

2008 Chevrolet Silverado 1500

2008 SUSPENSION Front Suspension - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

2008 SUSPENSION

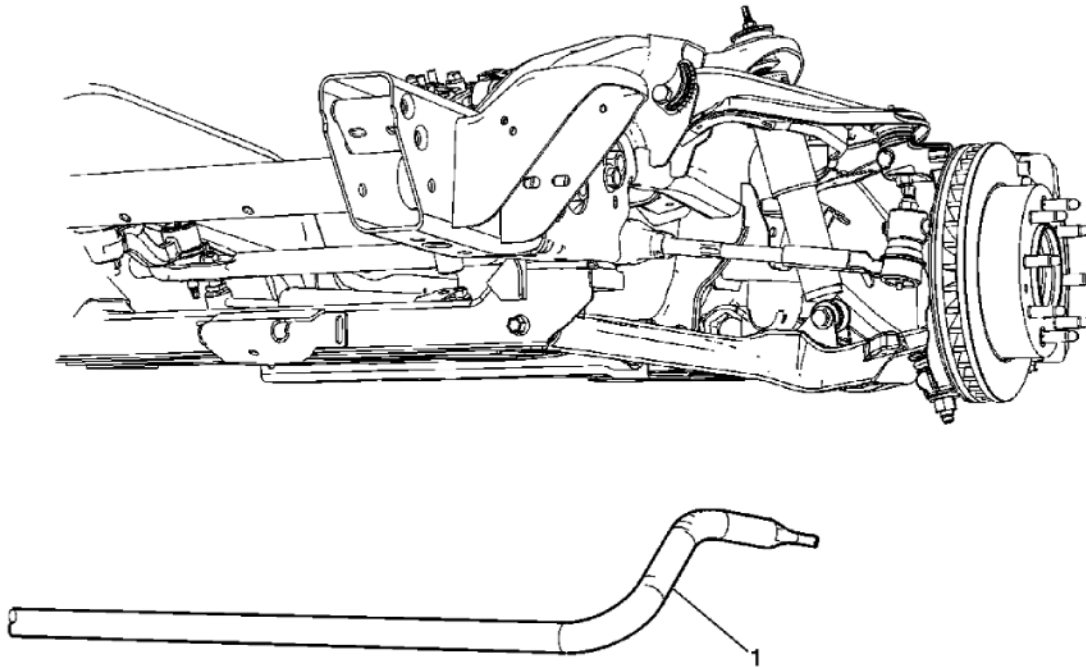
Front Suspension - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Brake Hose Bracket Bolt	9 N.m	80 lb in
Brake Hose Clip Bolts	12 N.m	106 lb in
Hub and Bearing Assembly to Steering Knuckle Bolts	180 N.m	133 lb ft
Lower Ball Joint Stud Nut	110 N.m	81 lb ft
Lower Control Arm to Frame Nuts	175 N.m	129 lb ft
Shock Absorber Module to Frame Nuts	50 N.m	37 lb ft
Shock Absorber Module to Lower Control Arm Bolt - 1500 Series	50 N.m	37 lb ft
Shock Absorber Module to Lower Control Arm Nut - 2500 Series	80 N.m	59 lb ft
Shock Absorber Nut - 1500 Series	50 N.m	37 lb ft
Shock Absorber Nut - 2500 Series	24 N.m	17 lb ft
Shock Absorber to Lower Control Arm Bolts - 2500 Series	80 N.m	59 lb ft
Spring Jounce Bumper Nut - 2500 Series	30 N.m	22 lb ft
Stabilizer Shaft Insulator Clamp Bolts	50 N.m	37 lb ft
Stabilizer Shaft Link Nuts - 1500 Series	23 N.m	17 lb ft
Stabilizer Shaft Link Nuts - 2500 Series	23 N.m	17 lb ft
Torsion Bar Crossmember to Frame Bushing Bolt	95 N.m	70 lb ft
Torsion Bar Support Link Bolt	95 N.m	70 lb ft
Upper Ball Joint Stud Nut	50 N.m	37 lb ft
Upper Control Arm to Frame Nuts	190 N.m	140 lb ft
Wheel Drive Shaft to Front Hub Nut	240 N.m	177 lb ft
Wheel Speed Sensor Mounting Bolt	18 N.m	13 lb ft

REPAIR INSTRUCTIONS

STABILIZER SHAFT REPLACEMENT (2500, 3500)**Fig. 1: View Of Stabilizer Shaft (2500, 3500)****Courtesy of GENERAL MOTORS CORP.**

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
2. Remove the front tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> .	
3. Remove the engine shield, if equipped. Refer to <u>Engine Shield Replacement</u> .	
4. Remove the stabilizer shaft insulators. Refer to <u>Stabilizer Shaft Insulator Replacement (1500)</u> or <u>Stabilizer Shaft Insulator Replacement (2500, 3500)</u> .	
1	Front Stabilizer Shaft

STABILIZER SHAFT REPLACEMENT (1500)

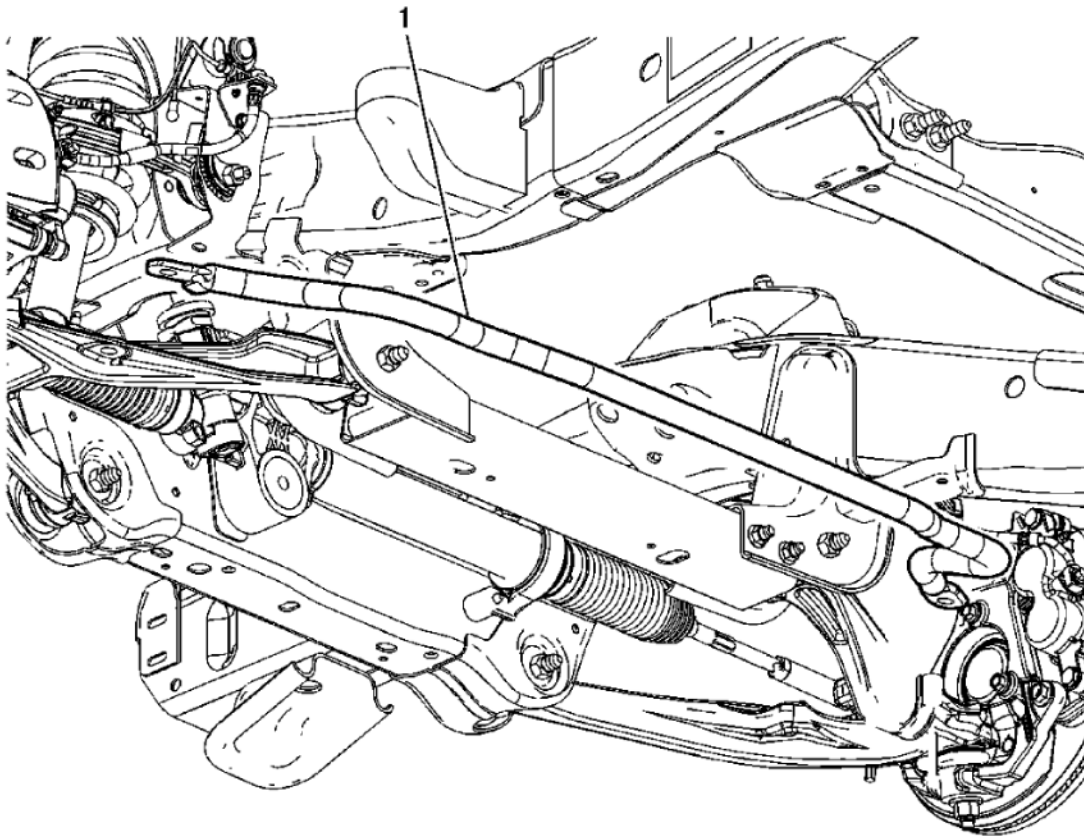


Fig. 2: View Of Stabilizer Shaft (1500)

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
2. Remove the front stabilizer shaft links. Refer to <u>Stabilizer Shaft Link Replacement (2500/3500)</u> or <u>Stabilizer Shaft Link Replacement (1500)</u> .	
3. Remove the front stabilizer shaft insulators. Refer to <u>Stabilizer Shaft Insulator Replacement (1500)</u> or <u>Stabilizer Shaft Insulator Replacement (2500, 3500)</u> .	
1	Front Stabilizer Shaft

STABILIZER SHAFT LINK REPLACEMENT (2500/3500)

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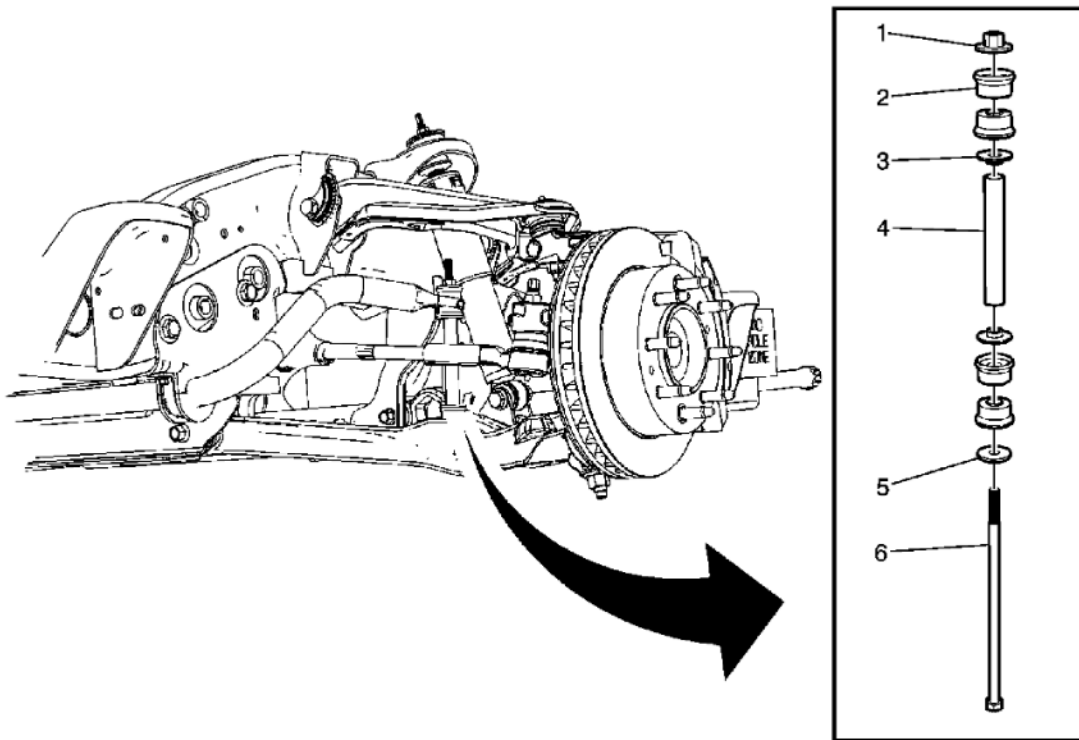


Fig. 3: View Of Stabilizer Shaft Link (2500/3500)

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the engine shield, if equipped. Refer to <u>Engine Shield Replacement</u> . 3. Remove the stabilizer shaft link. Refer to <u>Stabilizer Shaft Link Replacement (2500/3500)</u> or <u>Stabilizer Shaft Link Replacement (1500)</u>. 4. Remove the stabilizer shaft insulator. Refer to <u>Stabilizer Shaft Insulator Replacement (1500)</u> or <u>Stabilizer Shaft Insulator Replacement (2500, 3500)</u>.	
1	Stabilizer Shaft Link Retaining Nut NOTE: Refer to <u>Fastener Notice</u> . Procedure 1. Remove all traces of the original adhesive patch.

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2. Apply Threadlocker GM P/N 12345382 (Canadian P/N 10953489) BLUE LOCTITE # 242 on the threads of the bolt.

Tighten: 23 N.m (17 lb ft)

2	Front Stabilizer Shaft Insulator (Qty: 4)
3	Front Stabilizer Shaft Washer (Qty: 2)
4	Front Stabilizer Shaft Spacer
5	Front Stabilizer Shaft Washer
6	Front Stabilizer Shaft Bolt

STABILIZER SHAFT LINK REPLACEMENT (1500)

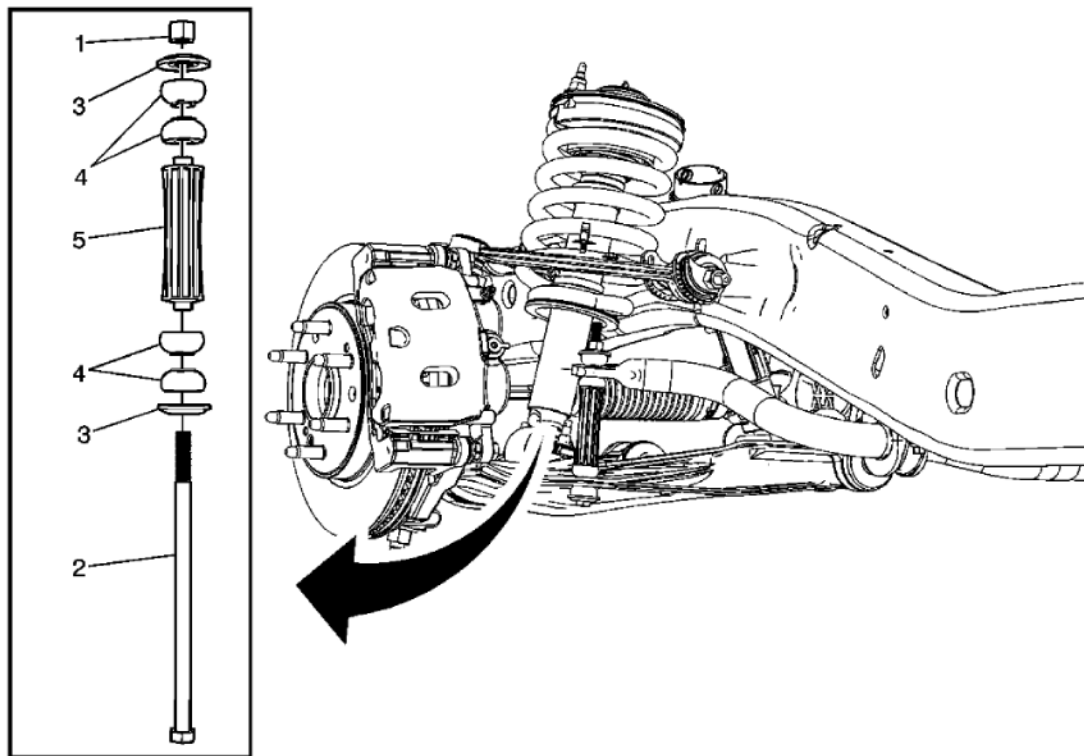


Fig. 4: View Of Stabilizer Shaft Link (1500)

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure:	
Remove the tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> .	
	Stabilizer Shaft Link Nut

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NOTE:

Refer to Fastener Notice .

Procedure

- 1
 1. Remove all traces of the original adhesive patch.
 2. Apply Threadlocker GM P/N 12345382 (Canadian P/N 10953489) BLUE LOCTITE # 242 on the threads of the bolts.

Tighten: 23 N.m (17 lb ft)

- | | |
|---|--|
| 2 | Stabilizer Shaft Link Bolt |
| 3 | Stabilizer Shaft Link Washer (Qty: 2) |
| 4 | Stabilizer Shaft Link Insulator (Qty: 4) |
| 5 | Stabilizer Shaft Link Spacer |

STABILIZER SHAFT INSULATOR REPLACEMENT (1500)

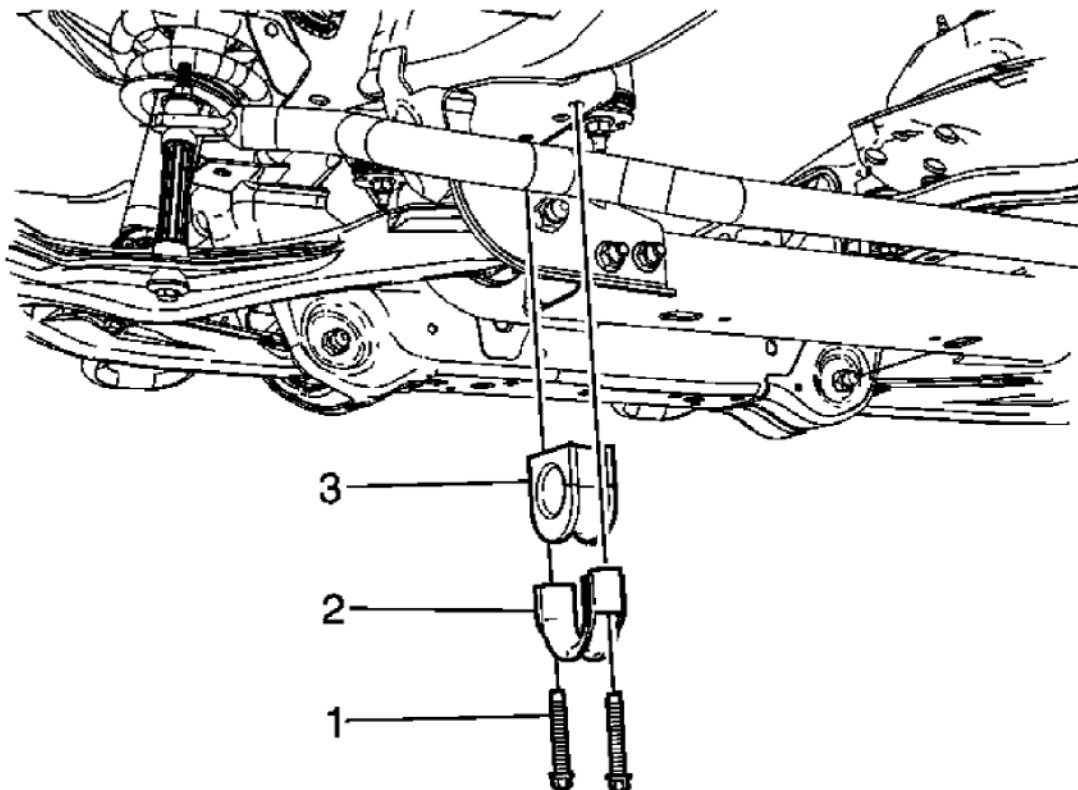


Fig. 5: View Of Stabilizer Shaft Insulator (1500)

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Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the engine shield, if equipped. Refer to <u>Engine Shield Replacement</u> .	
1	Stabilizer Shaft Clamp Bolt (Qty: 2) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 50 N.m (37 lb ft)
2	Stabilizer Shaft Clamp
3	Stabilizer Shaft Insulator Tip: Ensure that the slit in the stabilizer shaft insulator is installed toward the rear of the vehicle.

STABILIZER SHAFT INSULATOR REPLACEMENT (2500, 3500)

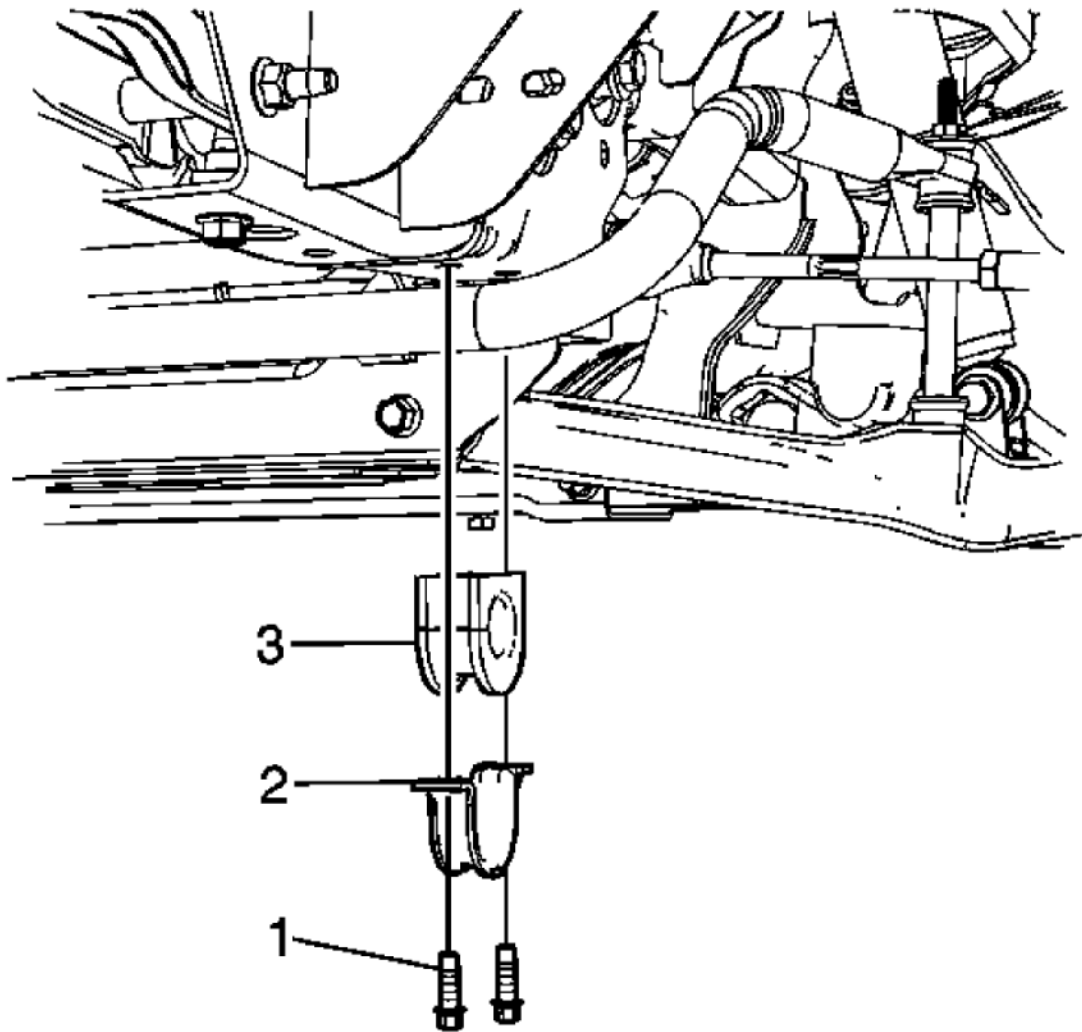


Fig. 6: View Of Stabilizer Shaft Insulator (2500, 3500)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
2. Remove the engine shield, if equipped. Refer to <u>Engine Shield Replacement</u> .	
1	Stabilizer Shaft Clamp Bolt (Qty: 2) NOTE: Refer to <u>Fastener Notice</u> .

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	Tighten: 50 N.m (37 lb ft)
2	Stabilizer Shaft Clamp
3	Stabilizer Shaft Insulator Tip: Ensure the slit in the insulator is facing front of the vehicle when installed.

LOWER CONTROL ARM BALL JOINT REPLACEMENT

Removal Procedure

IMPORTANT: The following service procedure applies to vehicle equipped with cast iron lower control arms only.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
3. Remove the lower control arm from the vehicle. Refer to Lower Control Arm Replacement (1500) or Lower Control Arm Replacement (2500, 3500).
4. Place the lower control arm in a vise.
5. Using a chisel, remove the securing crimps from the ball joint body, if equipped.
6. Using a press, remove the ball joint from the lower control arm.

Installation Procedure

IMPORTANT: Use the outer flange of the ball joint in order to press the ball joint into place.

1. Install the ball joint using a press.
2. Place the lower control arm a bench vise.
3. Using a punch, install the crimps to the ball joint, if necessary. Use the replaced ball joint as a reference.
4. Install the lower control arm in the vehicle. Refer to Lower Control Arm Replacement (1500) or Lower Control Arm Replacement (2500, 3500)
5. Install the tire and wheel. Refer to Tire and Wheel Removal and Installation .
6. Remove the safety stand and lower the vehicle.
7. Verify the wheel alignment. Refer to Wheel Alignment Specifications .

STEERING KNUCKLE REPLACEMENT (2500, 3500)

Removal Procedure

1. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
2. Remove the wheel drive shaft, if equipped. Refer to **Wheel Drive Shaft Replacement (2500)** or **Wheel Drive Shaft Replacement (1500)** .
3. Remove the wheel bearing and hub assembly. Refer to **Front Wheel Hub, Bearing, and Seal Replacement (2500)** or **Front Wheel Hub, Bearing, and Seal Replacement (1500)** .
4. Remove the outer tie rod end from the knuckle.

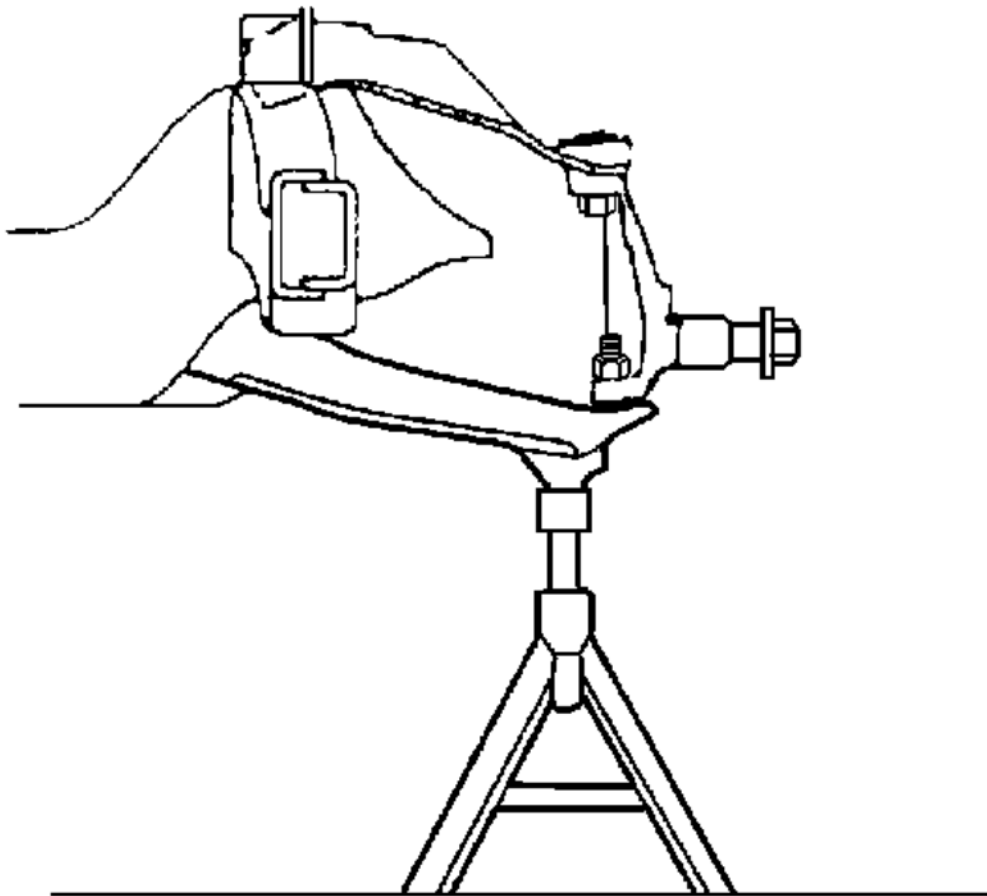


Fig. 7: Supporting Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

5. Support the lower control arm.
6. Separate the upper ball joint from the knuckle. Refer to **Upper Control Arm Replacement (1500)** or **Upper Control Arm Replacement (2500, 3500)**.
7. Separate the lower ball joint from the knuckle. Refer to **Lower Control Arm Replacement (1500)** or **Lower Control Arm Replacement (2500, 3500)**.
8. Remove the knuckle from the vehicle.

Installation Procedure

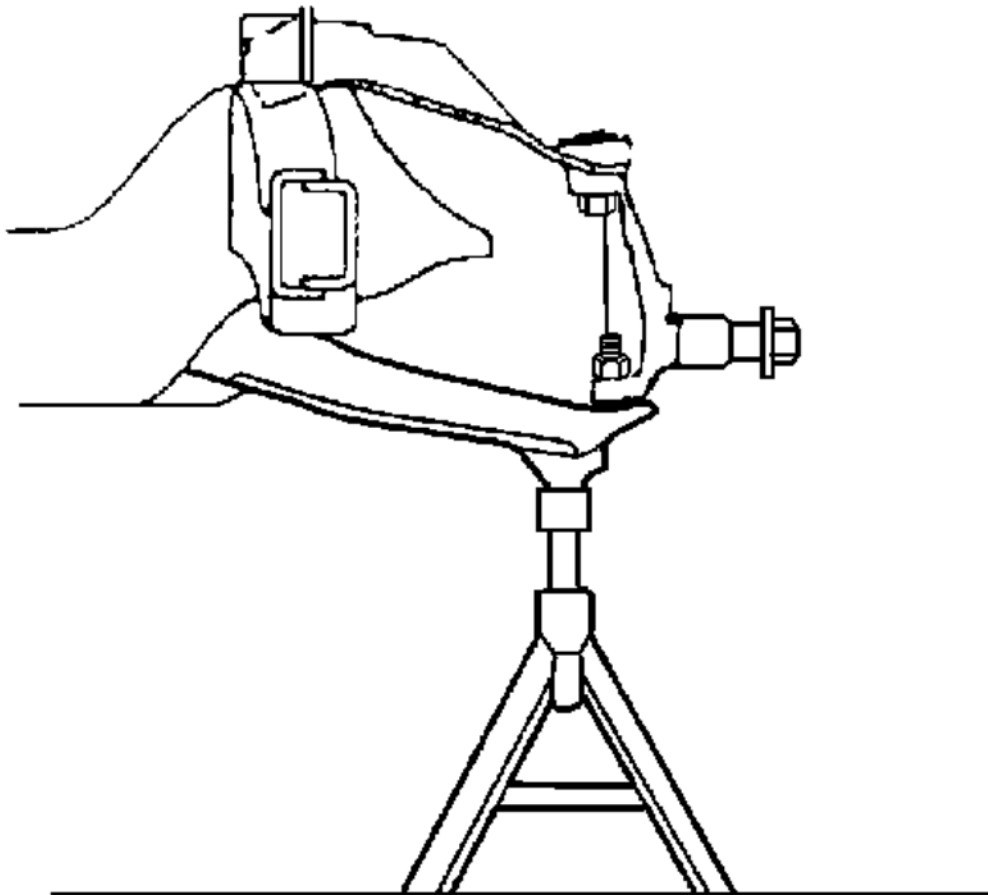


Fig. 8: Supporting Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

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1. Install the knuckle on the lower ball joint. Refer to **Lower Control Arm Replacement (1500)** or **Lower Control Arm Replacement (2500, 3500)**.
2. Install the upper ball joint in the knuckle. Refer to **Upper Control Arm Replacement (1500)** or **Upper Control Arm Replacement (2500, 3500)**.
3. Install the outer tie rod end. Refer to **Steering Linkage Outer Tie Rod Replacement** .
4. Install the wheel bearing and hub assembly. Refer to **Front Wheel Hub, Bearing, and Seal Replacement (2500)** or **Front Wheel Hub, Bearing, and Seal Replacement (1500)**.
5. Install the wheel drive shaft, if equipped. Refer to **Wheel Drive Shaft Replacement (2500)** or **Wheel Drive Shaft Replacement (1500)** .

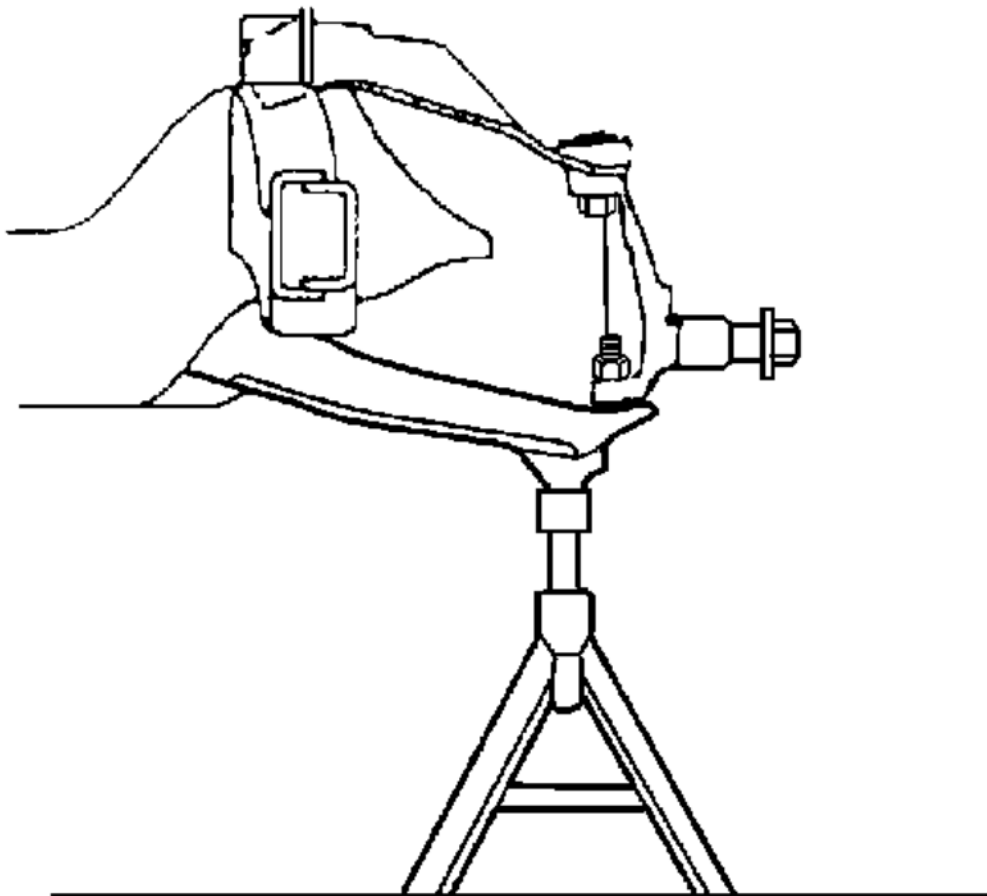


Fig. 9: Supporting Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

6. Remove the support from the lower control arm.
7. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
8. Verify the wheel alignment. Refer to **Wheel Drive Shaft Replacement (2500)** or **Wheel Drive Shaft Replacement (1500)** .

STEERING KNUCKLE REPLACEMENT (1500)

Removal Procedure

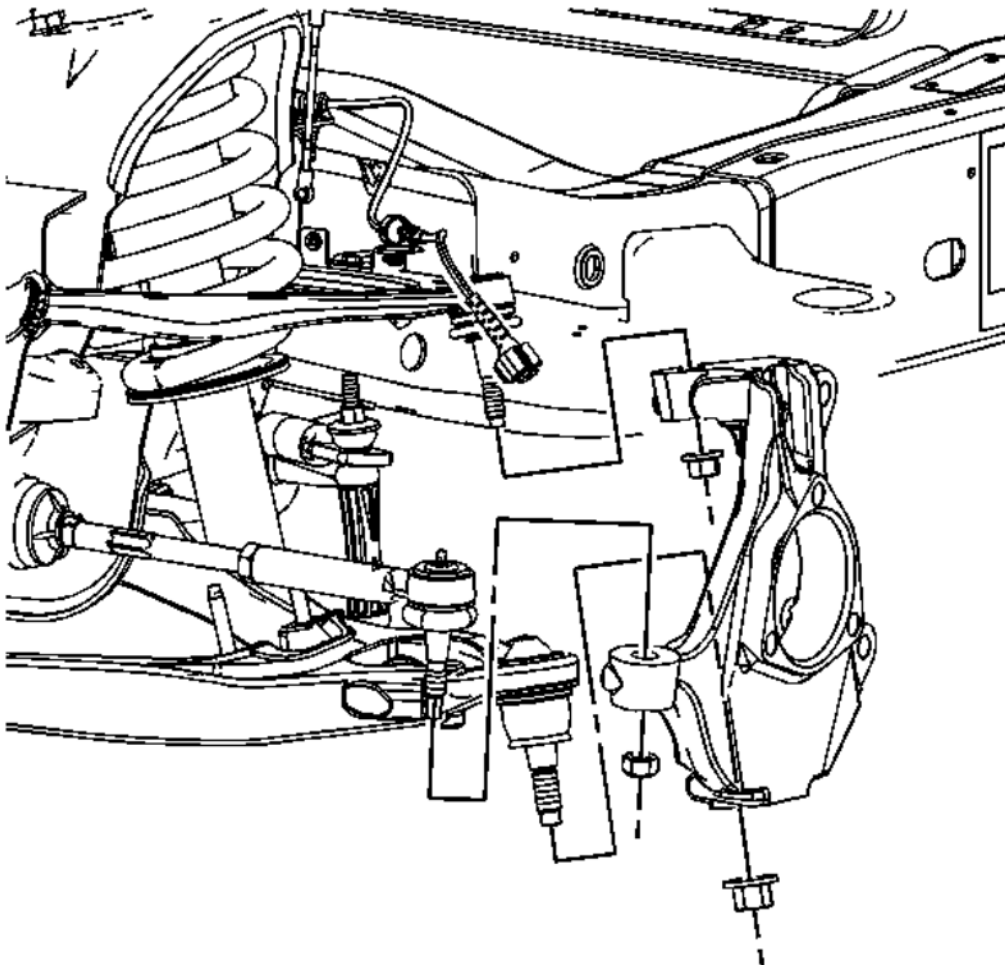


Fig. 10: View Of Steering Knuckle (1500)
Courtesy of GENERAL MOTORS CORP.

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 wheel drive shaft, if equipped. Refer to **Wheel Drive Shaft Replacement (2500)** or **Wheel Drive Shaft Replacement (1500)** .
4. Remove the wheel bearing and hub assembly. Refer to **Front Wheel Hub, Bearing, and Seal Replacement (2500)** or **Front Wheel Hub, Bearing, and Seal Replacement (1500)**.
5. Remove the outer tie rod end from the knuckle. Refer to **Steering Linkage Outer Tie Rod Replacement** .
6. Separate the upper control arm from the knuckle. Refer to **Upper Control Arm Replacement (1500)** or **Upper Control Arm Replacement (2500, 3500)**.
7. Separate the lower control arm from the knuckle. Refer to **Lower Control Arm Replacement (1500)** or **Lower Control Arm Replacement (2500, 3500)**.
8. Remove the knuckle from the vehicle.

Installation Procedure

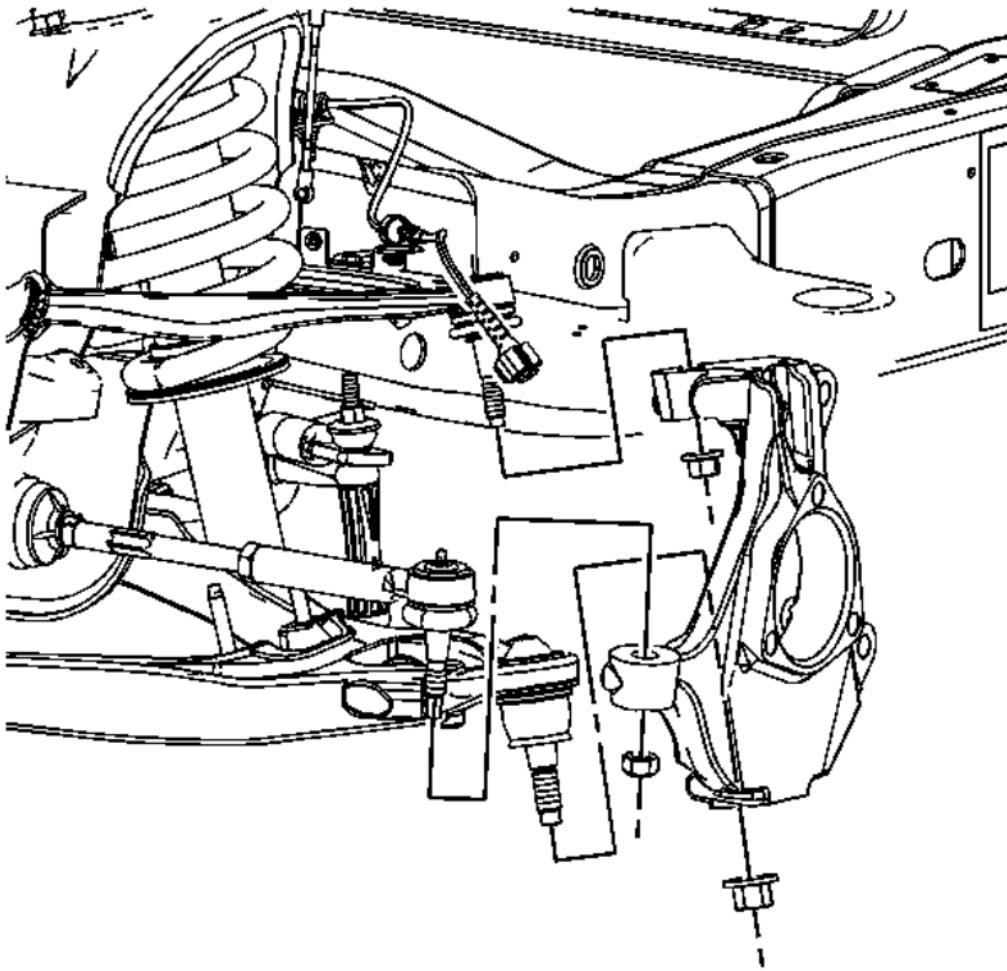
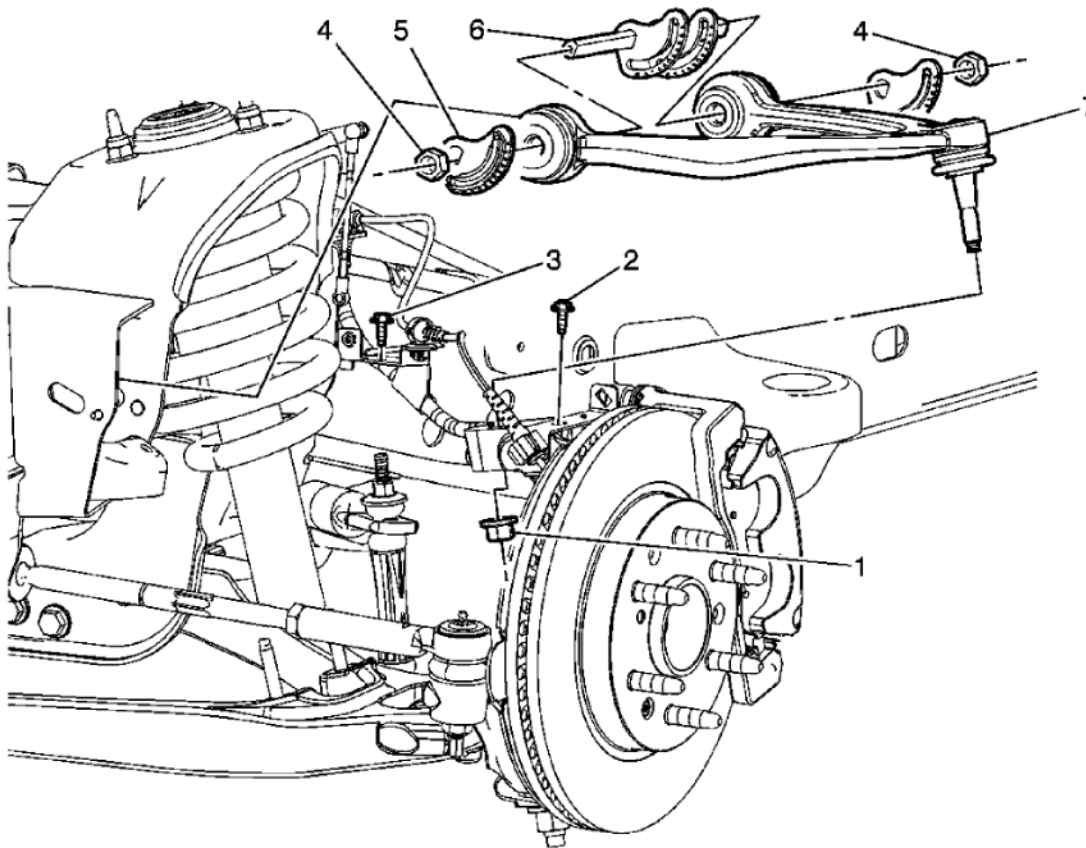


Fig. 11: View Of Steering Knuckle (1500)
Courtesy of GENERAL MOTORS CORP.

1. Install the lower ball joint in the knuckle. Refer to **Lower Control Arm Replacement (1500)** or **Lower Control Arm Replacement (2500, 3500)**.
2. Install upper ball joint in the knuckle. Refer to **Upper Control Arm Replacement (1500)** or **Upper Control Arm Replacement (2500, 3500)**.
3. Install the outer tie rod end in the knuckle. Refer to **Steering Linkage Outer Tie Rod Replacement**.
4. Install the wheel bearing and hub assembly. Refer to **Front Wheel Hub, Bearing, and**

Seal Replacement (2500) or Front Wheel Hub, Bearing, and Seal Replacement (1500).

5. Install the wheel drive shaft, if equipped. Refer to **Wheel Drive Shaft Replacement (2500) or Wheel Drive Shaft Replacement (1500)** .
6. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
7. Remove the support and lower the vehicle.
8. Verify the wheel alignment. Refer to **Wheel Alignment Specifications** .

UPPER CONTROL ARM REPLACEMENT (1500)**Fig. 12: View Of Upper Control Arm (1500)****Courtesy of GENERAL MOTORS CORP.**

Callout	Component Name
Preliminary Procedures	
1.	Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .

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2. Remove the front tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation**.

1	Upper Ball Joint Nut NOTE: Refer to <u>Fastener Notice</u>. Procedure 1. Disconnect the electronic suspension control link connector. 2. Place a suitable support under the lower control arm and load the suspension. 3. Use the J-42188-B to separate the ball joint from the steering knuckle. See <u>Special Tools</u>. Tighten: 50 N.m (37 lb ft) Special Tool: J-42188-B Ball Joint Separator. See <u>Special Tools</u>.
2	Wheel Speed Sensor Wire Bolt Tighten: 10 N.m (89 lb ft)
3	Brake Hose/Wheel Speed Sensor Harness Retainer Bolt Tighten: 9 N.m (80 lb in)
4	Upper Control Arm Nut (Qty: 4) Tighten: 190 N.m (140 lb ft)
5	Upper Control Arm Alignment Cam (Qty: 4)
6	Upper Control Arm Bolt (Qty: 2)
7	Upper Control Arm Tip: Verify wheel alignment. Refer to <u>Wheel Alignment Specifications</u>

UPPER CONTROL ARM REPLACEMENT (2500, 3500)

Tools Required

J-42188-B Ball Joint Separator. See **Special Tools**.

Removal Procedure

1. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .

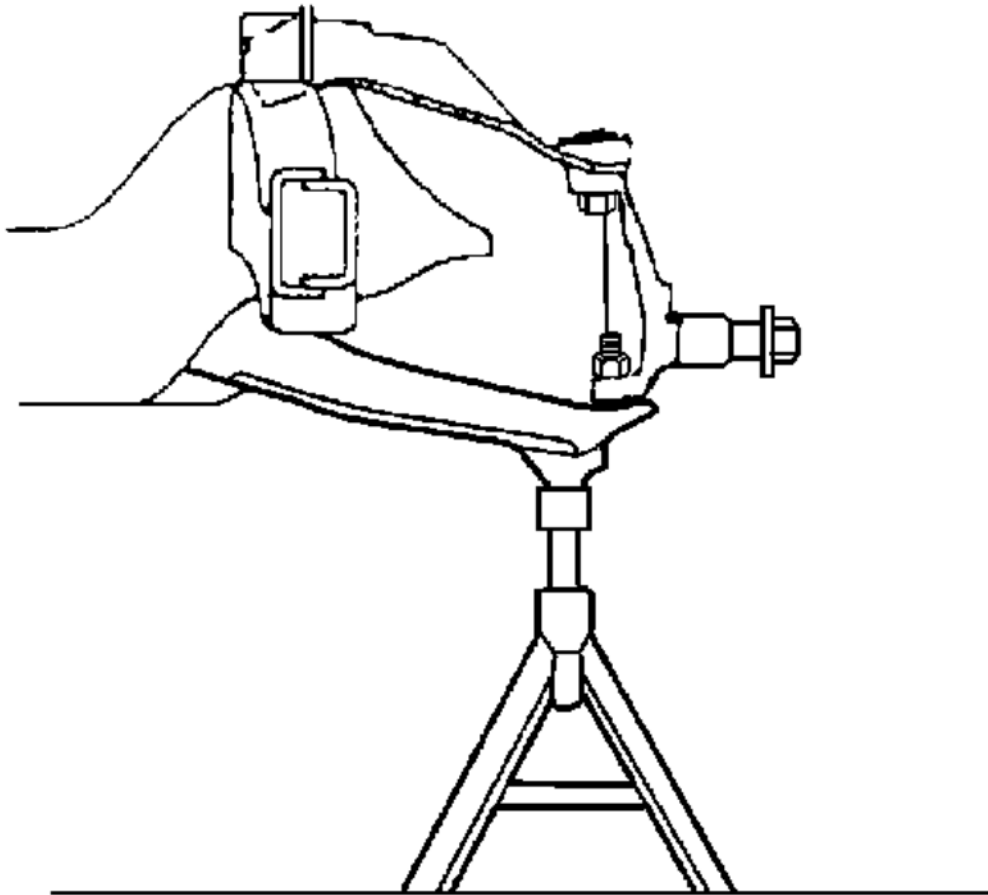


Fig. 13: Supporting Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

2. Lower the vehicle and support the lower control arm.
3. Remove the retaining bolt for the brake hose and the wheel speed sensor brackets.
4. Remove the nut at the upper ball joint. Discard the nut.

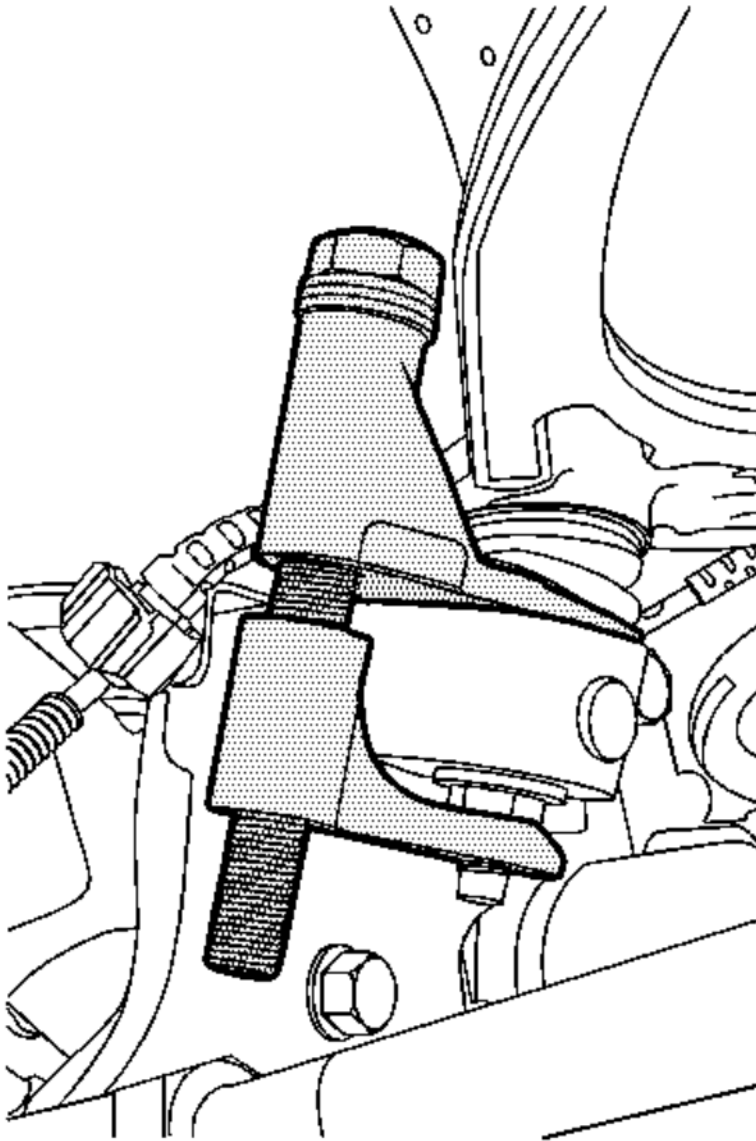


Fig. 14: View Of Special Tool At Upper Ball Joint & Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

5. Disconnect the upper control arm from the steering knuckle using the **J-42188-B** . See **Special Tools**.

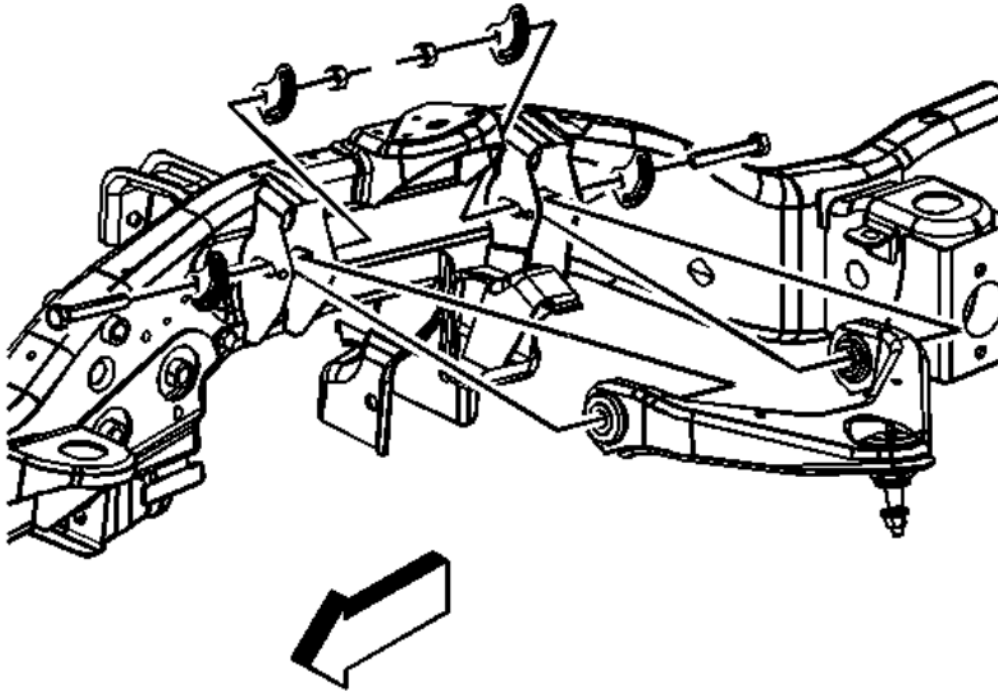


Fig. 15: Upper Control Arm
Courtesy of GENERAL MOTORS CORP.

6. Remove the upper control arm nuts and the adjustment cams.
7. Remove the upper control arm.

Installation Procedure

1. Install the upper control arm.

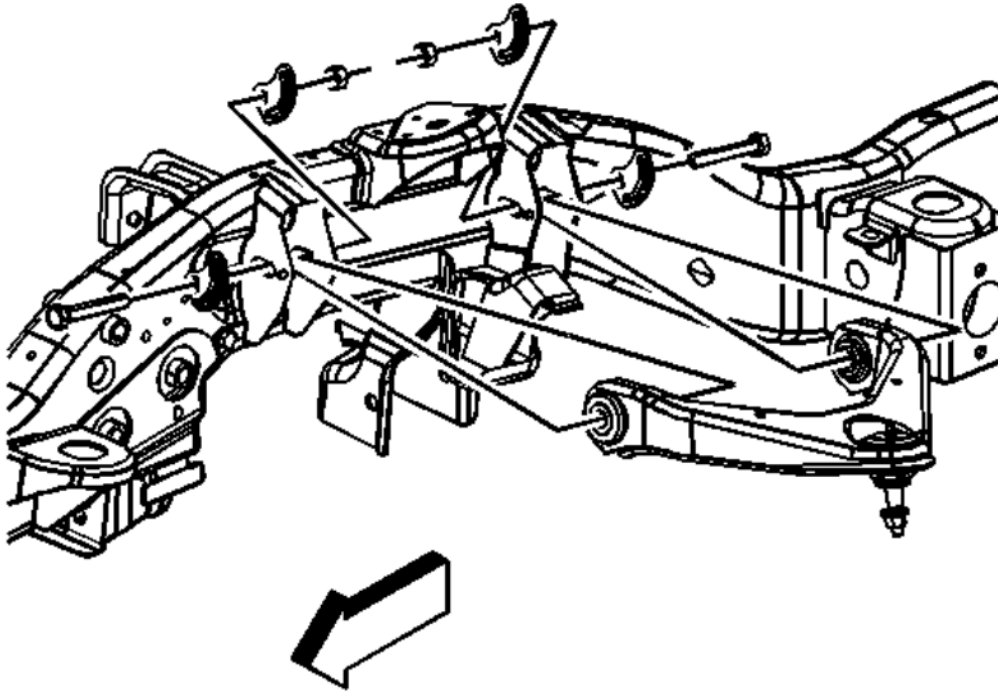


Fig. 16: Upper Control Arm
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

2. Install the upper control arm bolts.

Tighten: Tighten the nuts to 190 N.m (140 lb ft).

3. Connect the upper control arm to the steering knuckle.
4. Install the new nut to the upper ball joint stud.

Tighten: Tighten the nut to 50 N.m (39 lb ft).

5. Install the retaining bolts for the brake hose and wheel speed sensor brackets.

Tighten: Tighten the bolts to 9 N.m (80 lb in).

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6. Raise the vehicle and remove the support for the lower control arm.
7. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
8. Verify the wheel alignment. Refer to **Wheel Alignment Specifications** .

LOWER CONTROL ARM REPLACEMENT (1500)

Special Tools

- **J 43631** Ball Joint Separator. See **Special Tools**.
- **J 45851** Ball Joint Separator Protector Adapters. See **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. Remove the stabilizer shaft link from the lower control arm. Refer to **Stabilizer Shaft Link Replacement (2500/3500)** or **Stabilizer Shaft Link Replacement (1500)**.
4. Remove the wheel drive shaft, if equipped. Refer to **Wheel Drive Shaft Replacement (2500)** or **Wheel Drive Shaft Replacement (1500)** .
5. Using mechanics wire or equivalent, support the knuckle assembly and upper control arm.

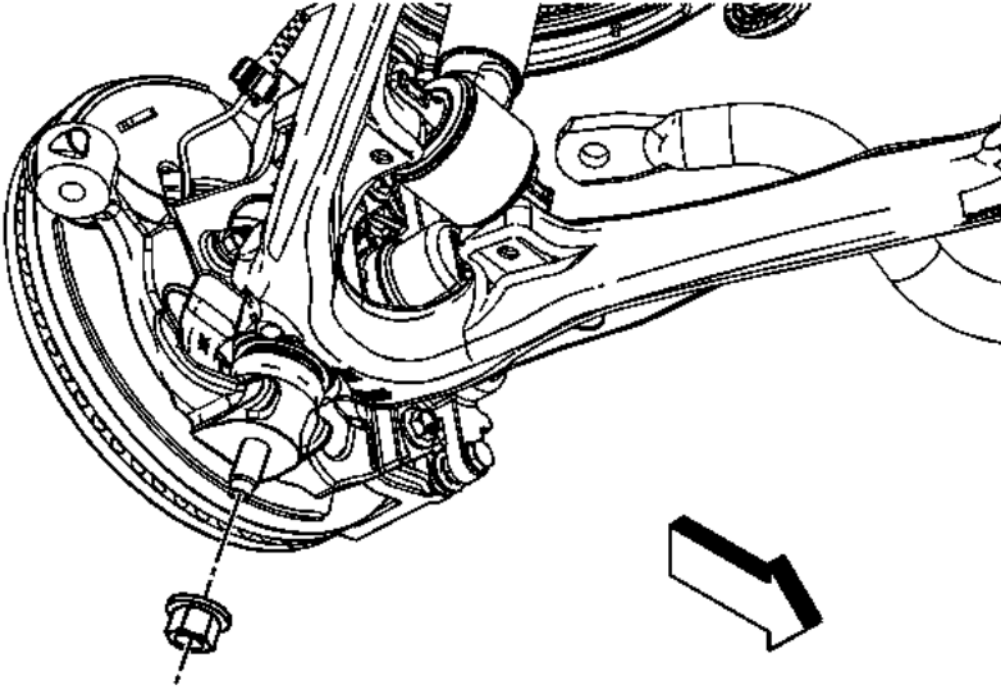


Fig. 17: View Of Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

6. Remove the lower ball joint retaining nut.

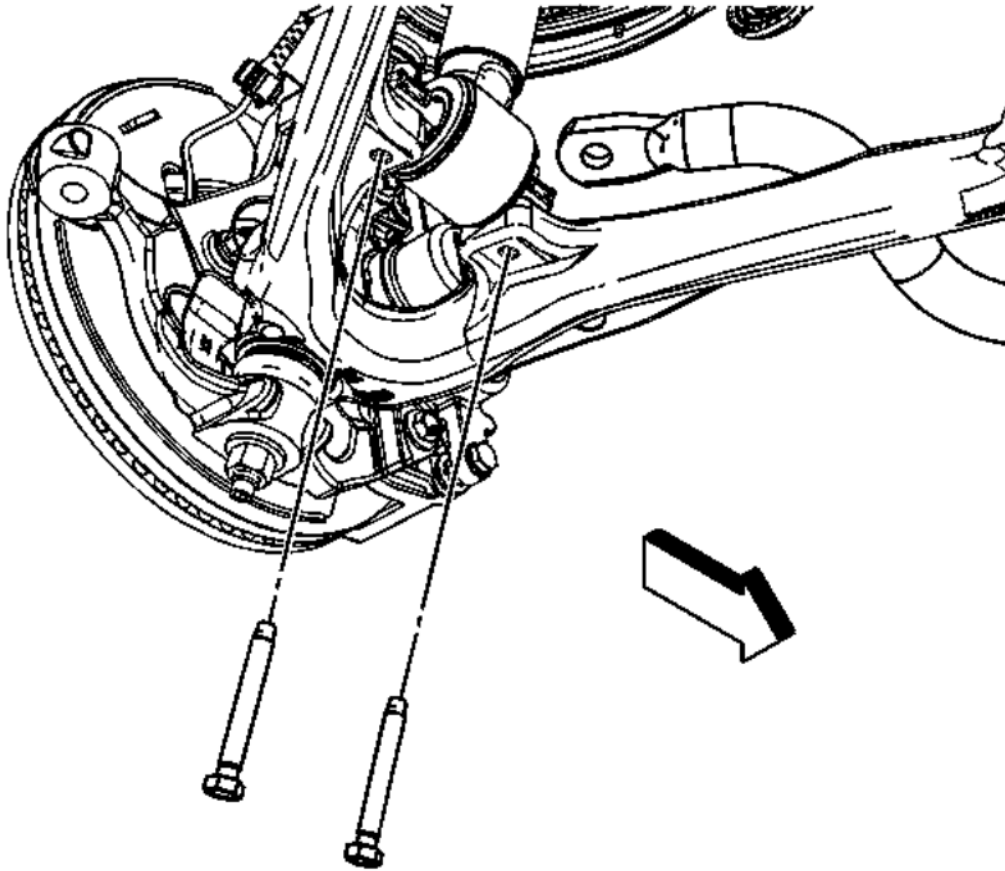


Fig. 18: View Of Lower Shock Absorber Module Mount Bolts
Courtesy of GENERAL MOTORS CORP.

7. Remove the lower shock module bolts from the lower control arm.

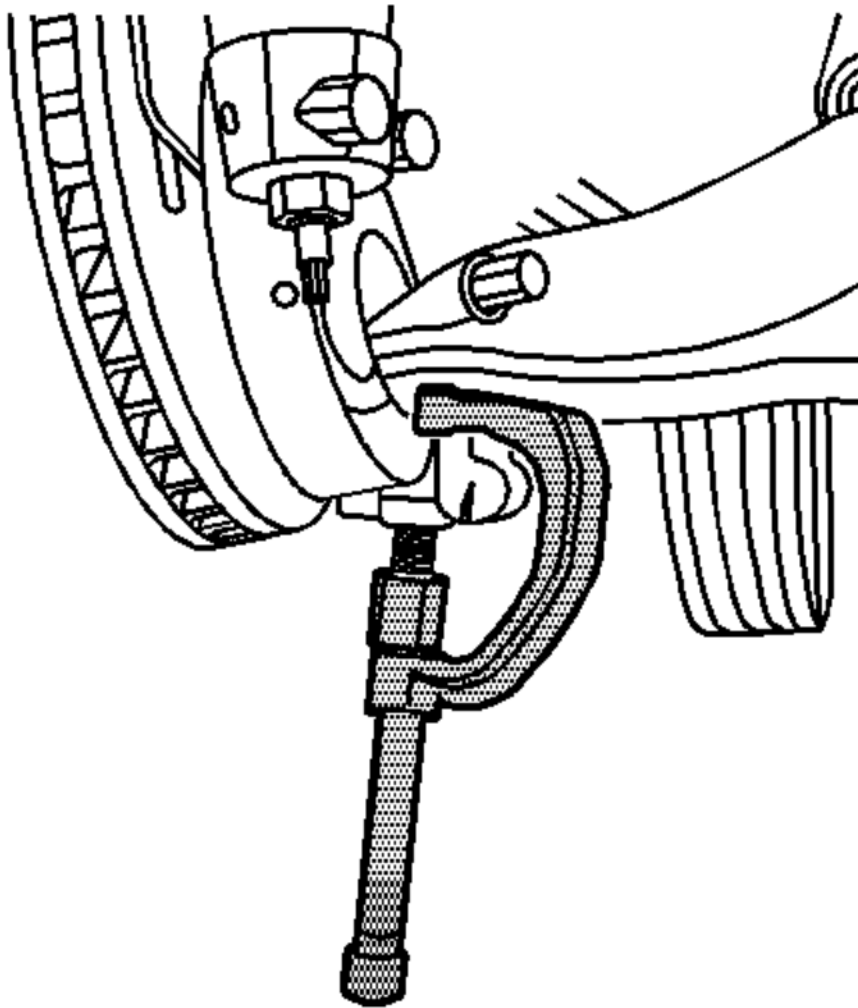


Fig. 19: Separating Lower Ball Joint From Steering Knuckle (RWD)
Courtesy of GENERAL MOTORS CORP.

8. Using the **J 43631** and the **J 45851** , remove the lower ball joint from the steering knuckle. See **Special Tools**.

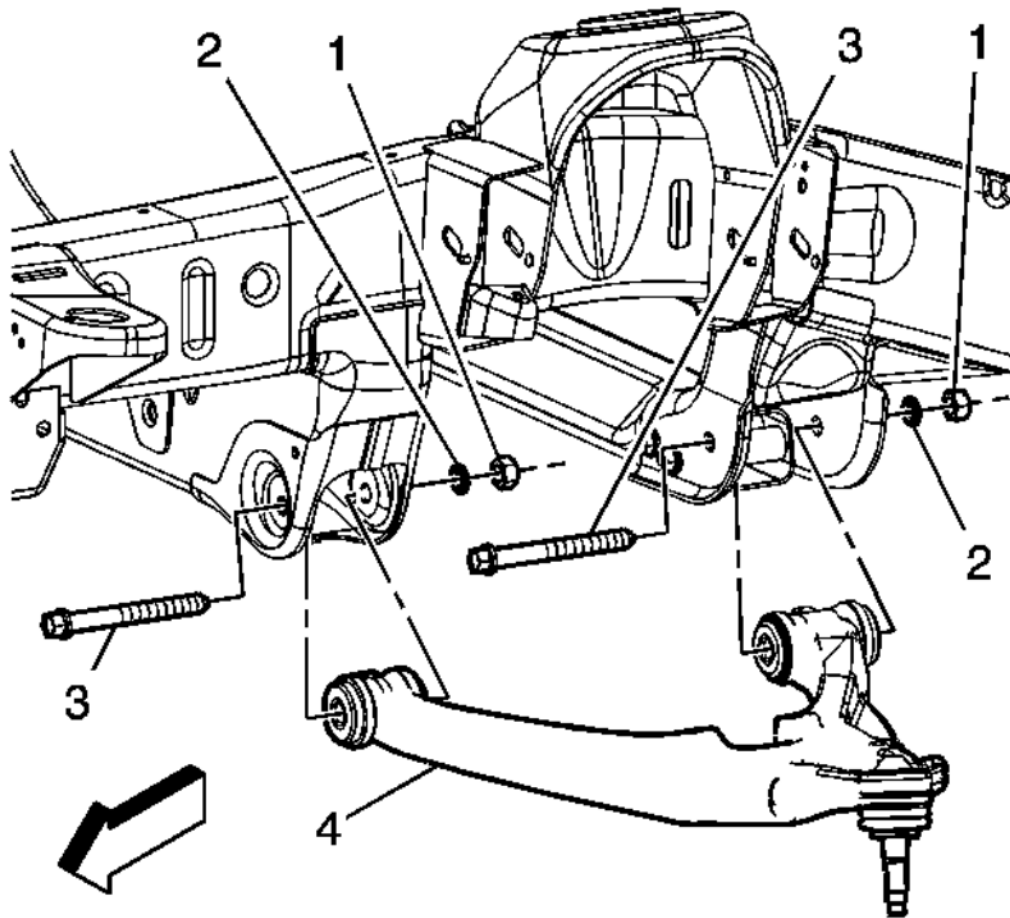


Fig. 20: Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

9. Remove the lower control arm nuts (1) and washers (2).
10. Remove the control arm bolts (3).
11. Remove the control arm (4).

Installation Procedure

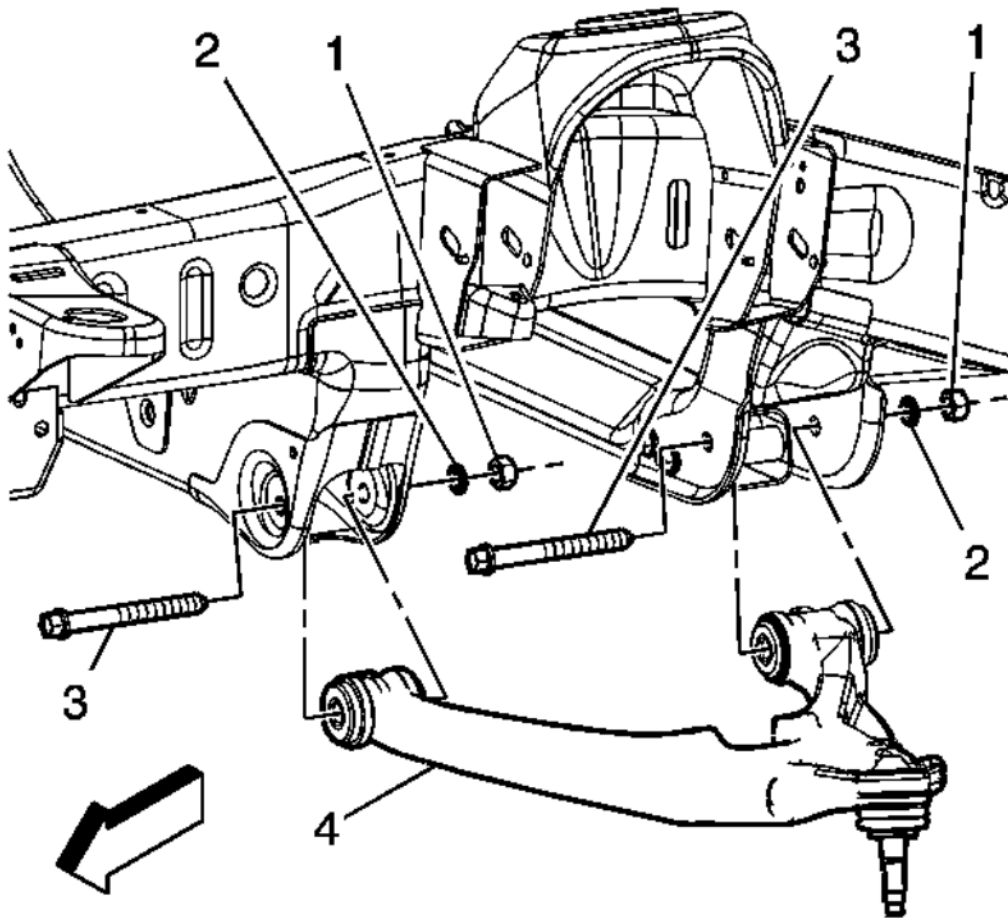


Fig. 21: Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

1. Install the lower control arm (4).
2. Install the lower control arm bolts (3).
3. Install the washers (2).

NOTE: Refer to Fastener Notice .

4. Install the lower control arm retaining nuts (1).

Tighten: Tighten nuts to 175 N.m (129 lb ft).

5. Install the lower ball joint in the steering knuckle.

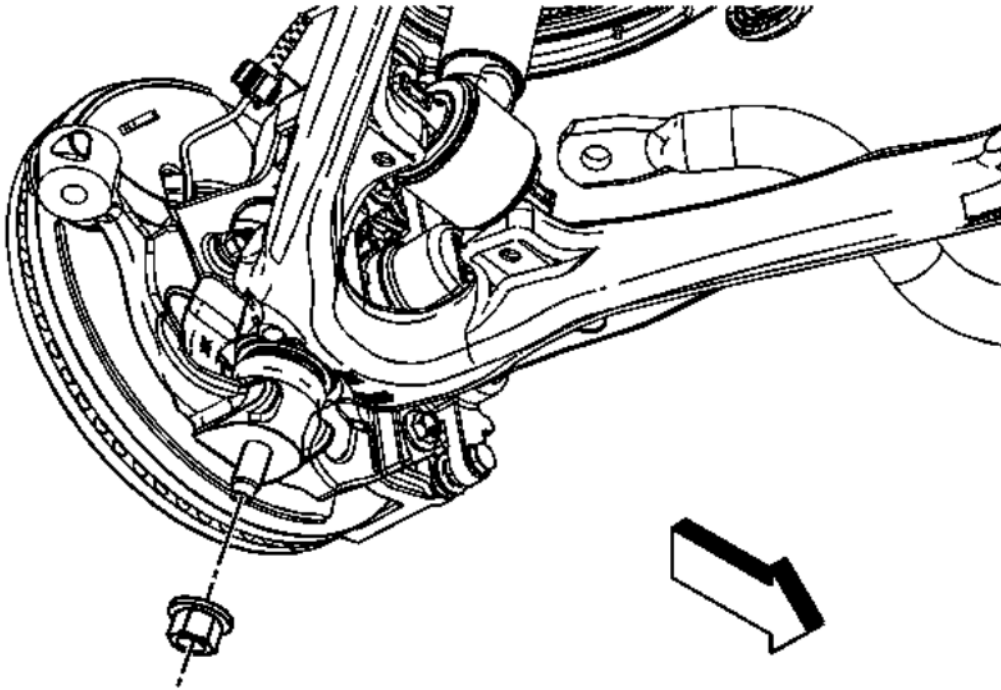


Fig. 22: View Of Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

6. Install the lower ball joint retaining nut.

Tighten: Tighten nuts to 110 N.m (81 lb ft).

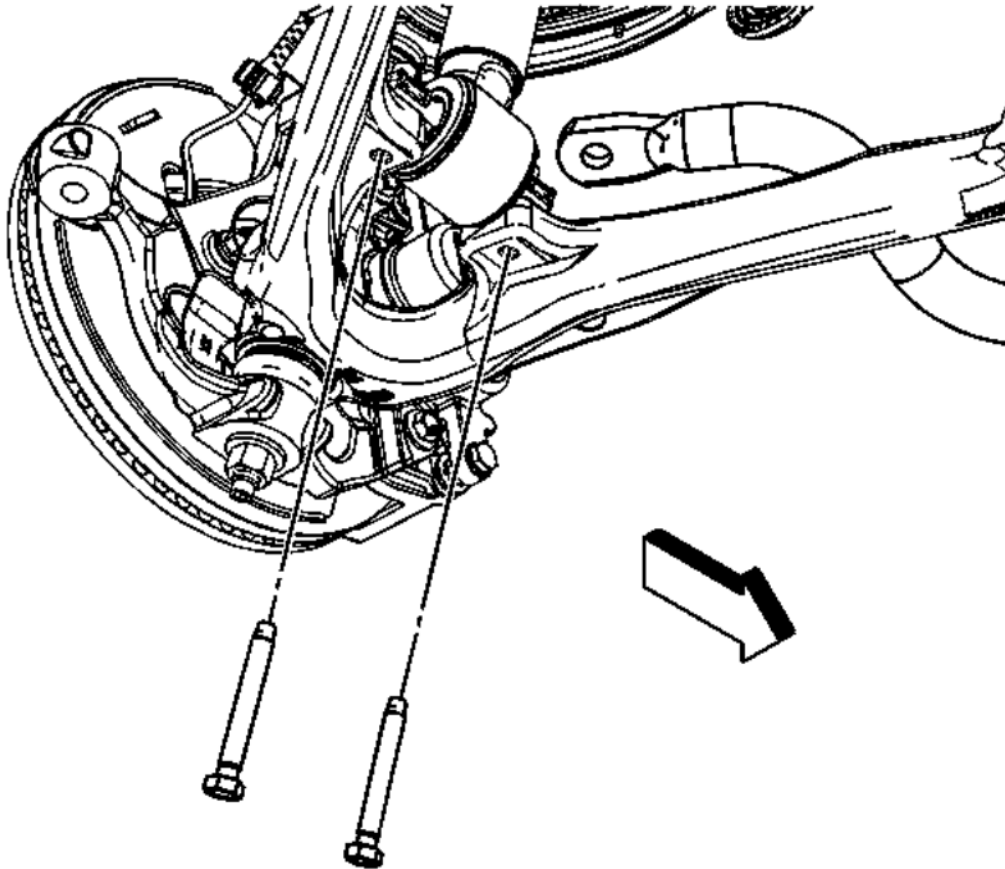


Fig. 23: View Of Lower Shock Absorber Module Mount Bolts
Courtesy of GENERAL MOTORS CORP.

7. Install the lower shock absorber module mount bolts.

Tighten: Tighten bolts to 50 N.m (37 lb ft).

8. Remove the support for the steering knuckle and upper control arm.
9. Install the wheel drive shaft, if equipped. Refer to **Wheel Drive Shaft Replacement (2500)** or **Wheel Drive Shaft Replacement (1500)** .
10. Install the stabilizer shaft link to the lower control arm. Refer to **Stabilizer Shaft Link Replacement (2500/3500)** or **Stabilizer Shaft Link Replacement (1500)**.
11. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .

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12. Remove the support and lower the vehicle.
13. Align the front end. Refer to **Wheel Alignment Measurement** .

LOWER CONTROL ARM REPLACEMENT (2500, 3500)

Special Tools

- **J 43631** Ball Joint Separator. See **Special Tools**.
- **J 45851** Ball Joint Separator Protector Adapters. See **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. Using mechanics wire or equivalent, support the knuckle and upper control arm.
4. Remove the stabilizer shaft links from the lower control arm. Refer to **Stabilizer Shaft Replacement (2500, 3500)** or **Stabilizer Shaft Replacement (1500)**.
5. Remove the shock absorber module. Refer to **Shock Absorber Replacement (2500 Series)**.
6. Remove the torsion bars. Refer to **Torsion Bar and Support Assembly Replacement (Bushing Style)** or **Torsion Bar and Support Assembly Replacement (Link Style)**.
7. Remove the wheel drive shafts. Refer to **Wheel Drive Shaft Replacement (2500)** or **Wheel Drive Shaft Replacement (1500)** .

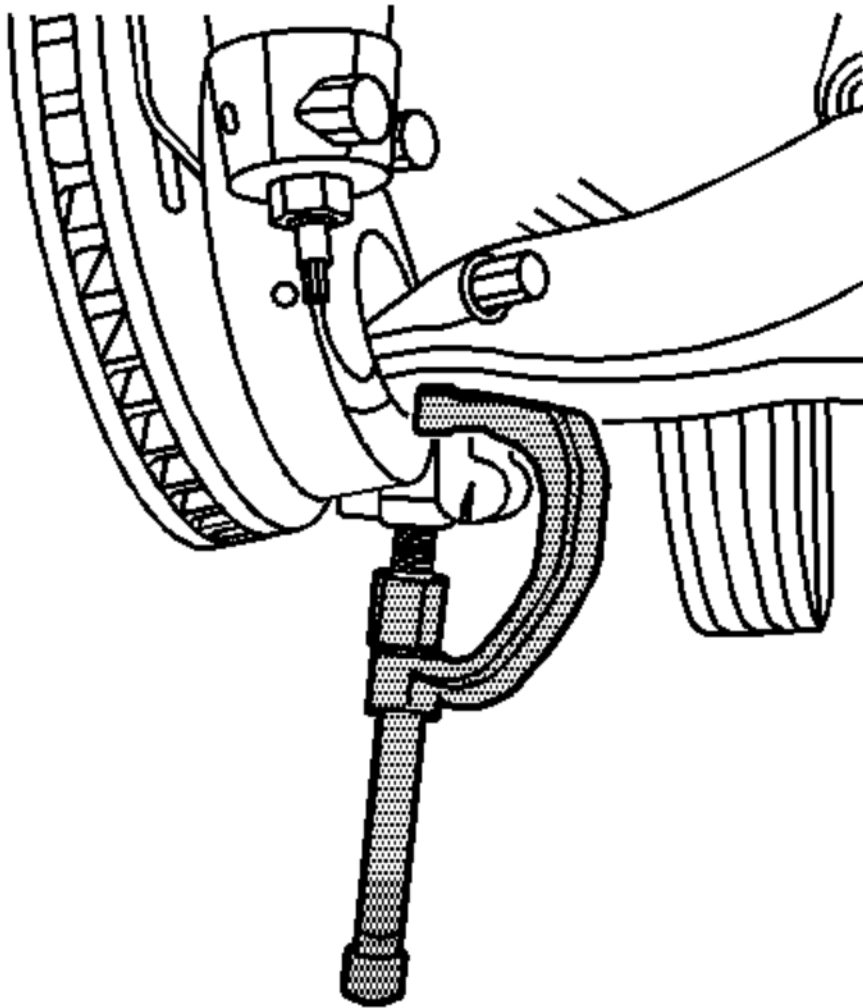
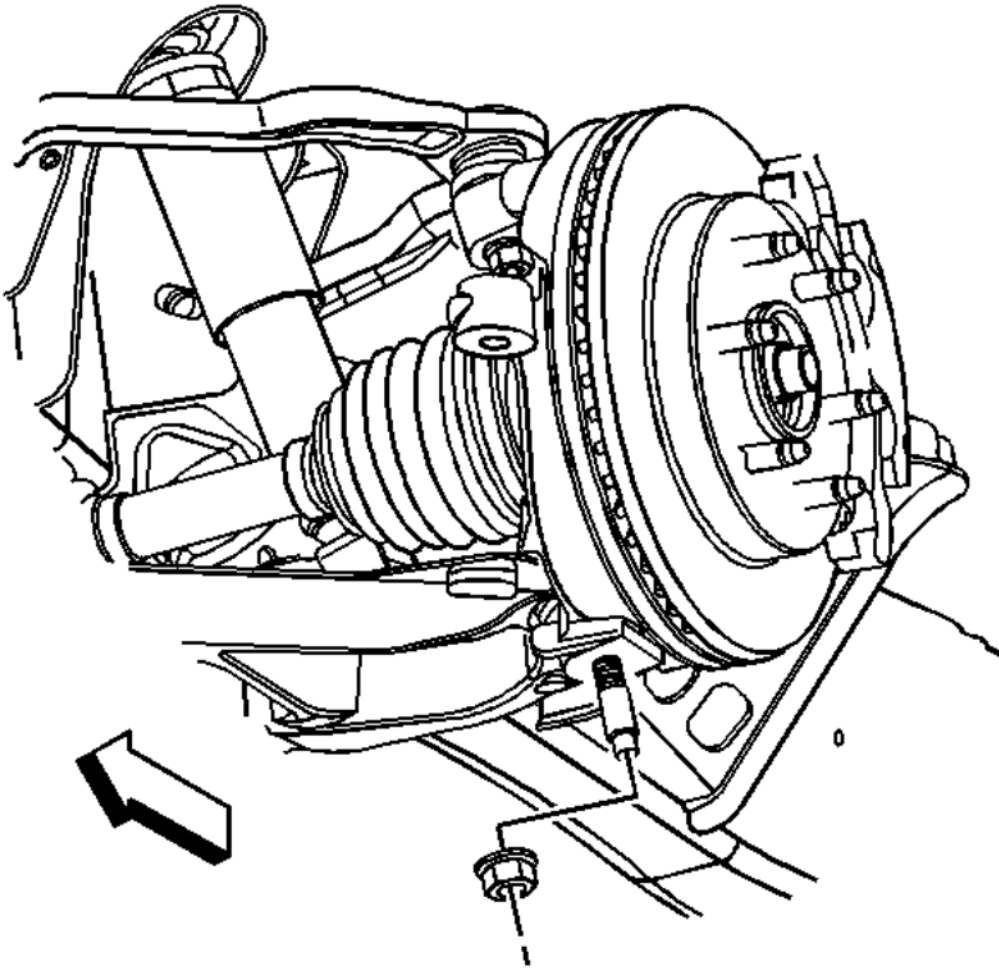


Fig. 24: Separating Lower Ball Joint From Steering Knuckle (RWD)
Courtesy of GENERAL MOTORS CORP.

8. Using the **J 43631** and the **J 45851** , remove the lower ball joint from the steering knuckle. See **Special Tools**.



9. Remove the lower ball joint retaining nut.

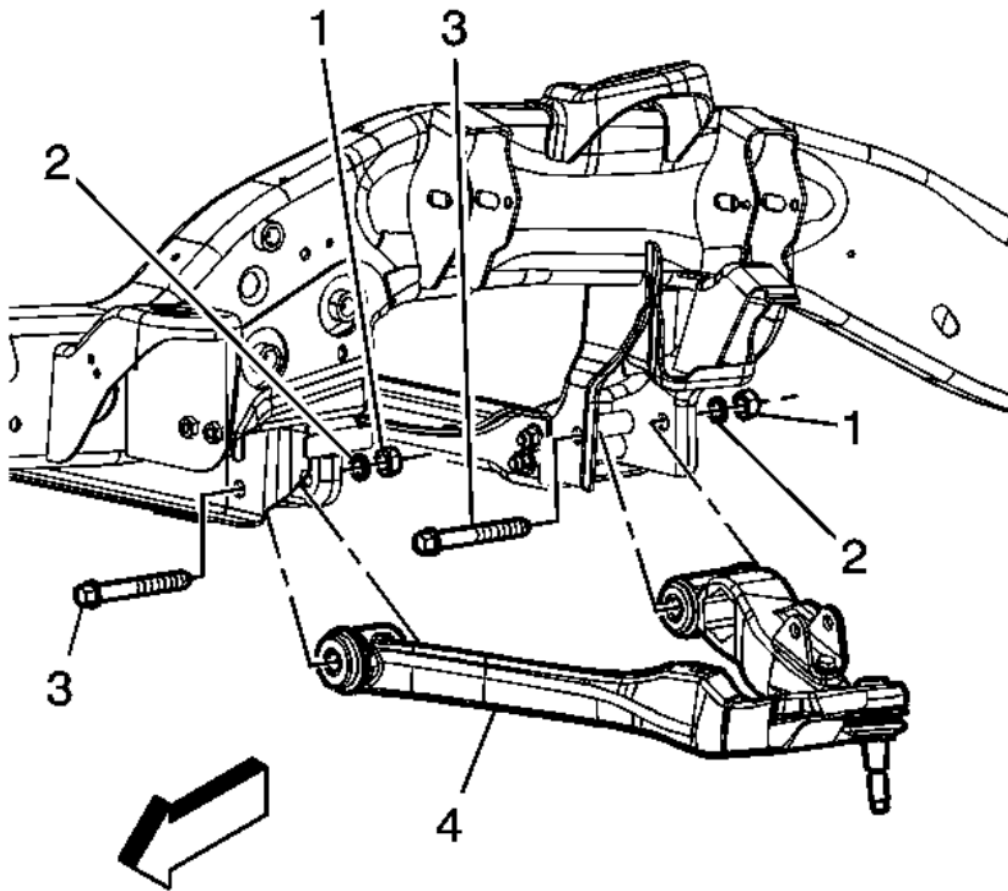


Fig. 26: Lower Control Arm

Courtesy of GENERAL MOTORS CORP.

10. Remove the lower control arm nuts (1) and washers (2).
11. Remove the control arm bolts (3).
12. Remove the control arm (4).

Installation Procedure

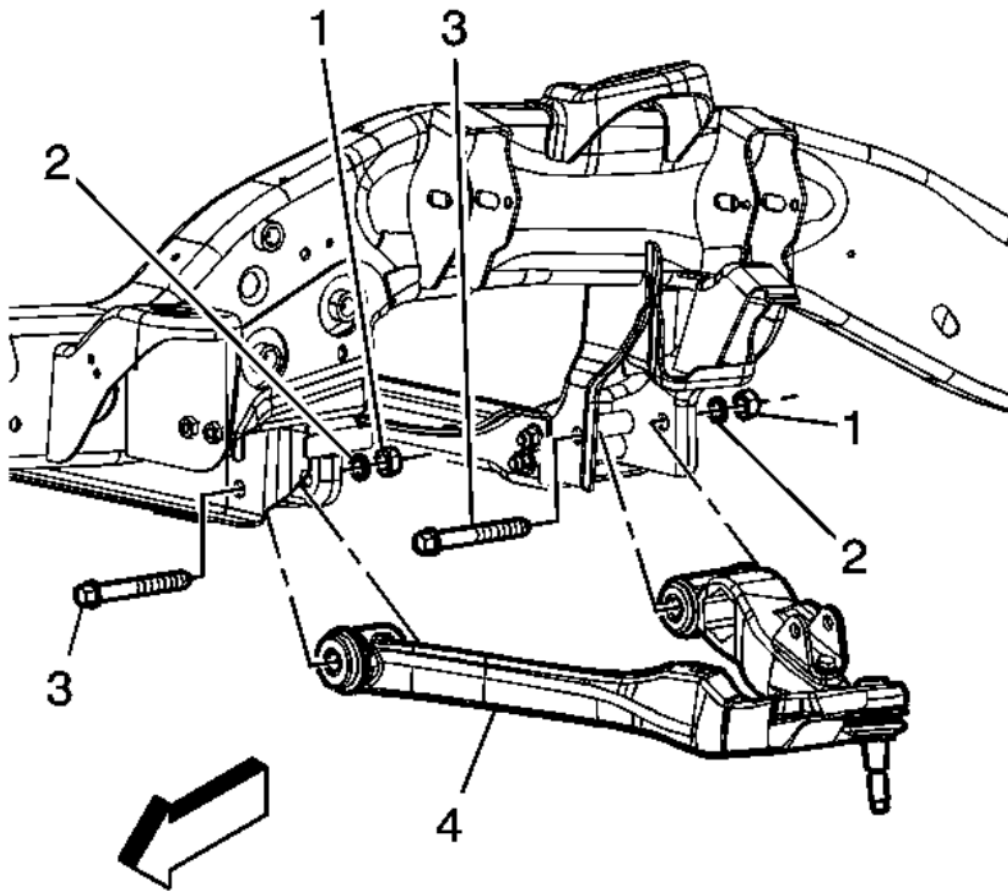


Fig. 27: Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

1. Install the lower control arm (4).
2. Install the lower control arm bolts (3).
3. Install the washers (2).

NOTE: Refer to Fastener Notice .

4. Install the lower control arm retaining nuts (1).

Tighten: Tighten nuts to 175 N.m (129 lb ft).

5. Install the torsion bars. Refer to **Torsion Bar and Support Assembly Replacement (Bushing Style)** or **Torsion Bar and Support Assembly Replacement (Link Style)**.
6. Install the lower ball joint in the steering knuckle.
7. Install the wheel drive shaft. Refer to **Wheel Drive Shaft Replacement (2500)** or **Wheel Drive Shaft Replacement (1500)** .

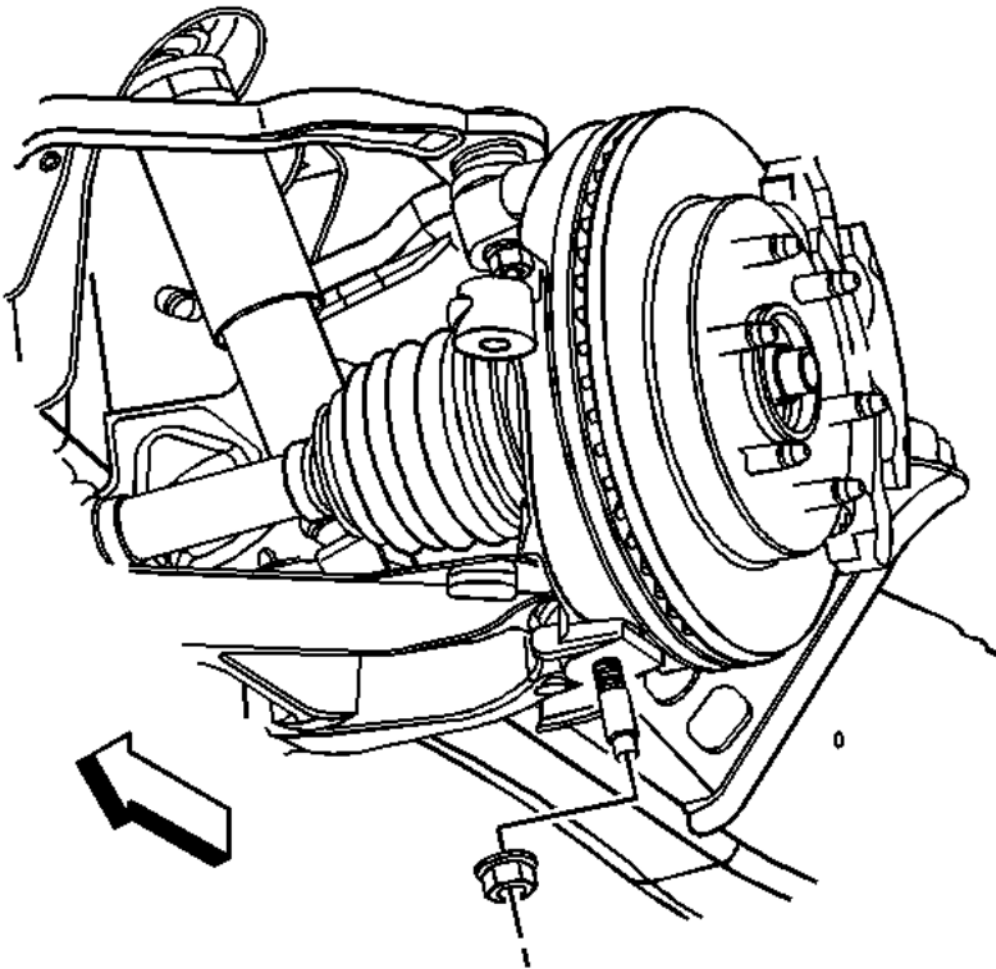


Fig. 28: Removing/Installing The Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

8. Install the lower ball joint retaining nut.

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Tighten: Tighten nuts to 110 N.m (81 lb ft).

9. Install the shock module. Refer to **Shock Absorber Replacement (2500 Series)**.
10. Remove the support for the knuckle and upper control arm.
11. Install the stabilizer shaft links to the lower control arm. Refer to **Stabilizer Shaft Replacement (2500, 3500)** or **Stabilizer Shaft Replacement (1500)**.
12. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation**.
13. Remove the supports and lower the vehicle.
14. Align the front end. Refer to **Wheel Alignment Measurement**.

SPRING JOUNCE BUMPER REPLACEMENT (2500 SERIES)

Removal Procedure

IMPORTANT: The following service procedure is for 2500 series vehicles.

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**.

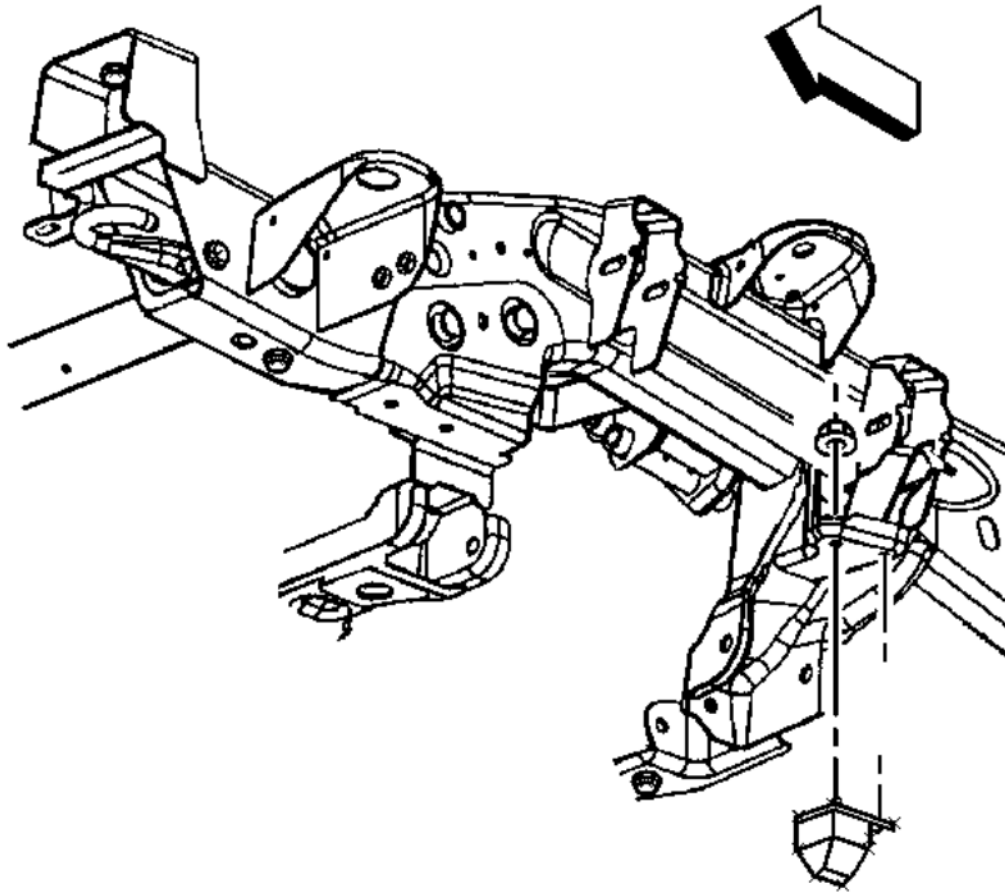


Fig. 29: Removing Nut From Spring Bumper Stud (4WD 15-Series and 2WD 25/35-Series)

Courtesy of GENERAL MOTORS CORP.

3. Remove the nut from the jounce bumper stud.
4. Remove the jounce bumper.

Installation Procedure

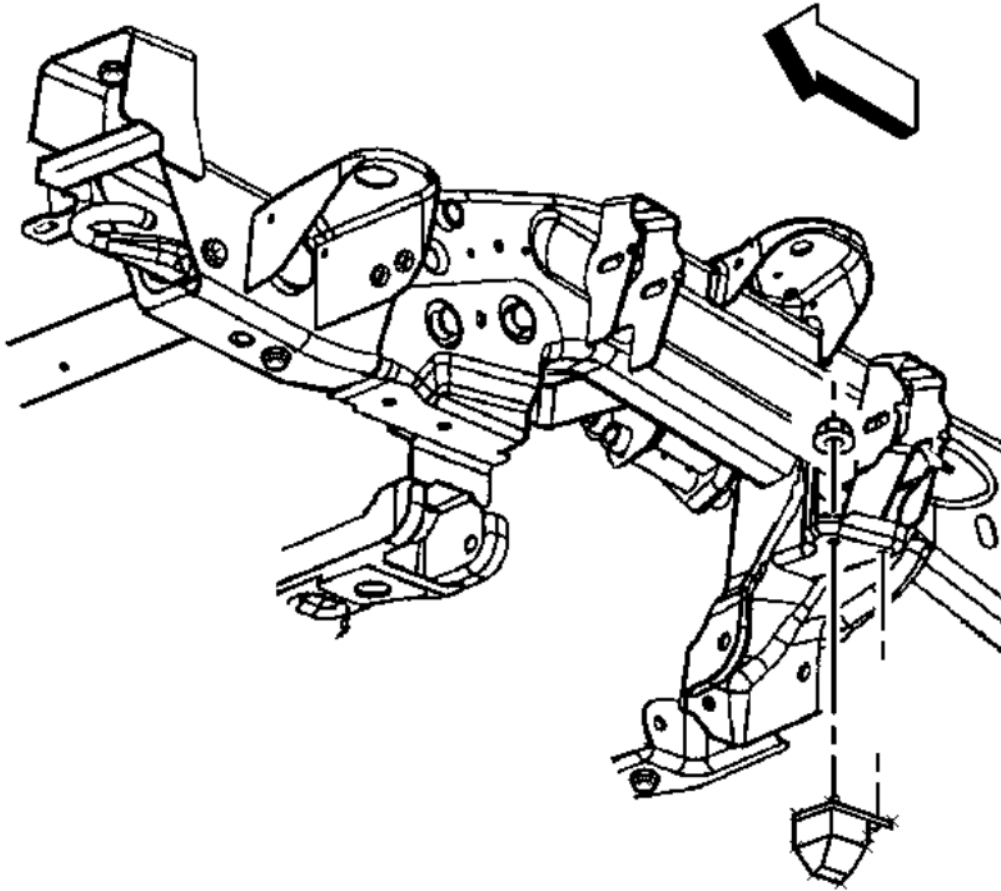


Fig. 30: Removing Nut From The Spring Bumper Stud (4WD 15-Series and 2WD 25/35-Series)

Courtesy of GENERAL MOTORS CORP.

1. Install the jounce bumper.

NOTE: Refer to Fastener Notice .

2. Install the nut to the jounce bumper stud.

Tighten: Tighten the nut to 30 N.m (22 lb ft).

3. Install the tire and wheel. Refer to Tire and Wheel Removal and Installation .

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4. Lower the vehicle.

WHEEL STUD REPLACEMENT

Tools Required

J 43631 Ball Joint Remover. See 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. Remove the brake rotor. Refer to Front Brake Rotor Replacement (JH6, JH7) or Front Brake Rotor Replacement (JD9, JF3, JF7) .

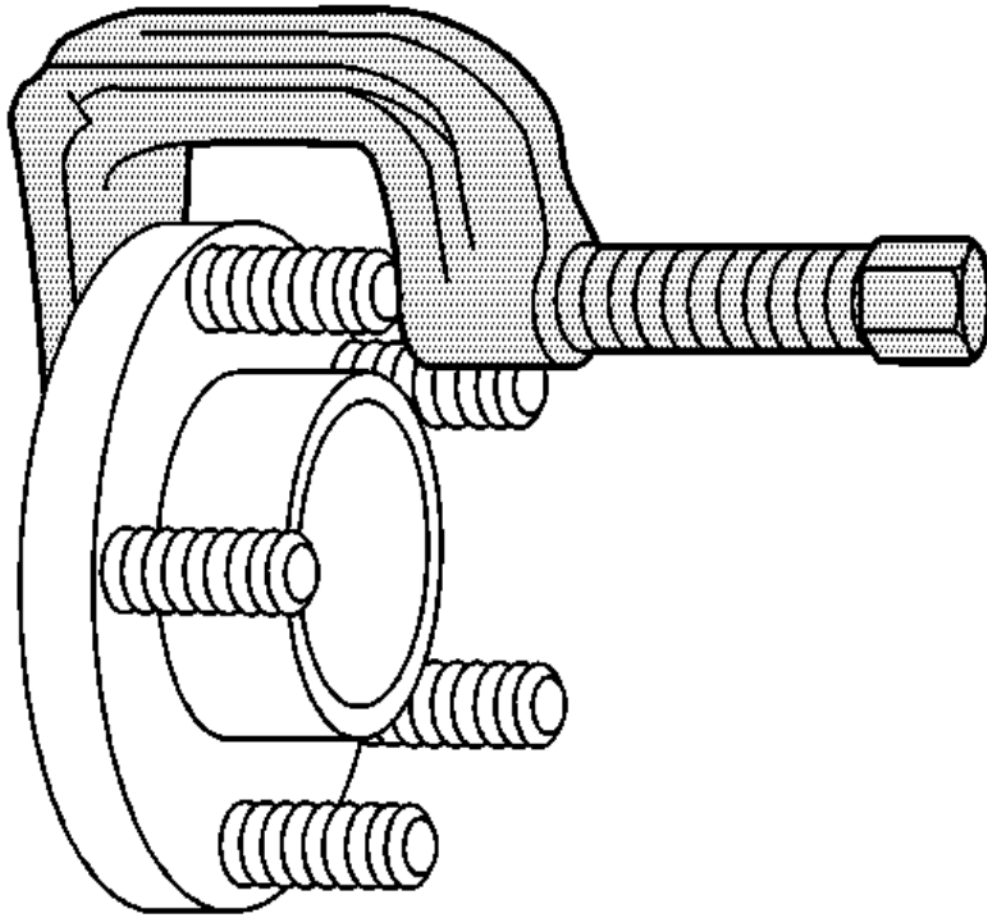


Fig. 31: Removing Wheel Stud From Axle Flange
Courtesy of GENERAL MOTORS CORP.

4. Use the **J 43631** to press the stud from the wheel bearing/hub. See **Special Tools**.

Installation Procedure

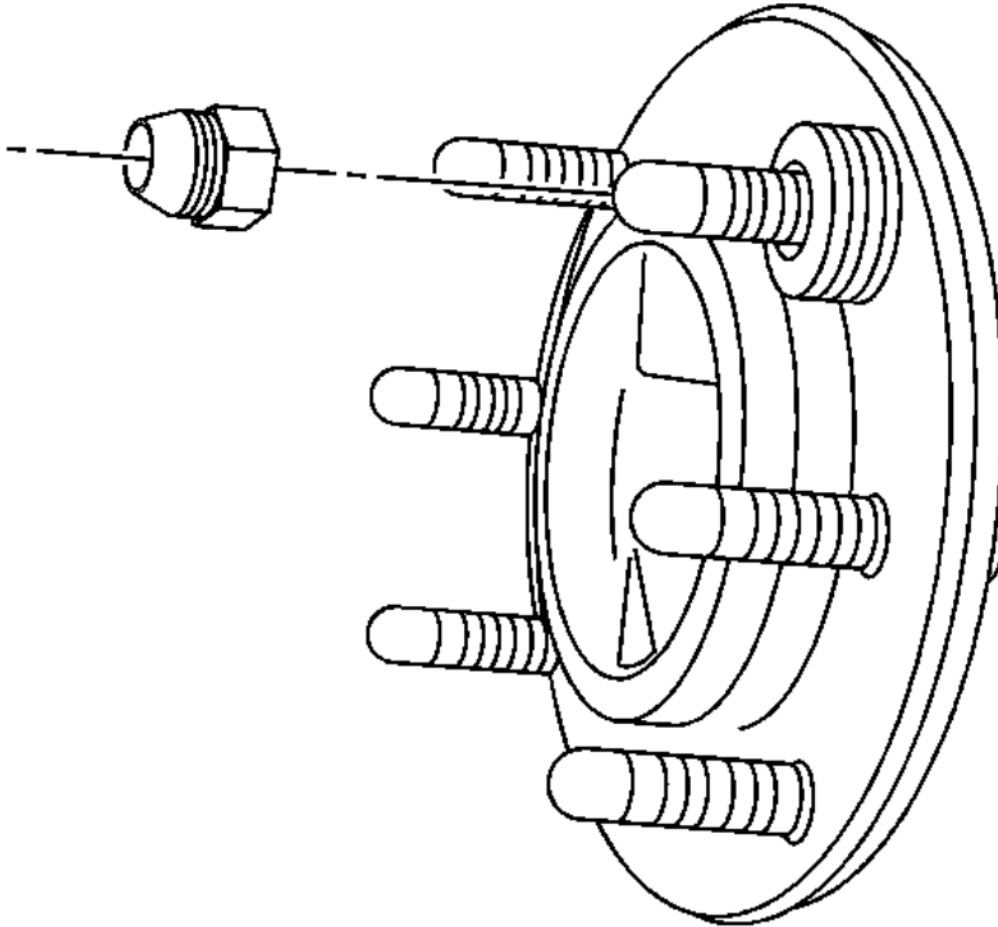


Fig. 32: View Of Wheel Nut & Studs
Courtesy of GENERAL MOTORS CORP.

1. Install a new stud. Use washers and a wheel nut and pull the new stud into the hub.
2. Install the brake rotor. Refer to **Front Brake Rotor Replacement (JH6, JH7)** or **Front Brake Rotor Replacement (JD9, JF3, JF7)** .
3. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
4. Lower the vehicle.

FRONT WHEEL HUB, BEARING, AND SEAL REPLACEMENT (2500)

Removal Procedure

NOTE: Never place vehicle on the ground with the halfshaft removed or the halfshaft nut torqued improperly. Otherwise, bearing seals may become dislodged causing premature wear and/or damage to the hub and bearing assembly.

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 rotor. Refer to Front Brake Rotor Replacement (JH6, JH7) or Front Brake Rotor Replacement (JD9, JF3, JF7) .
4. Remove the wheel speed sensor and brake hose mounting bracket bolt from the steering knuckle.
5. Disconnect the electrical connection for the wheel speed sensor.

IMPORTANT: Steps 6 thru 8 applies to those vehicles equipped with 4WD

6. Remove the wheel driveshaft nut retaining cover.

NOTE: Wheel drive shaft boots, seals and clamps should be protected from sharp objects any time service is performed on or near the wheel drive shaft(s). Damage to the boot(s), the seal(s) or the clamp(s) may cause lubricant to leak from the joint and lead to increased noise and possible failure of the wheel drive shaft.

7. Wrap shop towel around the inner and outer wheel drive shaft boot.
8. Remove the wheel driveshaft assembly retaining nut and washer from the wheel driveshaft assembly.

Disengage the wheel driveshaft from the wheel hub and bearing.

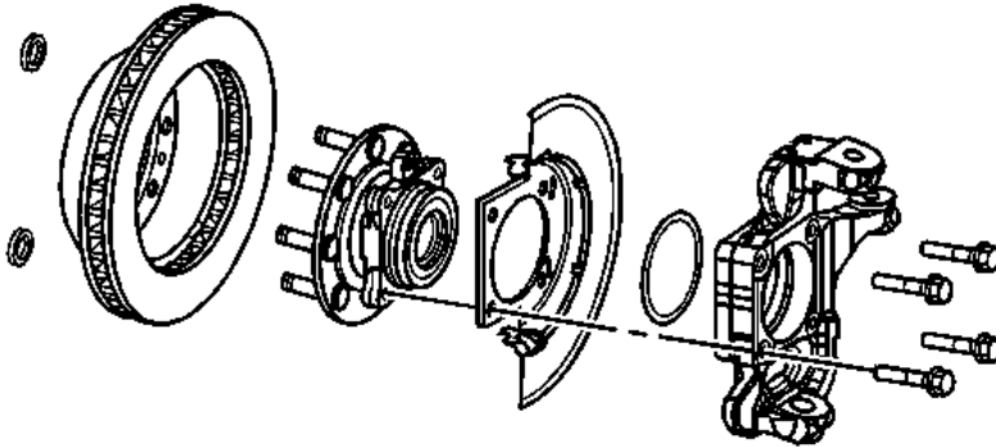
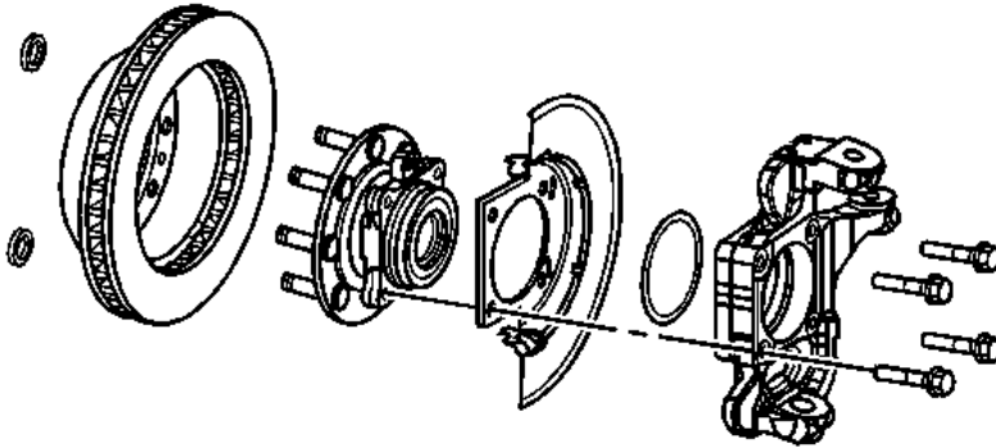


Fig. 33: Splash Shield (25/35 Series)
Courtesy of GENERAL MOTORS CORP.

9. Remove the wheel hub and bearing mounting bolts.
10. Remove the wheel hub and bearing and splash shield from the vehicle.
11. Remove the O-ring seal from the steering knuckle bore.
12. Remove the wheel speed sensor from the wheel hub and bearing.
13. Clean and inspect the O-ring seal.
14. Replace the seal if the following conditions exist:
 - Nicks
 - Cuts
 - Dry or brittle
 - Compression set

Installation Procedure

1. Clean all corrosion or contaminants from the steering knuckle bore and the hub and bearing assembly.
2. Lubricate the steering knuckle bore with wheel bearing grease or the equivalent.



NOTE: Refer to Fastener Notice .

3. Install the O-ring to the steering knuckle.

Tighten: Tighten the sensor mounting bolt to 18 N.m (13 lb ft).

5. Install the wheel hub and bearing and splash shield to the vehicle.
6. Install the wheel hub and bearing mounting bolts.

Tighten: Tighten the wheel hub to knuckle bolts to 180 N.m (133 lb ft).

IMPORTANT: The following service procedure applies to those vehicles equipped with 4WD.

7. Install the nut and washer retaining the wheel drive shaft assembly to the wheel hub and bearing.

Tighten: Tighten the nut to 240 N.m (177 lb ft).

8. Connect the electrical connection for the wheel speed sensor.
9. Install the wheel speed sensor and brake hose mounting bracket bolt to the steering knuckle.

Tighten: Tighten the bolt to 12 N.m (106 lb in).

10. Install the rotor. Refer to **Front Brake Rotor Replacement (JH6, JH7)** or **Front Brake Rotor Replacement (JD9, JF3, JF7)** .
11. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
12. Lower the vehicle.

FRONT WHEEL HUB, BEARING, AND SEAL REPLACEMENT (1500)

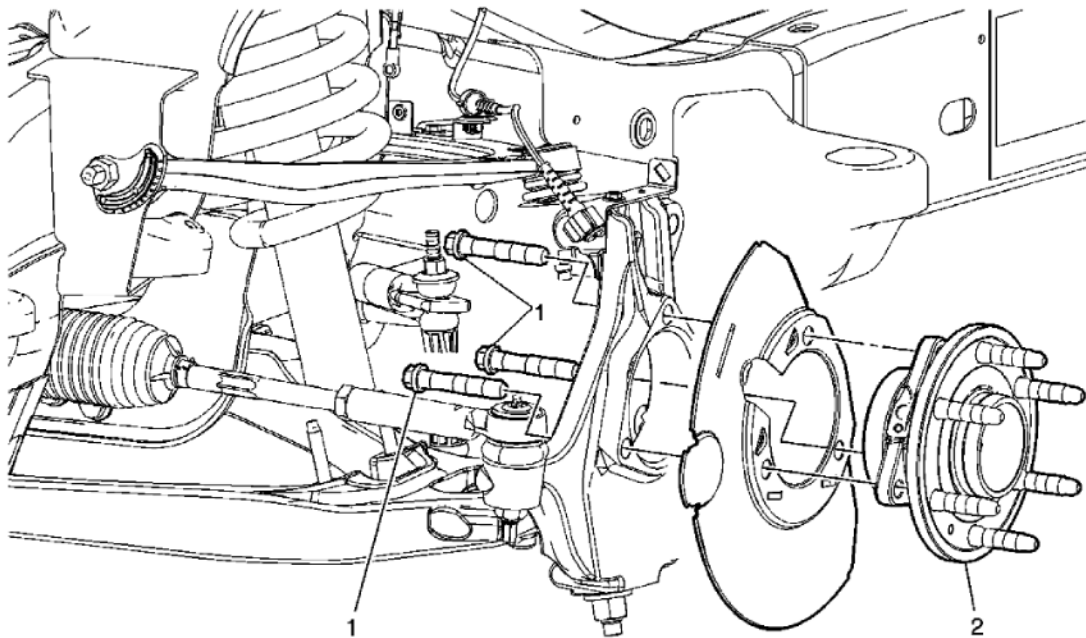


Fig. 35: View Of Front Wheel Hub, Bearing, and Seal (1500)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1.	Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .
2.	Remove the brake rotor. Refer to <u>Front Brake Rotor Replacement (JH6, JH7)</u> or <u>Front Brake Rotor Replacement (JD9, JF3, JF7)</u> .
3.	Remove the speed sensor. Refer to <u>Front Wheel Speed Sensor Replacement (JD9,</u>

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JF3, JF7 or **Front Wheel Speed Sensor Replacement (JH6, JH7)**

4. For vehicles equipped with 4WD, remove the wheel drive shaft from the wheel bearing and hub assembly. Refer to **Wheel Drive Shaft Replacement (2500)** or **Wheel Drive Shaft Replacement (1500)** .

1	Wheel Bearing and Hub Bolt (Qty: 3) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 180 N.m (133 lb ft)
2	Wheel Hub and Bearing Assembly

TORSION BAR AND SUPPORT ASSEMBLY REPLACEMENT (BUSHING STYLE)

Tools Required

J 36202 Torsion Bar Unloading/Loading Tool. See **Special Tools**.

Removal Procedure

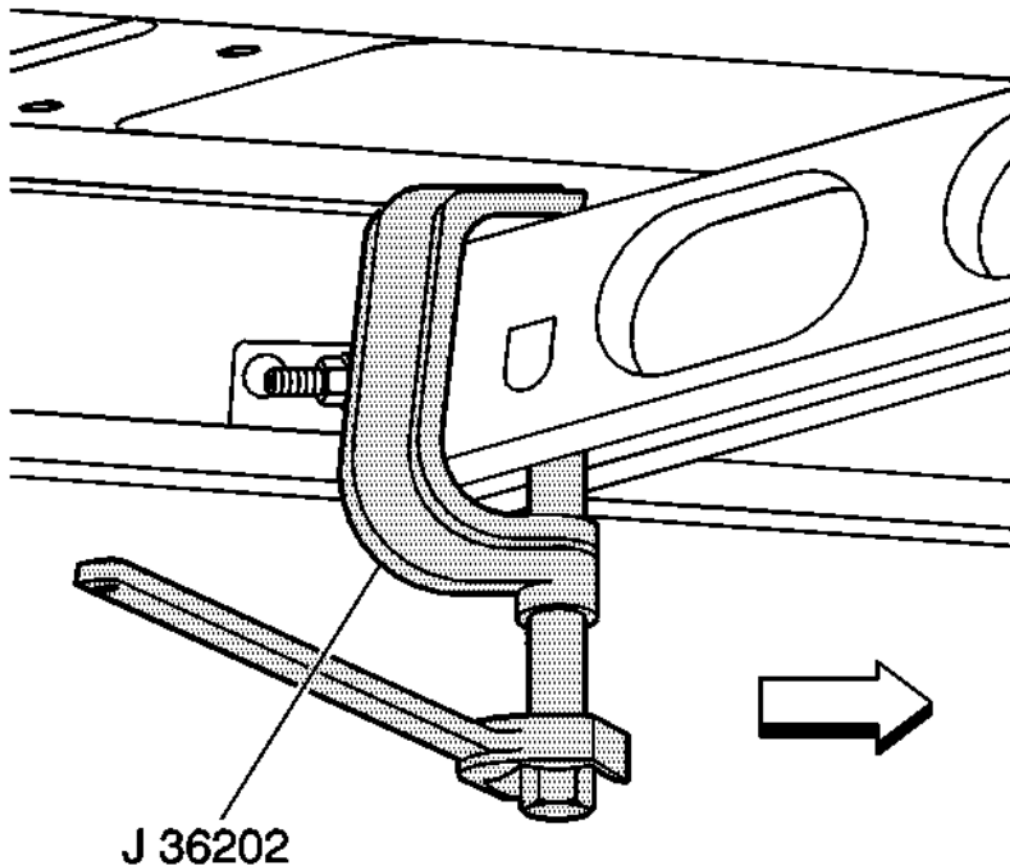


Fig. 36: J 36202, Adjustment Arm & Crossmember
Courtesy of GENERAL MOTORS CORP.

NOTE: Use care when handling the torsion bars in order to avoid chipping or scratching the coating. Damage to the coating will result in premature failure of the torsion bars.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Install the **J 36202** to the adjustment arm and the crossmember. See Special Tools.
3. Using the **J 36202** , increase the tension on the adjustment arm until the load is removed from the adjustment bolt and the adjuster nut. See Special Tools.

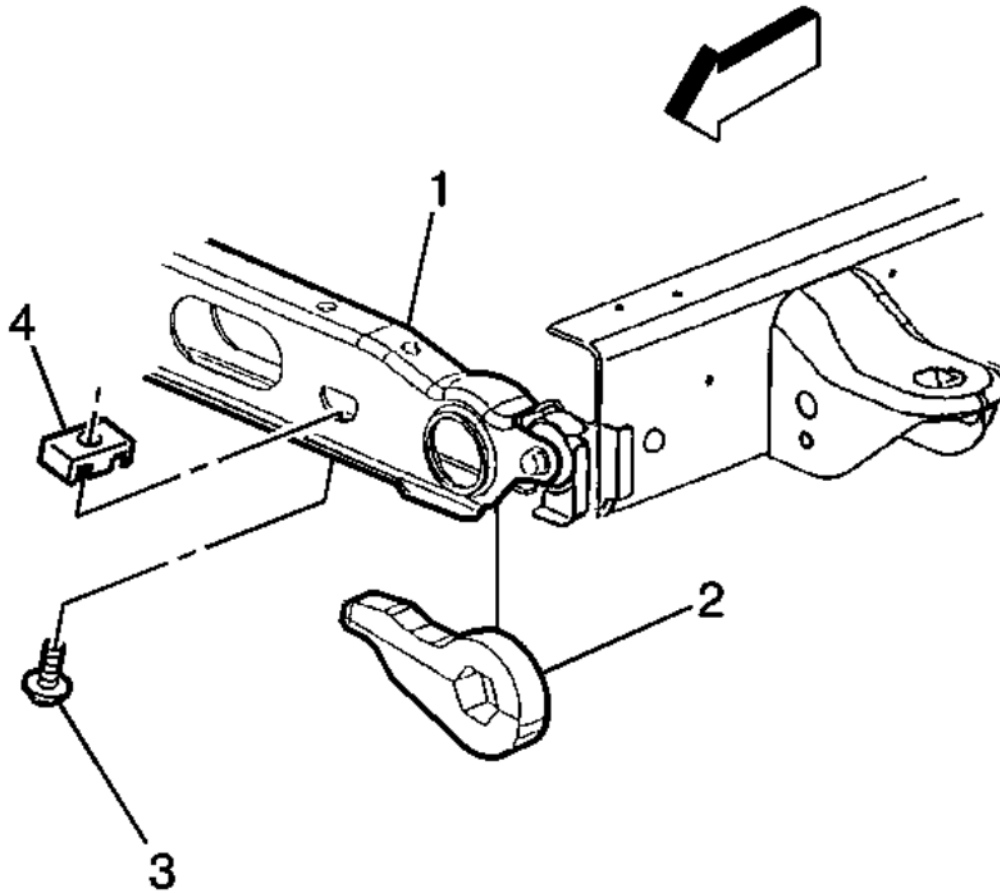


Fig. 37: Torsion Bar, Adjustment Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Mark the adjustment bolt and count the number of times that is required to remove the adjustment bolt.

4. Remove the adjustment bolt (3) and the adjust nut (4) from the crossmember (1).
5. Remove the **J 36202** , allowing the torsion bar to unload. See **Special Tools**.
6. Remove the adjustment arm (2) by sliding the torsion bar forward.

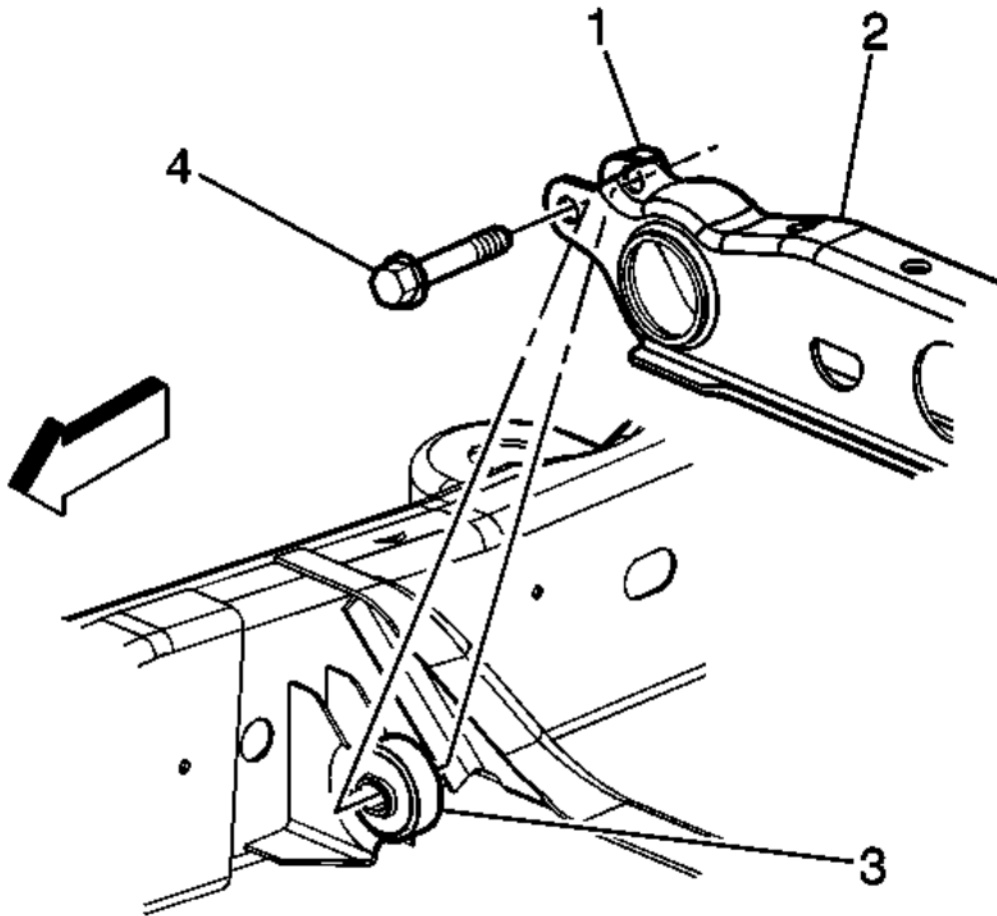


Fig. 38: Torsion Bar Crossmember, Bolts & Weld Nuts
Courtesy of GENERAL MOTORS CORP.

7. Remove the torsion bar crossmember bolt (4) from the weld nut (1).
8. Remove the crossmember (2) from the crossmember mount (3).
9. Remove the torsion bar from the crossmember.

IMPORTANT: The left and right torsion bars are different and are not interchangeable.

10. Remove the torsion bars from the vehicle.

Installation Procedure

1. Position the torsion bar in the lower control arm.

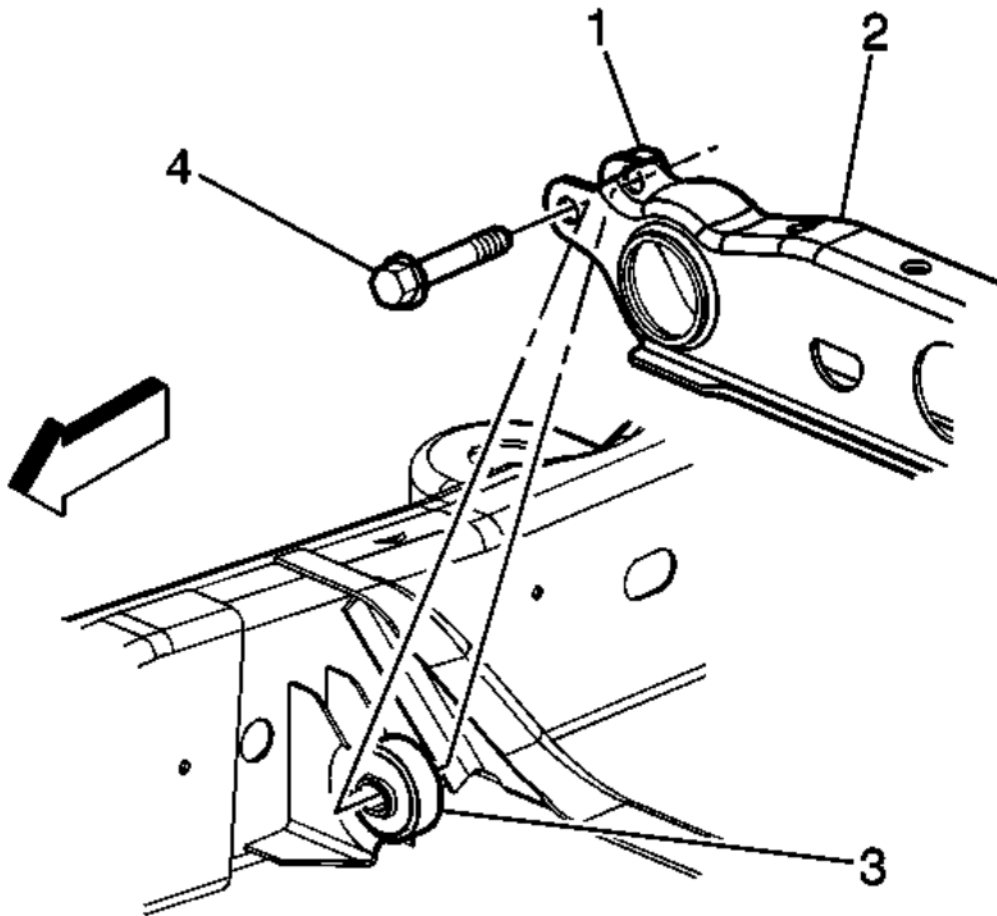


Fig. 39: Torsion Bar Crossmember, Bolts & Weld Nuts
Courtesy of GENERAL MOTORS CORP.

2. Install the torsion bar in the crossmember (2) on the crossmember mount (3).

NOTE: Refer to Fastener Notice .

3. Install the torsion bar crossmember bolt (4) in the weld nut (1).

Tighten: Tighten the crossmember bolt to 95 N.m (70 lb ft).

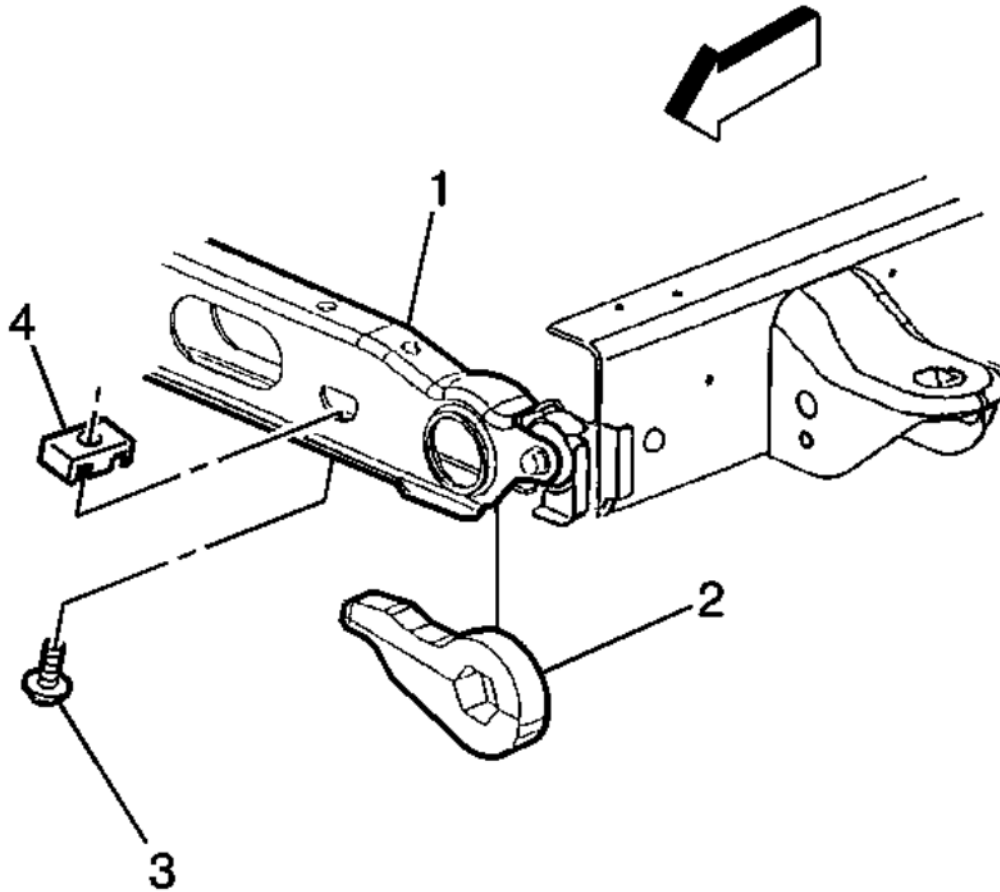


Fig. 40: Torsion Bar, Adjustment Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

4. Install the adjustment arm (2) in the crossmember (1).
5. Install the adjuster bolt (3) and the adjuster nut (4).
6. Install the torsion bar into the adjustment arm until the torsion bar is fully seated.

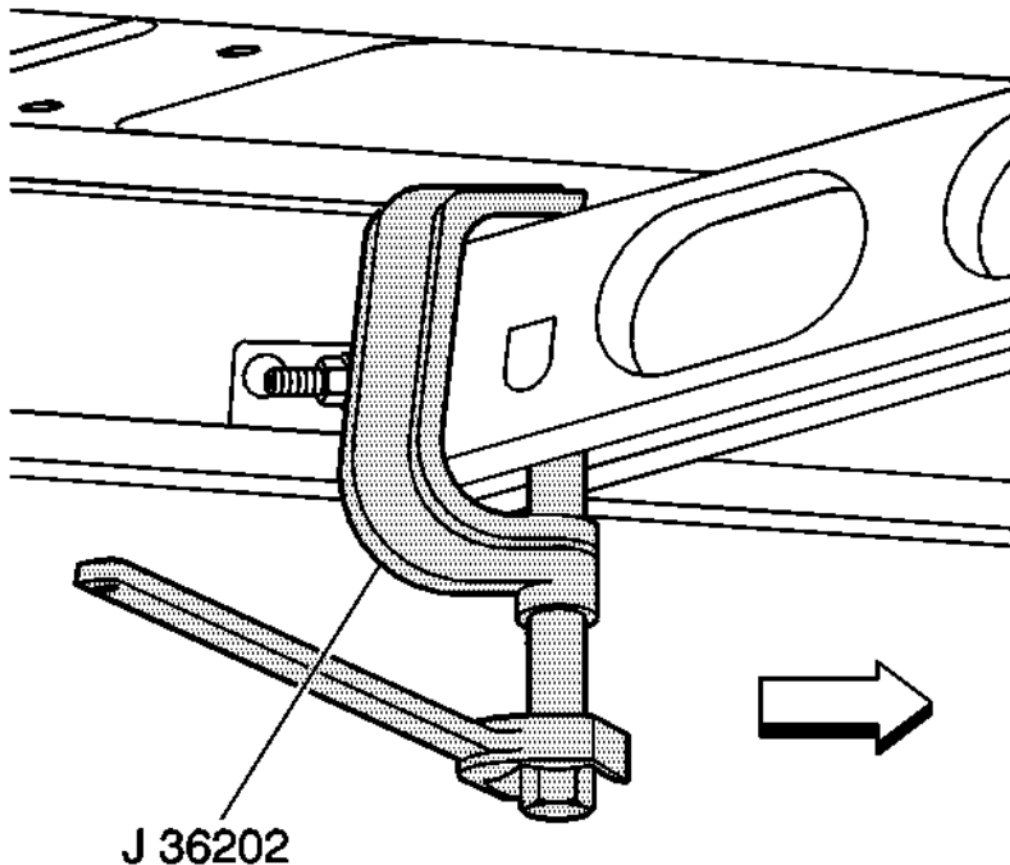


Fig. 41: J 36202, Adjustment Arm & Crossmember
Courtesy of GENERAL MOTORS CORP.

7. Install the **J 36202** to the adjustment arm and the crossmember. See **Special Tools**.
8. Using the **J 36202** , increase the tension on the adjustment arm to load the torsion bar. See **Special Tools**.
9. Turn the adjuster bolt the same amount of turns as it took to remove it.
10. Remove the **J 36202** from the crossmember. See **Special Tools**.
11. Remove the safety stands and lower the vehicle.
12. Measure the Z height. Refer to **Trim Height Inspection** .

Tools Required

J 36202 Torsion Bar Unloading/Loading Tool. See **Special Tools**.

Removal Procedure

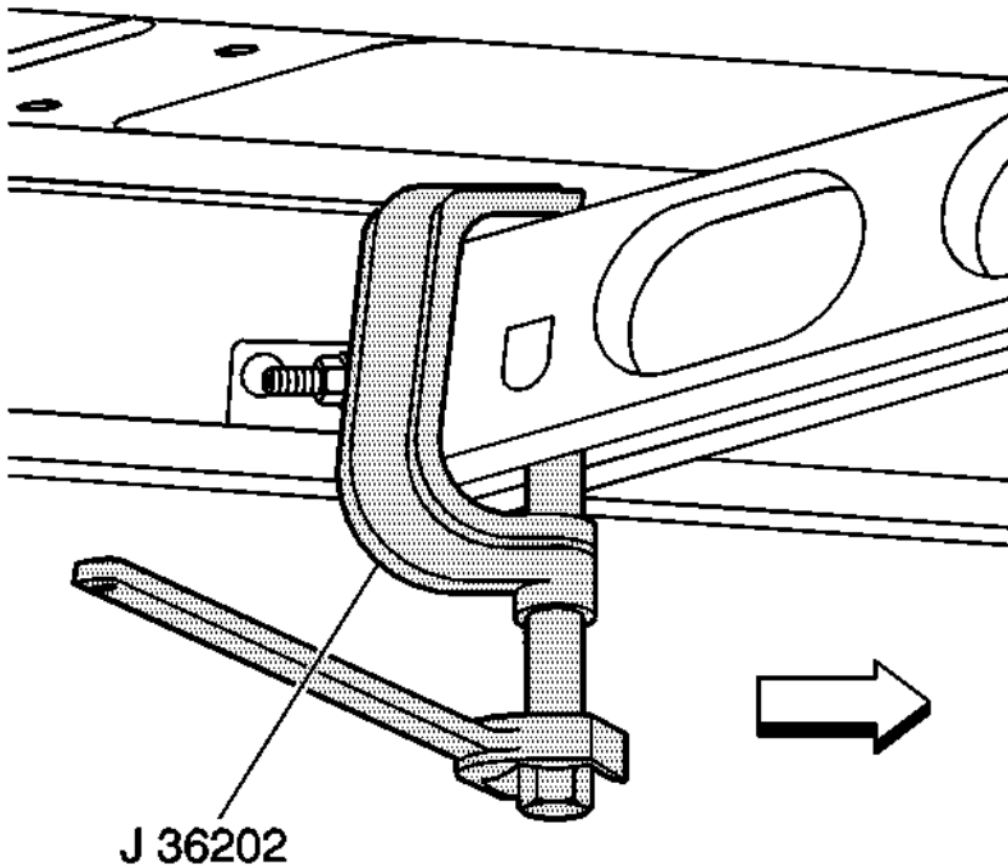


Fig. 42: J 36202, Adjustment Arm & Crossmember
Courtesy of GENERAL MOTORS CORP.

NOTE: Use care when handling the torsion bars in order to avoid chipping or scratching the coating. Damage to the coating will result in premature failure of the torsion bars.

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

2. Install the **J 36202** to the adjustment arm and the support assembly. See **Special Tools**.
3. Using the **J 36202** , increase the tension on the adjustment arm until the load is removed from the adjustment bolt and the adjuster nut. See **Special Tools**.

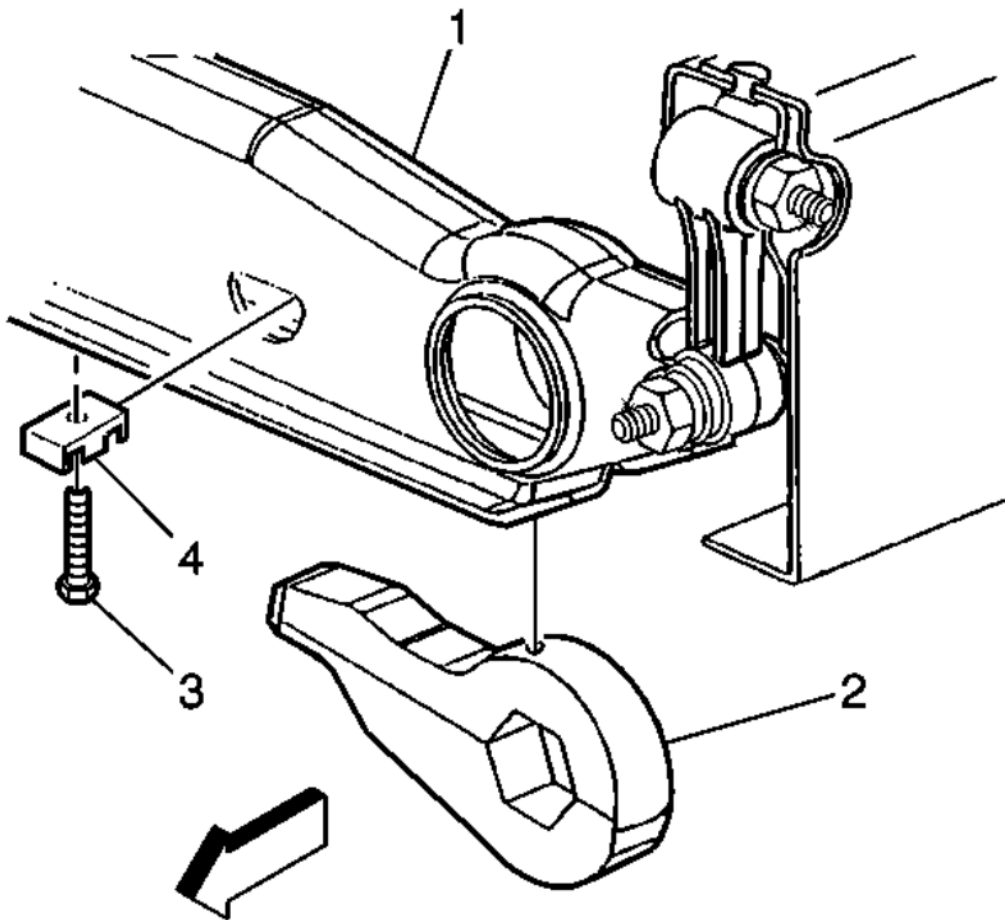


Fig. 43: Torsion Bar, Adjustment Bolt & Nut (MN8, MT1 And MW3)
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Create a reference point for the adjustment bolt to the support. Count the number of times that is required to remove the adjustment bolt.

4. Remove the adjustment bolt (3) and the adjuster nut (4) from the support assembly (1).

5. Remove the **J 36202** , allowing the torsion bar to unload. See **Special Tools**.
6. Remove the adjustment arm (2) by sliding the torsion bar forward.
7. Remove the adjustment arm (2) from the support assembly (1).

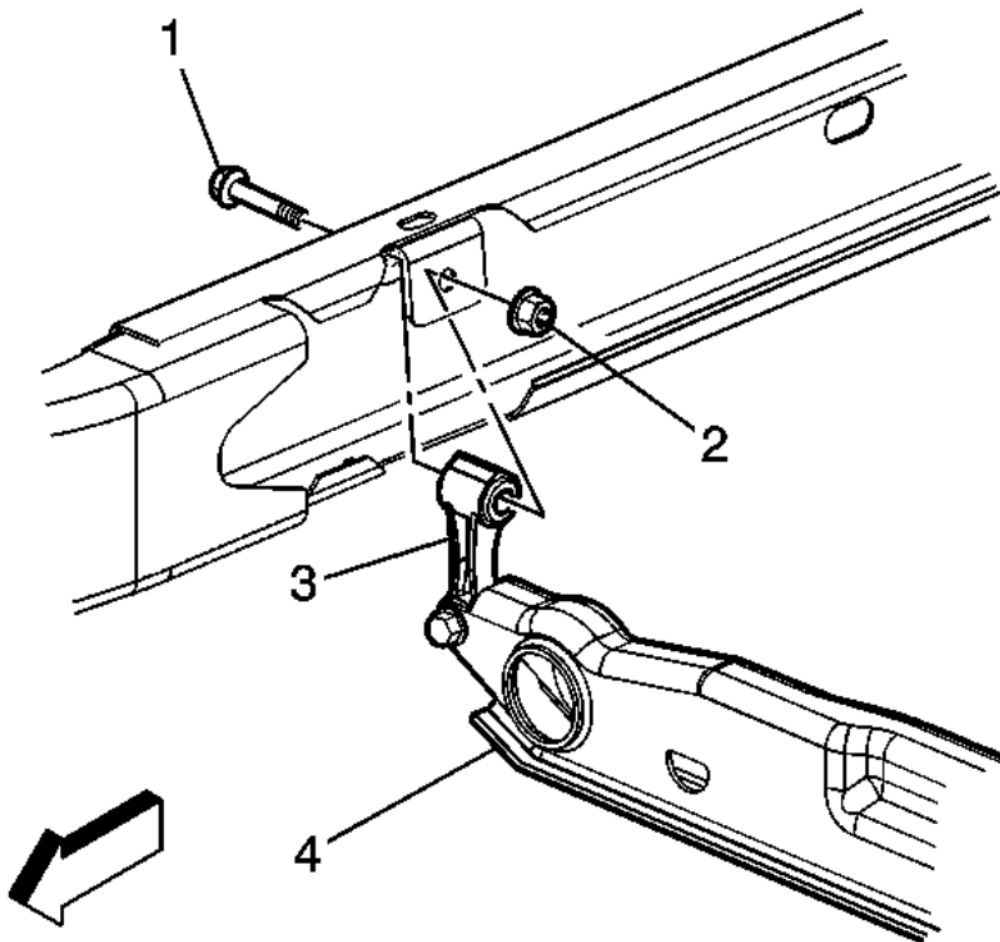


Fig. 44: Upper Link, Mounting Nuts & Bolts
Courtesy of GENERAL MOTORS CORP.

8. Remove the upper link mounting bolt (1) and nut (2) from the link (3).
9. Remove the torsion bar support assembly (4).

IMPORTANT: The left and right torsion bars are different and are not

interchangeable

10. Remove the torsion bar from the vehicle.

Installation Procedure

1. Position the torsion bar in the lower control arm.
2. Install the torsion bar in the support assembly.

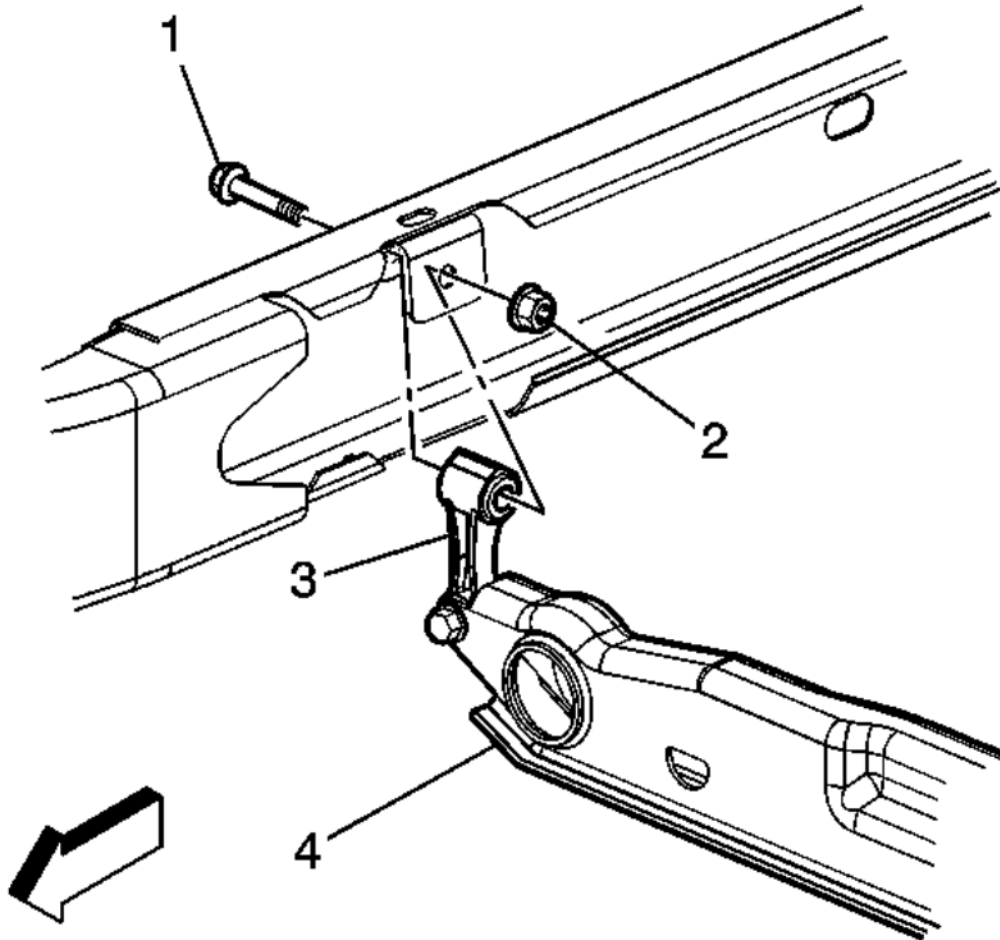


Fig. 45: Upper Link, Mounting Nuts & Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

3. Install the upper link mounting nut (2) and the bolt (1) in the link (3).

Tighten: Tighten the nut to 95 N.m (70 lb ft).

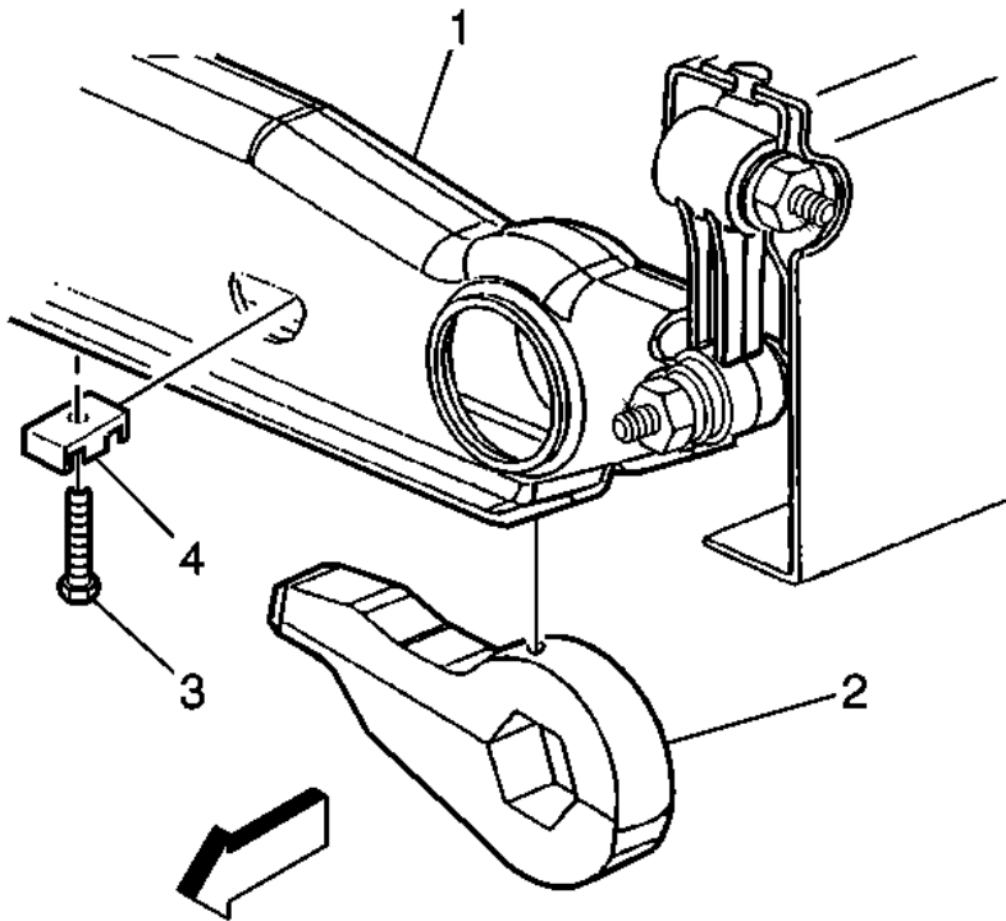


Fig. 46: Torsion Bar, Adjustment Bolt & Nut (MN8, MT1 And MW3)
Courtesy of GENERAL MOTORS CORP.

4. Install the adjustment arm (2) in the support assembly (1).
5. Install the adjuster bolt (3) and the adjustment nut (4).
6. Slide the torsion bar rearward until the torsion bar is fully seated in the adjustment arm.

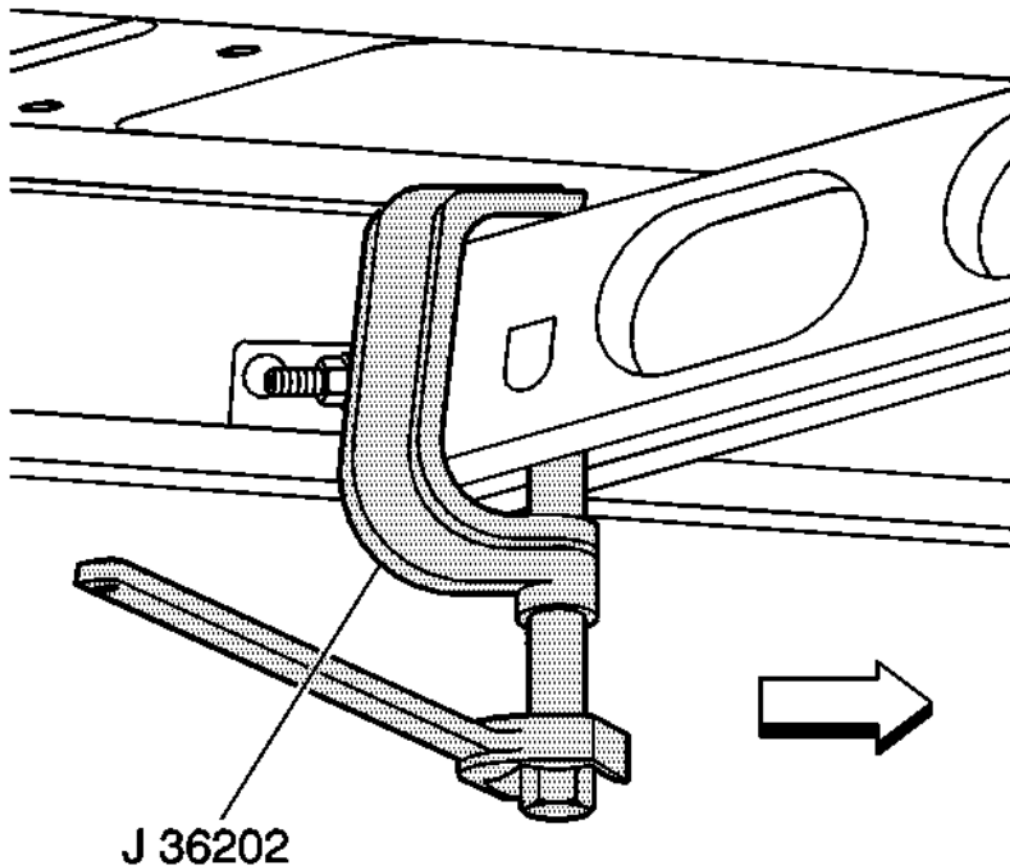


Fig. 47: J 36202, Adjustment Arm & Crossmember
Courtesy of GENERAL MOTORS CORP.

7. Install the **J 36202** on the adjustment arm and the support assembly. See **Special Tools**.
8. Using the **J 36202** , increase the tension on the adjustment arm in order to load the torsion bar. See **Special Tools**.
9. Align the reference marks, turn the adjuster bolt the same amount of turns as it took to remove it.
10. Remove the **J 36202** from the support assembly. See **Special Tools**.
11. Remove the safety stand and lower the vehicle.
12. Measure the Z height. Refer to **Trim Height Inspection** .

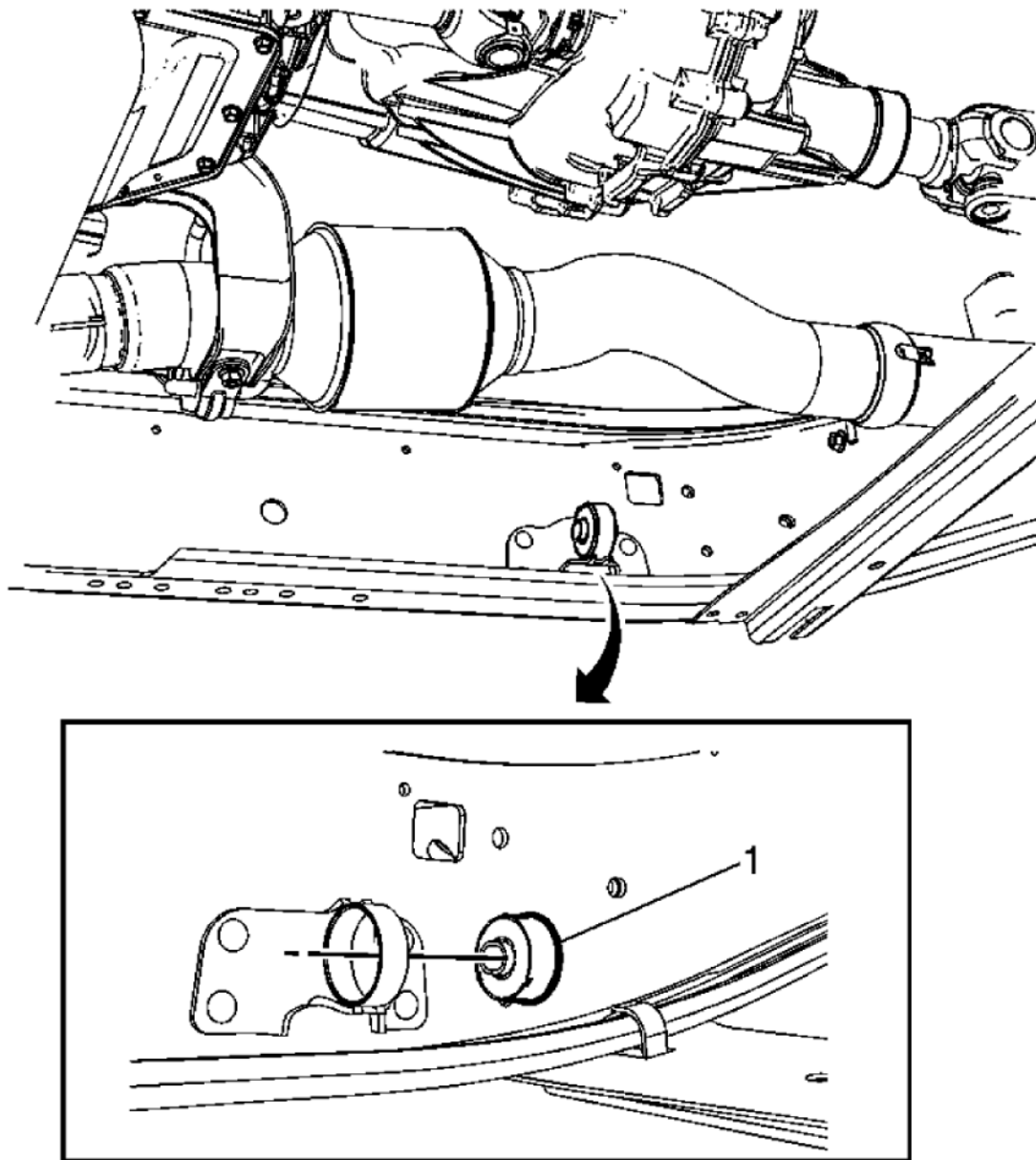


Fig. 48: Torsion Bars Bushing

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1.	Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .
2.	Remove the torsion bars. Refer to <u>Torsion Bar and Support Assembly Replacement (Bushing Style)</u> or <u>Torsion Bar and Support Assembly</u>

Replacement (Link Style).

Front Suspension Torsion Bar Bushing

Procedure

1. Note the position of the bushing in the mounting bracket.
2. Using the appropriate bushing remover/installer, remove the bushing.
3. After installing the bushing, peened the bushing in three places 120 degrees part from each other.
4. Measure the trim height. Refer to **Trim Height Inspection** .

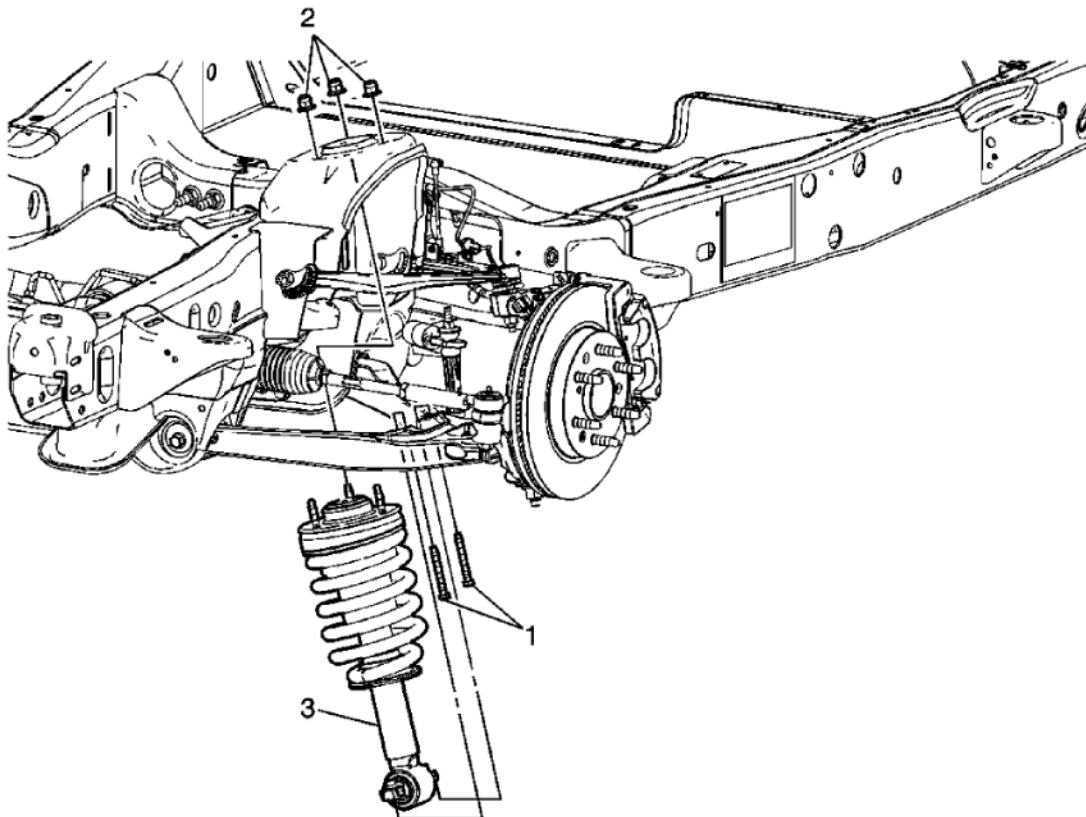
SHOCK ABSORBER AND SPRING ASSEMBLY REPLACEMENT

Fig. 49: View Of Shock Absorber Module & Components
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	

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1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the front tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
3. Disconnect the outer tie rod from the steering knuckle. Refer to **Steering Linkage Outer Tie Rod Replacement** .

1	Shock Absorber Module Bolt (Qty: 2) NOTE: Do not use air powered tools in order to disassemble or assemble any vehicle component. Bolt torques are vital to diagnosis. You can detect bolt torques only when using hand tools. Improper bolt torques can contribute to vehicle repair problems. NOTE: Refer to <u>Fastener Notice</u> . Procedure 1. Support the lower control arm. 2. Disconnect the electronic suspension control electrical connector. Tighten: 50 N.m (37 lb ft)
2	Shock Absorber Module Nut (Qty: 3) Tighten: 50 N.m (37 lb ft)
3	Shock Absorber Module Procedure 1. If removing the shock module to service its components, refer to <u>Shock, Shock Component, and/or Spring Replacement</u>. 2. For the proper disposal procedure of the shock absorber, refer to <u>Shock Absorber Disposal</u>.

SHOCK, SHOCK COMPONENT, AND/OR SPRING REPLACEMENT

Special Tools

J 45400 Spring Compressor. See **Special Tools**.

Removal Procedure

IMPORTANT: Use only hand tools to perform the following service procedure.

IMPORTANT: The following service procedure is to be performed after the strut assembly has been removed from the vehicle and installed in the appropriate tool.

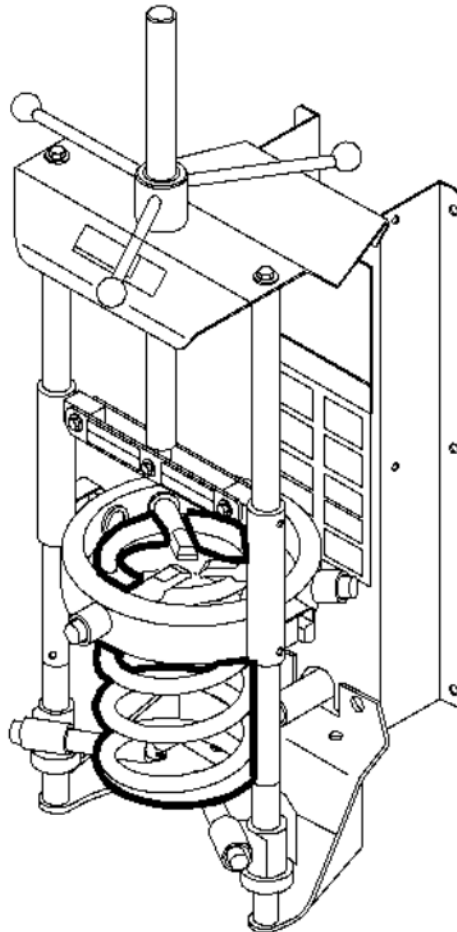


Fig. 50: Strut & Spring Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the shock absorber assembly in the **J 45400** . See Special Tools.

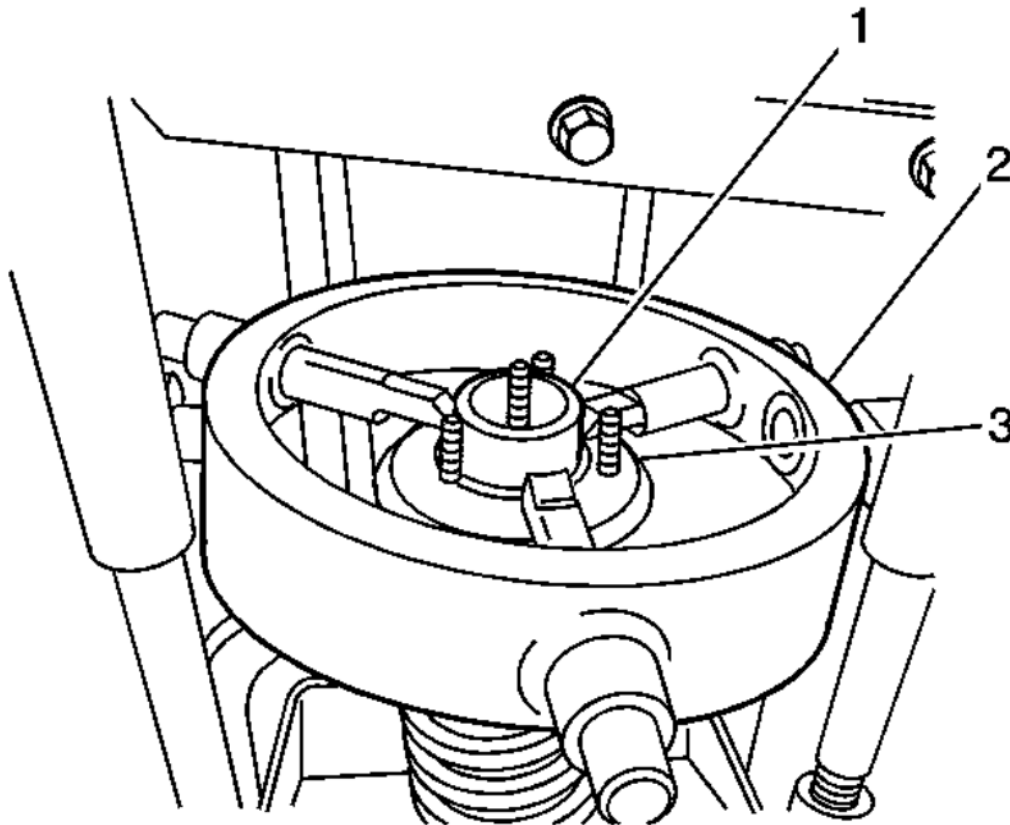


Fig. 51: View Of Properly Seated Fingers
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Ensure that the fingers for the spring compressor are properly adjusted on the top of the front suspension mount.

2. Position the shock absorber assembly (3) in the **J 45400** (2) so that the fingers are properly seated on the top of the front suspension strut mount (1). See **Special Tools**.

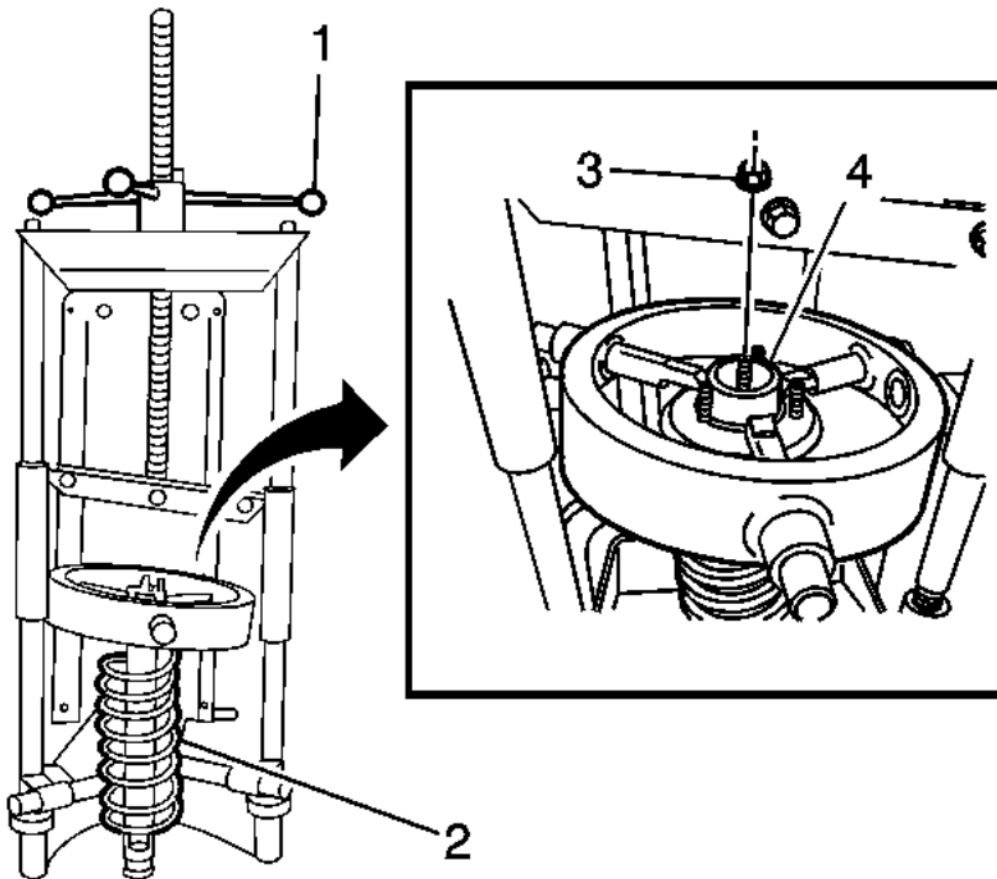


Fig. 52: Identifying Spring Compressor Components
 Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Note the orientation of the upper spring seat, spring, and the shock before the they are to be removed. This will aid in the proper align during the installation procedure.

3. Using the **J 45400** (1), compressed the front spring (2). See **Special Tools**.
4. Remove and discard the nut (3) from the shock (4). DO NOT reuse the nut, use NEW only.

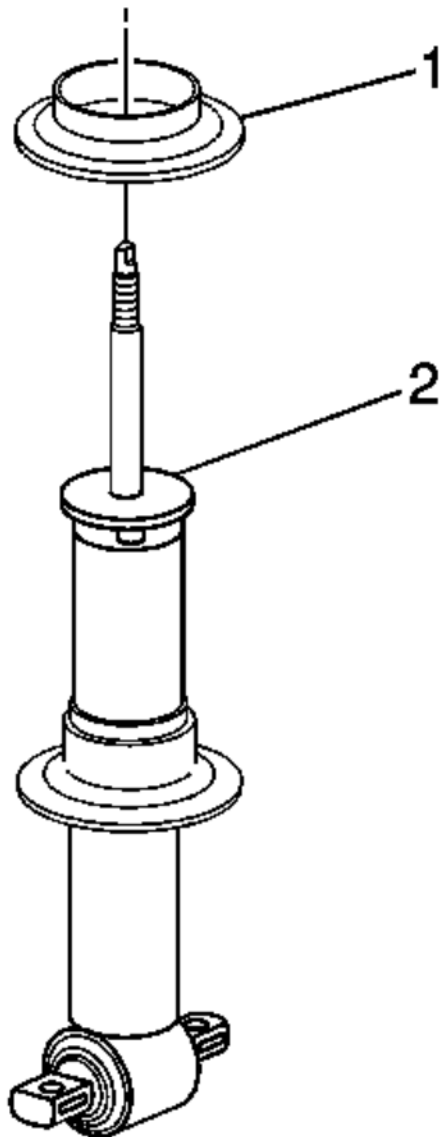


Fig. 53: Locating Front Suspension Shock Absorber And Front Spring Lower Insulator

Courtesy of GENERAL MOTORS CORP.

5. Remove the front suspension shock absorber (2), and the front spring lower insulator (1).

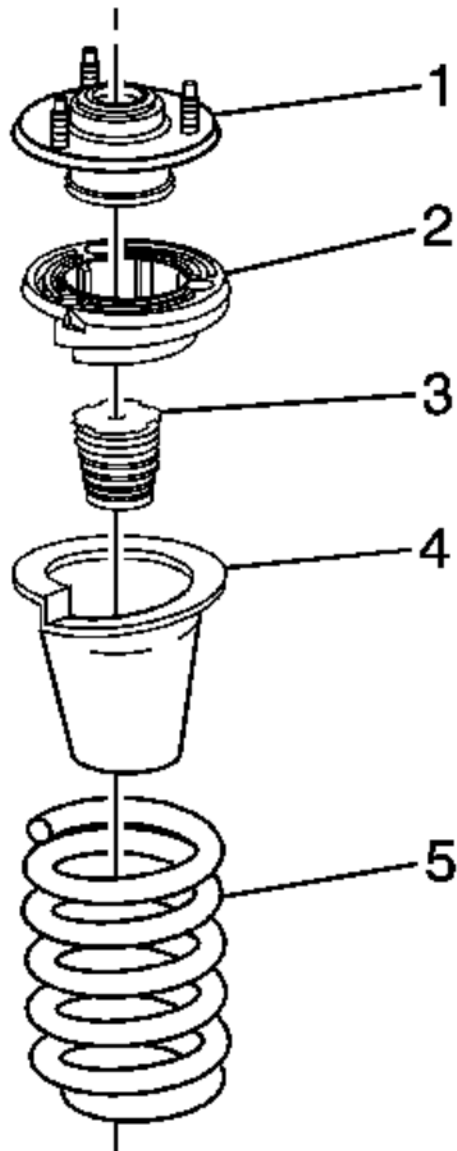


Fig. 54: Identifying Front Suspension Components
Courtesy of GENERAL MOTORS CORP.

6. Remove the front suspension strut mount (1), front spring upper seat (2), front suspension strut bumper (3), front spring upper insulator (4), and the front suspension spring (5) from the spring compressor.

Installation Procedure

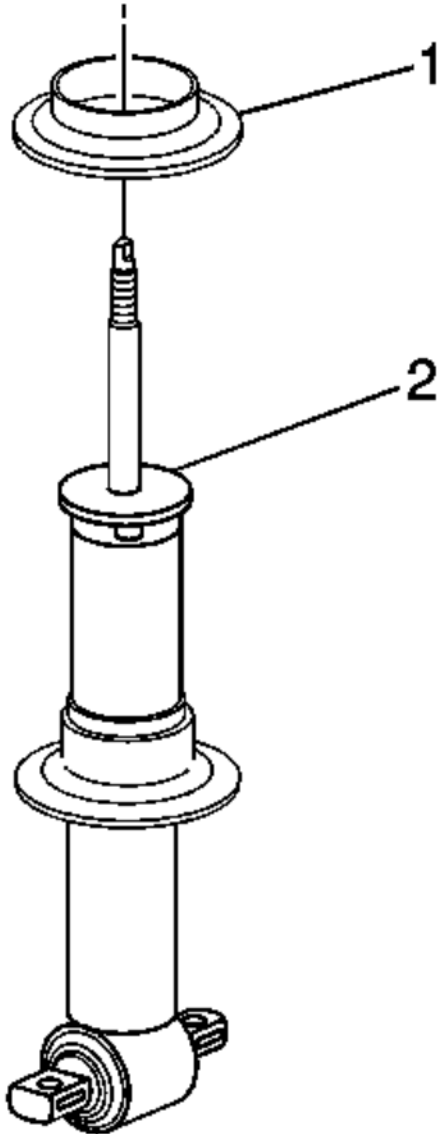


Fig. 55: Locating Front Suspension Shock Absorber And Front Spring Lower Insulator

Courtesy of GENERAL MOTORS CORP.

1. Install the front spring lower insulator (1) on the shock absorber (2).

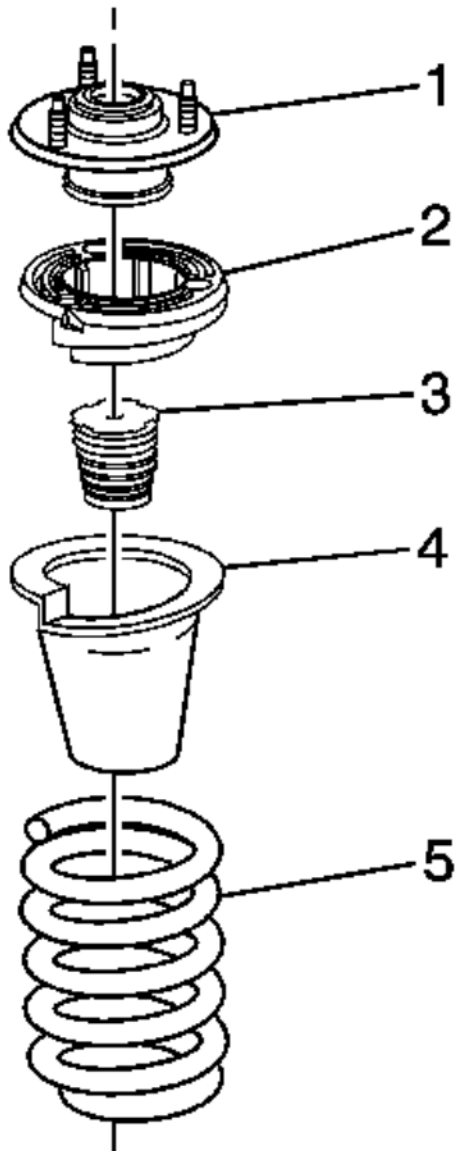


Fig. 56: Identifying Front Suspension Components
Courtesy of GENERAL MOTORS CORP.

2. Assembly the front suspension strut mount (1), front spring upper seat (2), front suspension

strut bumper (3), and the front spring (5).

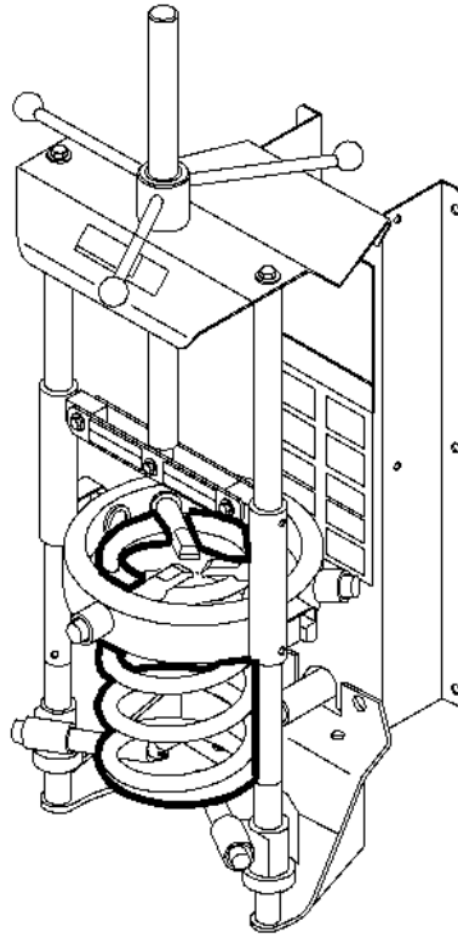


Fig. 57: Strut & Spring Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the front suspension spring and related components in the spring compressor.

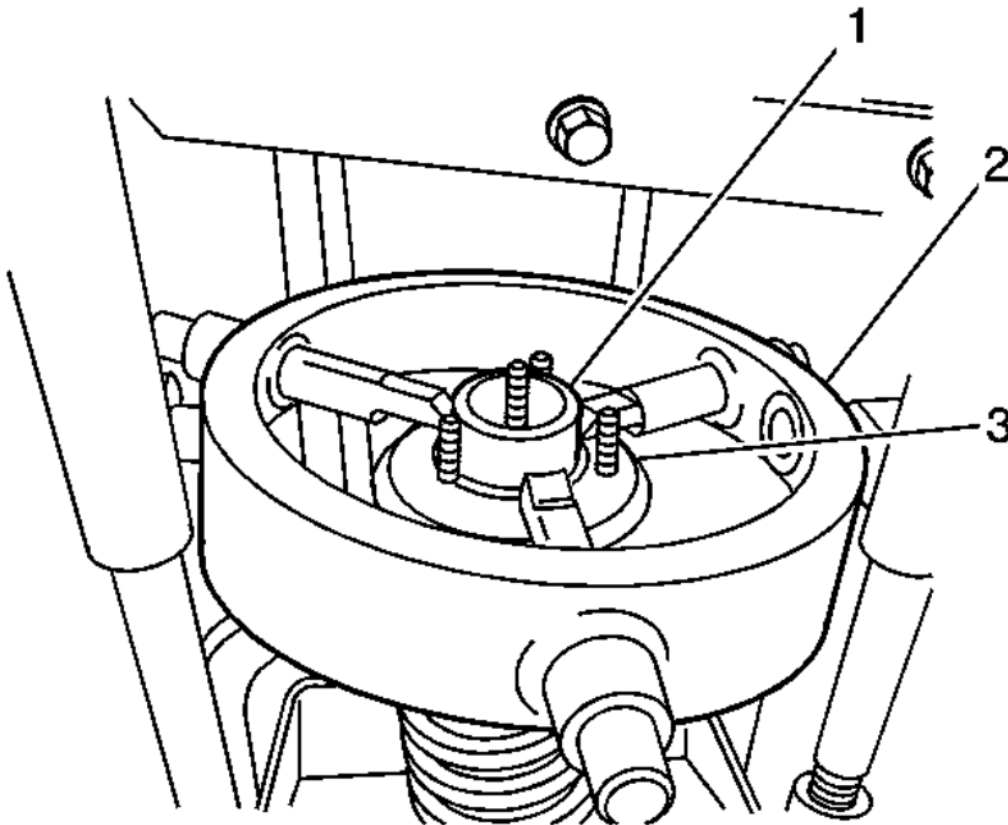


Fig. 58: View Of Properly Seated Fingers
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The fingers for the spring compression must be adjusted so that the spring is properly seated in the spring compressor.

4. Adjust the fingers (1) for the spring compressor (2) on the front suspension mount (3) so that the fingers (1) are properly seated on the top of the front suspension strut mount (3).
5. Align the upper spring seat, spring, and the shock absorber as noted during disassembly.

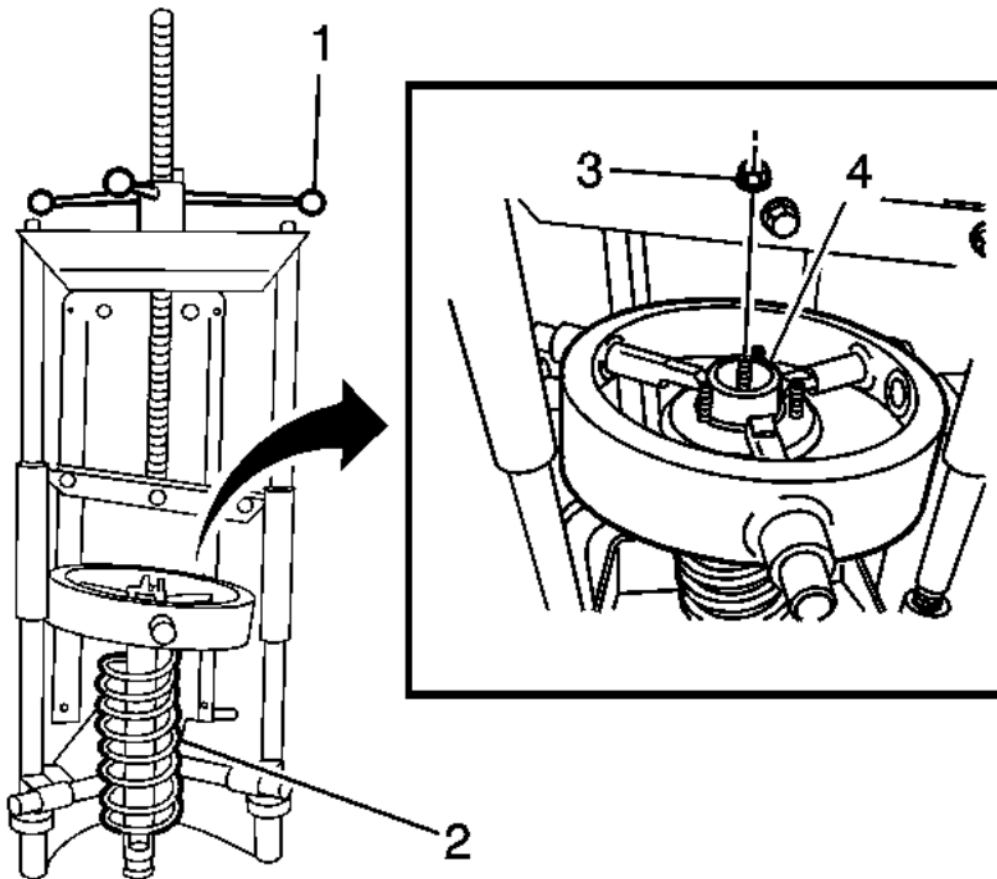


Fig. 59: Identifying Spring Compressor Components
 Courtesy of GENERAL MOTORS CORP.

6. Using the **J 45400** (1), compress the spring assembly (2) enough to install the NEW nut (3).
 See **Special Tools**.
7. Install the shock absorber (4).

NOTE: Refer to **Fastener Notice** .

8. Install the NEW nut (3).

Tighten: For vehicles equipped with electronic suspension, tighten the nut (3) to 50 N.m (37 lb ft).

Tighten: For vehicles without electronic suspension, tighten the nut (3) to 60 N.m (44 lb ft).

9. Remove the shock absorber assembly from the spring compressor.
10. Install the strut assembly in the vehicle. Refer to **Shock Absorber and Spring Assembly Replacement**.

SHOCK ABSORBER REPLACEMENT (2500 SERIES)

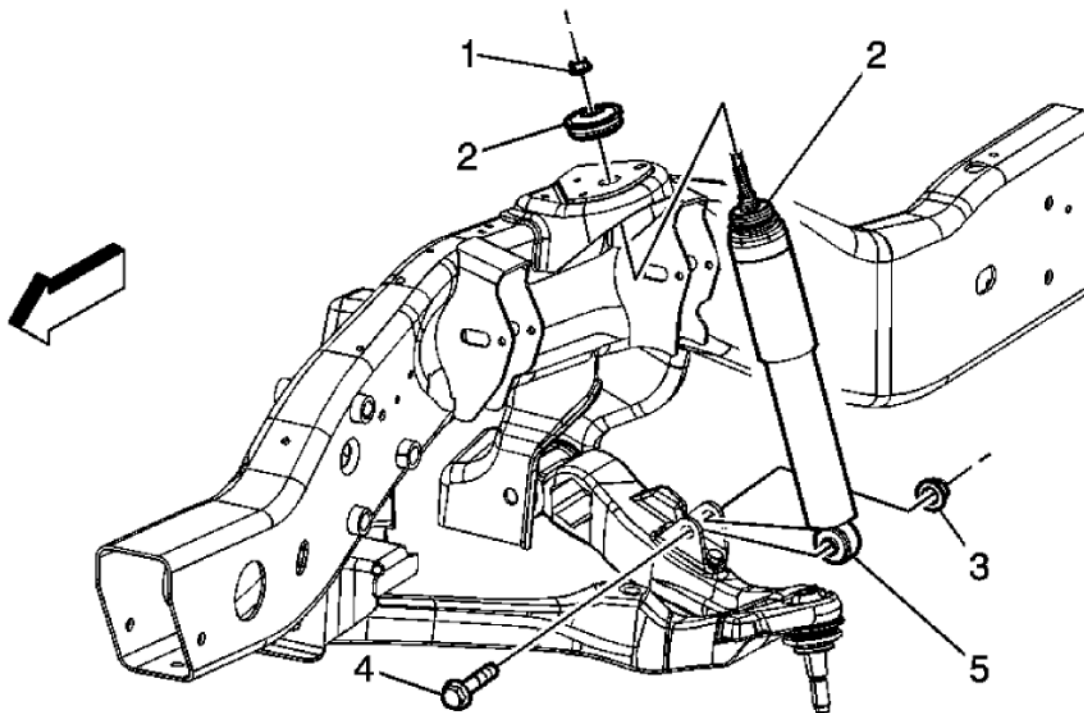


Fig. 60: View Of Shock Absorber (2500 Series)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Shock Absorber Retaining Nut NOTE: Refer to <u>Fastener Notice</u> .

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	Tip: Support the lower control arm with a safety stand. Tighten: 24 N.m (17 lb ft)
2	Insulator (Qty: 2) Tip: 1. Install the lower insulator, which is smaller than the upper insulator and plastic pilot ring. 2. Install the upper insulator, which is the larger of the 2 insulators.
3	Retaining Nut Tighten: 80 N.m (59 lb ft)
4	Mounting Bolt
5	Shock Absorber Tip: If replacing the shock absorber, refer <u>Shock Absorber Disposal</u> for the proper disposal procedure.

SHOCK ABSORBER DISPOSAL

CAUTION: Gas charged shock absorbers contain high pressure gas. Do not remove the snap ring from inside the top of the tube. If the snap ring is removed, the contents of the shock absorber will come out with extreme force which may result in personal injury.

CAUTION: To prevent personal injury, wear safety glasses when centerpunching and drilling the shock absorber. Use care not to puncture the shock absorber tube with the centerpunch.

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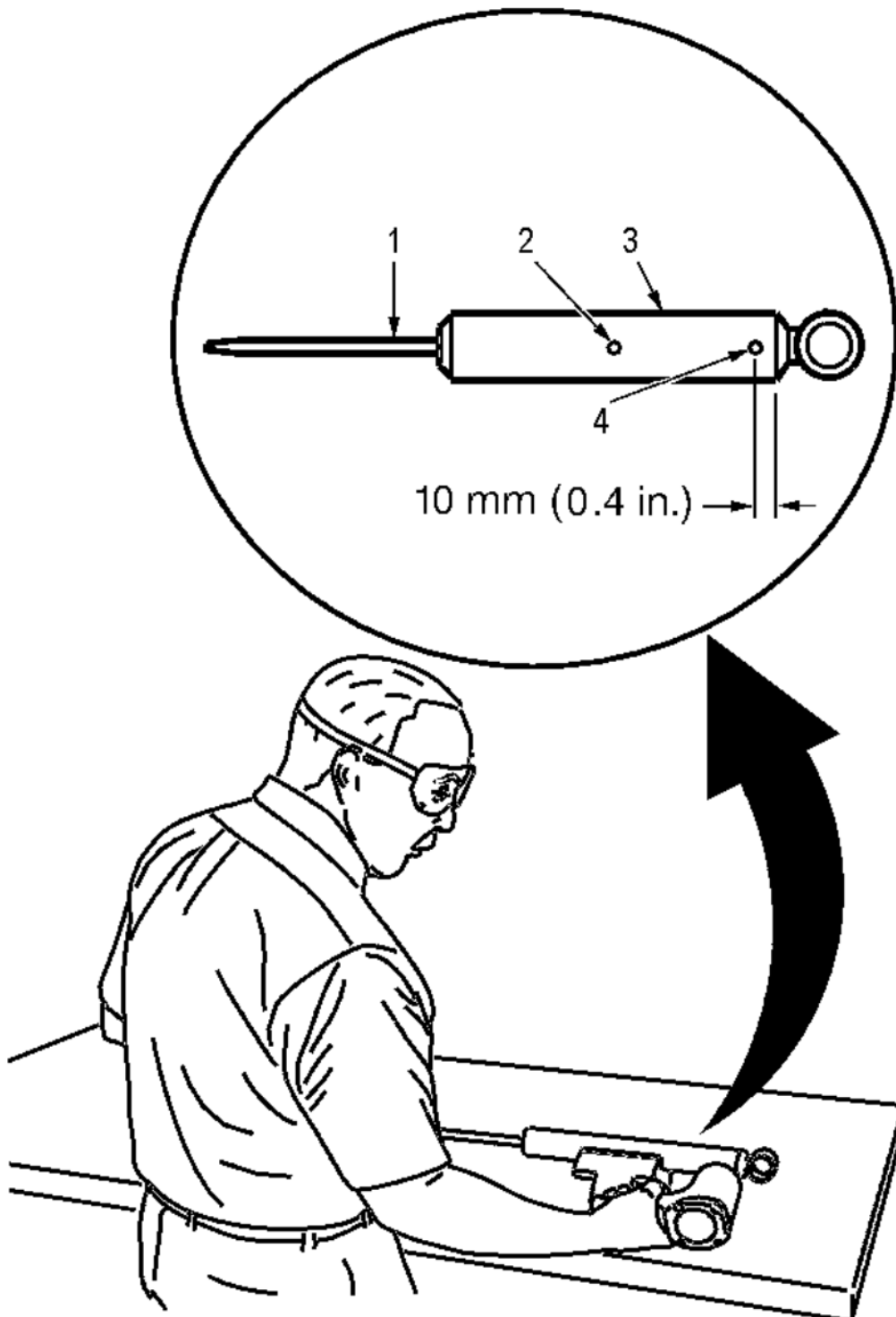


Fig. 61: Drilling Hole In Shock Absorber At Centerpunched Locations
Courtesy of GENERAL MOTORS CORP.

1. Make an indentation 10 mm (0.4 in) from the bottom (4) of the tube (3) using a centerpunch.
2. Clamp the shock absorber in a vise horizontally with the shock absorber rod (1) completely extended.
3. Drill a hole in the shock absorber at the centerpunch (4) using a 5 mm (3/16 in) drill bit. Gas or a gas/oil mixture will exhaust when the drill bit penetrates the shock absorber. Use shop towels in order to contain the escaping oil.
4. Make an indentation in the middle (2) of the tube (3) with a centerpunch.
5. Drill a second hole in the shock absorber at the centerpunch (2) using a 5 mm (3/16 in) drill bit. Oil will exhaust when the drill bit penetrates the shock absorber. Use shop towels in order to contain the escaping oil.
6. Remove the shock absorber from the vise. Hold the shock absorber over a drain pan horizontally with the holes down. Move the rod (1) in and out of the tube (3) to completely drain the oil from the shock absorber.

DESCRIPTION AND OPERATION

GENERAL DESCRIPTION

The front suspension allows each wheel to compensate for changes in the road surface without affecting the opposite wheel. Each wheel independently connects to the frame with a steering knuckle, ball joint assemblies, and upper and lower control arms.

Two tie rods connect to the steering arms on the knuckles and to a steering gear.

Rear wheel drive models have a front suspension that consists of the following components:

- Control arms
- Stabilizer shaft
- Shock/Coil spring modules

The upper part of each Shock/Coil spring module bolts to the frame. Three insulators, a mounting plate and a nut secure the coil spring to the shock housing. Two bolts secure the lower part of the shock module to the lower control arm.

A spring steel stabilizer shaft controls the side roll of the front suspension. This shaft is mounted

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in rubber insulators that are held by clamps to the frame side rails. The ends of the stabilizer shaft connect to the lower control arms with link assemblies.

The upper ball joint assembly is integrated into the upper control arm. The assembly attaches to the steering knuckle with a prevailing torque nut.

The lower ball joint assembly is integrated into the control arm. The assembly attaches to the steering knuckle with a prevailing torque nut.

The upper and the lower control arms have pressed-in bushings. The bolts pass through the bushings and join the arms to the frame.

Ball joint assemblies have rubber grease seals. These seals prevent the entry of moisture and dirt. This prevents damage to the bearing surfaces.

Four-wheel drive models have a front suspension that consists of the following components:

- Control arms
- Stabilizer shaft
- Shock module/Shock absorbers
- Coil Springs (1500 series)
- Torsion bars (2500, 3500 series)

The upper part of each shock absorber (2500, 3500 series) extends through a frame bracket. Two insulators and a nut secure the upper part of the shock to the frame. A through bolt secures the lower part of the shock to the lower control arm.

The upper part of each shock module (1500 series) attaches to the frame by 3 nuts. The lower part of the shock module attaches to the lower control arm by 2 bolts.

A spring steel stabilizer shaft controls the side roll of the front suspension. This shaft is mounted in rubber insulators that are held by clamps to the frame side rails. The ends of the stabilizer shaft connect to the lower control arms with link assemblies.

The front end of the torsion bar attaches to the lower control arm. The rear of the torsion bar mounts into an adjustable arm at the torsion bar crossmember. This arm adjustment controls the vehicle trim height.

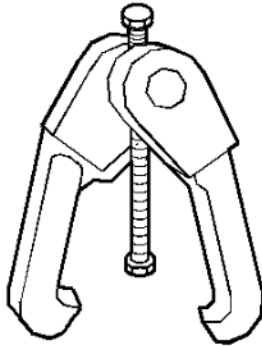
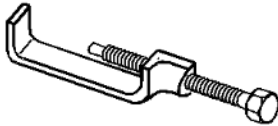
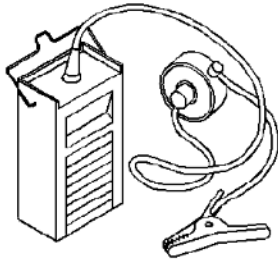
Both RWD and 4WD models have sealed front wheel bearings. These bearings are pre-adjusted and need no lubrication.

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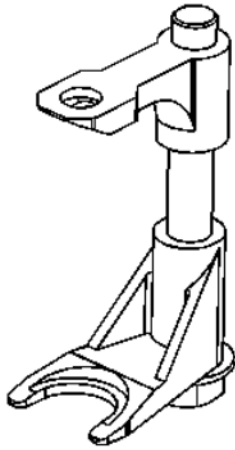
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	J-24319-B Steering Linkage and Tie Rod Puller
	J-36202 Torsion Loading/Unloading Tool
	J-36660-A Torque Angle Meter

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J-42188-B
Ball Joint Separator

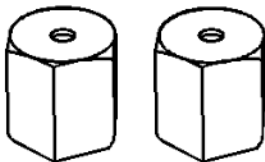
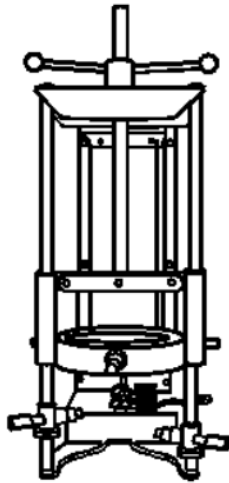


J-43631
Ball Joint Remover

J-45400
Strut Spring Compressor

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J-45851
Ball Joint Separator Protector Adapters