

2014 SUSPENSION

Front Suspension - Acadia, Enclave And Traverse

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Ball Joint to Lower Control Arm Mounting Nuts and Bolts	68 N.m	50 lb ft
Front Frame Reinforcement Mounting Bolts	50 N.m	37 lb ft
Front Frame to Body Bolts		
• First Pass	110 N.m	81 lb ft
• Final Pass	+ 90°	
Front Wheel Bearing and Hub to Knuckle Bolts	120 N.m	89 lb ft
Front Lower Control Arm Front Nut	195 N.m	144 lb ft
Front Lower Control Arm Bushings Nuts	75 N.m	55 lb ft
Front Lower Control Arm Bushing Rear Nut	150 N.m	111 lb ft
Lower Control Arm Ball Stud Nuts		
• First Pass	40 N.m	30 lb ft
• Final Pass	+ 90°	
Stabilizer Link to Stabilizer Shaft Nuts	75 N.m	55 lb ft
Stabilizer Link to Strut Nuts	80 N.m	59 lb ft
Stabilizer Shaft Clamp to Frame Bolts	50 N.m	37 lb ft
Steering Knuckle to Strut Bolts	195 N.m	144 lb ft
Strut Mount Nut	85 N.m	63 lb ft
Strut to Body Mounting Nuts	45 N.m	33 lb ft
Upper Strut to Bearing Plate Nuts	83 N.m	61 lb ft

ADHESIVES, FLUIDS, LUBRICANTS AND SEALERS

Adhesives, Fluids, Lubricants and Sealers

Application	Type of Material	GM Part Number	Canadian Part Number
Strut Rod/Jounce Bumper	Lubricant (Dielectric Silicone)	12345579	10953481

REPAIR INSTRUCTIONS

STABILIZER SHAFT REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the front tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .
3. Remove the bolt from the intermediate shaft bracket to the front cradle. Refer to **Front Wheel Drive Intermediate Shaft Replacement** .
4. Remove the rear propeller shaft, if equipped. Refer to **Propeller Shaft Replacement** .
5. Disconnect the outer tie rods from the steering knuckles. Refer to **Steering Linkage Outer Tie Rod Replacement** .
6. Disconnect the stabilizer shaft links from the stabilizer shaft. Refer to **Stabilizer Shaft Link Replacement** .
7. Position an adjustable jack stand underneath the left rear and right rear of the front frame.
8. Remove the left and right frame reinforcement mounting bolts.

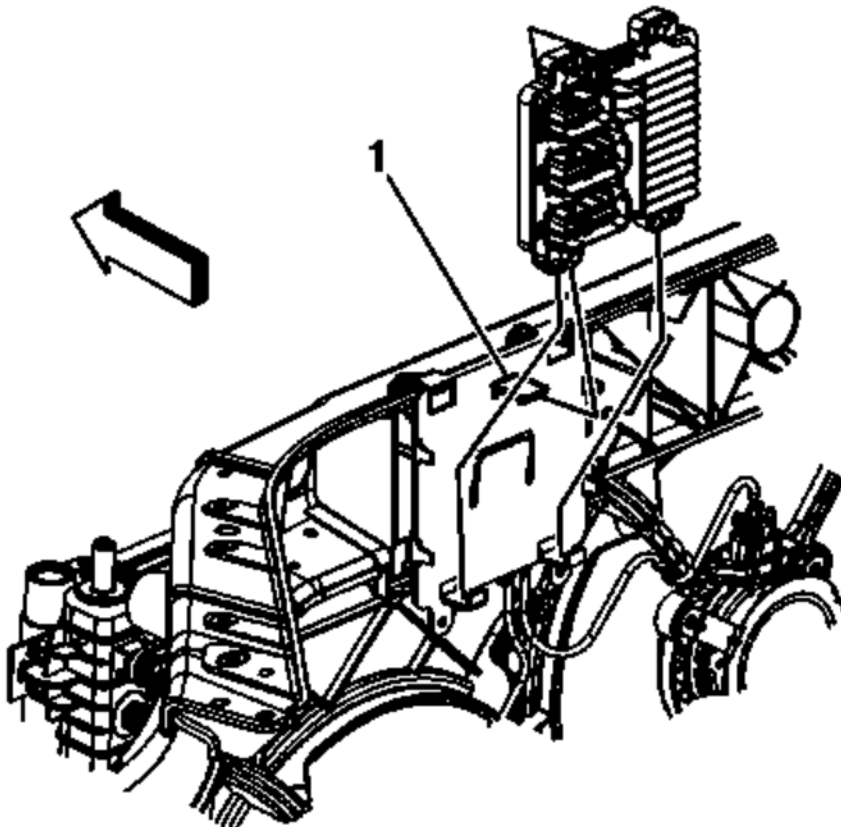


Fig. 1: Identifying Frame Reinforcement Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

9. Loosen the front frame reinforcement mounting bolts (1).

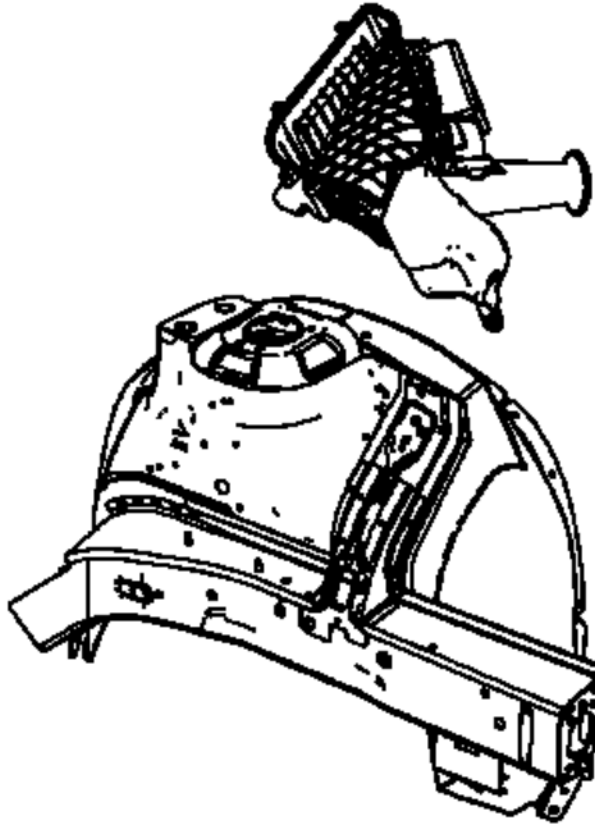


Fig. 2: Identifying Front Frame Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

10. Loosen the front frame mounting bolts (2).
11. Loosen the front frame rear mounting bolts (1).

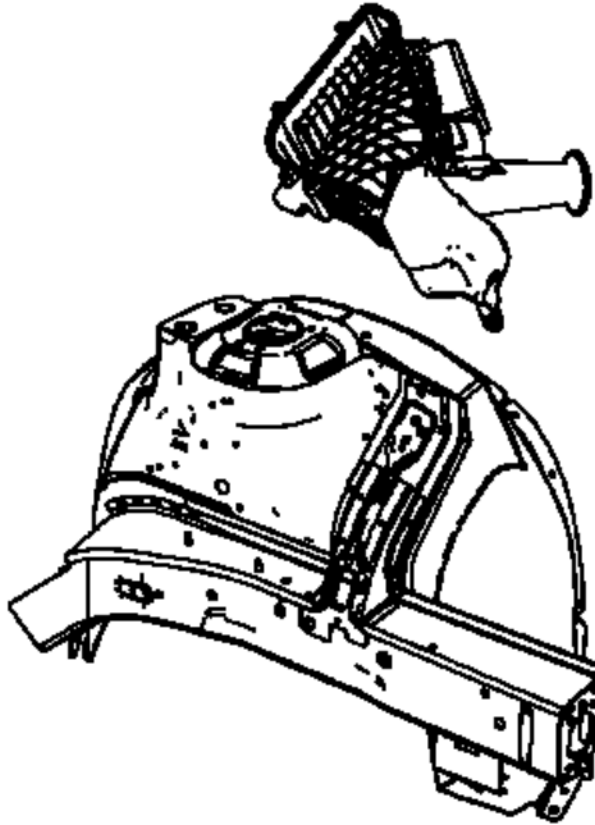


Fig. 3: Locating Rear Frame Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

12. Lower the front frame (1) from the frame rail (2) until enough clearance is gained to remove the stabilizer shaft.

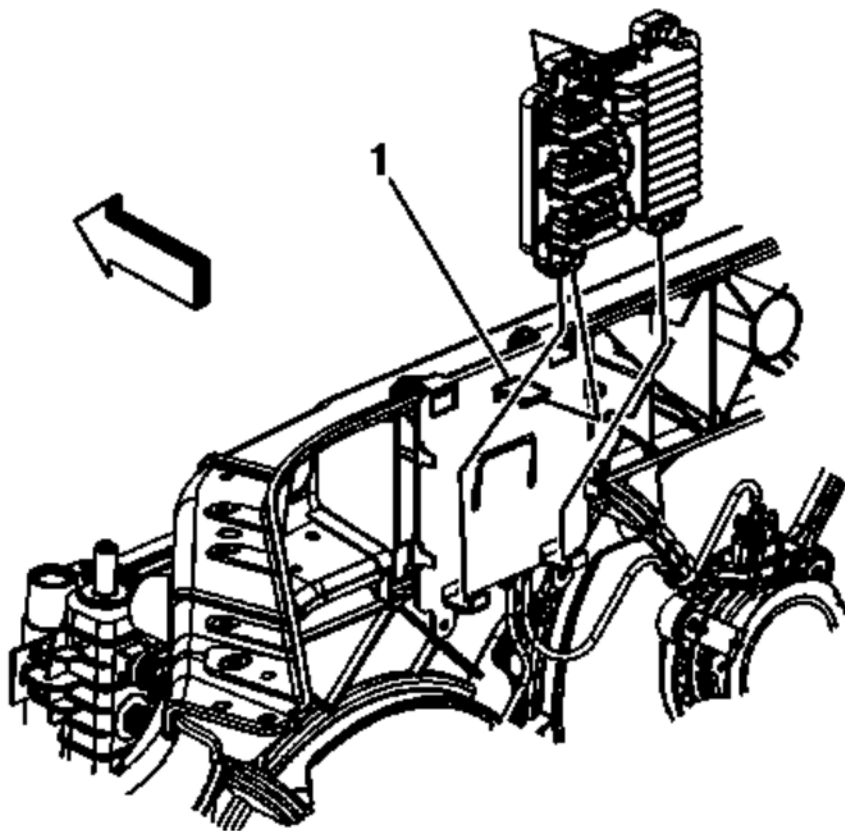


Fig. 4: Identifying Frame & Frame Rail

Courtesy of GENERAL MOTORS COMPANY

13. Remove both left and right stabilizer shaft insulators. Refer to Stabilizer Shaft Insulator Replacement.

NOTE: If replacing the stabilizer shaft, use NEW insulators.

14. Remove the stabilizer shaft from the vehicle.

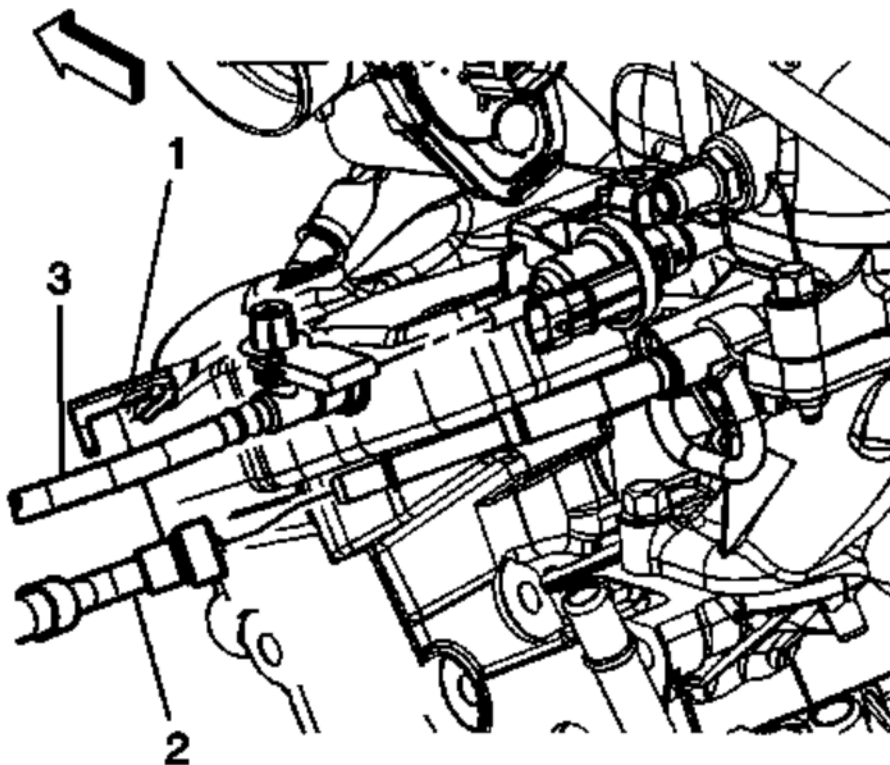


Fig. 5: Positioning Stabilizer Shaft

Courtesy of GENERAL MOTORS COMPANY

NOTE: It may be necessary to maneuver the stabilizer shaft in order to remove the stabilizer shaft from the front frame.

Installation Procedure

1. Position the stabilizer shaft on the front frame.

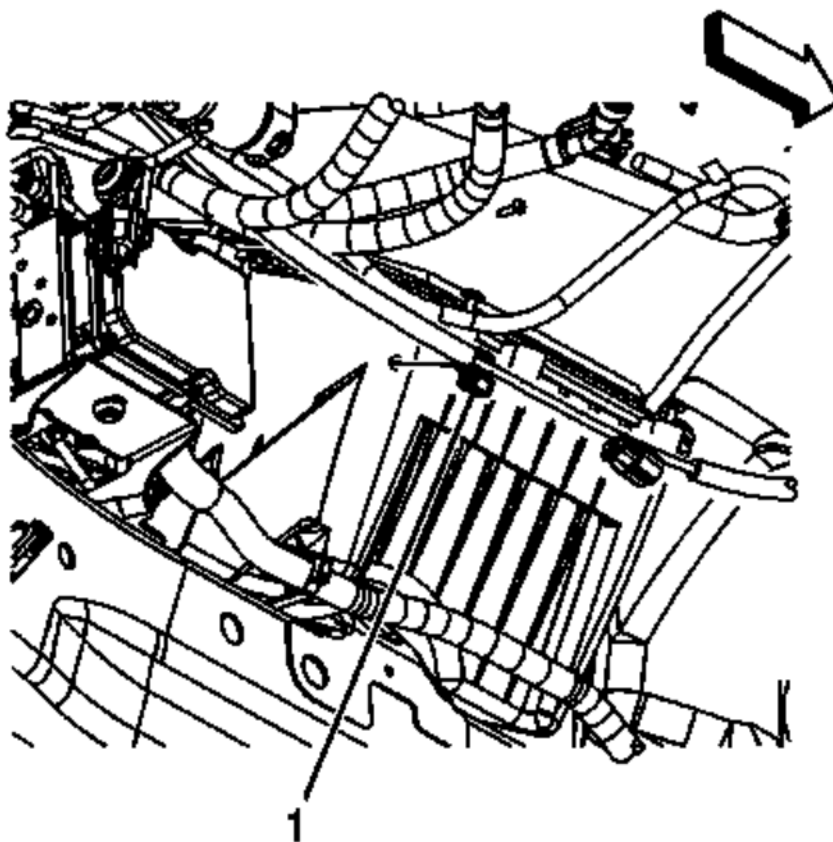


Fig. 6: Positioning Stabilizer Shaft

Courtesy of GENERAL MOTORS COMPANY

2. Install the left and right stabilizer shaft insulators and brackets. Refer to **Stabilizer Shaft Insulator Replacement**.
3. Connect the stabilizer shaft links to the stabilizer shaft. Refer to **Stabilizer Shaft Link Replacement**.
4. Using the jack stands, raise the front frame to the vehicle body leaving a gap of approximately 12 mm (0.5 in).
5. Install the front frame mounting bolts (2) and tighten to 110 N.m (81 lb ft).

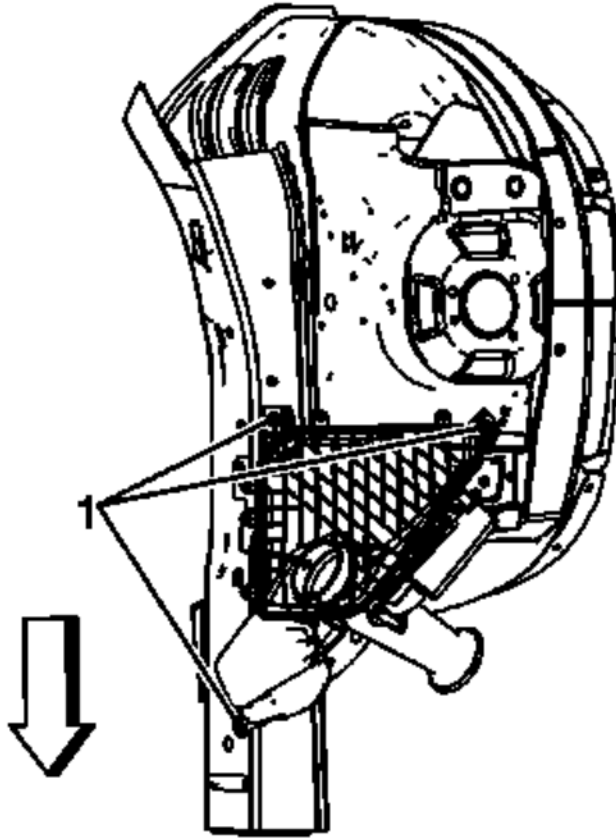


Fig. 7: Identifying Front Frame Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

6. Tighten the front frame mounting bolts an additional 90°.
7. Tighten the front frame reinforcement mounting bolts (1) to 50 N.m (37 lb ft).
8. Install the front frame rear mounting bolts (1) and tighten to 110 N.m (81 lb ft).

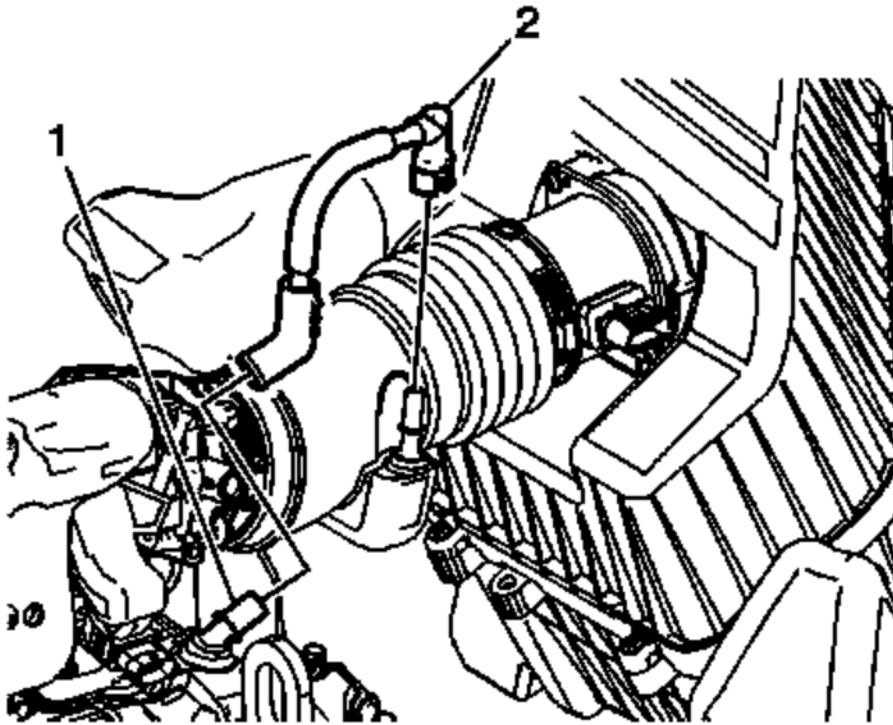


Fig. 8: Locating Rear Frame Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

9. Tighten the front frame rear mounting bolts an additional 90°.
10. Install the left and right front frame reinforcement mounting bolts and tighten to 50 N.m (37 lb ft).

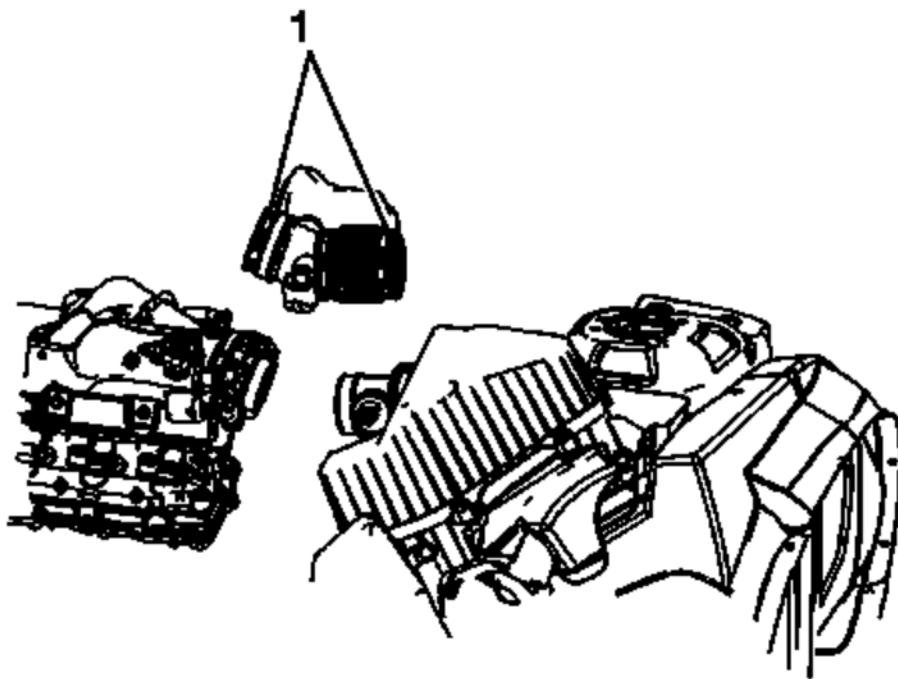


Fig. 9: Identifying Frame Reinforcement Mounting Bolts
Courtesy of GENERAL MOTORS COMPANY

11. Remove the adjustable jack stands.
12. Install the bolt from the intermediate shaft bracket to the front cradle. Refer to **Front Wheel Drive Intermediate Shaft Replacement** .
13. Connect the outer tie rods to the knuckle. Refer to **Steering Linkage Outer Tie Rod Replacement** .
14. Install the rear propeller shaft, if equipped. Refer to **Propeller Shaft Replacement** .
15. Install the front tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .
16. Remove the support and lower the vehicle.

STABILIZER SHAFT LINK REPLACEMENT

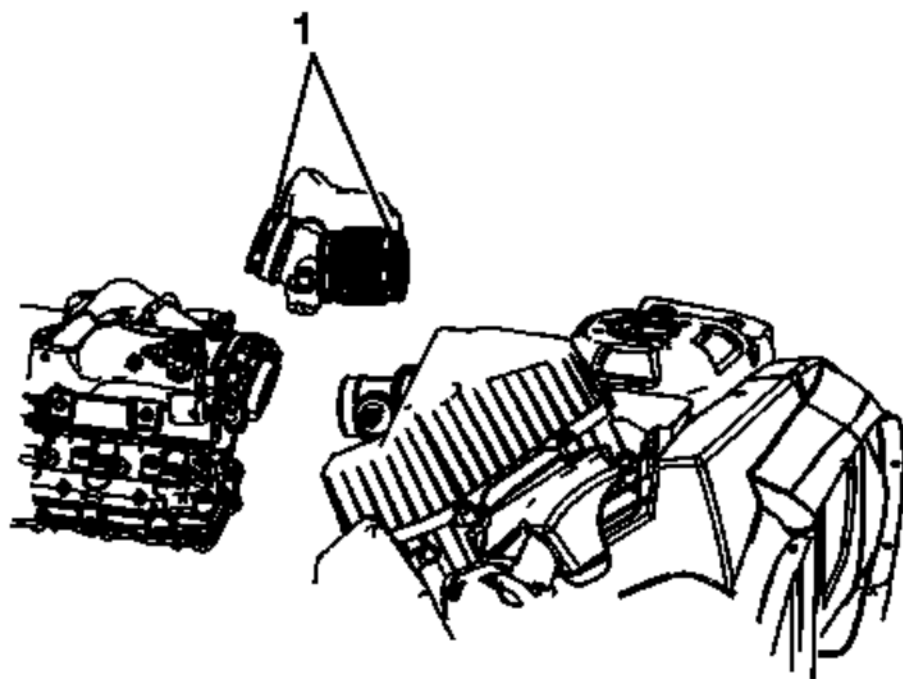


Fig. 10: Identifying Stabilizer Shaft Link

Courtesy of GENERAL MOTORS COMPANY

Stabilizer Shaft Link Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Stabilizer Shaft Link (left side shown, right side similar). CAUTION: Refer to <u>Fastener Caution</u> . Procedure 1. Use a wrench to prevent the stub link from rotating. 2. Using the proper size wrench, remove the retaining nut for the upper stabilizer shaft link stub link.

3. Repeat the previous steps to remove the lower stabilizer shaft stub link retaining nut.
4. Remove the stabilizer shaft link from the vehicle.

TIP: Use the wrench to hold the stabilizer shaft stub link while torquing to the specified torque.

Tighten

- Stabilizer Link to Strut 80 N.m (59 lb ft)
- Stabilizer link to Stabilizer Shaft 75 N.m (55 lb ft)

STABILIZER SHAFT INSULATOR REPLACEMENT

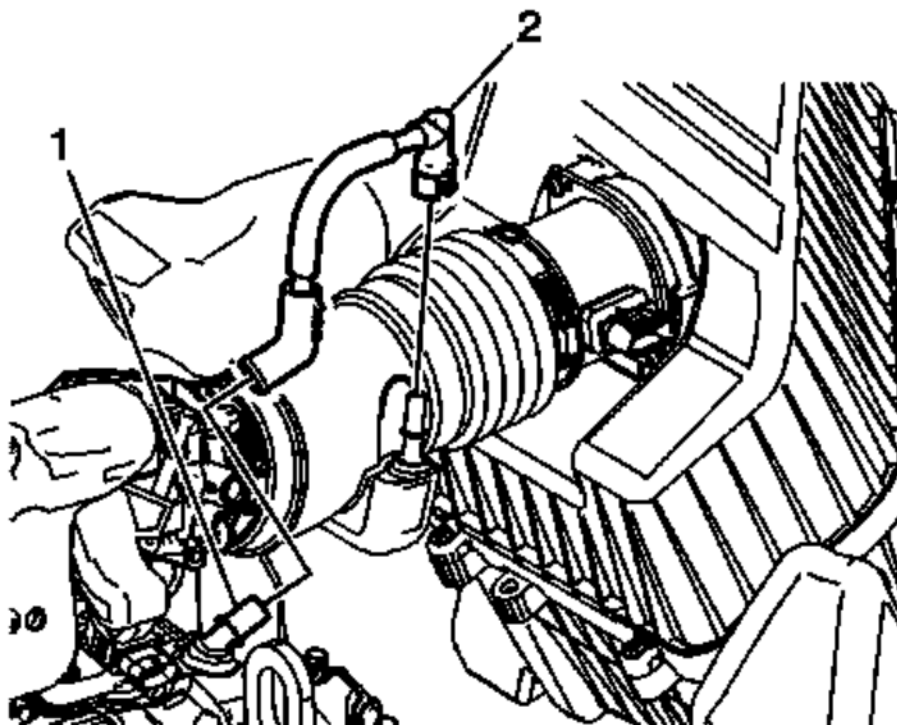


Fig. 11: Identifying Stabilizer Shaft Insulator
Courtesy of GENERAL MOTORS COMPANY

Stabilizer Shaft Insulator Replacement

Callout	Component Name
Preliminary Procedure	
Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .	

1	Stabilizer Shaft Clamp Bolt (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 50 N.m (37 lb ft)
2	Stabilizer Shaft Insulator Clamp (Qty: 2)
3	Stabilizer Shaft Insulator (Qty: 2) TIP: Lift up on the stabilizer shaft to gain enough clearance to remove the insulator.

LOWER CONTROL ARM BALL JOINT REPLACEMENT

Removal Procedure

1. Remove the lower control arm assembly. Refer to Lower Control Arm Replacement.
2. Install the lower control arm in a vise.
3. Drill or grind off the head of the rivet.

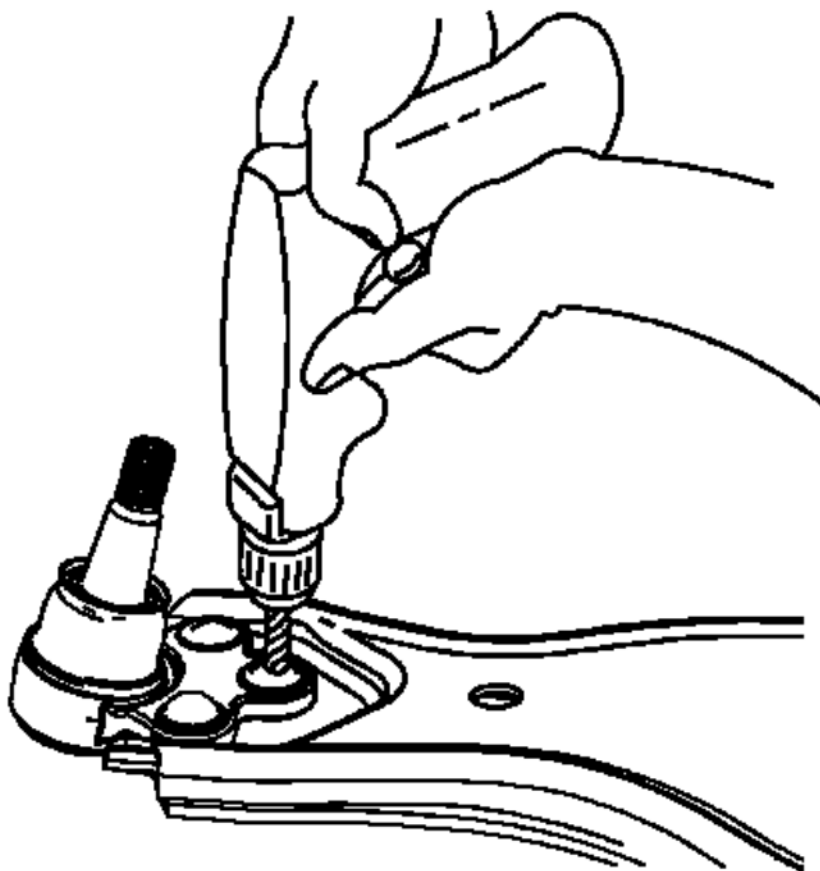


Fig. 12: Drilling Off Head Of Rivet

Courtesy of GENERAL MOTORS COMPANY

NOTE: Use a center punch to aid in starting the drill if drilling the rivet.

4. Use a punch and a hammer to loosen the rivets from the lower control arm.

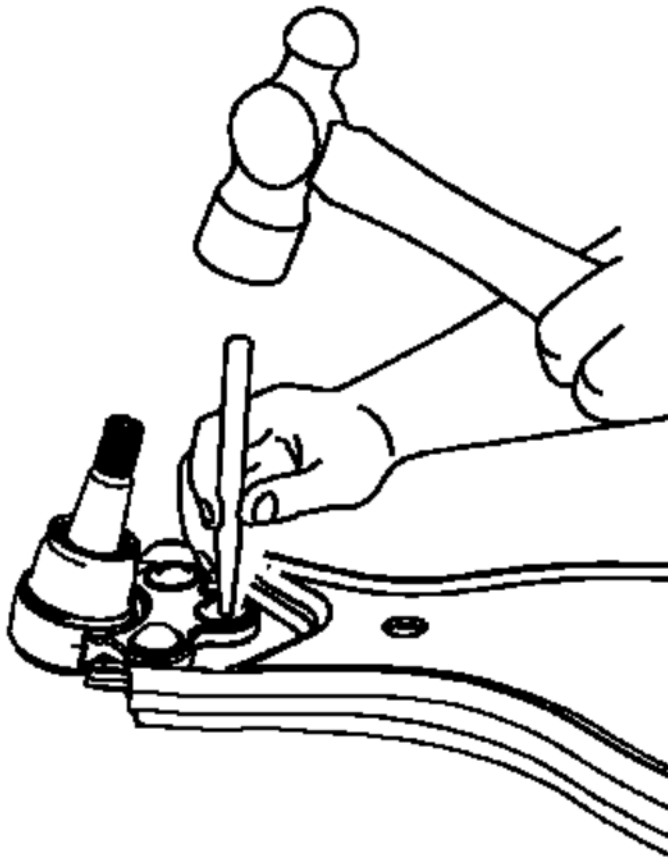


Fig. 13: Removing Rivets With A Punch And A Hammer

Courtesy of GENERAL MOTORS COMPANY

5. Remove the rivets from the lower control arm.



- 15

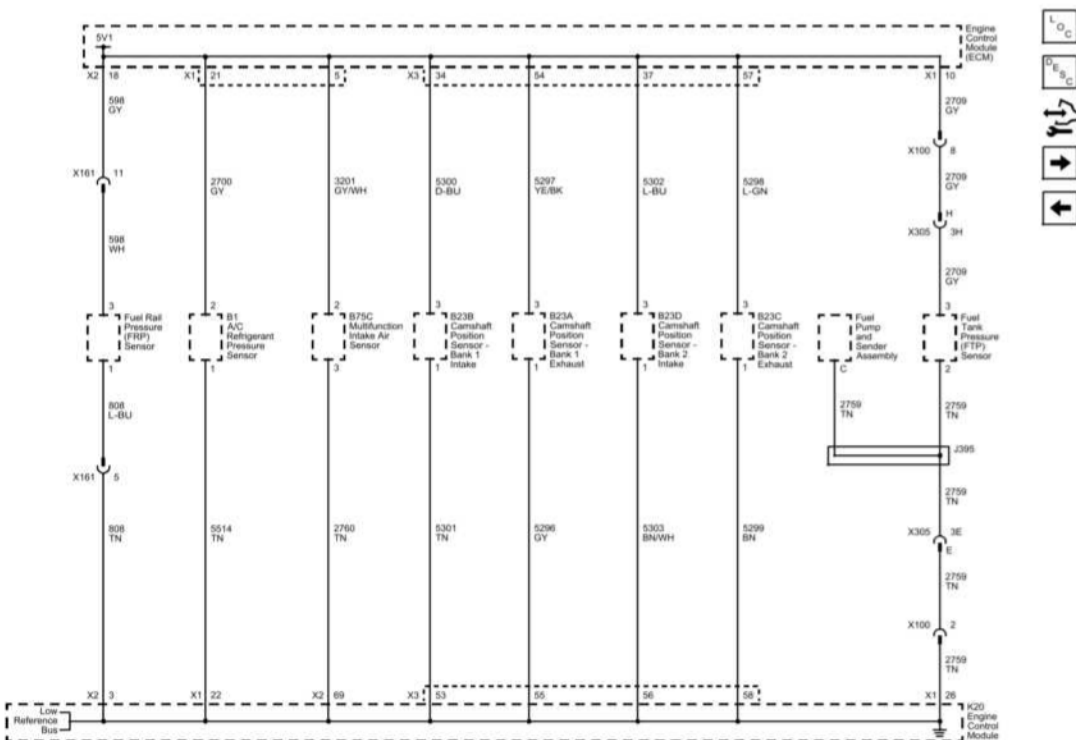


Fig. 15: Removing/Installing Ball Joint At Lower Control Arm
Courtesy of GENERAL MOTORS COMPANY

7. Remove the ball joint from the lower control arm.

Installation Procedure

1. Position the ball joint on the lower control arm.

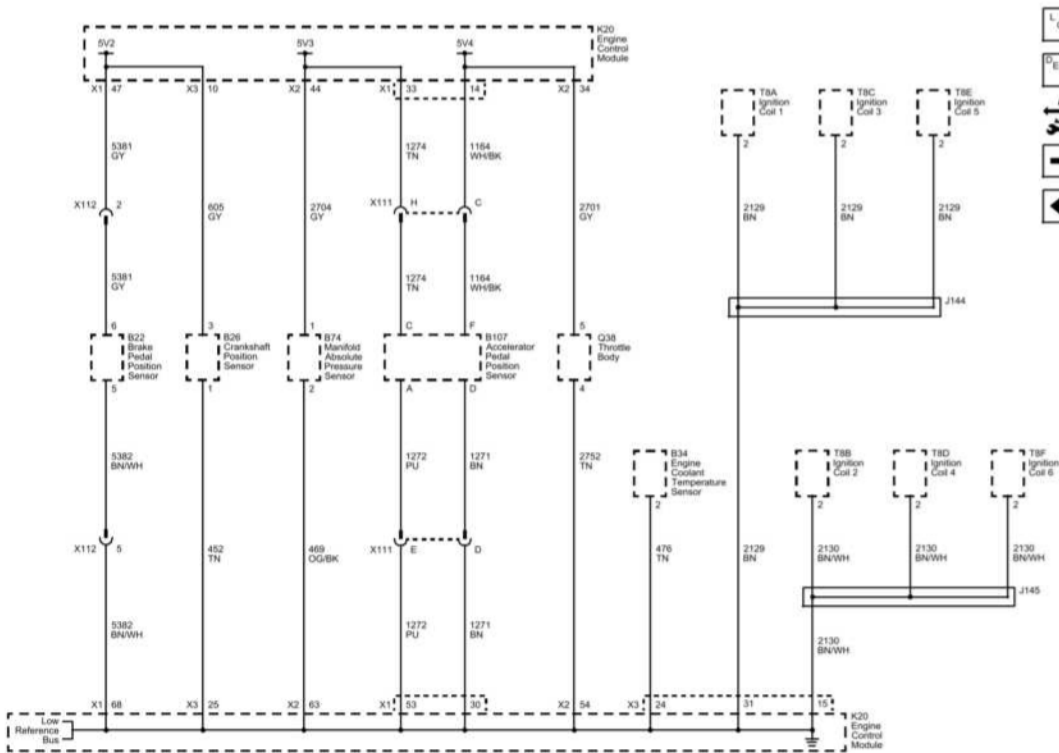


Fig. 16: Removing/Installing Ball Joint At Lower Control Arm
Courtesy of GENERAL MOTORS COMPANY

2. Install the ball joint mounting nuts and bolts.

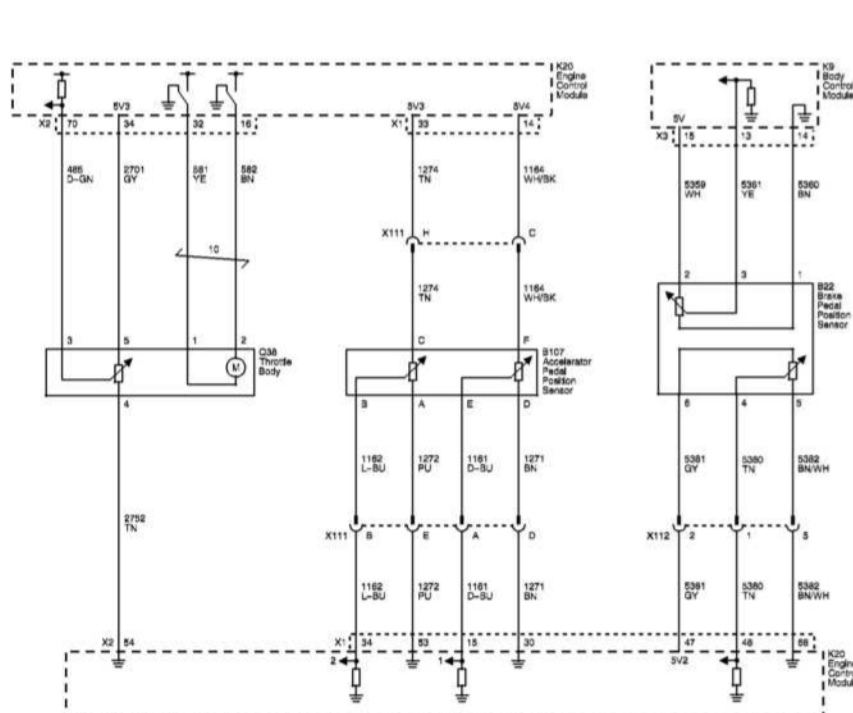


Fig. 17: View Of Ball Joint Mounting Nuts & Bolts
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

NOTE: When tightening the mounting nuts and bolts for the ball joint, hold the bolt and torque the nut for the proper torque measure.

Tighten

Tighten the mounting nuts to 68 N.m (50 lb ft).

3. Remove the lower control arm assembly from the vise.
4. Install the lower control arm. Refer to Lower Control Arm Replacement.
5. Check the front end alignment of the vehicle. Refer to Wheel Alignment Specifications .

FRONT WHEEL BEARING AND HUB REPLACEMENT

Special Tools

Courtesy of GENERAL MOTORS COMPANY

- Remove the wheel bearing and hub assembly.

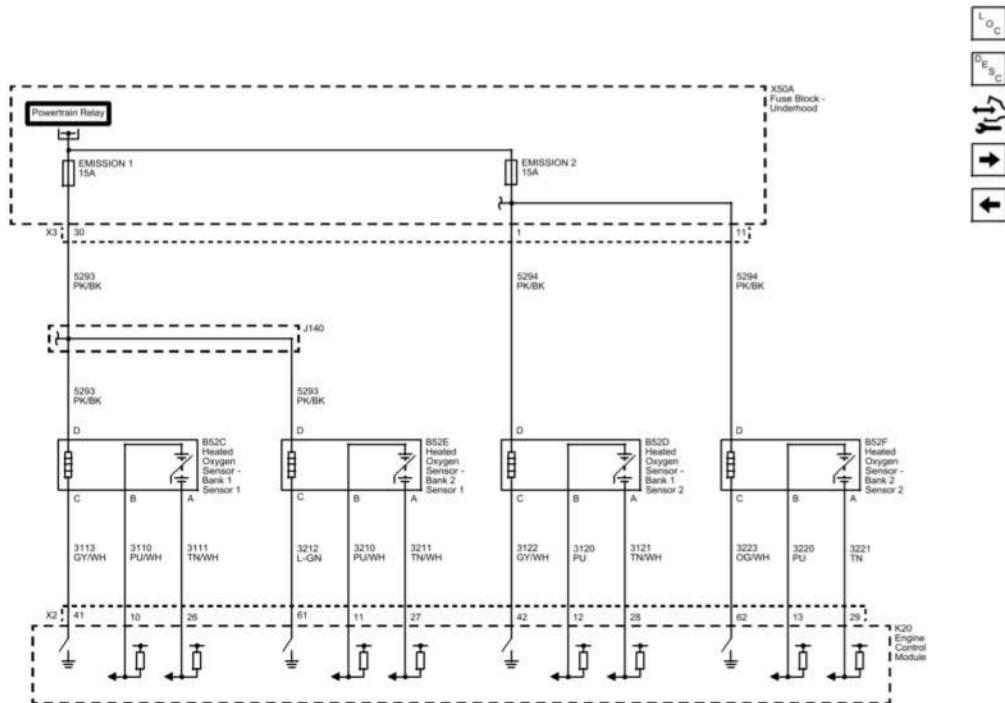


Fig. 19: Identifying Wheel Bearing & Hub Assembly
 Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

- Position the wheel bearing and hub assembly in the knuckle.

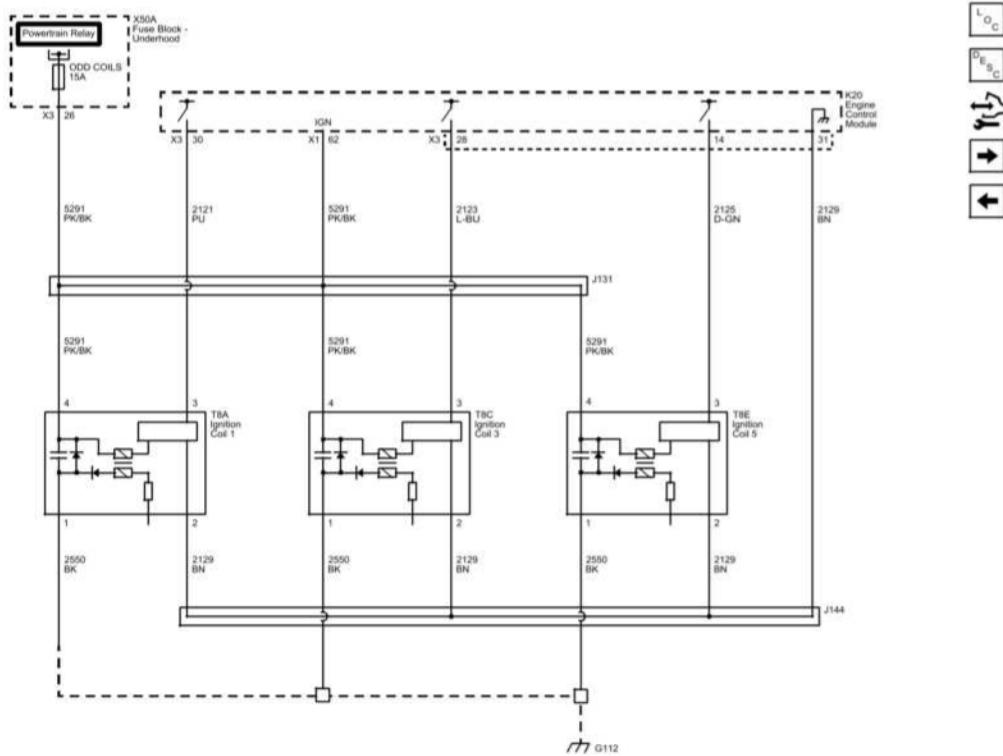


Fig. 20: Identifying Wheel Bearing & Hub Assembly
Courtesy of GENERAL MOTORS COMPANY

- Using an approved solvent, clean the old threadlocker from the threads of the wheel bearing hub and the bolts.

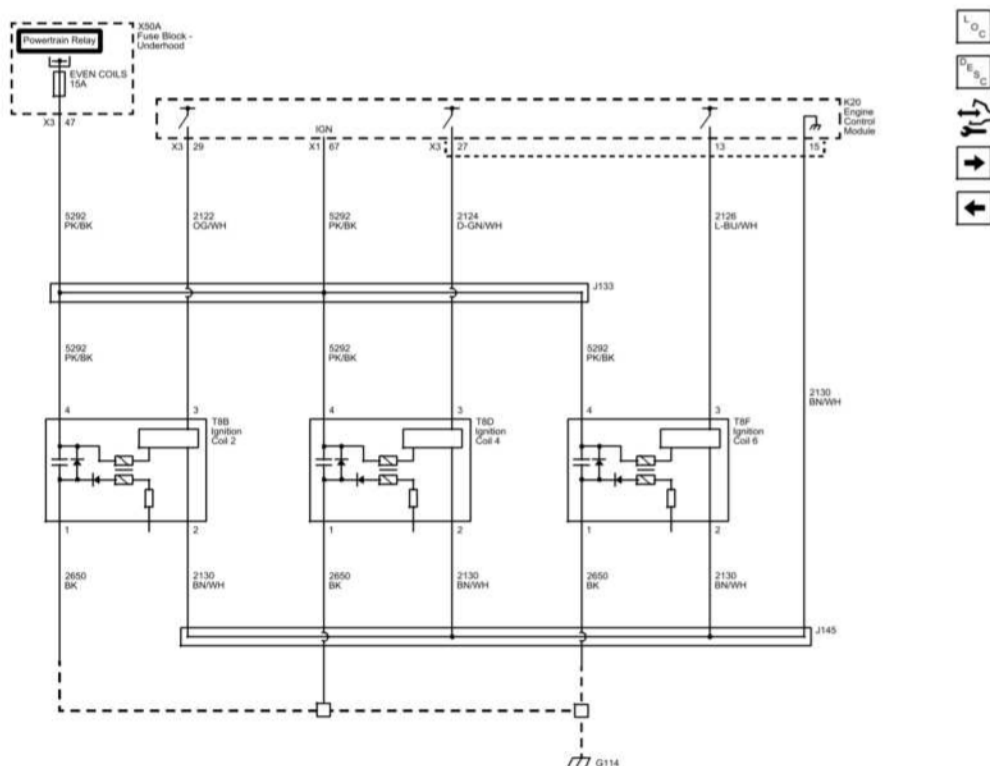


Fig. 21: View Of J 28733-B Installed Onto Wheel Hub
Courtesy of GENERAL MOTORS COMPANY

3. Apply the high-temperature, high-strength threadlocker to 2/3 of the threads of the wheel bearing and the bolts.

NOTE: Ensure that there are no gaps in the threadlocker and allow to dry approximately 10 minutes before installing the wheel bearing bolts.

4. Install the retaining bolts for the wheel bearing and hub.

CAUTION: Refer to Fastener Caution .

Tighten

Tighten the bolts to 120 N.m (89 lb ft).

5. Install the front brake rotor. Refer to Front Brake Rotor Replacement .
6. Install the wheel drive shaft retaining nut and washer. Refer to Front Wheel Drive Shaft Replacement .
7. Install the tire and wheel. Refer to Tire and Wheel Removal and Installation .

8. Remove the support and lower the vehicle.

STEERING KNUCKLE REPLACEMENT

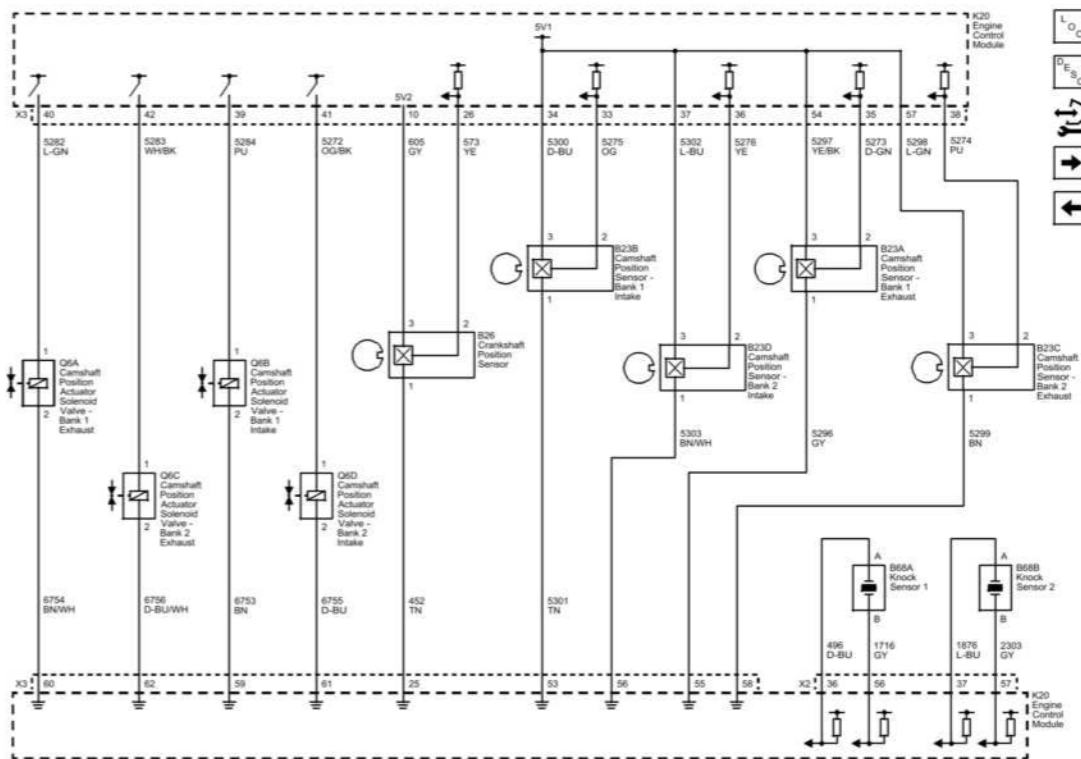


Fig. 22: Identifying Steering Knuckle
Courtesy of GENERAL MOTORS COMPANY

Steering Knuckle Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle. 2. Remove the wheel bearing/hub assembly. Refer to Front Wheel Bearing and Hub Replacement. 3. Disconnect the outer tie rod from the steering knuckle. Refer to Steering Linkage Outer Tie Rod Replacement. 4. Disconnect the lower ball joint from the steering knuckle. Refer to Lower Control Arm Ball Joint Replacement.	
1	Front Strut Suspension Nut (Qty: 2)
	Front Strut Suspension Bolt (Qty: 2)
	CAUTION:

	Refer to <u>Fastener Caution</u> .
2	TIP: Support the wheel drive shaft with mechanics wire after the knuckle has been removed. Tighten 195 N.m (144 lb ft)
3	Steering Knuckle

LOWER CONTROL ARM REPLACEMENT

Special Tools

J 42188-B Ball Joint Separator

For regional equivalent tools, refer to **Special Tools**.

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
3. Disconnect the outer tie rod end from the steering knuckle. Refer to **Steering Linkage Outer Tie Rod Replacement** .
4. Turn the knuckle to the left.
5. Using the J-42188-A (2) and a wrench, loosen the lower ball joint nut.

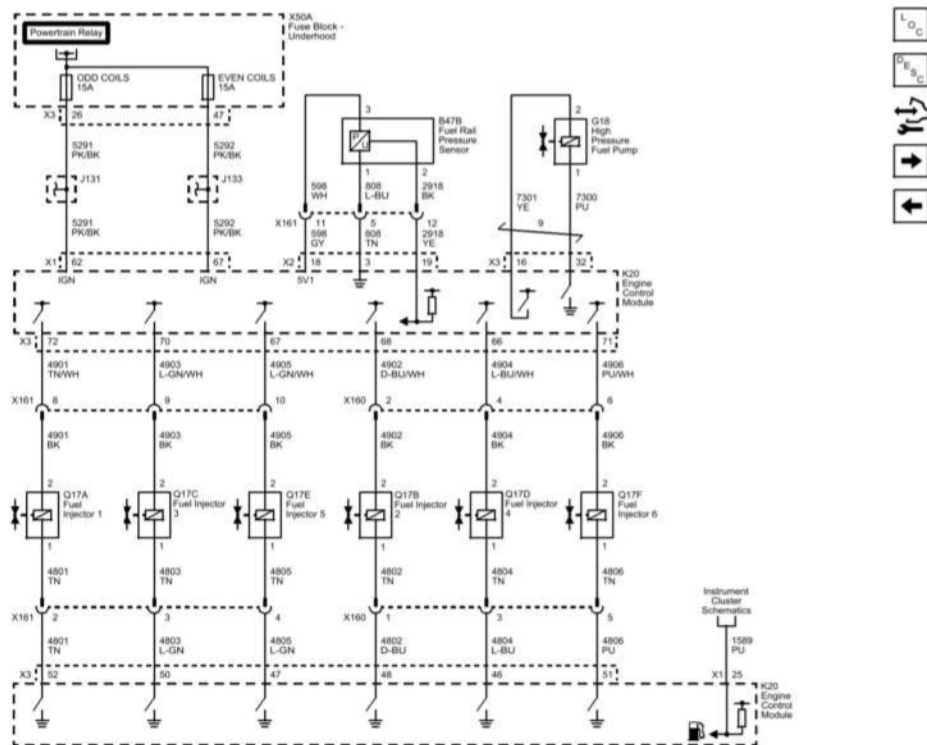


Fig. 23: Identifying J 42188 Ball Joint Separator
Courtesy of GENERAL MOTORS COMPANY

- Using the **J 42188-B** separator (1), disconnect the lower ball joint from the knuckle.
- Remove the lower ball joint nut (1).

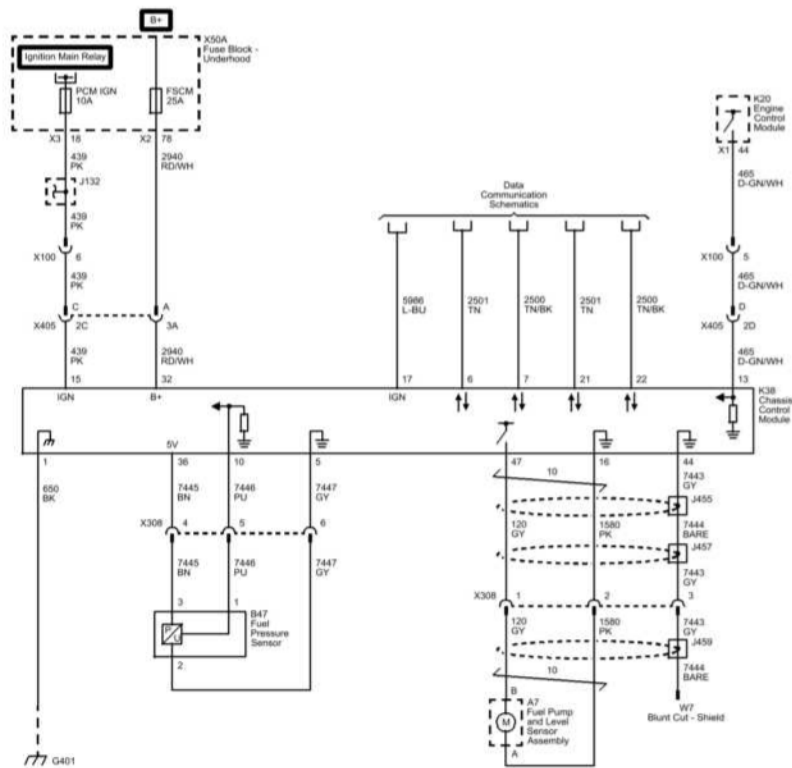
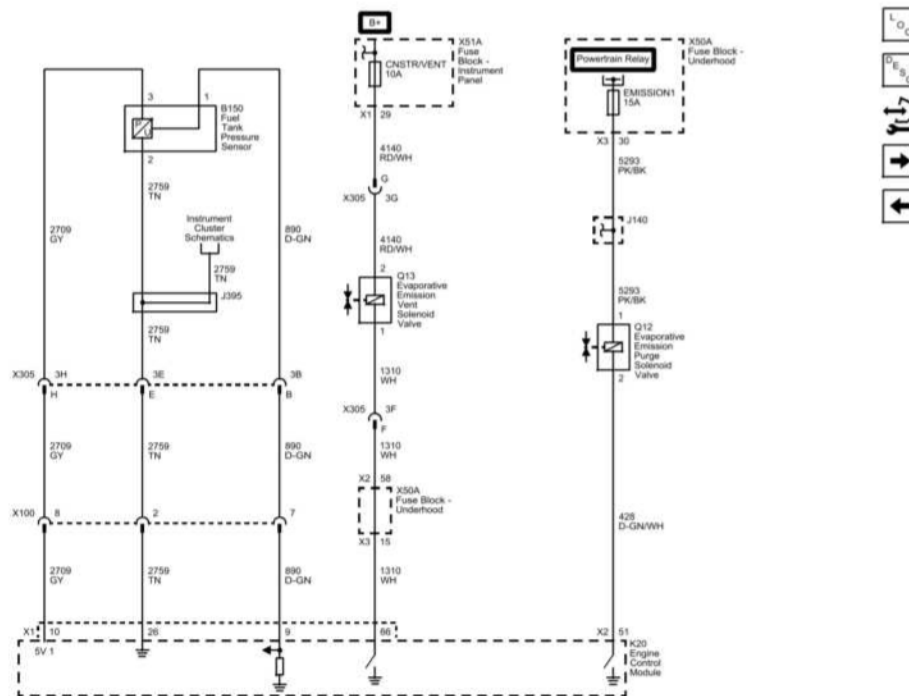


Fig. 24: Identifying Lower Ball Joint Retaining Nut
 Courtesy of GENERAL MOTORS COMPANY

8. Remove the front lower control arm front nut (4) from the stud (3).



- 27

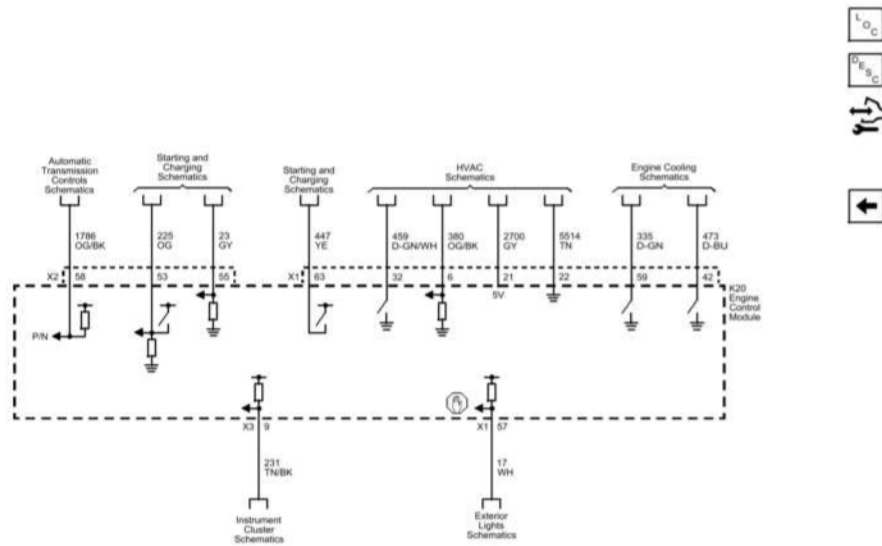


Fig. 26: Identifying Lower Control Arm
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the front lower control arm (1) in the frame.

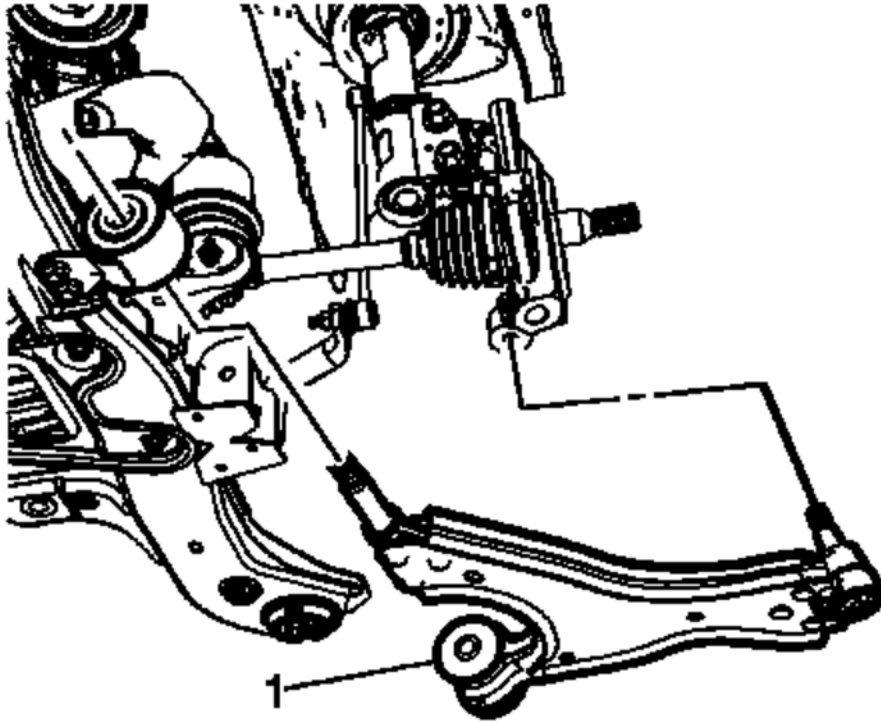


Fig. 27: Identifying Lower Control Arm

Courtesy of GENERAL MOTORS COMPANY

2. Install the front lower control arm rear nut (2) and bolt (1). Hand tighten the rear nut (2).

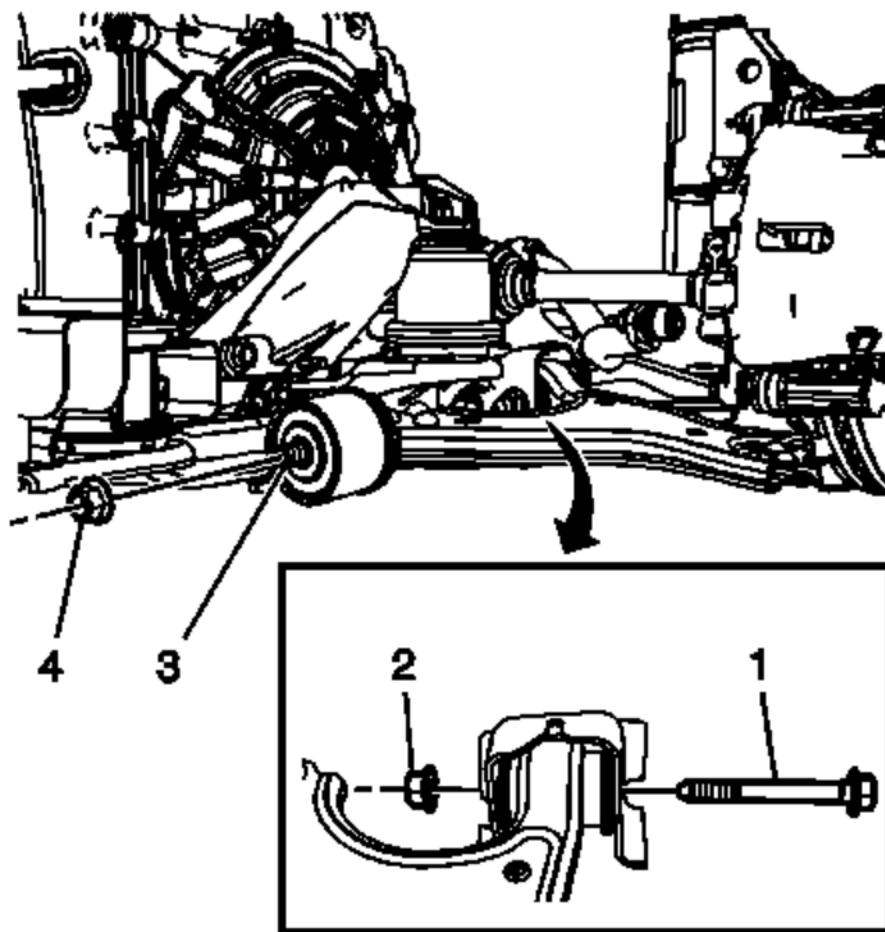


Fig. 28: Identifying Control Arm Mounting Bolt And Nut
Courtesy of GENERAL MOTORS COMPANY

3. Install the front lower control arm front nut (4) to the stud (3) and tighten to 195 N.m (144 lb ft).

CAUTION: Refer to Fastener Caution .

4. Tighten the front rear lower control arm rear nut (2) to 150 N.m (111 lb ft).

NOTE: Use the appropriate size wrench to hold the bolt while torquing the nut.

5. Connect the lower ball joint in the knuckle.

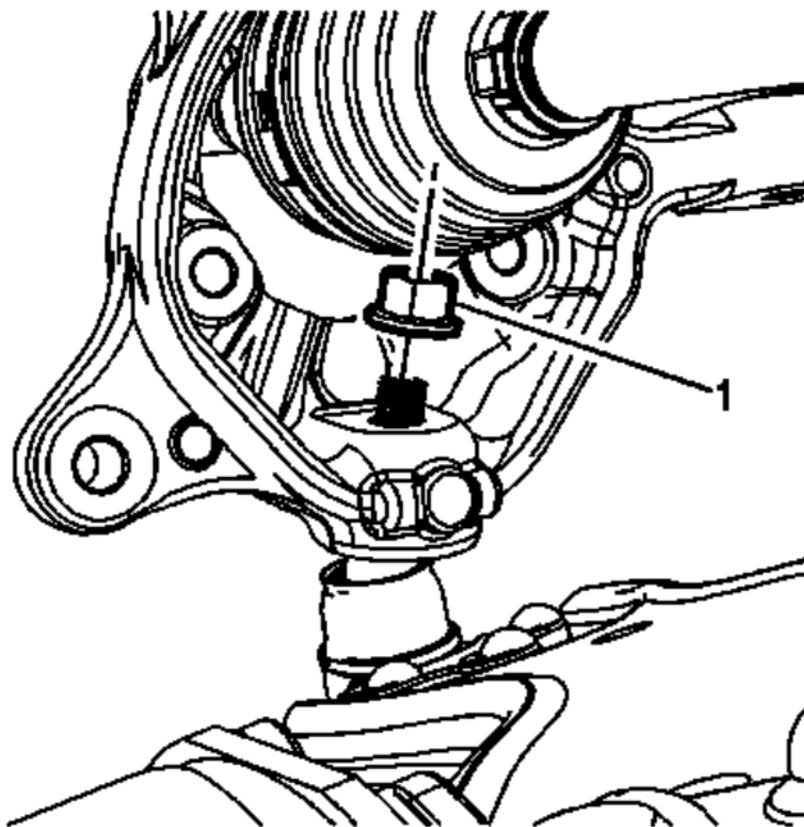


Fig. 29: Identifying Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS COMPANY

6. Install the ball joint nut and tighten to:
 - First Pass: 40 N.m (30 lb ft)
 - Final Pass: plus 90°.
7. Connect the outer tie rod end. Refer to **Steering Linkage Outer Tie Rod Replacement** .
8. Install the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
9. Remove the support and lower the vehicle.

FRONT LOWER CONTROL ARM BUSHING REPLACEMENT

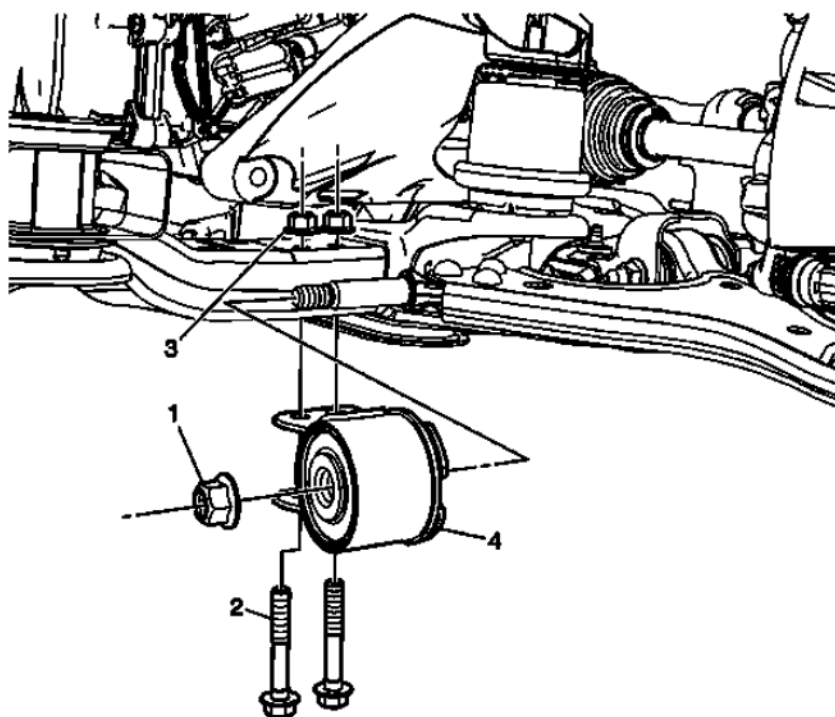


Fig. 30: Identifying Lower Control Arm Bushing & Bracket
 Courtesy of GENERAL MOTORS COMPANY

Front Lower Control Arm Bushing Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle . 2. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation .	
1	Front Lower Control Arm Bushing Nut CAUTION: Refer to Fastener Caution . Tighten 195 N.m (144 lb ft)
2	Front Lower Control Arm Bushing Bolt (Qty: 2) NOTE: When tightening the bolt to specifications, hold the bolt and torque the nut for the proper torque.
3	Lower Control Arm Front Bushing Nut (Qty: 2) Tighten

	75 N.m (55 lb ft)
4	Front Lower Control Arm Bushing NOTE: The control arm bushing is NOT serviced separately, but with the mounting bracket.

FRONT LOWER CONTROL ARM REAR BUSHING REPLACEMENT

Special Tools

- **CH-48107** Bushing Remover and Installer
- **J 2619-01** Slide Hammer and Adapter
- **J 5590** Installer and Remover

Removal Procedure

1. Remove the front lower control arm assembly. Refer to **Lower Control Arm Replacement**.
2. Install the lower control arm in a soft jawed vise.

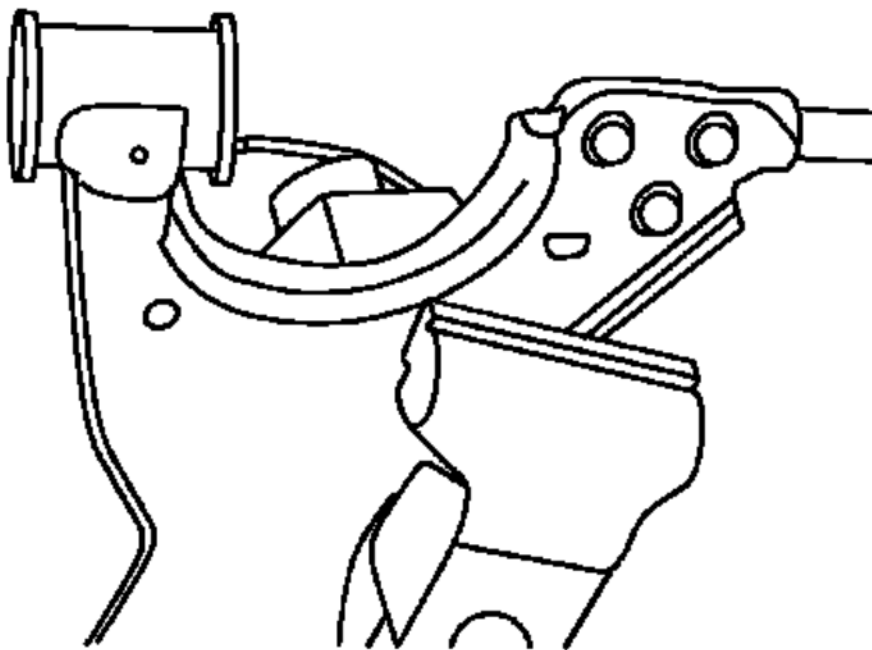


Fig. 31: View Of Lower Control Arm In Soft Jawed Vise

Courtesy of GENERAL MOTORS COMPANY

3. Assemble the **J 2619-01** Slide Hammer and Adapter and the **CH-48107** Bushing Remover and Installer.

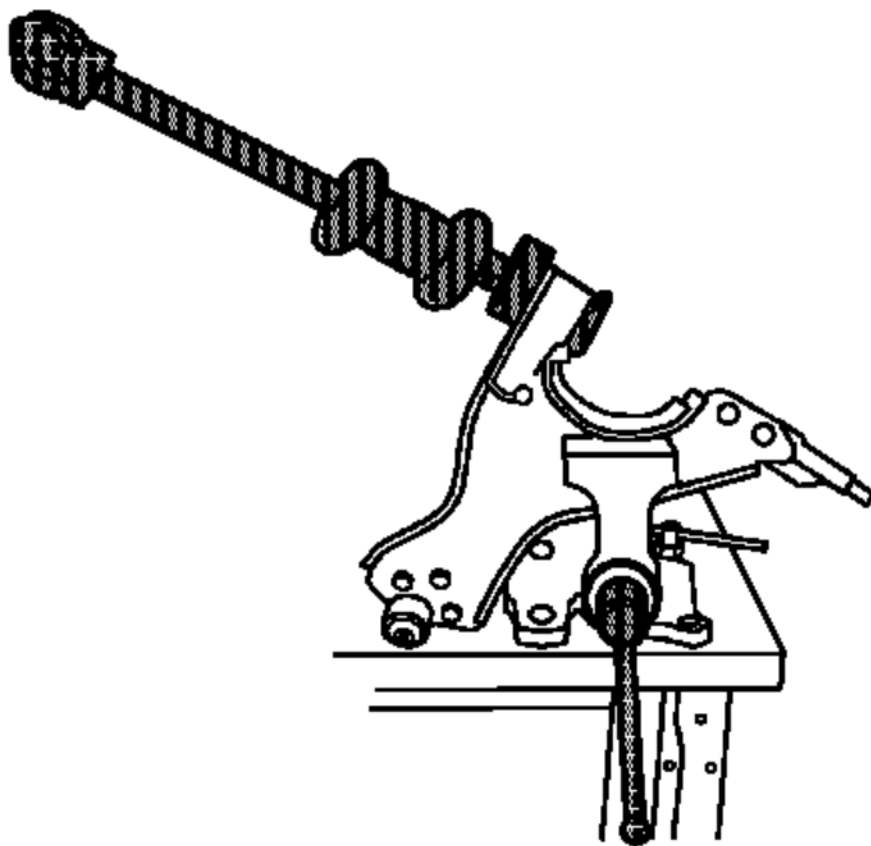


Fig. 32: Identifying Special Tools J 2619-01 & CH-48107

Courtesy of GENERAL MOTORS COMPANY

4. Position the **J 2619-01** Slide Hammer and Adapter and the **CH-48107** Bushing Remover and Installer lower control arm bushing.
5. Using the **J 2619-01** Slide Hammer and Adapter and the **CH-48107** Bushing Remover and Installer, remove the front lower control arm bushing.
6. Using the **J 5590** Installer and Remover, remove the rear lower control arm bushing.

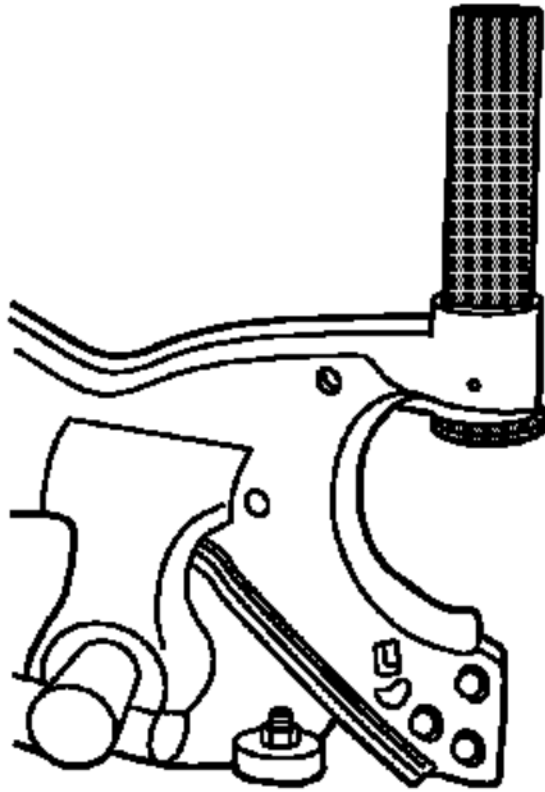


Fig. 33: Identifying Special Tool J 5590
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Position the front and rear bushings so that they are equally in the control arm.

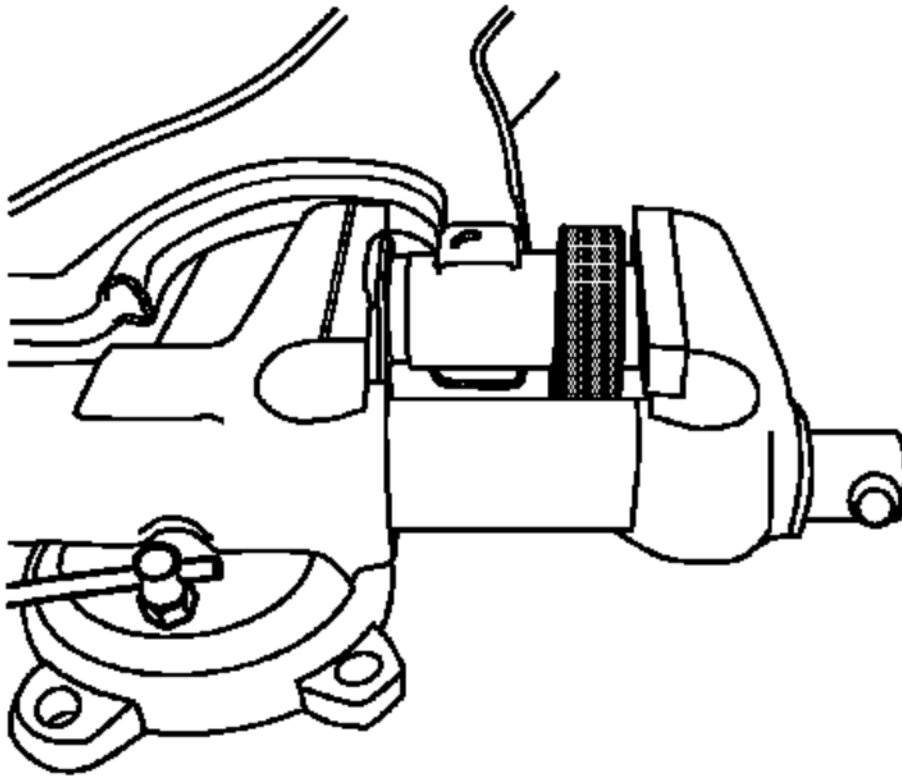


Fig. 34: Identifying Front & Rear Bushings
Courtesy of GENERAL MOTORS COMPANY

2. Position the **CH-48107** Bushing Remover and Installer on the front bushing.
3. Using the vise, compress the front and rear bushings until they are seated.
4. Remove the lower control arm from the vise.
5. Remove the **CH-48107** Bushing Remover and Installer from the front bushing.
6. Install the lower control arm in the vehicle. Refer to **Lower Control Arm Replacement**.

WHEEL STUD REPLACEMENT

Special Tools

J 35917 Ball Joint Remover

Removal Procedure

WARNING: If you are replacing the wheel(s), the wheel stud(s), the wheel nut(s) or the wheel bolt(s), install only new GM original equipment parts. Installation of used parts or non-GM original equipment parts may cause the wheel to

loosen, loss of tire air pressure, poor vehicle handling and loss of vehicle control resulting in personal injury.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation .
3. Remove the brake rotor. Refer to Front Brake Rotor Replacement .
4. Use the **J 35917** Ball Joint Remover in order to press the wheel stud (1) from the bearing/hub (2).

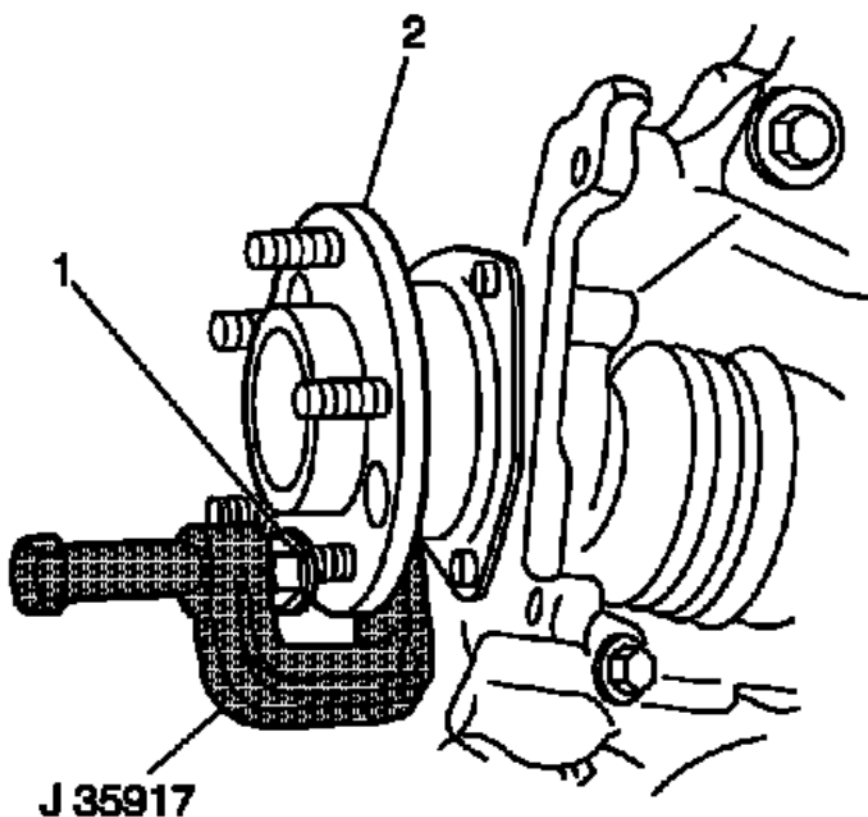


Fig. 35: Identifying J 35917 To Press Wheel Stud From Bearing/Hub
Courtesy of GENERAL MOTORS COMPANY

Installation Procedure

1. Install a new wheel stud from the back side of the bearing/hub.
2. Install 3 flat washers (1) to the wheel stud (3).

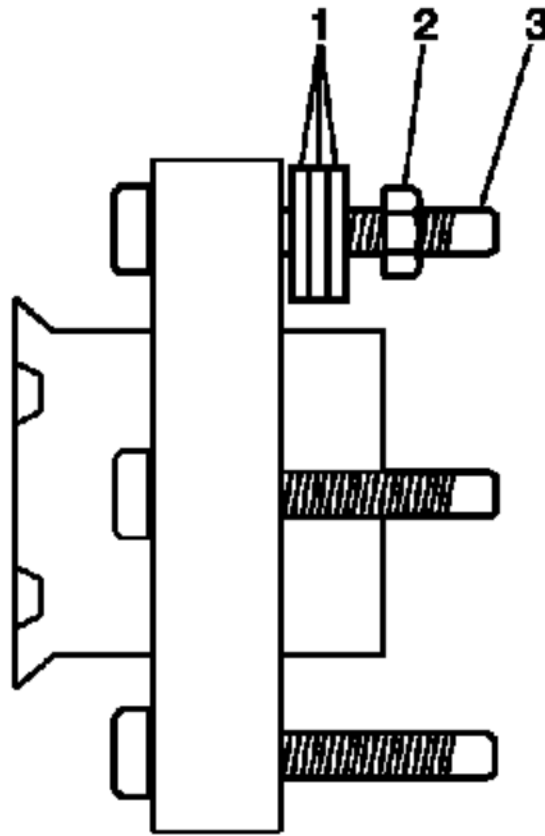


Fig. 36: Identifying Washers, Wheel Stud & Hex Nut
Courtesy of GENERAL MOTORS COMPANY

3. Install a hex nut (2) to the wheel stud (3).
4. Tighten the hex nut until the stud head is fully seated in the bearing/hub flange.

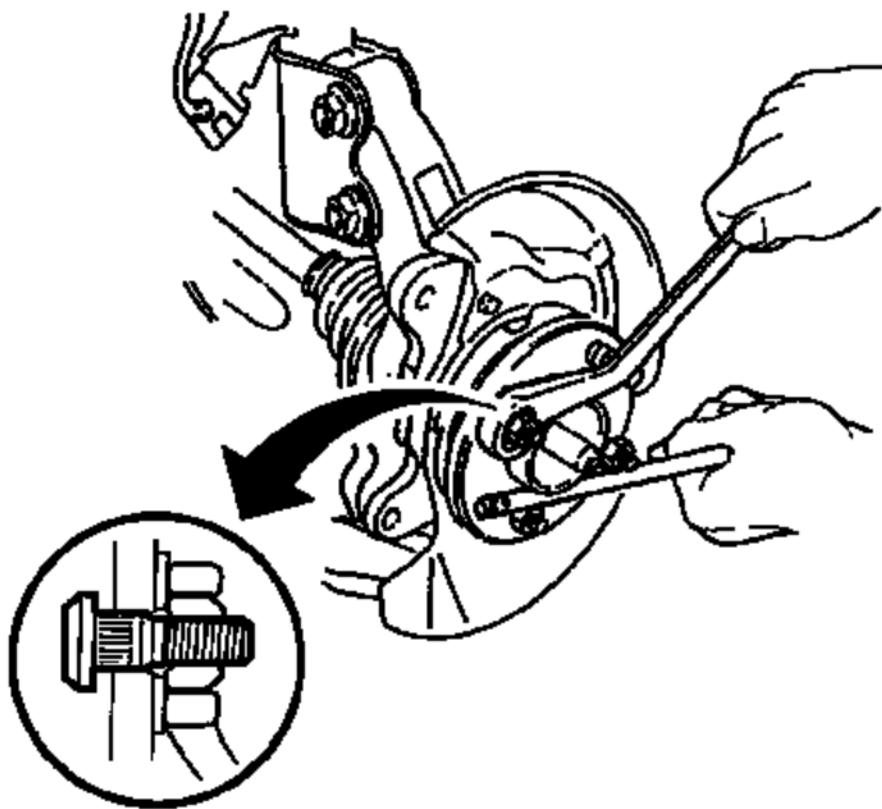


Fig. 37: Seating Stud Head Fully In Bearing/Hub Flange
Courtesy of GENERAL MOTORS COMPANY

5. Remove the hex nut and the washers from the wheel stud.
6. Install the brake rotor. Refer to **Front Brake Rotor Replacement** .
7. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
8. Lower the vehicle.

STRUT AND SHOCK ABSORBER INSPECTION (STRUT)

NOTE: The strut assembly **DOES NOT** have to be removed from the vehicle to perform the following inspection procedure.

NOTE: A light film of oil on the top portion of the strut is normal. **DO NOT** replace the strut for this condition.

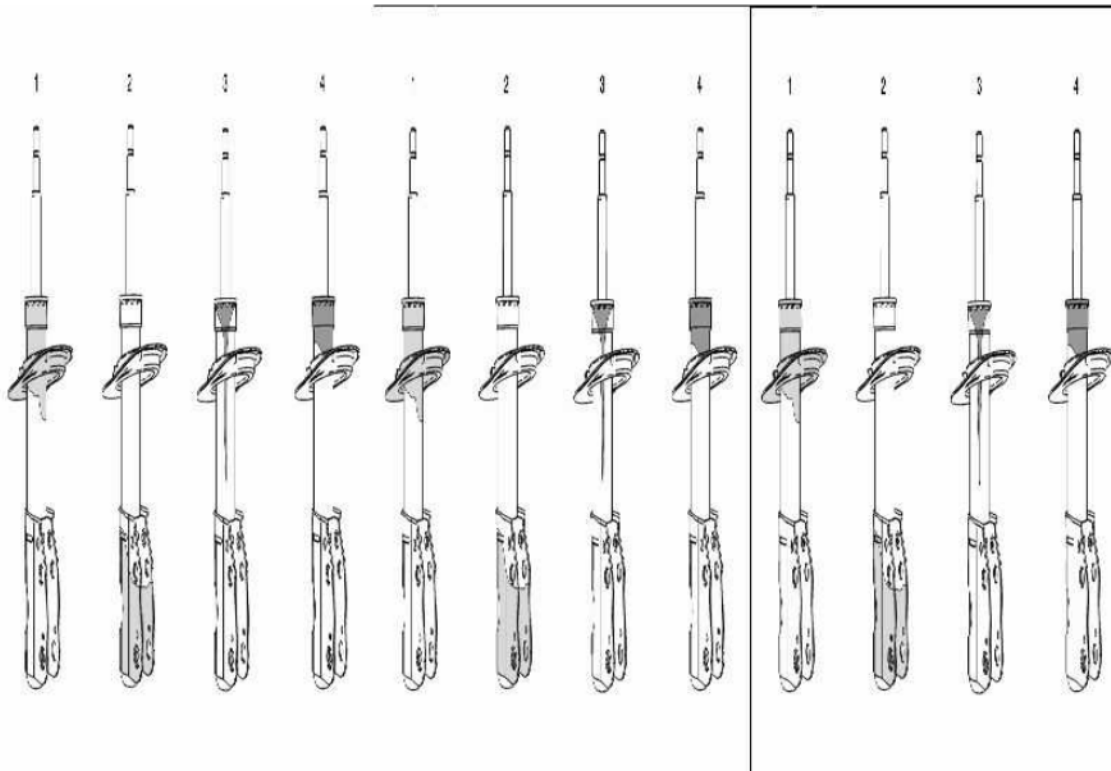


Fig. 38: Illustrating Of Strut Conditions
 Courtesy of GENERAL MOTORS COMPANY

Condition 1

Oil or fluid residue only on the bottom of the strut tube or on other strut components and not originating from the shaft seal, is not a strut related problem. DO NOT replace the strut, look for other external leaks.

Condition 2

Light film/residue on the strut tube, but not on the spring seat and originating from the shaft seal, is a NORMAL condition. DO NOT replace the strut.

Condition 3

Oil drip or trail down the strut tube and originating from the shaft seal, is an ABNORMAL condition. Replace the strut.

Condition 4

Extreme wet film of oil covering the strut tube and pooling in the spring seat and originating from the shaft seal, is an ABNORMAL condition. Replace the strut.

Inspection

1. Verify the customer's concern is present. If the concern is present, continue to the next step. If the concern is not present, then the vehicle is operating normally.
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

NOTE: **The strut assembly DOES NOT have to be removed from the vehicle to perform the following inspection procedure.**

3. Visually inspect each of the shock absorbers or struts for external fluid leaks. Refer to the following conditions 1, 2, 3 and 4 for visual inspection.
 - If conditions 1 or 2 are found, continue to step 4.
 - If conditions 3 or 4 are found, replace strut. Refer to Strut Replacement below.
4. If equipped with electronic suspension control system, ensure that the system is working properly. Refer to the appropriate Diagnostic Starting Point - Electronic Suspension Control information.
5. Use your hands in order to lift up and push down on each corner of the vehicle 3 times. Remove your hands from the vehicle. If the corner motion exceeds 2 cycles, replace the strut. If the strut does not exceed 2 cycles, NO repair is necessary.

STRUT ASSEMBLY REMOVAL AND INSTALLATION

Removal Procedure

1. Remove the air inlet grille. Refer to **Air Inlet Grille Panel Replacement** .
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the stabilizer link at the front strut. Refer to **Stabilizer Shaft Link Replacement**.
4. Remove the wheel speed sensor wiring harness (1) and (2) from the front strut (3).

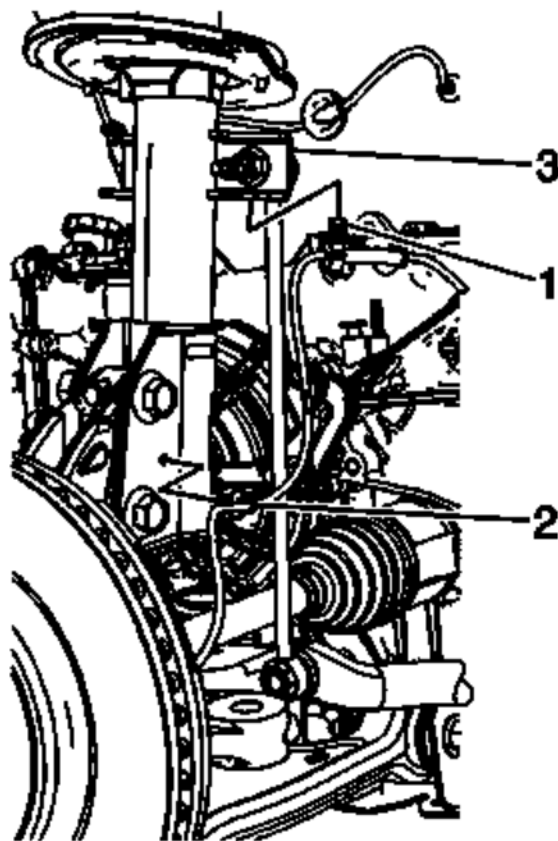


Fig. 39: Identifying Wheel Speed Sensor Wiring Harness & Front Strut
Courtesy of GENERAL MOTORS COMPANY

5. If removing the front strut to service any other suspension or steering component, scribe a line in the steering knuckle against the front strut. This will aid in the realigning the front suspension.

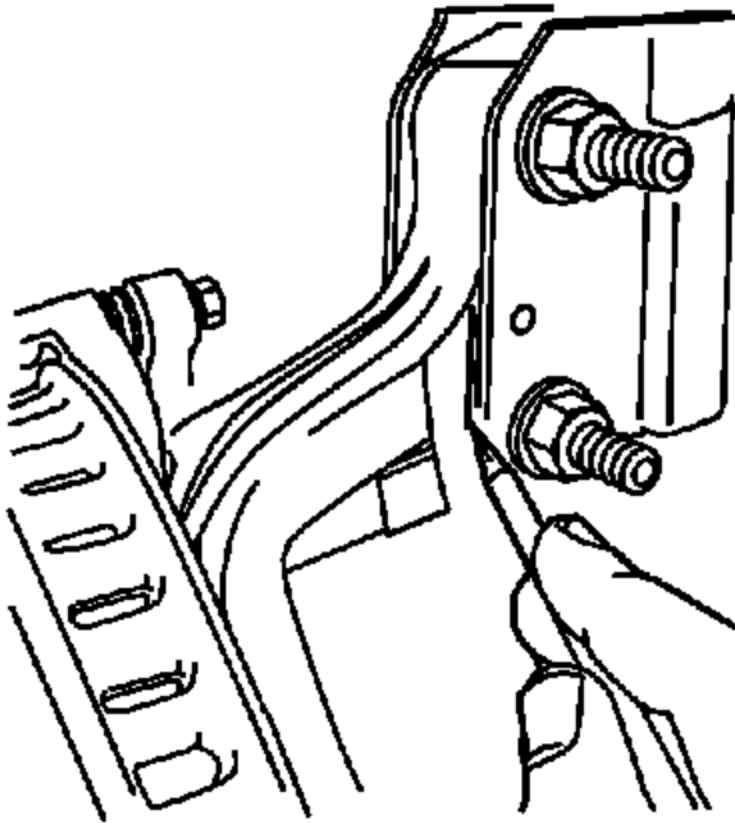


Fig. 40: Scribing Strut To Knuckle
Courtesy of GENERAL MOTORS COMPANY

6. Lower the vehicle to gain access to the upper strut mounting bolts.
7. Remove the front strut mounting bolts and nuts.

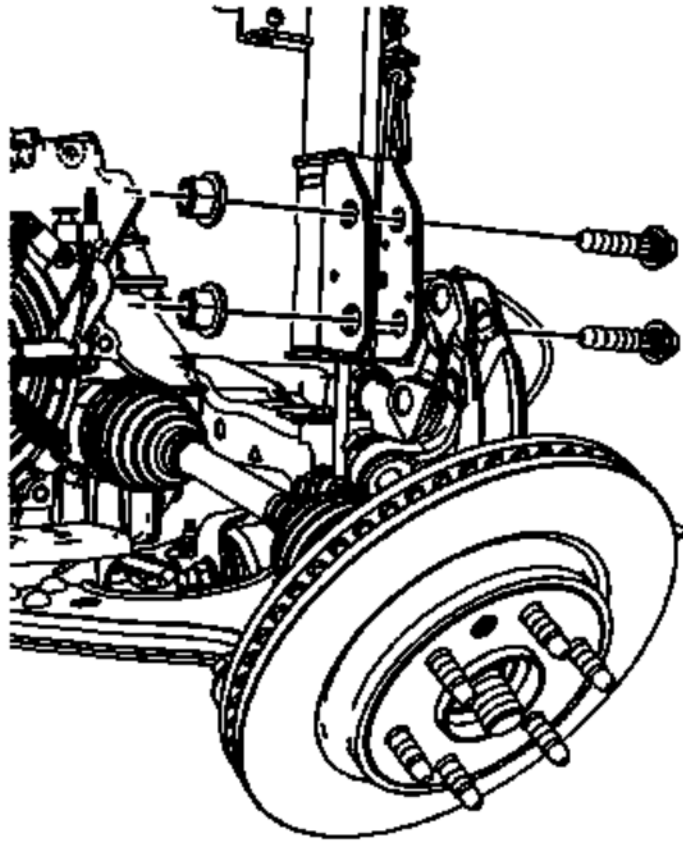


Fig. 41: Identifying Front Strut Mounting Bolts & Nuts
Courtesy of GENERAL MOTORS COMPANY

8. Remove the upper strut mounting nuts.

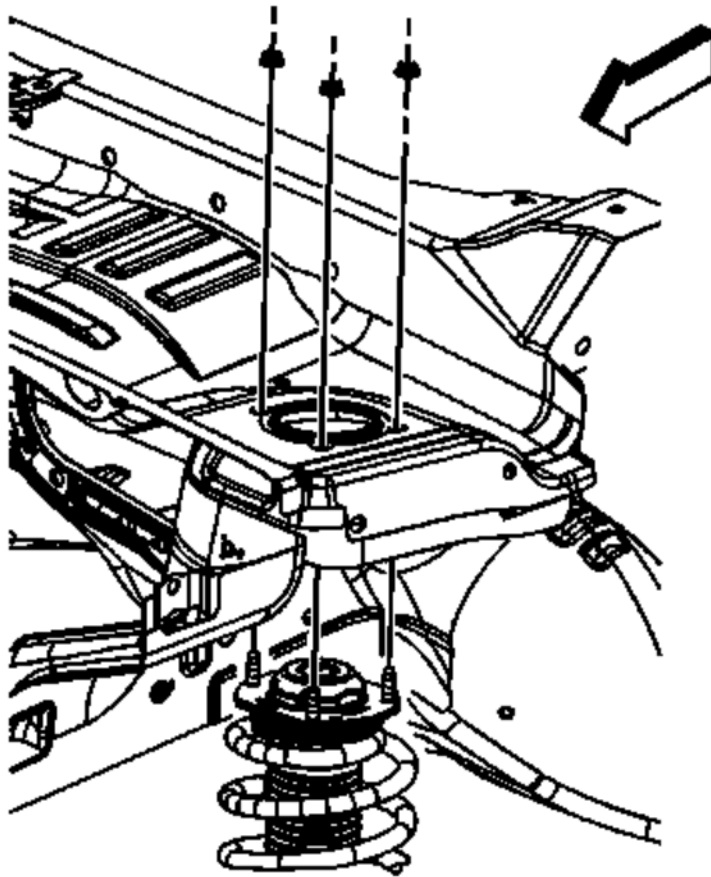


Fig. 42: Identifying Upper Strut Mounting Nuts
Courtesy of GENERAL MOTORS COMPANY

9. Separate the front strut from the steering knuckle.

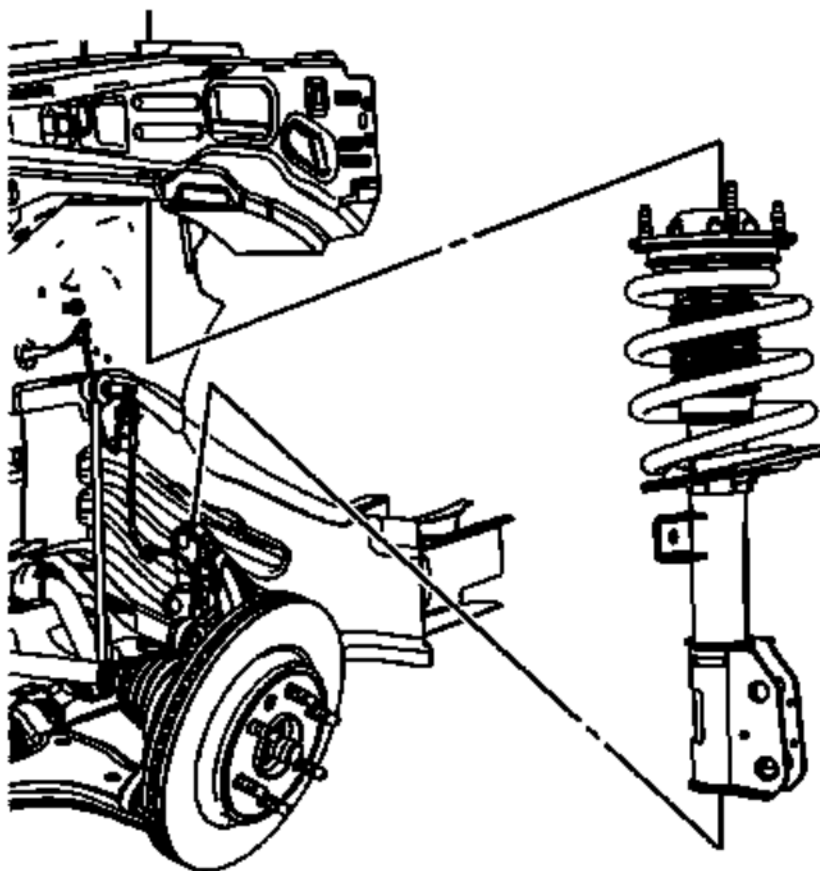


Fig. 43: Identifying Front Strut Assembly
Courtesy of GENERAL MOTORS COMPANY

NOTE: To reduce the brake hose stress during strut removal, install a jack stand under the steering knuckle.

10. Remove the front strut assembly from the vehicle.
11. If replacing the strut or the spring, refer to **Strut, Strut Component or Spring Replacement**.

Installation Procedure

1. Position the front strut in the strut tower.

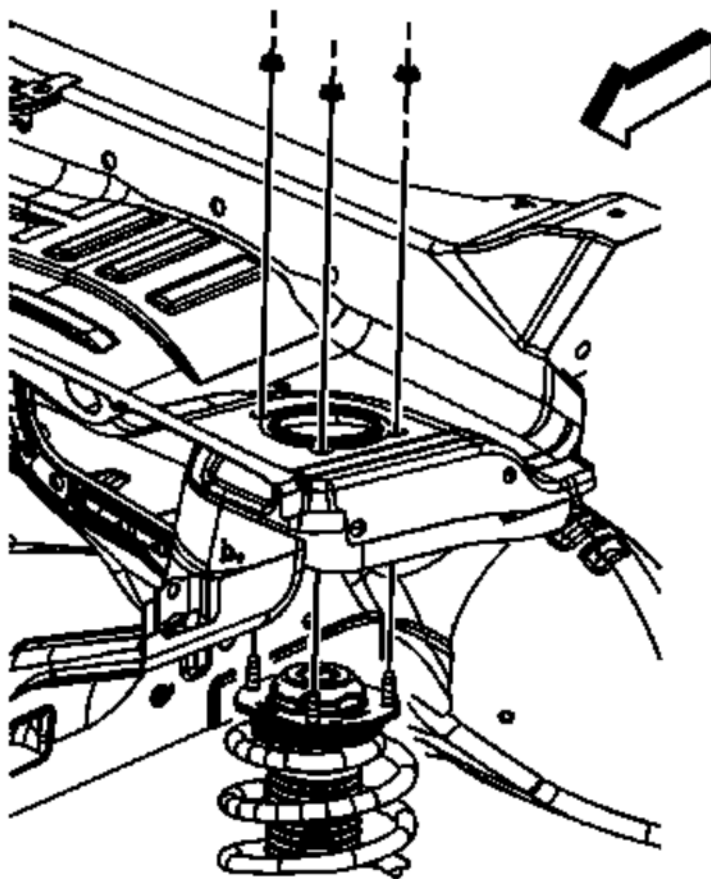


Fig. 44: Identifying Upper Strut Mounting Nuts
Courtesy of GENERAL MOTORS COMPANY

2. Install the upper strut mounting nuts.

CAUTION: Refer to Fastener Caution .

Tighten

Tighten the mounting nut to 45 N.m (33 lb ft).

3. Raise the vehicle.
4. Position the front strut on the steering knuckle.

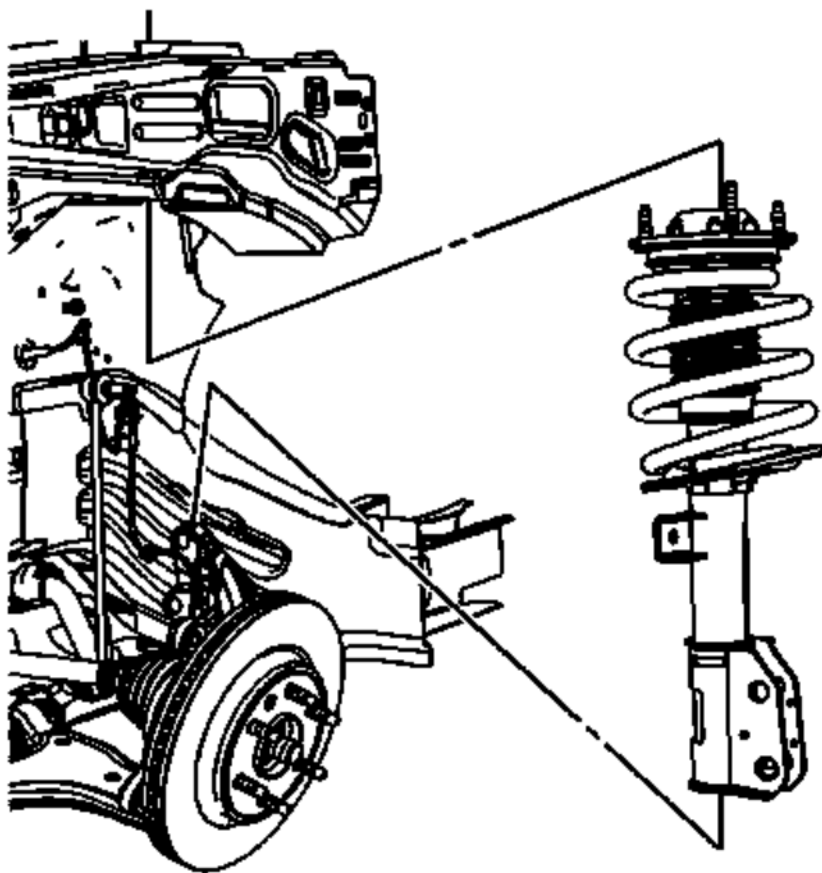


Fig. 45: Identifying Front Strut Assembly
Courtesy of GENERAL MOTORS COMPANY

- NOTE:** To reduce the brake hose stress during strut installation, install a jack stand under the steering knuckle.
- NOTE:** If installing the front strut after servicing another steering or suspension component, align the front strut to the scribe mark on the steering knuckle.

5. Install the front strut to steering knuckle mounting nuts and bolts.

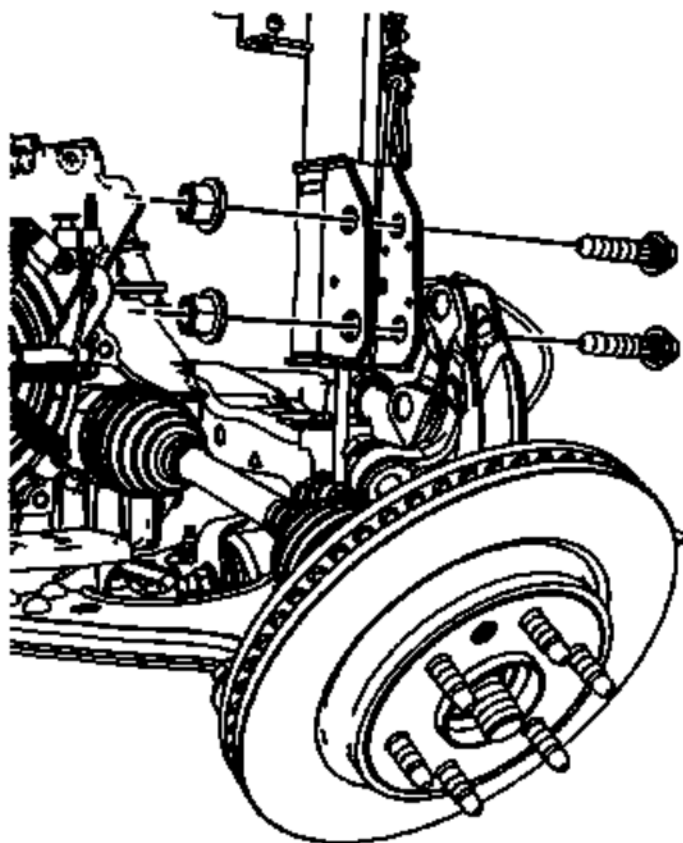


Fig. 46: Identifying Front Strut Mounting Bolts & Nuts
Courtesy of GENERAL MOTORS COMPANY

Tighten

Tighten the mounting nut to 195 N.m (144 lb ft).

6. Install the stabilizer link at the front strut. Refer to **Stabilizer Shaft Link Replacement**.
7. Install the wheel speed sensor wiring harness (1) and (2) on the front strut (3).

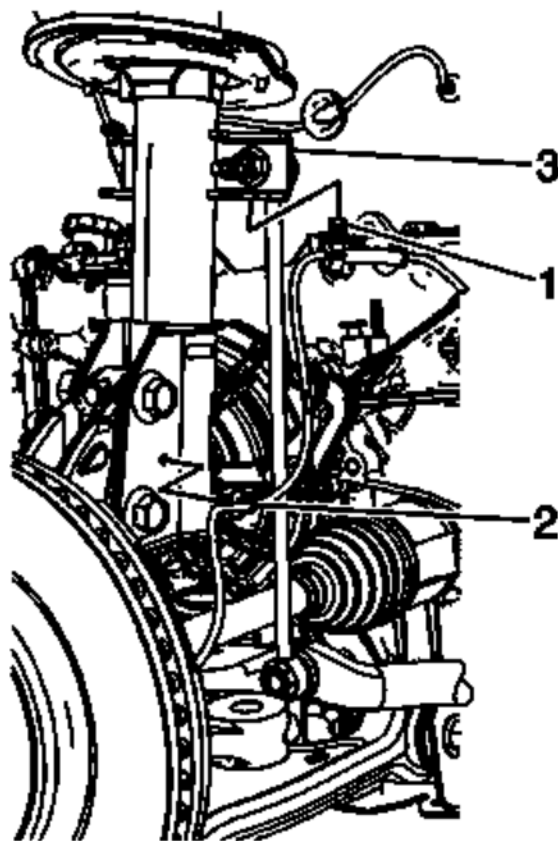


Fig. 47: Identifying Wheel Speed Sensor Wiring Harness & Front Strut
Courtesy of GENERAL MOTORS COMPANY

8. Install the air inlet grille. Refer to [Air Inlet Grille Panel Replacement](#) .
9. Align the front end. Refer to [Wheel Alignment Measurement](#) .

SUSPENSION SHOCK/STRUT DISPOSAL

WARNING: Use the proper eye protection when drilling to prevent metal chips from causing physical injury.

1. Clamp the strut in a vise horizontally with the rod (1) completely extended.

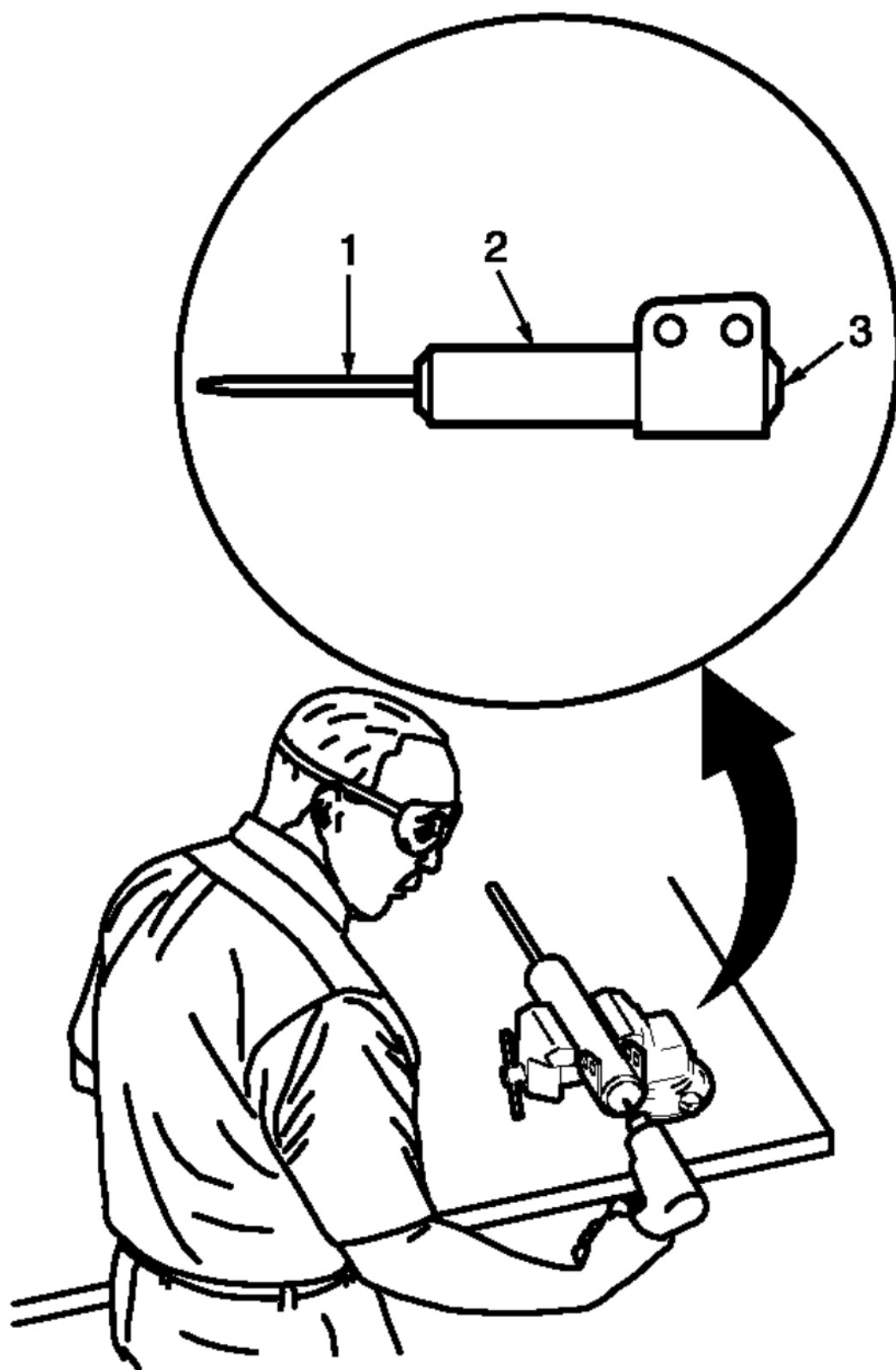


Fig. 48: Drilling Hole In Strut At Center Of End Cap
Courtesy of GENERAL MOTORS COMPANY

2. Drill a hole in the strut at the center of the end cap (3) using a 5 mm (3/16 in) drill bit. Gas or a gas/oil mixture will exhaust when the drill bit penetrates the strut. Use shop towels in order to contain the escaping oil.
3. Remove the strut from the vise.
4. Hold the strut over a drain pan vertically with the hole down.
5. Move the rod (1) in and out of the tube (2) to completely drain the oil from the strut.

STRUT, STRUT COMPONENT OR SPRING REPLACEMENT

Special Tools

- **J 42991** Strut Rod Nut Socket
- **J 45400** Strut Spring Compressor

Disassembly Procedure

1. Remove the strut from the vehicle. Refer to **Strut Assembly Removal and Installation**.
2. Install the strut (2) in the **J 45400** Strut Spring Compressor (1).

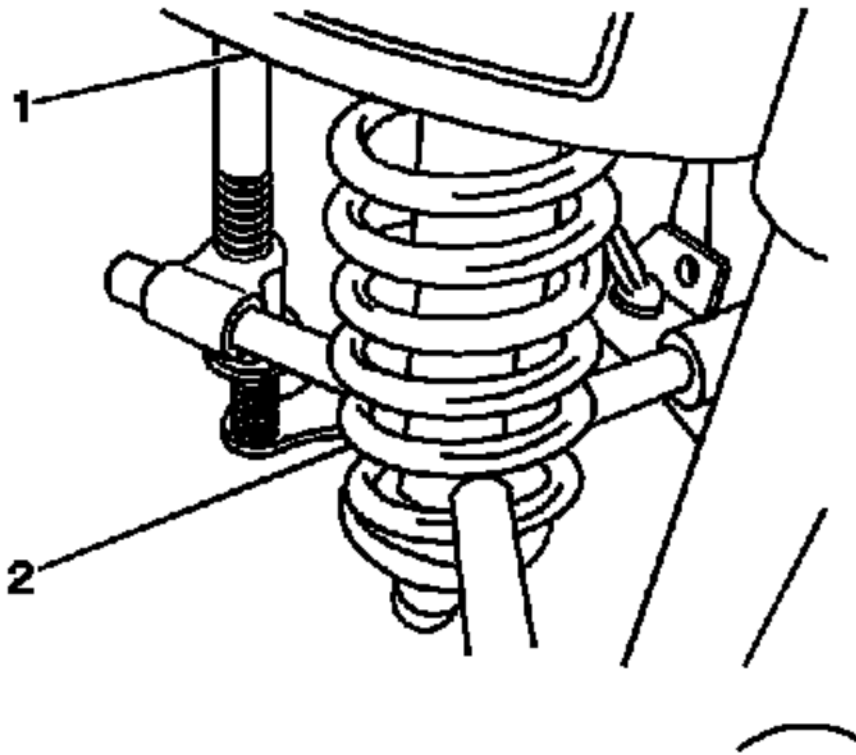


Fig. 49: Compressing/Releasing Lower Part Of Shock Spring
Courtesy of GENERAL MOTORS COMPANY

3. Turn the spring compressor forcing screw (1) until the coil spring (2) is compressed.

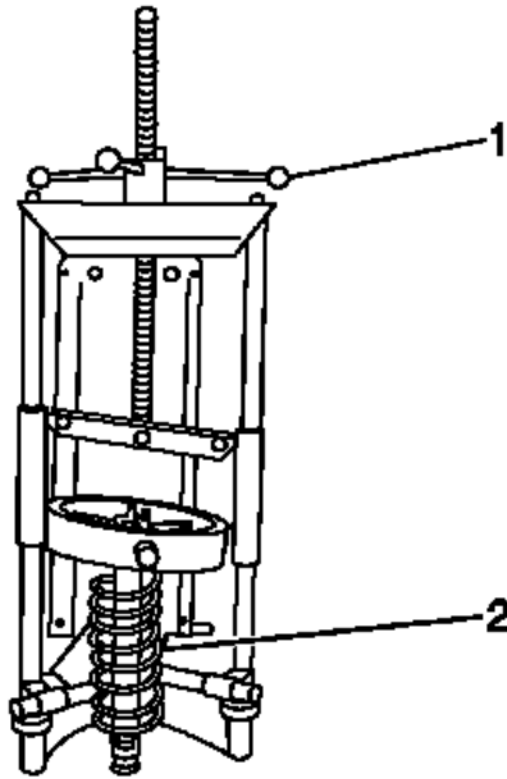


Fig. 50: View Of Compressor Forcing Screw & Coil Spring
Courtesy of GENERAL MOTORS COMPANY

NOTE: The spring is compressed when the strut moves freely.

4. Using a socket or a wrench hold the strut rod, use the **J 42991** Strut Rod Nut Socket and a ratchet wrench, remove the strut rod nut.
5. Remove the strut from the **J 45400** Strut Spring Compressor.
6. Loosen the compressor forcing screw (1) until the upper strut mount and coil spring (2) may be removed.
7. Remove the upper strut mount and the coil spring from the **J 45400** Strut Spring Compressor.

Assembly Procedure

1. Prior to reassembling the strut components, apply a small amount of lubricant to the strut rod and the inside of the jounce bumper. Refer to **Adhesives, Fluids, Lubricants and Sealers**.
2. Install the coil spring and upper strut mount to the **J 45400** Strut Spring Compressor.
3. Turn the spring compressor forcing screw (1) until the coil spring is compressed.

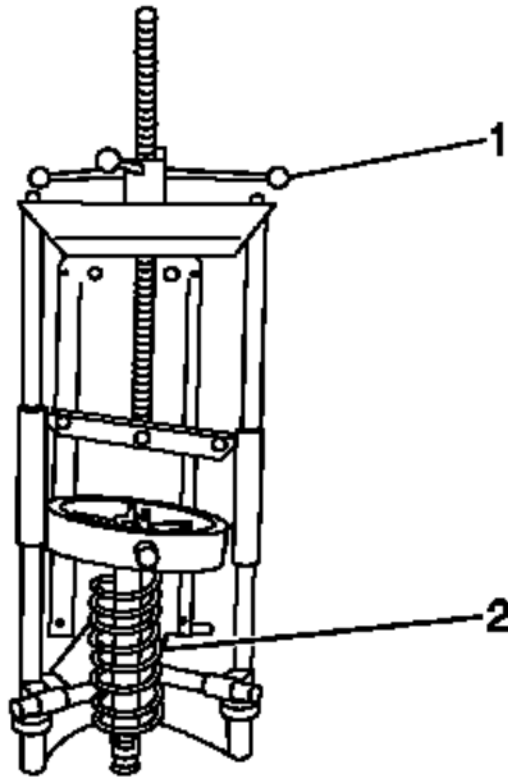


Fig. 51: View Of Compressor Forcing Screw & Coil Spring
Courtesy of GENERAL MOTORS COMPANY

4. Install the strut to the coil spring and upper strut mount.
5. Loosely install the strut retaining nut.
6. Using a socket or a wrench hold the strut rod.
7. With the wrench or socket holding the strut rod, use the **J 42991** Strut Rod Nut Socket and a torque to install the upper strut mount nut. Tighten the strut mount nut to 85 N.m (63 lb ft).

CAUTION: Refer to Fastener Caution .

8. Remove the strut from the **J 45400** Strut Spring Compressor.
9. Install the strut to the vehicle. Refer to Strut Assembly Removal and Installation.

DESCRIPTION AND OPERATION

FRONT SUSPENSION DESCRIPTION AND OPERATION

The front suspension has 2 primary purposes:

- Isolate the driver from irregularities in the road surface.
- Define the ride and handling characteristics of the vehicle.

The front suspension absorbs the impact of the tires travelling over irregular road surfaces and dissipates this energy throughout the suspension system. This process isolates the vehicle occupants from the road surface. The rate at which the suspension dissipates the energy and the amount of energy that is absorbed is how the suspension defines the vehicles ride characteristics. Ride characteristics are designed into the suspension system and are not adjustable. The ride characteristics are mentioned in this description in order to aid in the understanding of the functions of the suspension system. The suspension system must allow for the vertical movement of the tire and wheel assembly as the vehicle travels over irregular road surfaces while maintaining the tire's horizontal relationship to the road.

This requires that the steering knuckle be suspended between a lower control arm and a strut assembly. The lower control arm attaches from the steering knuckle at the outermost point of the control arm. The attachment is through a ball and socket type joint. The innermost end of the control arm attached at 2 points to the vehicle frame through semi-rigid bushings. The upper portion of the steering knuckle is attached to a strut assembly. The strut assembly then connects to the vehicle body by way of an upper bearing. The steering knuckle is allowed to travel up and down independent of the vehicle body structure and frame.

This up and down motion of the steering knuckle as the vehicle travels over bumps is absorbed predominantly by the coil spring. This spring is retained under tension over the strut assembly. A strut is used in conjunction with this system in order to dampen out the oscillations of the coil spring. A strut is a basic hydraulic cylinder. The strut is filled with oil and has a moveable shaft that connects to a piston inside the strut. Valves inside the shock absorber offer resistance to oil flow and consequently inhibit rapid movement of the piston and shaft. Each end of the shock absorber is connected in such a fashion to utilize this recoil action of a spring alone. Each end of the strut is designed as the connection point of the suspension system to the vehicle and acts as the coil spring seat. This allows the strut to utilize the dampening action to reduce the recoil of a spring alone. The lower control arm is allowed to pivot at the vehicle frame in a vertical fashion. The ball joint allows the steering knuckle to maintain the perpendicular relationship to the road surface.

Front suspensions systems utilize a stabilizer shaft. The stabilizer bar connects between the left and right lower control arm assemblies through the stabilizer link and stabilizer shaft insulators. This bar controls the amount of independent movement of the suspension when the vehicle turns. Limiting the independent movement defines the vehicles handling characteristics on turns.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

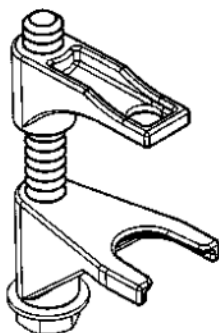
Illustration	Tool Number/Description

2014 GMC Acadia Denali

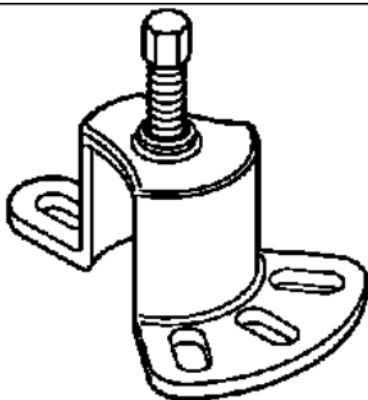
2014 SUSPENSION Front Suspension - Acadia, Enclave And Traverse



J 2619-01
Slide Hammer



J 42188-B
Ball Joint Separator



J 42129
Front/Rear Spindle Remover

J 43631
Ball Joint Operator

cardiaqn.com

2014 GMC Acadia Denali

2014 SUSPENSION Front Suspension - Acadia, Enclave And Traverse

