

## 2008 Isuzu Ascender LS

2008 SUSPENSION Front Suspension - Ascender, Envoy & Trailblazer

### 2008 SUSPENSION

#### Front Suspension - Ascender, Envoy & Trailblazer

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

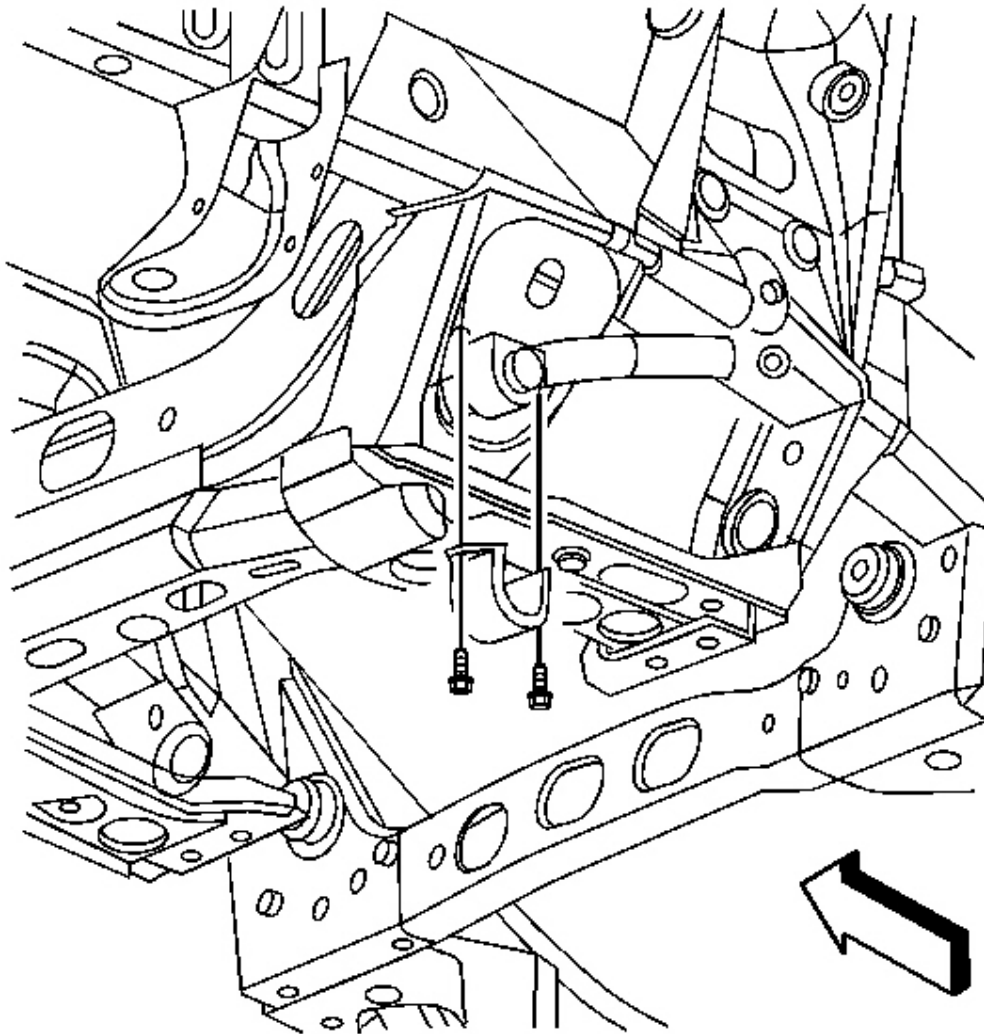
Application	Specification	
	Metric	English
Brake Hose Bracket Retaining Bolts	10 N.m	89 lb in
Drive Axle Nut	140 N.m	103 lb ft
Lower Ball Joint Retaining Nuts	107 N.m	79 lb ft
Lower Control Arm Bracket Front Mounting Bolt	260 N.m	1925 lb ft
Lower Control Arm Bracket Rear Mounting Bolt	230 N.m	170 lb ft
Lower Control Arm to the Lower Control Arm Bracket Mounting Nuts	130 N.m	96 lb ft
Outer Tie Rod to the Steering Knuckle Retaining Nut	57 N.m	42 lb ft
Shock Absorber Retaining Nut	43 N.m	32 lb ft
Shock Module Upper Retaining Nuts	45 N.m	33 lb ft
Shock Module Yoke to the Lower Control Arm Retaining Nut	111 N.m	82 lb ft
Shock Module Yoke to the Shock Absorber Pinch Bolt	70 N.m	52 lb ft
Stabilizer Shaft Insulator Clamp Mounting Bolts	54 N.m	40 lb ft
Stabilizer Shaft Link Retaining Nuts	23 N.m	17 lb ft
Upper Ball Joint Pinch Bolt	41 N.m	30 lb ft
Upper Control Arm Mounting Bolts	146 N.m	108 lb ft
Wheel Hub and Bearing Mounting Bolts	105 N.m	77 lb ft
Wheel Speed Sensor to the Wheel Hub and Bearing Mounting Bolt	18 N.m	13 lb ft
Wheel Stud	130 N.m	95 lb ft

## REPAIR INSTRUCTIONS

### STABILIZER SHAFT REPLACEMENT

#### Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the tires and wheels. Refer to **Tire and Wheel Removal and Installation** .
3. Remove the stabilizer shaft links to the stabilizer shaft retaining nuts. Refer to **Stabilizer Shaft Link Replacement**.



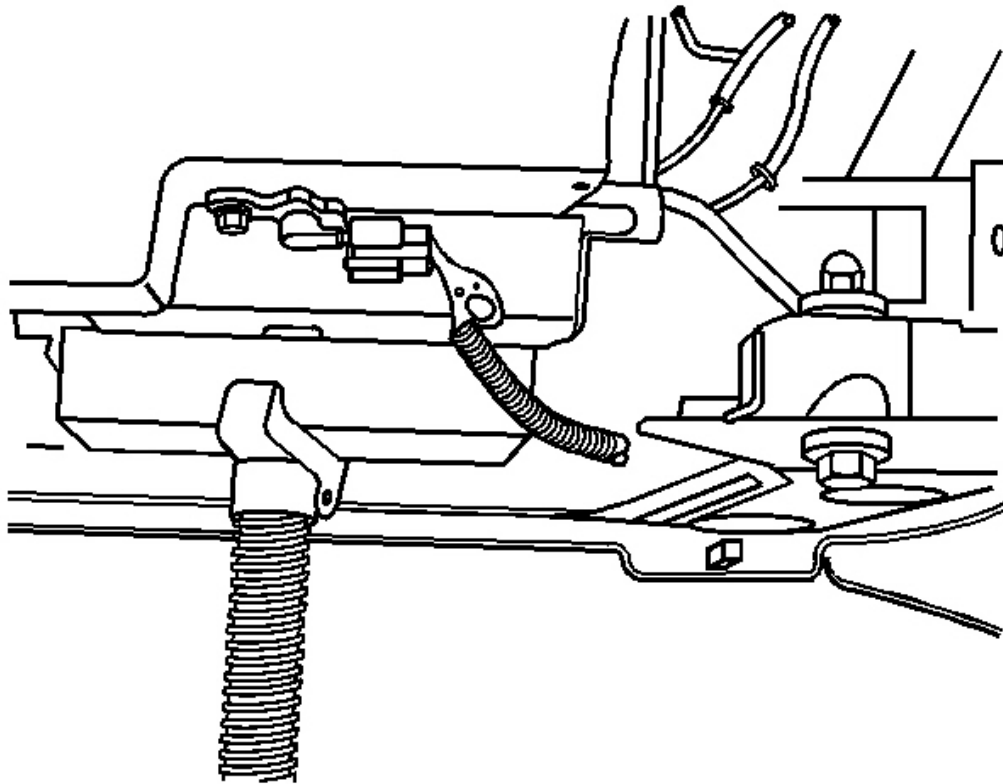
**Fig. 1: View Of Stabilizer Shaft, Insulator, Insulator Clamp & Mounting Bolts**  
Courtesy of GENERAL MOTORS CORP.

4. Remove the stabilizer shaft insulator clamp mounting bolts.
5. Remove the stabilizer shaft insulator clamp from the stabilizer shaft insulator.

**IMPORTANT:** Note the position of the bend in the stabilizer shaft.

6. Remove the stabilizer shaft insulators from the stabilizer shaft.

7. If equipped with a LL8 6 cylinder engine, do the following:
- Remove the engine protection shield. Refer to **Engine Protection Shield Replacement** .
  - Remove the engine mount nuts-to-frame bracket.



**Fig. 2: View Of Wood Block Between Engine Oil Pan & Pole Jack**  
Courtesy of GENERAL MOTORS CORP.

- Install a pole jack underneath the oil pan.
- Insert a block of wood between the oil pan and the pole jack.

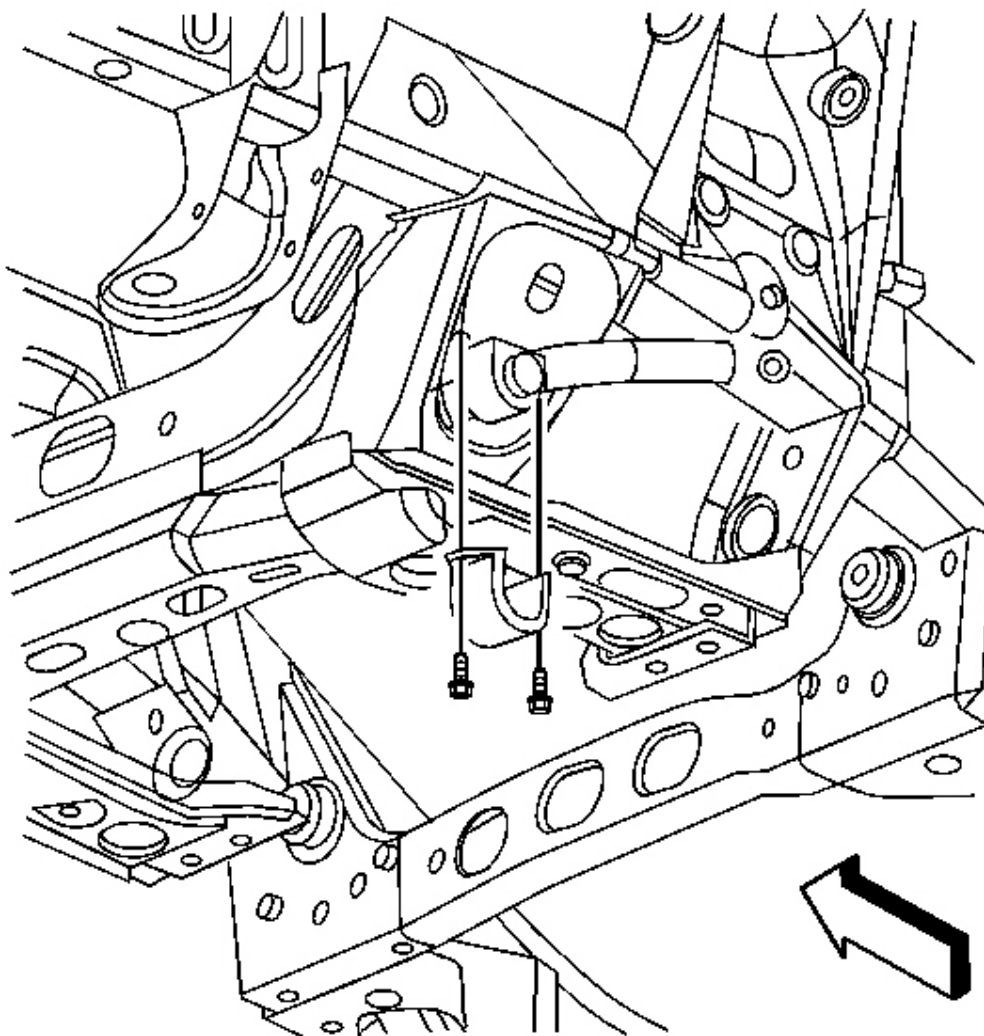
**IMPORTANT:** The jackstand should only be used to support the weight of the powertrain. **DO NOT** lift the entire weight of the front end of the vehicle by the jackstand.

- Raise the engine 10 mm measuring from the bottom of the oil pan to the rear edge of the front suspension crossmember.

8. Remove the stabilizer shaft from the vehicle.

**Installation Procedure**

**NOTE:** The stabilizer shaft must be installed with the bend down and away from the engine. If the stabilizer shaft is installed improperly, contact between the stabilizer shaft and oil filter may occur.



**Fig. 3: View Of Stabilizer Shaft, Insulator, Insulator Clamp & Mounting Bolts**  
Courtesy of GENERAL MOTORS CORP.

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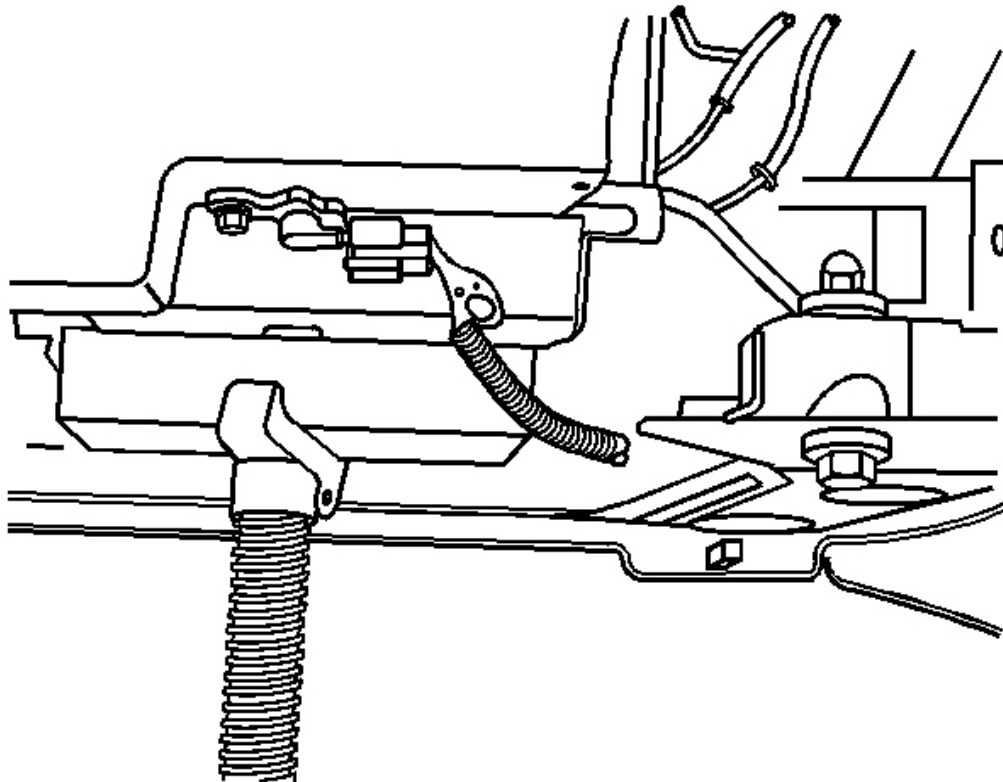
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1. Install the stabilizer shaft to the vehicle, with the bend down and away from the engine. There may be a label on the shaft. If so, it should be on the LH side.
2. If equipped with a LL8 6 cylinder engine, do the following:
  - Lower the engine.

**NOTE:** Refer to Fastener Notice .

- Install the engine mounting nuts-to-frame bracket.

**Tighten:** Tighten the engine mount nuts to 70 N.m (52 lb ft).



**Fig. 4: View Of Wood Block Between Engine Oil Pan & Pole Jack**  
Courtesy of GENERAL MOTORS CORP.

- Remove the block of wood between the oil pan and the pole jack.
- Remove the jackstand from underneath the oil pan.

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- Install the engine protection shield. Refer to **Engine Protection Shield Replacement** .
- 3. Install the stabilizer shaft insulators to the stabilizer shaft.
- 4. Install the stabilizer shaft insulator clamp to the stabilizer shaft insulator.
- 5. Install the stabilizer shaft insulator clamp mounting bolts.

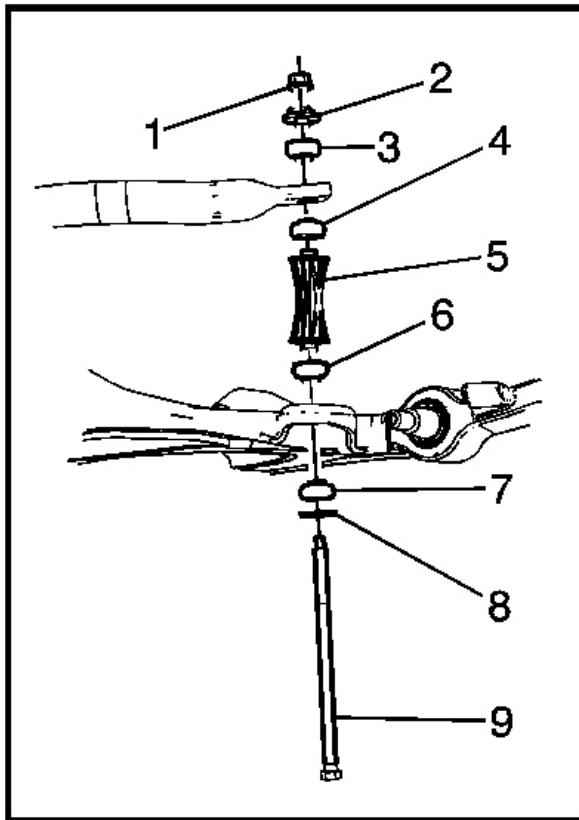
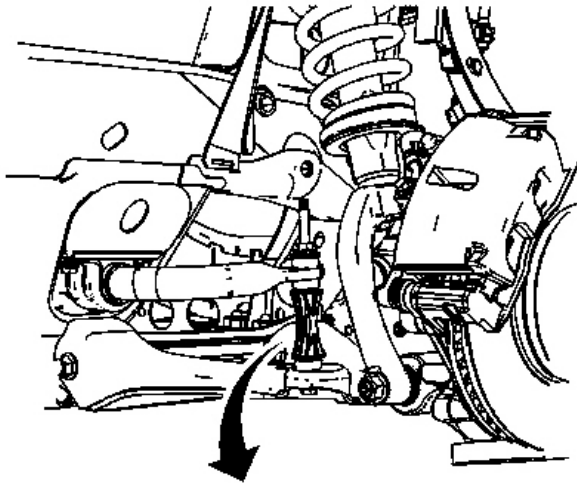
**Tighten:** Tighten the stabilizer shaft insulator clamp mounting bolts to 54 N.m (40 lb ft).

- 6. Install the stabilizer shaft links to the stabilizer shaft. Refer to **Stabilizer Shaft Link Replacement**.
- 7. Install the tires and wheels. Refer to **Tire and Wheel Removal and Installation** .
- 8. Lower the vehicle.

### STABILIZER SHAFT LINK REPLACEMENT

#### Removal Procedure

- 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 any dirt or debris from the threads of the stabilizer link bolt.



**Fig. 5: Exploded View Of Stabilizer Shaft Link Components**  
Courtesy of GENERAL MOTORS CORP.

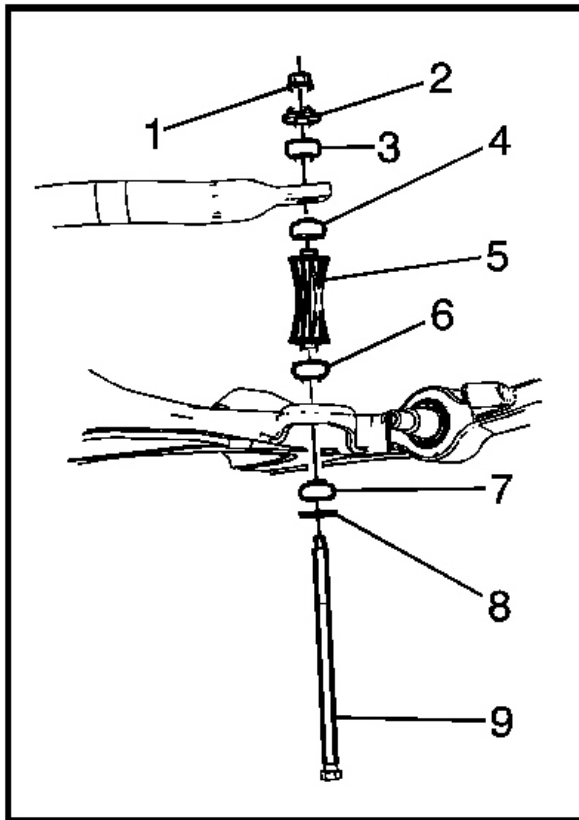
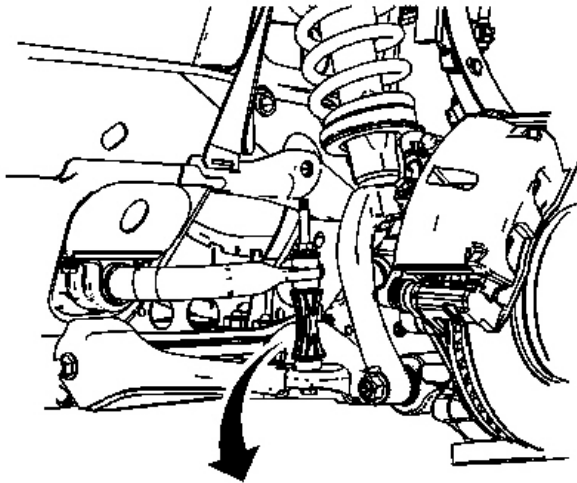
4. Use the proper size wrench or socket to hold the stabilizer bolt while removing the stabilizer shaft nut (1).

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5. Remove the washer (2) and the insulator (3) from the stabilizer shaft link bolt (9).
6. Remove the stabilizer shaft link bolt (9), washer (8) and the insulator (7).
7. Remove the insulators (4) (6), spacer (5).

**Installation Procedure**





**Fig. 6: Exploded View Of Stabilizer Shaft Link Components**  
Courtesy of GENERAL MOTORS CORP.

1. Install the washer (8) and the insulator (7) on the stabilizer shaft link bolt (9).

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**IMPORTANT:** When installing the spacer (5) and the insulators (3), (4), (6) and (7), ensure that the insulators are properly seated in the stabilizer shaft and the lower control arm.

2. Position the insulators (4) (6), spacer (5) between the stabilizer shaft and the lower control arm.

**IMPORTANT:** Use the stabilizer shaft bolt (9) to align the spacer (5) and the insulators (3), (4), (6) and (7) during the installation of the stabilizer shaft bolt (9).

3. Install the stabilizer shaft link bolt (9), washer (8) and the insulator (7).
4. Install the insulator (3) and the washer (2).

**NOTE:** Refer to Fastener Notice .

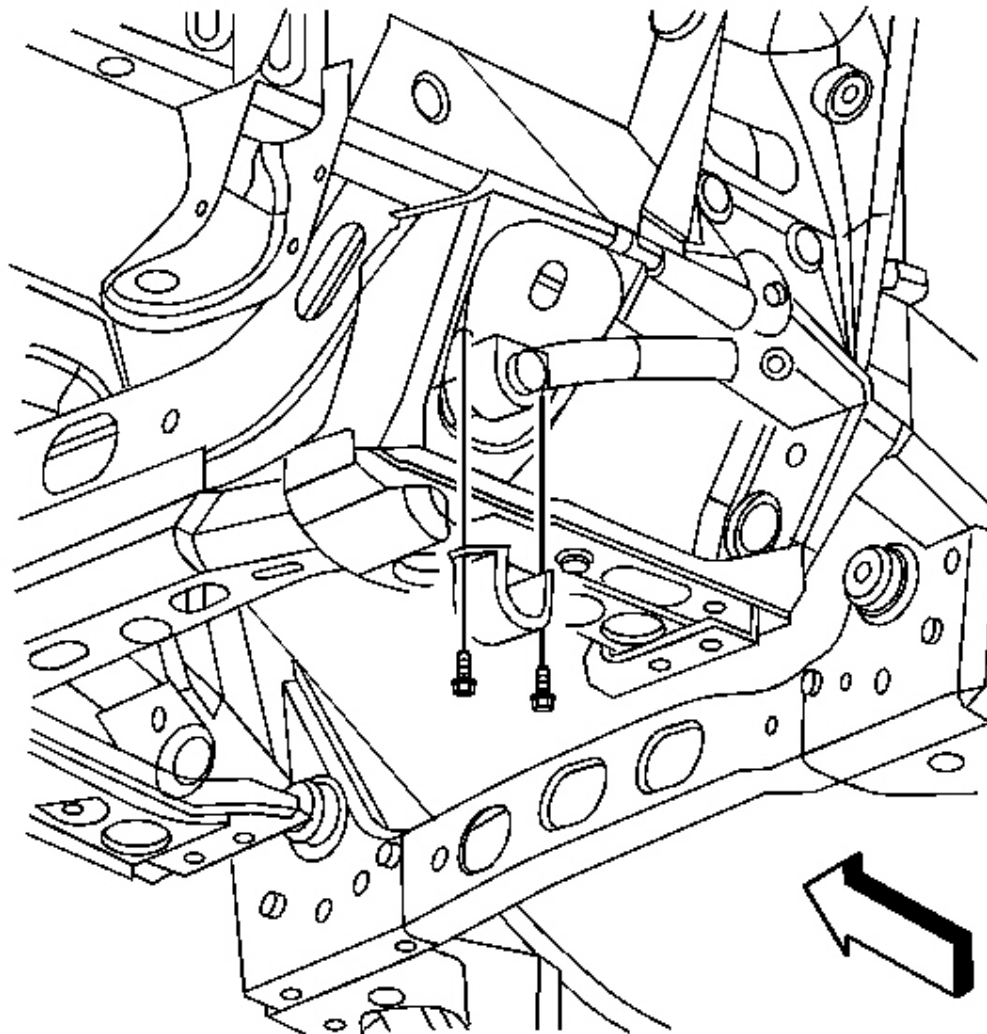
5. Install the stabilizer shaft link nut.

**Tighten:** Tighten the stabilizer shaft link nut to 23 N.m (17 lb ft).

6. Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
7. Remove the support and lower the vehicle.

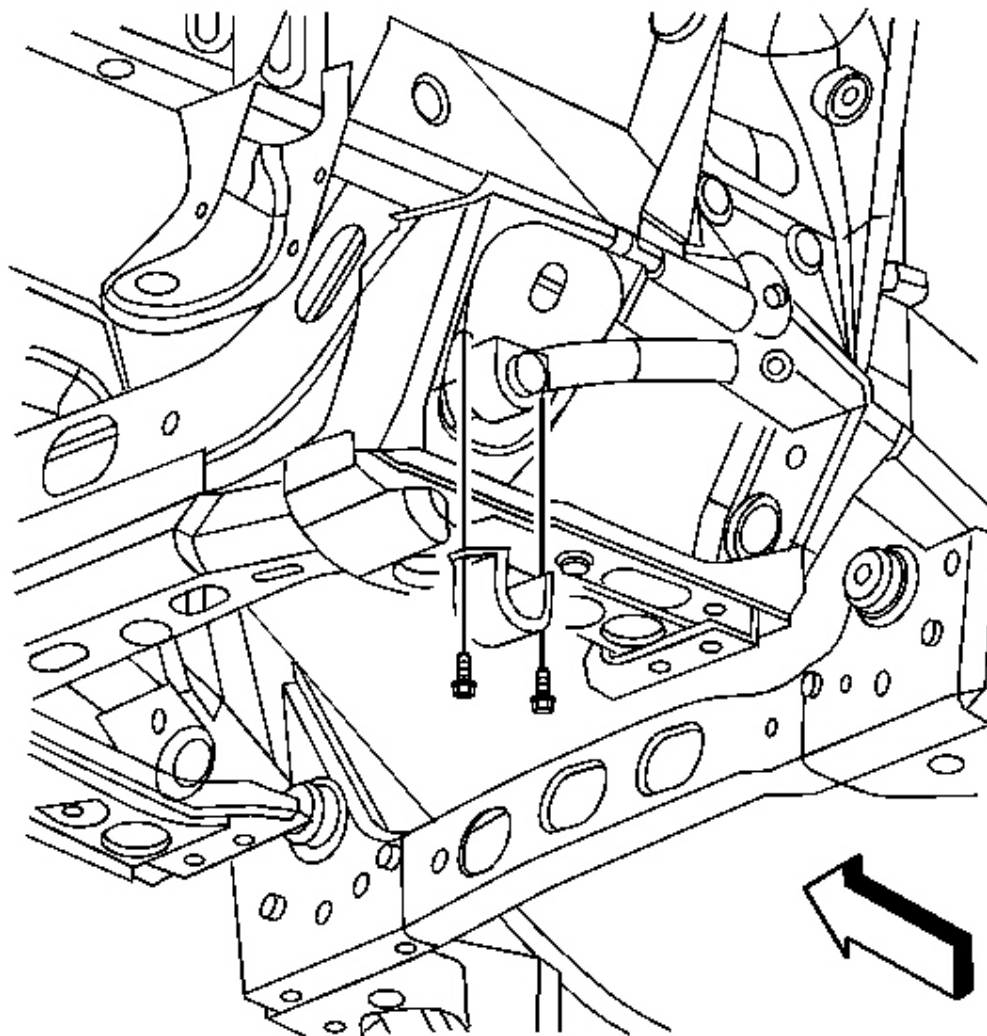
## STABILIZER SHAFT INSULATOR REPLACEMENT

### Removal Procedure



**Fig. 7: View Of Stabilizer Shaft, Insulator, Insulator Clamp & Mounting Bolts**  
**Courtesy of GENERAL MOTORS CORP.**

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the stabilizer shaft insulator clamp mounting bolts.
3. Remove the stabilizer shaft insulator clamp from the stabilizer shaft insulator.
4. Lower the stabilizer shaft and remove the stabilizer shaft insulator.



**Fig. 8: View Of Stabilizer Shaft, Insulator, Insulator Clamp & Mounting Bolts**  
**Courtesy of GENERAL MOTORS CORP.**

1. Install the stabilizer shaft insulator to stabilizer shaft with slit facing the front of the vehicle.
2. Install the stabilizer shaft insulator clamp to the stabilizer shaft insulator.

**NOTE:** Refer to **Fastener Notice** .

3. Install the stabilizer shaft insulator clamp mounting bolts.

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**Tighten:** Tighten the stabilizer shaft insulator clamp mounting bolts to 54 N.m (40 lb ft).

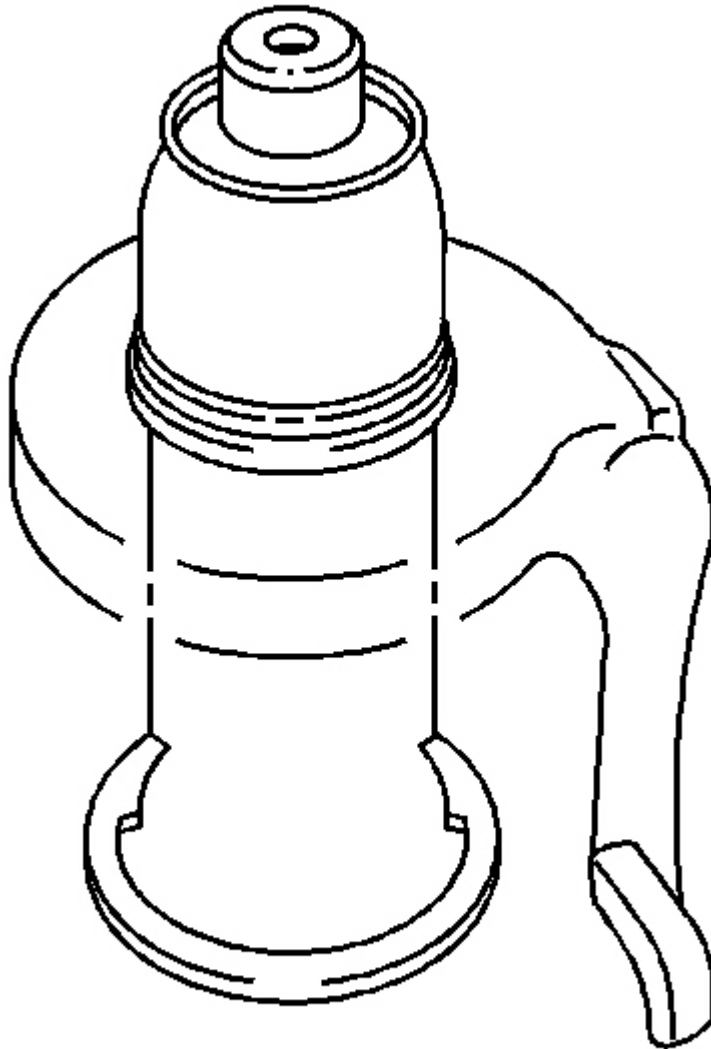
4. Lower the vehicle.

### UPPER CONTROL ARM BALL JOINT REPLACEMENT

#### Tools Required

- **J 9519-E** Lower Ball Joint Remover and Installer. See **Special Tools**.
- **J 21474-01** Control Arm Bushing Set. See **Special Tools**.
- **J 45117** Ball Joint Installation Spacer. See **Special Tools**.

#### Removal Procedure

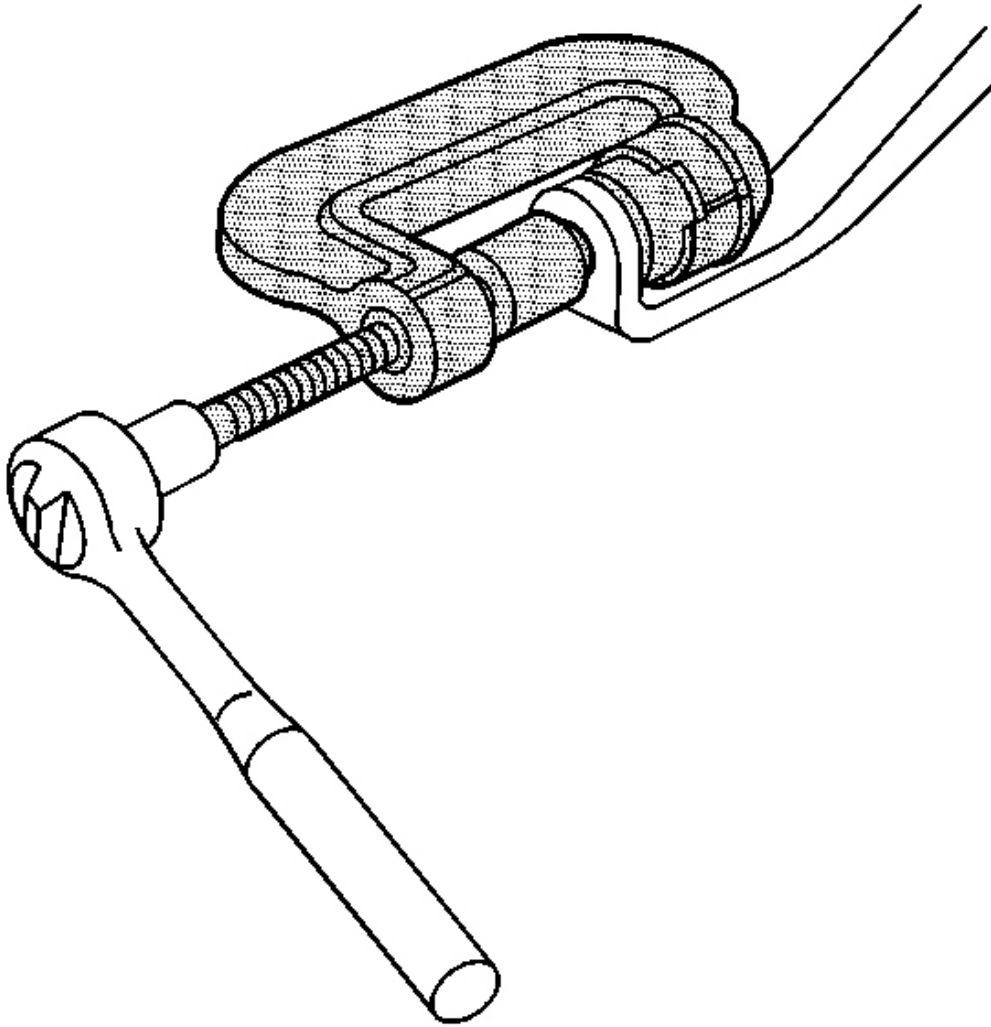


**Fig. 9: View Of Upper Ball Joint Retaining Clip**  
Courtesy of GENERAL MOTORS CORP.

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 steering knuckle with wheel hub attached. Refer to **Steering Knuckle Replacement (4WD)**.
4. Remove the upper ball joint retaining clip.

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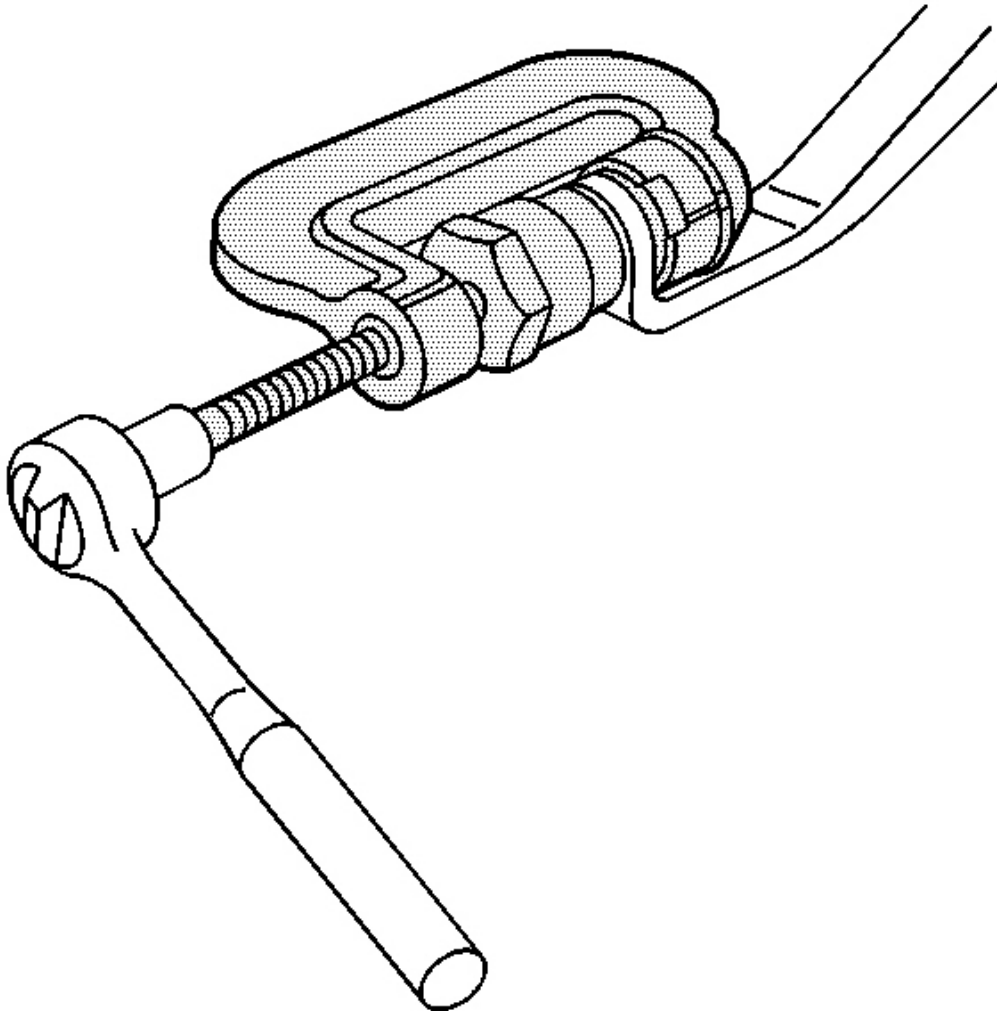
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**Fig. 10: Illustrating Removal Of Upper Ball Joint From Steering Knuckle**  
Courtesy of GENERAL MOTORS CORP.

5. Remove the upper ball joint boot.
6. Remove the upper ball joint from the steering knuckle using **J 9519-E** . See **Special Tools**.

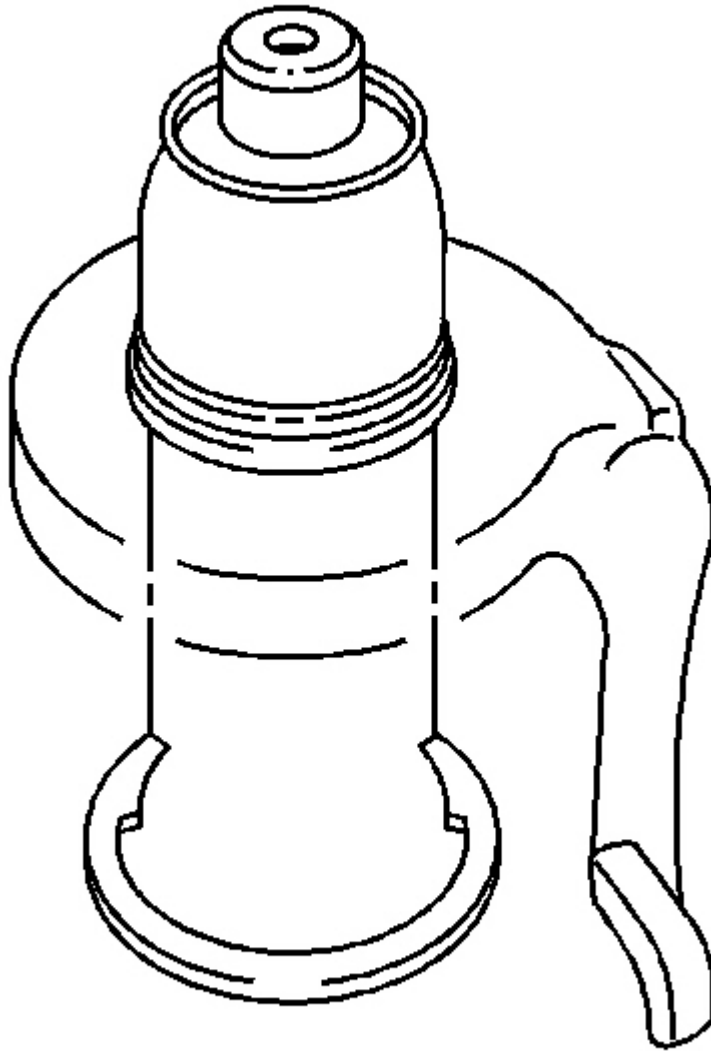
### Installation Procedure



**Fig. 11: View Of Upper Ball Joint To Steering Knuckle Installation**  
Courtesy of GENERAL MOTORS CORP.

1. Install the upper ball joint to steering knuckle using **J 9519-E** , **J 21474-01** , and **J 45117** . See **Special Tools**.





**Fig. 12: View Of Upper Ball Joint Retaining Clip**  
Courtesy of GENERAL MOTORS CORP.

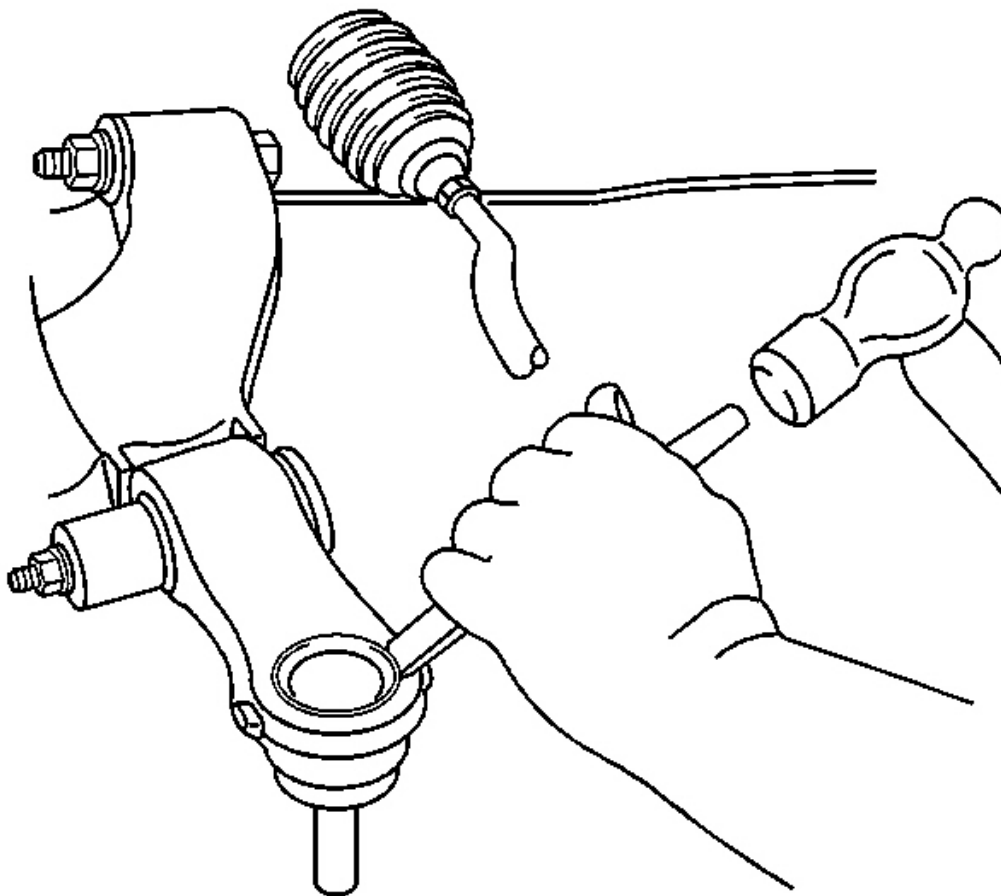
2. Install the upper ball joint retaining clip.
3. Install the steering knuckle with wheel hub attached. Refer to **Steering Knuckle Replacement (4WD)**.
4. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
5. Lower the vehicle.
6. Check the front wheel alignment. Refer to **Wheel Alignment Specifications** .

## LOWER CONTROL ARM BALL JOINT REPLACEMENT

### Tools Required

- **J 9519-E** Ball Joint Remover and Installer Set. See Special Tools.
- **J 34874** Booster Seal Remover/Installer. See Special Tools.
- **J 41435** Ball Joint Installer. See Special Tools.
- **J 45105-1** Ball Joint Flaring Adapter. See Special Tools.
- **J 45105-2** Receiver. See Special Tools.

### Removal Procedure

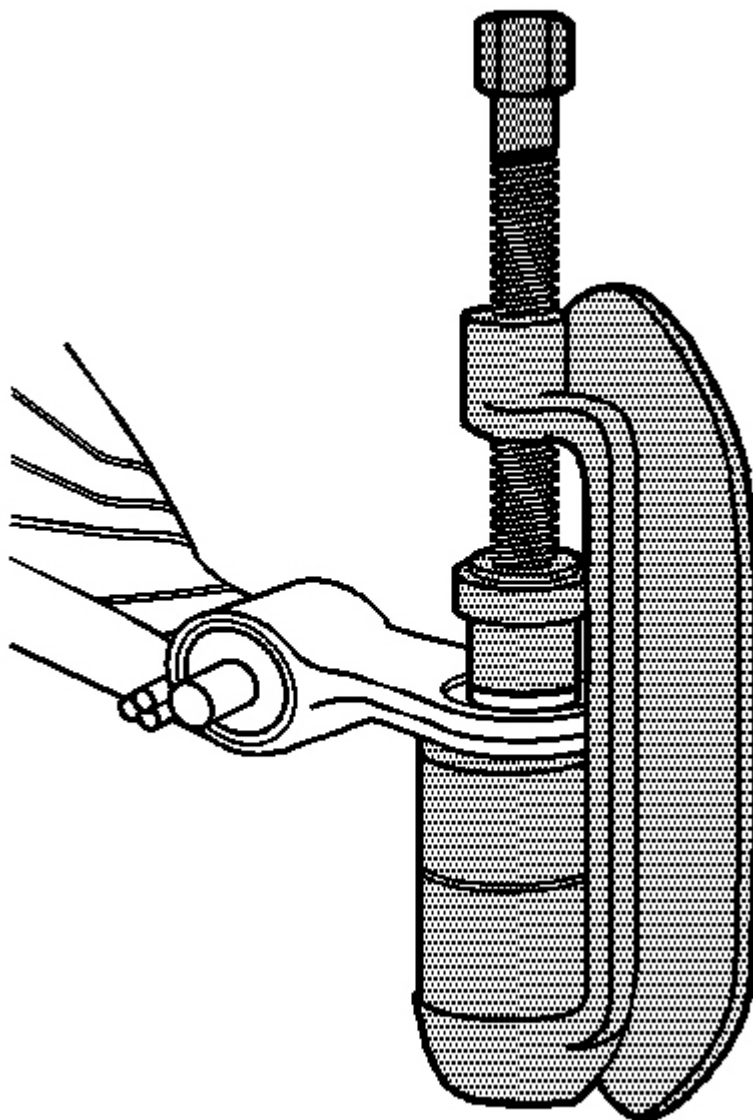


**Fig. 13: Removing Lower Ball Joint Flange**  
Courtesy of GENERAL MOTORS CORP.

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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 steering knuckle with wheel hub and bearing attached. Refer to **Steering Knuckle Replacement (4WD)**.
4. Remove the lower ball joint flange with a chisel.



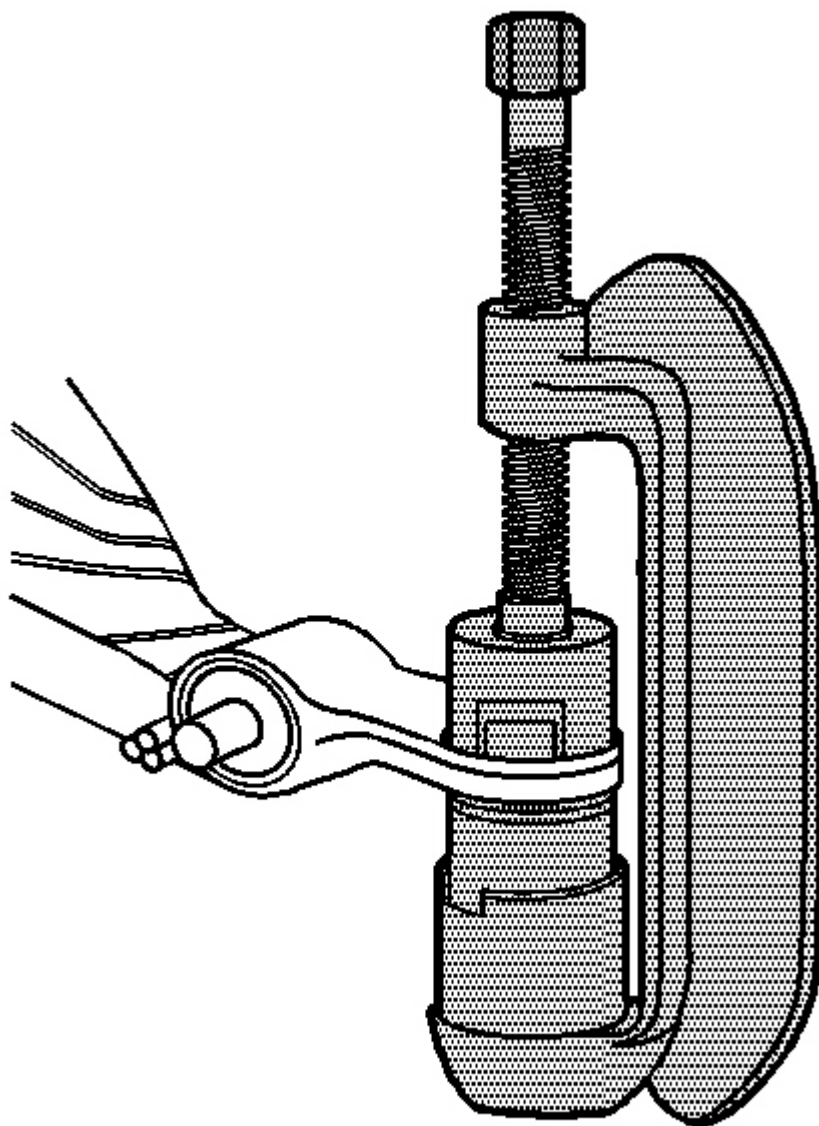
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**Fig. 14: View Of J 9519-E & J 34874 Attached To Lower Ball Joint**  
Courtesy of GENERAL MOTORS CORP.

5. Install **J 9519-E** and **J 34874** to the lower ball joint. See **Special Tools**.
6. Remove the lower ball joint from the lower control arm using **J 9519-E** and **J 34874** . See **Special Tools**.

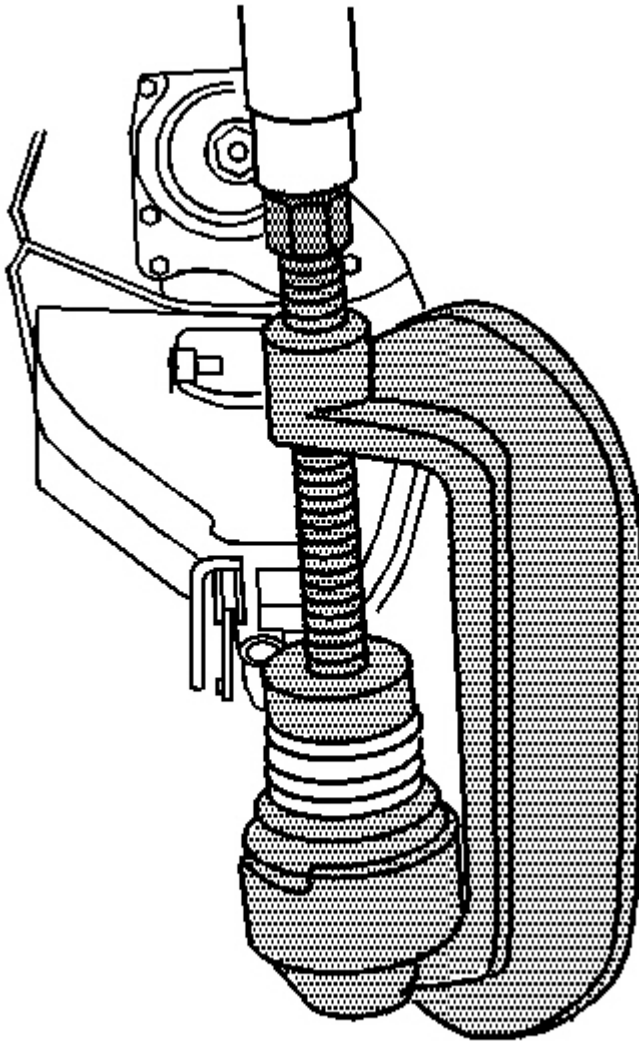
### Installation Procedure



**Fig. 15: View Of Lower Ball Joint Installation**  
Courtesy of GENERAL MOTORS CORP.

1. Install the lower ball joint and **J 9519-E** , **J 41435** , and **J 45105-2** to the lower control arm. See **Special Tools**.
2. Install the lower ball joint to the lower control arm using **J 9519-E** , **J 41435** , and **J 45105-2** . See **Special Tools**.

3. Remove **J 9519-E** , **J 41435** , and **J 45105-2** from the lower control arm. See **Special Tools**.



**Fig. 16: Flaring Lower Ball Joint Flange**  
Courtesy of GENERAL MOTORS CORP.

4. Install **J 9519-E** and **J 45105-1** to the lower ball joint. See **Special Tools**.
5. Flare the lower ball joint flange using **J 9519-E** and **J 45105-1** . See **Special Tools**.
6. Remove **J 9519-E** and **J 45105-1** from the lower ball joint. See **Special Tools**.
7. Install the steering knuckle with wheel hub and bearing attached. Refer to **Steering Knuckle**

**Replacement (4WD).**

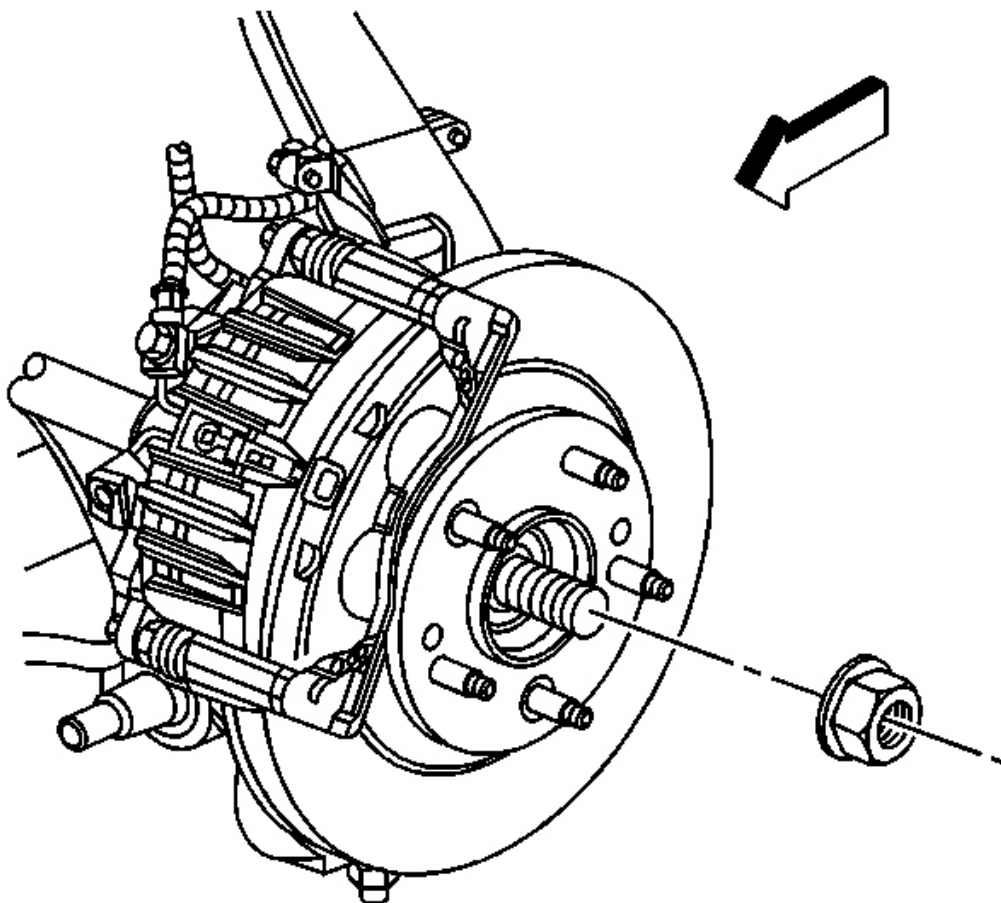
8. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
9. Lower the vehicle.
10. Check the front wheel alignment. Refer to **Wheel Alignment Specifications** .

**STEERING KNUCKLE REPLACEMENT (4WD)**

**Tools Required**

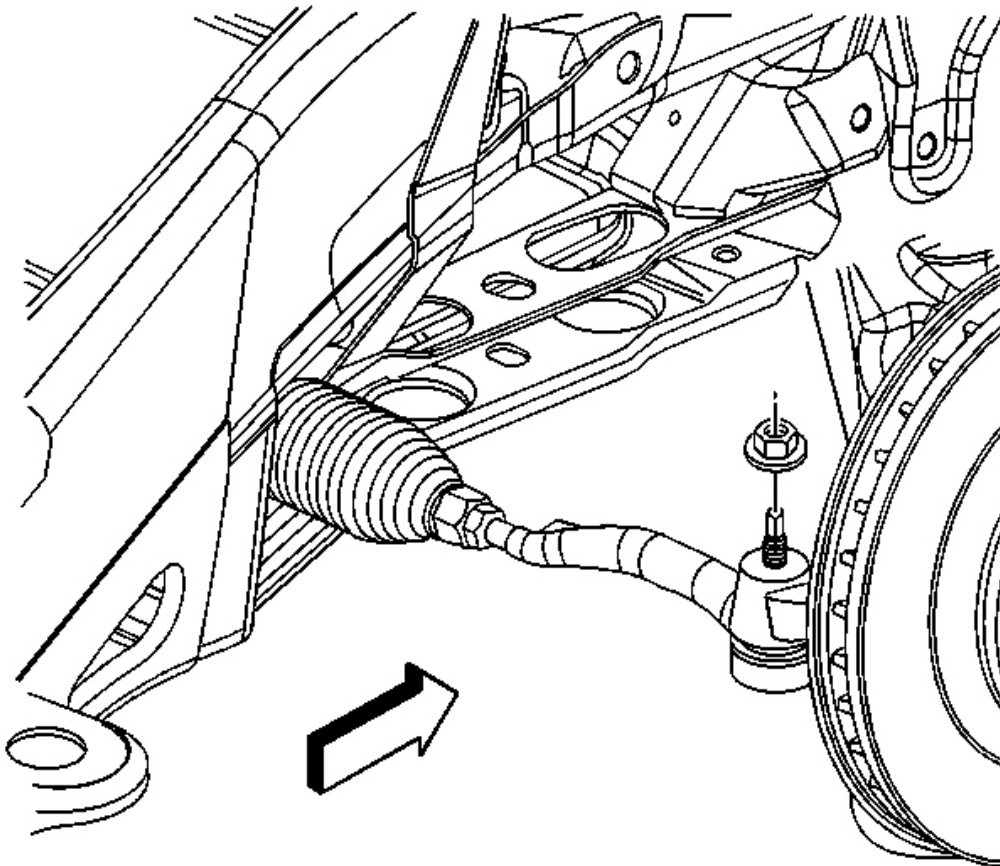
- **J 24319-B** Steering Linkage and Tie Rod Puller
- **J 43631** Ball Joint Remover. See **Special Tools**.

**Removal Procedure**



**Fig. 17: View of Wheel Drive Shaft Nut**  
Courtesy of GENERAL MOTORS CORP.

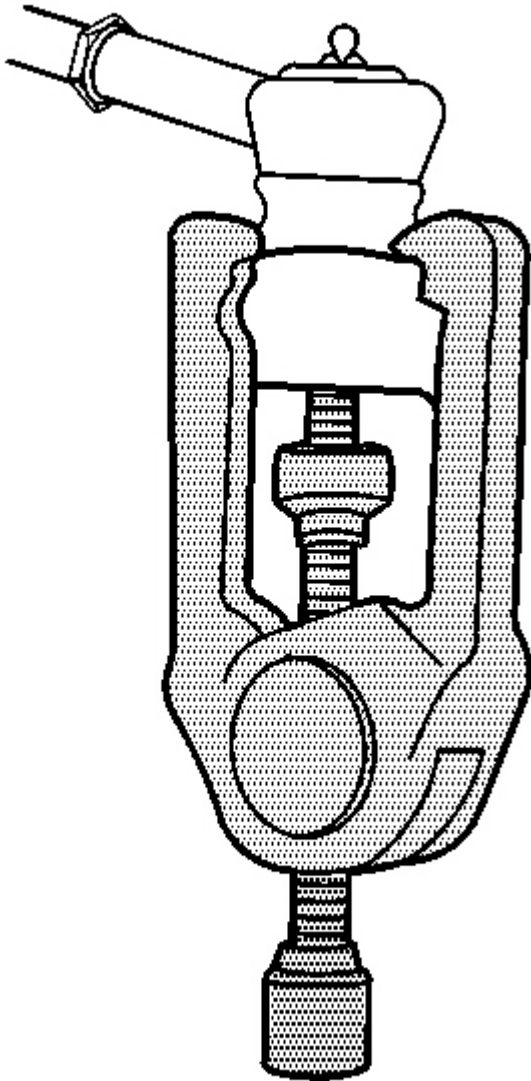
1. Remove the tire and wheel center cap.
2. Remove the drive axle nut.



**Fig. 18: View Of Tie Rod Retaining Nut**  
Courtesy of GENERAL MOTORS CORP.

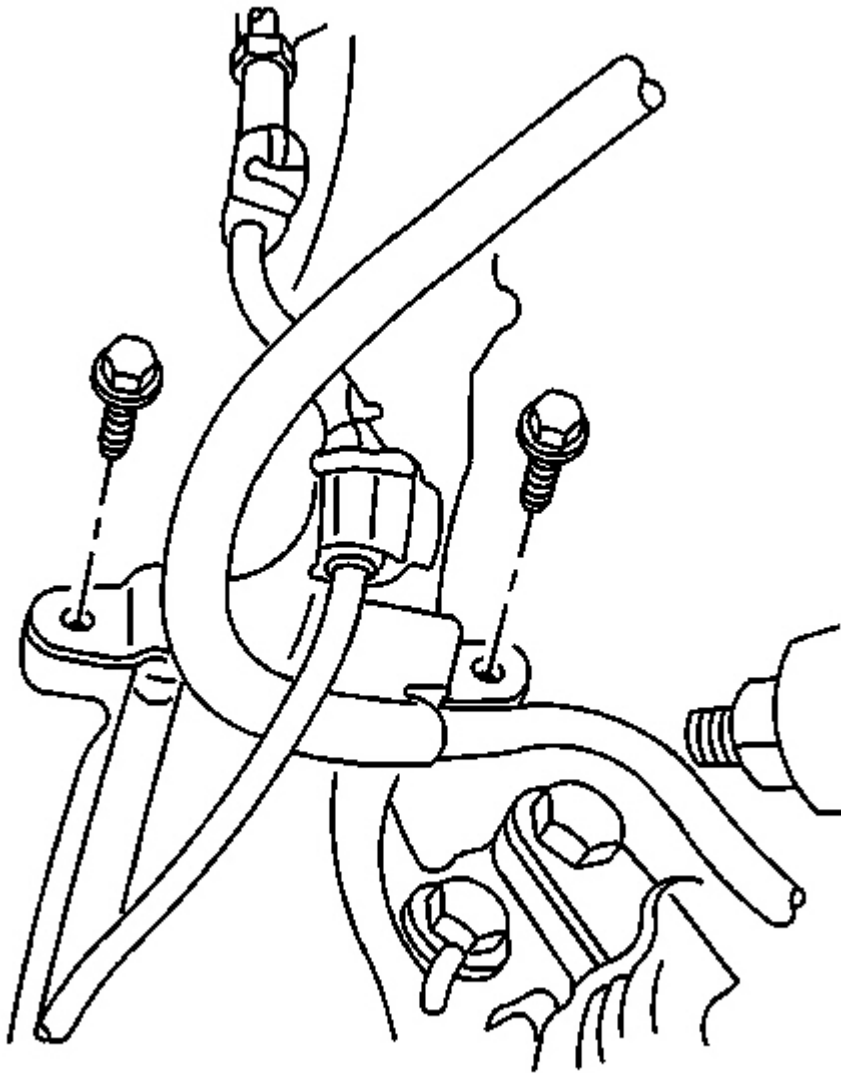
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
4. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
5. Remove the wheel hub and bearing. Refer to **Front Wheel Hub, Bearing, and Seal Replacement (RWD)** or **Front Wheel Hub, Bearing, and Seal Replacement (4WD)**.
6. Remove and discard the outer tie rod retaining nut.





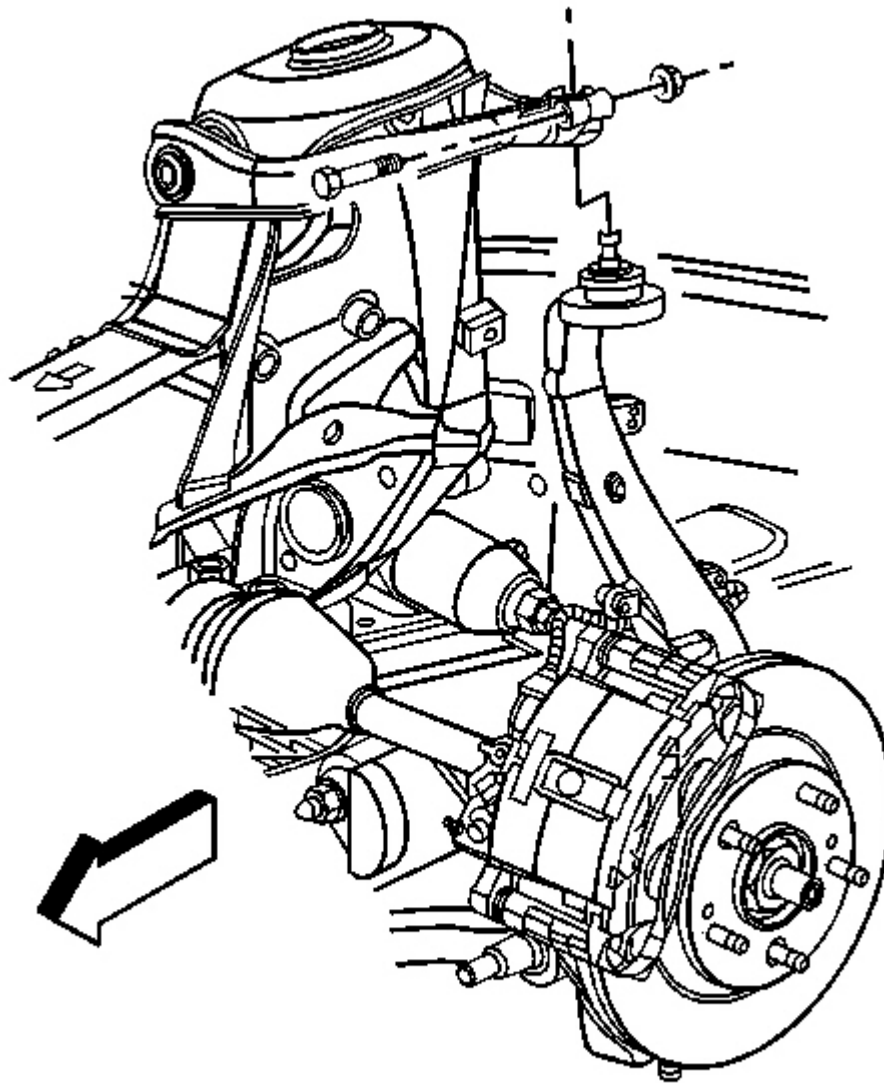
**Fig. 19: View Of Outer Tie Rod Assembly & J 24319-B**  
Courtesy of GENERAL MOTORS CORP.

7. Disconnect the outer tie rod from the steering knuckle using **J 24319-B** .



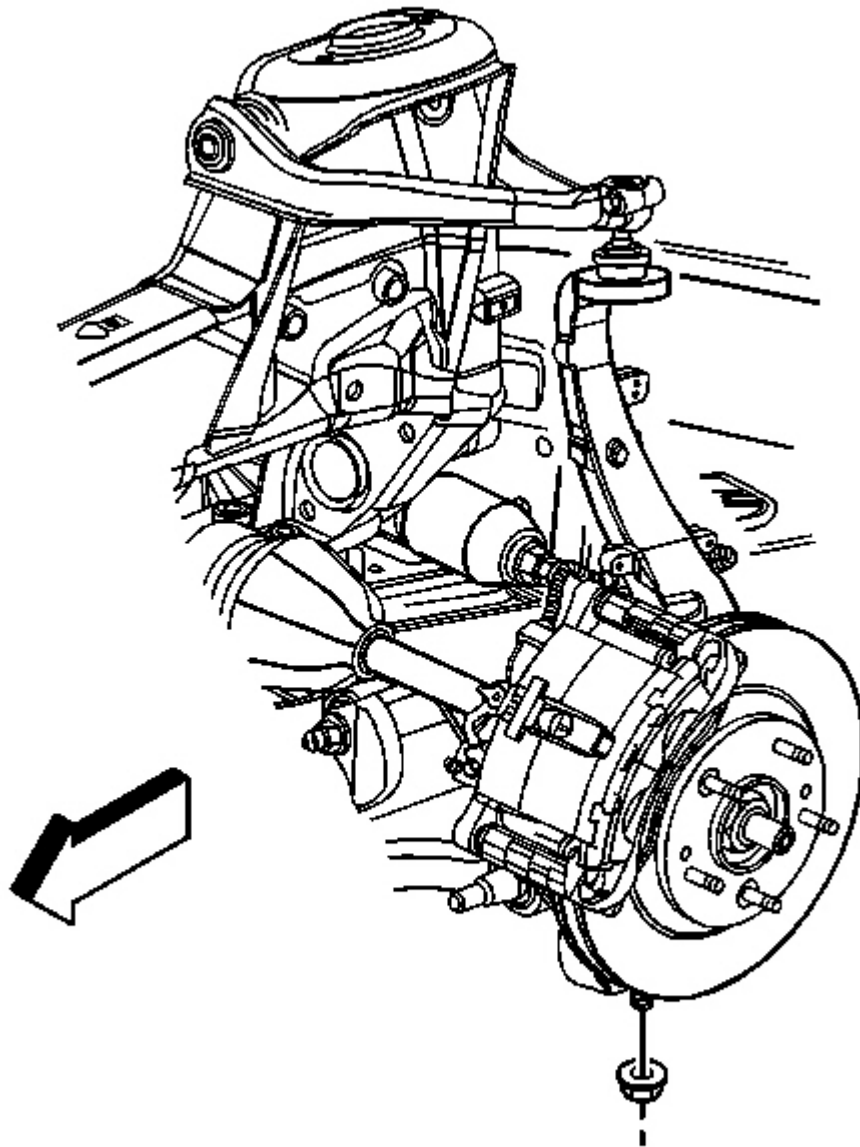
**Fig. 20: View Of Brake Hose Bracket & Retaining Bolts**  
Courtesy of GENERAL MOTORS CORP.

8. Remove the brake hose bracket retaining bolts.
9. Remove the brake hose bracket from the steering knuckle.



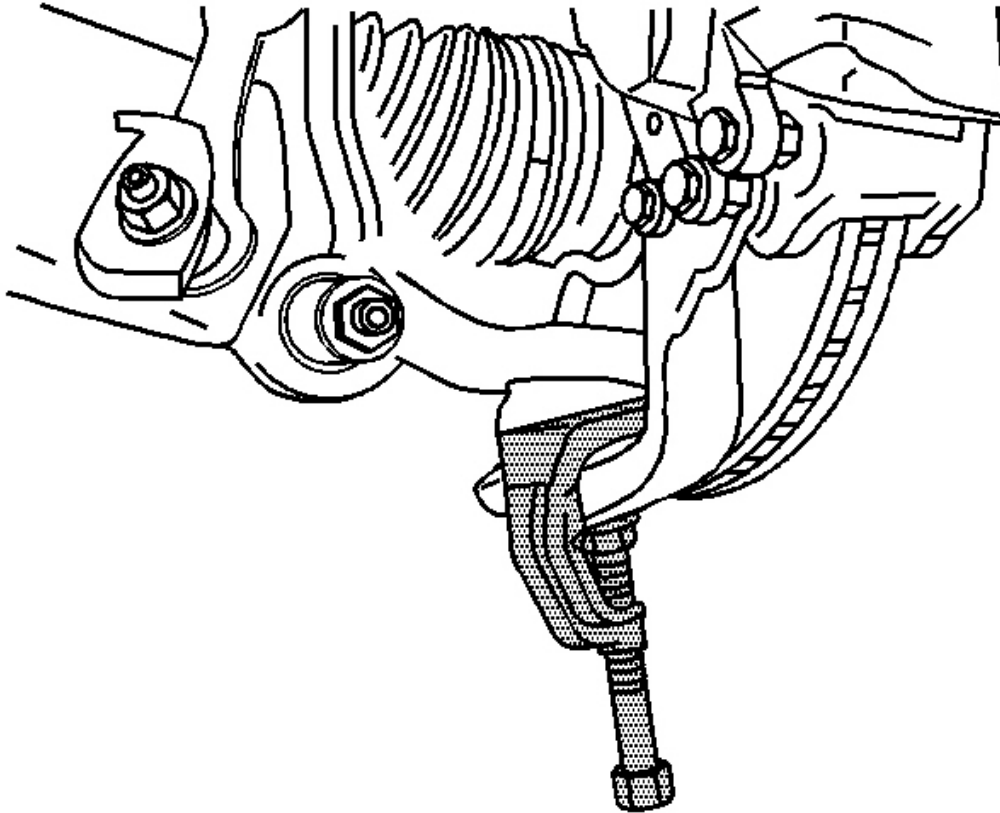
**Fig. 21: View Of Upper Control Arm To Steering Knuckle Pinch Bolt & Nut**  
**Courtesy of GENERAL MOTORS CORP.**

10. Remove and discard the upper control arm to the steering knuckle pinch bolt and nut.
11. Disconnect the upper control arm from the steering knuckle.



**Fig. 22: Identifying Lower Ball Joint Retaining Nut**  
**Courtesy of GENERAL MOTORS CORP.**

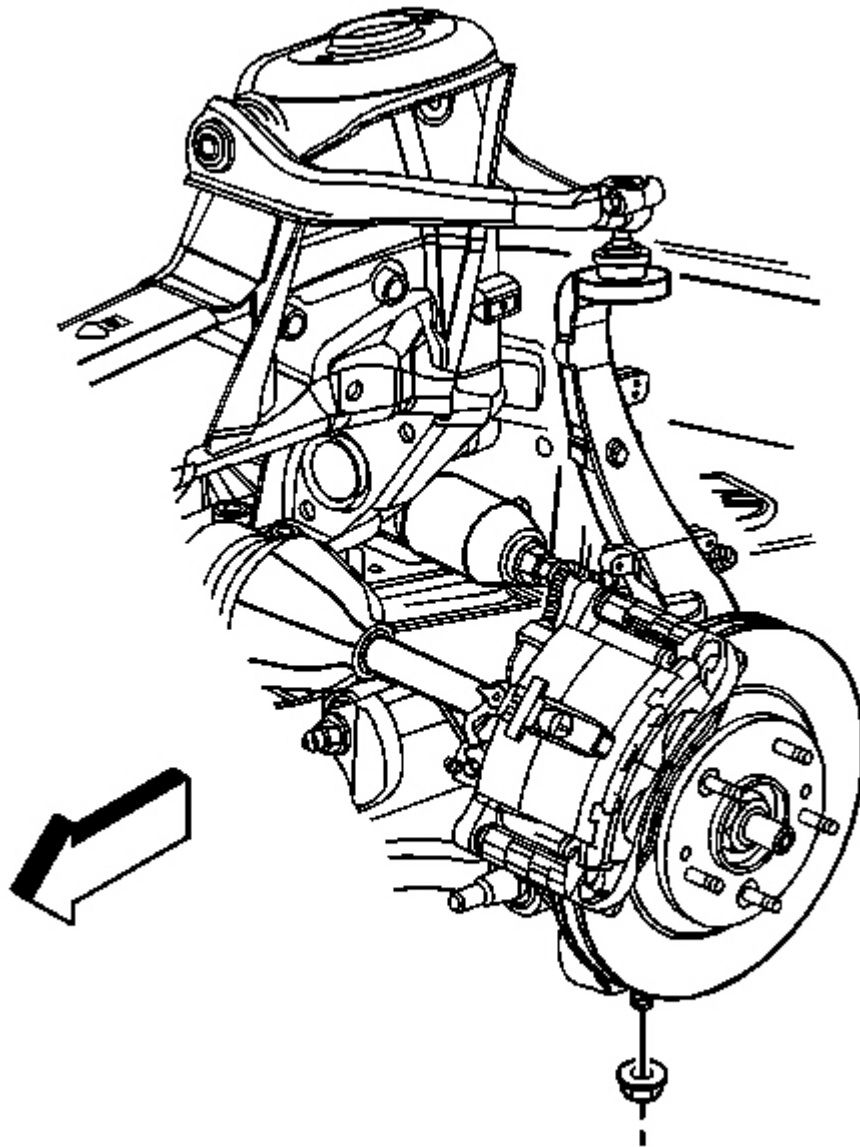
12. Remove and discard the lower ball joint retaining nut.



**Fig. 23: View Of Steering Knuckle & Lower Control Arm**  
Courtesy of GENERAL MOTORS CORP.

13. Remove the steering knuckle from the lower control arm using **J 43631** . See **Special Tools**.
14. Remove the steering knuckle from the vehicle.

#### **Installation Procedure**



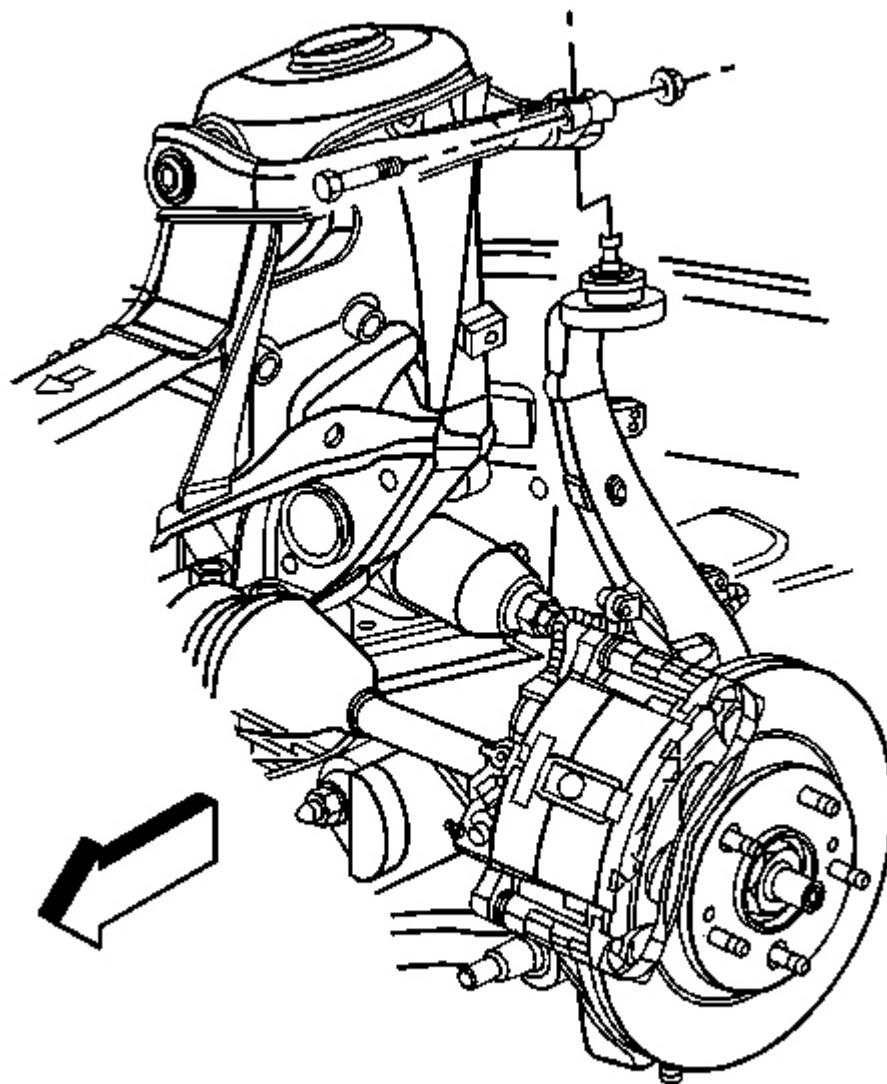
**Fig. 24: Identifying Lower Ball Joint Retaining Nut**  
Courtesy of GENERAL MOTORS CORP.

1. Install the steering knuckle to the lower control arm.

**NOTE:** Refer to Fastener Notice .

2. Install a new lower ball joint retaining nut.

**Tighten:** Tighten the lower ball joint retaining nut to 110 N.m (81 lb ft).

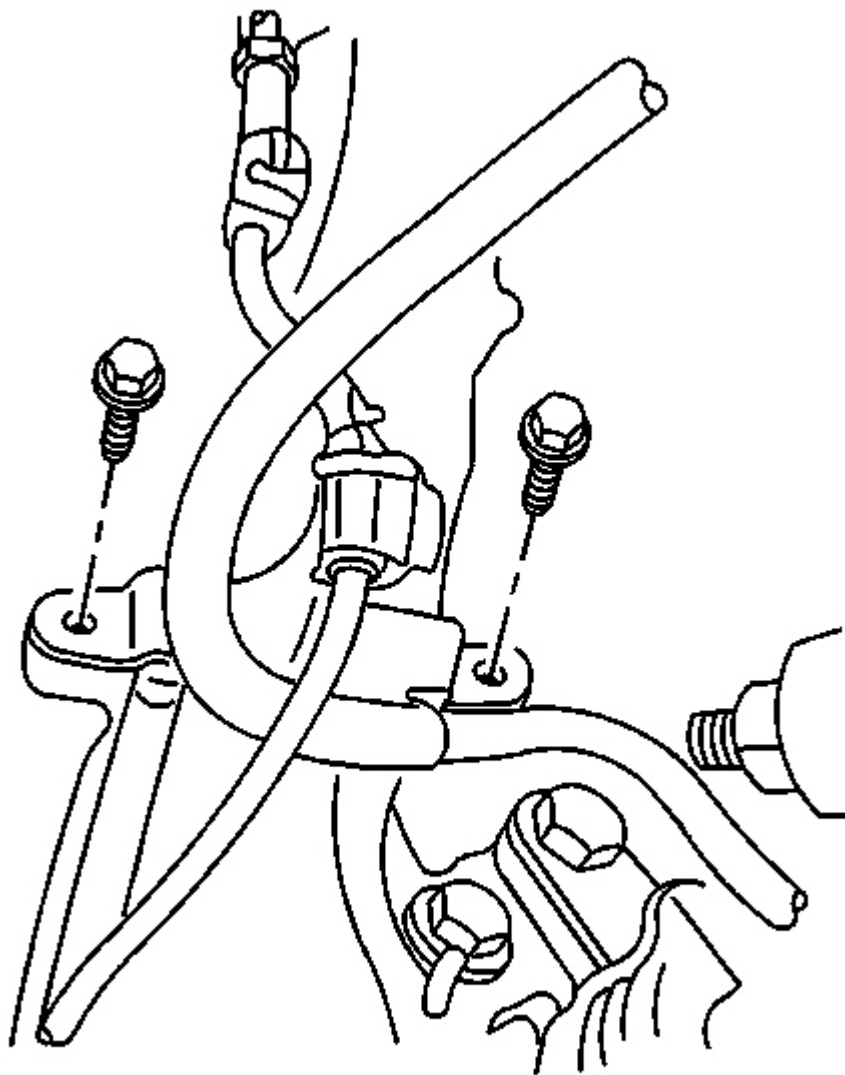


**Fig. 25: View Of Upper Control Arm To Steering Knuckle Pinch Bolt & Nut**  
Courtesy of GENERAL MOTORS CORP.

3. Connect the upper control arm to the steering knuckle.

4. Install a new upper control arm pinch bolt and nut.

**Tighten:** Tighten the upper control arm pinch bolt to 40 N.m (30 lb ft).



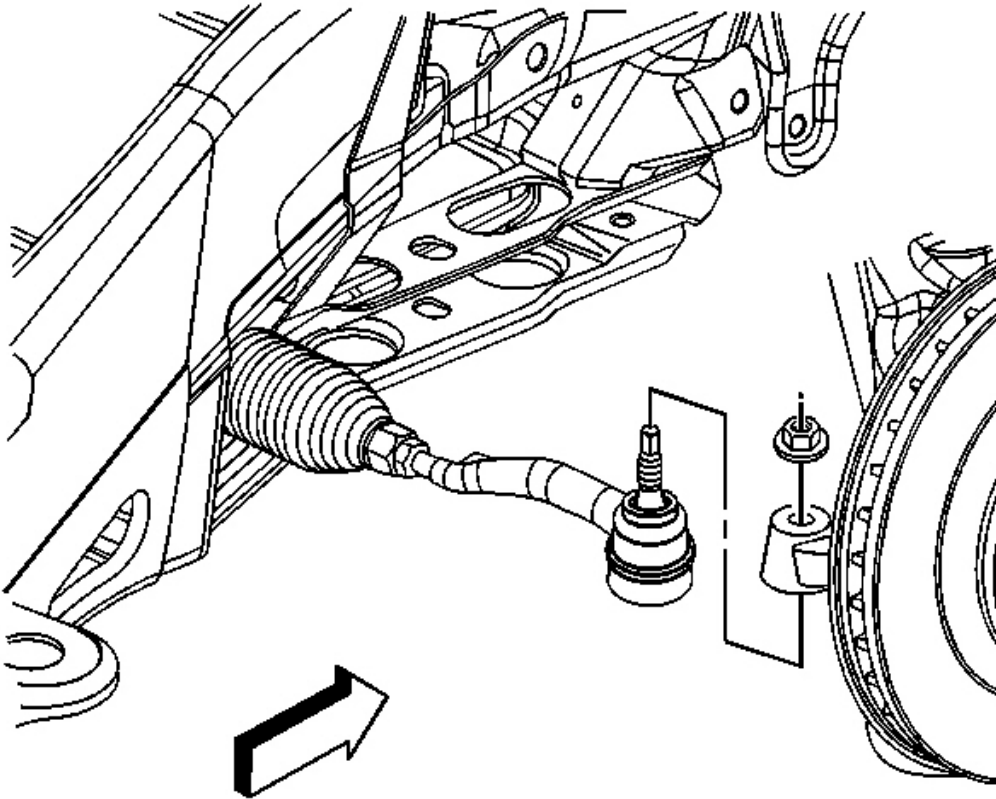
**Fig. 26: View Of Brake Hose Bracket & Retaining Bolts**  
Courtesy of GENERAL MOTORS CORP.

5. Install the brake hose bracket to the steering knuckle.



6. Install the brake hose bracket retaining bolts.

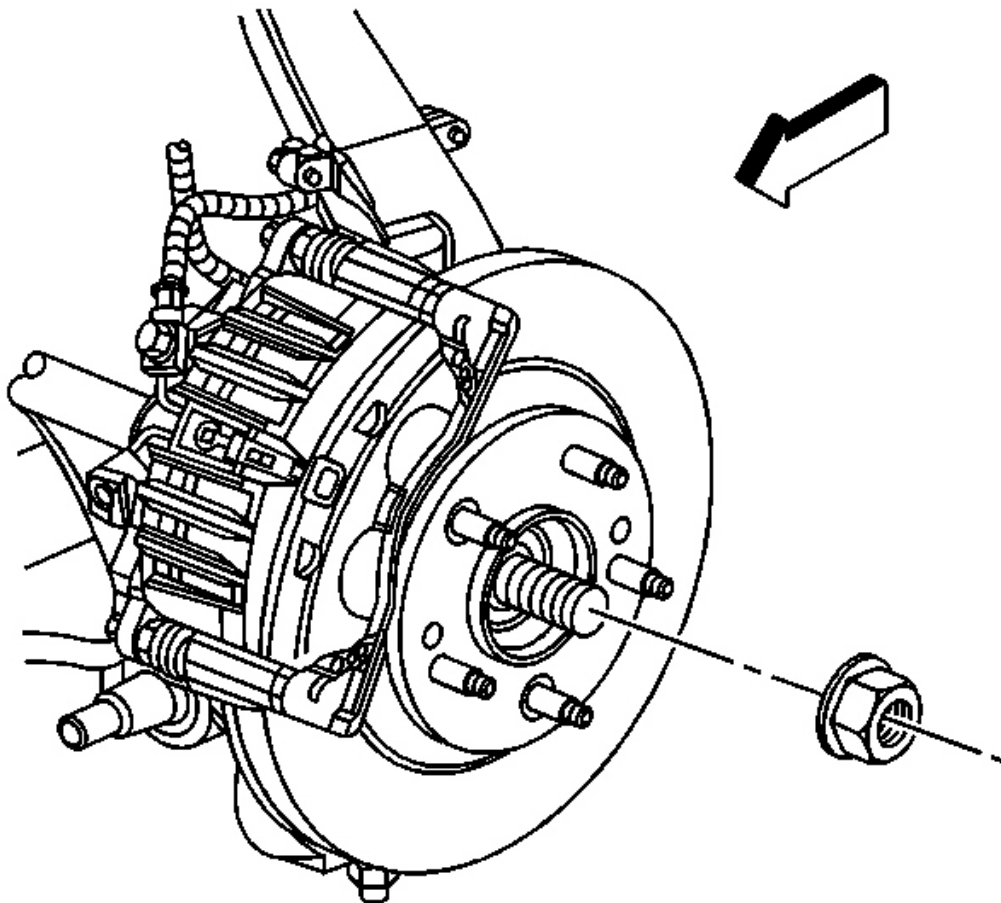
**Tighten:** Tighten the brake hose bracket retaining bolts to 10 N.m (89 lb in).



**Fig. 27: View Of Tie Rod & Steering Knuckle**  
Courtesy of GENERAL MOTORS CORP.

7. Install the outer tie rod to the steering knuckle.
8. Install the new outer tie rod retaining nut.

**Tighten:** Tighten the outer tie rod retaining nut to 60 N.m (44 lb ft).



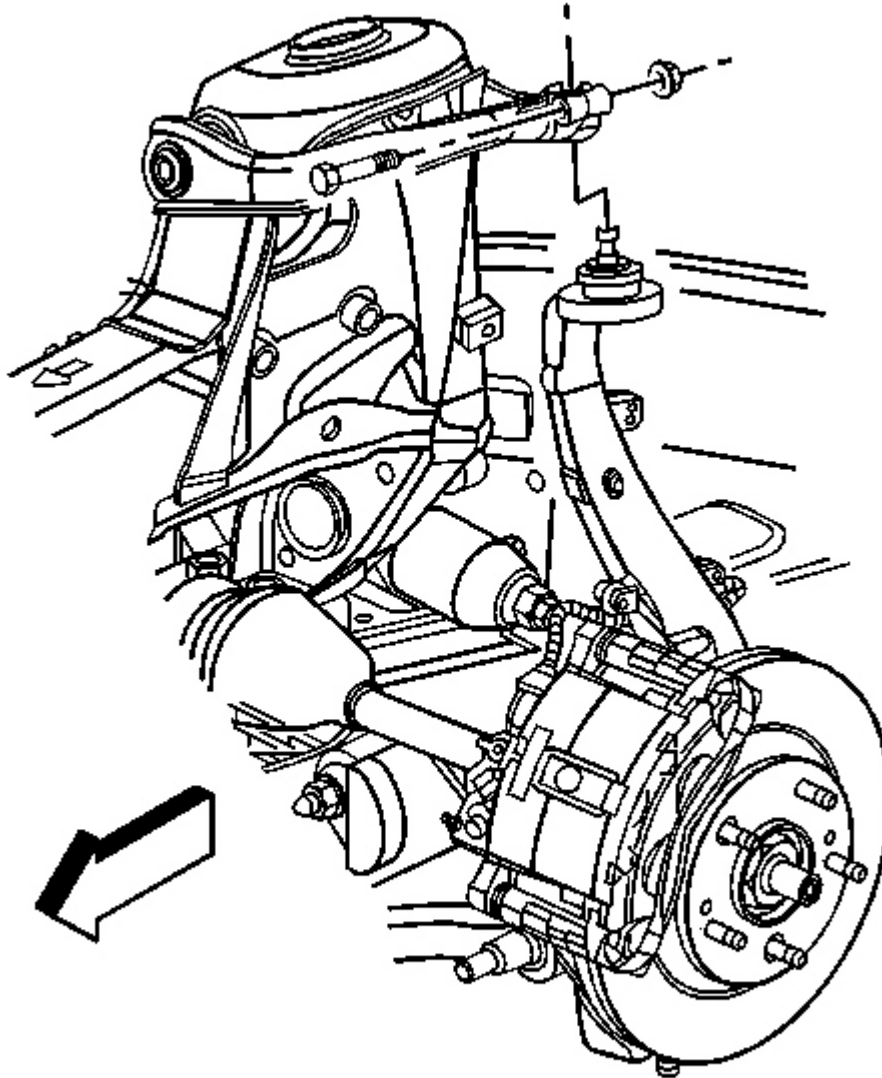
**Fig. 28: View of Wheel Drive Shaft Nut**  
Courtesy of GENERAL MOTORS CORP.

9. Install the wheel hub and bearing. Refer to **Front Wheel Hub, Bearing, and Seal Replacement (RWD)** or **Front Wheel Hub, Bearing, and Seal Replacement (4WD)**.
10. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation**.
11. Lower the vehicle.
12. Install the drive axle nut.

**Tighten:** Tighten the drive axle nut to 140 N.m (103 lb ft).

13. Check the front wheel alignment. Refer to **Wheel Alignment Specifications**.

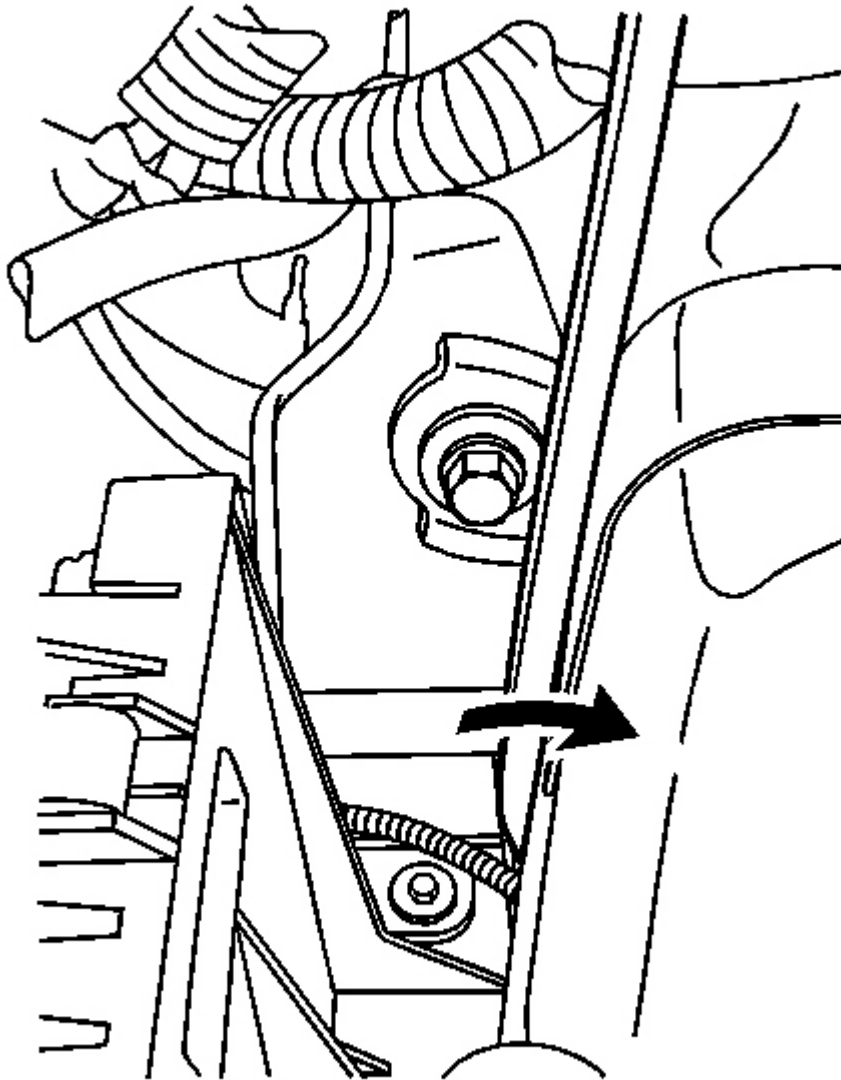
**Removal Procedure**



**Fig. 29: View Of Upper Control Arm To Steering Knuckle Pinch Bolt & Nut**  
Courtesy of GENERAL MOTORS CORP.

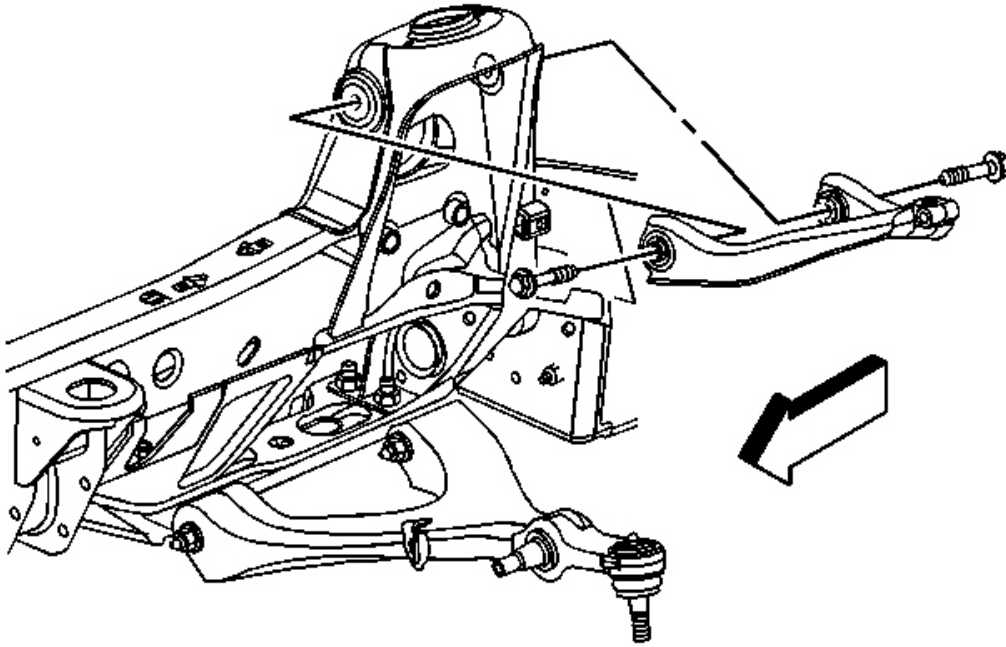
1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
3. Remove and discard the upper ball joint to upper control arm bolt and nut.

4. Separate the upper control arm from the steering knuckle.
5. Remove the wheel speed sensor wiring harness from the upper control arm. Refer to **Wheel Speed Sensor Replacement**.
6. If servicing the left upper control arm, remove the battery tray. Refer to **Battery Tray Replacement**.



**Fig. 30: Accessing Forward Facing Bolt**  
Courtesy of GENERAL MOTORS CORP.

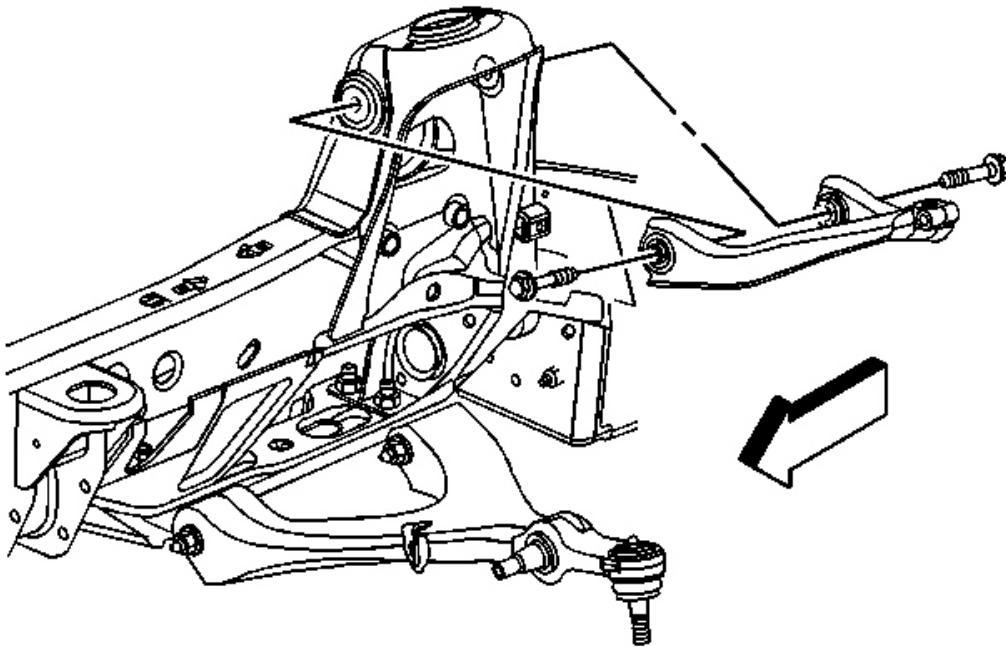
7. Gently pry out on inner fender body panel to access forward facing bolt.



**Fig. 31: View Of Upper Control Arm & Mounting Bolts**  
Courtesy of GENERAL MOTORS CORP.

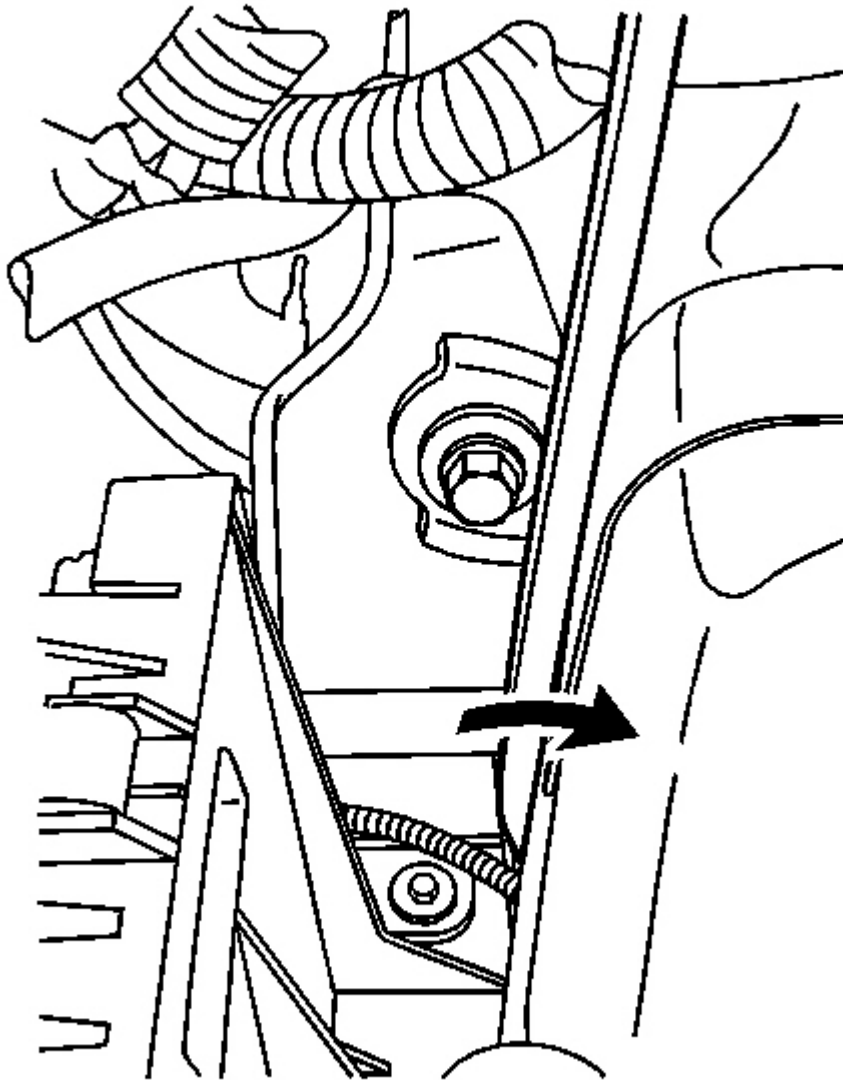
8. Remove the upper control arm mounting bolts.
9. Remove the upper control arm.

#### **Installation Procedure**



**Fig. 32: View Of Upper Control Arm & Mounting Bolts**  
Courtesy of GENERAL MOTORS CORP.

1. Install the upper control arm.



**Fig. 33: Accessing Forward Facing Bolt**  
**Courtesy of GENERAL MOTORS CORP.**

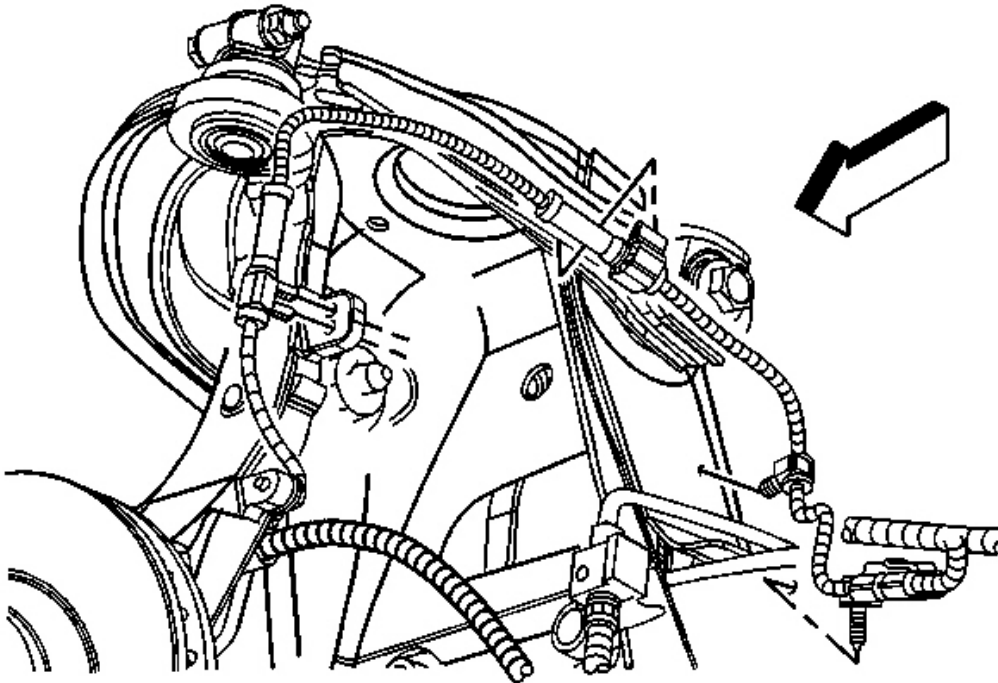
2. Gently pry out on inner fender to access the forward facing bolt.

**NOTE:** Refer to Fastener Notice .

3. Install the upper control arm mounting bolts.

**Tighten:** Tighten the upper control arm mounting bolts to 146 N.m (108 lb ft).

4. Install the battery tray, if removed. Refer to **Battery Tray Replacement** .



**Fig. 34: View Of ABS Harness**  
Courtesy of GENERAL MOTORS CORP.

5. Install the ABS wheel speed sensor wiring harness to the upper control arm. Refer to **Wheel Speed Sensor Replacement**
6. Connect the upper control arm to the steering knuckle.
7. Install a new upper ball joint to upper control arm bolt and nut.

**Tighten:** Tighten the upper ball joint to upper control arm bolt to 41 N.m (30 lb ft).

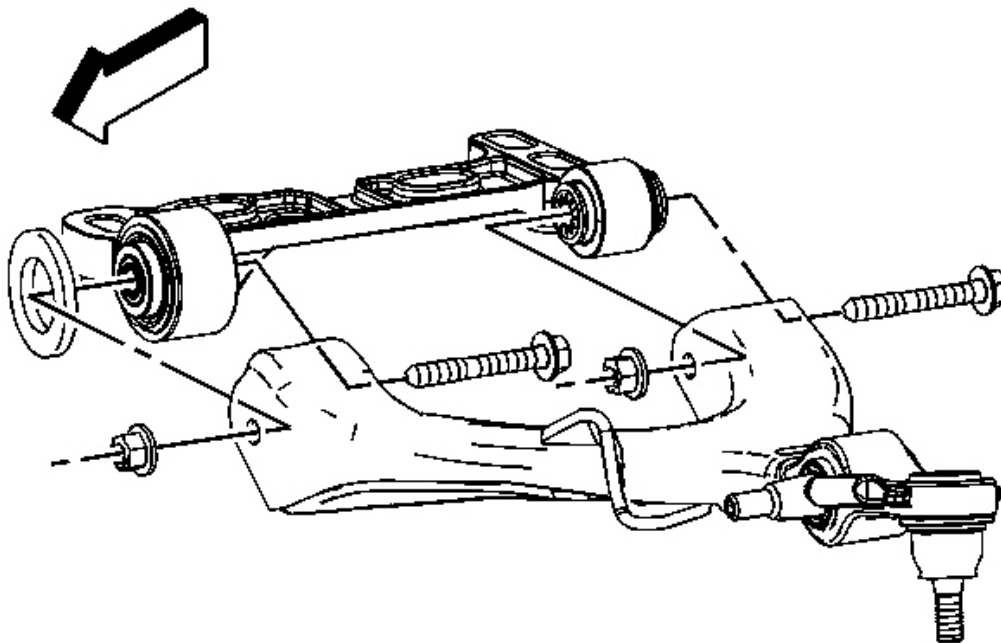
8. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
9. Lower the vehicle.
10. Check the front wheel alignment. Refer to **Wheel Alignment Specifications** .

## **LOWER CONTROL ARM REPLACEMENT**



**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 outer tie rod from the steering knuckle. Refer to **Rack and Pinion Outer Tie Rod End Replacement** .
4. Remove the stabilizer shaft link from the lower control arm. Refer to **Stabilizer Shaft Link Replacement**.
5. Remove the shock module yoke lower from the lower control arm. Refer to **Front Shock Absorber Yoke Replacement**.
6. Remove the lower ball joint from the lower control arm. Refer to **Lower Control Arm Ball Joint Replacement**.



**Fig. 35: Identifying Lower Control Arm Bracket Mounting Nuts**  
Courtesy of GENERAL MOTORS CORP.

7. Remove the lower control arm to lower control arm bracket mounting nuts.

**IMPORTANT:** Note the direction the bolts are removed for installation.

8. Remove the lower control arm to lower control arm bracket mounting bolts.

**IMPORTANT: Take care not to disengage the axle shaft from the transmission (4WD only).**

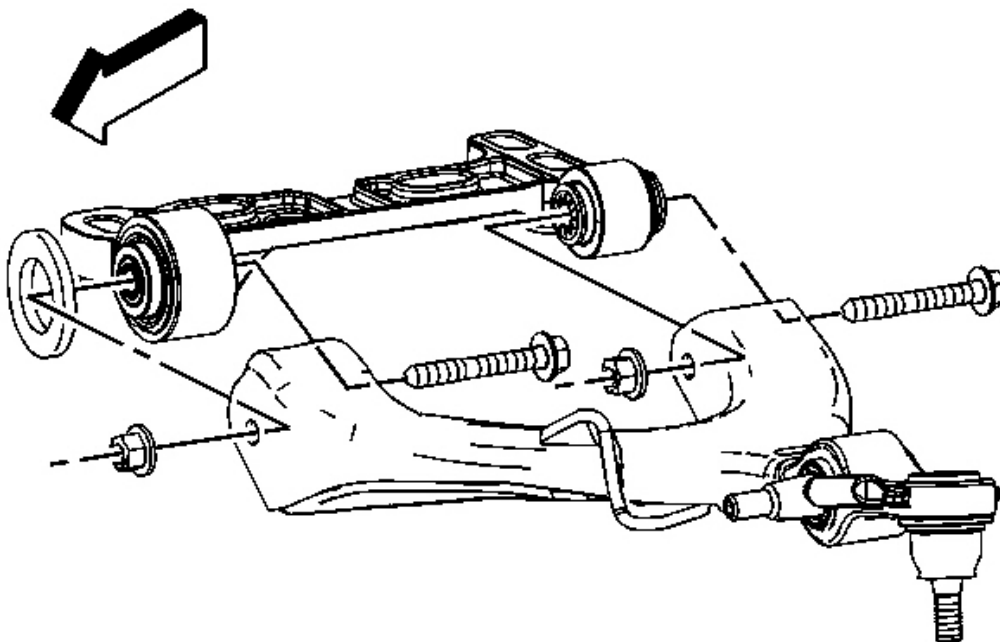
9. Pivot the lower control arm outward and downward in order to disconnect the lower control arm from the lower control arm bracket.

**IMPORTANT: Ensure that the spacer stays in position on the front control arm bracket front bushing.**

10. Remove the lower control arm from the vehicle.

#### Installation Procedure

**IMPORTANT: Take care not to disengage the axle shaft from the transmission.**



**Fig. 36: Identifying Lower Control Arm Bracket Mounting Nuts**  
Courtesy of GENERAL MOTORS CORP.

1. Position the lower control arm ball joint stud to the steering knuckle.

## 2008 Isuzu Ascender LS

2008 SUSPENSION Front Suspension - Ascender, Envoy & Trailblazer

**IMPORTANT:** Ensure that the spacer stays in position on the front control arm bracket front bushing.

2. Pivot the lower control arm outward and upward in order to connect the lower control arm to the lower control arm bracket.
3. Install the lower control arm to lower control arm bracket mounting bolts.

**NOTE:** Refer to Fastener Notice .

**IMPORTANT:** Ensure that the lower control arm is parallel to the lower control arm bracket during the installation and tightening of the lower control arm mounting bolts and nuts. This will ensure correct alignment of the lower control arm bushings.

4. Install the lower control arm to lower control arm bracket mounting nuts.

**Tighten:** Tighten the nuts to 130 N.m (96 lb ft).

5. Install the shock module yoke to the lower control arm. Refer to Front Shock Absorber Yoke Replacement.
6. Install the lower ball joint to the steering knuckle. Refer to Lower Control Arm Ball Joint Replacement.
7. Install the stabilizer shaft link. Refer to Stabilizer Shaft Link Replacement.
8. Install the outer tie rod to the steering knuckle. Refer to Rack and Pinion Outer Tie Rod End Replacement .
9. Install the tire and wheel. Refer to Tire and Wheel Removal and Installation .
10. Lower the vehicle.
11. Inspect the front wheel alignment. Refer to Wheel Alignment Specifications .

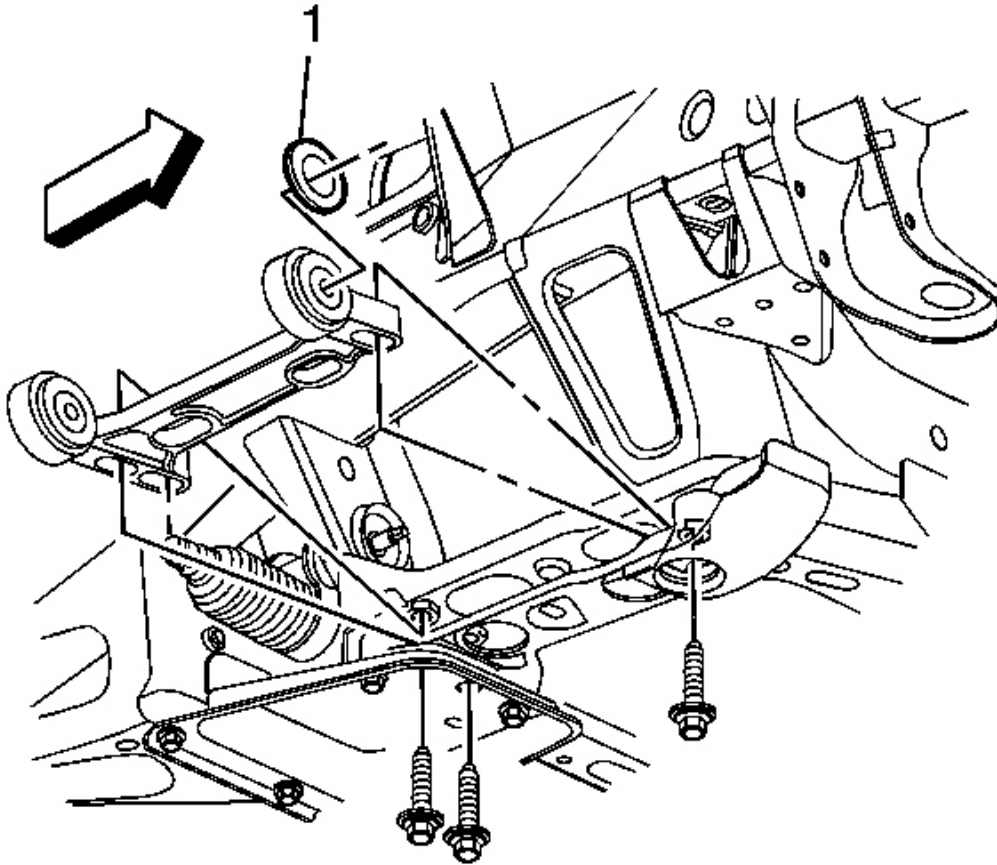
### LOWER CONTROL ARM BRACKET REPLACEMENT

#### 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.

**IMPORTANT:** In the following step, it is NOT necessary to completely remove the lower control arm from the vehicle. Allow the lower control arm to remain attached to the knuckle assembly.

4. Remove the lower control arm from the bracket. Refer to Lower Control Arm Replacement.

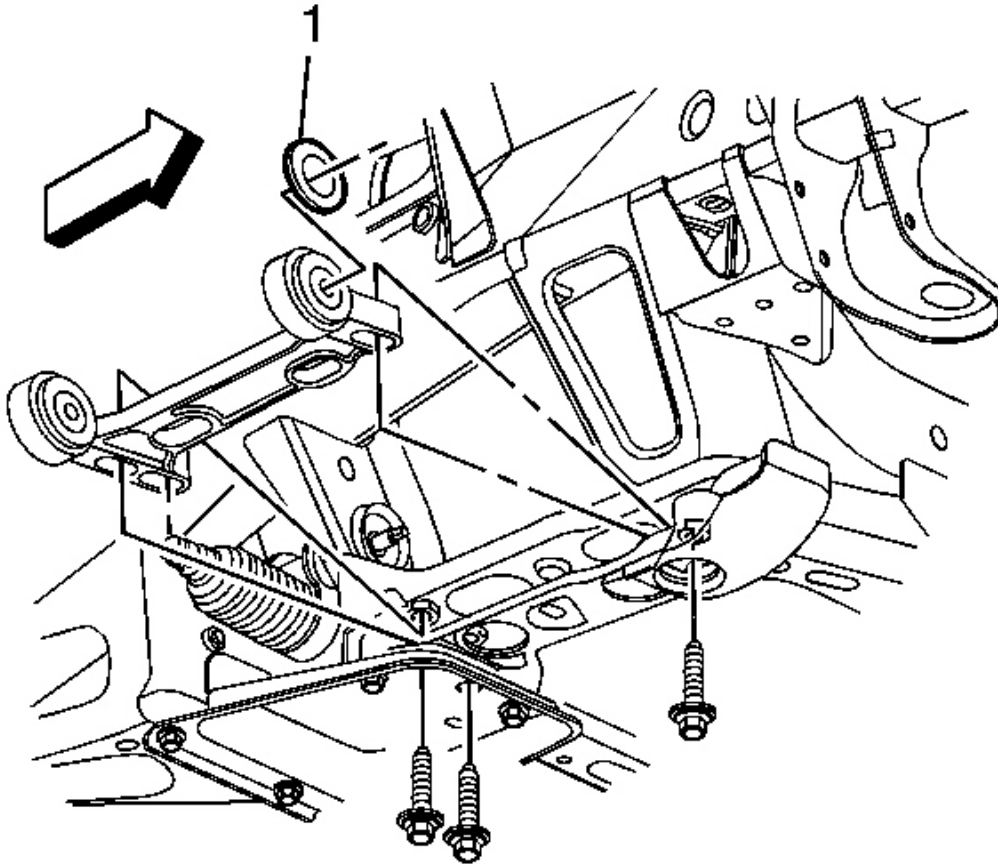


**Fig. 37: View Of Lower Control Arm Bracket, Spacer & Bolts**  
Courtesy of GENERAL MOTORS CORP.

**IMPORTANT:** Note the position of the spacer (1) on the front bushing.

5. Remove the lower control arm bracket from the vehicle.

#### Installation Procedure



**Fig. 38: View Of Lower Control Arm Bracket, Spacer & Bolts**  
Courtesy of GENERAL MOTORS CORP.

**IMPORTANT:** Ensure the spacer (1) is in the proper position on the front bushing.

1. Install the lower control arm bracket to the vehicle.

**NOTE:** Refer to Fastener Notice .

2. Install the lower control arm bracket mounting bolts to the frame.

**Tighten:**

- Tighten the front lower control arm bracket mounting bolt to 260 N.m (192 lb ft).
- Tighten the rear lower control arm bracket mounting bolts to 230 N.m (170 lb ft).

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3. Install the lower control arm to the lower control arm bracket. Refer to **Lower Control Arm Replacement**.
4. Install the stabilizer shaft link to the lower control arm. Refer to **Stabilizer Shaft Link Replacement**.
5. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
6. Lower the vehicle.
7. Inspect the front wheel alignment. Refer to **Wheel Alignment Specifications** .

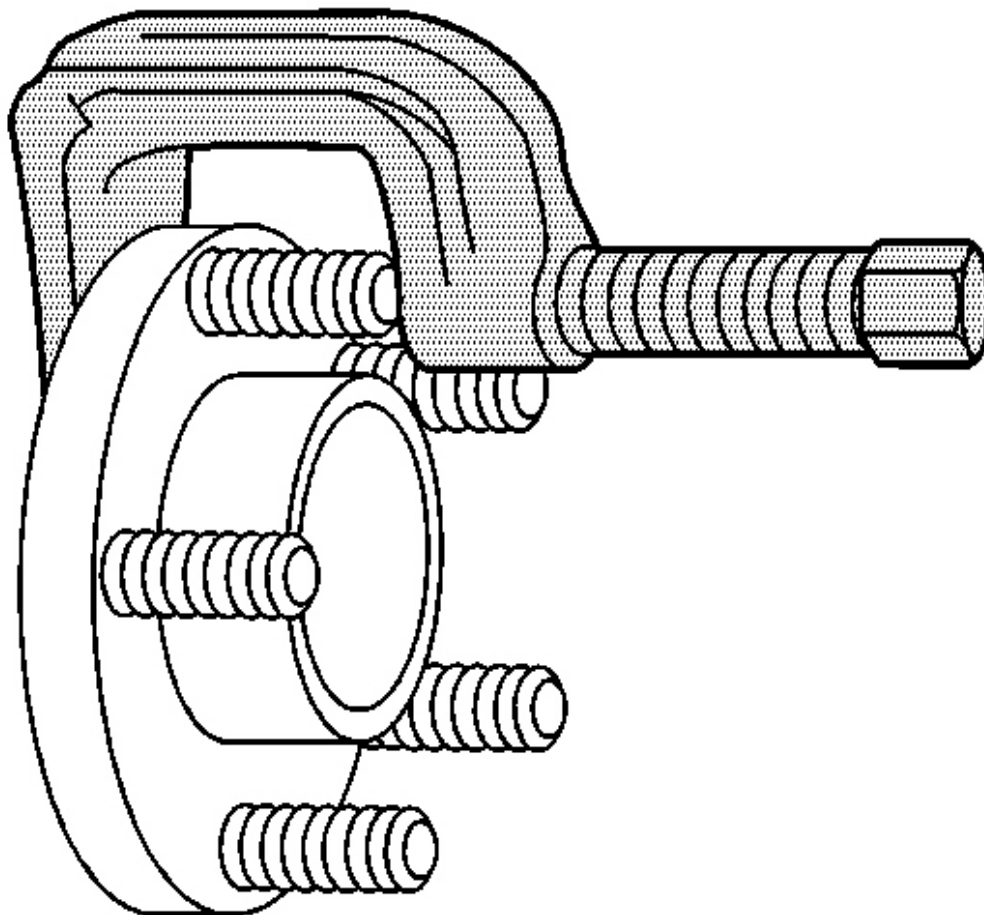
### WHEEL STUD REPLACEMENT

#### 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 the wheel. Refer to **Tire and Wheel Removal and Installation** .
3. Remove the rotor. Refer to **Front Brake Rotor Replacement** .



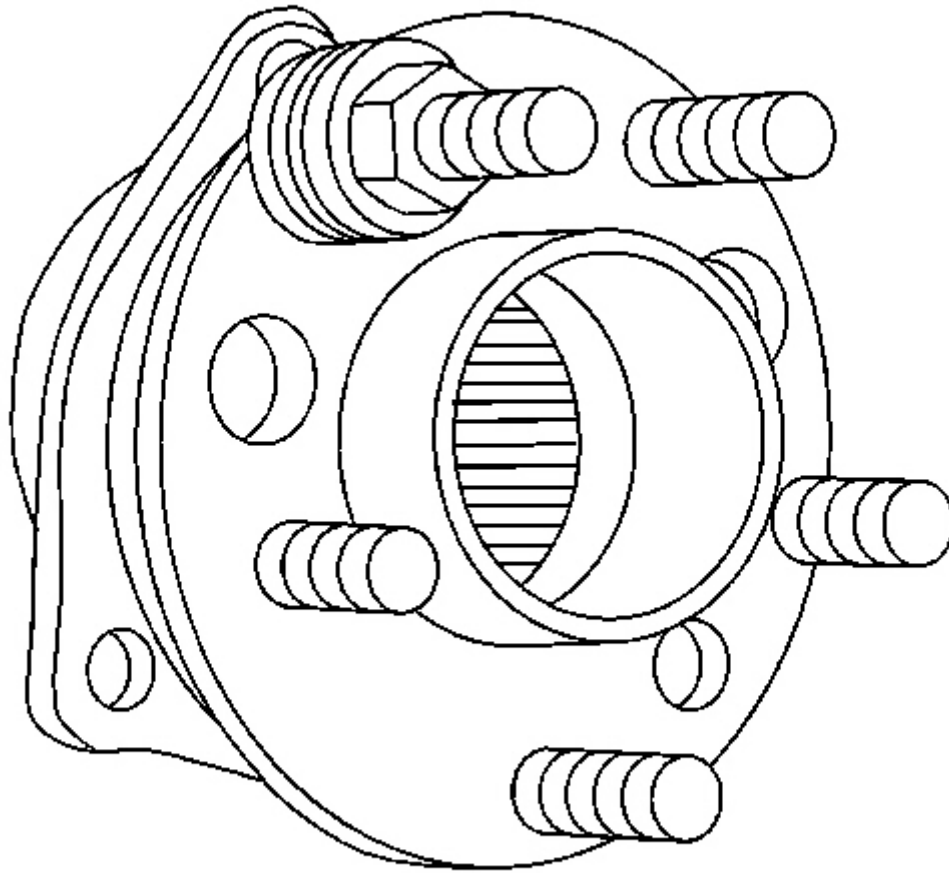
**Fig. 39: Using J 43631 To Remove Wheel Stud From Wheel Bearing**  
Courtesy of GENERAL MOTORS CORP.

**IMPORTANT: Do not hammer on a wheel stud.**

4. Remove the wheel stud bolt using **J 43631** . See **Special Tools**.

#### **Installation Procedure**

1. Install the wheel stud to the wheel hub and bearing.



**Fig. 40: View Of Wheel Stud**

Courtesy of GENERAL MOTORS CORP.

**NOTE:** Refer to Fastener Notice .

2. Install 4 washers and the nut to the wheel stud.

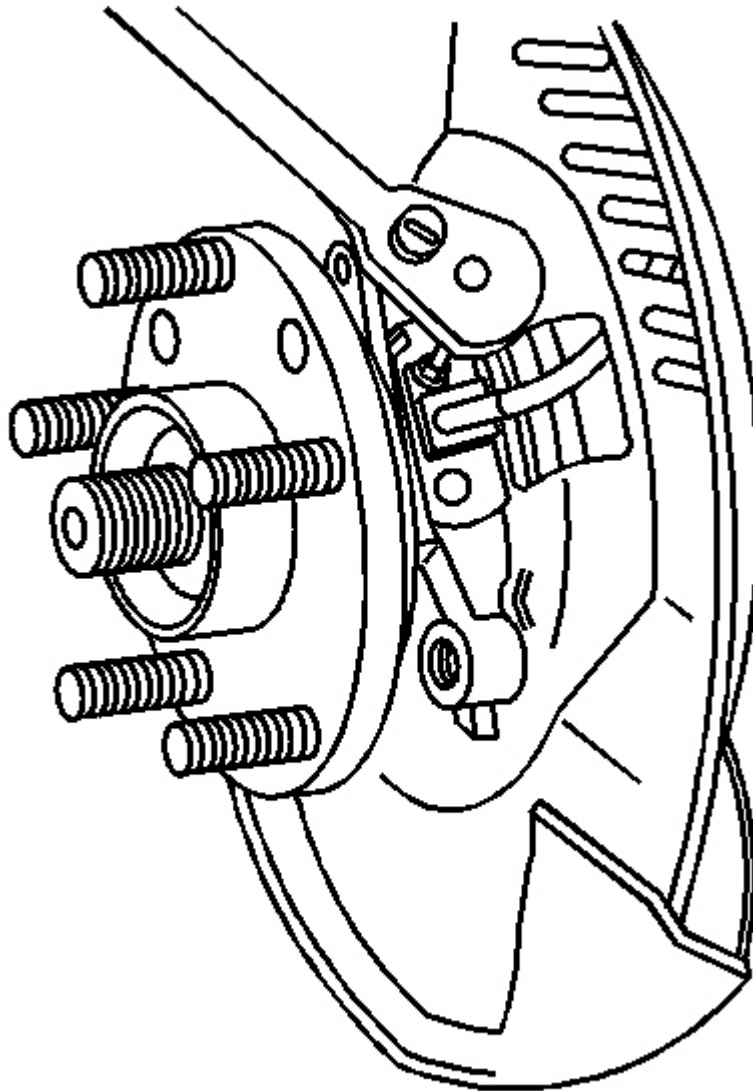
**Tighten:** Tighten the wheel stud nut to 140 N.m (103 lb ft), drawing in the wheel stud.

3. Remove the nut and the washers.
4. Install the rotor. Refer to Front Brake Rotor Replacement .
5. Install the tire and the wheel. Refer to Tire and Wheel Removal and Installation .
6. Lower the vehicle.



## **FRONT WHEEL HUB, BEARING & SEAL REPLACEMENT (RWD)**

### **Removal Procedure**



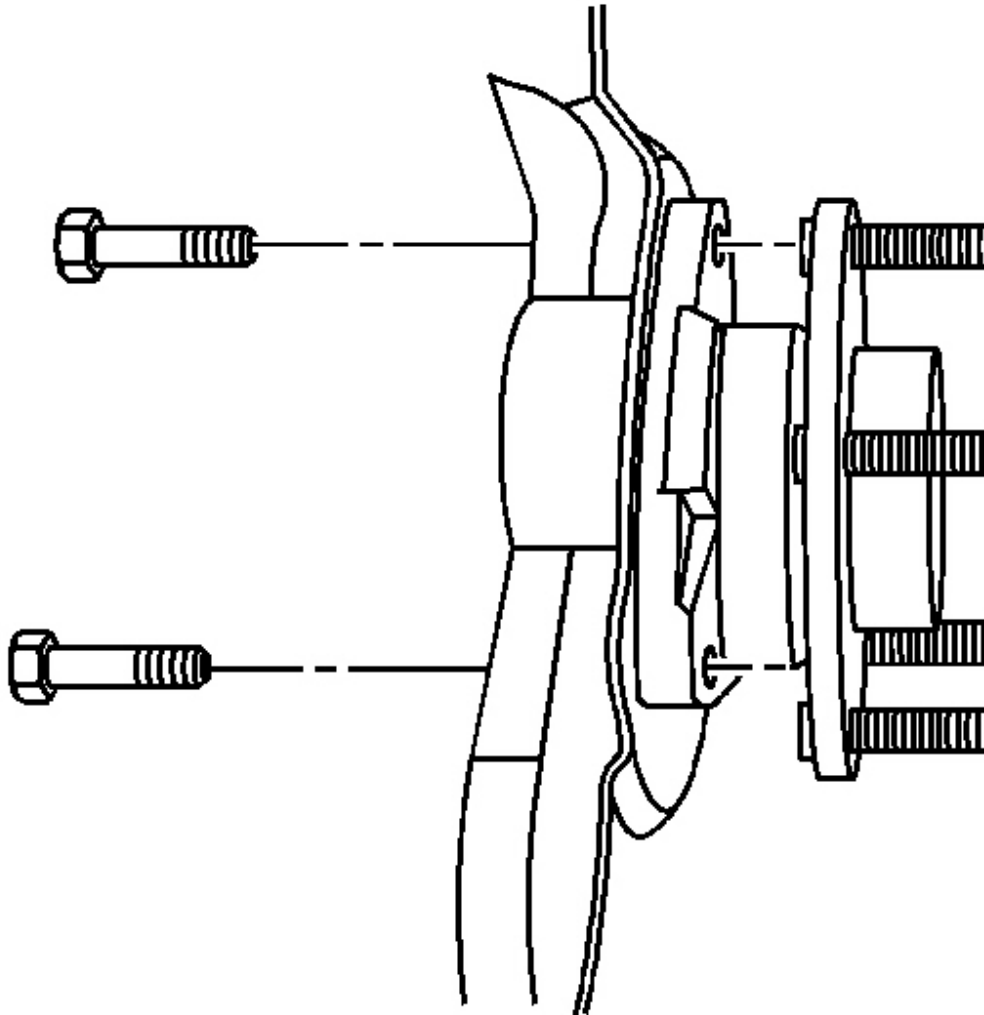
**Fig. 41: Removing/Installing Wheel Speed Sensor Mounting Bolt**  
Courtesy of GENERAL MOTORS CORP.

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

## 2008 Isuzu Ascender LS

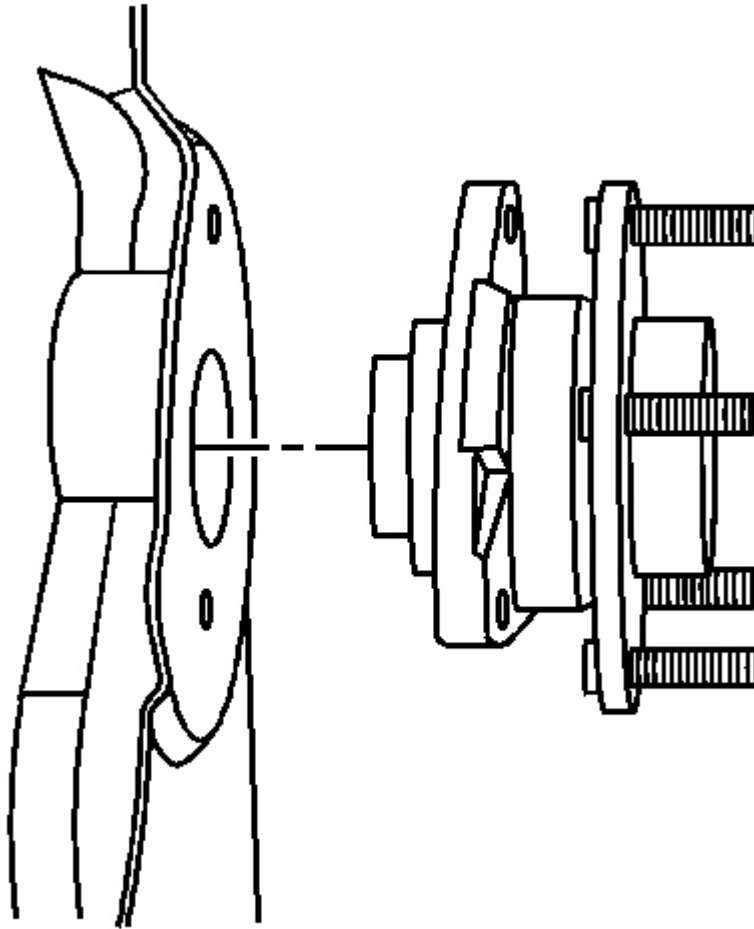
### 2008 SUSPENSION Front Suspension - Ascender, Envoy & Trailblazer

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. Remove the ABS sensor mounting bolt from the wheel hub and bearing.
5. Remove the ABS sensor from the wheel hub and bearing.



**Fig. 42: View Of Wheel Hub & Bearing Mounting Bolts (RWD)**  
Courtesy of GENERAL MOTORS CORP.

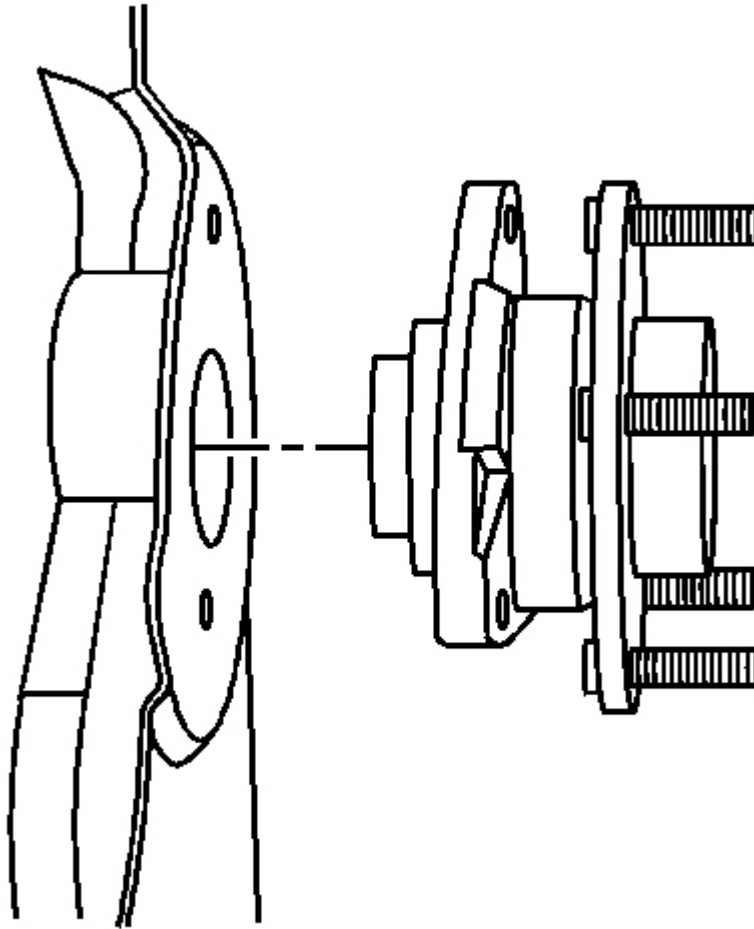
6. Remove the wheel hub and bearing to the steering knuckle mounting bolts.



**Fig. 43: View Of Wheel Hub & Bearing**  
Courtesy of GENERAL MOTORS CORP.

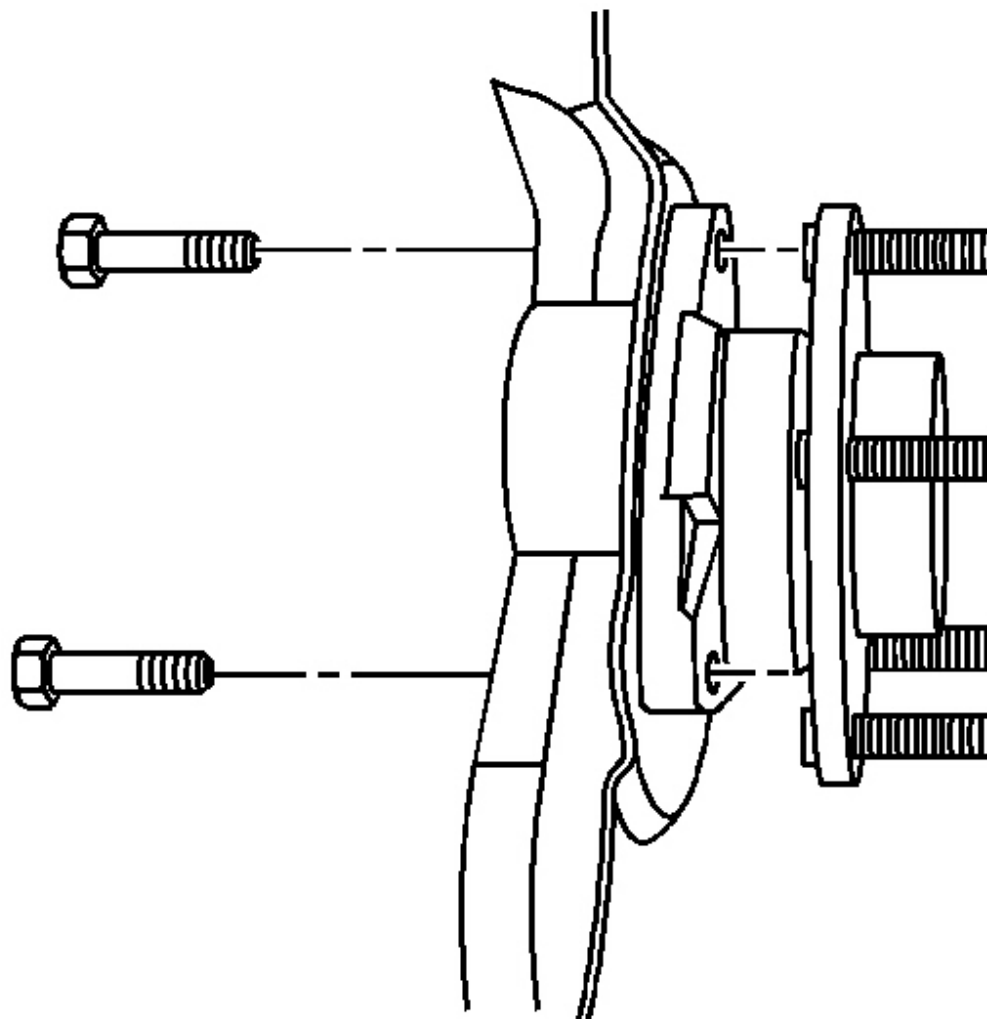
7. Remove the wheel hub and bearing from the steering knuckle.
8. Remove the splash shield from the steering knuckle.

#### **Installation Procedure**



**Fig. 44: View Of Wheel Hub & Bearing**  
Courtesy of GENERAL MOTORS CORP.

1. Install the splash shield to the steering knuckle. Align the splash shield to the steering knuckle threaded holes.
2. Install the wheel hub and bearing to the steering knuckle. Align the threaded holes.

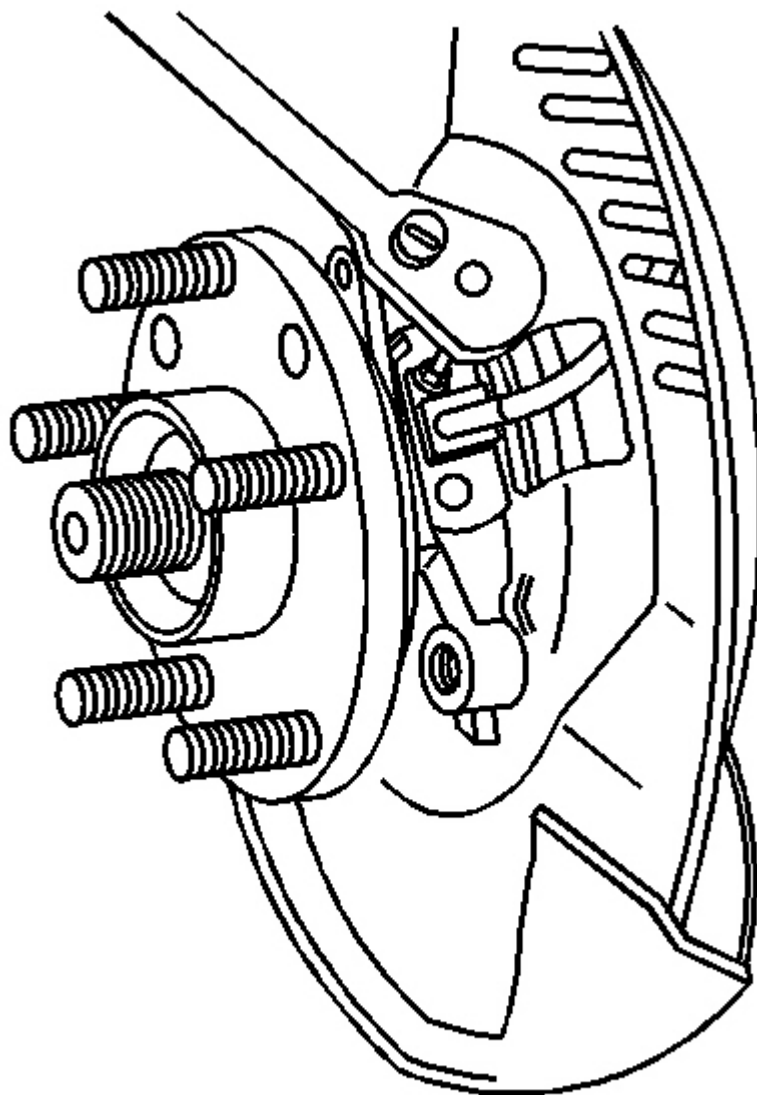


**Fig. 45: View Of Wheel Hub & Bearing Mounting Bolts (RWD)**  
Courtesy of GENERAL MOTORS CORP.

**NOTE:** Refer to Fastener Notice .

3. Install the wheel hub and bearing to the steering knuckle mounting bolts.

**Tighten:** Tighten the wheel hub and bearing mounting bolts to 105 N.m (77 lb ft).



**Fig. 46: Removing/Installing Wheel Speed Sensor Mounting Bolt**  
Courtesy of GENERAL MOTORS CORP.

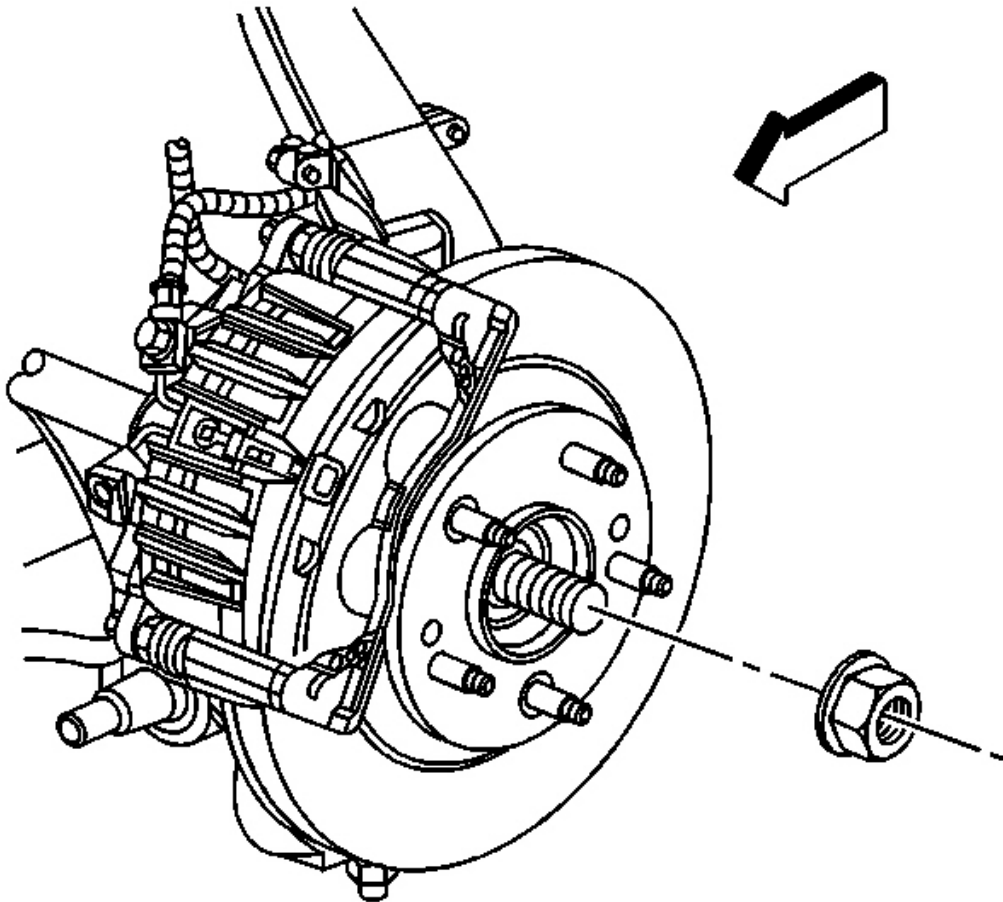
4. Install the ABS sensor to the wheel hub and bearing.
5. Install the ABS sensor mounting bolt to the wheel hub and bearing.

**Tighten:** Tighten the ABS sensor to the wheel hub and bearing mounting bolt to 18 N.m (13 lb ft).

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.

## **FRONT WHEEL HUB, BEARING & SEAL REPLACEMENT (4WD)**

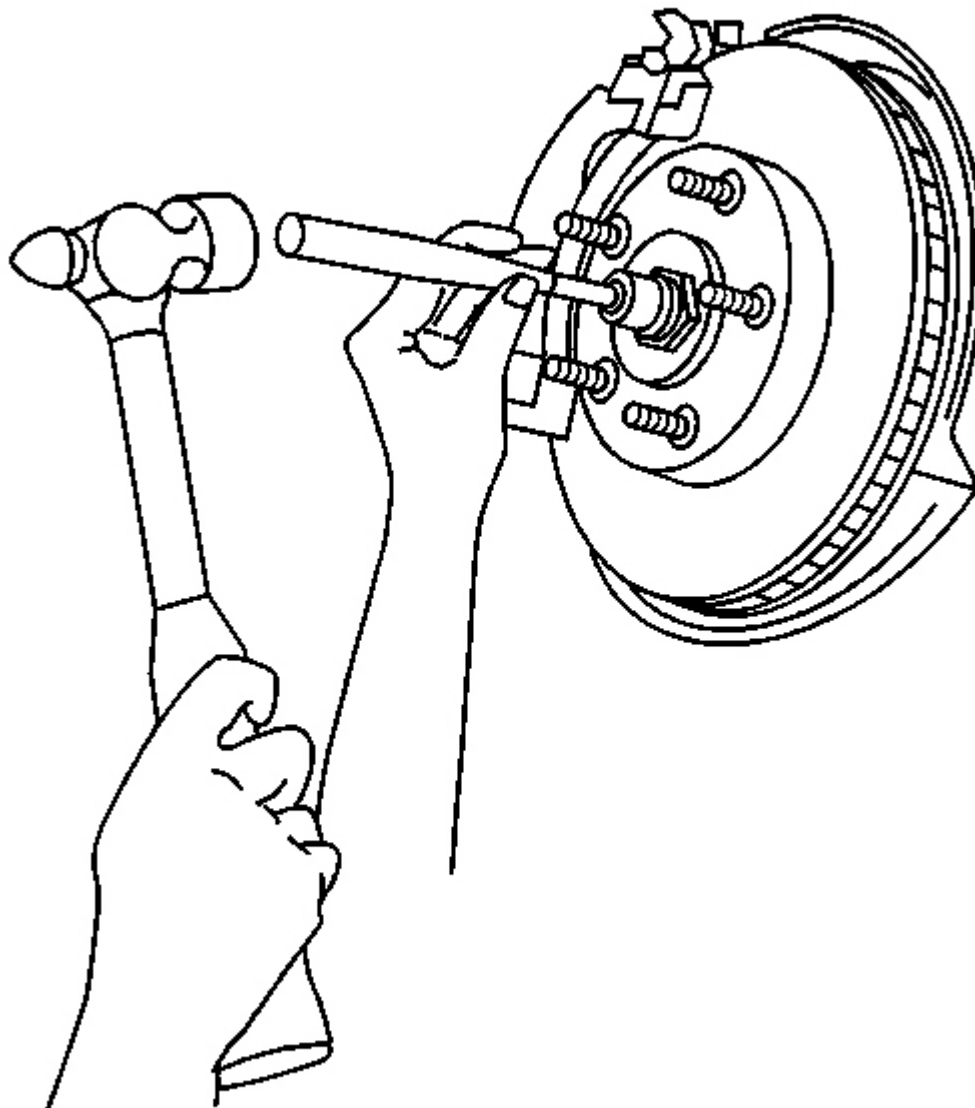
### **Removal Procedure**



**Fig. 47: View of Wheel Drive Shaft Nut**  
**Courtesy of GENERAL MOTORS CORP.**

1. Remove the tire and wheel center cap.
2. Remove the drive axle nut.
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

4. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
5. Remove the brake rotor. Refer to **Front Brake Rotor Replacement** .

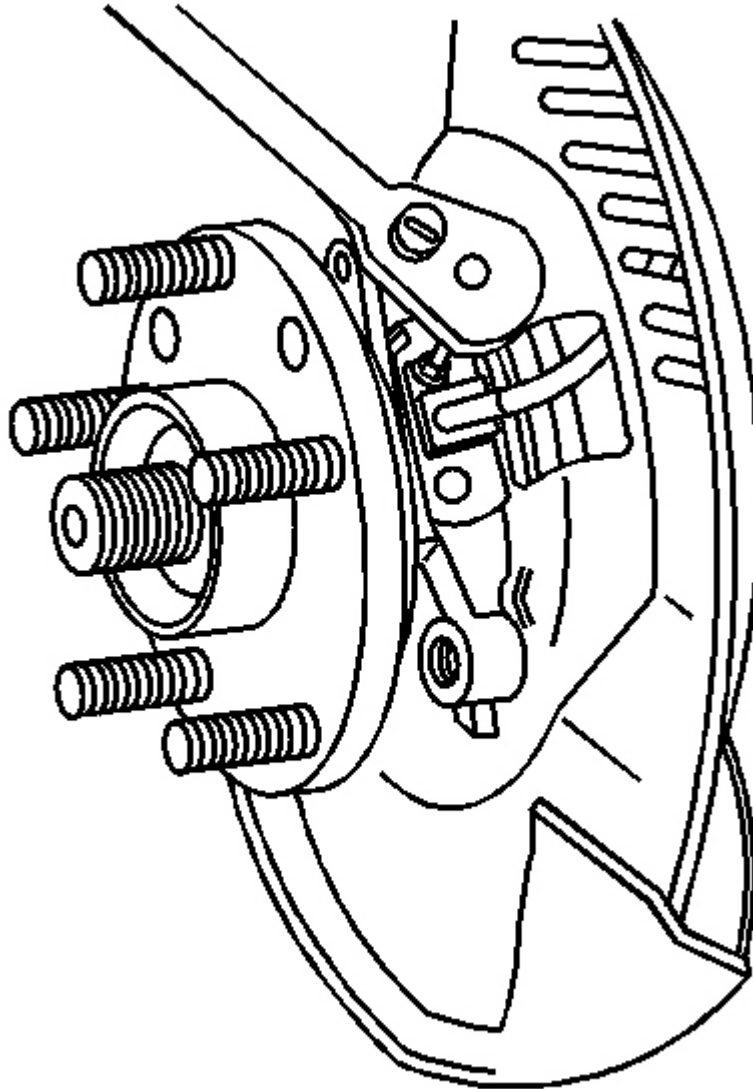


**Fig. 48: Disengaging Wheel Drive Shaft From Wheel Hub & Bearing**  
Courtesy of GENERAL MOTORS CORP.

6. Disengage the wheel drive shaft from the wheel hub and bearing. Place a brass drift against the outer end

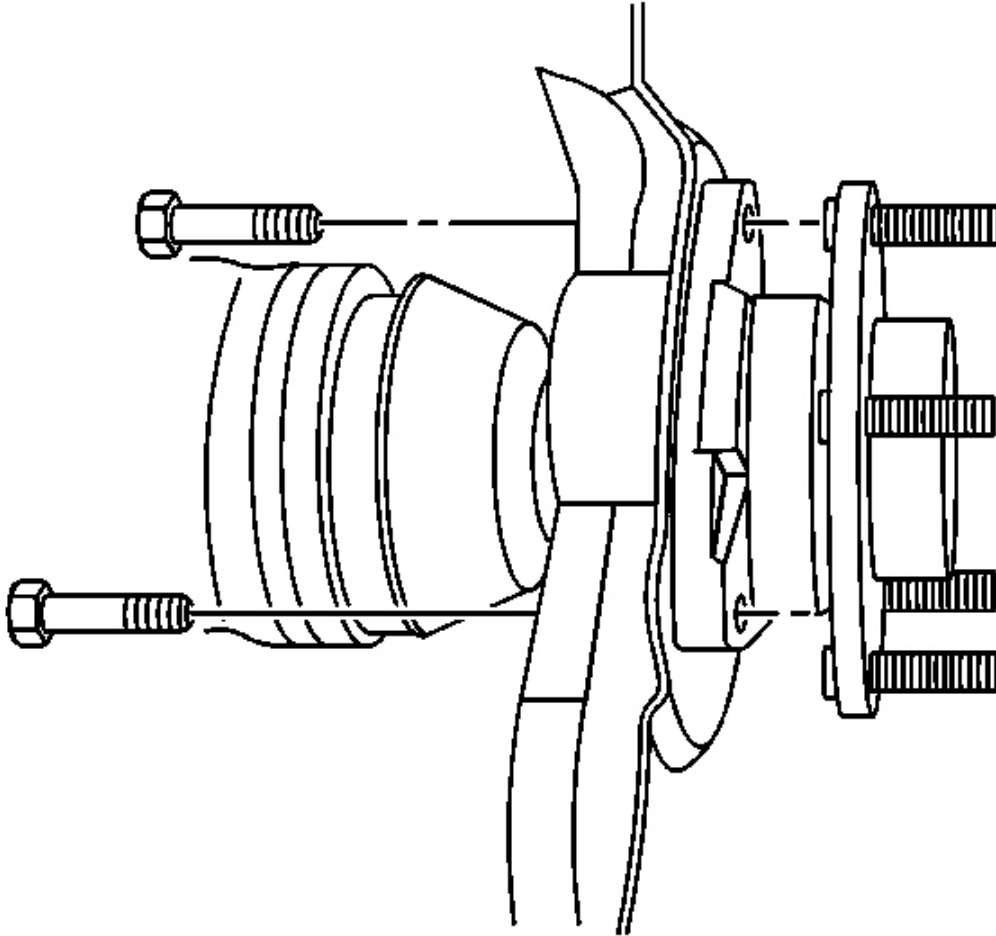


of the wheel drive shaft in order to protect the wheel drive shaft threads. Sharply strike the brass drift with the hammer. Do not attempt to remove the wheel drive shaft from the wheel hub and bearing at this time.



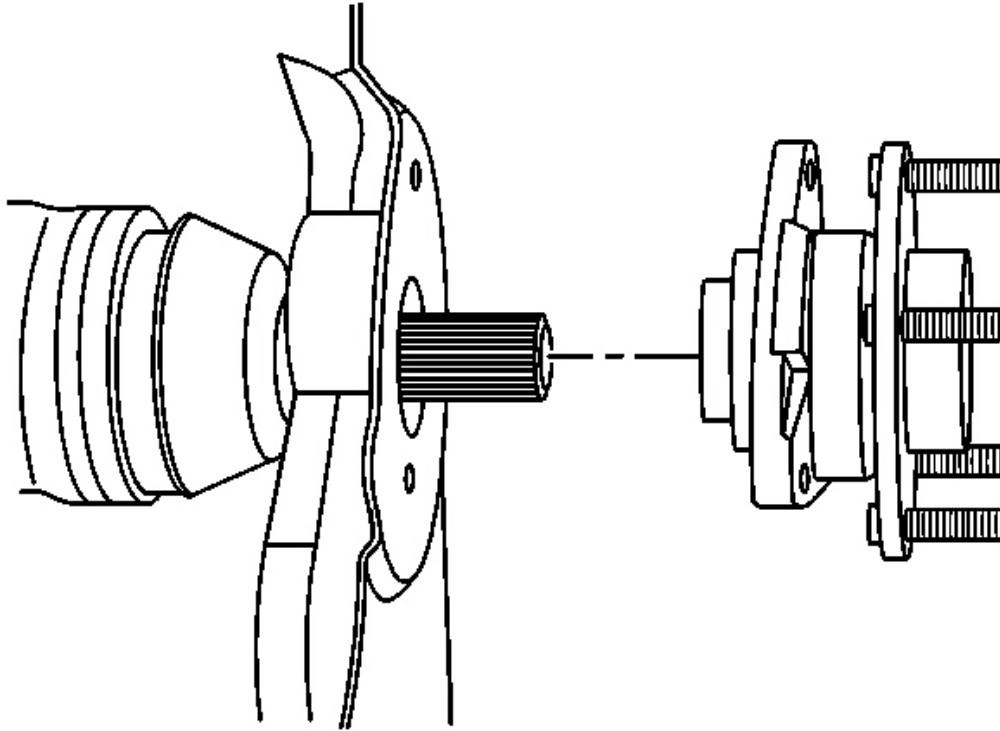
**Fig. 49: Removing/Installing Wheel Speed Sensor Mounting Bolt**  
Courtesy of GENERAL MOTORS CORP.

7. Remove the ABS sensor mounting bolt from the wheel hub and bearing.
8. Remove the ABS sensor from the wheel hub and bearing.



**Fig. 50: Wheel Hub & Bearing Mounting Bolts (4WD)**  
Courtesy of GENERAL MOTORS CORP.

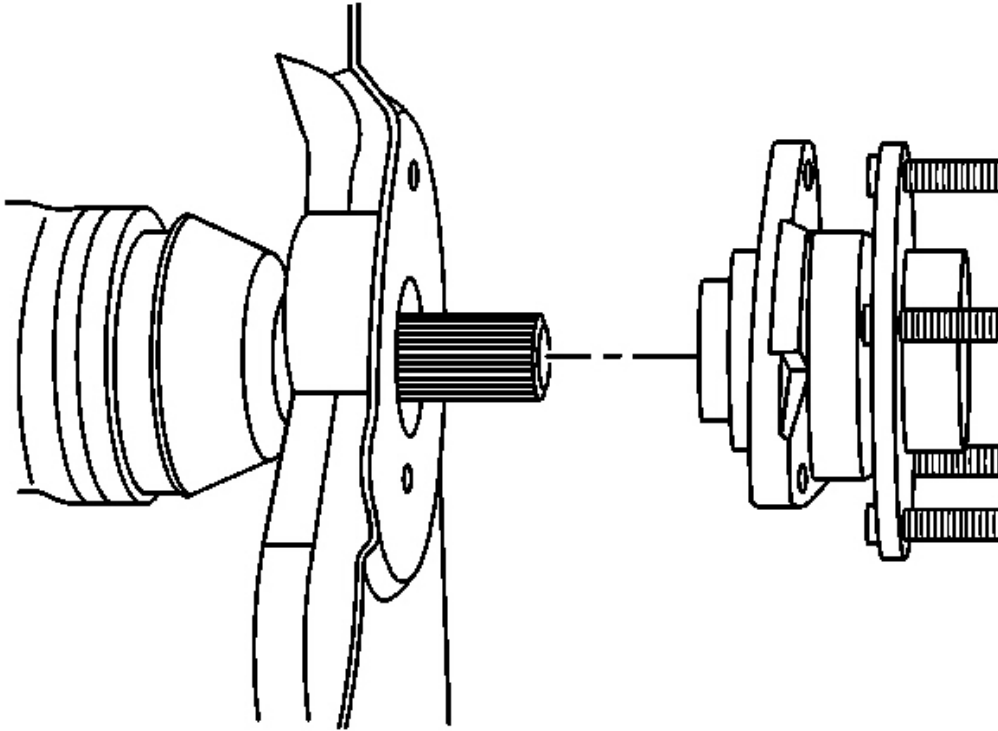
9. Remove the wheel hub and bearing to the steering knuckle mounting bolts.



**Fig. 51: Wheel Hub, Bearing, Splash Shield & Steering Knuckle (4WD)**  
Courtesy of GENERAL MOTORS CORP.

10. Remove the wheel hub and bearing from the steering knuckle.
11. Remove the splash shield from the steering knuckle.

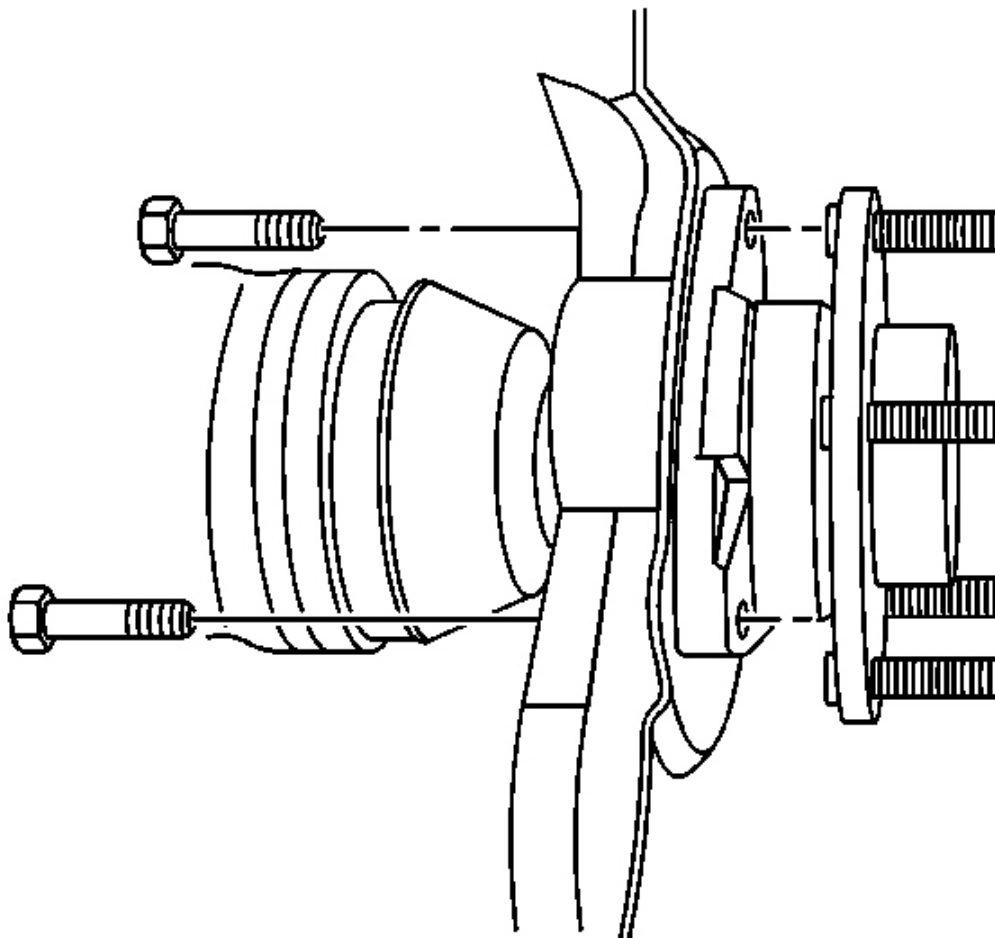
**Installation Procedure**



**Fig. 52: Wheel Hub, Bearing, Splash Shield & Steering Knuckle (4WD)**

**Courtesy of GENERAL MOTORS CORP.**

1. Install the splash shield to the steering knuckle. Align the splash shield to the steering knuckle threaded holes.
2. Install the wheel hub and bearing to the steering knuckle. Align the threaded holes.

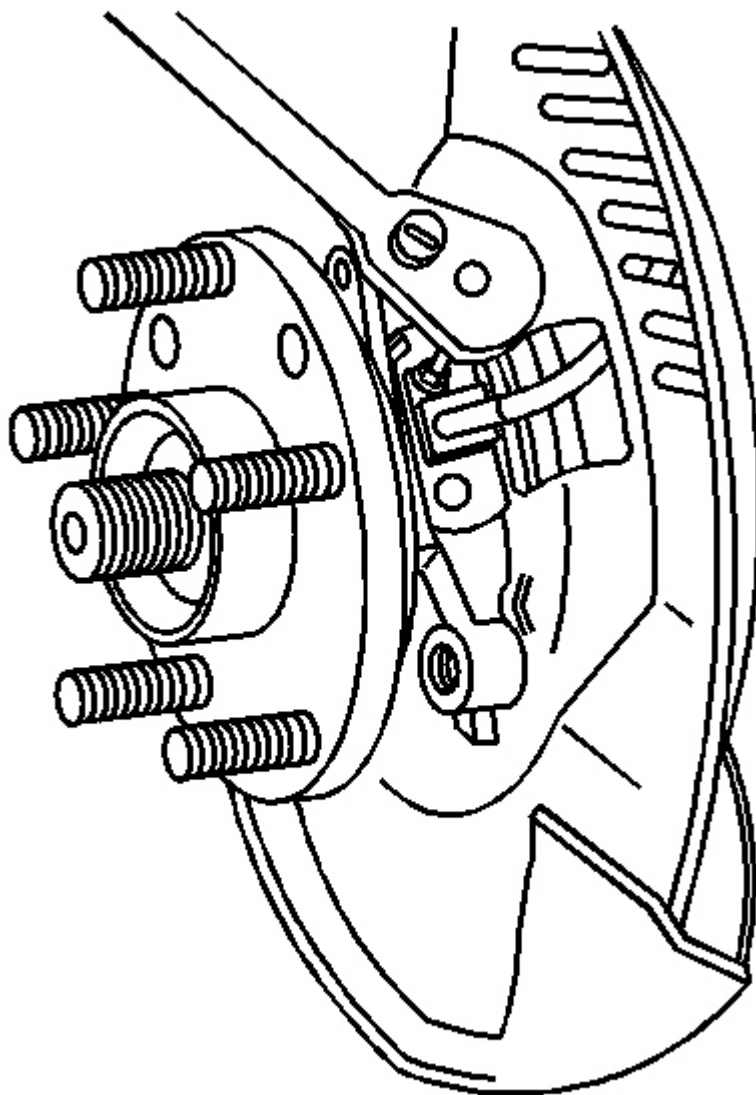


**Fig. 53: Wheel Hub & Bearing Mounting Bolts (4WD)**  
Courtesy of GENERAL MOTORS CORP.

**NOTE:** Refer to Fastener Notice .

3. Install the wheel hub and bearing to the steering knuckle mounting bolts.

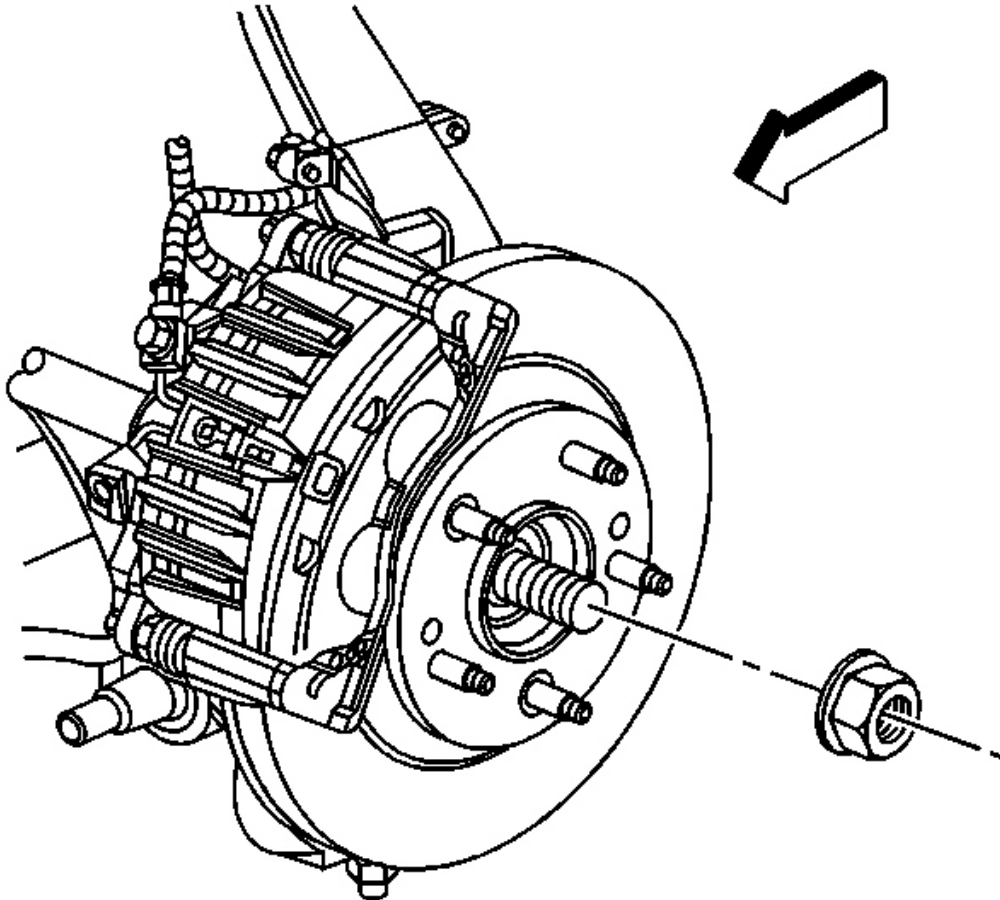
**Tighten:** Tighten the wheel hub and bearing mounting bolts to 105 N.m (77 lb ft).



**Fig. 54: Removing/Installing Wheel Speed Sensor Mounting Bolt**  
Courtesy of GENERAL MOTORS CORP.

4. Install the ABS sensor to the wheel hub and bearing.
5. Install the ABS sensor mounting bolt to the wheel hub and bearing.

**Tighten:** Tighten the ABS sensor to the wheel hub and bearing mounting bolt to 18 N.m (13 lb ft).



**Fig. 55: View of Wheel Drive Shaft Nut**  
Courtesy of GENERAL MOTORS CORP.

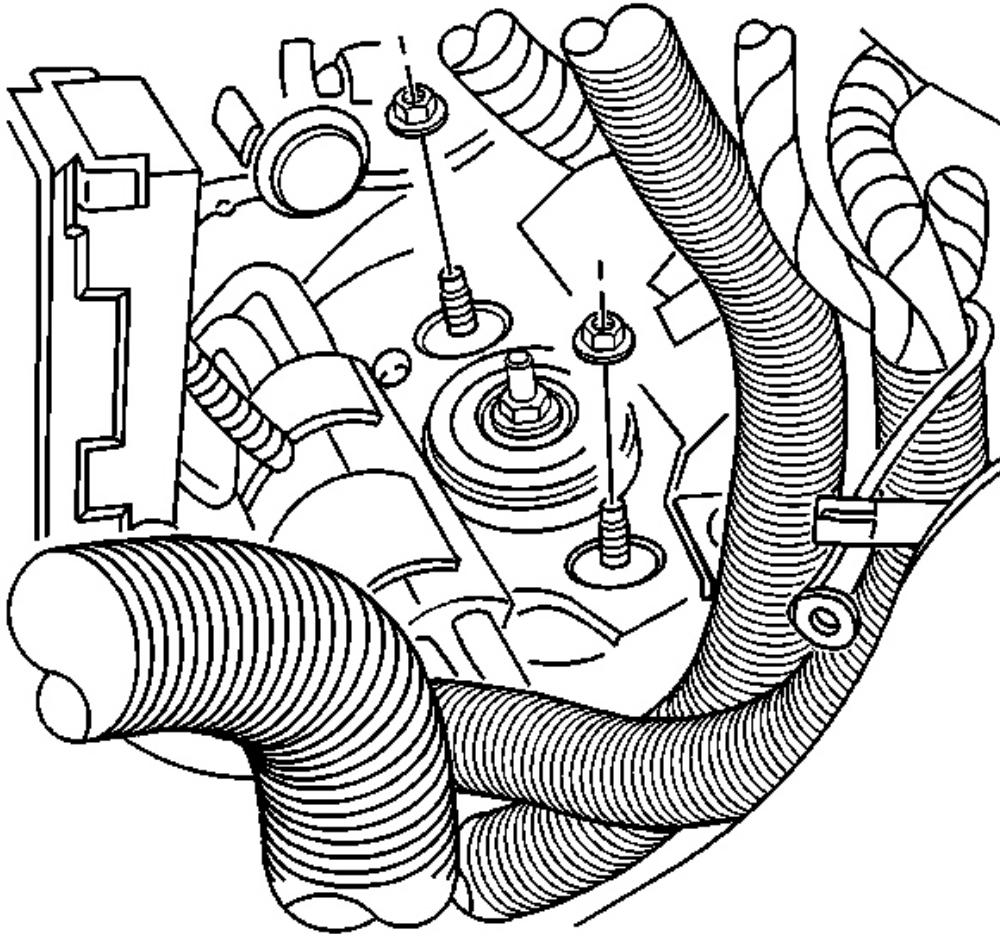
6. Install the brake rotor. Refer to **Front Brake Rotor Replacement** .
7. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
8. Lower the vehicle.
9. Install the drive axle nut and draw the hub and bearing onto the axle.

**Tighten:** Tighten the drive axle nut to 140 N.m (103 lb ft).

10. Install the tire and wheel center cap.

## SHOCK ABSORBER & SPRING ASSEMBLY REPLACEMENT

## Removal Procedure



**Fig. 56: View Of Shock Module Upper Retaining Nuts**  
Courtesy of GENERAL MOTORS CORP.

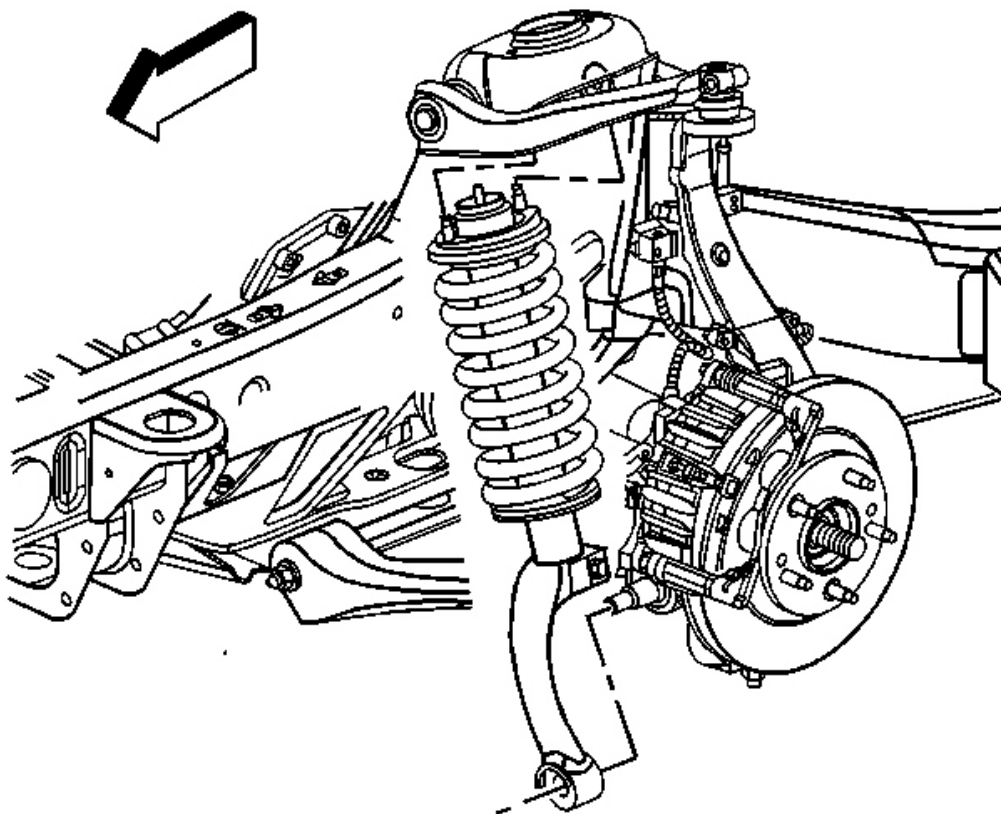
1. Remove the shock module upper retaining nuts.

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

2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .



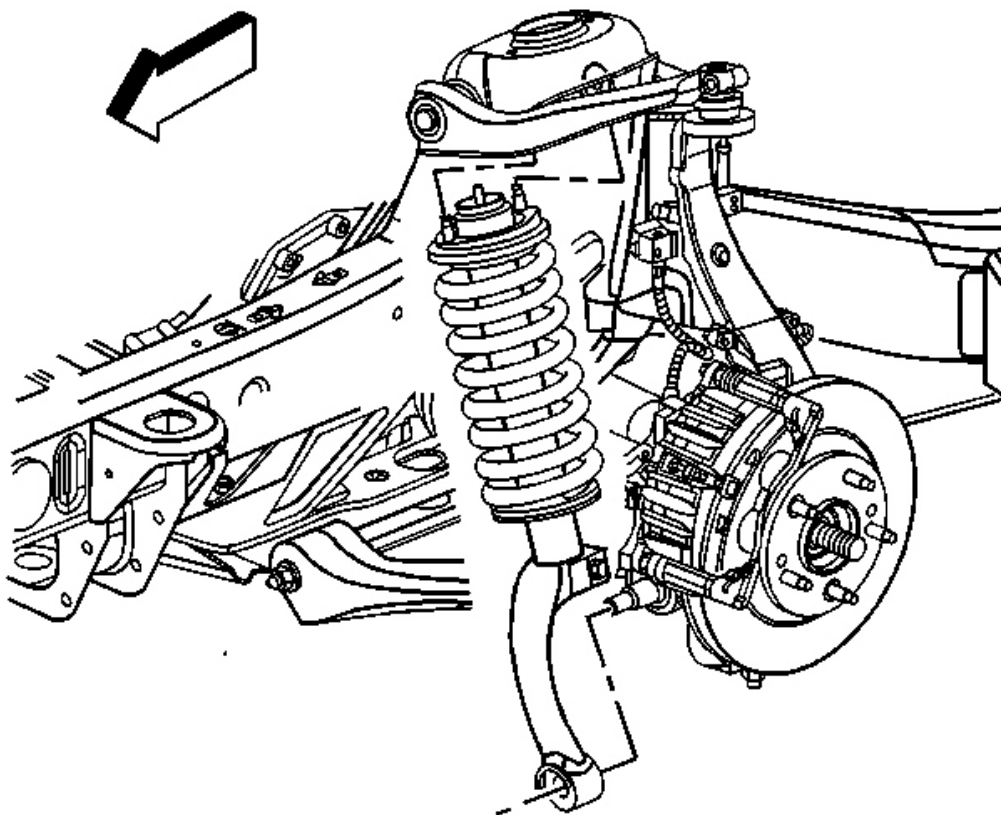
4. Remove the shock module yoke from the lower control arm. Refer to **Front Shock Absorber Yoke Replacement**.



**Fig. 57: View Of Shock Module**  
Courtesy of GENERAL MOTORS CORP.

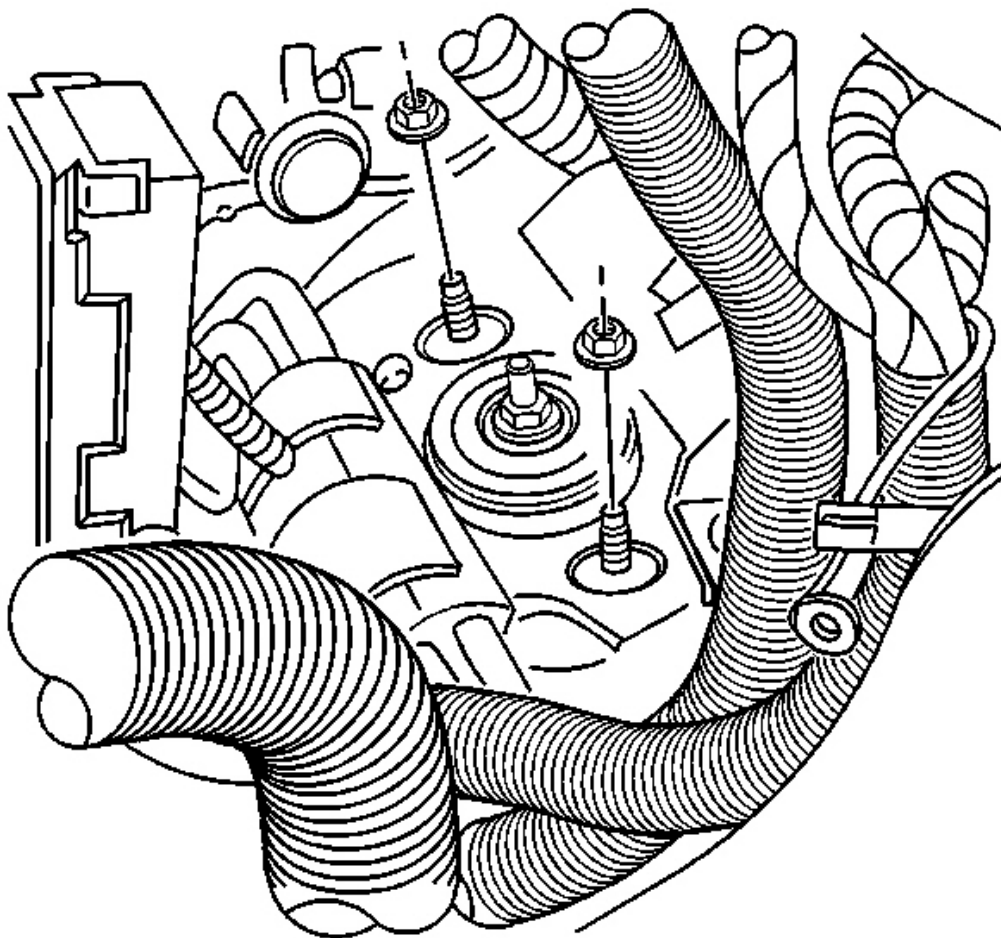
5. Remove the shock module from the shock tower and lower control arm.

#### **Installation Procedure**



**Fig. 58: View Of Shock Module**  
Courtesy of GENERAL MOTORS CORP.

1. Install the shock module to the shock tower and lower control arm.
2. Install the shock module yoke to the lower control arm. Refer to **Front Shock Absorber Yoke Replacement**.
3. Lower the vehicle.



**Fig. 59: View Of Shock Module Upper Retaining Nuts**  
Courtesy of GENERAL MOTORS CORP.

**NOTE:** Refer to Fastener Notice .

4. Install the shock module upper retaining nuts.

**Tighten:** Tighten the shock module upper retaining nuts to 45 N.m (33 lb ft).

5. Raise the vehicle.
6. Install the tire and wheel. Refer to Tire and Wheel Removal and Installation .
7. Remove the support and lower the vehicle.

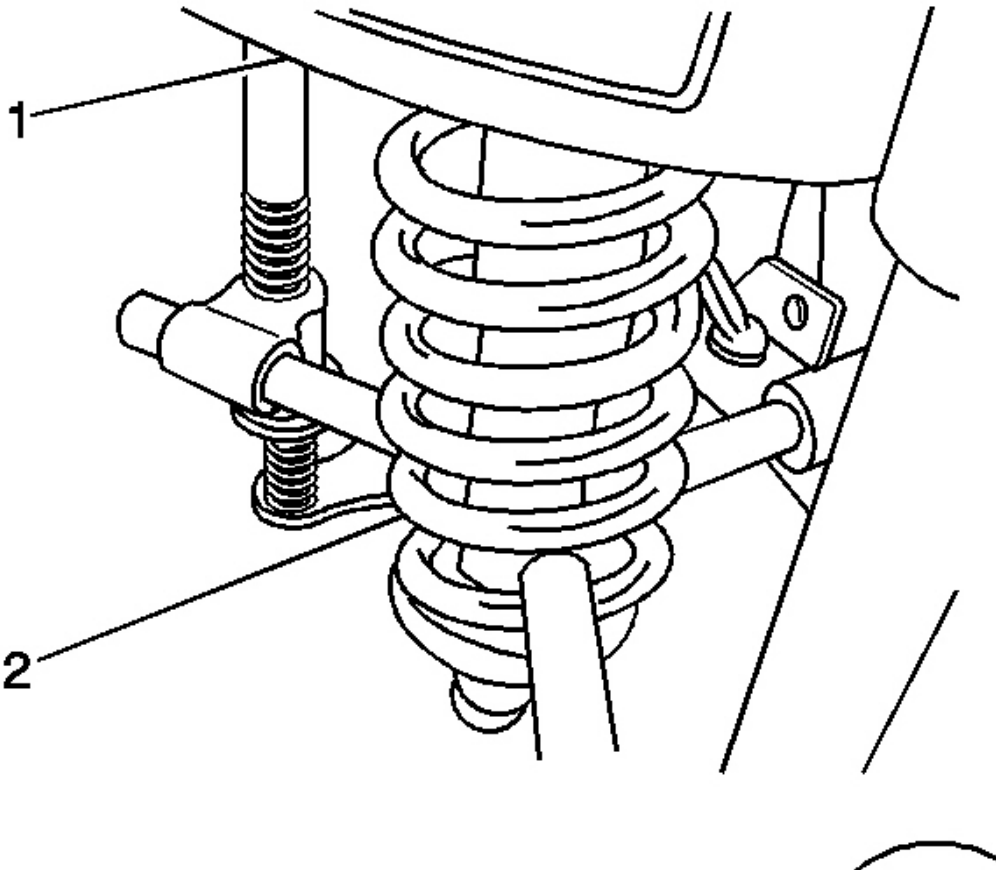
## **SHOCK, SHOCK COMPONENT & SPRING REPLACEMENT**

### **Special Tools**

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

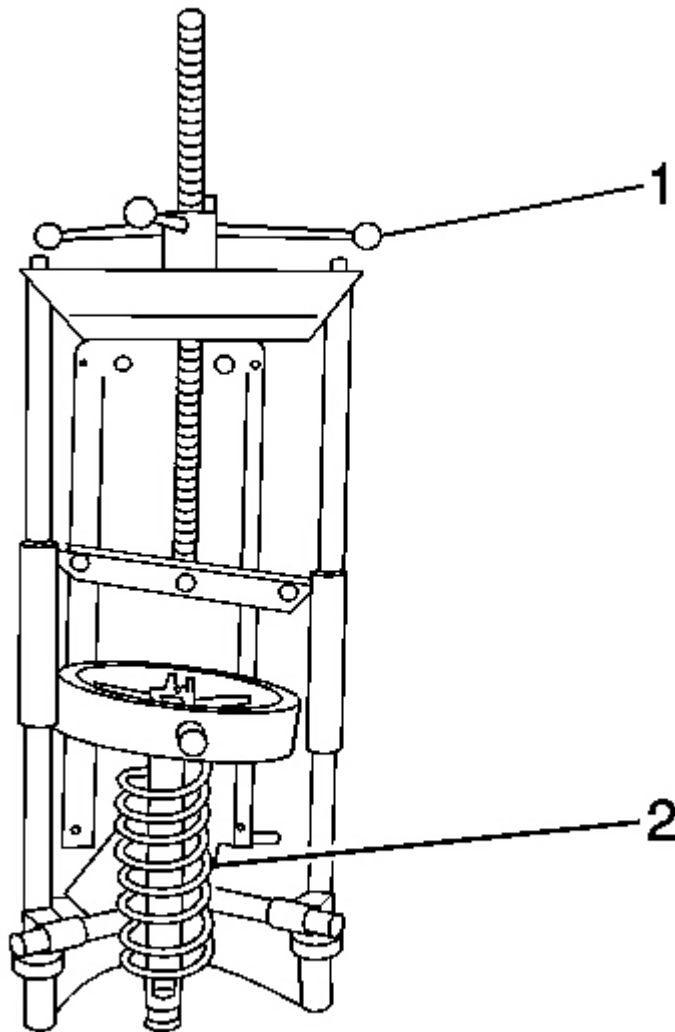
### **Removal Procedure**

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 shock absorber to shock absorber yoke bolt. Refer to **Front Shock Absorber Yoke Replacement**.
4. Remove the shock absorber assembly from the vehicle. Refer to **Shock Absorber and Spring Assembly Replacement**.



**Fig. 60: Compressing/Releasing Lower Part Of Shock Spring**  
Courtesy of GENERAL MOTORS CORP.

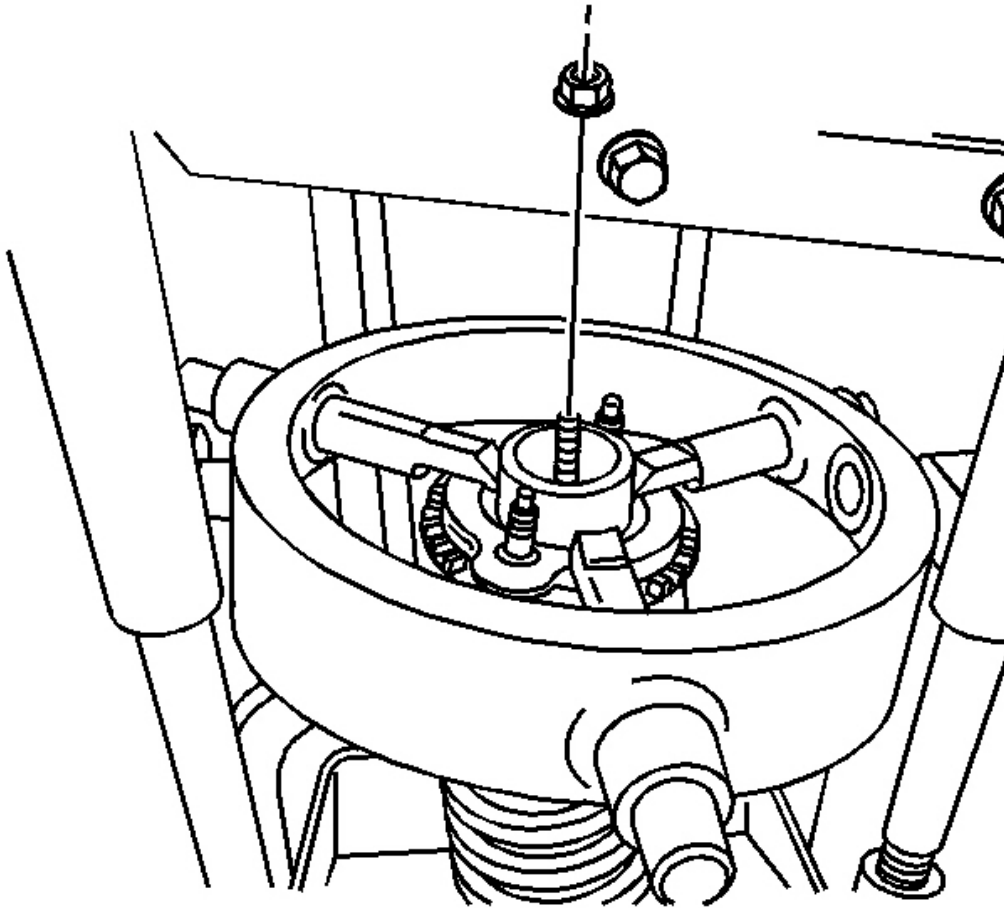
5. Install pieces of heater hose to the front spring where **J 45400** contacts lower part of front spring. See **Special Tools**.
6. Install the shock absorber assembly (2) into the **J 45400** (1). See **Special Tools**.



**Fig. 61: View Of Compressor Forcing Screw & Coil Spring**  
Courtesy of GENERAL MOTORS CORP.

**IMPORTANT:** The front spring is compressed when the shock absorber moves freely.

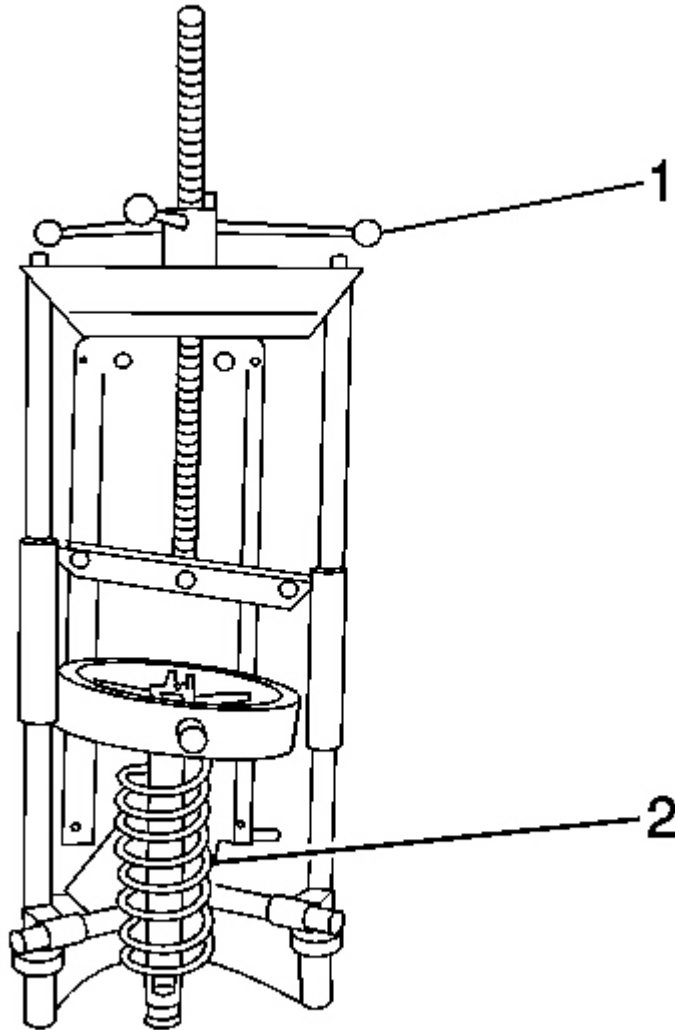
7. Turn the spring compressor adjusting screw (1) until the front spring (2) is compressed.



**Fig. 62: View Of Shock Absorber Upper Retaining Nut**  
Courtesy of GENERAL MOTORS CORP.

8. Remove the shock absorber nut and suspension washer.
9. Remove the shock absorber from the front spring.
10. Loosen the spring compressor until the front spring insulator can be removed.
11. Remove the front spring insulator and the front spring from the **J 45400** . See **Special Tools**.
12. Remove the front shock absorber retainer, front shock absorber boot and the front shock absorber upper bumper from the front shock absorber.

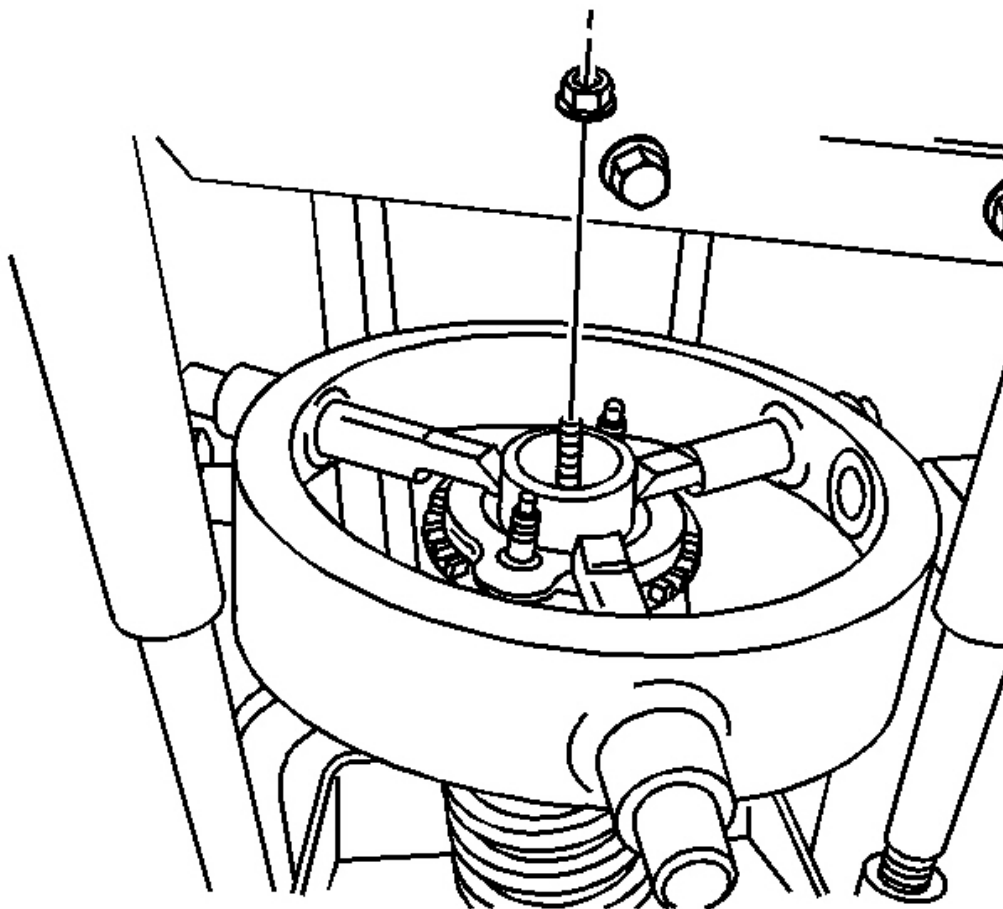
**Installation Procedure**



**Fig. 63: View Of Compressor Forcing Screw & Coil Spring**  
Courtesy of GENERAL MOTORS CORP.

1. Install the front spring and the front spring insulator in the **J 45400** . See **Special Tools**.
2. Turn the spring compressor adjusting screw (1) until the coil spring is compressed.
3. Install the lower front spring insulator, front shock absorber upper bumper, front shock absorber boot, front shock retainer, front suspension washer on to the shock absorber.

4. Install the shock absorber to the **J 45400** . See **Special Tools**.
5. Install the front suspension washer on the shock absorber.



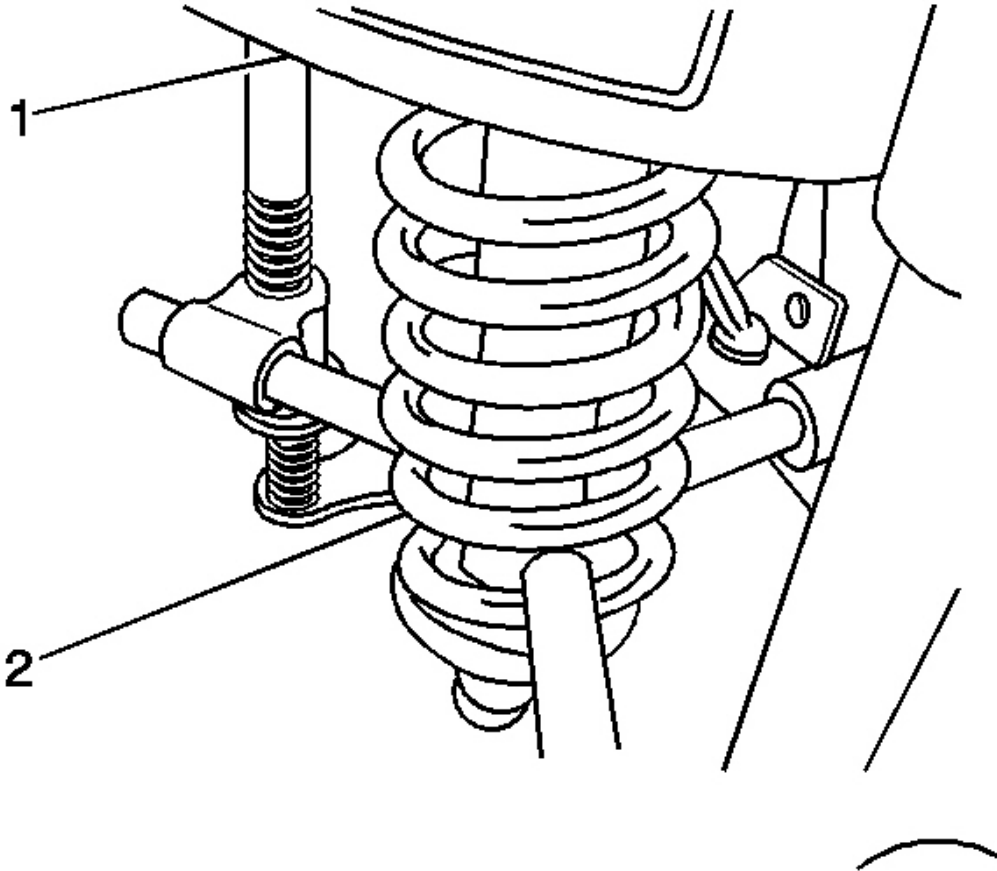
**Fig. 64: View Of Shock Absorber Upper Retaining Nut**  
Courtesy of GENERAL MOTORS CORP.

**NOTE:** Refer to **Fastener Notice** .

6. Install the shock absorber nut.

**Tighten:** Tighten the shock absorber nut to 45 N.m (33 lb ft).





**Fig. 65: Compressing/Releasing Lower Part Of Shock Spring**  
Courtesy of GENERAL MOTORS CORP.

7. Remove the shock absorber assembly (2) from the **J 45400** (1). See **Special Tools**.
8. Remove the pieces of heater hose from the front spring.
9. Install the shock absorber assembly in the vehicle. Refer to **Shock Absorber and Spring Assembly Replacement**.
10. Install the shock module yoke to the shock absorber bolt. Refer to **Front Shock Absorber Yoke Replacement**.
11. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation**.
12. Lower the vehicle.

## **FRONT SHOCK ABSORBER YOKE REPLACEMENT**

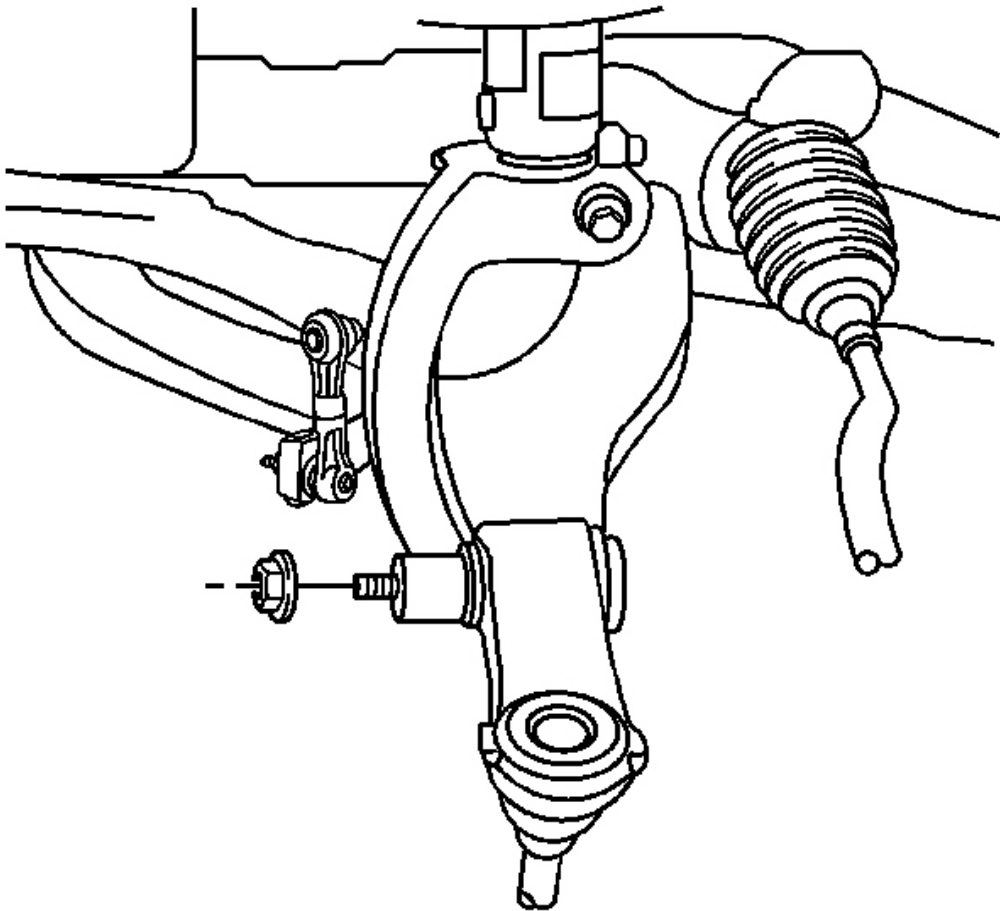
## 2008 Isuzu Ascender LS

2008 SUSPENSION Front Suspension - Ascender, Envoy & Trailblazer

### Special Tools

**J 24319-B** Steering Linkage and Tie Rod Puller

### Removal Procedure

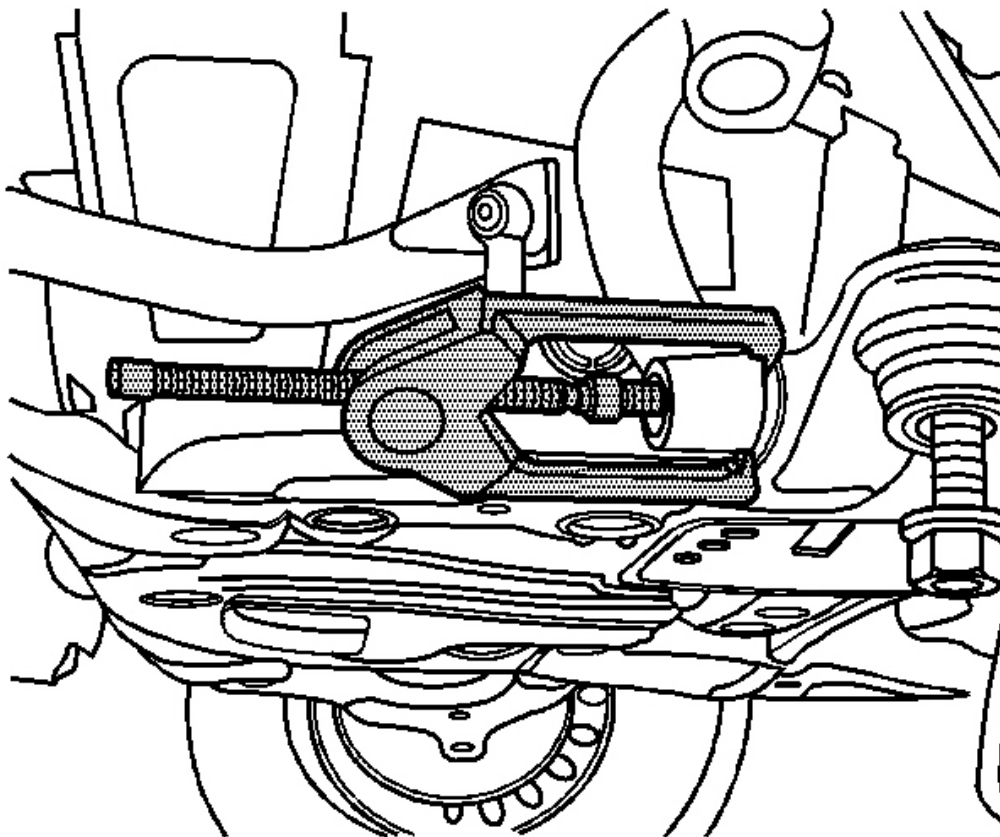


**Fig. 66: View Of Shock Module Yoke To Lower Control Arm Retaining Nut**  
Courtesy of GENERAL MOTORS CORP.

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** .

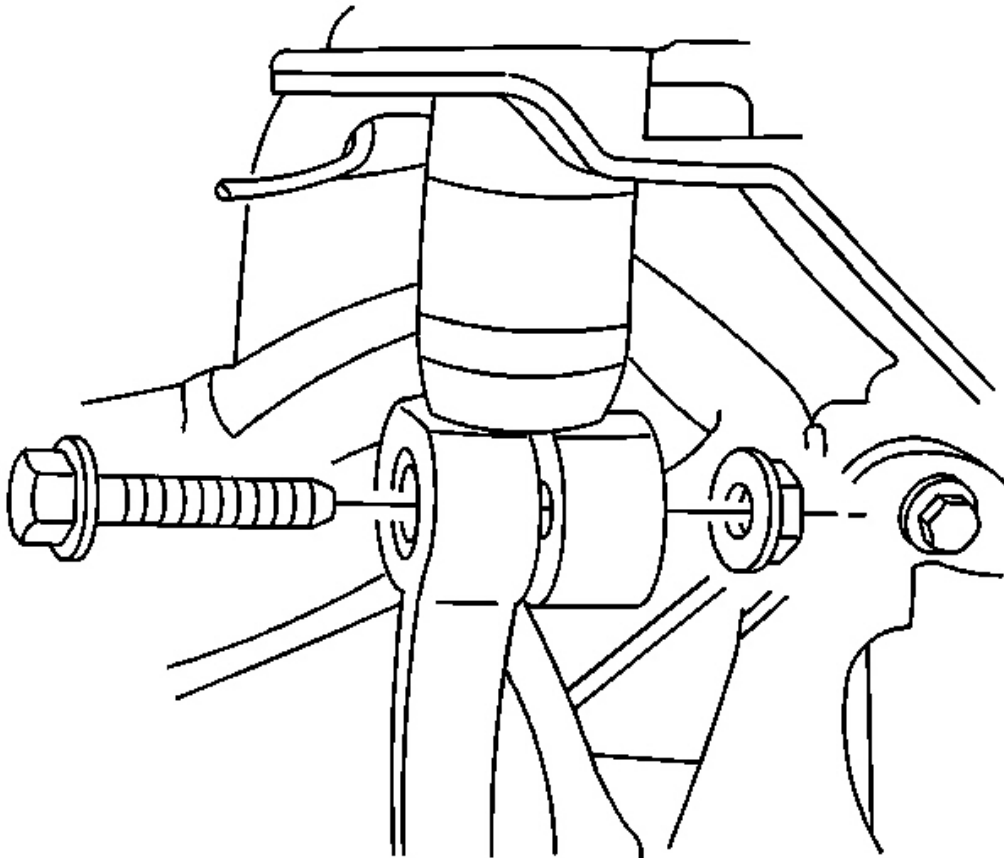
**IMPORTANT:** The lower control arm must be supported so that the ball is not over extended.

3. Support the lower control arm with an appropriate jack stand.
4. Remove the shock module yoke to lower control arm mounting nut.



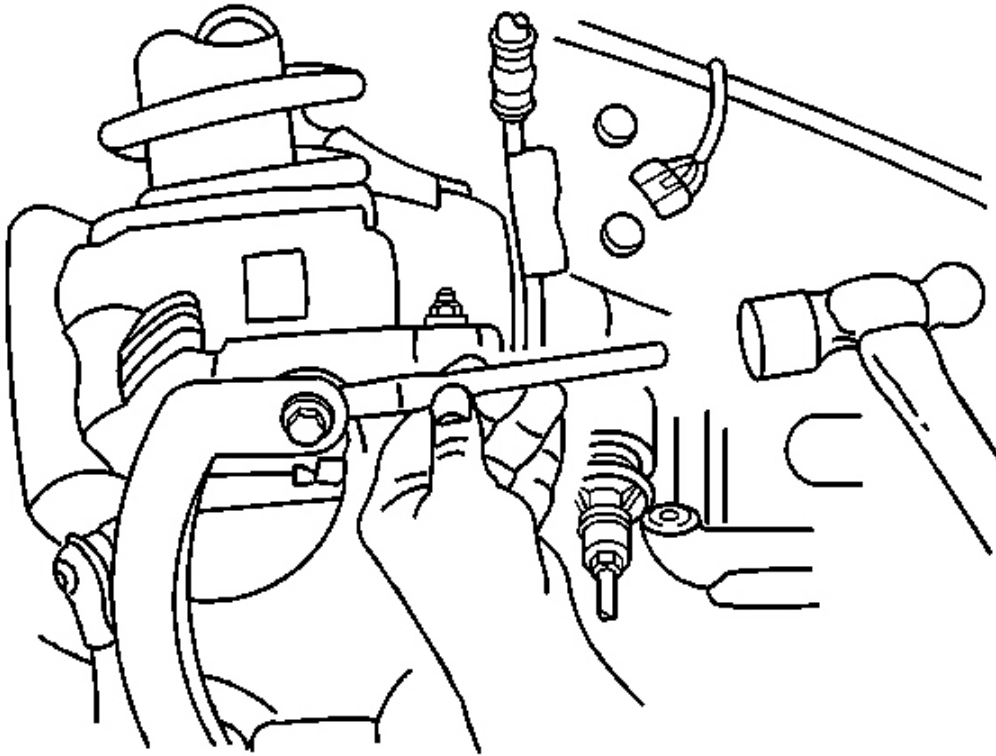
**Fig. 67: Disconnecting Shock Module Yoke From Lower Control Arm**  
Courtesy of GENERAL MOTORS CORP.

5. Using the **J 24319-B** , remove the shock module yoke from the lower control.



**Fig. 68: View Of Shock Module Yoke To Shock Absorber Pinch Bolt & Nut**  
Courtesy of GENERAL MOTORS CORP.

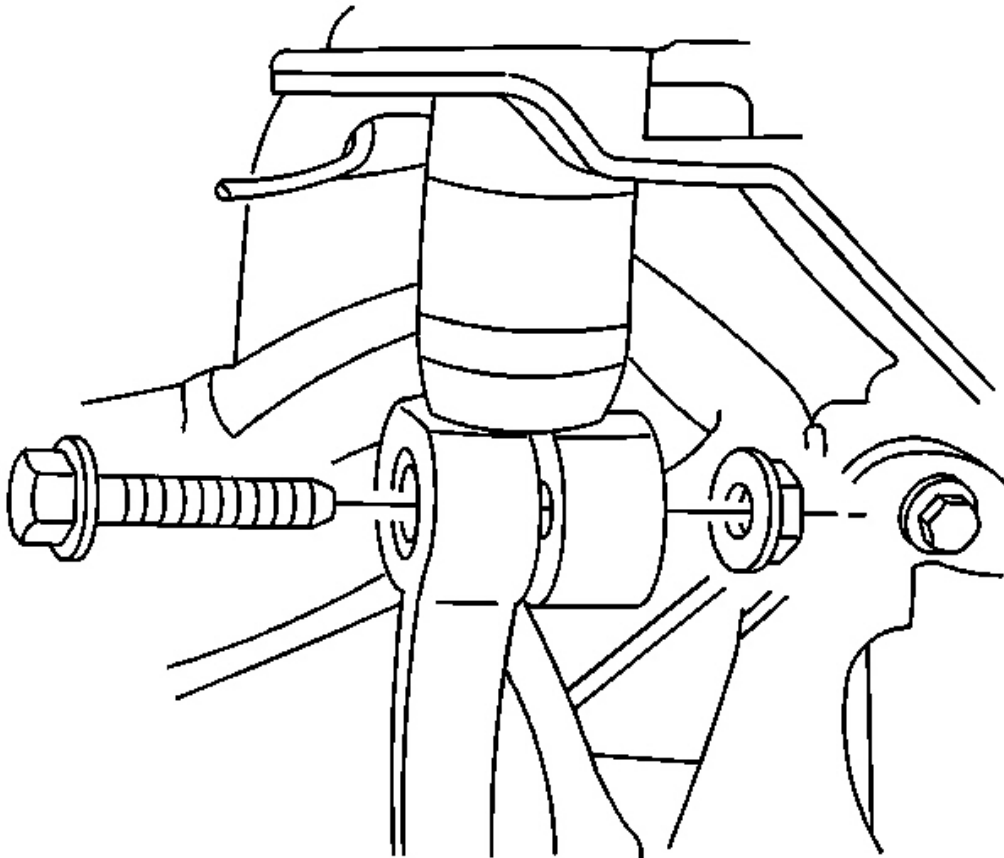
6. Remove the shock module yoke to shock absorber bolt and nut.



**Fig. 69: Spreading Shock Module Yoke**  
**Courtesy of GENERAL MOTORS CORP.**

7. Using a flat bladed tool, spread the shock module yoke at the bolt.
8. Remove the shock module yoke from the shock absorber.

#### **Installation Procedure**



**Fig. 70: View Of Shock Module Yoke To Shock Absorber Pinch Bolt & Nut**  
Courtesy of GENERAL MOTORS CORP.

**IMPORTANT:** Ensure that the shock absorber is fully seated in the yoke.

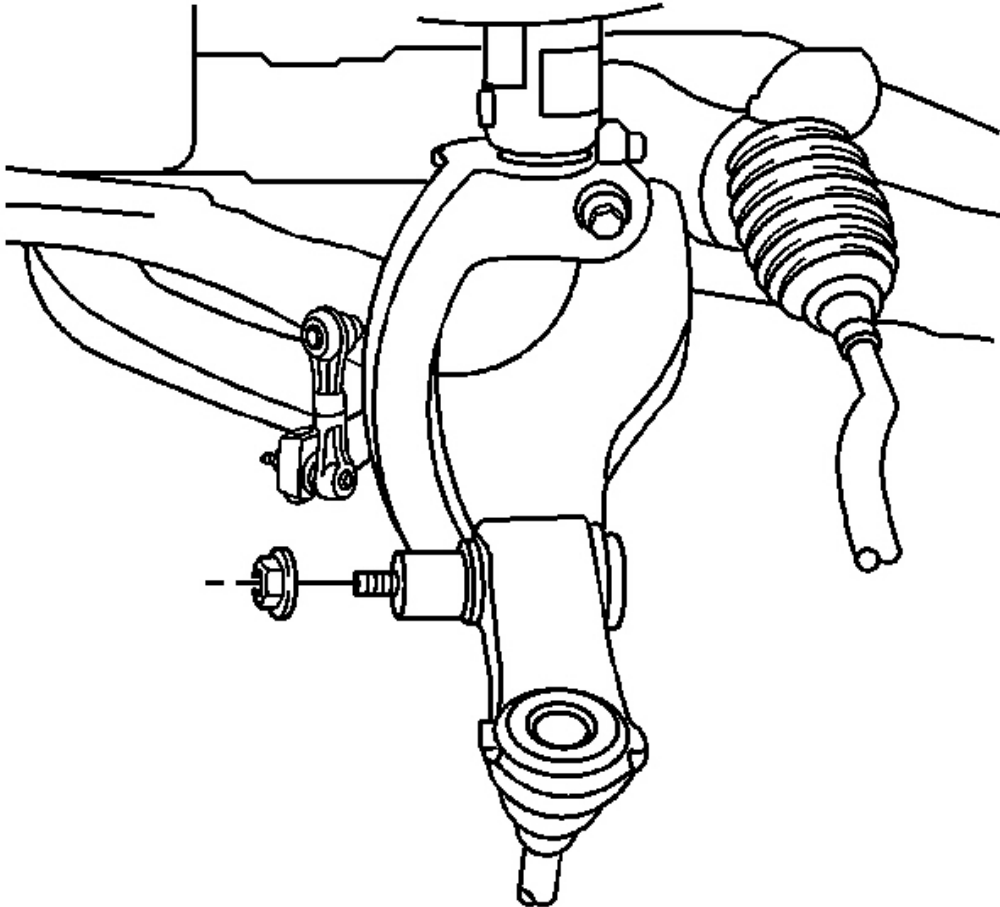
1. Install the shock module yoke to the lower control arm stud and shock absorber.

**IMPORTANT:** The bolt that secures the shock absorber to the shock absorber yoke moves freely to ensure the proper alignment of the shock absorber yoke to the lower control arm.

**NOTE:** Refer to Fastener Notice .

2. Install the shock module yoke to shock absorber bolt and nut.

**Tighten:** Tighten the shock module yoke to shock absorber bolt to 70 N.m (52 lb ft).



**Fig. 71: View Of Shock Module Yoke To Lower Control Arm Retaining Nut**  
Courtesy of GENERAL MOTORS CORP.

3. Install the shock module yoke to lower control arm mounting nut.

**Tighten:** Tighten the shock module yoke to lower control arm mounting nut to 111 N.m (82 lb ft).

4. Remove the jack stand from the lower control arm.
5. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .
6. Lower the vehicle.

## SHOCK ABSORBER DISPOSAL

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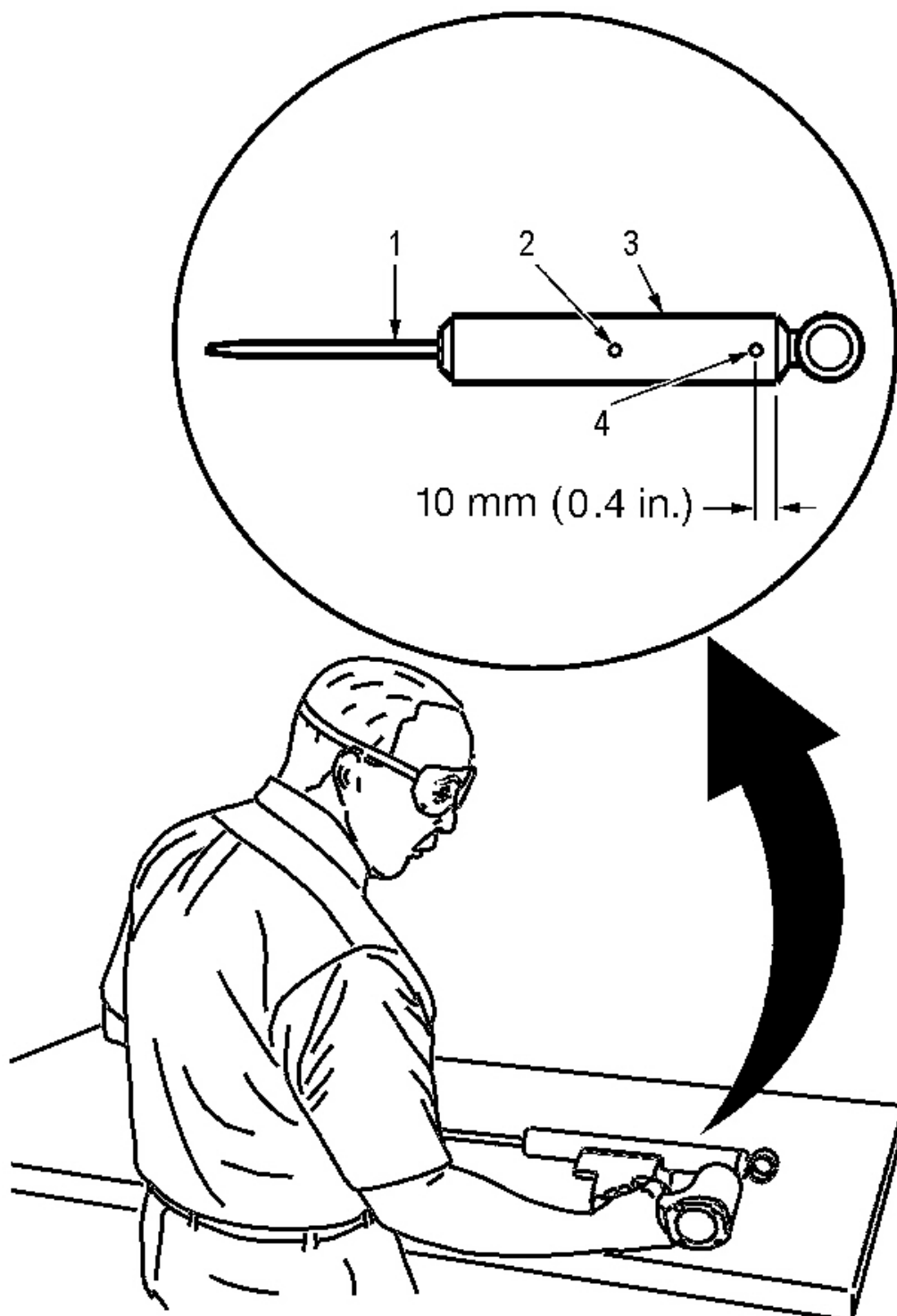
**CAUTION:** Gas charged shock absorbers contain high pressure gas. Do not remove the snap ring from inside the top of the tube. If the snap ring is removed, the contents of the shock absorber will come out with extreme force which may result in personal injury.

**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. 72: 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 & OPERATION**

### **GENERAL DESCRIPTION (COIL SPRING)**

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 vehicle's 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 an upper and a lower control arm. 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 control arm attaches to the frame in the same fashion. Between the lower control arm and a spring seat on the vehicle's frame, under tension, is a coil spring.

This up and down motion of the steering knuckle as the vehicle travels over bumps is absorbed predominantly by the coil spring. The vertical movement of the steering knuckle as the vehicle travels over irregular road surfaces will tend to compress the spring and spring tension will lead the spring to return to the original, at-rest state. This action isolates the vehicle from the road surface. The upper and lower control arms are allowed to pivot at the vehicle frame in a vertical fashion. The ball joint allows the steering knuckle to maintain the

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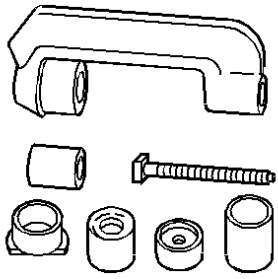
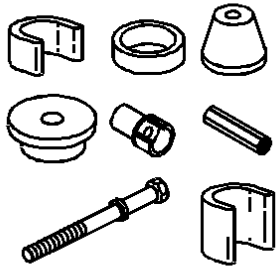
perpendicular relationship to the road surface.

A shock absorber is used in conjunction with this system in order to dampen out the oscillations of the coil spring. A shock absorber is a basic hydraulic cylinder. The shock is filled with oil and has a moveable shaft that connects to a piston inside the shock absorber. 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.

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 vehicle's handling characteristics on turns.

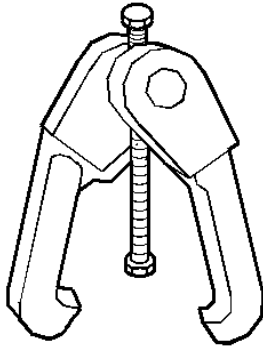
## SPECIAL TOOLS & EQUIPMENT

### SPECIAL TOOLS

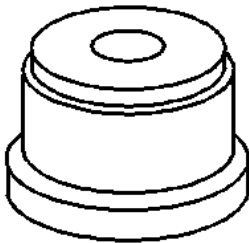
Illustration	Tool Number/Description
	J 9519-E Lower Ball Joint Remover and Installer
	J 21474-01 Control Arm Bushing Service Set

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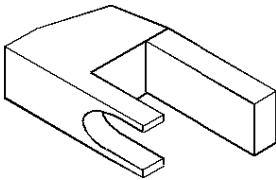
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J 24319-B  
Steering Linkage and Tie Rod Puller



J 34874  
Booster Seal Remover/Installer

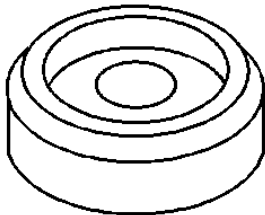
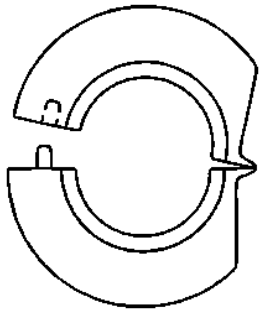
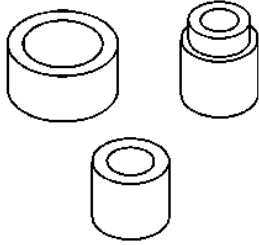


J 36607  
Ball Joint Separator

J 41435  
Ball Joint Remover/Installer Adapter

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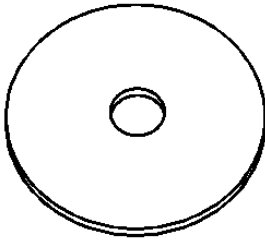
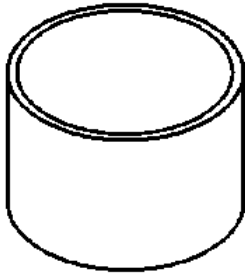
J 43631  
Ball Joint Remover

J 45105-1  
Ball Joint Flaring Adapter

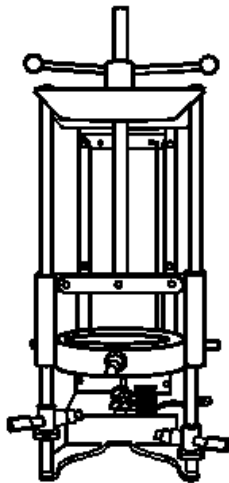
J 45105-2  
Receiver

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J 45117  
Ball Joint Installation Spacer



J 45400  
Strut Spring Compressor