

2017 ACCESSORIES & EQUIPMENT

Active Noise Cancellation - Impala

SCHEMATIC WIRING DIAGRAMS

ACTIVE NOISE CANCELLATION WIRING SCHEMATICS

Active Noise Cancellation (NKC)

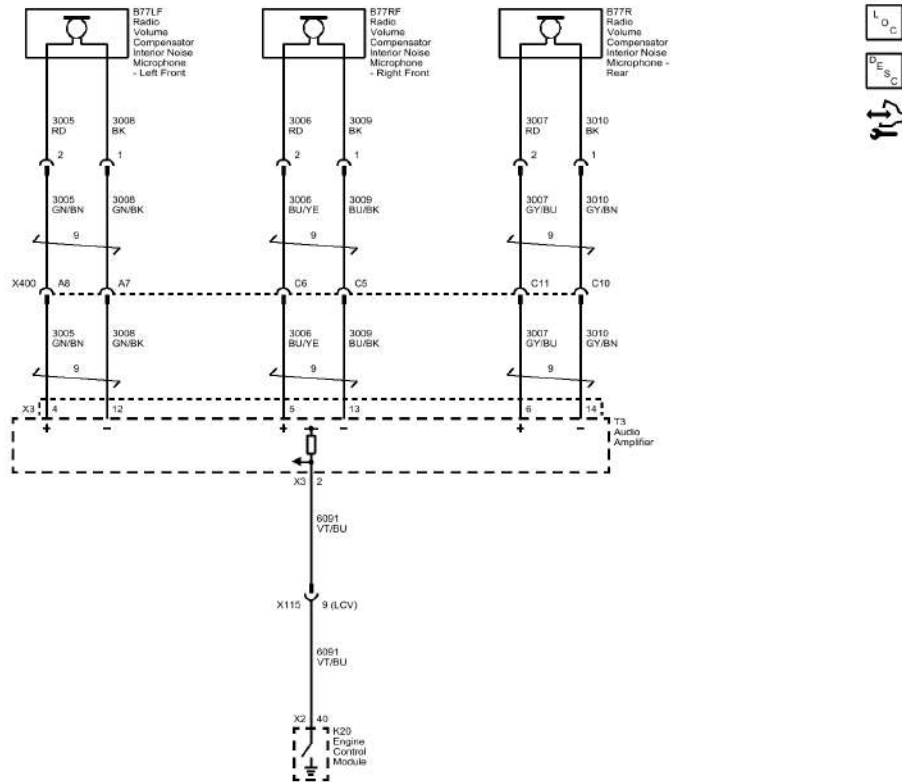


Fig. 1: Active Noise Cancellation (NKC).

Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B0560: ENGINE RPM INPUT CIRCUIT SIGNAL INVALID

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptor

DTC B0560 08

Engine RPM Input Circuit Signal Invalid

Circuit/System Description

The Audio Amplifier receives a discrete pulse-width modulated engine speed signal from the Engine Control Module. The Audio Amplifier uses the engine RPM signal for operating active noise

2017 ACCESSORIES & EQUIPMENT

Air/Wind Noise - Impala

DIAGNOSTIC INFORMATION AND PROCEDURES

AIR/WIND NOISE

Air / Wind Noise-Diagnosis and Tests

Tools

- Stethoscope
- Duct tape, foam, etc.

WARNING: Refer to [Assistant Driving Warning](#) .

Overview

To analyze a reported wind noise condition, use the following outline:

- Speak with the customer to obtain as much information as possible.
- Perform a static evaluation of the vehicle to identify potential areas of concern.
- Test drive the vehicle to determine the source of the noise.
- Select the appropriate solution.
- After repair, re-evaluate the vehicle to confirm the customer's complaint is resolved.

When test driving the vehicle, choose a regular route with smooth and straight roads. The area should have little traffic and little noise in order to minimize interference with the test. Drive the vehicle at the speed in which the noise was noticed, or until the noise is heard. Maintain safe and legal speeds.

You can diagnose the following types of wind noise:

- Wind whistle / wind leaks
- Wind rush

When moving at highway speeds, air pressure inside the vehicle becomes greater than the air pressure outside. When a leak occurs, the escaping air causes a hiss or a whistle. Wind whistle / wind leaks are repairable when properly root caused.

Wind rush occurs when air presses over the vehicle's body, and is related to the aerodynamics of the vehicle. Some wind rush is repairable as it relates to part fits and body panel fits. A thorough root cause analysis is required before concluding that the wind noise is not repairable.

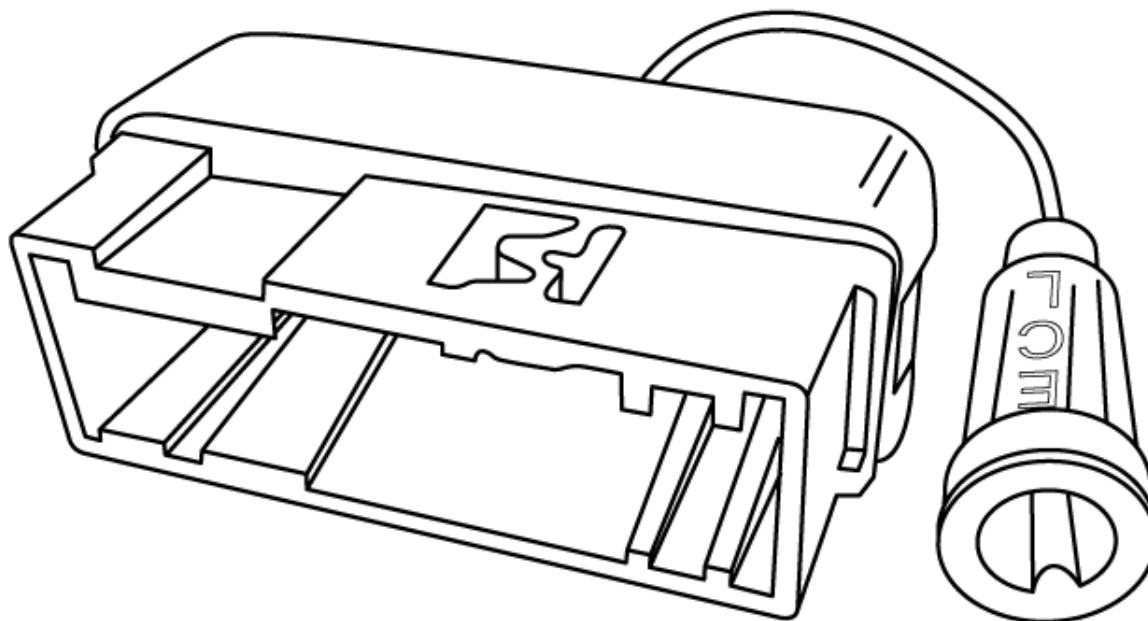
Air / Wind Noise - Diagnostic Procedure

Use the following procedure in order to diagnose wind noise:

1. It is important to obtain as many details from the customer as possible in order to assure that you are addressing the issue that the customer hears. Note the following details:
 - The perceived location (B-pillar, mirror, roof, rear of vehicle, front of vehicle, high or low in vehicle)
 - The location where the noise is loudest (specific location along the door header, front edge of sunroof, etc.)
 - The volume of the noise (very loud, can only hear when radio is off and no ambient noises)
 - The ambient conditions (temperature, windy, direction of wind, quiet)
 - The road surface (rough, smooth, smooth concrete, ribbed concrete, asphalt)

Illustration

Tool
Number/Description



EL - 51578 - 3
32 - Pin Gray Header
IPC

The driver and passenger 8-way power seat systems each consist of the following components:

- Seat adjuster switch
- Seat horizontal motor
- Seat front vertical motor
- Seat rear vertical motor
- Seat back recline motor

The 2-way power seat system consists of a seat adjuster switch and a seat vertical motor.

NOTE: The passenger seat block diagram is identical to the driver seat.

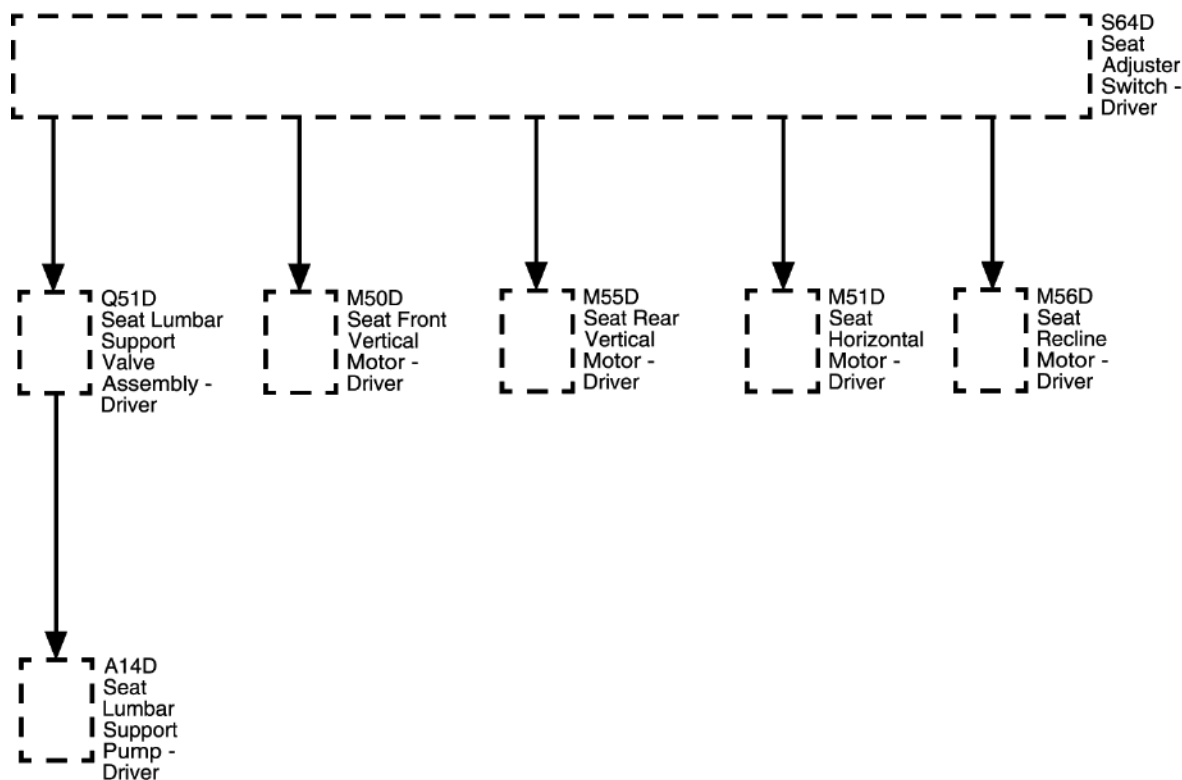


Fig. 24: Power Seat Without Memory - Passenger Seat Identical to Driver Seat Block Diagram
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S64D	S64D Seat Adjuster Switch - Driver
M56D	M56D Seat Recline Motor - Driver
M51D	M51D Seat Horizontal Motor - Driver
M55D	M55D Seat Rear Vertical Motor - Driver
M50D	M50D Seat Front Vertical Motor - Driver
Q51D	Q51D Seat Lumbar Support Valve Assembly - Driver
A14D	A14D Seat Lumbar Support Pump - Driver

Seat Motors

All of the seat motors operate independently of each other. Each motor contains an electronic circuit breaker (PTC) that opens in the event of a circuit overload and will reset only after voltage has been removed from the circuit. There are four seat position motors and two lumbar motors. These are the horizontal motor, front vertical motor, rear vertical motor, and the seat back recline motor. The seat horizontal motor moves the entire seat forward and rearward. The seat vertical motors may operate independently to tilt the front or rear of the seat cushion up or down. Both motors can also run simultaneously to move the entire seat up or down. The recline motor moves the angle of the seat back forward or rearward.

Seat Operation

- If 105Å,Å° C or greater

Replace the K83 Parking Brake Control Module.

- If less than 105Å,Å° C

6. All OK.

Repair Instructions

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

Refer to [Control Module References](#) for parking brake control module replacement, programming and setup.

SYMPTOMS - PARK BRAKE

IMPORTANT: Review the system operation in order to familiarize yourself with the system functions.

Refer to [Electronic Parking Brake Description](#).

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the park brake system.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Symptom List

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

[Park Brake Will Not Hold or Release](#)

PARK BRAKE WILL NOT HOLD OR RELEASE

Step	Action	Yes	No
1	Were you sent here from the Park Brake Symptom table?	Go to Step 2	Go to Diagnostic Starting Point - Vehicle
2	Inspect the park brake system for proper operation. Refer to Park Brake System Diagnosis . Did you find and correct a condition?	Go to Step 5	Go to Step 3
3	Inspect the disc brake system for proper operation. Refer to Disc Brake System Diagnosis . Did you find and correct a condition?	Go to Step 5	Go to Step 4
4	Inspect the hydraulic brake system for proper operation. Refer to Hydraulic Brake System Diagnosis . Did you find and correct a condition?	Go to Step 5	Go to Diagnostic Starting Point - Vehicle
5	Road test the vehicle in order to confirm proper operation. Refer to Brake System Vehicle Road Test . Is the condition still present?	Go to Step 2	System OK

PARK BRAKE SYSTEM DIAGNOSIS

Step	Action	Yes	No
DEFINITION: This diagnostic table is designed to diagnose ONLY the mechanical components of the PARK brake system in order to determine if the PARK brake system is operating properly. You will be directed by the appropriate Symptom table to go to other brake system diagnostic tables as appropriate.			

Code	Name	Option	Location	Locator View	Connector End View
J138	Body Harness	KL9	In the engine compartment, left of center near rear	-	-
J139	Body Harness	KL9	In the engine compartment, 110 cm from X50D Fuse Block - Battery	<u>Engine Harness Routing - Left Rear (LCV)</u>	-
J140	Engine Harness	LFR	In engine compartment 4 cm to the left of breakout DE lower front of engine	<u>Engine Harness Routing - Left Front (LFR)</u>	-
J141	Engine Harness	LFR	In engine compartment located upper left 6 cm to breakout KK	<u>Engine Harness Routing - Right Rear (LFR)</u>	-
J142	Engine Harness	LFR	In engine compartment located upper left 4 cm to breakout EE	<u>Engine Harness Routing - Right Rear (LFR)</u>	-
J149	Engine Harness	LFR	In engine compartment located lower right 6 cm to breakout KK	<u>Engine Harness Routing - Left Front (LFR)</u>	-
J150	Forward Lamp Harness	-	In the engine compartment, left front lower, on branch to X116 and X117, approximately 5.8 cm (2.3 in) from breakout to washer fluid container	<u>Body and Forward Lamp Harness Routing - Left Side of Engine Compartment</u>	-
J151	Forward Lamp Harness	-	In the engine compartment, left front, approximately 5 cm (2 in) from breakout to fuse block - underhood toward breakout to X110	<u>Body and Forward Lamp Harness Routing - Left Side of Engine Compartment</u>	-
J152	Forward Lamp Harness	-	In the engine compartment, right side, approximately 31.3 cm (12.3 in) rear of breakout to X120	<u>Forward Lamp Harness Routing - Right Side of Engine Compartment</u>	-
J153	Engine Harness	LFR	In the engine compartment, right rear side, approximately 8 cm right of breakout to EF	<u>Engine Harness Routing - Right Rear (LFR)</u>	-
J154	Engine Harness	LFR	In engine compartment located lower right 8 cm to breakout KK	<u>Engine Harness Routing - Left Front (LFR)</u>	-

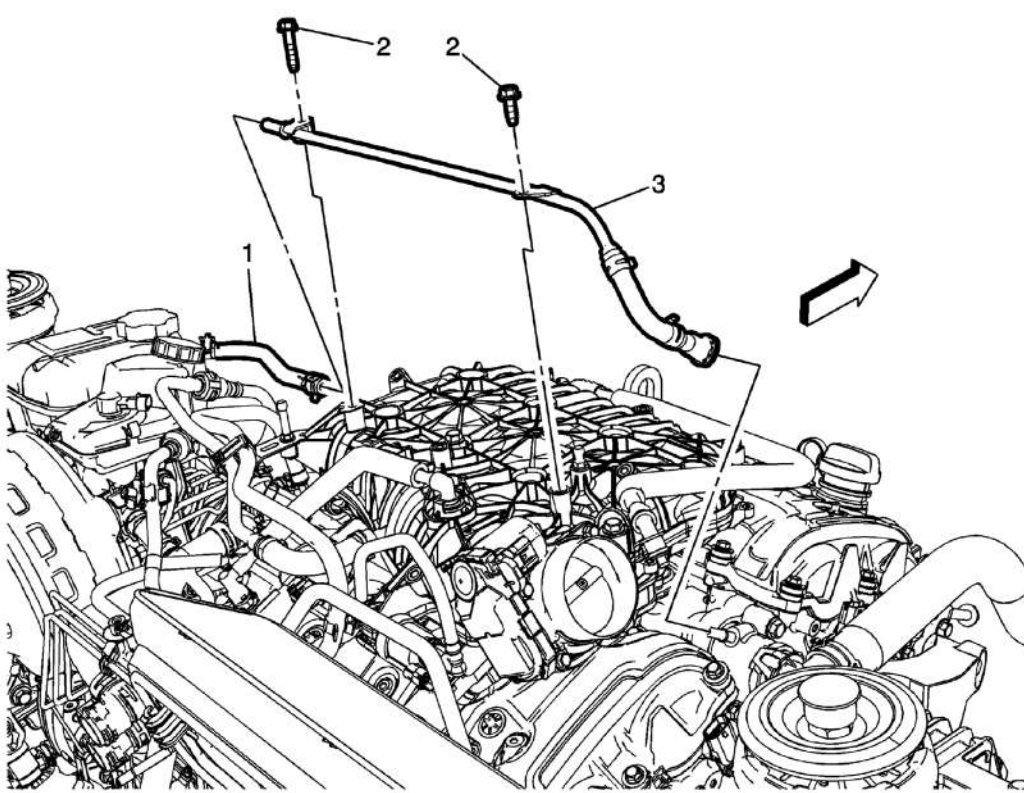


Fig. 45: Engine Coolant Air Bleed Pipe (LFX)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <ol style="list-style-type: none"> 1. Partially drain coolant system. 2. Remove the intake manifold cover. Refer to Intake Manifold Cover Replacement (LFX). 3. Remove the air cleaner outlet duct. Refer to Air Cleaner Outlet Duct Replacement. 	
1	Radiator Surge Tank Inlet Hose Clamp Procedure Reposition radiator surge tank inlet hose clamp using the BO-38185 Hose Clamp Pliers. NOTE: Replace hose clamps if necessary. Special Tools BO-38185 Hose Clamp Pliers For equivalent regional tools, refer to Special Tools .
2	Engine Coolant Air Bleed Pipe Fastener (Qty 2) CAUTION: Refer to Fastener Caution. Tighten 9 N.m (80 lb in)
3	Engine Coolant Air Bleed Pipe

ENGINE COOLANT AIR BLEED PIPE REPLACEMENT (LCV)

bearings for reassembly.

1. Before removing the connecting rods, check the connecting rod side clearance using the following procedure:
 1. Tap the connecting rod to one end of the crankshaft journal with a dead-blow or wooden hammer.
 2. Using feeler gauges, measure the clearance between the crankshaft counterweight and the connecting rod.
 3. The connecting rod side clearance should not exceed specifications. Refer to [Engine Mechanical Specifications](#).
 4. If the end play exceeds the specified limits, measure the width of the crankpin end of the connecting rod. Refer to [Piston, Connecting Rod, and Bearing Cleaning and Inspection](#).
 5. If the connecting rod width is significantly smaller than specified and severe wear is present on the side of the connecting rod, replace the connecting rod.
 6. If the connecting rod width is within specification and excessive scoring is present on the crankshaft journals, replace the crankshaft.
2. Using a marker, number each piston face. Draw an arrow along the centerline of the piston pointing toward the front of the engine.

CAUTION: Do not use a stamp, punch or any other method that may distort or stress the connecting rod or connecting rod cap. Extensive engine damage may result from a connecting rod that is distorted or stressed.

3. Mark the cylinder number on the connecting rod and the connecting rod cap with a scribe, paint stick or permanent marker.

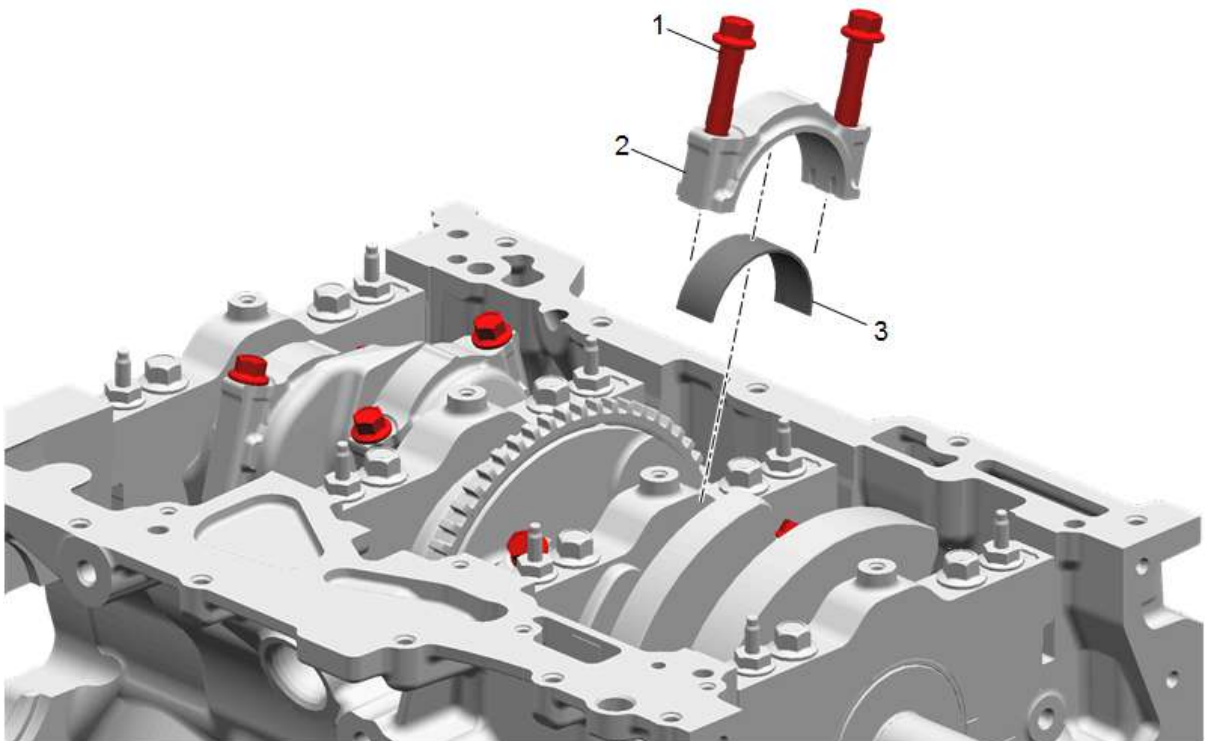


Fig. 62: View Of Connecting Rod Bearing & Cap
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Powdered metal connecting rods have rod bolts which yield when torqued. If the rod bolts are loosened or removed the rod bolts must be replaced. Rod bolts that are not replaced will not torque to the correct clamp load and can lead to serious engine damage.

4. Remove the connecting rod bolts.

Illustration

**Tool
Number/Description**



EN-41998-B
J-41998-B
J-41998
Crankshaft Balancer
Installer
South America Use
Local Equivalent

All U.S. GM Dealers participating in the Center of Learning / GM Service Technical College (STC) Programs can enroll through the Center of Learning website at <https://www.centerlearning.com>. Within the website, there are individual training paths that are designed to assist in planning the training needs for each individual and their job role. Dealers who have questions about Center of Learning Training should contact the Center of Learning help desk at 1-888-748-2687. The help desk is available Monday through Friday, 8:00 am - 9:00 pm Eastern Standard Time, excluding holidays. For GM Access support, contact the GM Access Help Desk at 1-888-337-1010.

Fleets

GM Fleet customers with GM Warranty In-Shop agreements are able to participate in service technical training through the Center of Learning/GM Service Technical College (STC).

Assistance for GM fleet registered customers using GM STC training is provided by the Center of Learning help desk at 1-888-748-2687. The help desk is available Monday through Friday, 8:00 am - 9:00 pm Eastern Standard Time, excluding holidays. For GM Access support, contact the GM Access Help Desk at 1-888-337-1010.

Most GM STC course materials have associated charges.

To purchase authentic GM STC Training Materials, contact the GM Training Materials Headquarters at 1-800-393-4831.

Non-GM Dealer Technicians

Technician training for non-GM dealers is available through ACDelco. This training is for ACDelco PSC and Fleet program members employed in the automotive or truck service industry.

ACDelco courses are available at approved GM STC Training Centers. Availability and schedules can be obtained by calling 1-800-825-5886 (prompt 1) or contact us via the web at www.acdelcotechconnect.com and select the Training tab. Seminars are also offered through the ACDelco Warehouse Distribution channel. Contact your Local ACDelco representative or distributor directly for more information.

VEHICLE, ENGINE AND TRANSMISSION ID AND VIN LOCATION, DERIVATIVE AND USAGE

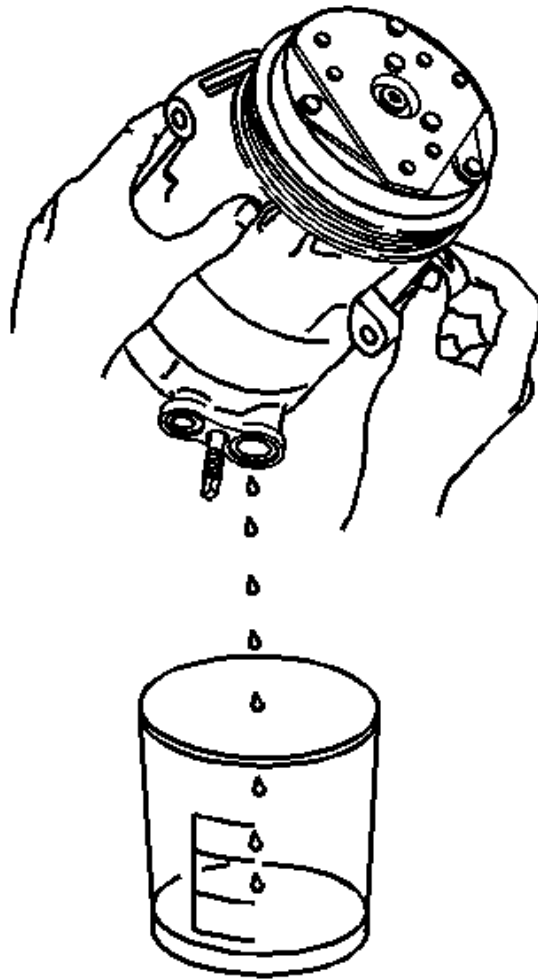


Fig. 3: Draining A/C Refrigerant Oil From Compressor
Courtesy of GENERAL MOTORS COMPANY

2. Rotate the compressor shaft to assist in draining the compressor.
3. Measure and record the amount of oil drained from the removed compressor.

This measurement will be used during installation of the replacement compressor.

4. Inspect oil drained from removed compressor. [Air Conditioning Compressor Oil Diagnosis](#)
5. Properly discard the used refrigerant oil.
6. Clean the graduated cylinder.

NOTE: Drain and measure as much of the refrigerant oil as possible from the rear head ports of the NEW compressor.

7. Remove the drain bolt and drain the refrigerant oil from the crankcase and rear head ports into a clean, graduated container.
8. Rotate the compressor shaft to assist in draining the compressor.

Balancing Procedure

Callout	Component Name
<p>WARNING: Refer to SIR Inflator Module Handling and Storage Warning .</p> <p>WARNING: Refer to SIR Warning .</p> <p>Preliminary Procedures</p> <ol style="list-style-type: none"> 1. Disable the SIR system. Refer to SIR Disabling and Enabling. 2. On the side of the steering wheel are 2 circular openings, place the wheel so that one opening is on top. 3. Using a blunt-ended tool, push the spring fastener inward through the access hole. Repeat the step for the other opening. 	
<p>1</p>	<p>Steering Wheel Inflatable Restraint Module</p> <p>WARNING: After installation of the steering wheel airbag module to the steering wheel, slightly pull the module outward. If there is no give on the airbag module then it is secured correctly. If the airbag module is not fully attached personal injury could result.</p> <p>Procedure</p> <ol style="list-style-type: none"> 1. Release the connector position assurance (CPA) retainer and release both snap fit clips on the sides of the connectors. 2. Disconnect the electrical connectors. 3. Refer to Inflatable Restraint Module Handling and Scrapping.

STEERING WHEEL AIRBAG COIL REPLACEMENT

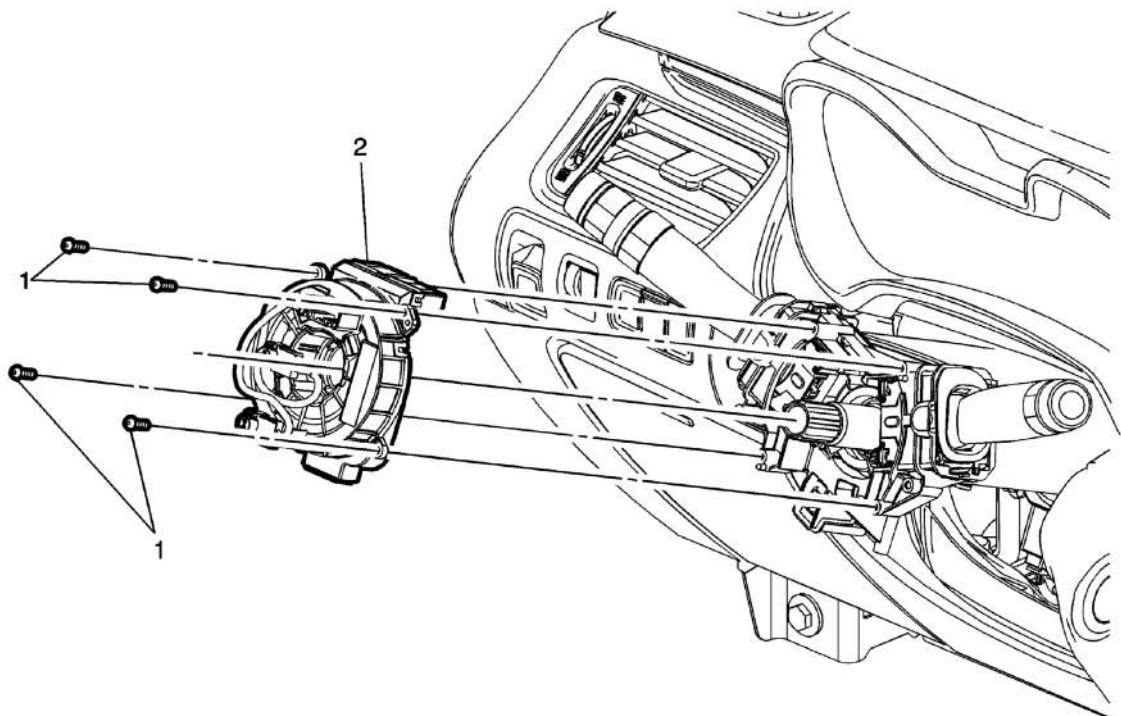


Fig. 10: Steering Wheel Airbag Coil
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Clean and inspect the ball joint seal for cuts or tears. If the ball joint seal is damaged, replace the lower control arm. Refer to [Lower Control Arm Replacement](#) .

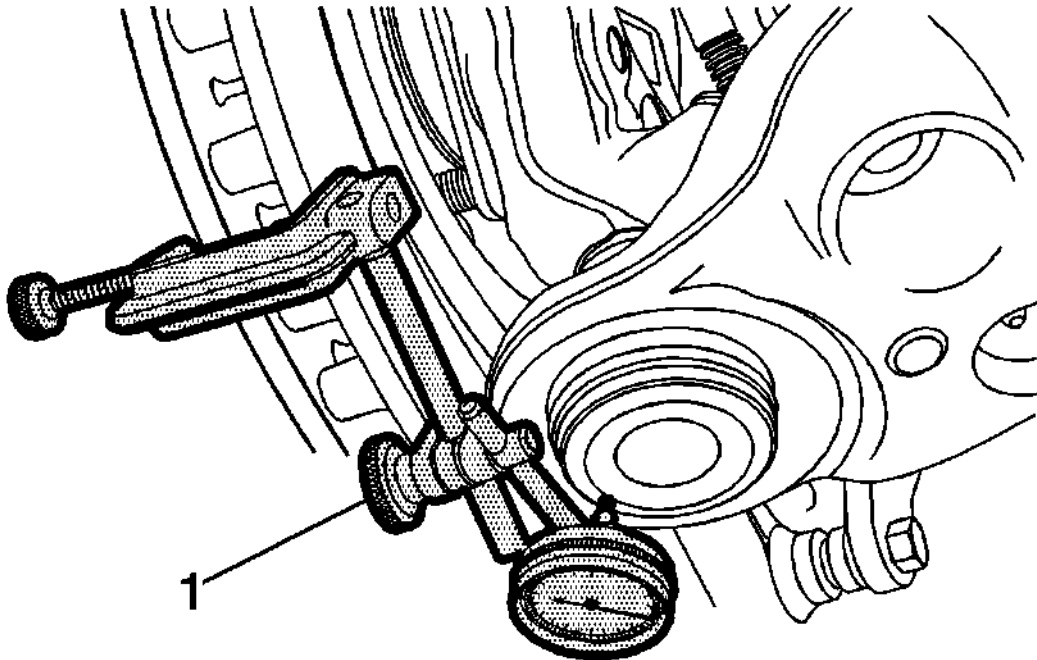


Fig. 1: Measuring Vertical Lash In Ball Joint
 Courtesy of GENERAL MOTORS COMPANY

3. Install the J 8001 set (1) in a way to measure vertical lash in the ball joint.

CAUTION: Do not pry in such a way that the ball joint seal is contacted. Damage to the seal may result.

4. Gently lift or pry the suspension to induce ball joint movement.
5. If the dial indicator indicates a reading greater than 0.5 mm (0.02 in), replace the lower control arm. Refer to [Lower Control Arm Replacement](#) .

SUSPENSION STRUT AND SHOCK ABSORBER TESTING - ON VEHICLE

Step	Action	Yes	No
1	Did you review the General Description and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Suspension General Diagnosis
2	Verify that the customer's concern is present. Does the vehicle operate normally?	System OK	Go to Step 3

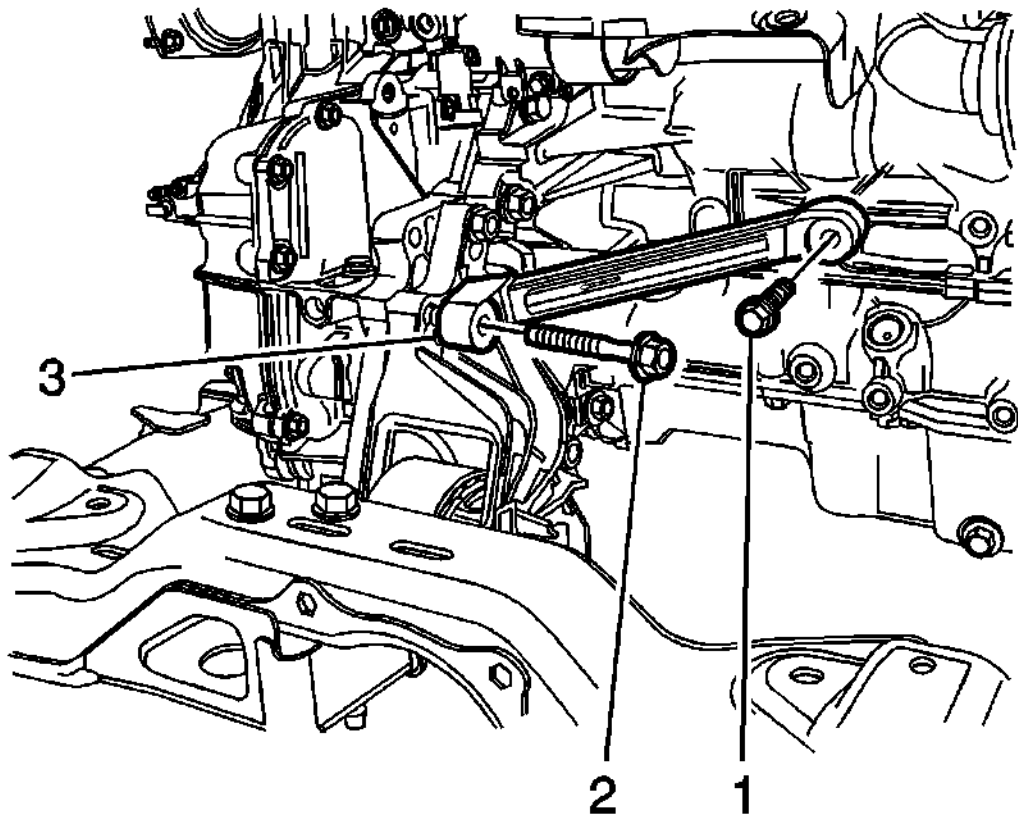


Fig. 70: Transmission Brace And Bolts

Courtesy of GENERAL MOTORS COMPANY

5. Remove the transaxle brace bolt (1), then loosen bolt (2) until it no longer engages the transaxle.
6. Remove the transaxle brace (3) with bolt (2) still retained in the brace.