections</u> 		
	Did you find and correct the condition?	Go to Step 9	Go to Step 5
5	<p>Test the ignition 3 voltage circuit of the air suspension compressor assembly for an open, short to ground and high resistance. Refer to the following in Wiring Systems:</p> <ul style="list-style-type: none"> • <u>Circuit Testing</u> • <u>Testing for Short to Ground</u> • <u>Testing for Intermittent Conditions and Poor Connections</u> 		
	Did you find and correct the condition?	Go to Step 9	Go to Step 6
6	<p>Inspect for poor connections at the harness connector of the air suspension compressor assembly.</p> <p>Did you find and correct the condition?</p>	Go to Step 9	Go to Step 8

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7	Repair the open in the air suspension compressor assembly ground circuit. Did you complete the repair?	Go to Step 9	-
8	Replace the air suspension compressor assembly. Refer to <u>Air Spring Compressor Replacement</u> . Did you complete the replacement?	Go to Step 9	-
9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

REAR AIR SPRINGS DO NOT DEFLATE

Rear Air Springs Do Not Deflate

Step	Action	Yes	No
Schematic Reference: <u>Suspension Controls Schematics</u>			
1	Did you review the Air Suspension operation and perform the necessary inspections?	Go to Step 2	Go to <u>Air Suspension Description and Operation</u>
2	IMPORTANT: The vehicle must be on a drive on hoist. <ol style="list-style-type: none"> 1. Raise and support the vehicle. 2. Disconnect the air suspension compressor assembly. 3. Connect a test lamp between the battery positive voltage circuit of the air suspension compressor assembly harness and ground. Does the test lamp illuminate?	Go to Step 3	Go to Step 6
3	Connect a test lamp between the ground circuit of the air suspension compressor assembly harness and a battery positive voltage circuit. Does the test lamp illuminate?	Go to Step 4	Go to Step 7
4	Disconnect both air spring supply tubes at the air suspension compressor assembly. Did the vehicle lower?	Go to Step 5	Go to Step 8

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3	<p>switch at air suspension compressor assembly.</p> <p>3. Turn ON the ignition, with the engine OFF.</p> <p>4. Connect a test lamp between the inflator switch ground circuit of the air suspension compressor assembly and a battery positive voltage circuit.</p> <p>Does the test lamp illuminate?</p>	Go to Step 4	Go to Step 6
4	<p>Connect a 3-amp fused jumper wire between the control circuit of the air suspension compressor assembly and the ground circuit of the air suspension compressor assembly.</p> <p>Does the compressor start and run?</p>	Go to Step 7	Go to Step 5
5	<p>Test the control circuit of the air suspension inflator switch for an open, short to ground, short to voltage and high resistance. Refer to the following in Wiring Systems:</p> <ul style="list-style-type: none"> • <u>Circuit Testing</u> • <u>Testing for Short to Ground</u> • <u>Testing for Intermittent Conditions and Poor Connections</u> <p>Did you find and correct the condition?</p>	Go to Step 11	Go to Step 8
6	<p>Inspect for poor connections at the harness connector of the air suspension compressor assembly.</p> <p>Did you find and correct the condition?</p>	Go to Step 11	Go to Step 9
7	<p>Inspect for poor connections at the harness connector of the air suspension inflator switch.</p> <p>Did you find and correct the condition?</p>	Go to Step 11	Go to Step 10
8	<p>Inspect for poor connections at the harness connector of the air suspension compressor assembly.</p> <p>Did you find and correct the condition?</p>	Go to Step 11	Go to Step 9

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9	Replace the air suspension compressor assembly. Refer to <u>Air Spring Compressor Replacement</u> . Did you complete the replacement?	Go to Step 11	-
10	Replace the air suspension inflator switch. Refer to <u>Inflator Air Switch Replacement</u> . Did you complete the replacement?	Go to Step 11	-
11	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

TRIM HEIGHT UNEVEN

Trim Height Uneven

Step	Action	Yes	No
Schematic Reference: <u>Suspension Controls Schematics</u>			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	Verify the fault is present. Does the system operate normally?	Go to <u>Air Spring Sensor Calibration</u>	Go to Step 3
3	Turn ignition ON with engine OFF. Does rear of vehicle raise to trim height and is level from side to side when viewing vehicle from rear?	Go to Step 4	Go to <u>Air Spring Sensor Calibration</u>
4	Check Air Suspension System for small leaks. Did you find and correct the condition?	Go to Step 5	-
5	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

REPAIR INSTRUCTIONS

AIR SPRING SENSOR CALIBRATION

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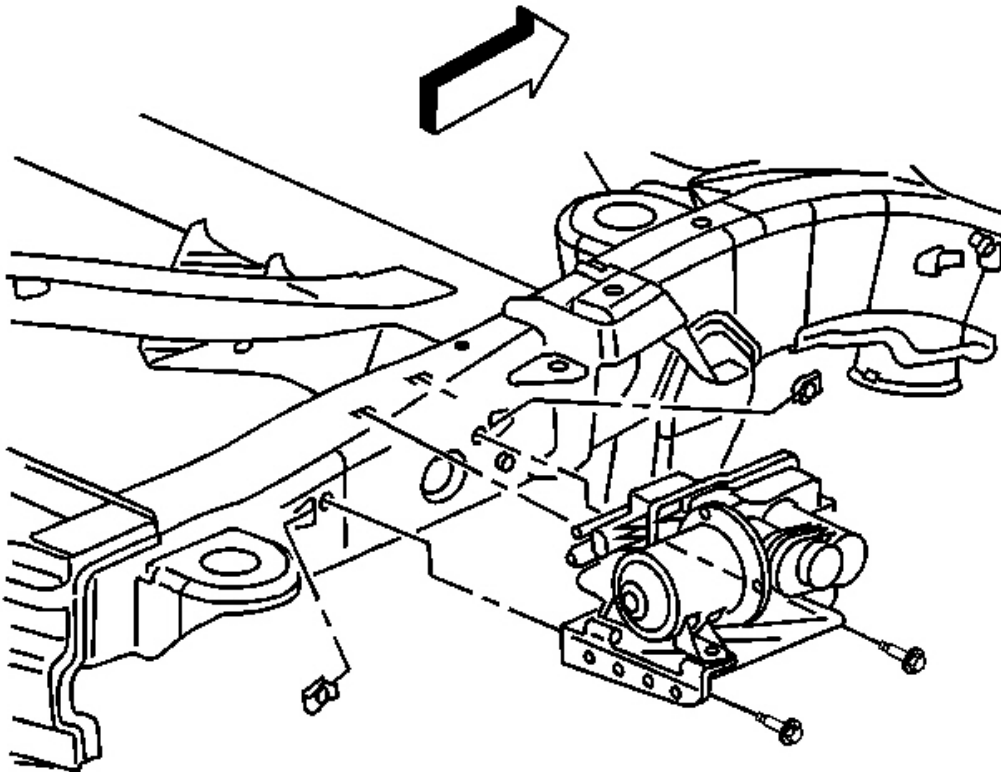


Fig. 4: Removing/Installing Air Compressor Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

CAUTION: A sudden release of pressure may cause personal injury or damage to the vehicle. The air suspension system is under pressure until the air supply lines are disconnected. Use the following precautions when servicing the air suspension system:

- Wear gloves, ear protection, and eye protection.
- Wrap a clean cloth around the air supply lines.

NOTE: Depressurize the air suspension system only after the rear axle is supported and is set between D- Height and Full Jounce.

IMPORTANT: Remove the air suspension system fuse before working on the rear suspension components or the rear axle. Failure to remove the air suspension system fuse could cause the calibration of the air suspension leveling sensor to change and the air suspension system not to function properly.

1. Remove the air suspension system fuse.
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
3. Raise and support the rear axle at the designed D height. Refer to **Trim Height Specifications** in Suspension General Diagnosis.
4. Remove the rear tire and wheels. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
5. Remove the air compressor mounting bolts from the frame and support air compressor.
6. Loosen both of the air supply line connections at the air compressor in order to depressurize the air springs.
7. Support the rear axle and set the rear axle to proper D height. Refer to **Trim Height Specifications** in Suspension General Diagnosis.

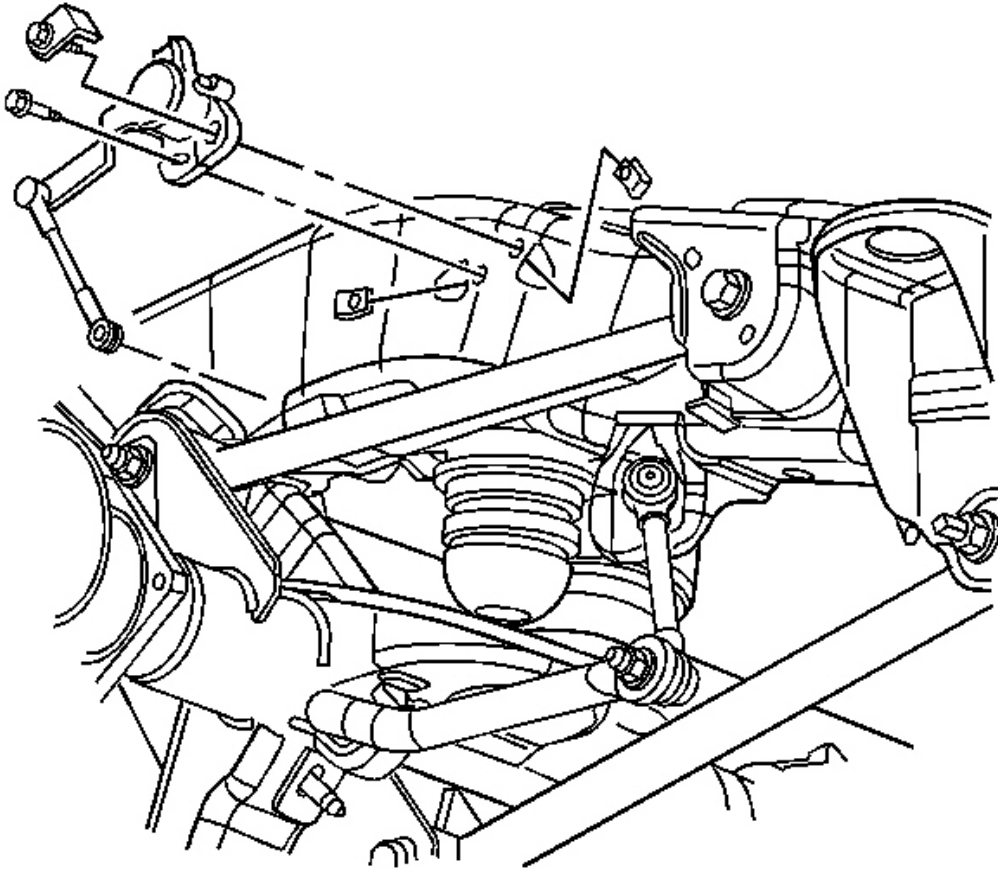


Fig. 5: Removing/Installing Air Spring Level Sensor
Courtesy of GENERAL MOTORS CORP.

8. Loosen the air spring level sensor to the frame mounting bolts.

NOTE: Failure to remove the air suspension auto level control sensor locating pin before the rear axle support is removed will cause damage to the air suspension auto level control sensor.

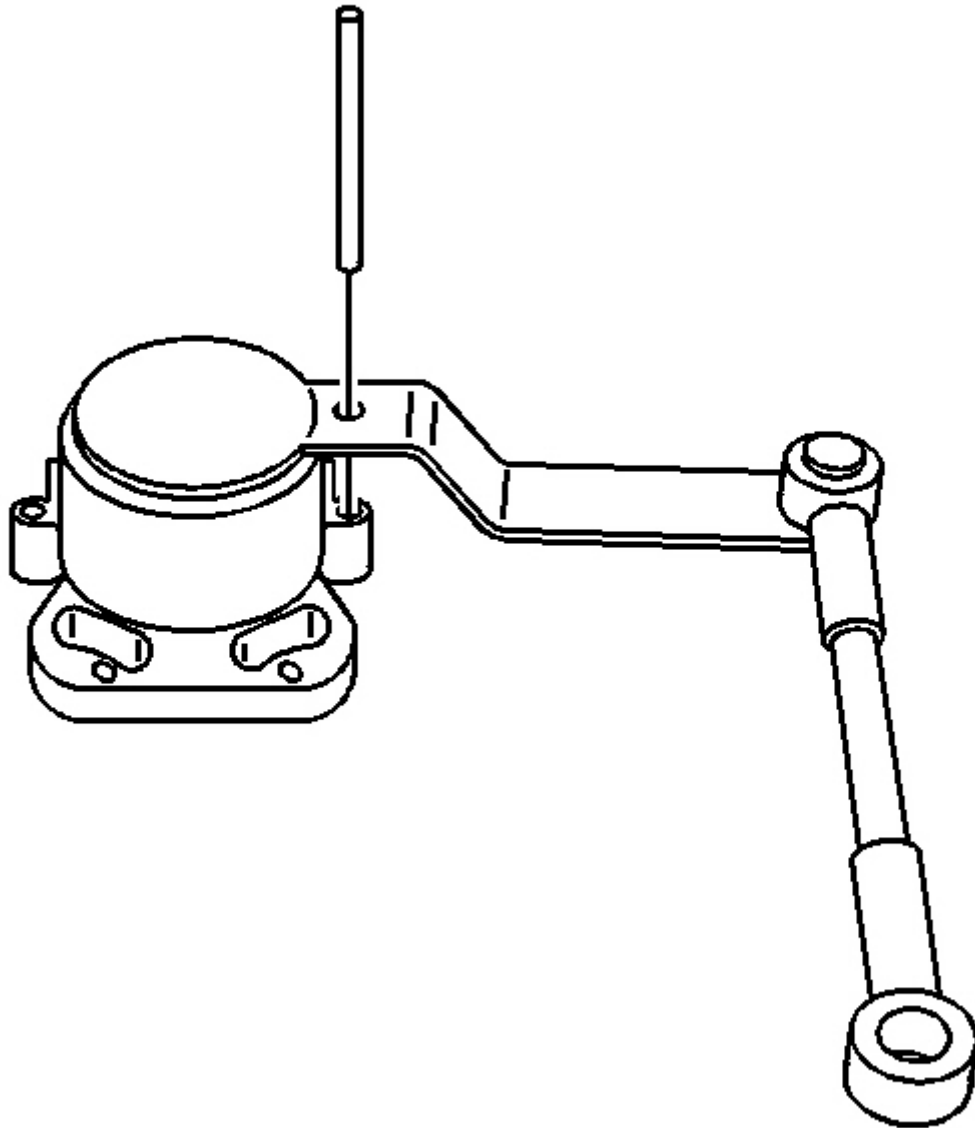


Fig. 6: Installing/Removing Air Spring Level Sensor Locating Pin
Courtesy of GENERAL MOTORS CORP.

9. Install air spring level sensor locating pin.

Use proper size drill bit that fits snugly.

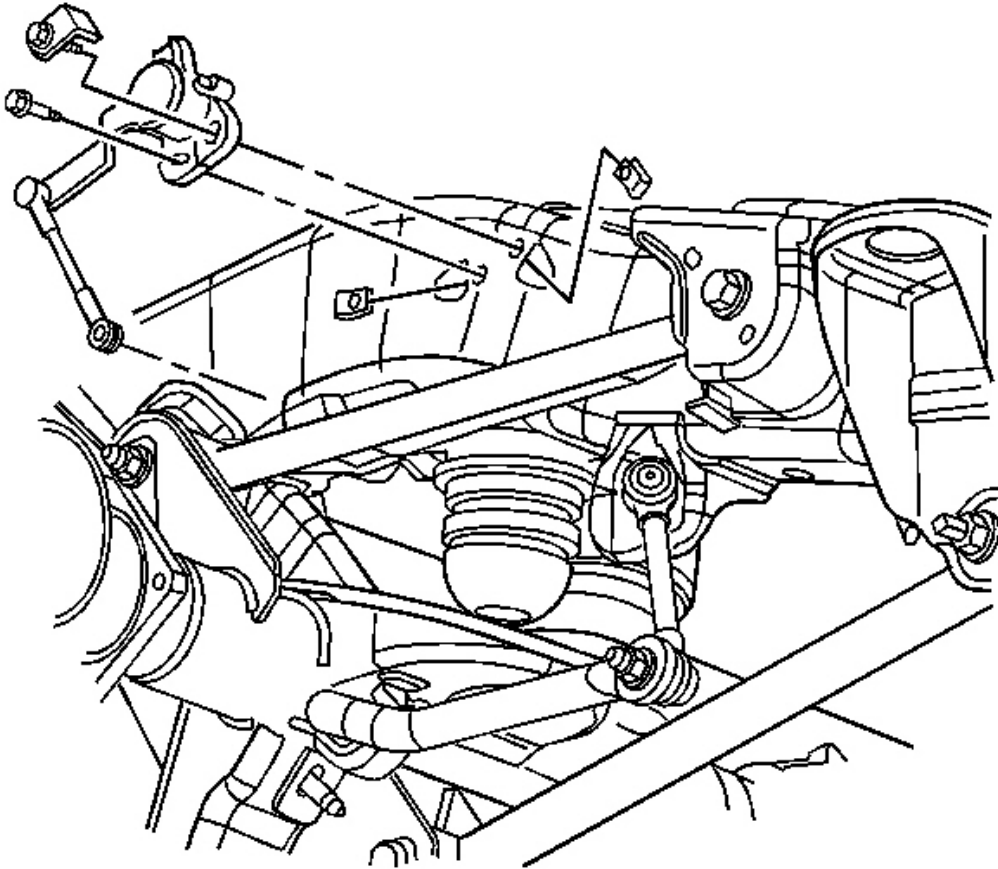


Fig. 7: Removing/Installing Air Spring Level Sensor
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

IMPORTANT: Do not remove the air spring level sensor locating pin until the air spring level sensor has been properly aligned and the proper D height has been measured and maintained. Refer to Trim Height Specifications in Suspension General Diagnosis.

10. Tighten the air spring level sensor to the frame mounting bolts.

Tighten: Tighten the air spring level sensor to the frame mounting bolts to 8 N.m (71 lb in).

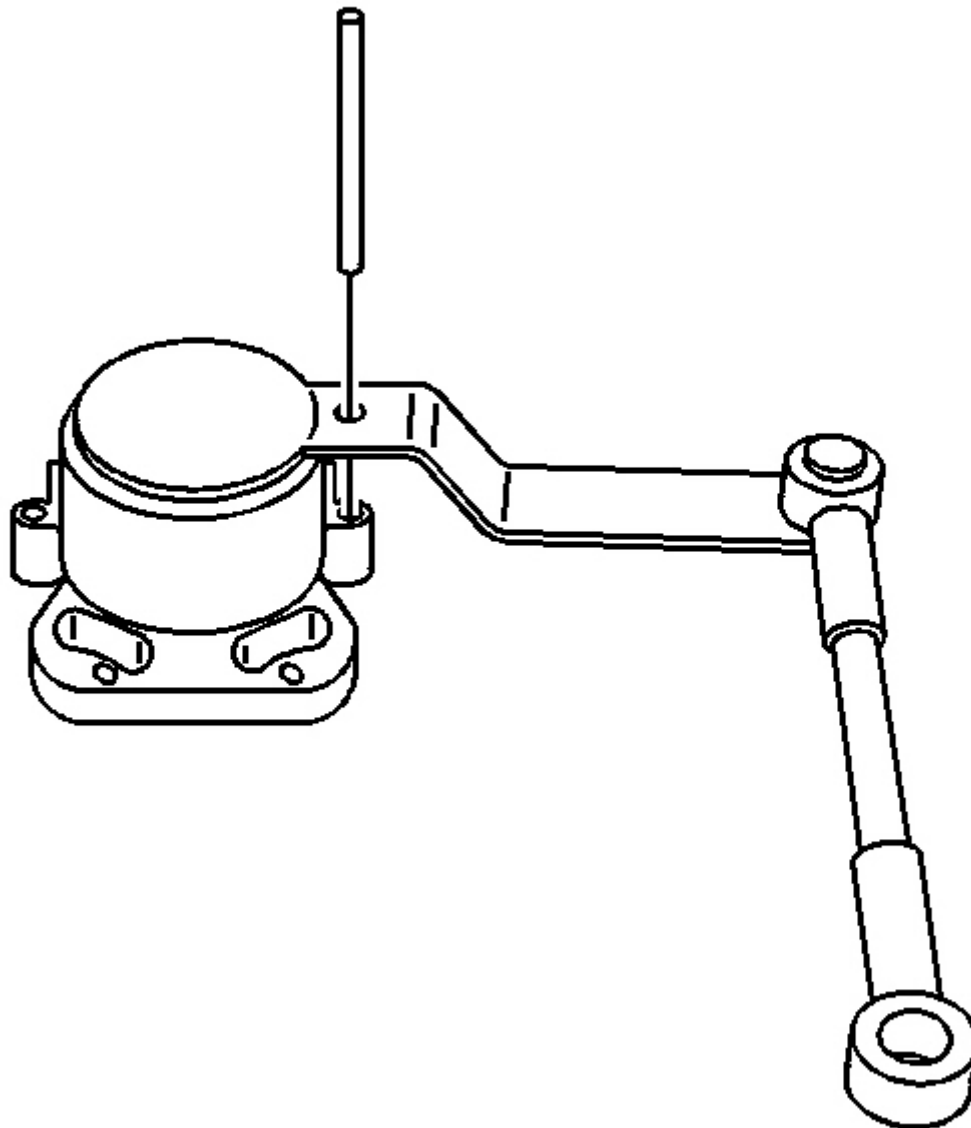


Fig. 8: Installing/Removing Air Spring Level Sensor Locating Pin
Courtesy of GENERAL MOTORS CORP.

NOTE: Failure to remove the air suspension auto level control sensor locating pin before the rear axle support is removed will cause damage to the air suspension auto level control sensor.

11. Remove the air spring level sensor locating pin.

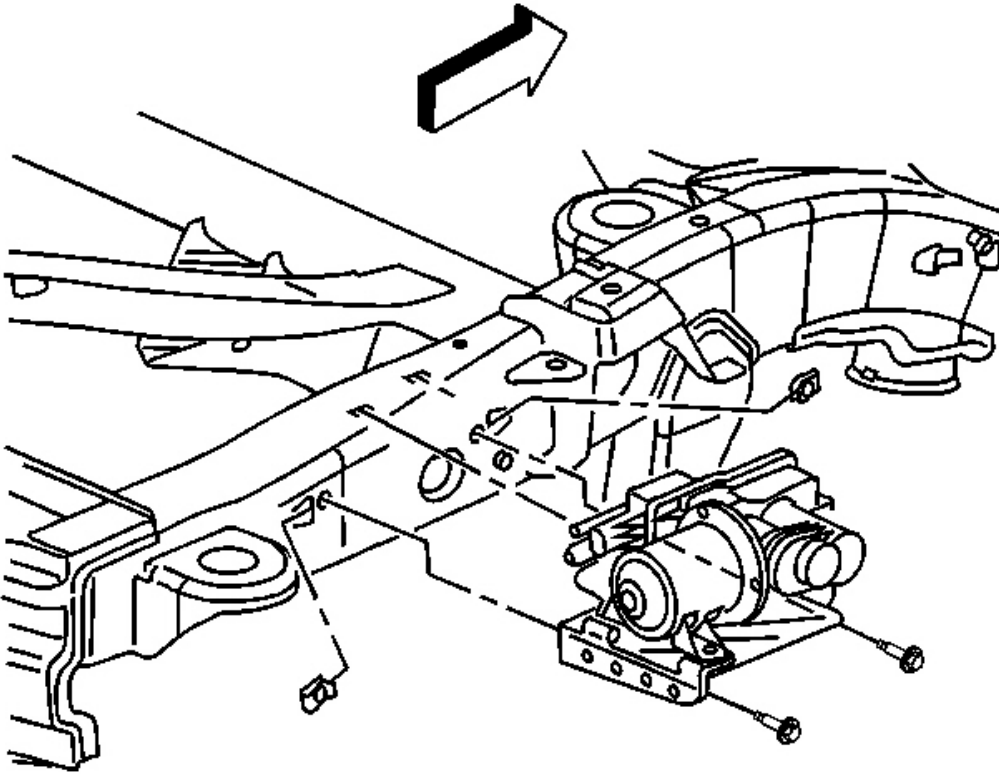


Fig. 9: Removing/Installing Air Compressor Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Check the air supply lines for deep scores or cuts. If the air supply lines are damaged the lines must be replaced. Refer to Air Suspension Air Line Replacement.

12. Tighten the air supply lines to the air compressor. Do not over tighten.

Tighten: Tighten the air supply lines to the air compressor to 2.25 N.m (20 lb in).

13. Install the air compressor to frame mounting bolts.

Tighten: Tighten the air compressor mounting bolts to the frame to 20 N.m (15 lb ft).

14. Install the rear tire and wheels. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
15. Remove the rear axle support.
16. Lower the vehicle.
17. Install the air suspension system fuse.
18. Start the vehicle and run for approximately 1 minute to ensure that the air suspension system is functioning properly.
19. Check the D height. Refer to **Trim Height Inspection Procedure** in Suspension General Diagnosis.

AIR SUSPENSION DEPRESSURIZATION PROCEDURE

Removal Procedure

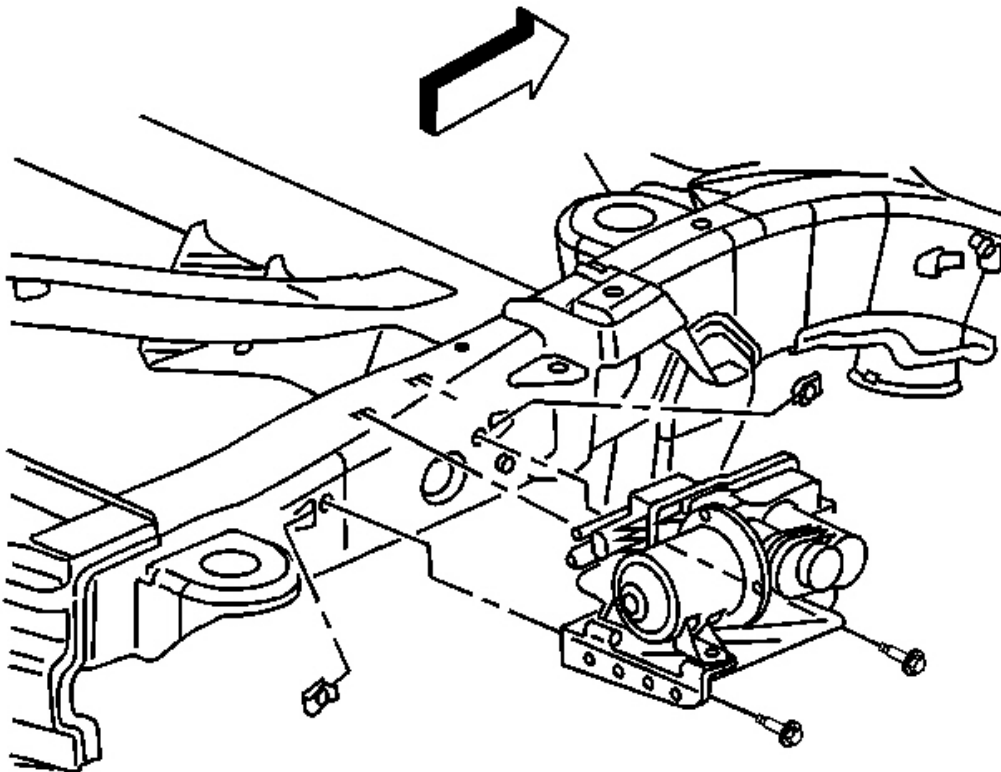


Fig. 10: Removing/Installing Air Compressor Mounting Bolts

Courtesy of GENERAL MOTORS CORP.

CAUTION: A sudden release of pressure may cause personal injury or damage to the vehicle. The air suspension system is under pressure until the air supply lines are disconnected. Use the following precautions when servicing the air suspension system:

- Wear gloves, ear protection, and eye protection.
- Wrap a clean cloth around the air supply lines.

NOTE: Depressurize the air suspension system only after the rear axle is supported and is set between D- Height and Full Jounce.

IMPORTANT: Remove the air suspension system fuse before working on the rear suspension components or the rear axle. Failure to remove the air suspension system fuse could cause the calibration of the air suspension leveling sensor to change and the air suspension system not to function properly.

1. Remove the air suspension system fuse.
2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.
3. Raise and support the rear axle at the designed D-height. Refer to Trim Height Specifications in Suspension General Diagnosis.
4. Remove the air compressor mounting bolts from the frame and support air compressor.
5. Loosen both of the air supply line connections at the air compressor in order to depressurize the air springs.

Installation Procedure

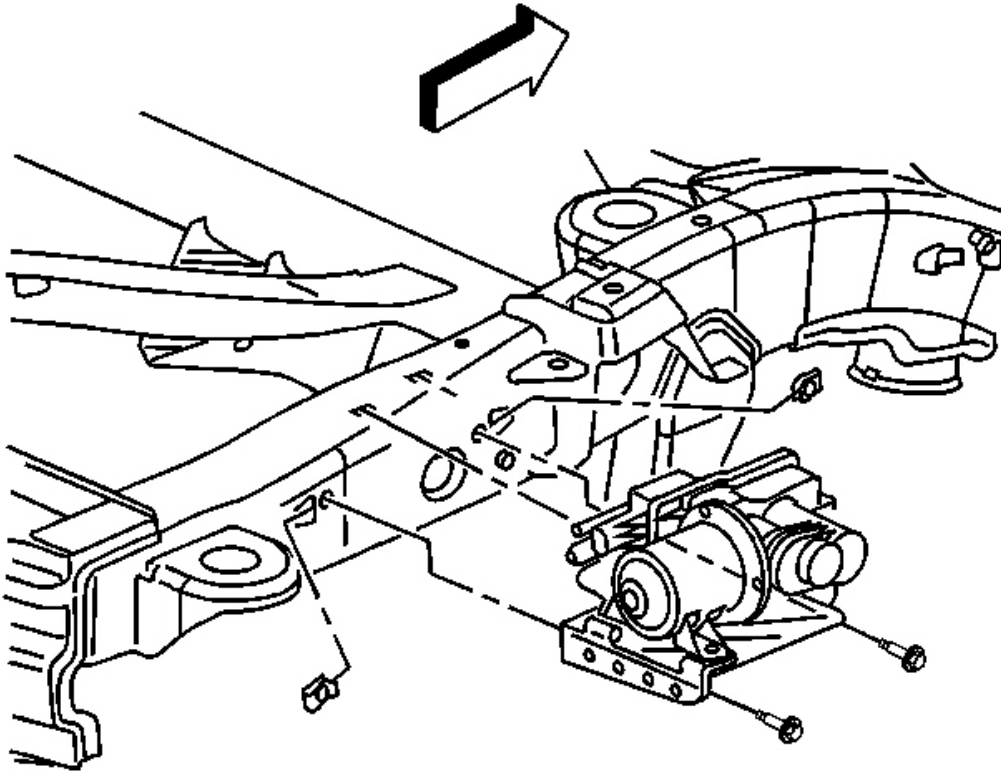


Fig. 11: Removing/Installing Air Compressor Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

IMPORTANT: Check the air supply lines for deep scores or cuts. If the air supply lines are damaged the lines must be replaced. Refer to Air Suspension Air Line Replacement.

1. Tighten the air supply lines to the air compressor. Do not over tighten.

Tighten: Tighten the air supply lines to the air compressor to 2.25 N.m (20 lb in).

2. Install the air compressor to frame mounting bolts.

Tighten: Tighten the air compressor mounting bolts to the frame to 20 N.m (15 lb ft).

3. Lower the vehicle.
4. Install the air suspension system fuse.
5. Start the vehicle and run for approximately 1 minute to ensure that the air suspension system is functioning properly.
6. Check the D height. Refer to **Trim Height Inspection Procedure** in Suspension General Diagnosis.

AIR SPRING LEVELING SENSOR REPLACEMENT

Removal Procedure

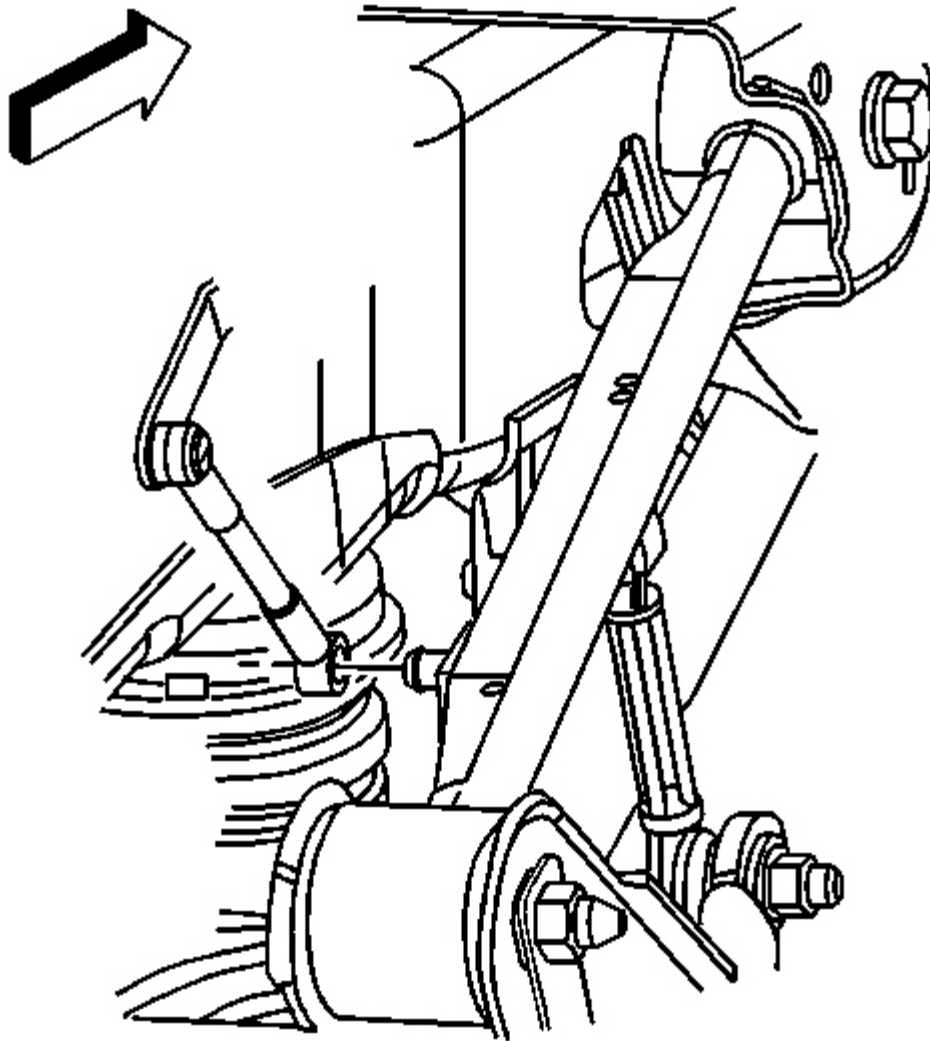


Fig. 12: Removing Rear Axle Upper Control Arm
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Remove the air suspension system fuse before working on the rear suspension components or the rear axle. Failure to remove the air suspension system fuse could cause the calibration of the air suspension leveling sensor to change and the air suspension system not to function properly.

1. Remove the air suspension system fuse.
2. Ensure that the vehicle is parked on level surface.
3. Inspect tires for proper tire pressure. Refer to **Label - Vehicle Certification, Tire Place Card, Anti-Theft and Service Parts ID** .
4. Inspect the air suspension system components for damage or defects.
5. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
6. Remove the rear tire and wheels. Refer to **Tire and Wheel Removal and Installation** .
7. Support the rear axle and set the rear axle to proper D height. Refer to **Trim Height Specifications** .
8. Disconnect the air spring level sensor link from the upper control arm.

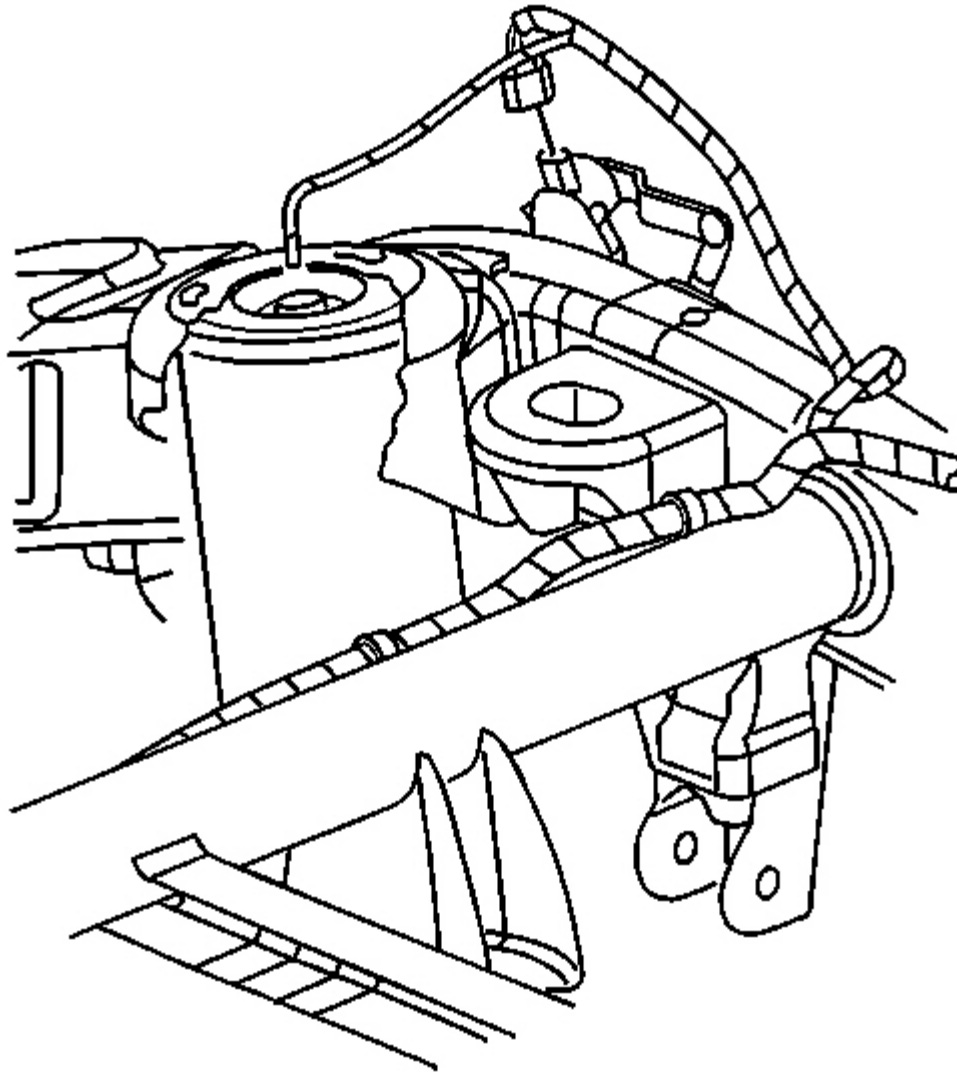


Fig. 13: Disconnecting/Connecting Air Spring Level Sensor Electrical Connector
Courtesy of GENERAL MOTORS CORP.

9. Disconnect the air spring level sensor electrical connector.

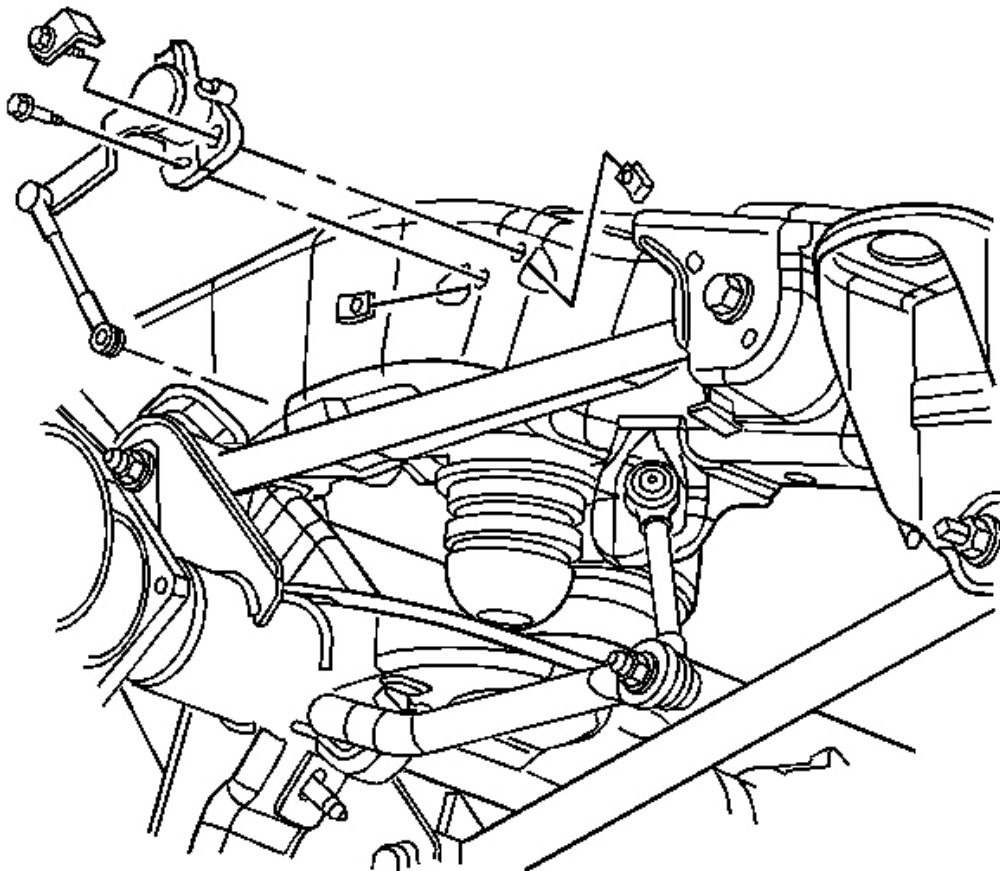


Fig. 14: Removing/Installing Air Spring Level Sensor
Courtesy of GENERAL MOTORS CORP.

10. Remove the air spring level sensor to the frame mounting bolts.
11. Remove the air spring level sensor.

Installation Procedure

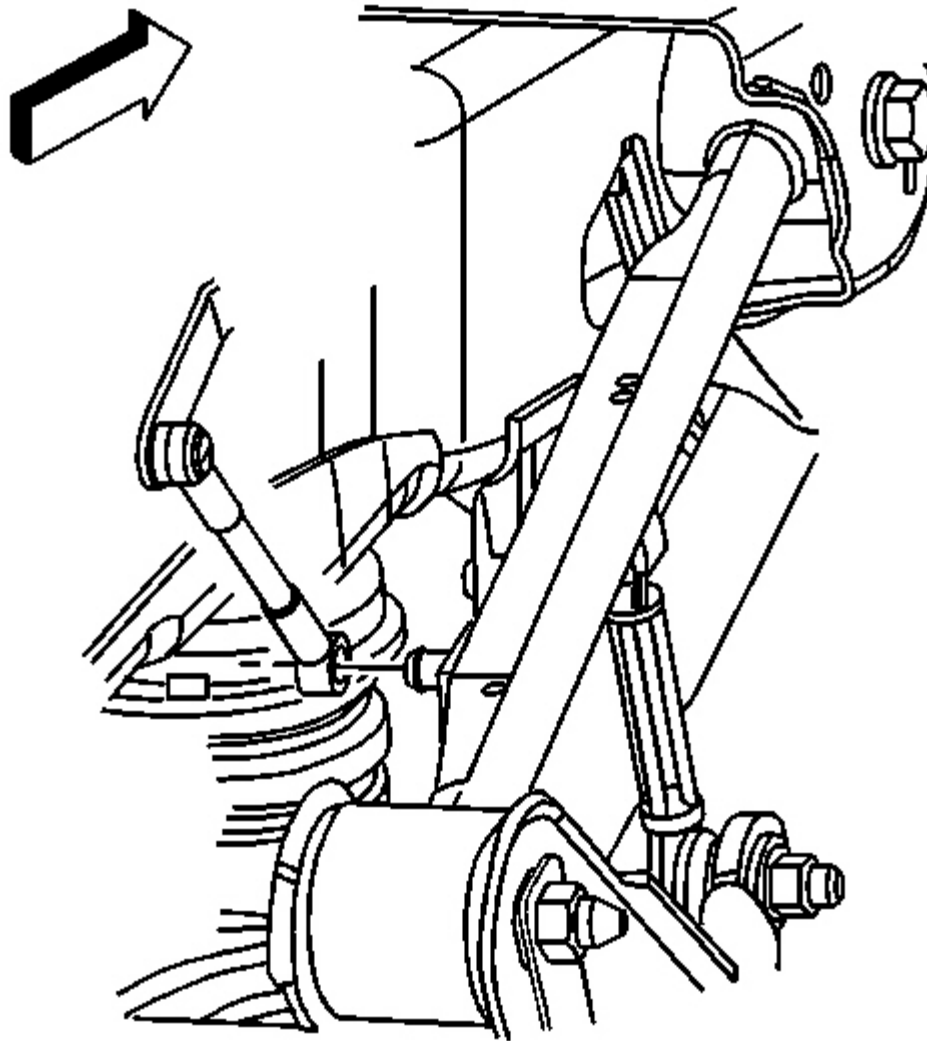


Fig. 15: Removing Rear Axle Upper Control Arm
Courtesy of GENERAL MOTORS CORP.

1. Install the air spring level sensor link to the upper control arm.

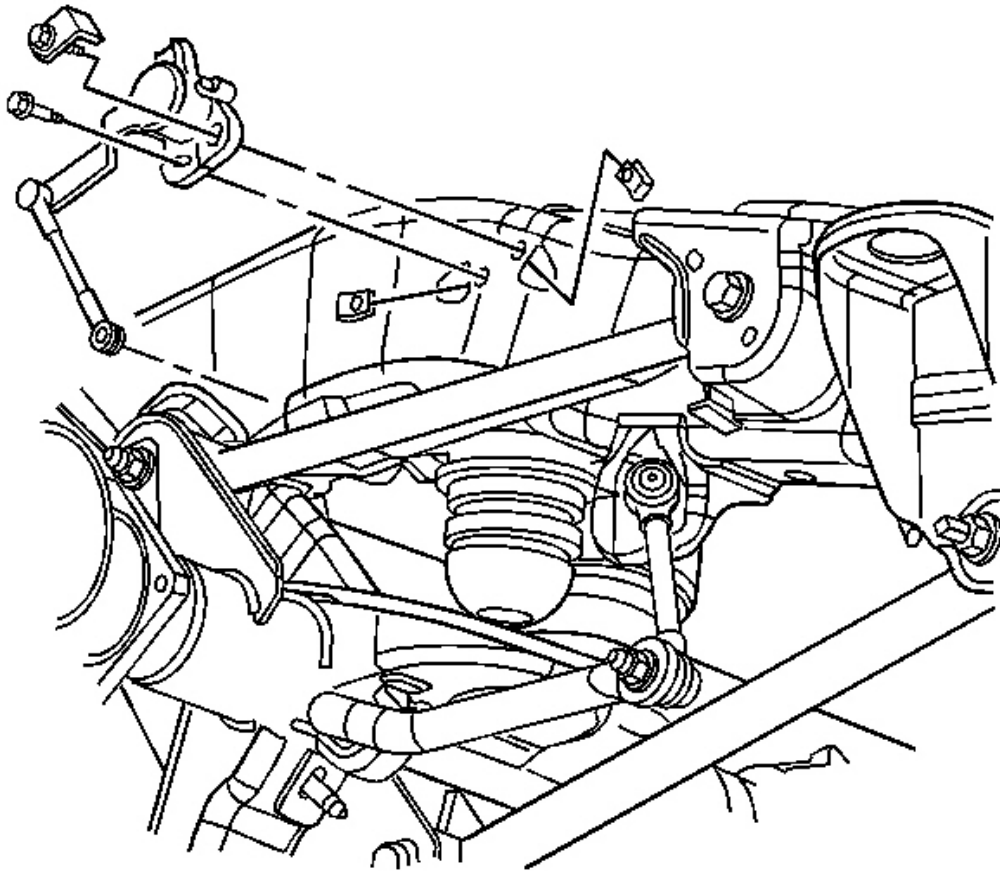


Fig. 16: Removing/Installing Air Spring Level Sensor
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

IMPORTANT: Do not remove the air spring level sensor locating pin until the air spring level sensor has been properly aligned and the proper D height has been measured and maintained. Refer to Trim Height Specifications .

2. Install the air spring level sensor to the frame mounting bolts.

Tighten: Tighten the air spring level sensor to the frame mounting bolts to 8 N.m (71 lb in).

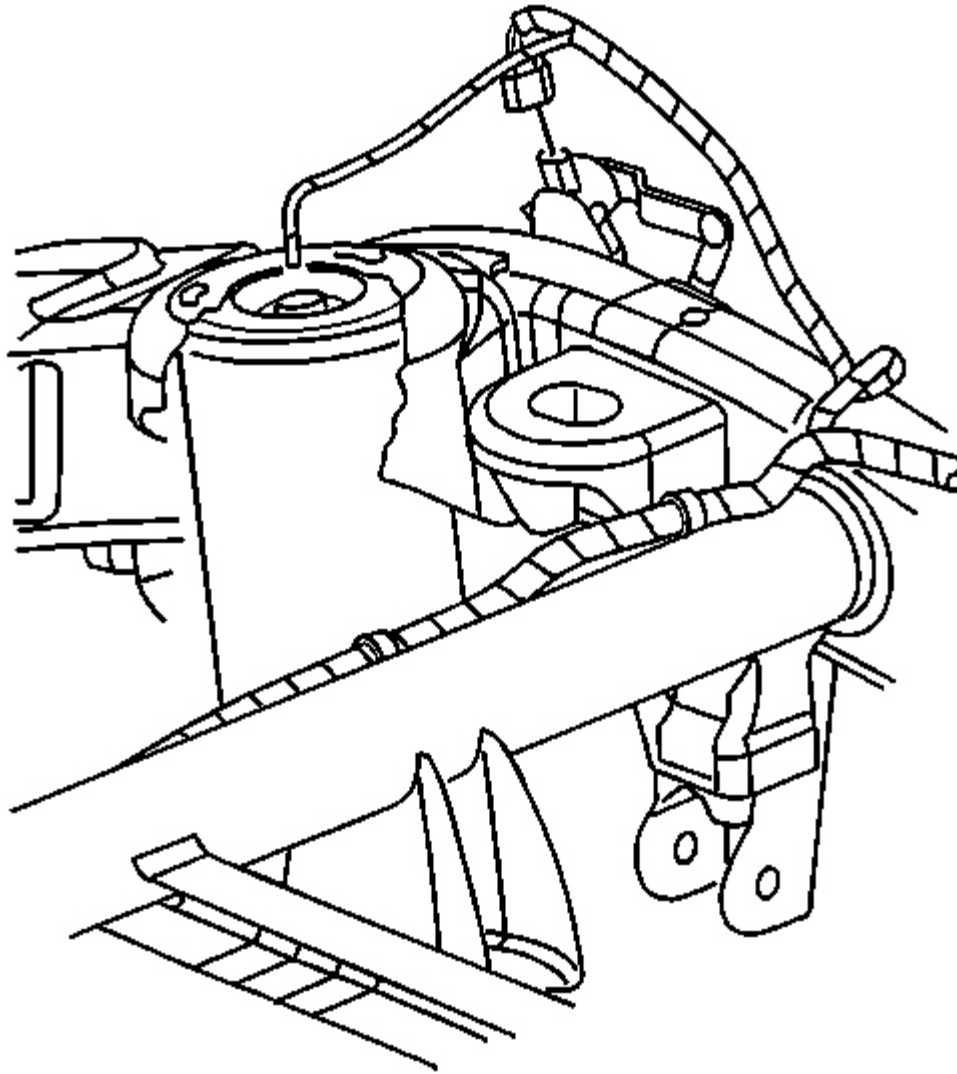


Fig. 17: Disconnecting/Connecting Air Spring Level Sensor Electrical Connector
Courtesy of GENERAL MOTORS CORP.

3. Connect the air spring level sensor electrical connector.

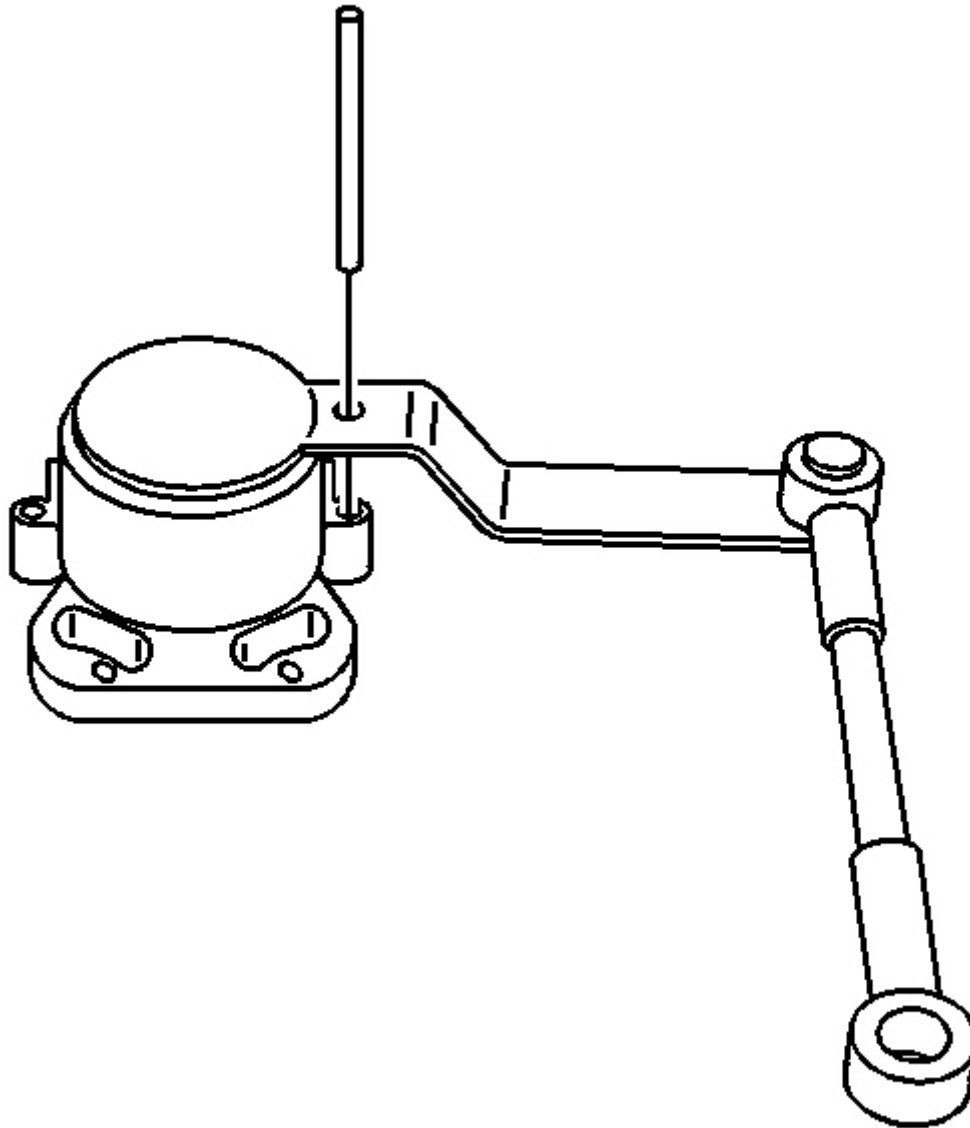


Fig. 18: Installing/Removing Air Spring Level Sensor Locating Pin
Courtesy of GENERAL MOTORS CORP.

NOTE: Failure to remove the air suspension auto level control sensor locating pin before the rear axle support is removed will cause damage to the air suspension auto level control sensor.

4. Remove the air spring level sensor locating pin.
5. Remove the rear axle support.
6. Install the rear tire and wheels. Refer to **Tire and Wheel Removal and Installation** .
7. Lower the vehicle.
8. Install the air suspension system fuse.
9. Start the vehicle and run for approximately 1 minute to ensure that the air spring leveling system is functioning properly.
10. Check the D height. Refer to **Trim Height Inspection Procedure** .

AIR SPRING COMPRESSOR REPLACEMENT

Removal Procedure

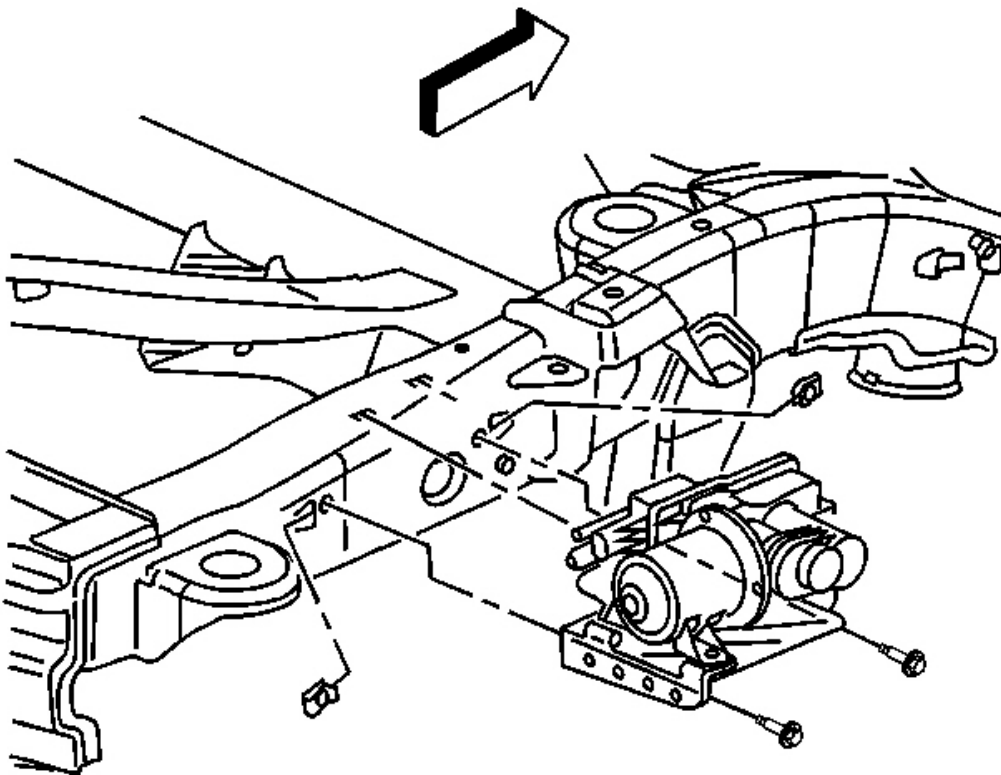


Fig. 19: Removing/Installing Air Compressor Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Depressurize the air suspension system only after the rear axle is supported and is set between D- Height and Full Jounce.

IMPORTANT: Remove the air suspension system fuse before working on the rear suspension components or the rear axle. Failure to remove the air suspension system fuse could cause the calibration of the air suspension leveling sensor to change and the air suspension system not to function properly.

1. Remove the air suspension system fuse.
2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.
3. Remove the air spring compressor to the frame mounting bolts.

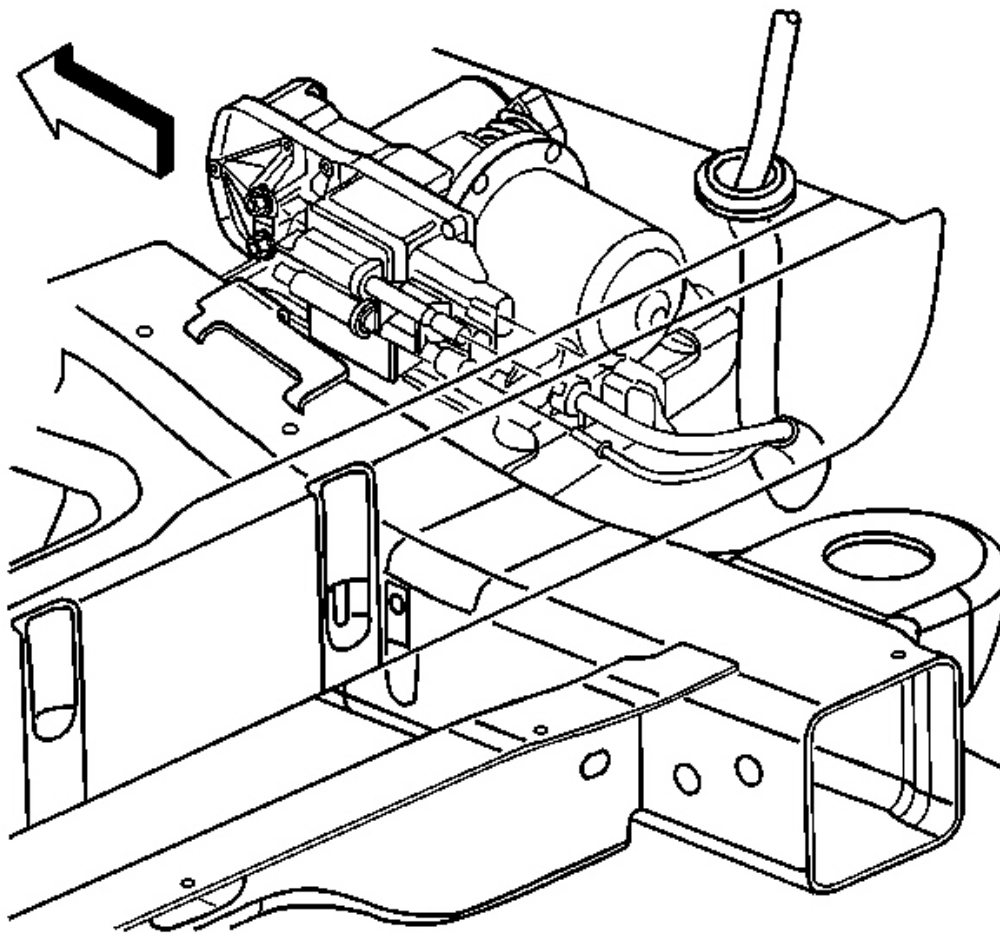


Fig. 20: Locating Air Spring Compressor
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the air inflator switch electrical connection, air supply lines, and air spring compressor vent hose from the air spring compressor.

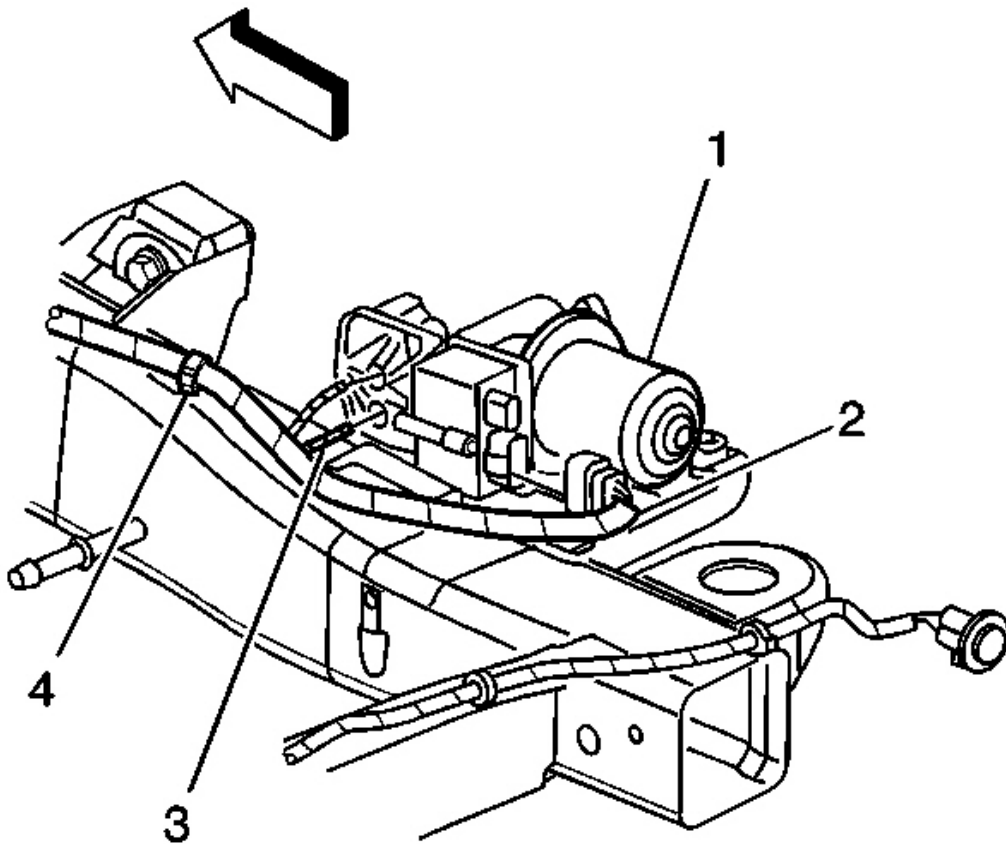


Fig. 21: Removing/Installing Air Spring Compressor
Courtesy of GENERAL MOTORS CORP.

5. Disconnect the air spring compressor electrical connection (2).

IMPORTANT: Ensure the color on air supply lines match the color on the air spring compressor for reassembly.

6. Disconnect the air supply lines (3) from the air spring compressor (1).
7. Remove the air spring compressor from the vehicle.

Installation Procedure

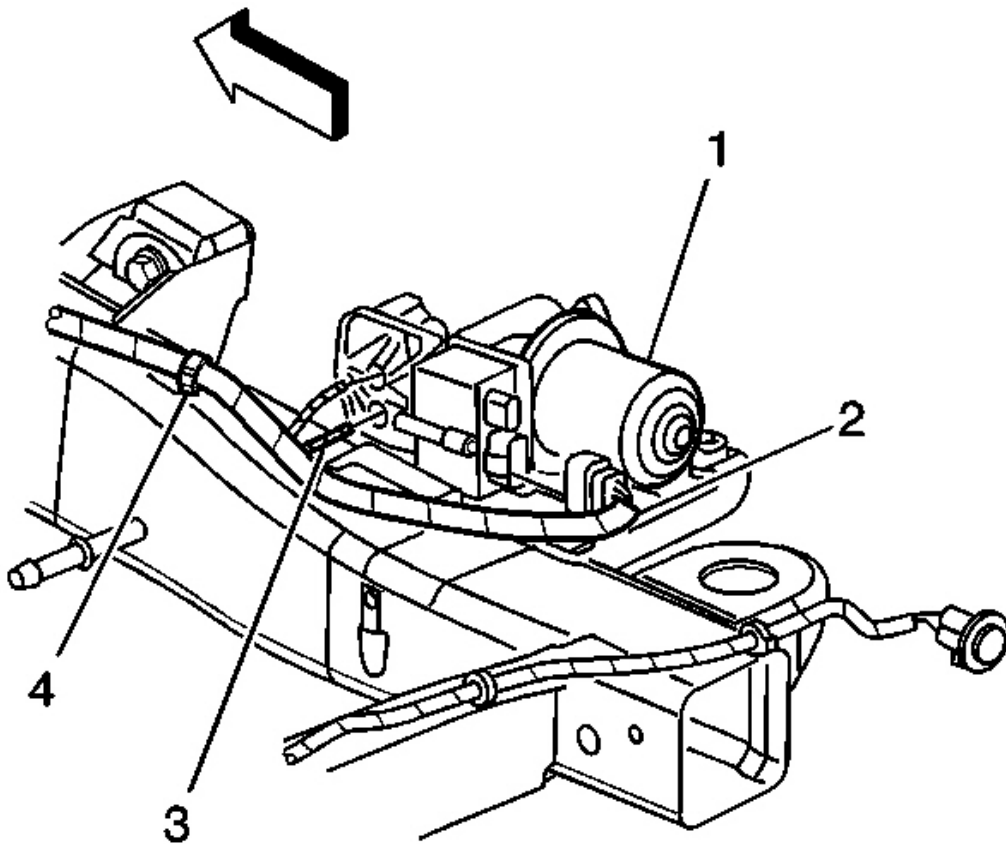


Fig. 22: Removing/Installing Air Spring Compressor
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

IMPORTANT: Inspect the air supply lines for deep scores or cuts. If the air supply lines are damaged the lines must be replaced.

1. If no damage to the air supply pipes is evident, then remove the fittings from the new compressor and use existing fittings that are already attached to air supply lines. Install the air supply lines with existing fittings to the air spring compressor.

Tighten: Tighten the air supply line fittings to 2.25 N.m (20 lb in).

2. If damage is evident to the air supply lines, then replace the air supply lines. Refer to **Air Suspension Air Line Replacement**.
3. Connect the air spring compressor electrical connection (2).

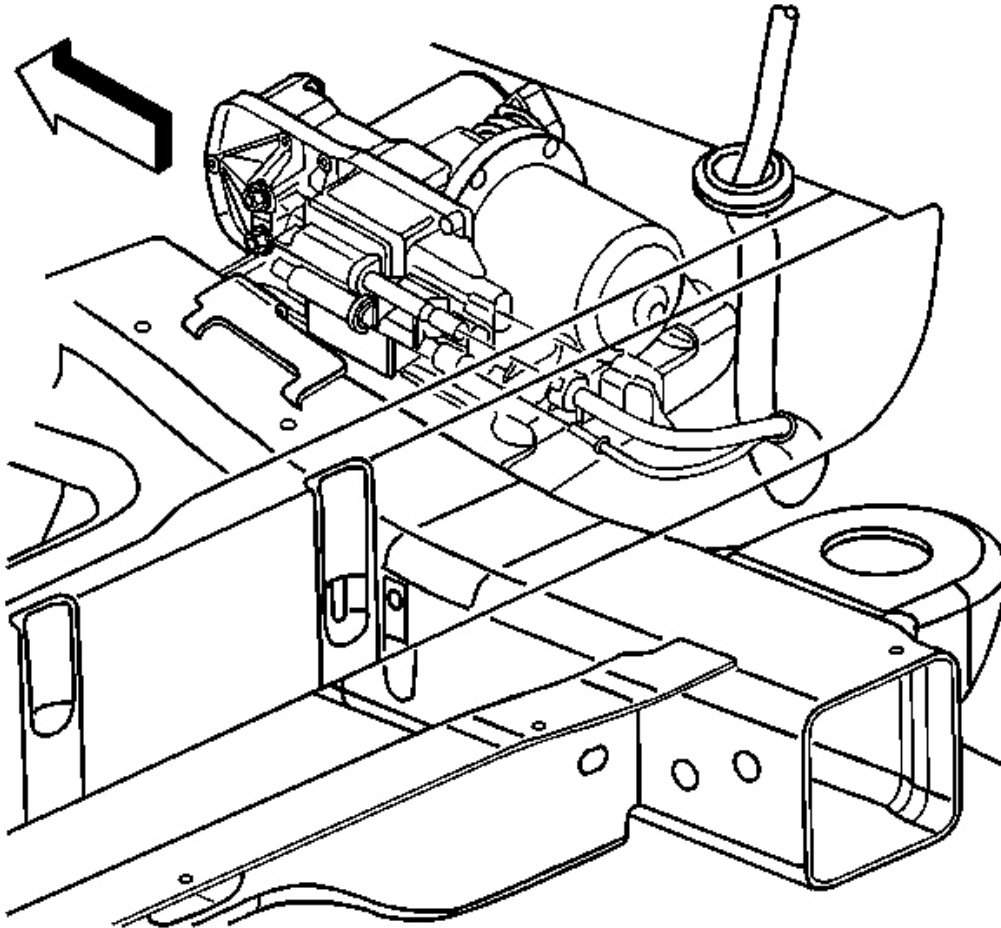


Fig. 23: Locating Air Spring Compressor
Courtesy of GENERAL MOTORS CORP.

4. Connect the air inflator switch electrical connection, air supply line, and air spring compressor vent hose to the air spring compressor.

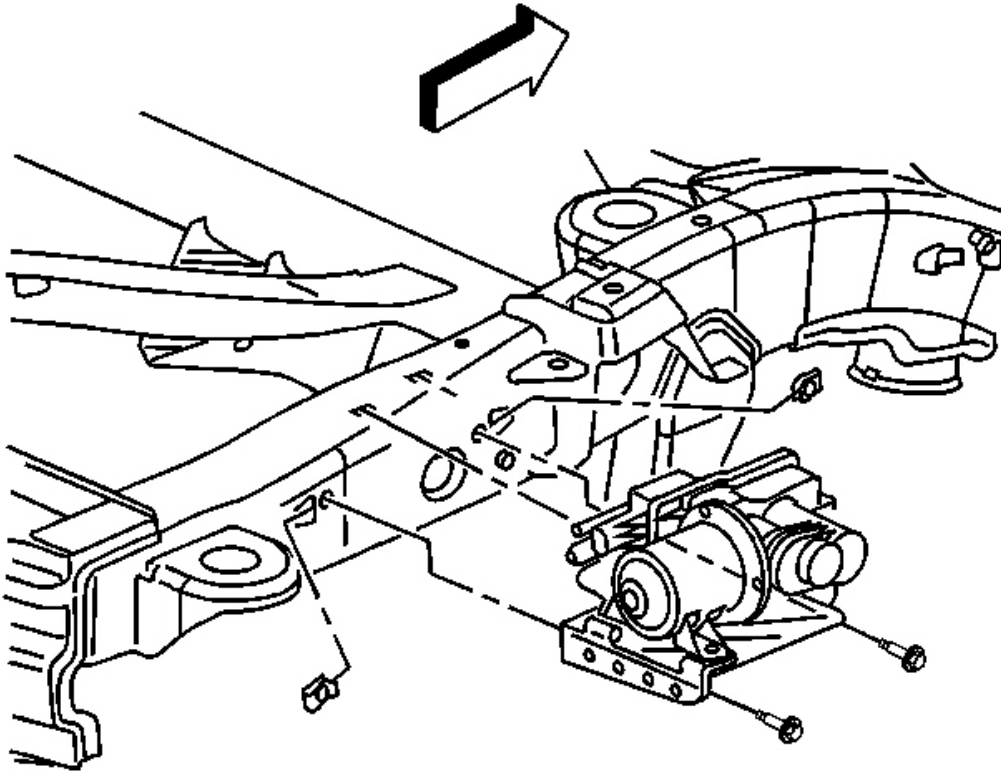


Fig. 24: Removing/Installing Air Compressor Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

5. Install the air spring compressor to the frame mounting bolts.

Tighten: Tighten the air spring compressor to the frame mounting bolts to 20 N.m (15 lb ft).

6. Lower the vehicle.
7. Install the air suspension system fuse.
8. Start the vehicle and run for approximately 1 minute to ensure that the air spring leveling system is functioning properly.
9. Inspect D height. Refer to **Trim Height Inspection Procedure** in Suspension General Diagnosis.
10. Inspect for leaks. If a leak is found at the air supply lines connections at the air spring

compressor, replace the air supply lines. Refer to [Air Suspension Air Line Replacement](#).

INFLATOR AIR SWITCH REPLACEMENT

Removal Procedure

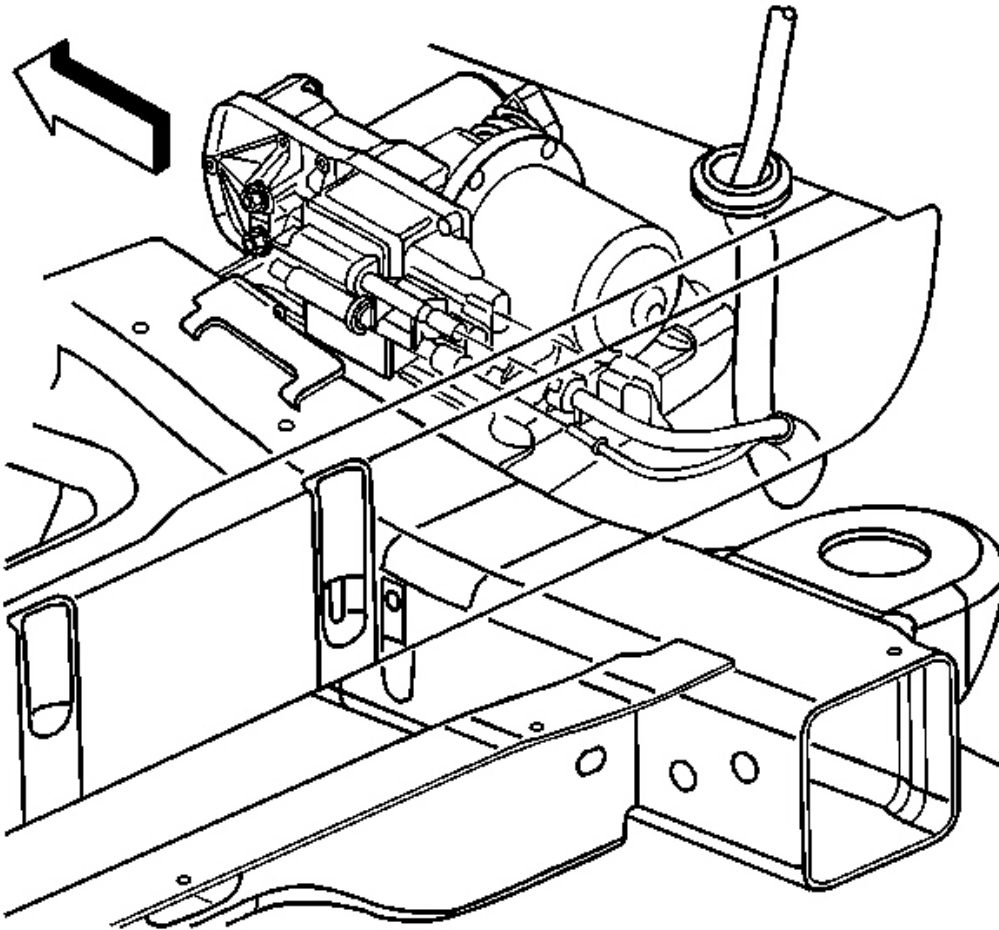


Fig. 25: Locating Air Spring Compressor
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Disconnect the inflator air switch harness from the air compressor.
3. Lower the vehicle.

4. Remove the rear quarter lower trim panel. Refer to [Trim Panel Replacement - Rear Quarter - Left \(TrailBlazer, Envoy, Rainier\)](#) or [Trim Panel Replacement - Rear Quarter - Left \(TrailBlazer EXT, Envoy XL\)](#) or to [Trim Panel Replacement - Rear Quarter - Right \(TrailBlazer, Envoy, Rainier\)](#) or [Trim Panel Replacement - Rear Quarter - Right \(TrailBlazer EXT, Envoy XL\)](#) .
5. Remove the inflator air switch from the vehicle.

Installation Procedure

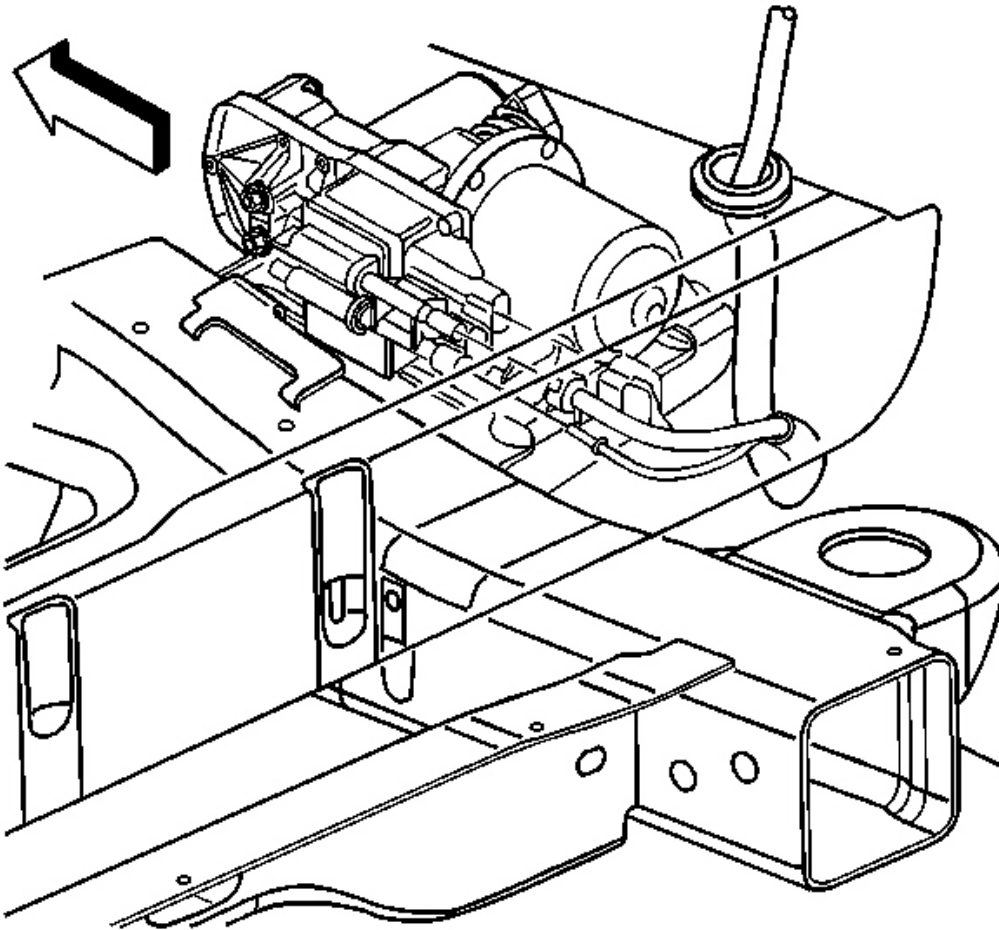


Fig. 26: Locating Air Spring Compressor
Courtesy of GENERAL MOTORS CORP.

1. Install the inflator air switch to the vehicle.
2. Install the rear quarter lower trim panel. Refer to **Trim Panel Replacement - Rear Quarter - Left (TrailBlazer, Envoy, Rainier)** or **Trim Panel Replacement - Rear Quarter - Left (TrailBlazer EXT, Envoy XL)** or to **Trim Panel Replacement - Rear Quarter - Right (TrailBlazer, Envoy, Rainier)** or **Trim Panel Replacement - Rear Quarter - Right (TrailBlazer EXT, Envoy XL)** .
3. Raise the vehicle.
4. Connect the inflator air switch harness to the air compressor.
5. Lower the vehicle.

AIR SPRING REPLACEMENT

Removal Procedure

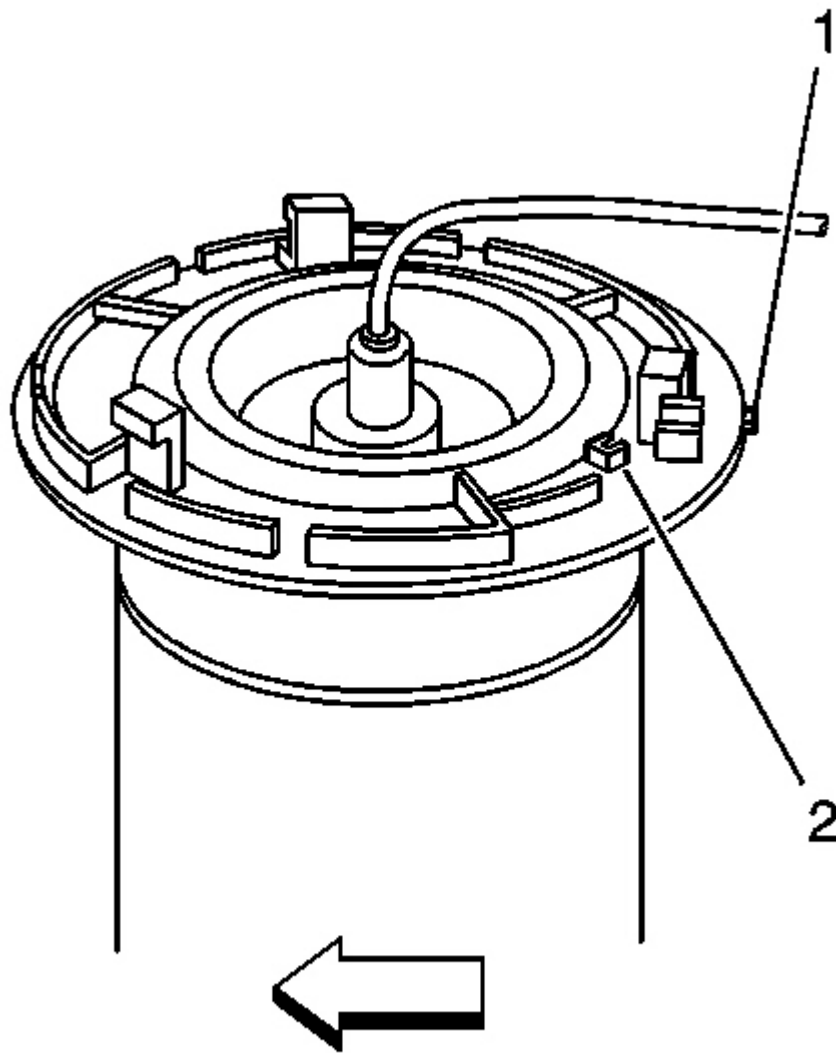


Fig. 27: Removing/Installing Air Spring
Courtesy of GENERAL MOTORS CORP.

CAUTION: A sudden release of pressure may cause personal injury or damage to the vehicle. The air suspension system is under pressure until the air supply lines are disconnected. Use the following precautions when servicing the air suspension system:

- Wear gloves, ear protection, and eye protection.
- Wrap a clean cloth around the air supply lines.

IMPORTANT: Remove the air suspension system fuse before working on the rear suspension components or the rear axle. Failure to remove the air suspension system fuse could cause the calibration of the air suspension leveling sensor to change and the air suspension system not to function properly.

1. Remove the air suspension system fuse.
2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.
3. Raise and support the rear axle at the designed D-height. Refer to Trim Height Specifications .

NOTE: Depressurize the air suspension system only after the rear axle is supported and is set between D- Height and Full Jounce.

4. Depressurize the air suspension system. Refer to Air Suspension Depressurization Procedure.

IMPORTANT: There is a raised feature on the outer rim of the air spring top plate that denotes the anti rotation peg position.

5. Depress the anti-rotation peg (2) in the air spring top plate located in the upper spring seat.
6. With the anti-rotation peg (2) depressed, rotate the air spring counterclockwise and remove the air spring from the upper spring seat.

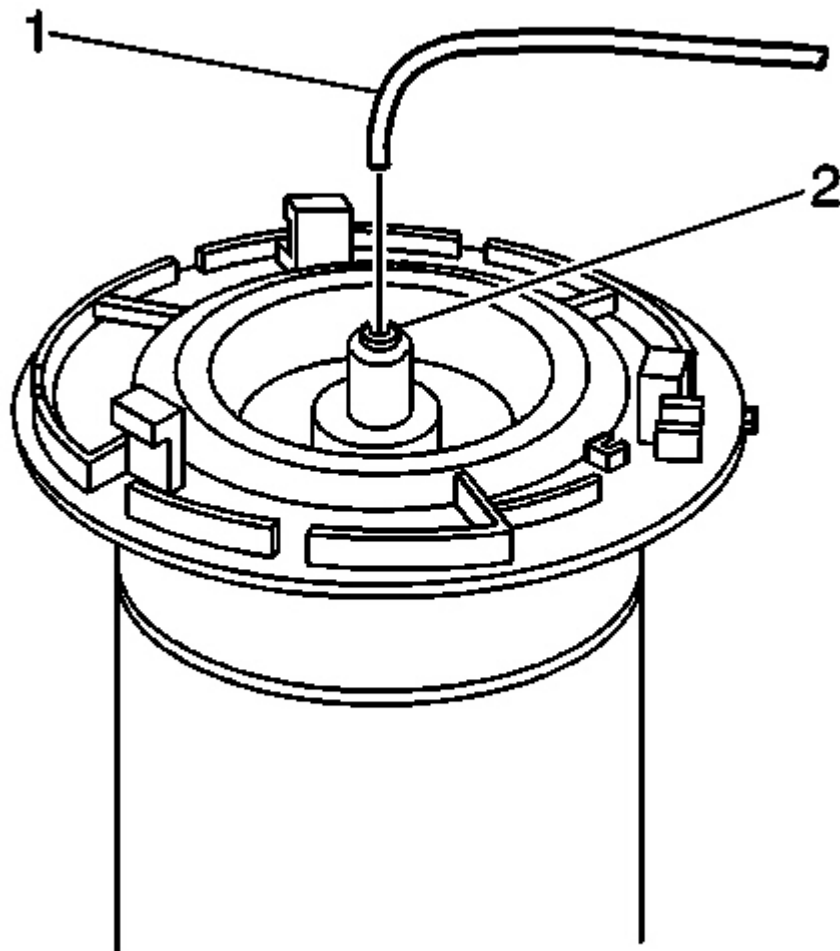


Fig. 28: Disconnecting Air Supply Line
Courtesy of GENERAL MOTORS CORP.

7. Disconnect the air supply line from the air spring in the following way:
 - Push the air supply line into the air spring connection and hold in place.
 - Depress and hold the air supply line collet (2) down.
 - Remove the air supply line (1) from the air spring.

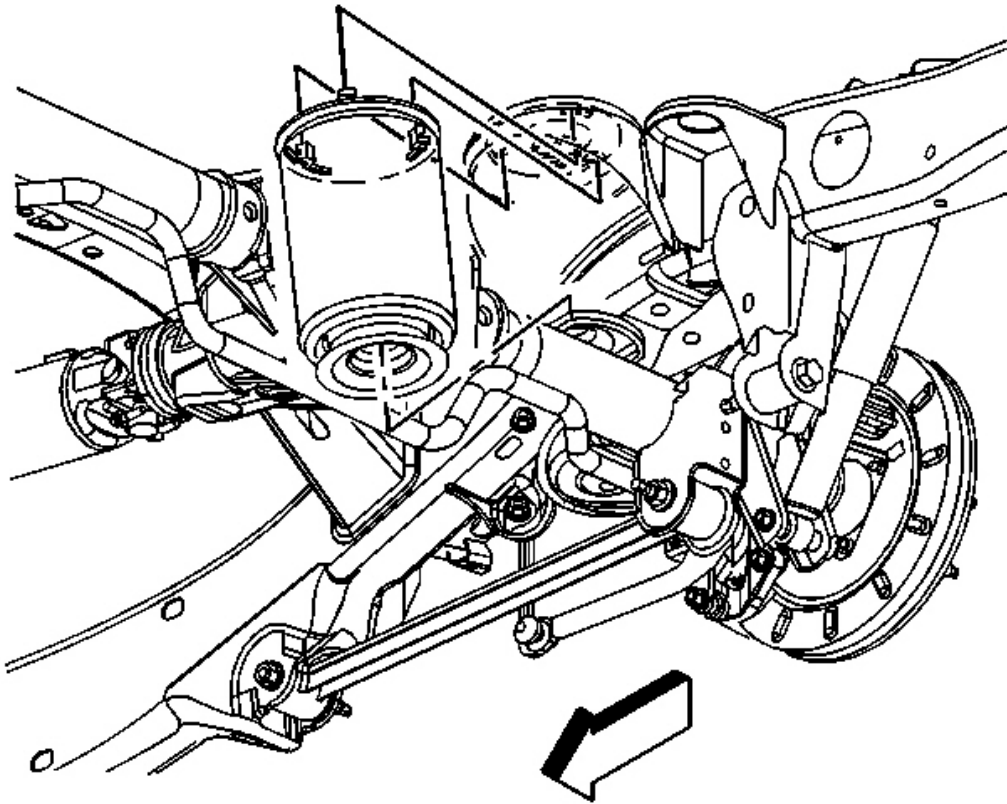


Fig. 29: Removing/Installing Air Spring From Vehicle
Courtesy of GENERAL MOTORS CORP.

8. Remove the air spring from the vehicle.

Installation Procedure

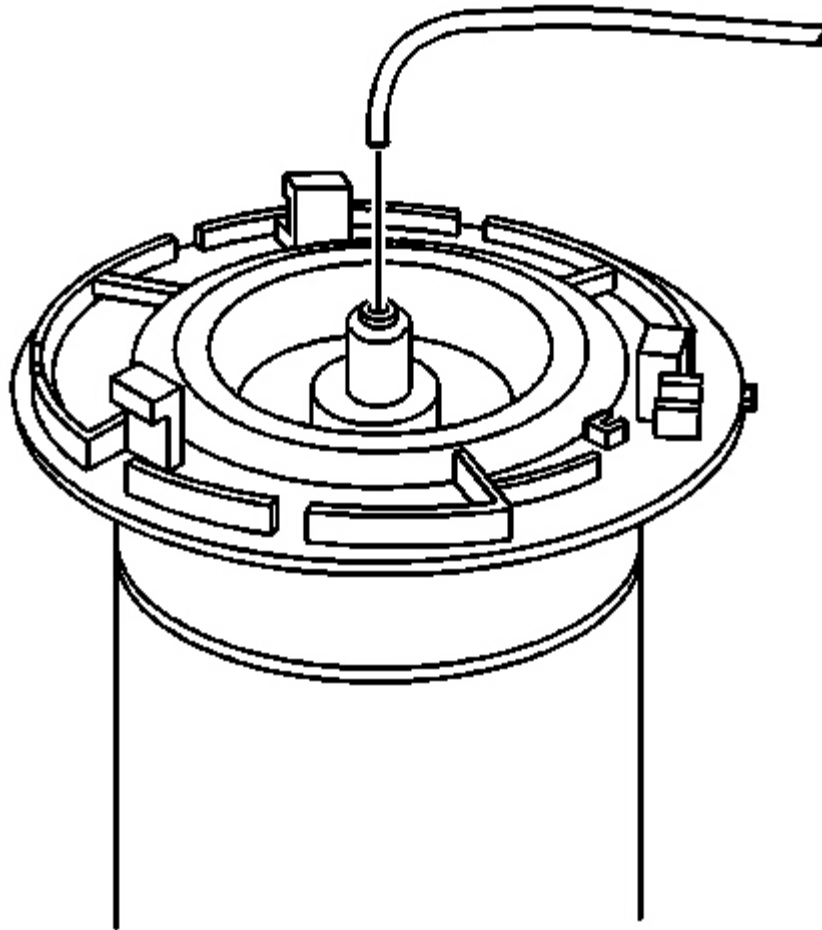


Fig. 30: Installing Air Supply Line
Courtesy of GENERAL MOTORS CORP.

1. Install the air supply line to the air spring. Ensure the air supply line is fully seated.

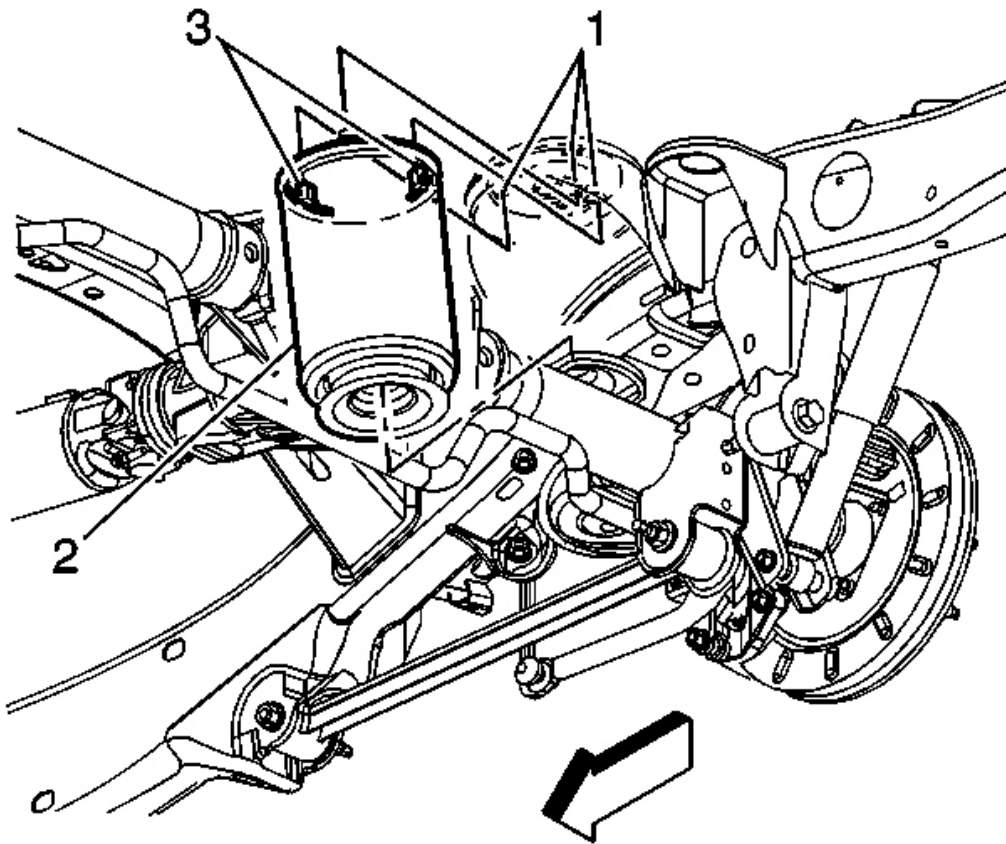


Fig. 31: Installing Air Spring From Vehicle
Courtesy of GENERAL MOTORS CORP.

CAUTION: Ensure that the air spring is fully seated and properly positioned on the axle pilot. Failure to properly position the air spring may cause the air spring to break apart, possibly resulting in personal injury or damage to the vehicle.

2. Install the air spring (2) to the frame by aligning the mounting tabs (3) with the keyhole slots (1) in the upper spring seat.
3. Apply upward pressure to the air spring (2) and rotate clockwise until the anti-rotation peg snaps into place.

4. Pressurize the air suspension system. Refer to **Air Suspension Depressurization Procedure**.
5. Lower the vehicle.
6. Install the air suspension system fuse.
7. Start the vehicle and run for approximately 1 minute to ensure that the air suspension system is functioning properly.
8. Inspect the D height. Refer to **Trim Height Inspection Procedure** in Suspension General Diagnosis.

AIR SUSPENSION AIR LINE REPLACEMENT

Removal Procedure

IMPORTANT: Remove the air suspension system fuse before working on the rear suspension components or the rear axle. Failure to remove the air suspension system fuse could cause the calibration of the air suspension leveling sensors to change and the air suspension system not to function properly.

1. Remove the air suspension system fuse.
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

NOTE: Depressurize the air suspension system only after the rear axle is supported and is set between D- Height and Full Jounce.

3. Ensure that the air suspension system is depressurized before removing the air suspension air lines. Refer to **Air Suspension Depressurization Procedure**.
4. Disconnect the air line from the air spring.
5. Disconnect the air line from the air compressor.
6. Trim off air line at the electrical harness with a sharp cutting tool. Leave remaining air line in the wiring harness.

Installation Procedure

1. Install air line to the air compressor using a new fitting.
2. Install air line to air spring.
3. Attach the air line to outside of the wiring harness using wire ties.

4. Lower vehicle.
5. Install air suspension system fuse.
6. Start vehicle and check for leaks.

DESCRIPTION & OPERATION

AIR SUSPENSION DESCRIPTION AND OPERATION

Air Suspension

The primary mission of the Air Suspension System is the following for the rear suspension under loaded and unloaded conditions:

- Keep the vehicle visually level
- Provide optimal headlight aiming
- Maintain optimal ride height

The Air Suspension System consists of the following items:

- Air Suspension Compressor Assembly
- Air Suspension Sensors
- Rear Air Springs

The Air Suspension Compressor Assembly has the ability to detect faults and indicate the appropriate fault code via a blink code on the inflator switch LED. The Air Suspension Compressor Assembly will indicate the code when the condition to cause the code becomes current.

During compressor activation the exhaust valve will be activated for a calibrated length of time to provide compressor head relief. After a calibrated length of time the compressor relay will activate to start the compressor. When trim height is achieved the relay will be deactivated. The exhaust valve and compressor relay are part of the air suspension compressor assembly. The Air Suspension System shall maintain the rear trim height within 4 mm (0.15 in) in all loading conditions and the leveling function shall deactivate if the vehicle is overloaded. The side to side variation has to be maintained within 8 mm (0.31 in). After ignition is turned off, the module will stay awake for between 30 minutes and 2 1/2 hours. The system will exhaust pressure within 30 minutes after ignition is turned off to lower the vehicle after unloading. The leakage of the complete load leveling system shall not result in more than 1.4 mm (0.05 in) drop of rear suspension height at GVWR during a 24 hour period.

There are software Leveling Sequence Timers that detect conditions of excessive output at which no leveling is accruing. These timers shall keep track of conditions which cause excessive run time or no calibratable change in trim height. These timers are defined in more detail below.

Accumulator Timer

The primary purpose of the accumulator timer is to detect conditions in which excessive activity may occur. The conditions are generally as follows: in the compress mode the existences of pneumatic leaks in the system, in the exhaust mode the existence of pneumatic blockage or unloaded vehicle conditions. The accumulator shall keep track of the accumulated run time of the compressor. If the accumulator timer reaches its calibratable limit the output function will be disabled until the accumulator is reset. The accumulator timer will be reset with each transition into the RUN power mode or if the complementary output activation is required.

Progress Timer

The primary propose of the progress timer is to quickly detect conditions in which excessive output activity may occur at zero vehicle speed condition. If the Air Suspension System does not detect a calibratable change in position within a calibratable time period, the output function will be disabled. The timer will be reset with each ignition switch cycle into the RUN position.

Air Suspension Sensors

The air suspension sensor arm is attached to an armature that rotates inside a coil. The inductance of the coil, not the resistance, changes dependent on the position of the armature in the coil. The air suspension module determines the angle of the sensor arm by sending a pulse width modulated supply voltage through the coil and measuring the response time. The sensors must be calibrated to the correct D height and are not adjustable.

Rear Air Springs

The air springs are mounted in the frame in the same location were the coil spring is mounted for a vehicle without air suspension. Support pieces are affixed to the axle for the air springs.