

2004 Isuzu Ascender LS

2004 SUSPENSION Front Suspension - Ascender

2004 SUSPENSION

Front Suspension - Ascender

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Brake Hose Bracket Retaining Bolts	10 N.m	89 in. lb.
Drive Axle Nut	140 N.m	103 ft. lb.
Lower Ball Joint Retaining Nuts	110 N.m	81 ft. lb.
Lower Control Arm Bracket Front Mounting Bolt	265 N.m	195 ft. lb.
Lower Control Arm Bracket Rear Mounting Bolt	240 N.m	177 ft. lb.
Lower Control Arm to the Lower Control Arm Bracket Mounting Nuts	110 N.m	81 ft. lb.
Outer Tie Rod to the Steering Knuckle Retaining Nut	45 N.m	33 ft. lb.
Shock Absorber Retaining Nut	45 N.m	33 ft. lb.
Shock Module Upper Retaining Nuts	45 N.m	33 ft. lb.
Shock Module Yoke to the Lower Control Arm Retaining Nut	110 N.m	81 ft. lb.
Shock Module Yoke to the Shock Absorber Pinch Bolt	70 N.m	52 ft. lb.
Stabilizer Shaft Insulator Clamp Mounting Bolts	55 N.m	41 ft. lb.
Stabilizer Shaft Link Retaining Nuts	145 N.m	107 ft. lb.
Upper Ball Joint Pinch Bolt	40 N.m	30 ft. lb.
Upper Control Arm Mounting Bolts	150 N.m	111 ft. lb.
Wheel Hub and Bearing Mounting Bolts	105 N.m	77 ft. lb.
Wheel Speed Sensor to the Wheel Hub and Bearing Mounting Bolt	18 N.m	13 ft. lb.
Wheel Stud	130 N.m	95 ft. lb.

REPAIR INSTRUCTIONS

STABILIZER SHAFT REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the stabilizer shaft links to the stabilizer shaft retaining nuts. Refer to **Stabilizer Shaft Link Replacement**.

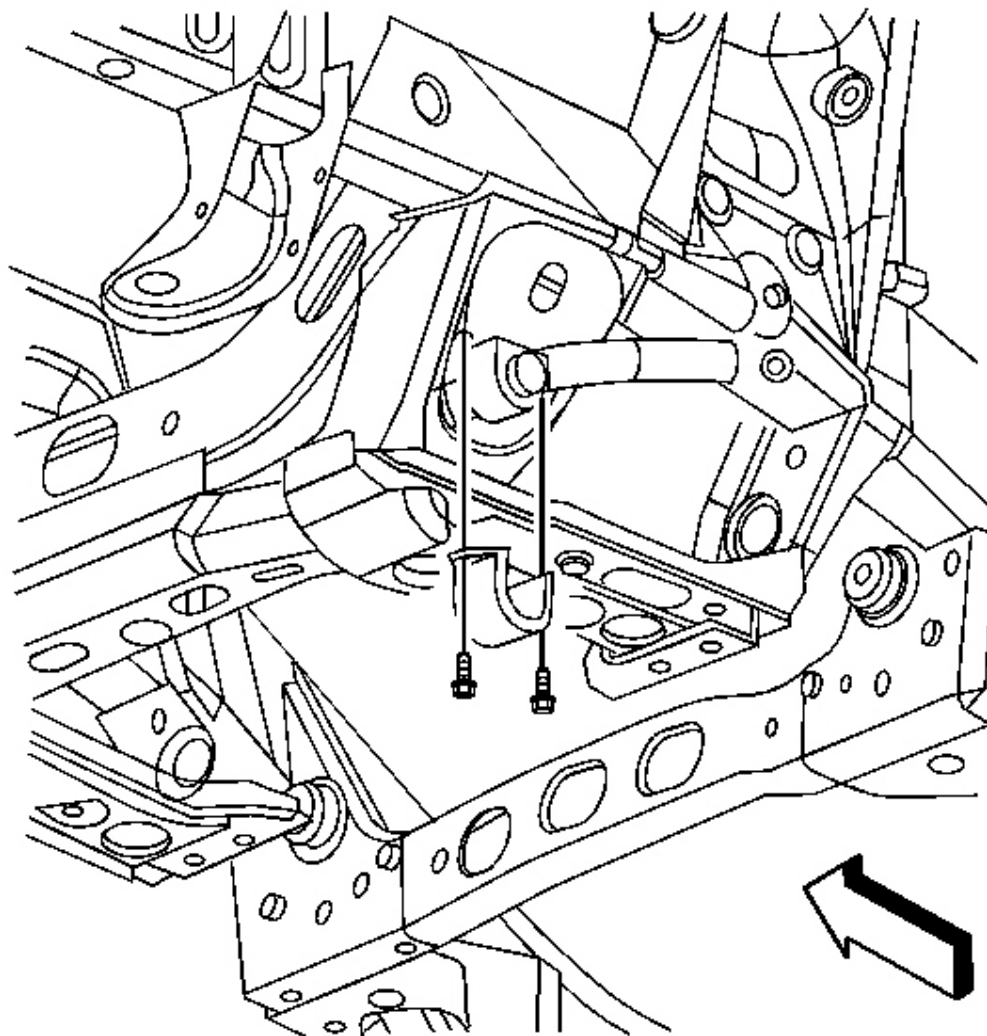


Fig. 1: View Of Stabilizer Shaft, Insulator, Insulator Clamp & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

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

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

6. 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.

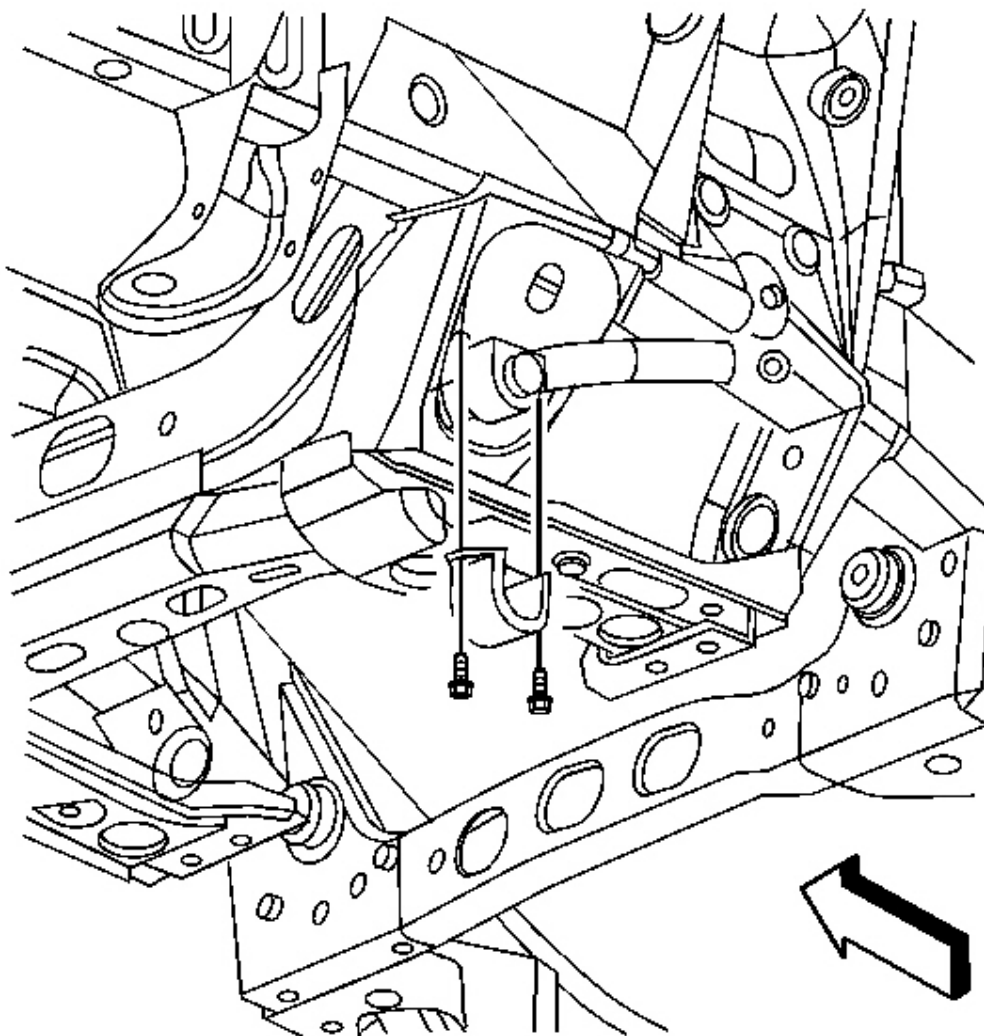


Fig. 2: View Of Stabilizer Shaft, Insulator, Insulator Clamp & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

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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. Install the stabilizer shaft insulators to the stabilizer shaft.
3. Install the stabilizer shaft insulator clamp to the stabilizer shaft insulator.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the stabilizer shaft insulator clamp mounting bolts.

Tighten: Tighten the stabilizer shaft insulator clamp mounting bolts to 55 N.m (41 ft. lb.).

5. Install the stabilizer shaft links to the stabilizer shaft. Refer to Stabilizer Shaft Link Replacement.
6. Lower the vehicle.

STABILIZER SHAFT LINK REPLACEMENT

Removal Procedure

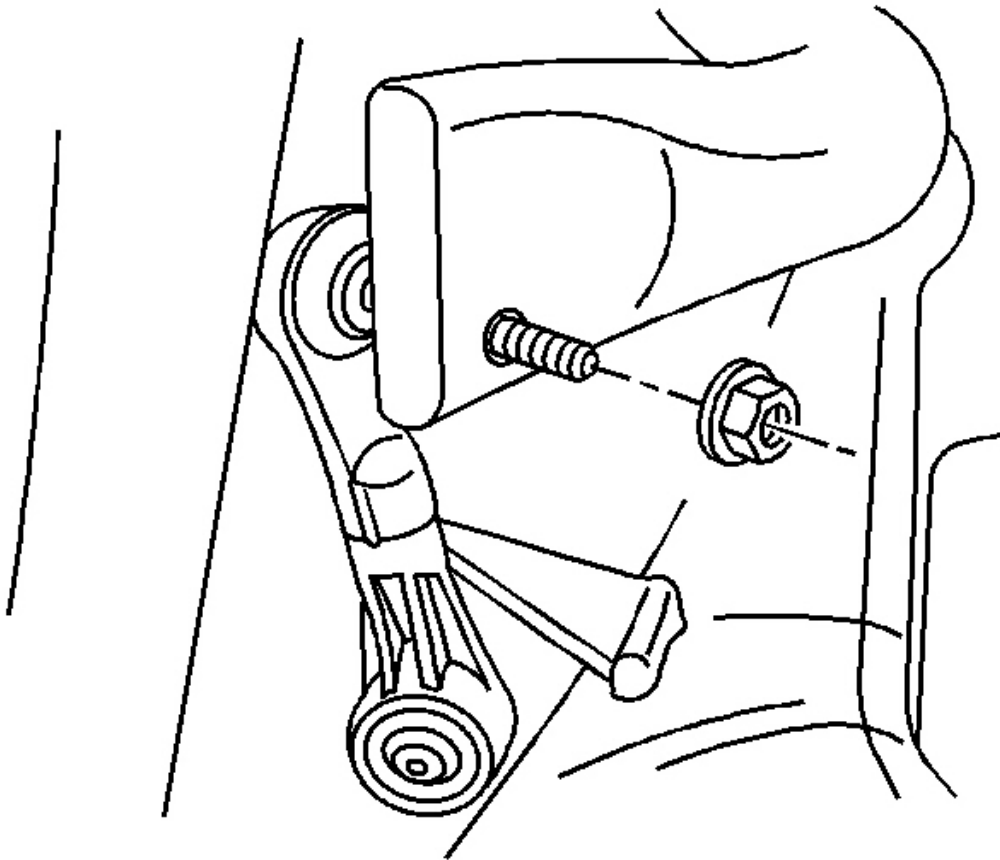


Fig. 3: Removing/Installing Stabilizer Shaft Link-To-Stabilizer Shaft Retaining Nut
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the stabilizer shaft link to stabilizer shaft retaining nut.

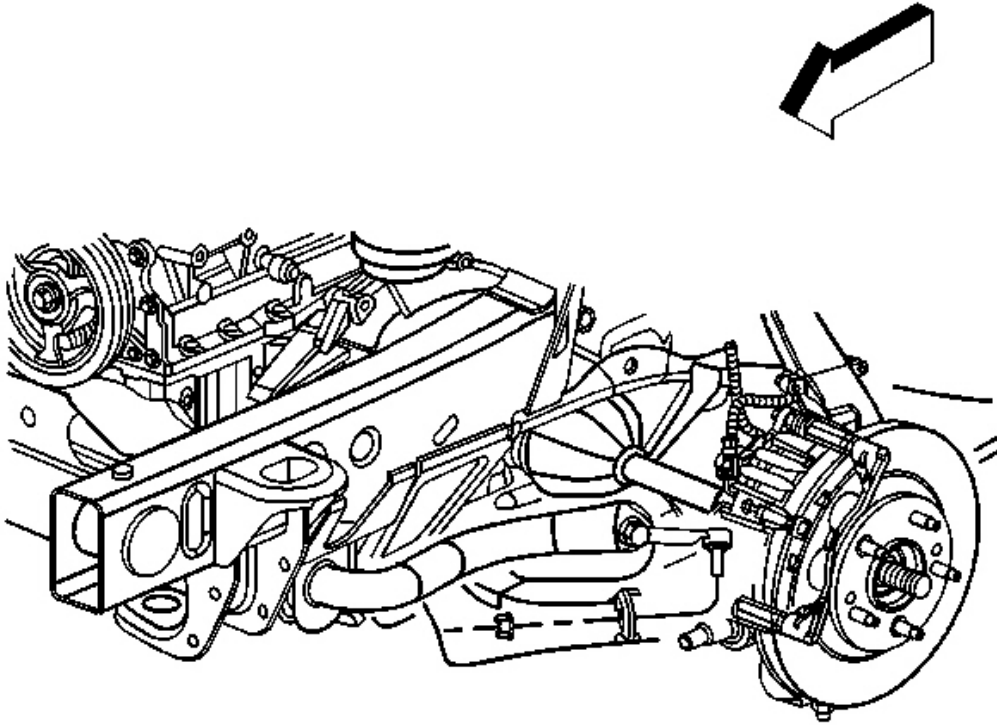


Fig. 4: View Of Stabilizer Shaft Link Lower Retaining Nut
Courtesy of GENERAL MOTORS CORP.

3. Remove the stabilizer shaft link to lower control arm retaining nut.

NOTE: Do not pry on the stabilizer shaft link. Use care when removing or installing the stabilizer shaft link in order to avoid tearing or puncturing the stabilizer shaft link boot. Damage to the stabilizer shaft link boot will lead to damage to the stabilizer shaft link.

4. Remove the stabilizer shaft link.

Installation Procedure

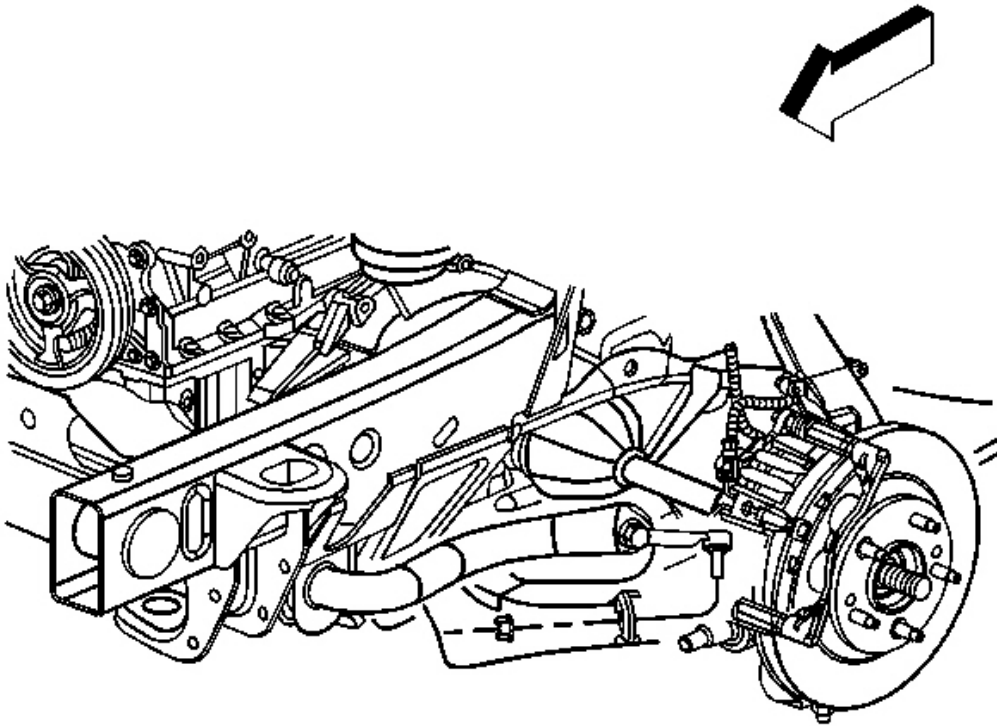


Fig. 5: View Of Stabilizer Shaft Link Lower Retaining Nut
Courtesy of GENERAL MOTORS CORP.

1. Install the stabilizer shaft link to the lower control arm.
2. Install the stabilizer shaft link to lower control arm retaining nut.

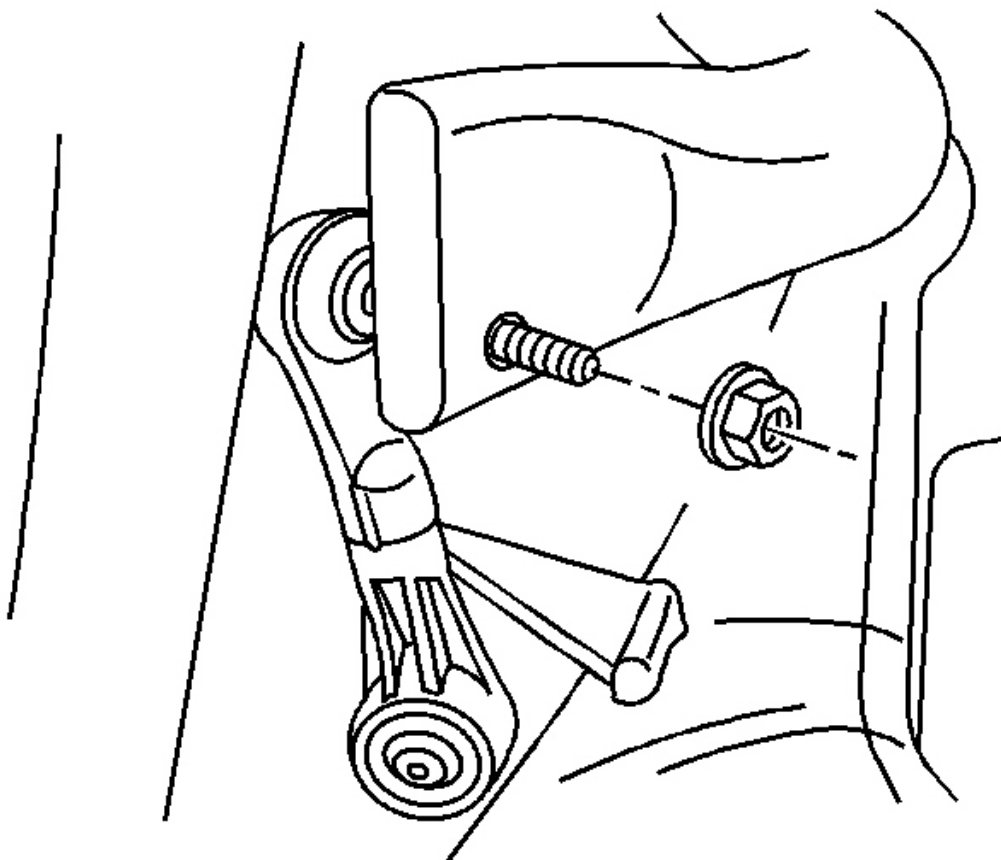


Fig. 6: Removing/Installing Stabilizer Shaft Link To-To-Stabilizer Shaft Retaining Nut
Courtesy of GENERAL MOTORS CORP.

3. Install the stabilizer shaft link to the stabilizer shaft.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the stabilizer shaft link to stabilizer shaft retaining nut.

Tighten: Tighten the nuts to 145 N.m (107 ft. lb.).

5. Lower the vehicle.

STABILIZER SHAFT INSULATOR REPLACEMENT

Removal Procedure

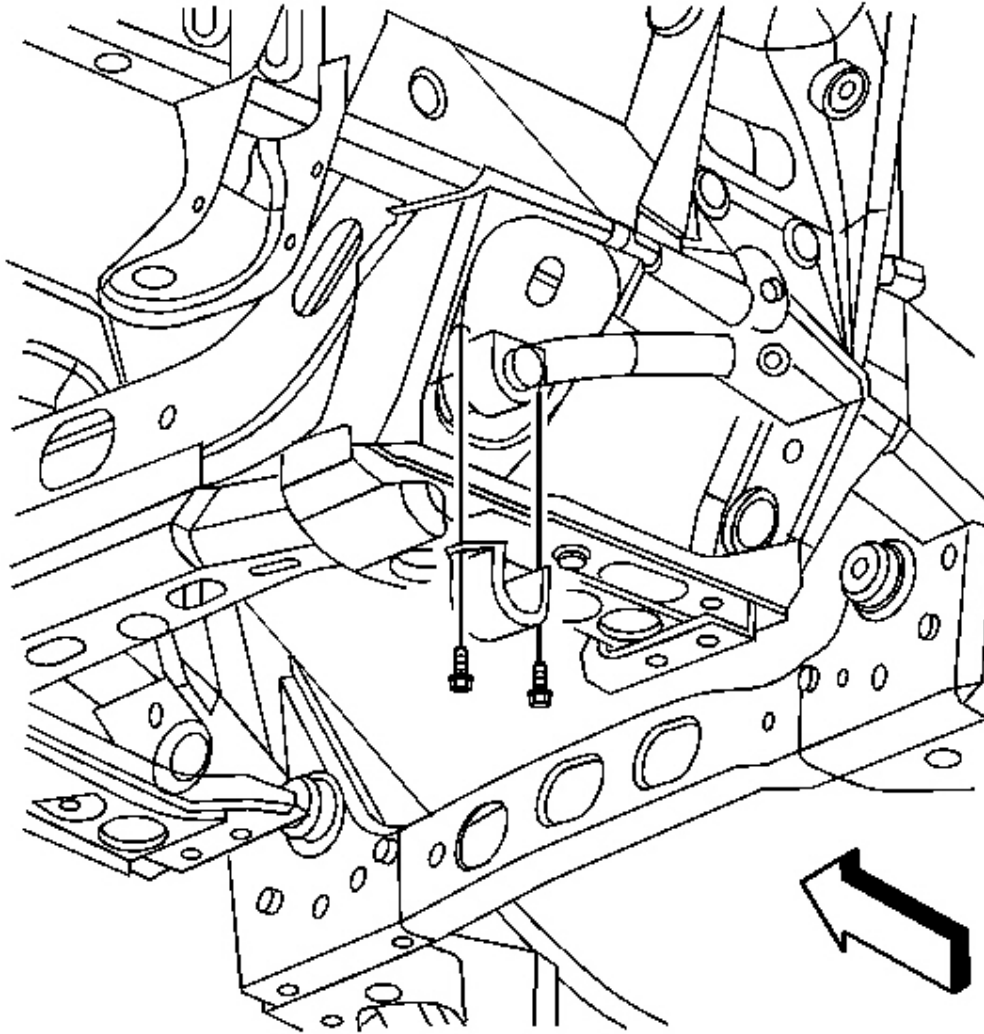


Fig. 7: View Of Stabilizer Shaft, Insulator, Insulator Clamp & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

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

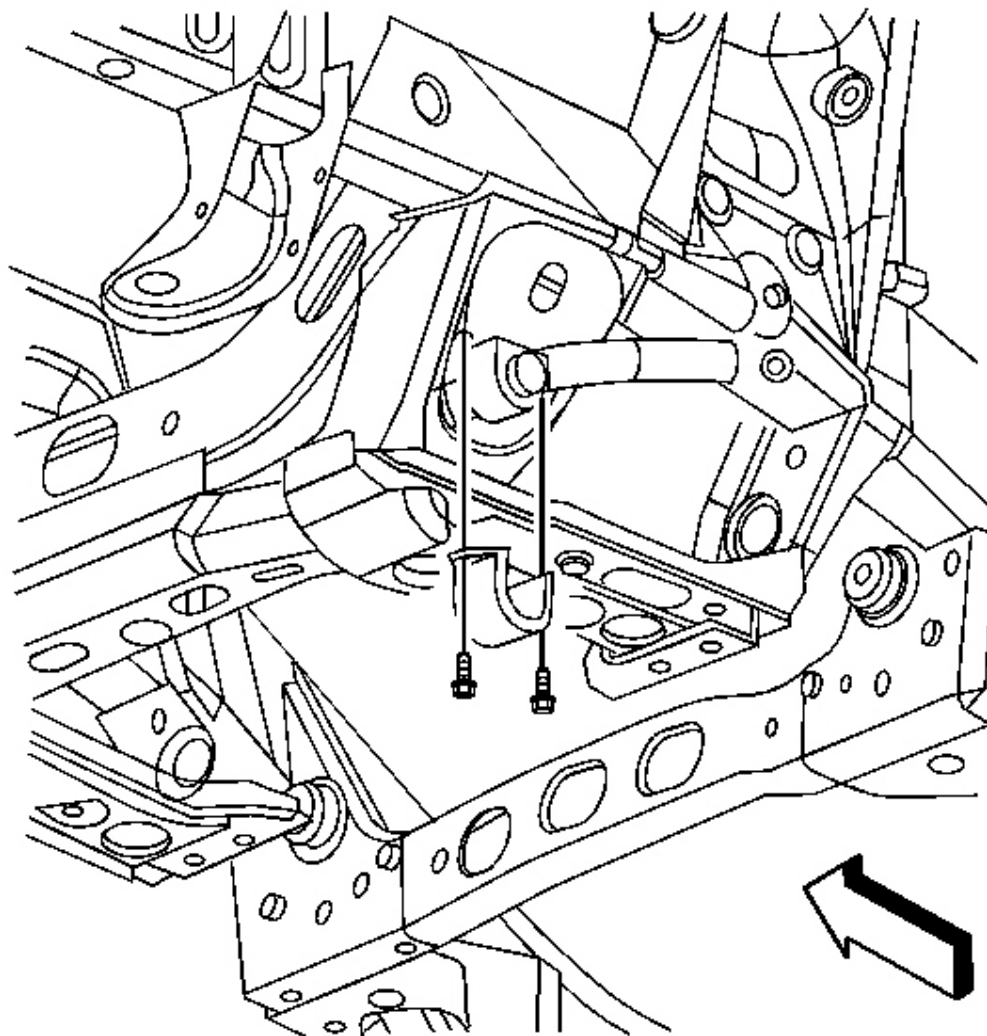


Fig. 8: View Of Stabilizer Shaft, Insulator, Insulator Clamp & Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

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** in Cautions and Notices.

3. Install the stabilizer shaft insulator clamp mounting bolts.

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Tighten: Tighten the stabilizer shaft insulator clamp mounting bolts to 55 N.m (41 ft. lb.).

4. Lower the vehicle.

UPPER BALL JOINT REPLACEMENT

Tools Required

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

Removal Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.
2. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation in Tires and Wheels.
3. Remove the steering knuckle with wheel hub attached. Refer to Steering Knuckle Replacement (RWD) or Steering Knuckle Replacement (4WD).
4. Remove the upper ball joint retaining clip.

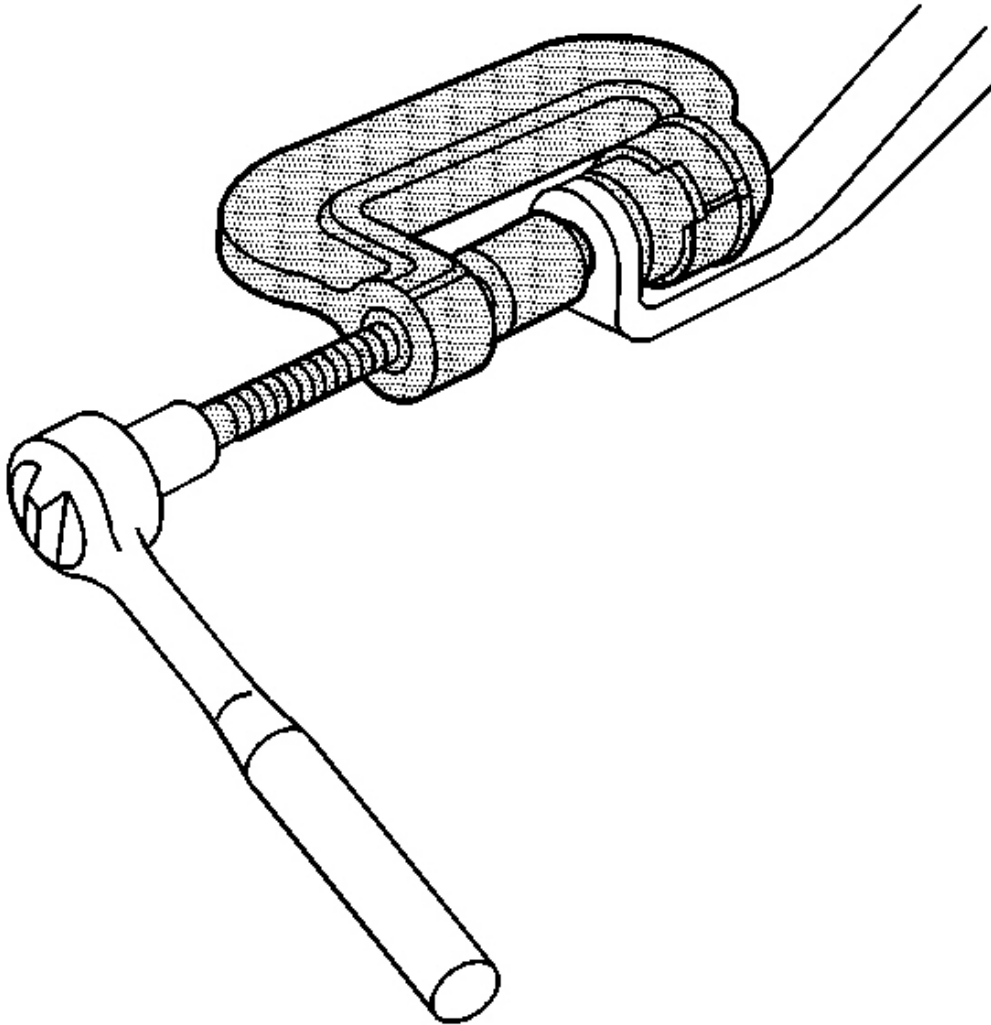


Fig. 9: Removing Upper Ball Joint From Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

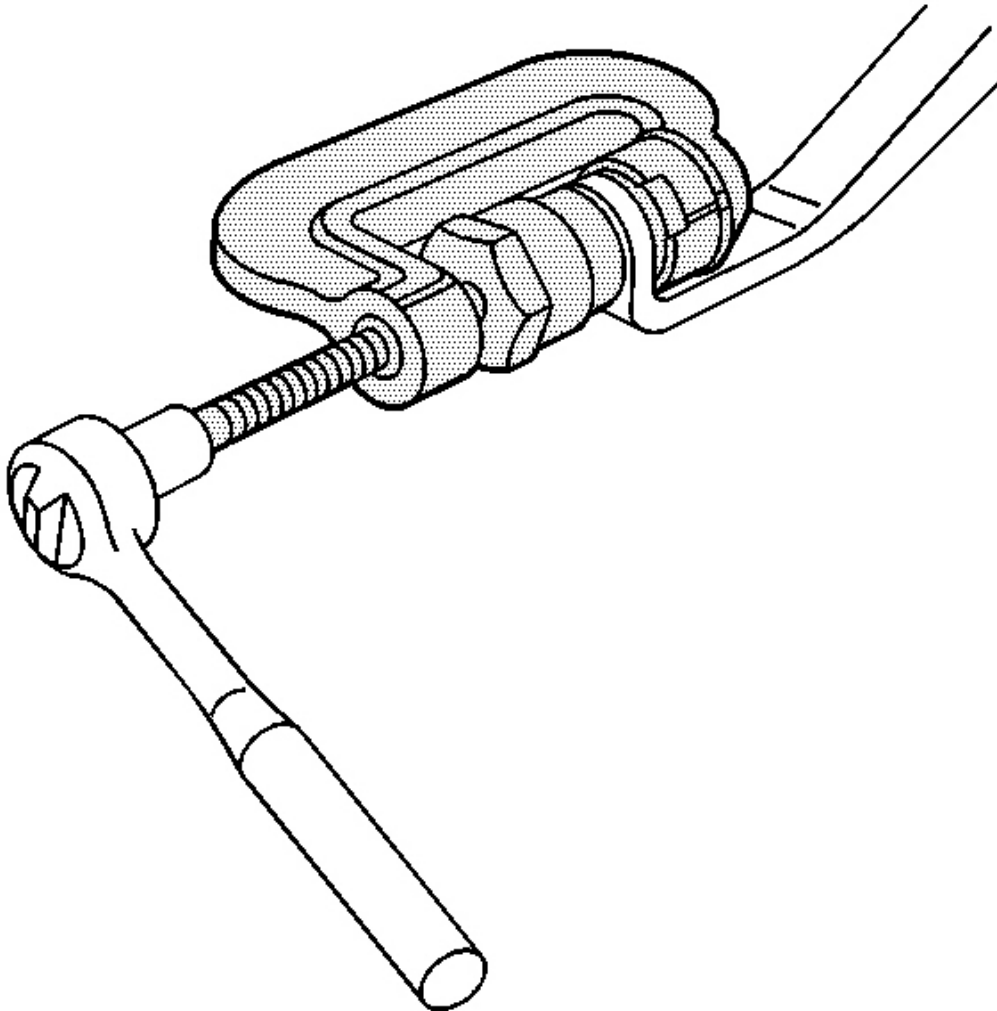


Fig. 10: Installing Upper Ball Joint To Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

1. Install the upper ball joint to steering knuckle using J 9519-E , J 21474-01 , and. See **Special Tools and Equipment.J 45117** . See **Special Tools and Equipment**.
2. Install the upper ball joint retaining clip.
3. Install the steering knuckle with wheel hub attached. Refer to **Steering Knuckle Replacement (RWD)** or **Steering Knuckle Replacement (4WD)**.
4. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
5. Lower the vehicle.

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

LOWER BALL JOINT REPLACEMENT

Tools Required

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

Removal Procedure

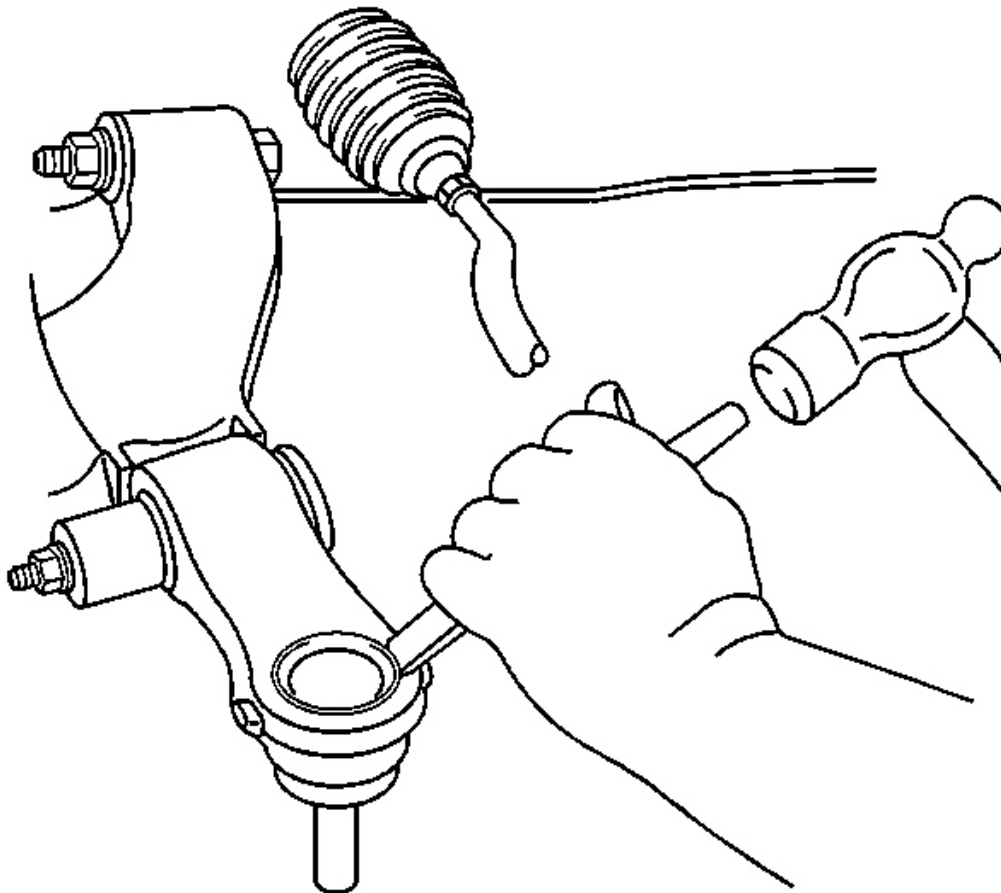


Fig. 11: Removing Lower Ball Joint Flange
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the steering knuckle with wheel hub and bearing attached. Refer to **Steering Knuckle Replacement (RWD)** or **Steering Knuckle Replacement (4WD)**.
4. Remove the lower ball joint flange with a chisel.

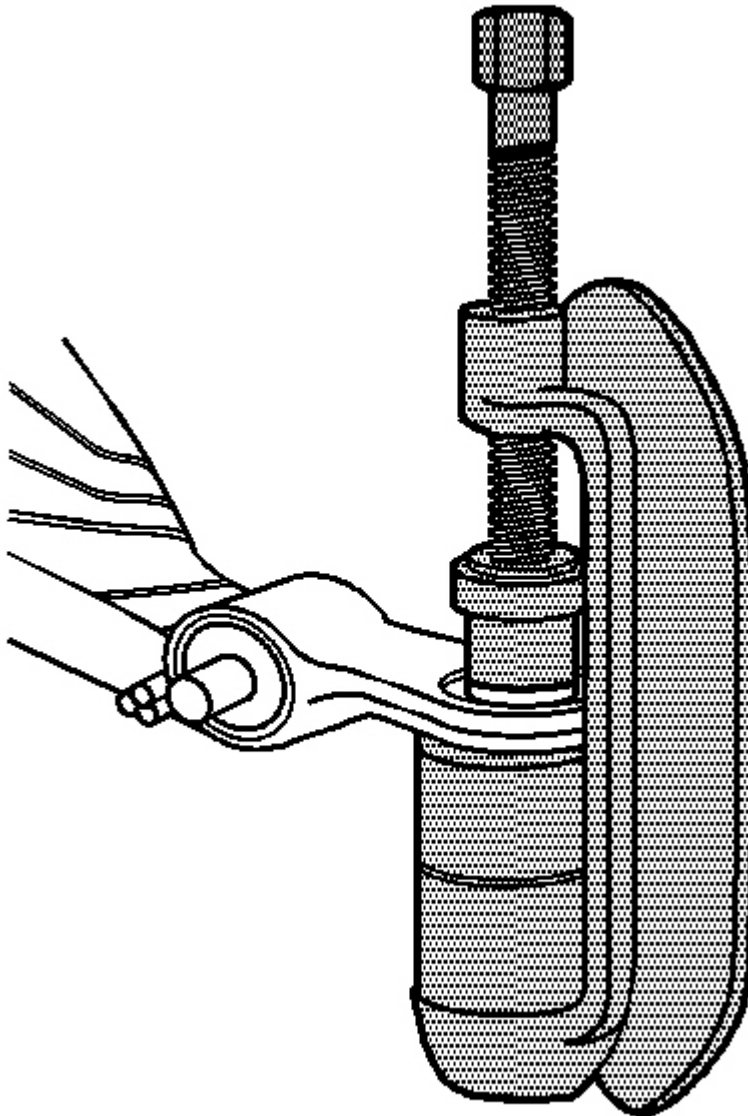


Fig. 12: Removing Lower Ball Joint
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

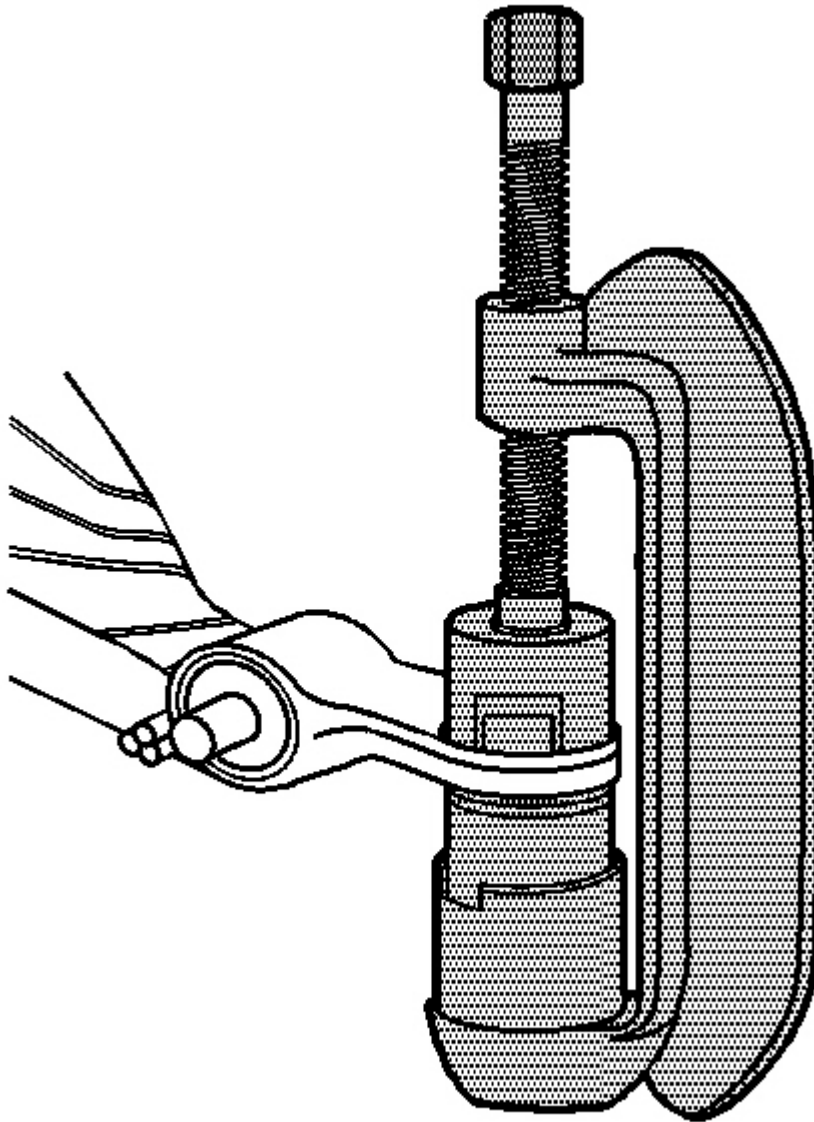


Fig. 13: Installing Lower Ball Joint
Courtesy of GENERAL MOTORS CORP.

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

2. Install the lower ball joint to the lower control arm using J 9519-E , J 41435 , and. See Special Tools and Equipment.J 45105-2 . See Special Tools and Equipment.
3. Remove J 9519-E , J 41435 , and. See Special Tools and Equipment.J 45105-2 from the lower control arm. See Special Tools and Equipment.

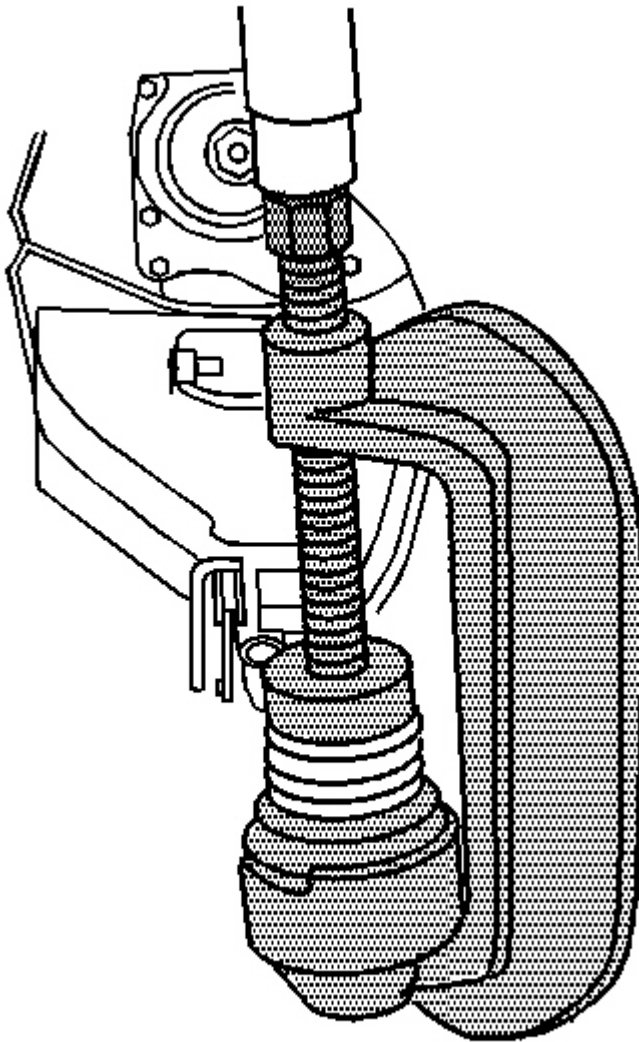


Fig. 14: Flaring Lower Ball Joint Flange
Courtesy of GENERAL MOTORS CORP.

4. Install J 9519-E and J 45105-1 to the lower ball joint. See Special Tools and Equipment.

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5. Flare the lower ball joint flange using J 9519-E and **J 45105-1** . See **Special Tools and Equipment**.
6. Remove J 9519-E and **J 45105-1** from the lower ball joint. See **Special Tools and Equipment**.
7. Install the steering knuckle with wheel hub and bearing attached. Refer to **Steering Knuckle Replacement (RWD)** or **Steering Knuckle Replacement (4WD)**.
8. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
9. Lower the vehicle.
10. Check the front wheel alignment. Refer to **Wheel Alignment Specifications** in Wheel Alignment.

STEERING KNUCKLE REPLACEMENT (RWD)

Tools Required

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

Removal Procedure

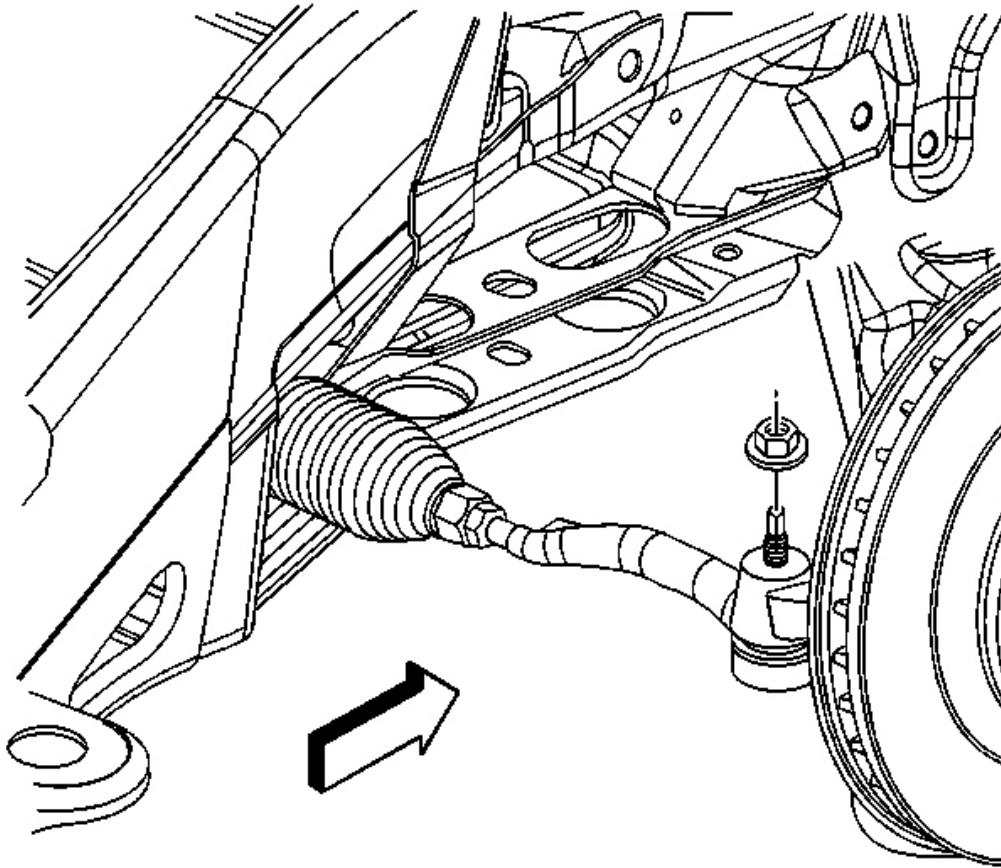


Fig. 15: View Of Tie Rod Retaining Nut
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the wheel hub and bearing. Refer to **Wheel Hub, Bearing, and Seal Replacement (RWD)** or **Wheel Hub, Bearing, and Seal Replacement (4WD)**.
4. Remove the outer tie rod retaining nut.

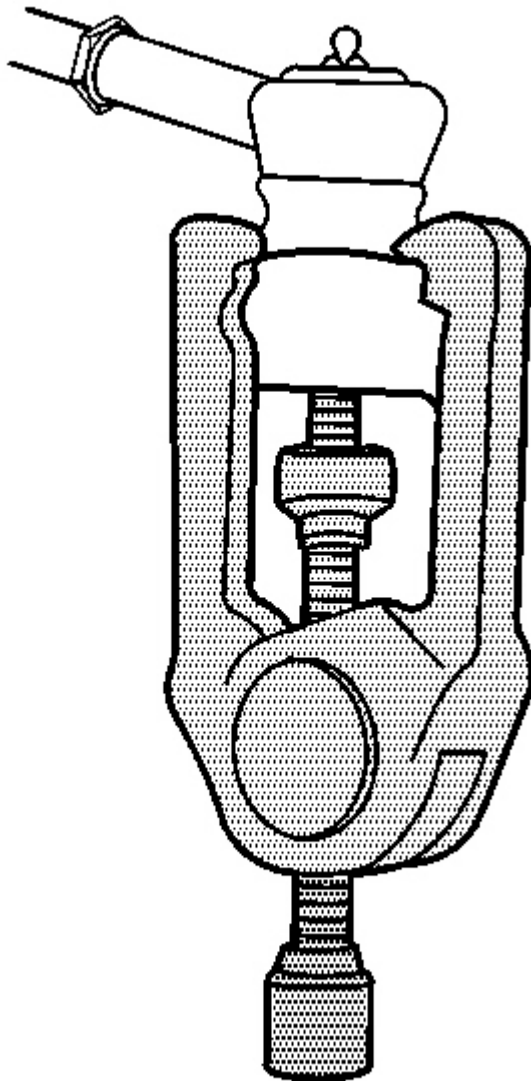


Fig. 16: Removing Outer Tie Rod Assembly From Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

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

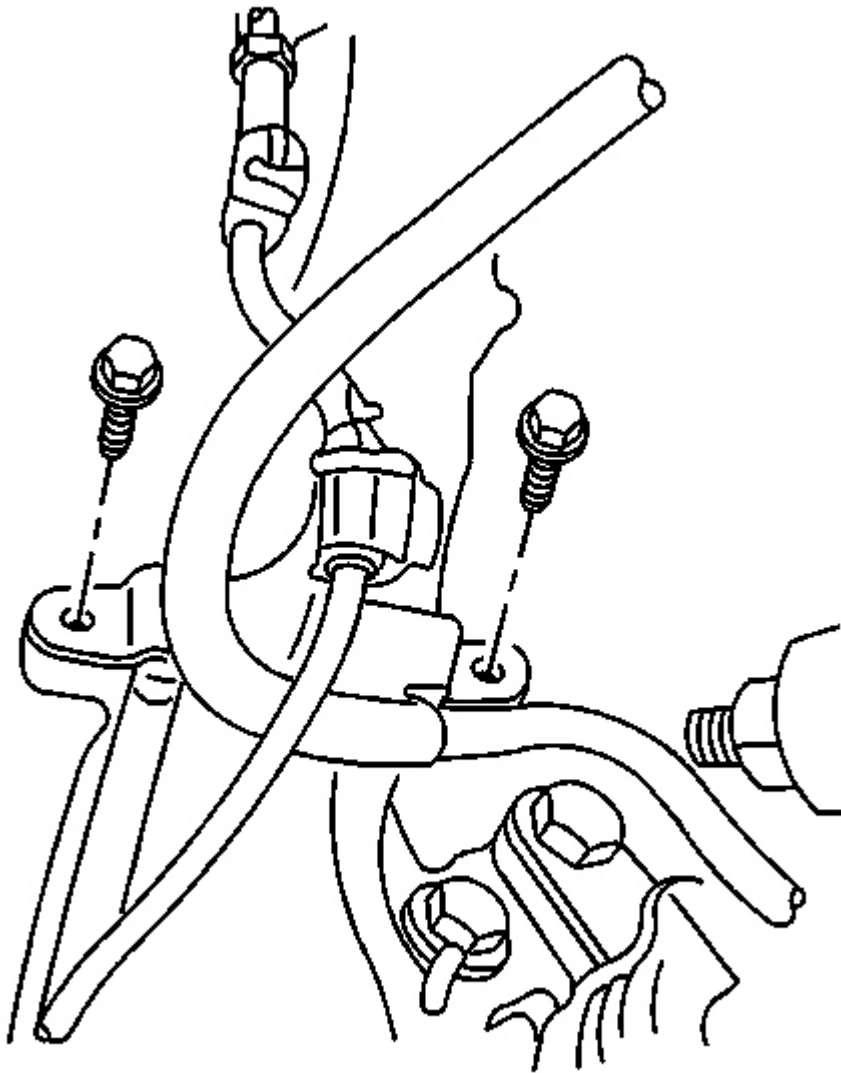


Fig. 17: Removing/Installing Brake Hose Bracket Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

6. Remove the brake hose bracket retaining bolts.
7. Remove the brake hose bracket from the steering knuckle.

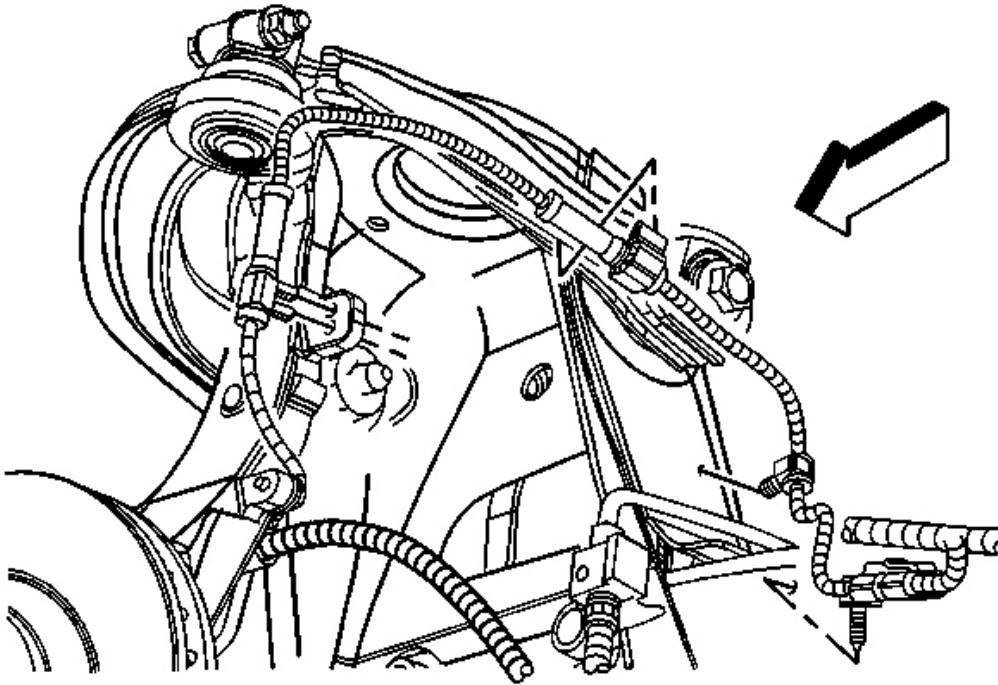


Fig. 18: View Of ABS Harness

Courtesy of GENERAL MOTORS CORP.

8. Disconnect the ABS wheel speed sensor wiring harness bracket from the steering knuckle.

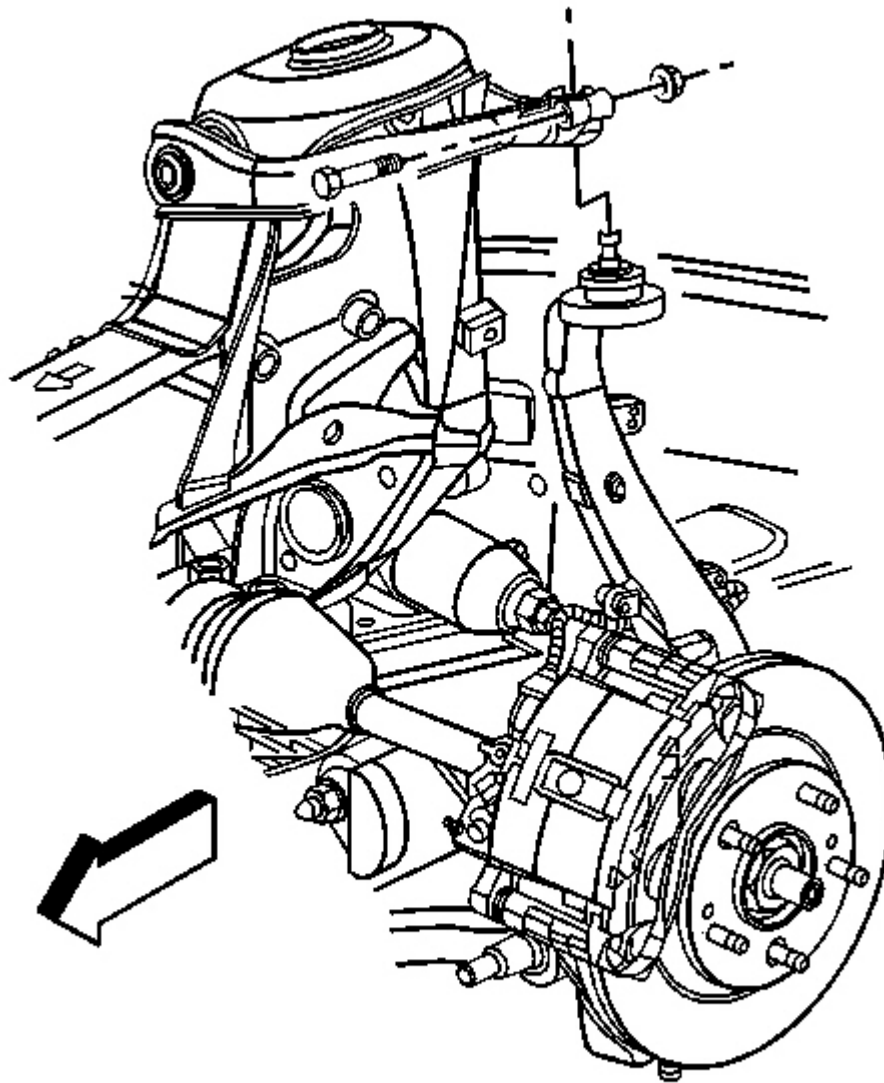


Fig. 19: View Of Upper Control Arm To The Steering Knuckle Pinch Bolt And Nut
Courtesy of GENERAL MOTORS CORP.

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

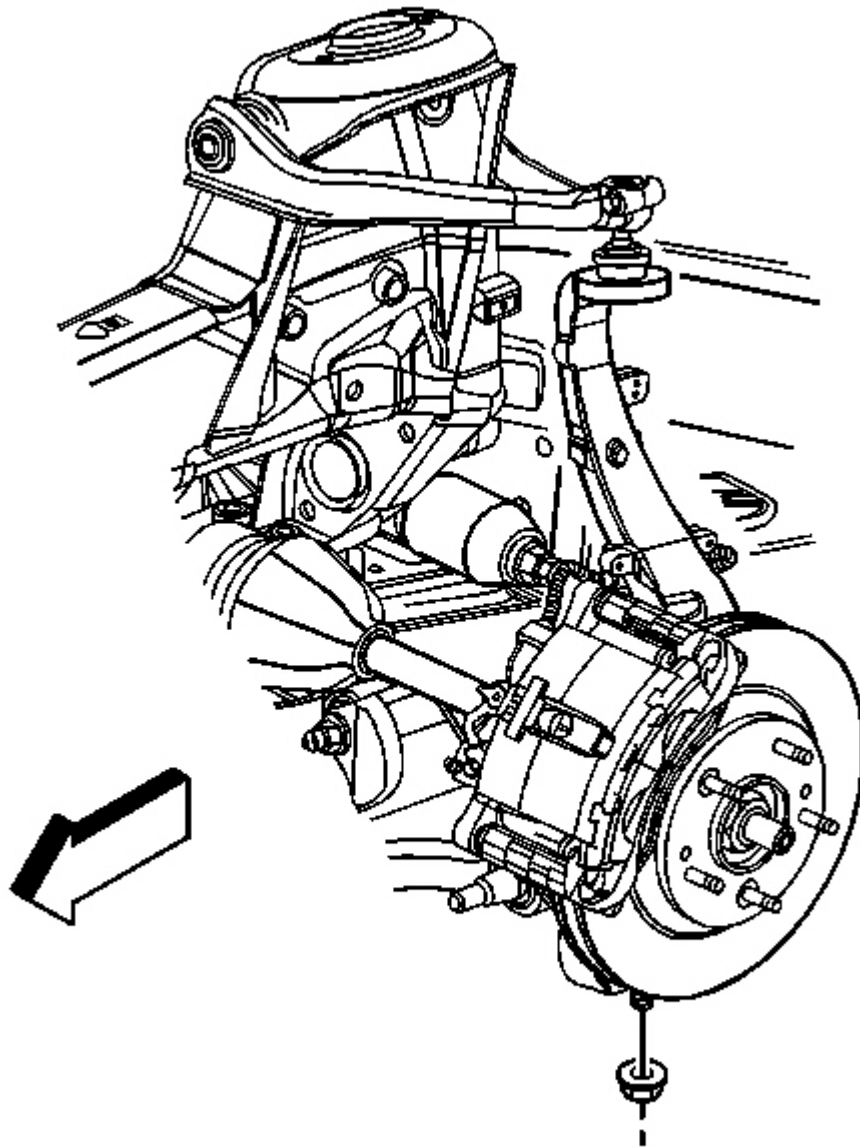


Fig. 20: Removing/Installing Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

11. Remove the lower ball joint retaining nut.

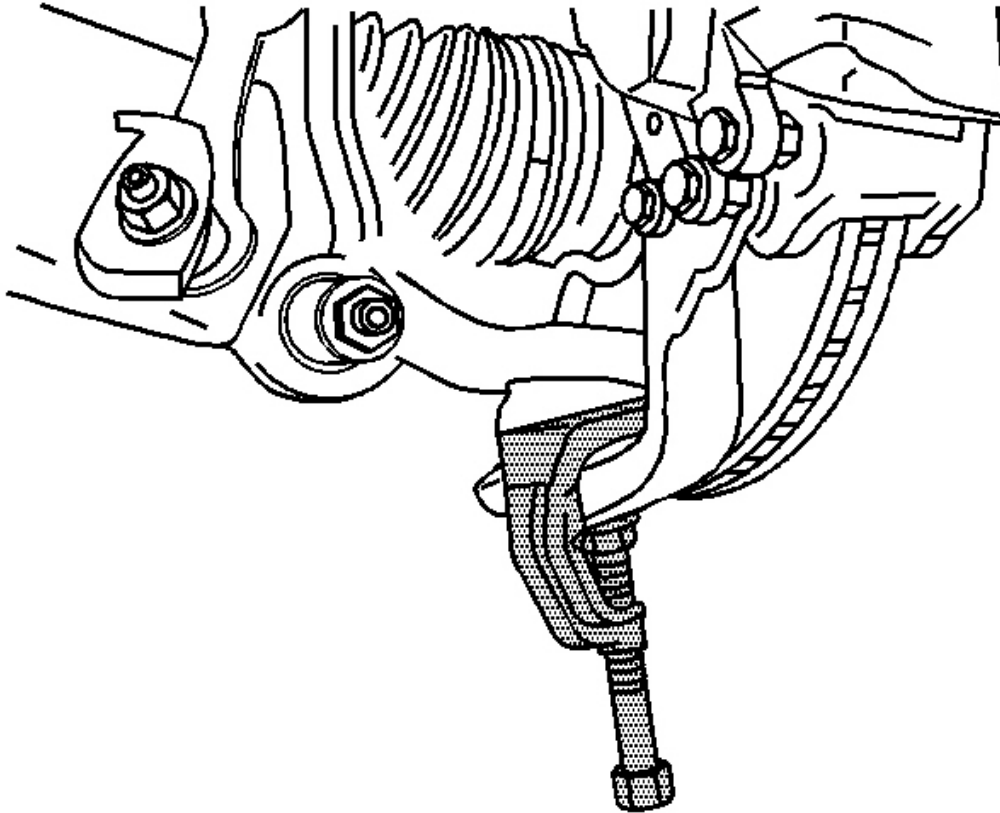


Fig. 21: Removing Steering Knuckle From Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

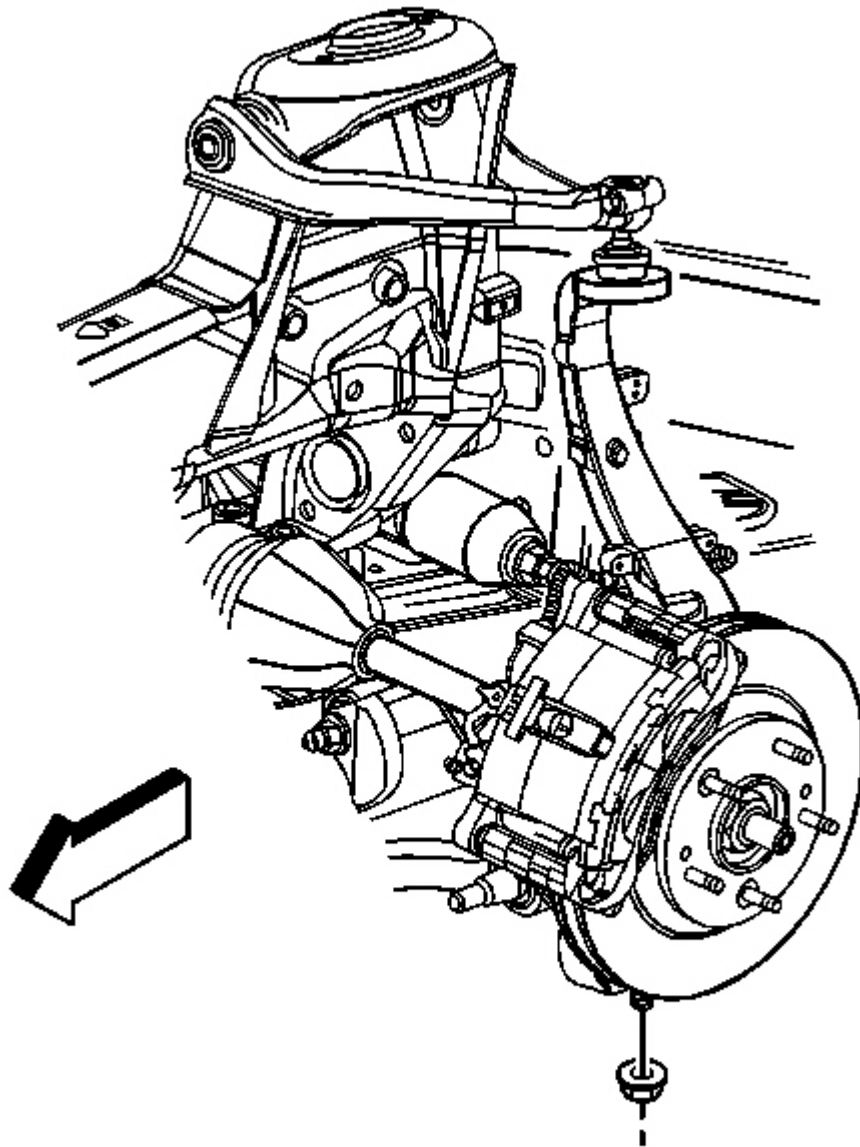


Fig. 22: Removing/Installing Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

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

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

2. Install the lower ball joint retaining nut.

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

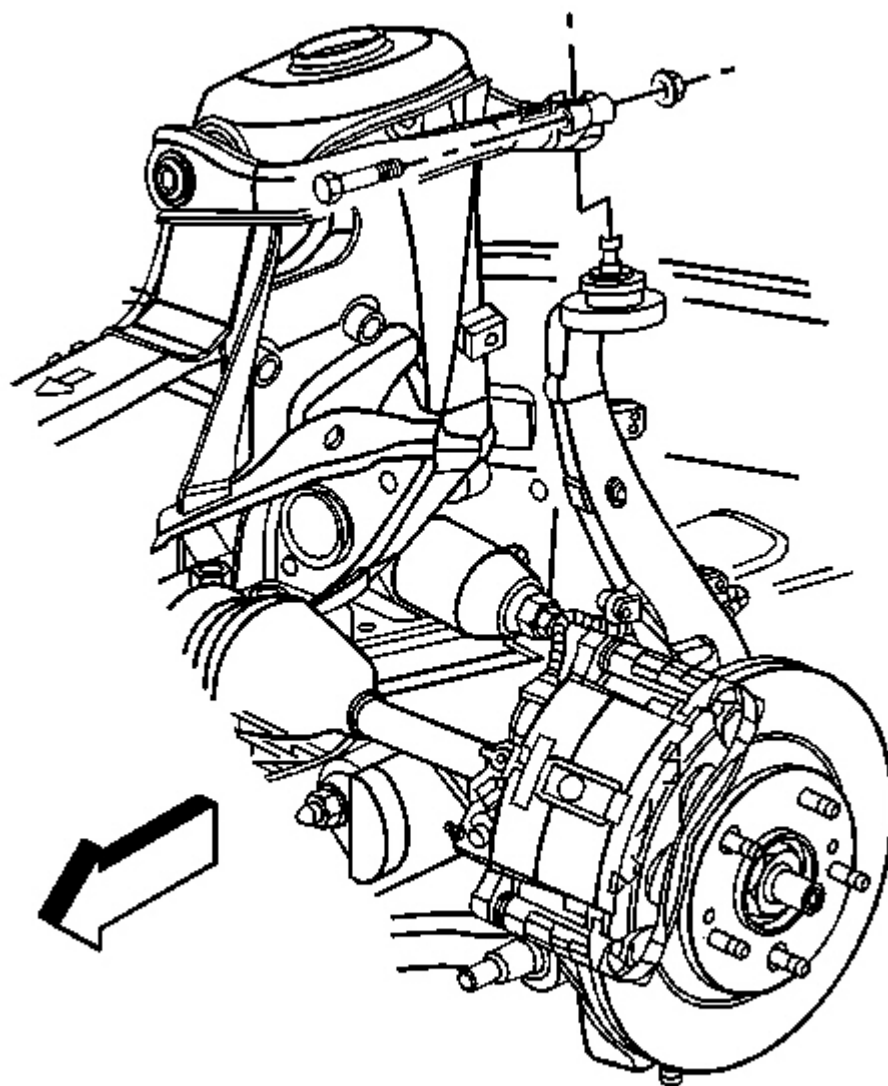


Fig. 23: View Of Upper Control Arm To The Steering Knuckle Pinch Bolt And Nut
Courtesy of GENERAL MOTORS CORP.

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

4. Install upper control arm pinch bolt and nut.

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

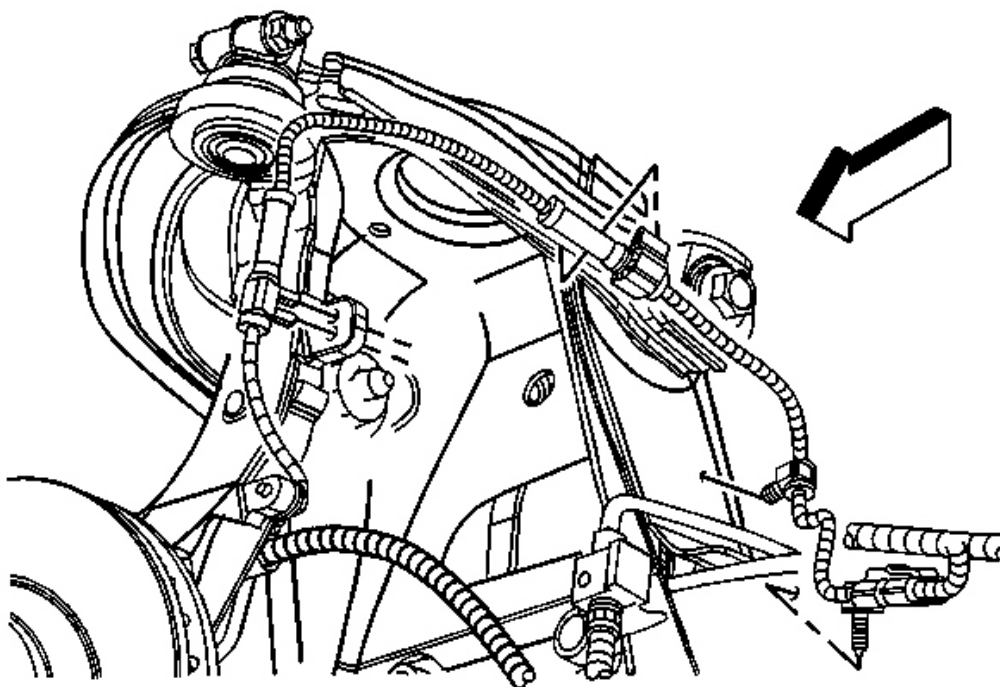


Fig. 24: View Of ABS Harness

Courtesy of GENERAL MOTORS CORP.

5. Connect the ABS wheel speed sensor wiring harness bracket to the steering knuckle.

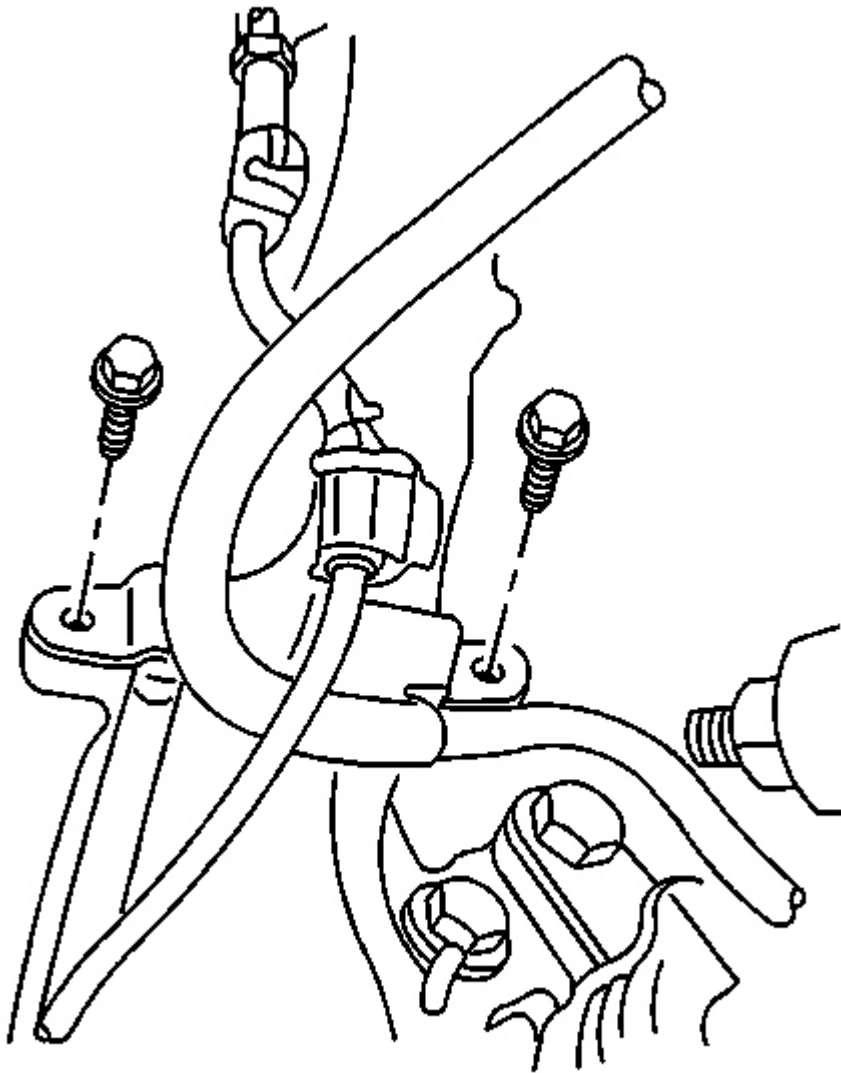


Fig. 25: Removing/Installing Brake Hose Bracket Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

6. Install the brake hose bracket to the steering knuckle.
7. Install the brake hose bracket retaining bolts.

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

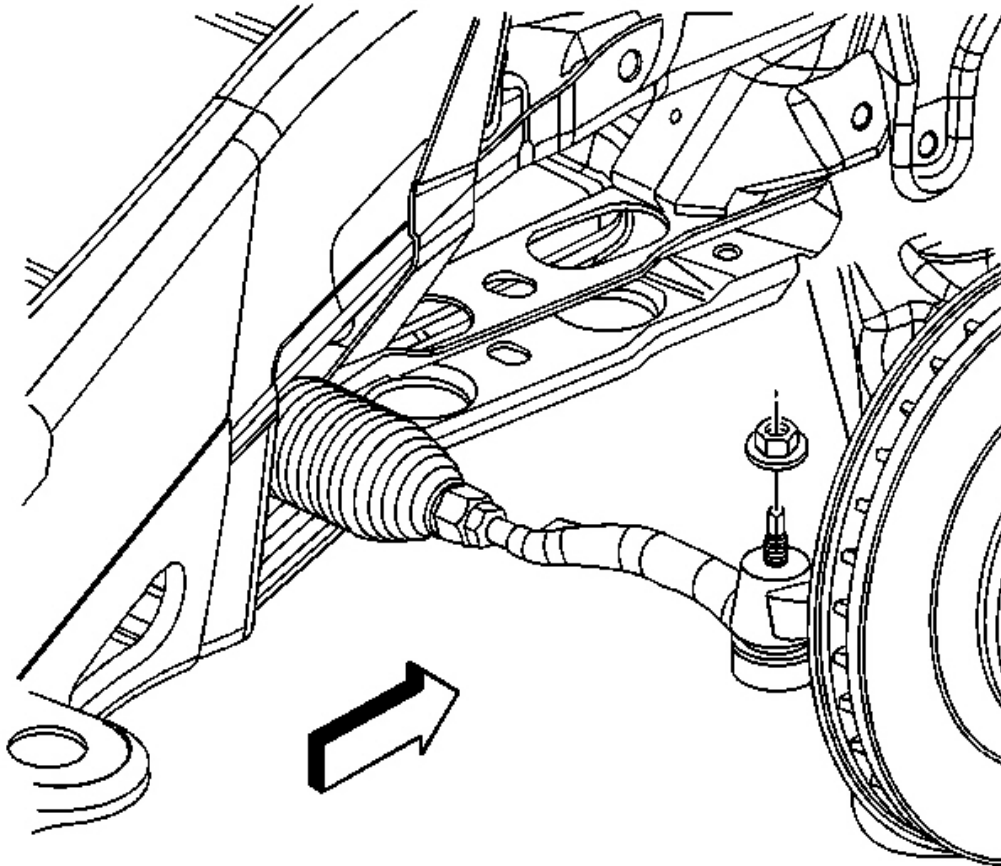


Fig. 26: View Of Tie Rod Retaining Nut
Courtesy of GENERAL MOTORS CORP.

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

Tighten: Tighten the outer tie rod retaining nut to 45 N.m (33 ft. lb.).

10. Install the wheel hub and bearing. Refer to **Wheel Hub, Bearing, and Seal Replacement (RWD)** or **Wheel Hub, Bearing, and Seal Replacement (4WD)**.
11. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
12. Lower the vehicle.
13. Adjust the front toe. Refer to **Front Toe Adjustment** in Wheel Alignment.

STEERING KNUCKLE REPLACEMENT (4WD)

Tools Required

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

Removal Procedure

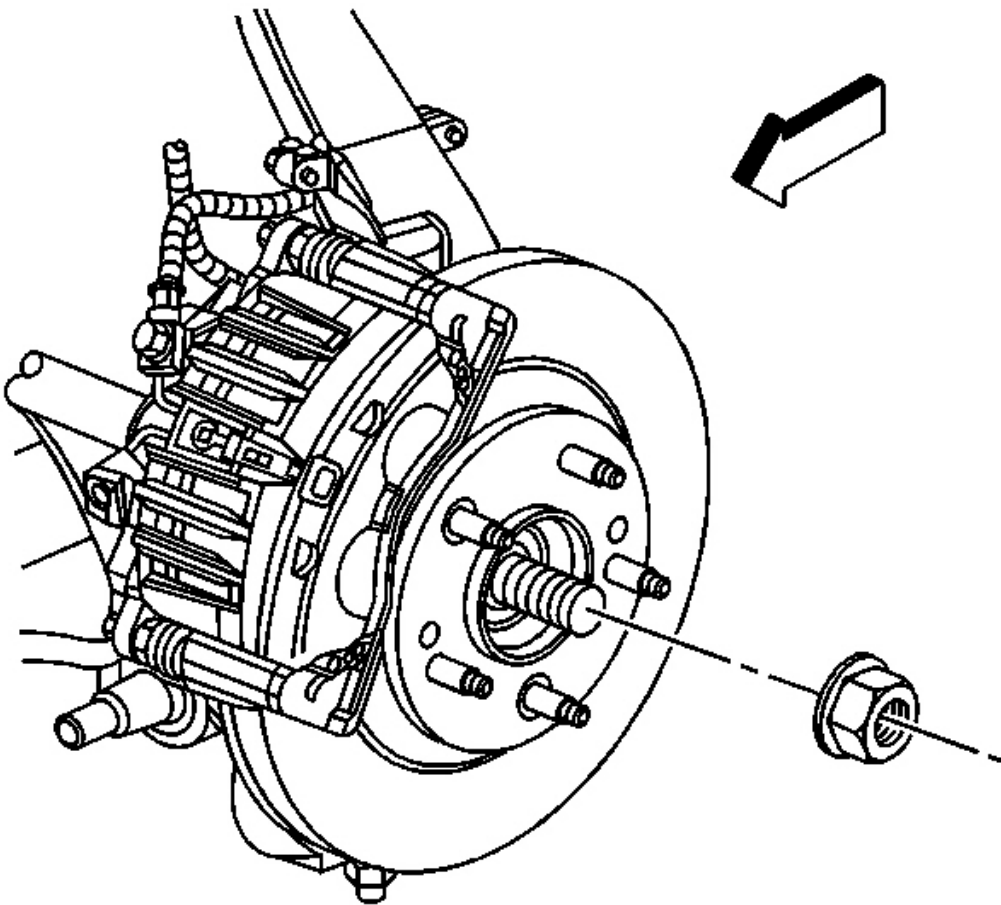


Fig. 27: Removing/Installing Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS CORP.

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

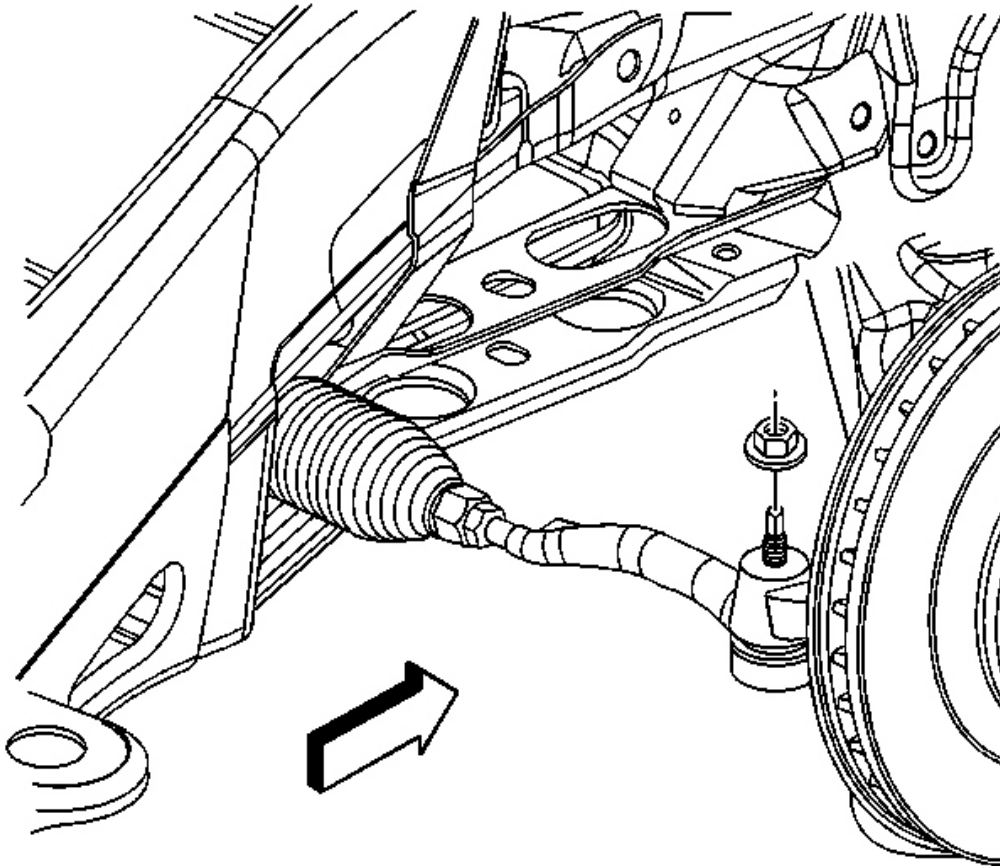


Fig. 28: View Of Tie Rod Retaining Nut
Courtesy of GENERAL MOTORS CORP.

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

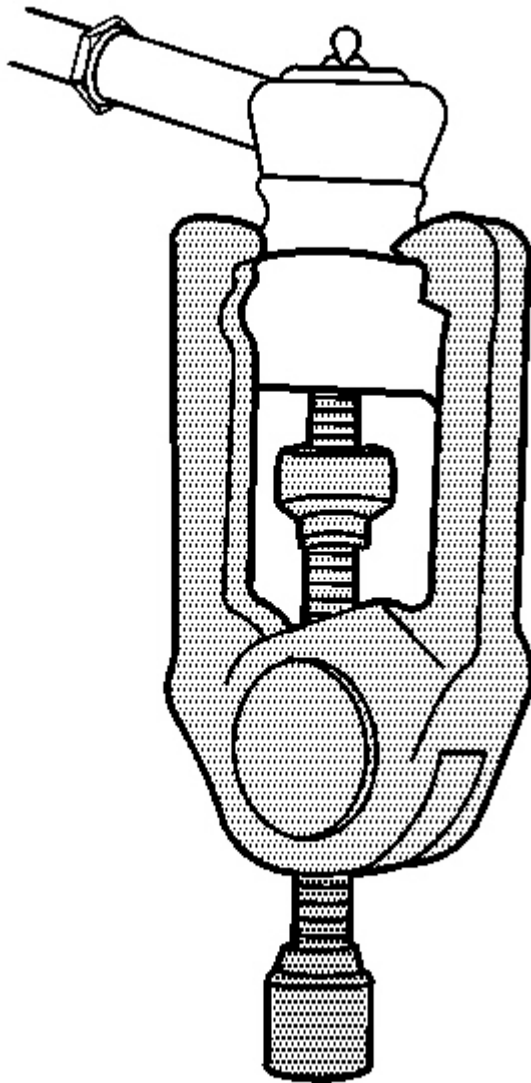


Fig. 29: Removing Outer Tie Rod Assembly From Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

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

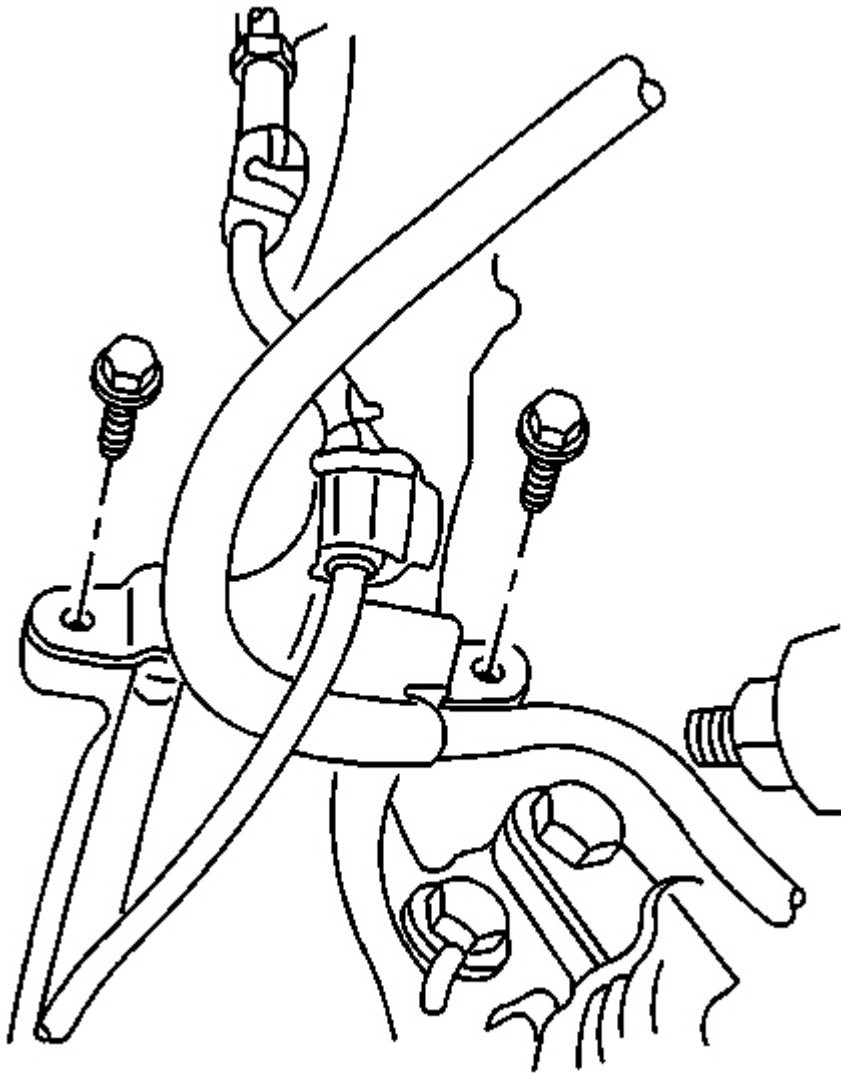


Fig. 30: Removing/Installing Brake Hose Bracket Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

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

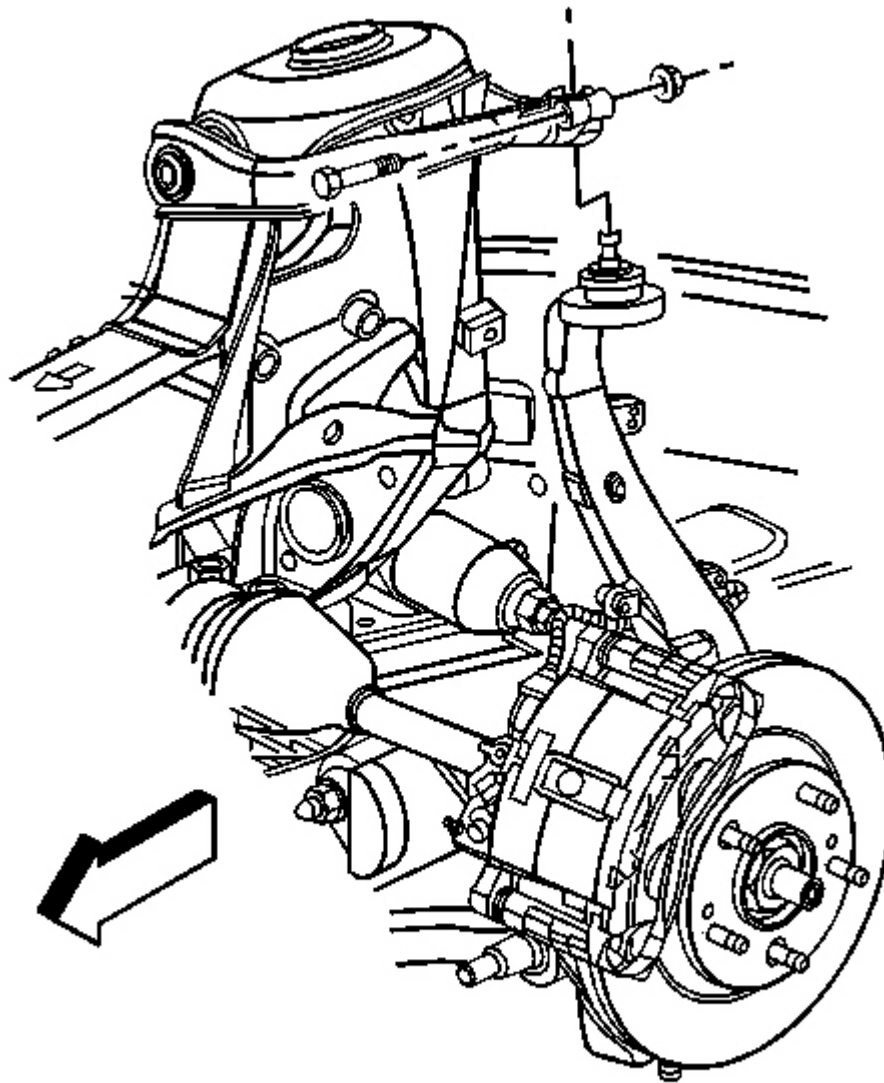


Fig. 31: View Of Upper Control Arm To The Steering Knuckle Pinch Bolt And Nut
Courtesy of GENERAL MOTORS CORP.

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

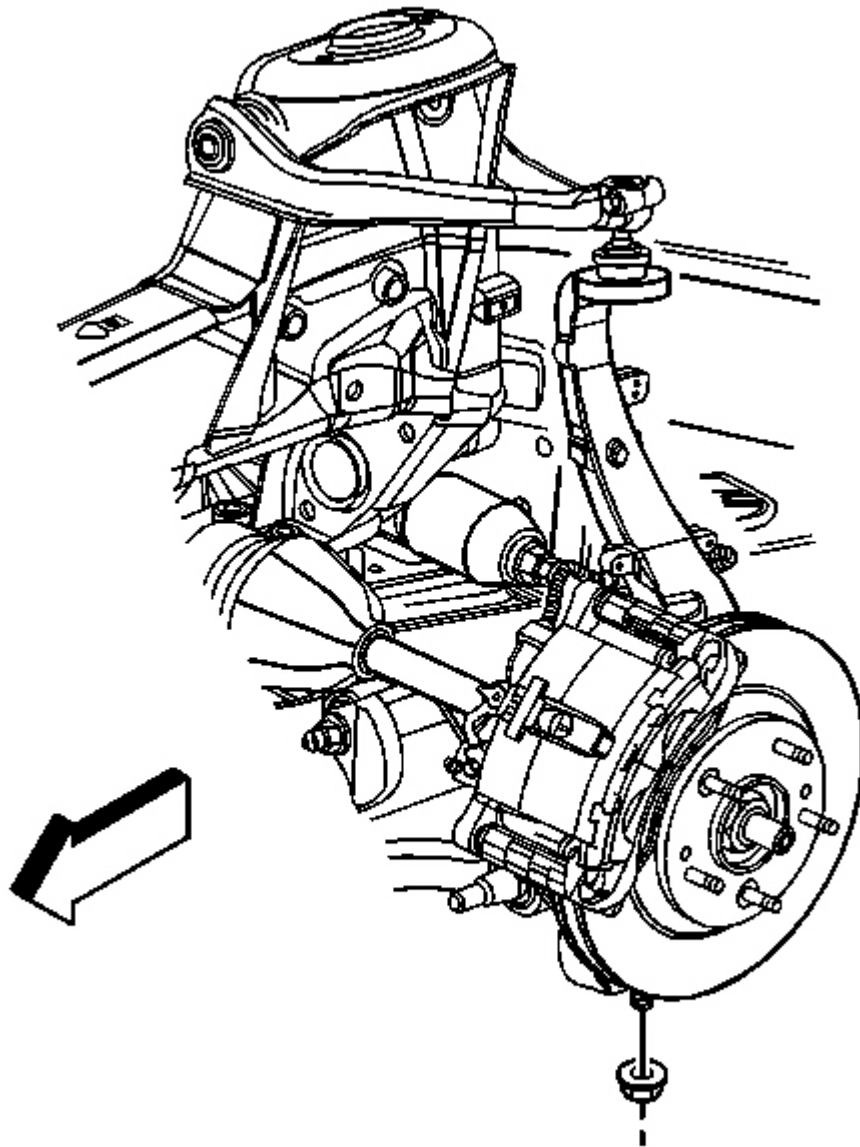


Fig. 32: Removing/Installing Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

12. Remove the lower ball joint retaining nut.

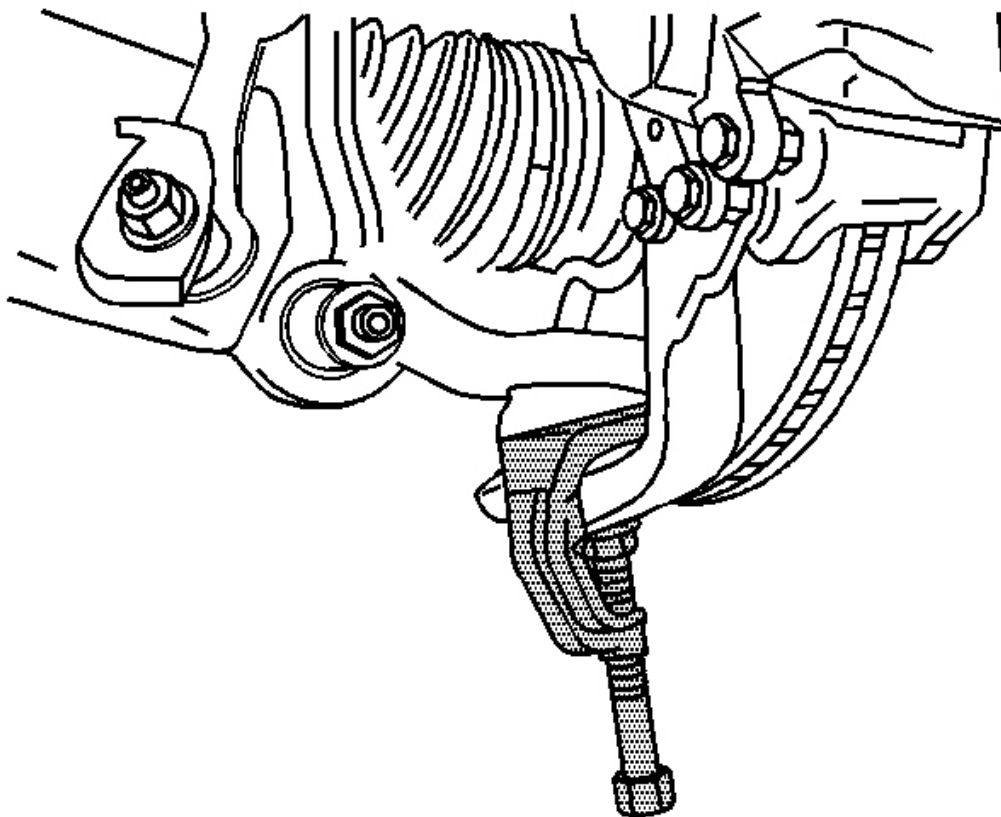


Fig. 33: Removing Steering Knuckle From Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

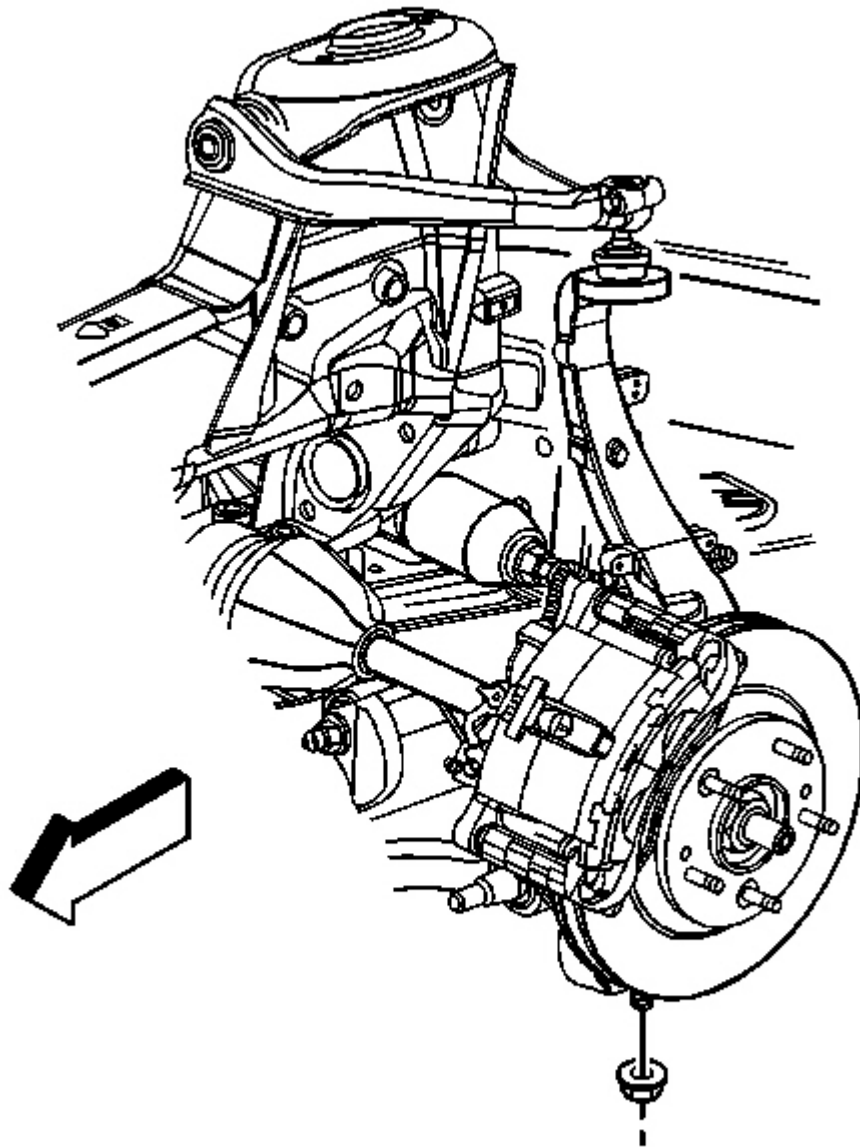


Fig. 34: Removing/Installing Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice .

2. Install the lower ball joint retaining nut.

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

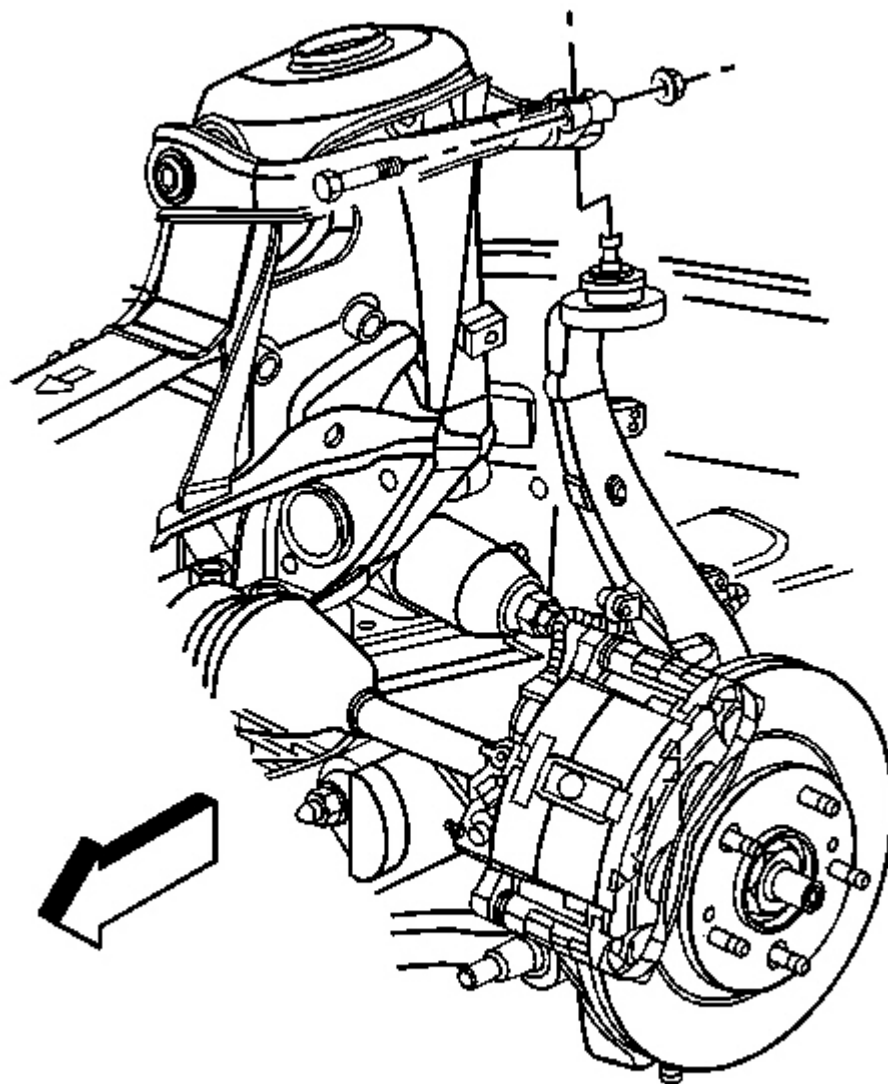


Fig. 35: View Of Upper Control Arm To The Steering Knuckle Pinch Bolt And Nut
Courtesy of GENERAL MOTORS CORP.

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

4. Install upper control arm pinch bolt and nut.

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

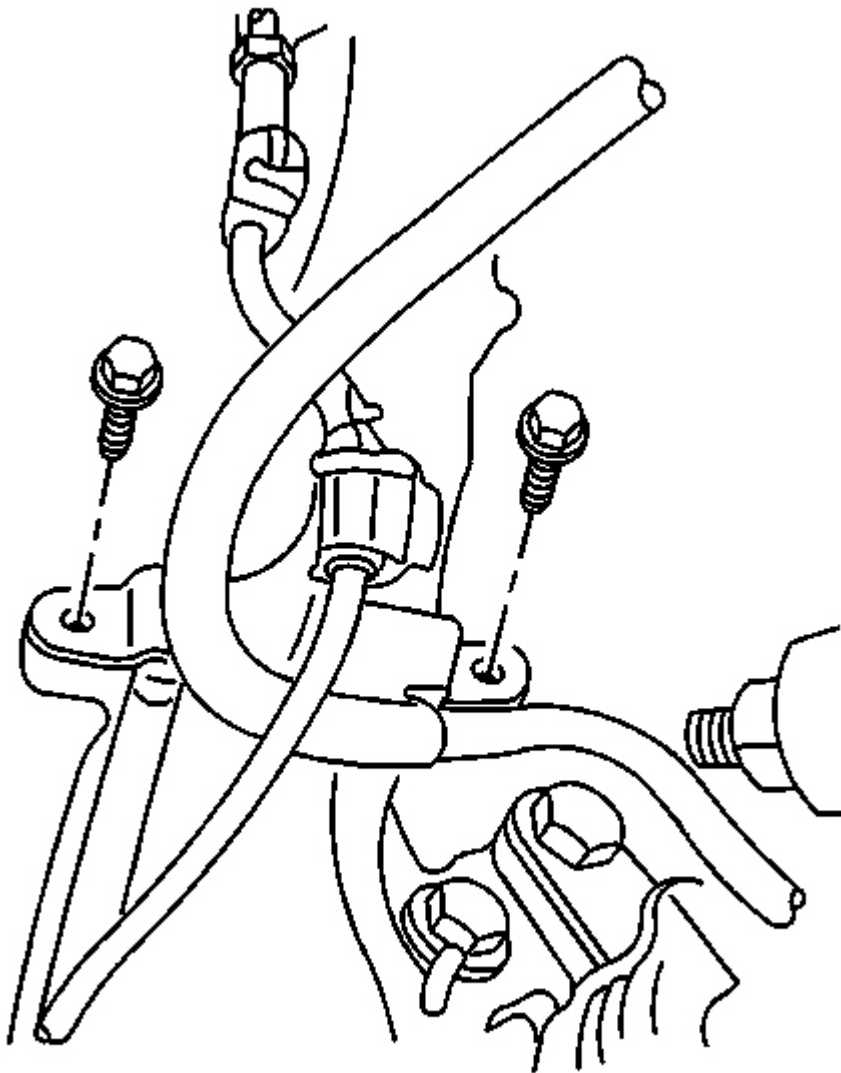


Fig. 36: Removing/Installing Brake Hose Bracket Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

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 in. lb.).

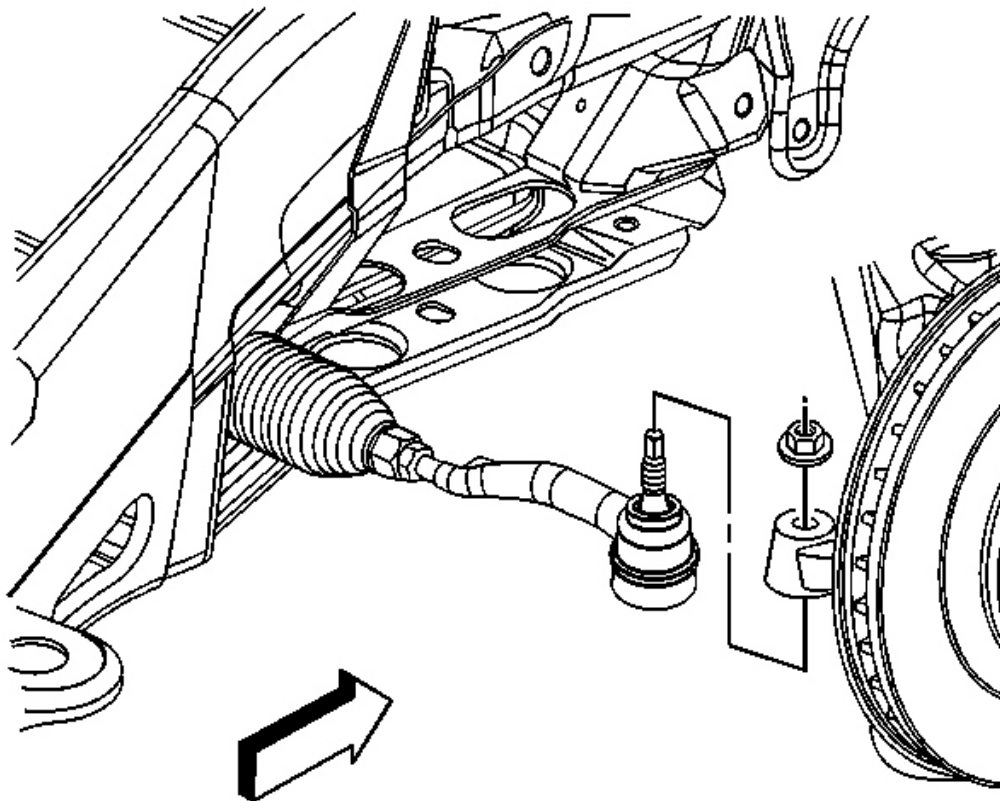


Fig. 37: Removing/Installing Tie Rod
Courtesy of GENERAL MOTORS CORP.

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 ft. lb.).

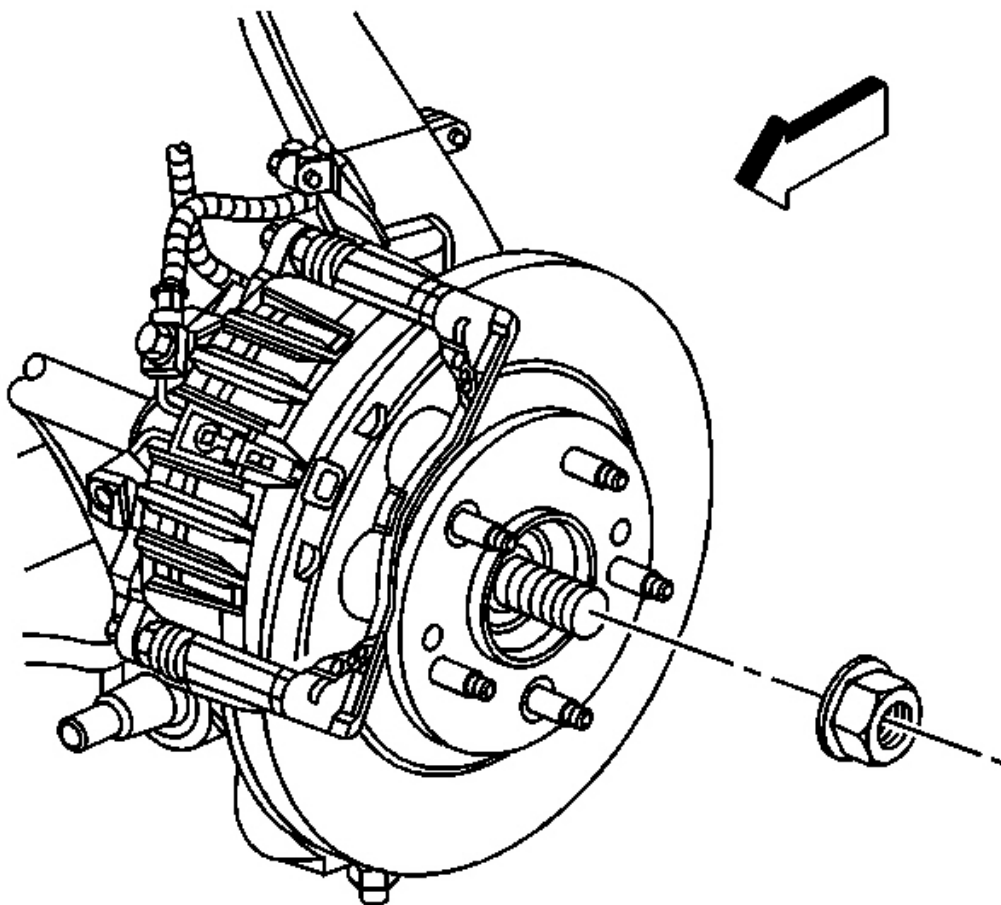


Fig. 38: Removing/Installing Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS CORP.

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

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

13. Adjust the front toe. Refer to **Front Toe Adjustment** in Wheel Alignment.

Removal Procedure

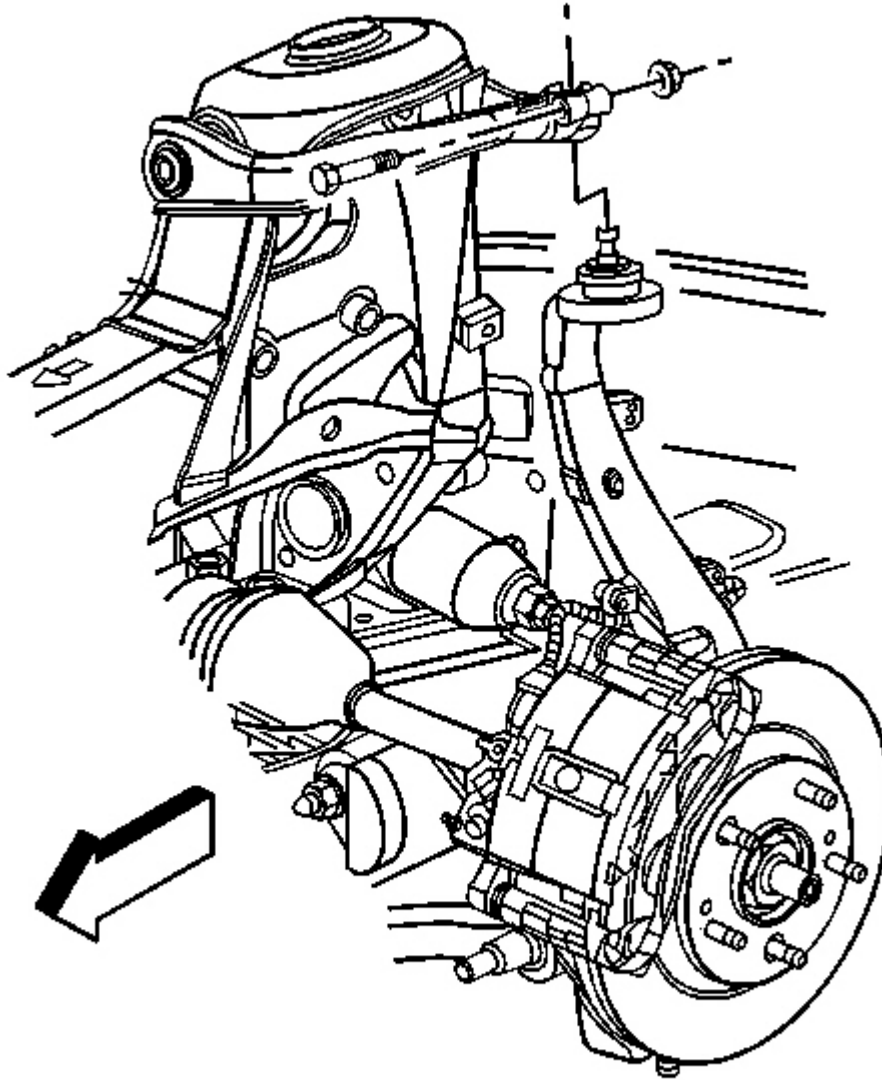


Fig. 39: View Of Upper Control Arm To The Steering Knuckle Pinch Bolt And Nut
Courtesy of GENERAL MOTORS CORP.

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

4. Disconnect the upper control arm from the steering knuckle.

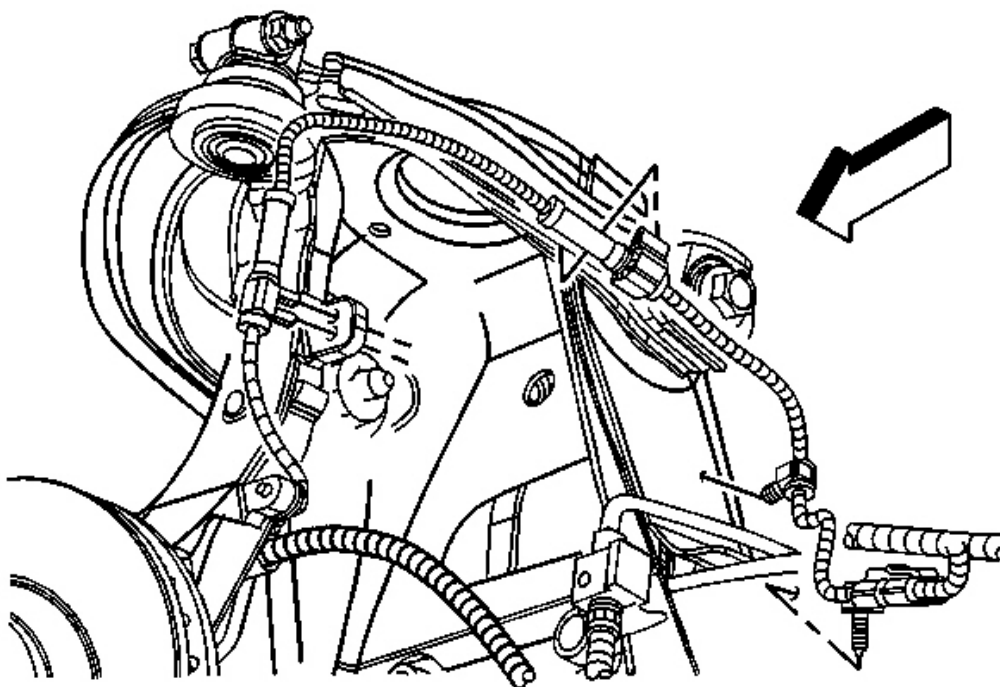


Fig. 40: View Of ABS Harness

Courtesy of GENERAL MOTORS CORP.

5. Disconnect the ABS wheel speed sensor wiring harness from the upper control arm.
6. If removing the left side, remove the battery tray. Refer to **Battery Tray Replacement** in Engine Electrical.

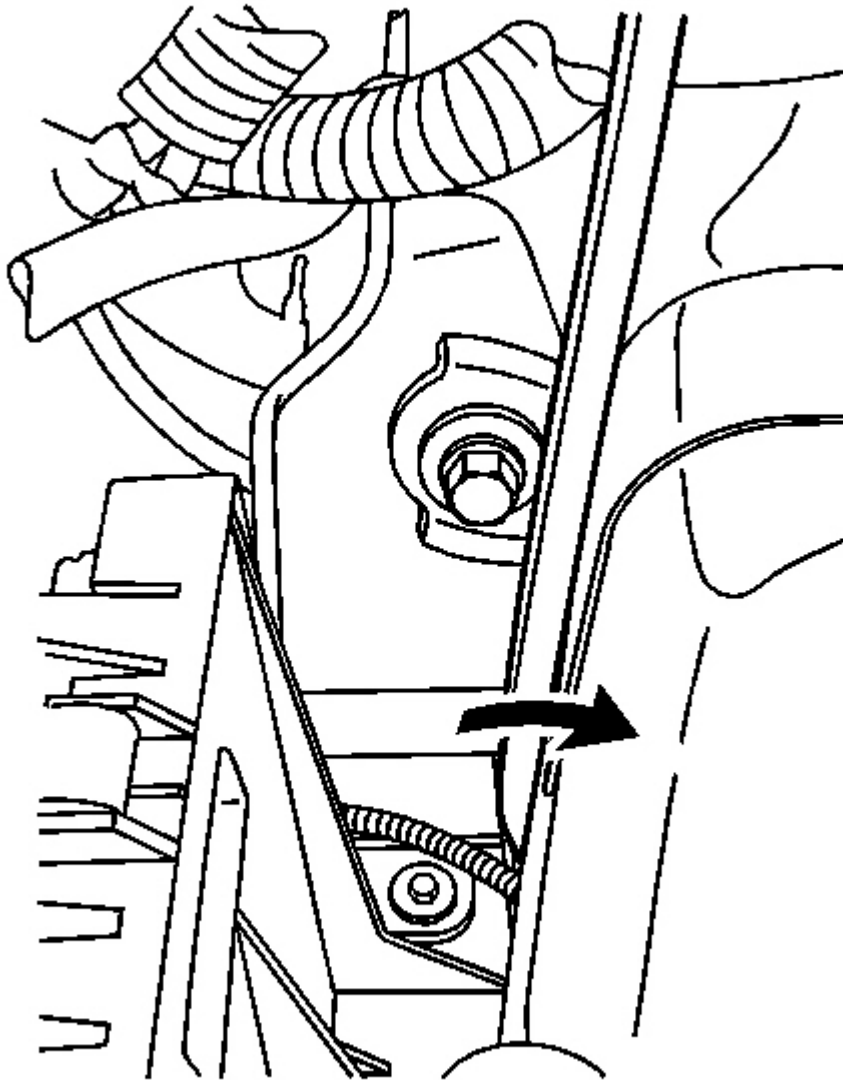


Fig. 41: Accessing Forward Facing Bolt
Courtesy of GENERAL MOTORS CORP.

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

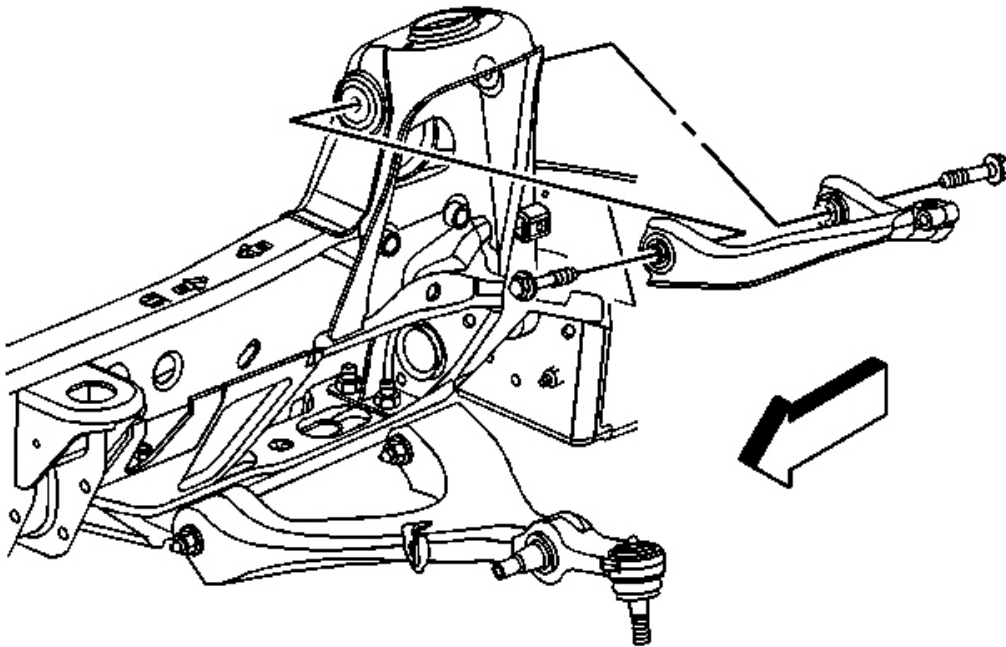


Fig. 42: Removing/Installing Upper Control Arm
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

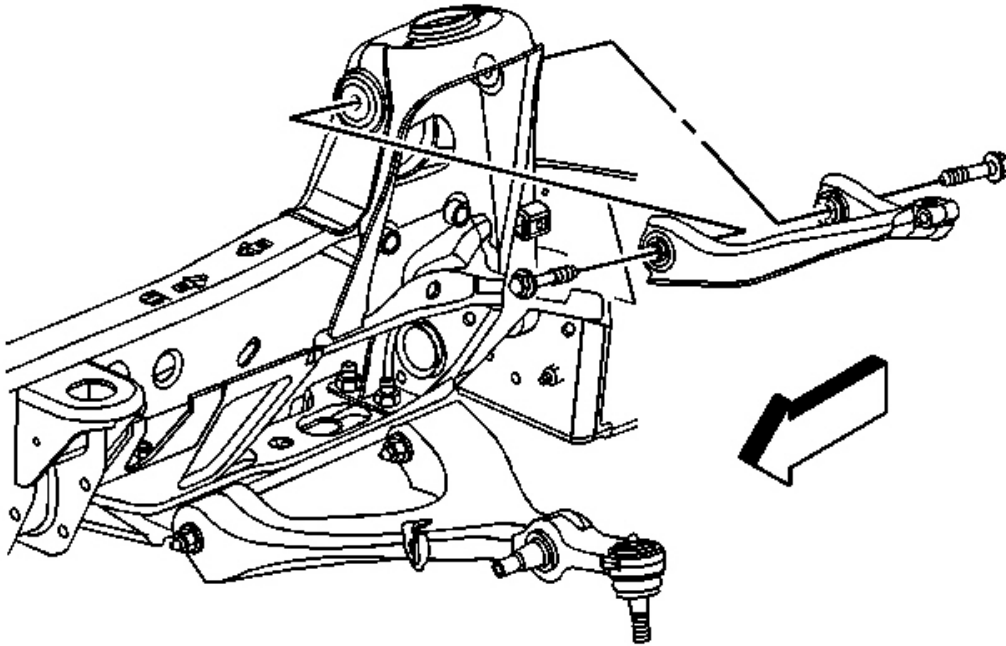


Fig. 43: Removing/Installing Upper Control Arm
Courtesy of GENERAL MOTORS CORP.

1. Install the upper control arm.

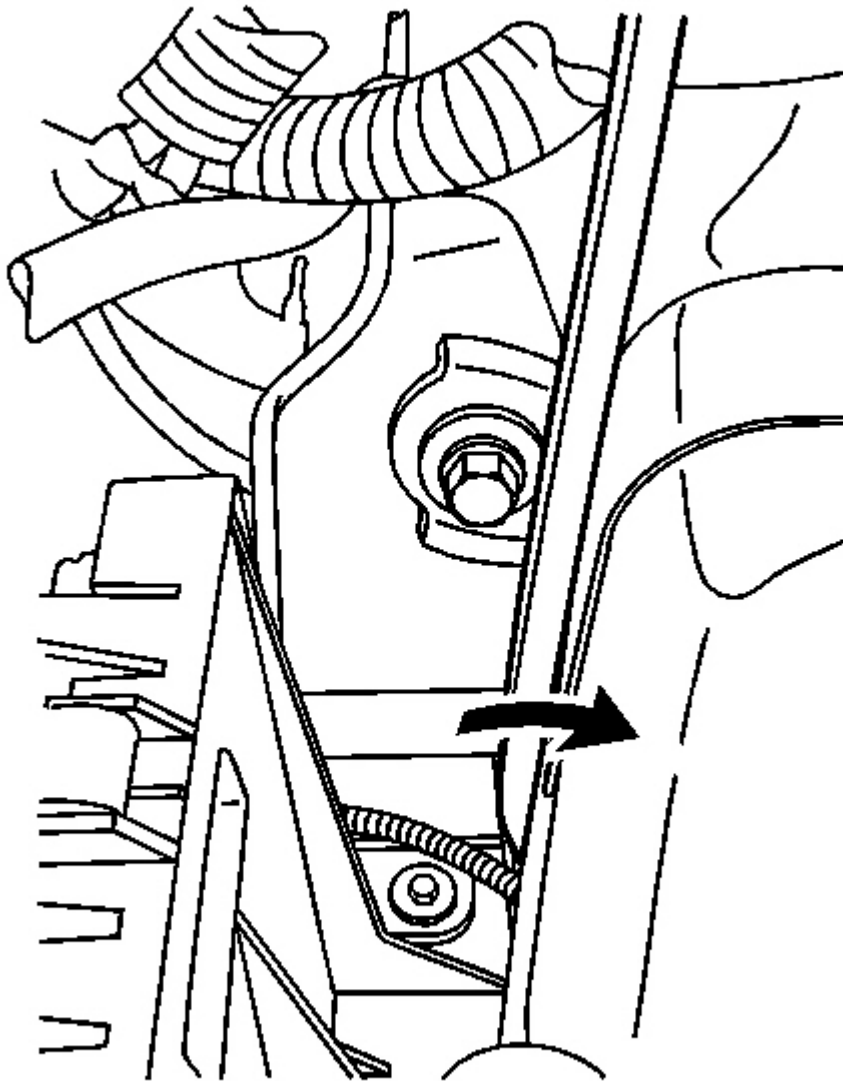


Fig. 44: Accessing Forward Facing Bolt
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the upper control arm mounting bolts.

Tighten: Tighten the upper control arm mounting bolts to 150 N.m (111 ft. lb.).

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

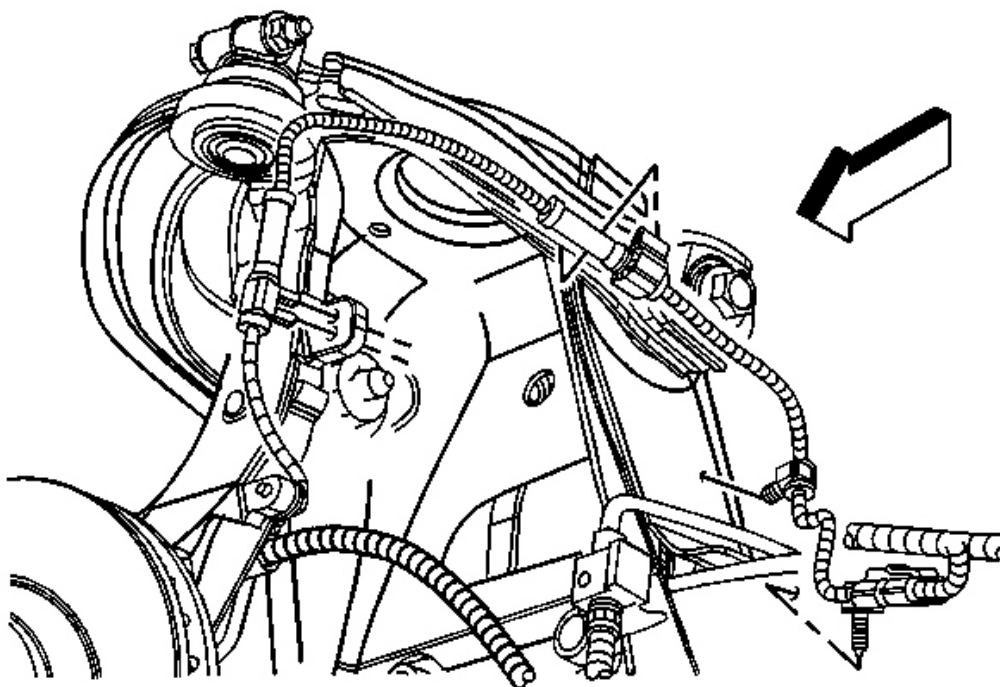


Fig. 45: View Of ABS Harness
Courtesy of GENERAL MOTORS CORP.

5. Connect the ABS wheel speed sensor wiring harness to the upper control arm.

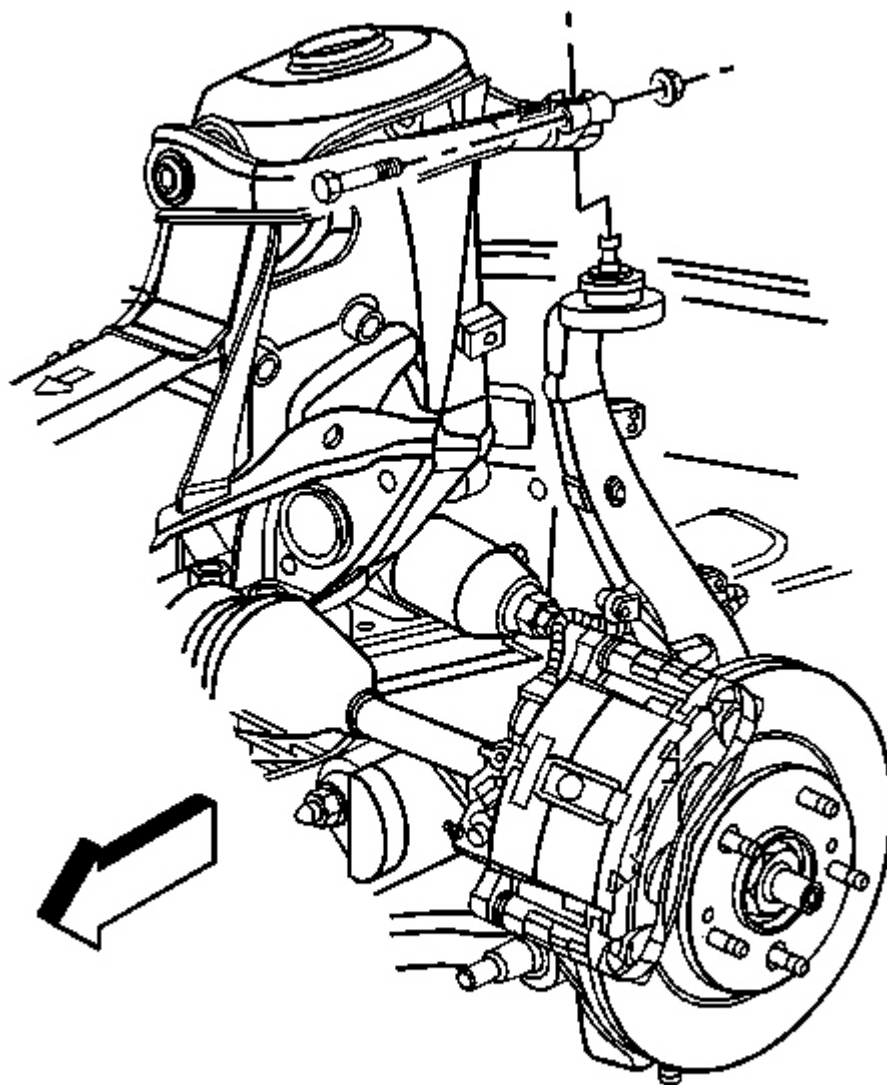


Fig. 46: View Of Upper Control Arm To The Steering Knuckle Pinch Bolt And Nut
Courtesy of GENERAL MOTORS CORP.

6. Connect the upper control arm to the steering knuckle
7. Install the upper ball joint to upper control arm pinch bolt and nut.

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

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

LOWER CONTROL ARM REPLACEMENT

Tools Required

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

Removal Procedure

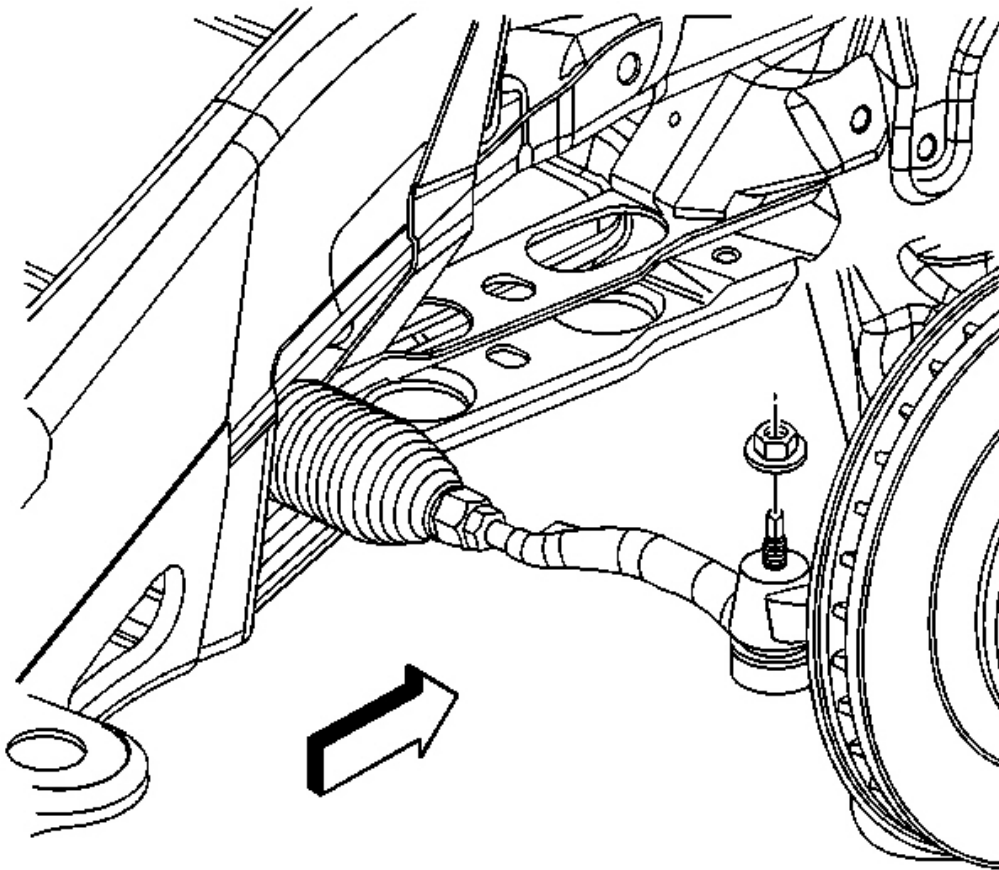


Fig. 47: View Of Tie Rod Retaining Nut
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the outer tie rod retaining nut.

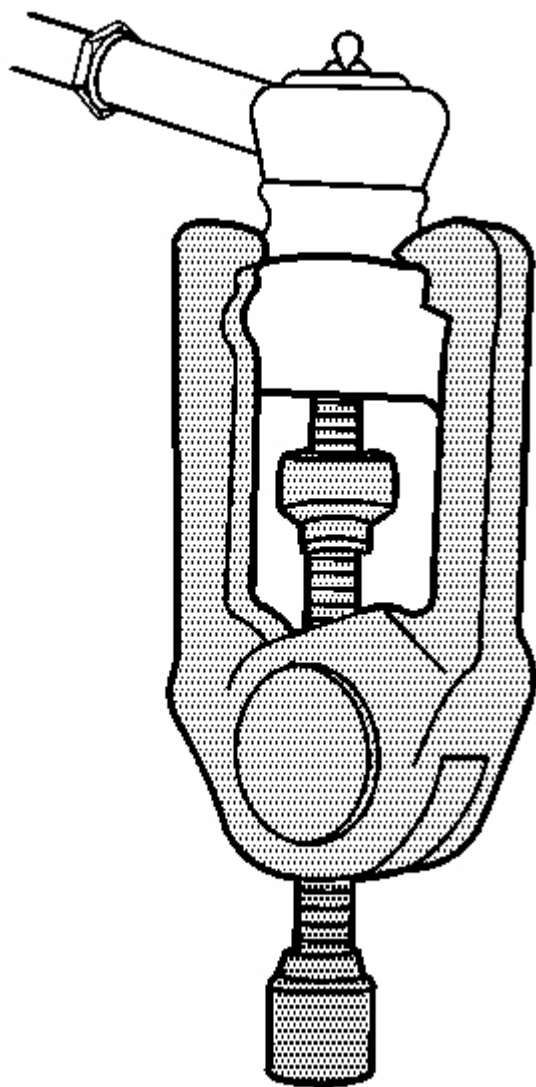


Fig. 48: Removing Outer Tie Rod Assembly From Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

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

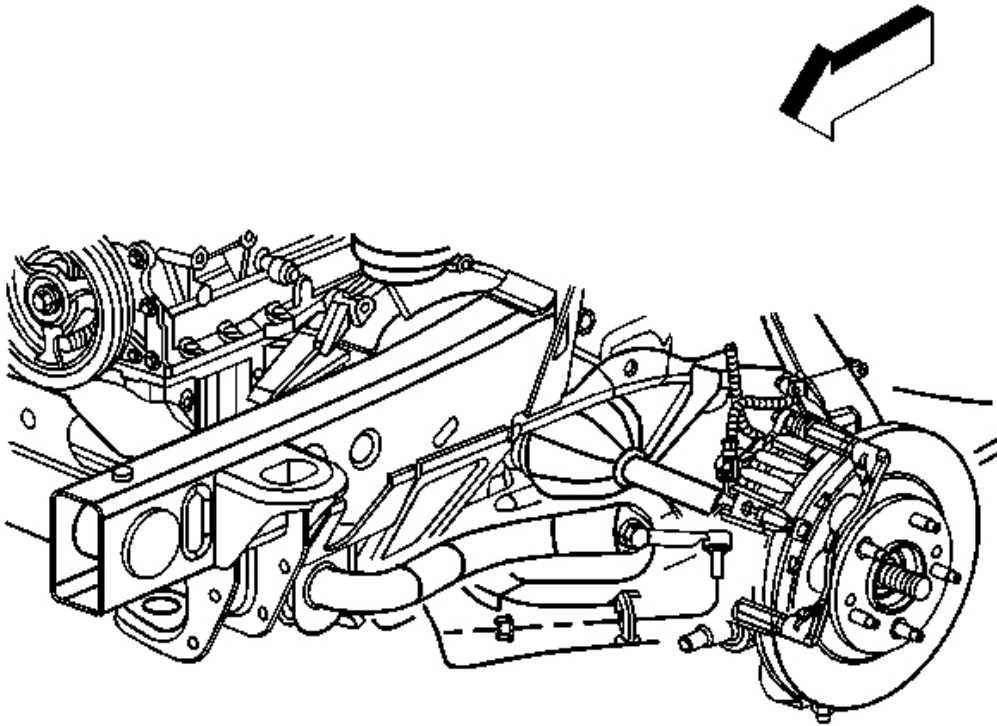


Fig. 49: View Of Stabilizer Shaft Link Lower Retaining Nut
Courtesy of GENERAL MOTORS CORP.

5. Remove the stabilizer shaft link lower retaining nut.
6. Disconnect the stabilizer shaft link and washer from the lower control arm.

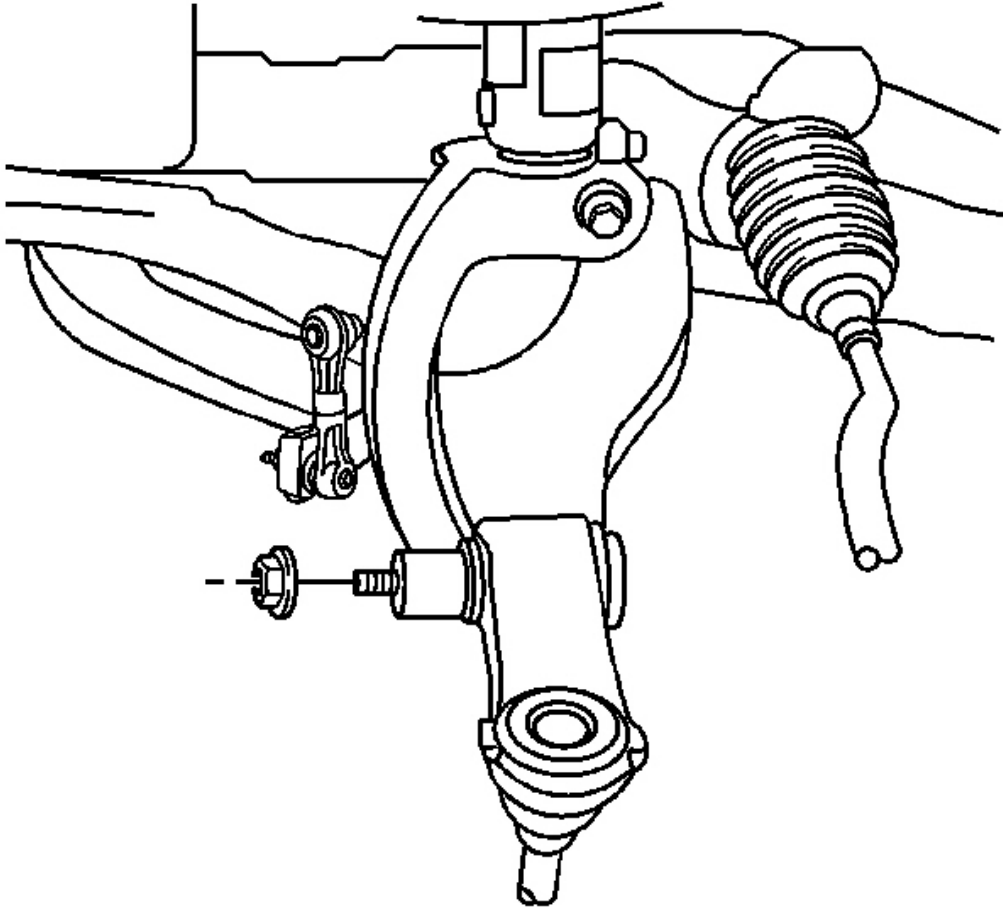


Fig. 50: Removing/Installing Shock Module Yoke Lower Mounting Nut
Courtesy of GENERAL MOTORS CORP.

7. Remove the shock module yoke lower mounting nut.

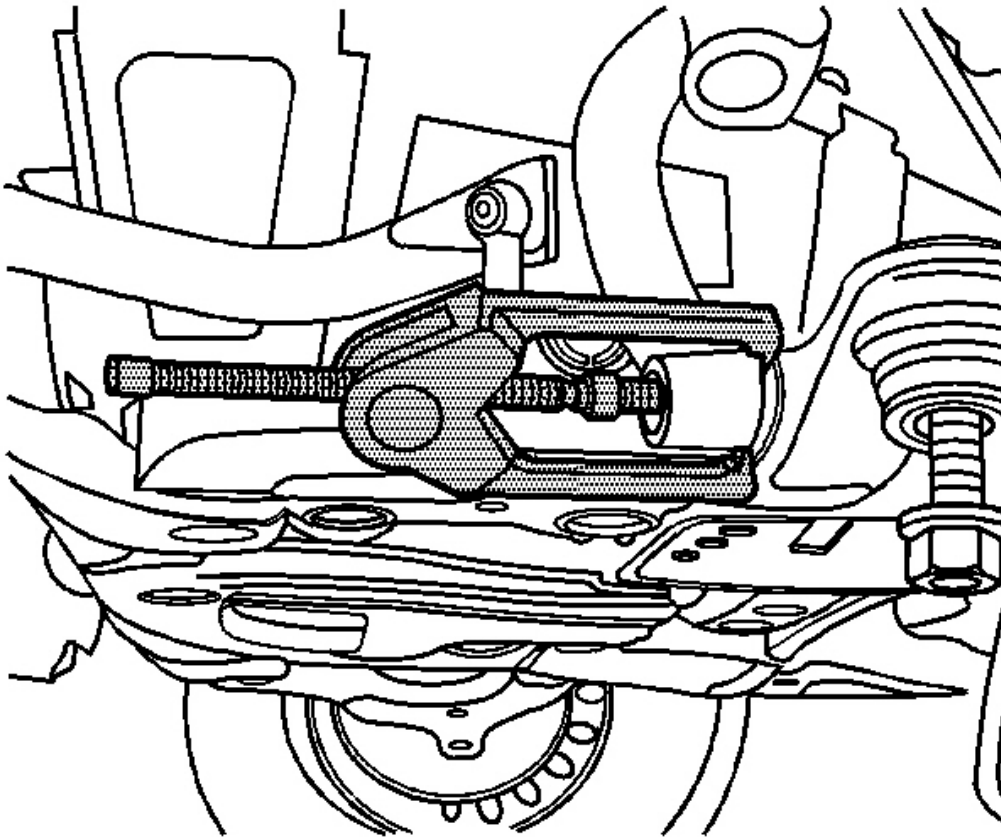


Fig. 51: Disconnecting Shock Module Yoke From Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

8. Disconnect the shock module yoke from the lower control arm using **J 24319-B** .

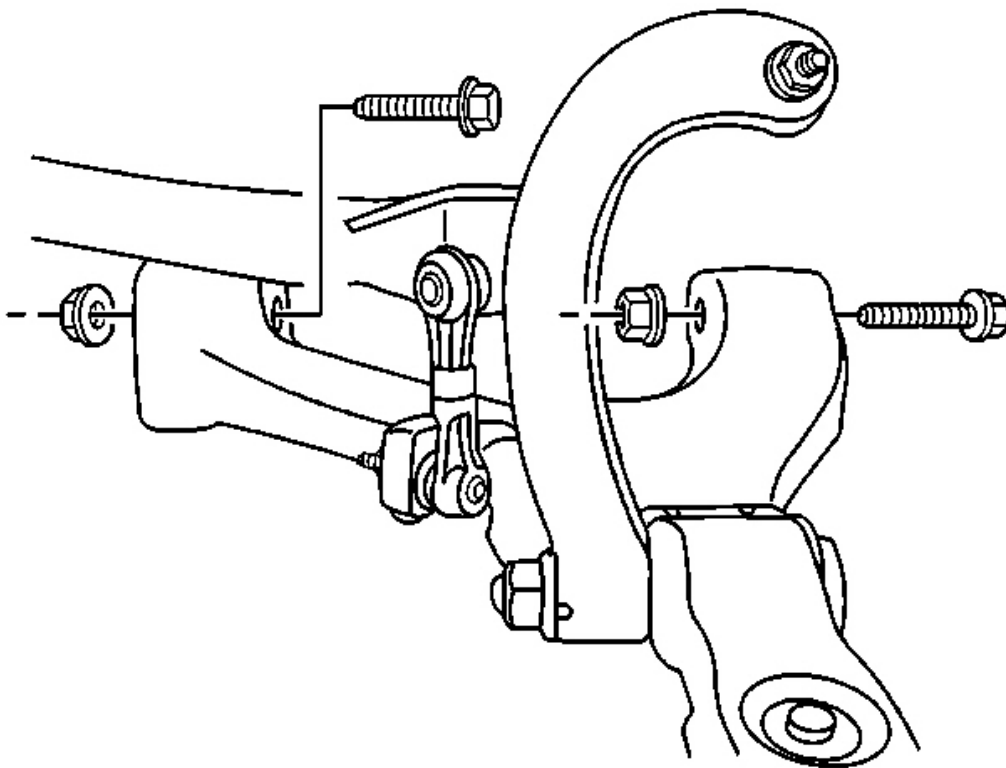


Fig. 52: Removing/Installing Lower Control Arm-To-Lower Control Arm Bracket Mounting Nuts
Courtesy of GENERAL MOTORS CORP.

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

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

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

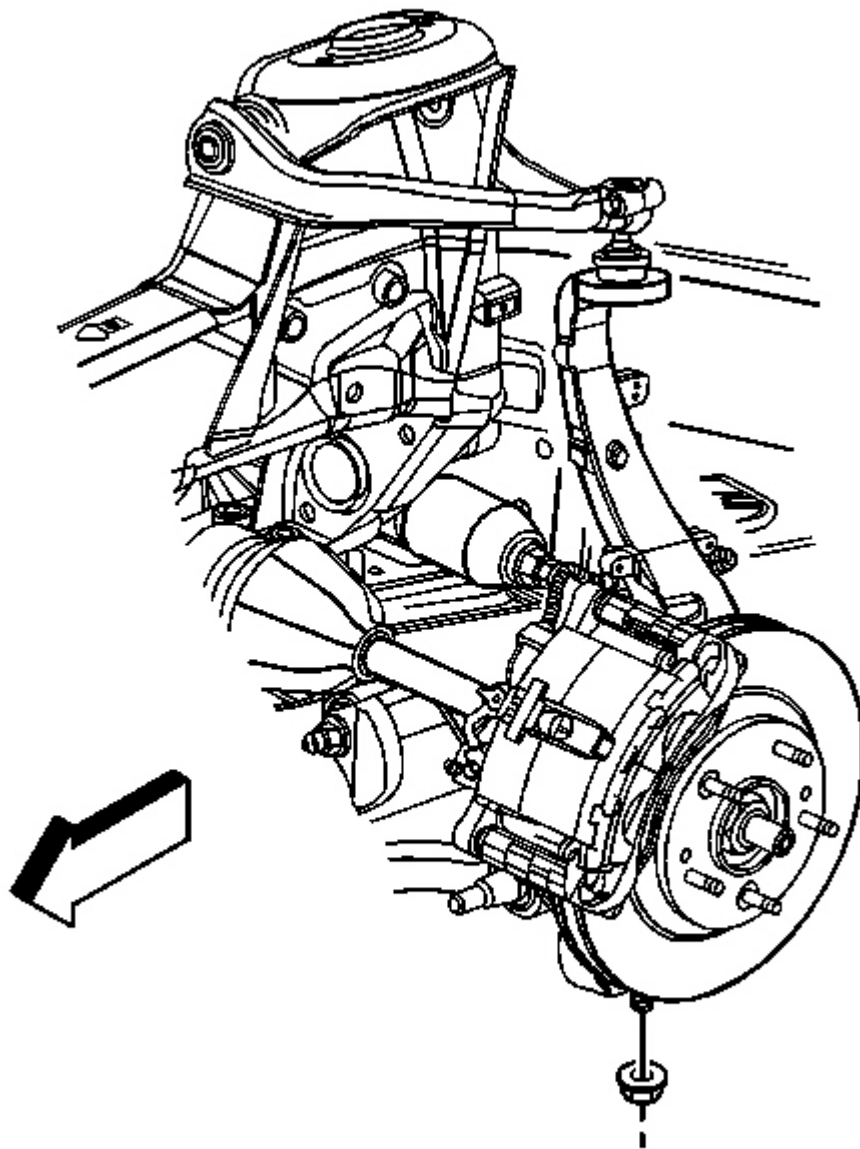


Fig. 53: Removing/Installing Lower Ball Joint Retaining Nut
Courtesy of GENERAL MOTORS CORP.

11. Remove lower ball joint retaining nut.

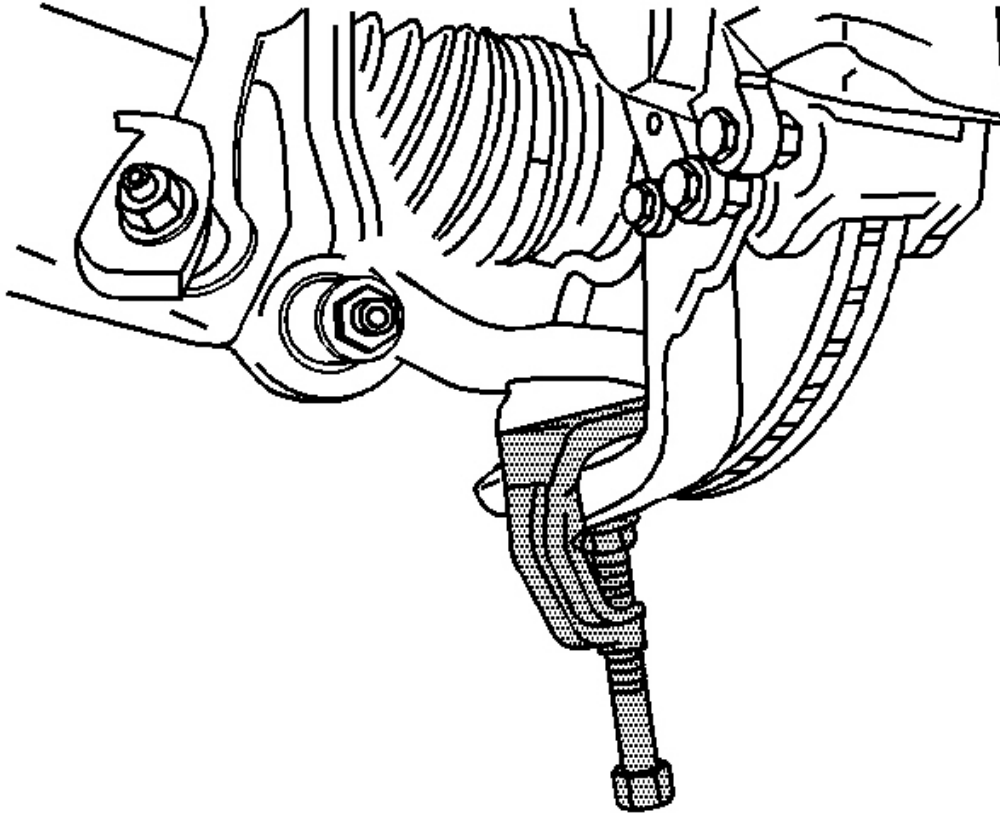


Fig. 54: Removing Steering Knuckle From Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

12. Disconnect lower ball joint from steering knuckle using **J 43631** . See **Special Tools and Equipment**.

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

13. Pivot the lower control arm outward and downward in order to disconnect the lower control arm from the lower control arm bracket.
14. Remove the lower control arm from the steering knuckle.

Installation Procedure

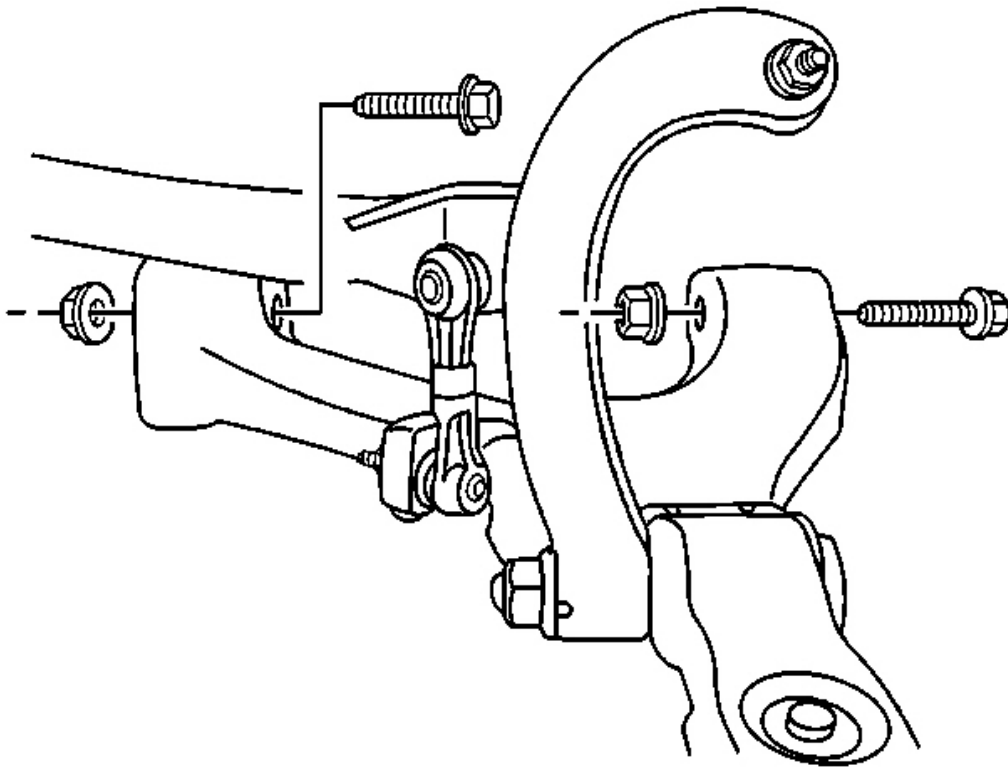


Fig. 55: Removing/Installing Lower Control Arm-To-Lower Control Arm Bracket Mounting Nuts
Courtesy of GENERAL MOTORS CORP.

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

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

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

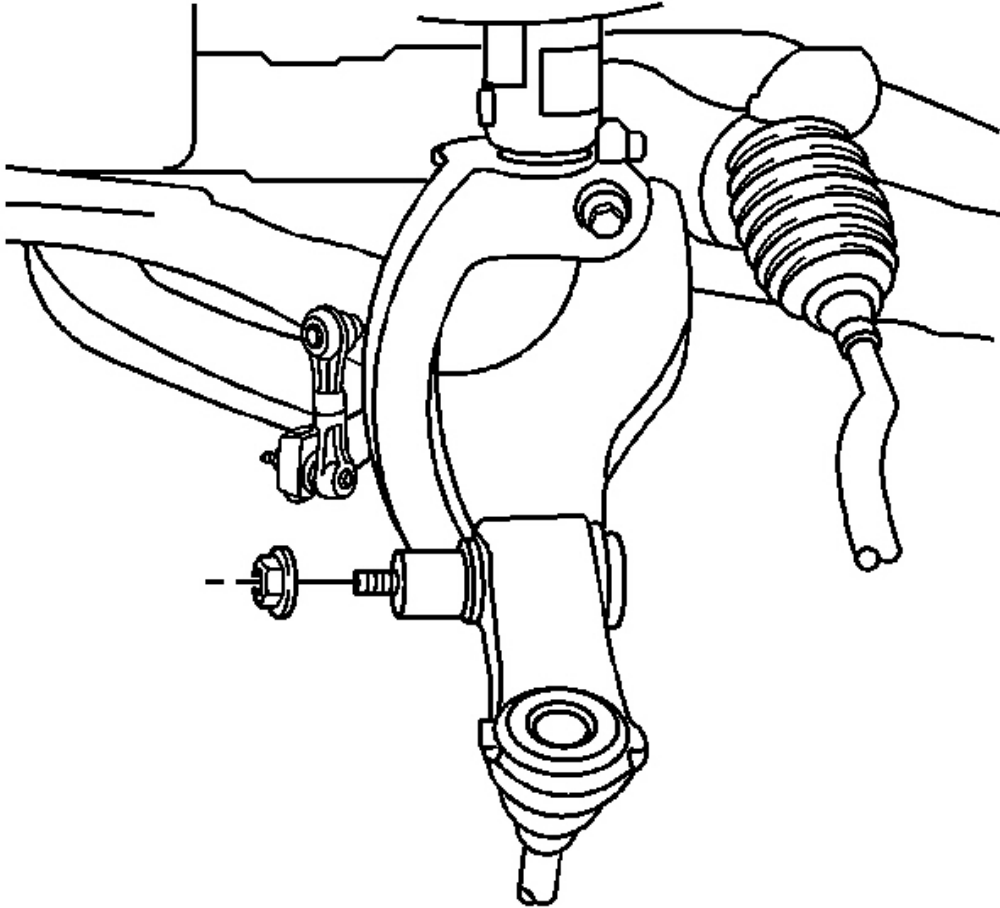


Fig. 56: Removing/Installing Shock Module Yoke Lower Mounting Nut
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

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.

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

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

6. Connect the shock module yoke to the lower control arm.
7. Install the shock module yoke lower mounting nut.

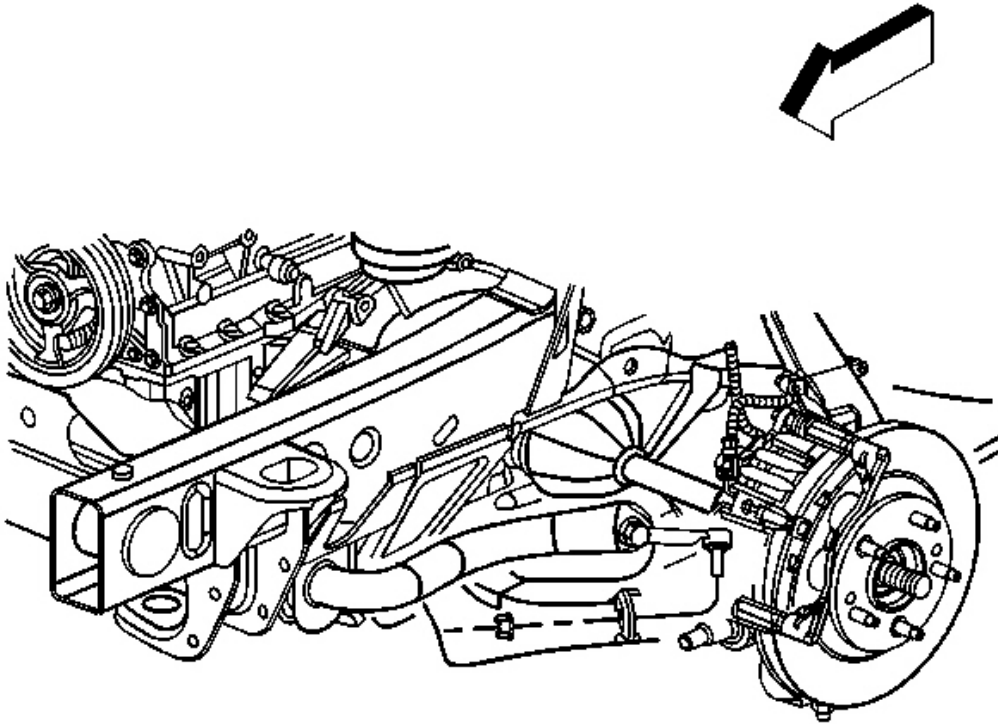


Fig. 57: View Of Stabilizer Shaft Link Lower Retaining Nut
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: There is a washer between the stabilizer shaft link and the lower control arm made of hardened steel and has a felt inner liner. Only replace this washer with an identical washer, standard washers should not be used.

8. Install the stabilizer shaft link and washer to the lower control arm.
9. Install the stabilizer shaft link retaining nut.

Tighten: Tighten the nut to 145 N.m (107 ft. lb.).

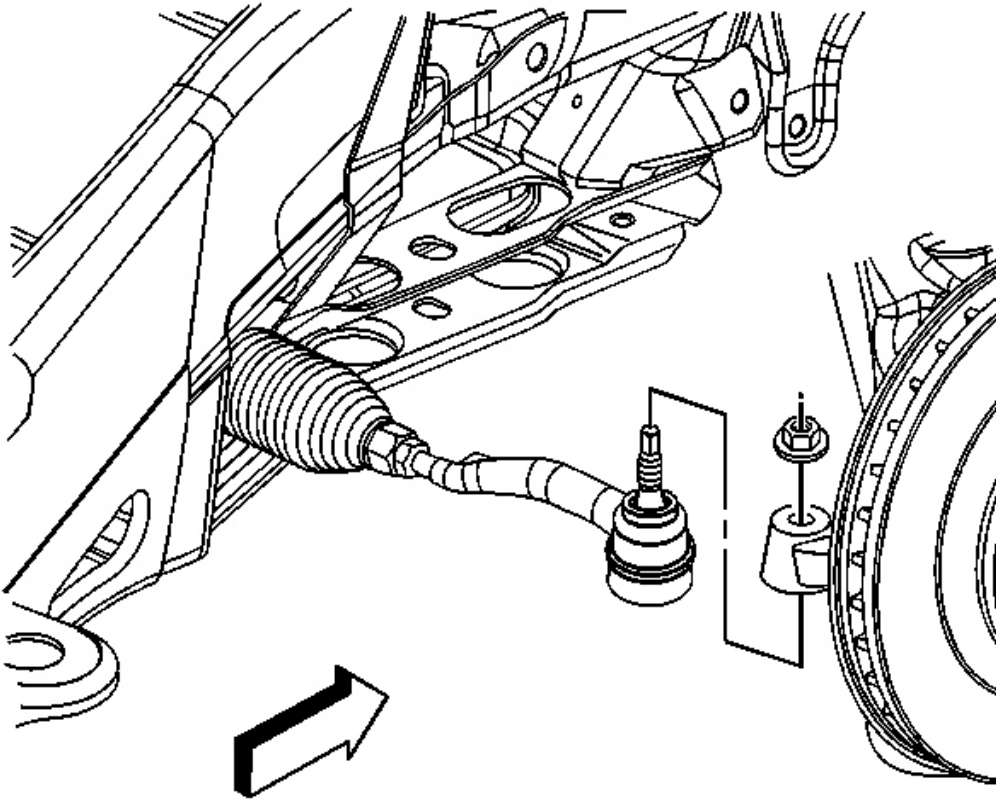


Fig. 58: Removing/Installing Tie Rod
Courtesy of GENERAL MOTORS CORP.

10. Install the outer tie rod to the steering knuckle.
11. Install the outer tie rod retaining nut.

Tighten: Tighten the nuts to 45 N.m (33 ft. lb.).

12. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
13. Lower the vehicle.
14. Inspect the front wheel alignment. Refer to **Wheel Alignment Specifications** in Wheel Alignment.

LOWER CONTROL ARM BRACKET REPLACEMENT

Removal Procedure

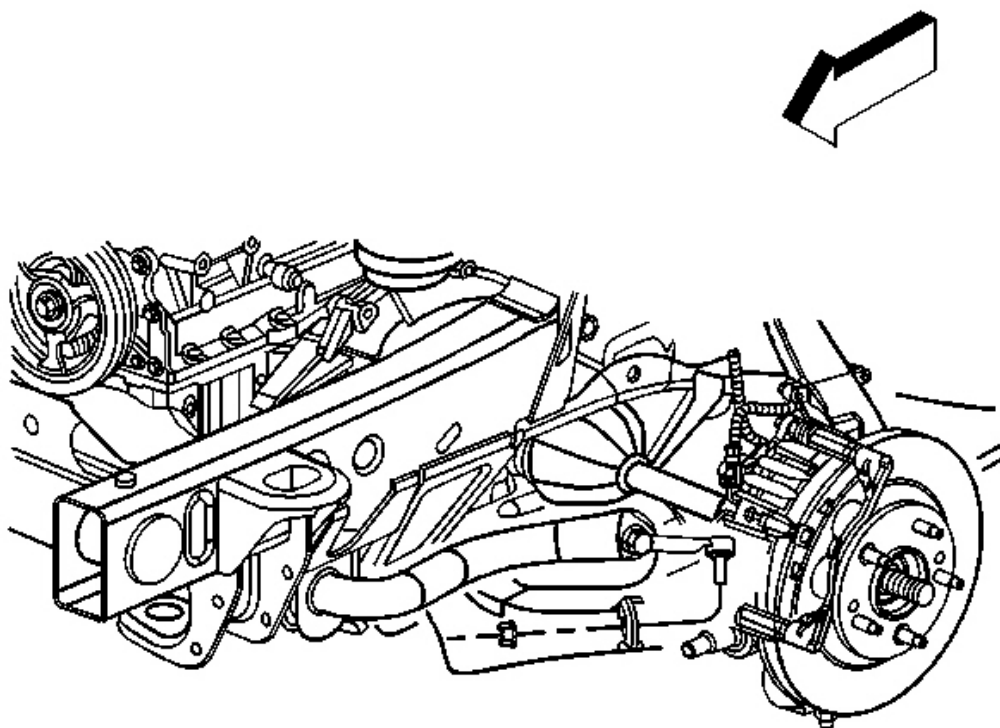


Fig. 59: View Of Stabilizer Shaft Link Lower Retaining Nut
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the stabilizer shaft link lower retaining nut.
4. Disconnect the stabilizer shaft link and washer from the lower control arm.

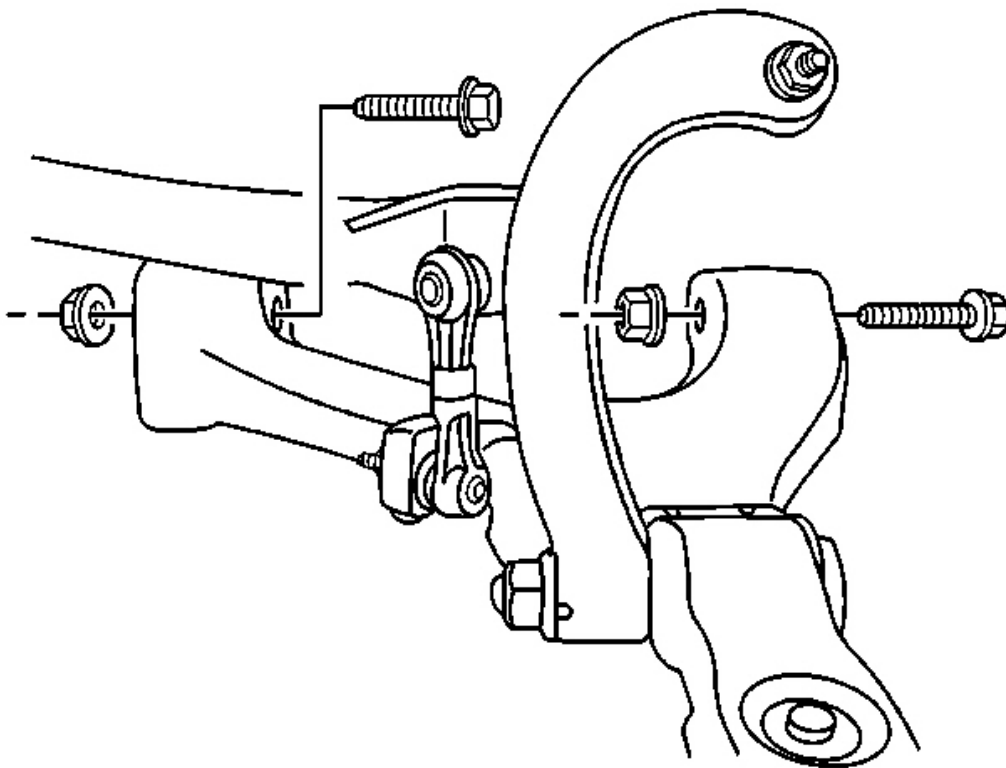


Fig. 60: Removing/Installing Lower Control Arm-To-Lower Control Arm Bracket Mounting Nuts
Courtesy of GENERAL MOTORS CORP.

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

IMPORTANT: Note the direction the bolts are removed for re-installation.

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

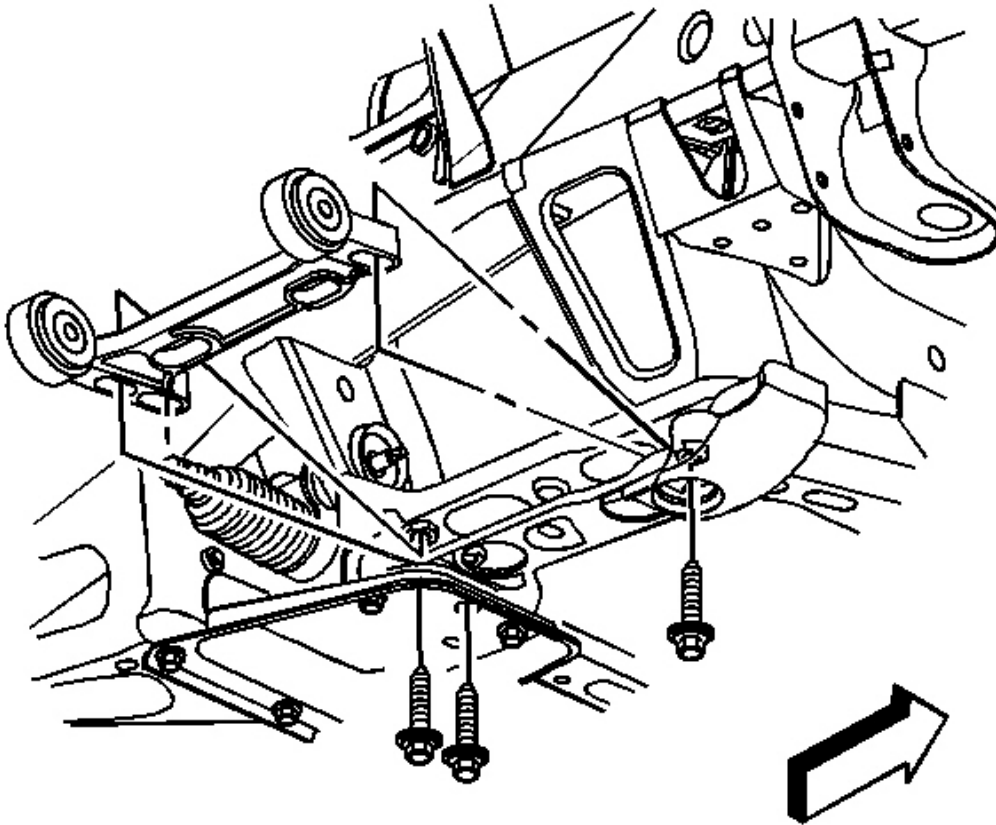


Fig. 61: Removing/Installing Lower Control Arm Bracket
Courtesy of GENERAL MOTORS CORP.

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

7. Pivot the lower control arm outward and downward for access to the lower control arm bracket.
8. Remove the lower control arm bracket mounting bolts from the frame.
9. Remove the lower control arm bracket from the vehicle.

Installation Procedure

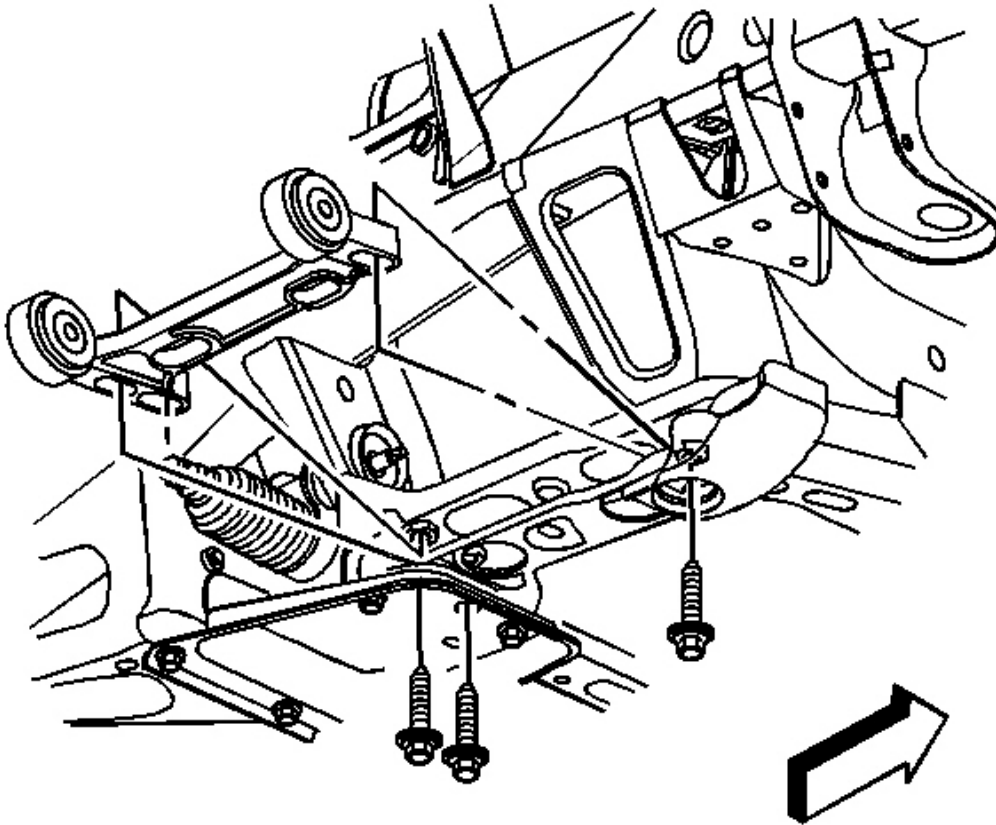


Fig. 62: Removing/Installing Lower Control Arm Bracket
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice in Cautions and Notices.

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

Tighten:

- Tighten the front lower control arm bracket mounting bolt to 265 N.m (195 ft. lb.).
- Tighten the rear lower control arm bracket mounting bolts to 240 N.m (177 ft. lb.).

3. Install the lower control arm to the lower control arm bracket.

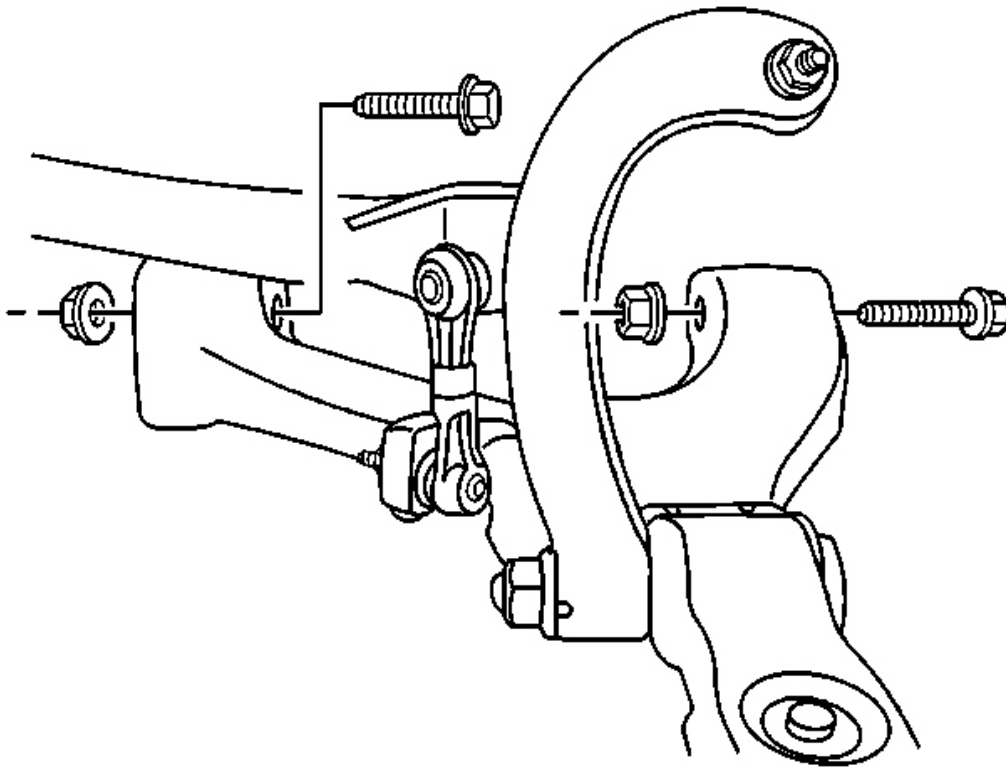


Fig. 63: Removing/Installing Lower Control Arm-To-Lower Control Arm Bracket Mounting Nuts
Courtesy of GENERAL MOTORS CORP.

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

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.

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

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

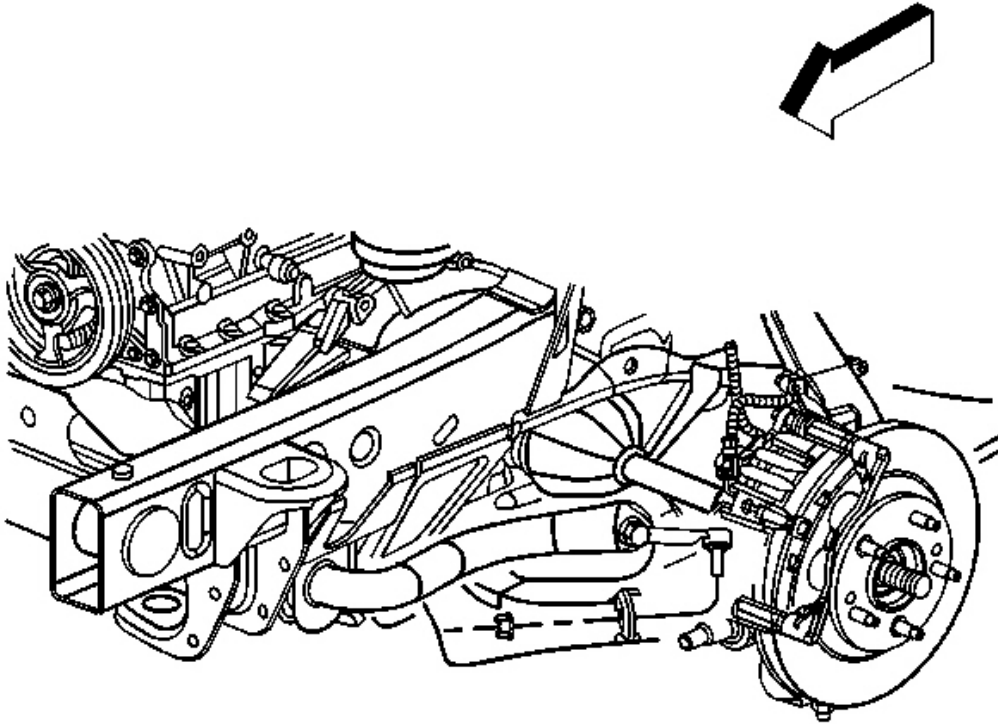


Fig. 64: View Of Stabilizer Shaft Link Lower Retaining Nut
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: There is a washer between the stabilizer shaft link and the lower control arm made of hardened steel and has a felt inner liner. Only replace this washer with an identical washer, standard washers should not be used.

6. Install the stabilizer shaft link and washer to the lower control arm.
7. Install the stabilizer shaft link retaining nut.

Tighten: Tighten the nut to 145 N.m (107 ft. lb.).

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

WHEEL STUD REPLACEMENT

Tools Required

J 43631 Ball Joint Remover. See Special Tools and Equipment.

Removal Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.
2. Remove the tire and the wheel. Refer to Tire and Wheel Removal and Installation in Tires and Wheels.
3. Remove the rotor. Refer to Brake Rotor Replacement - Front in Disc Brakes.

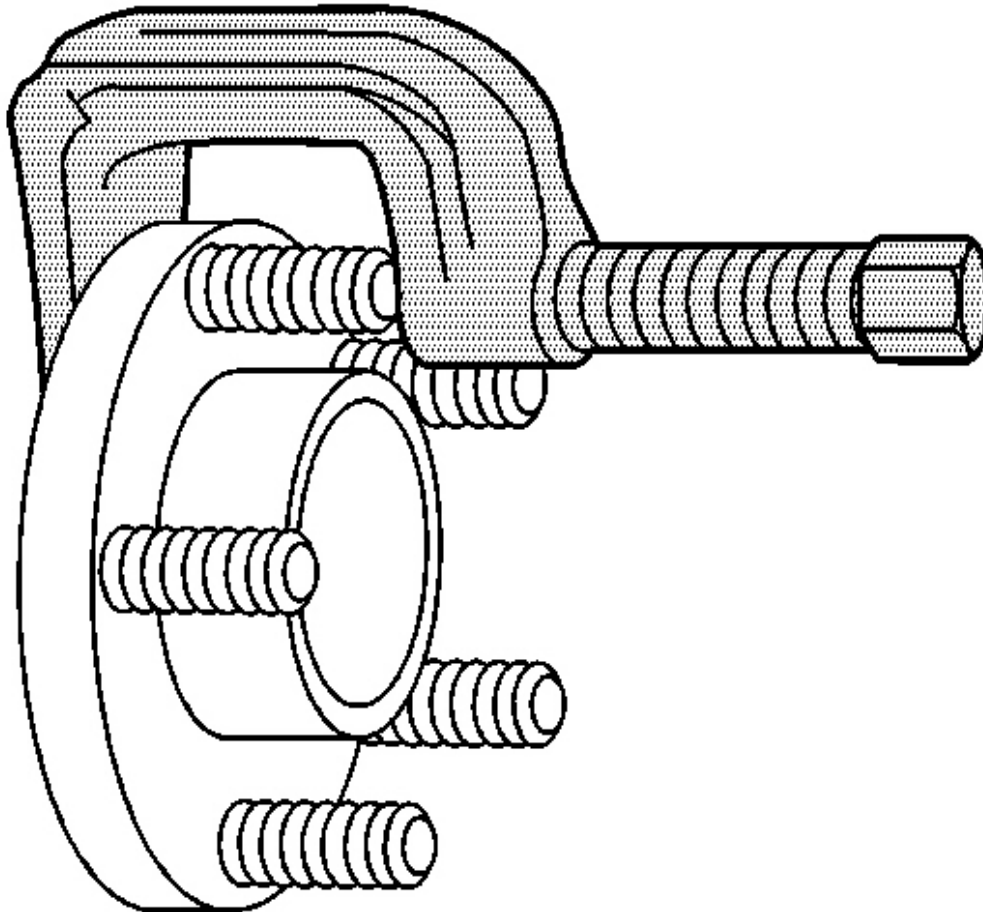


Fig. 65: Removing Wheel Stud From Axle Flange
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not hammer on a wheel stud.

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

Installation Procedure

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

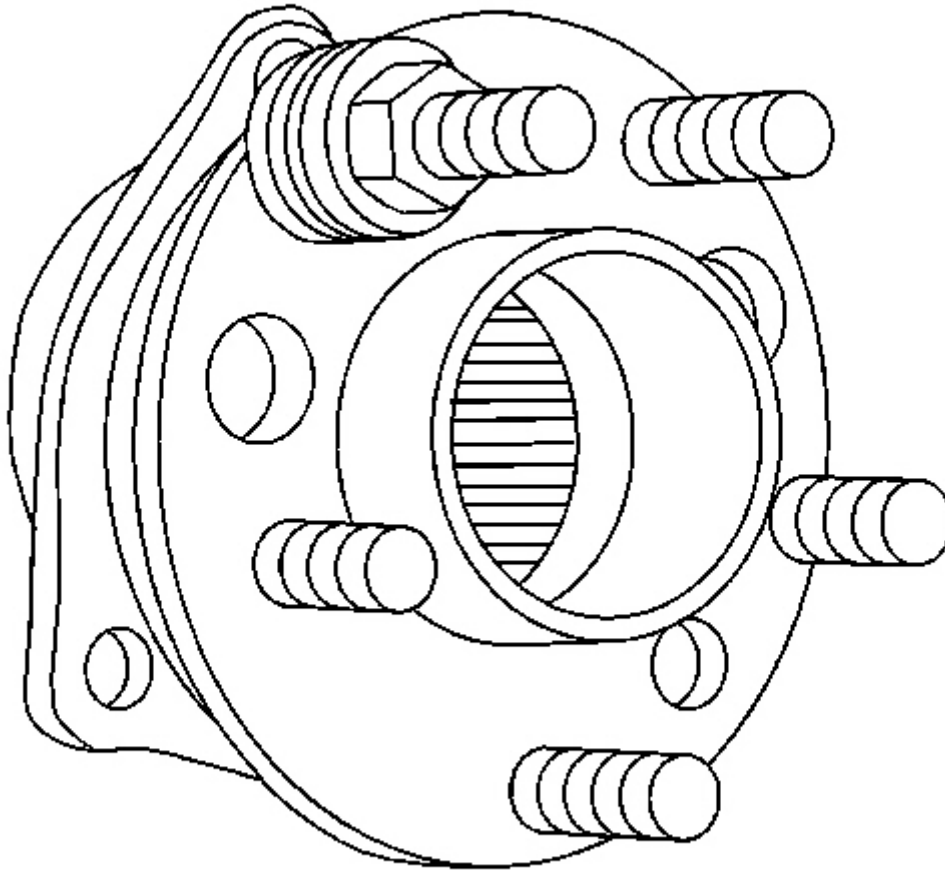


Fig. 66: Installing Wheel Stud
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to **Fastener Notice** in Cautions and Notices.

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

Tighten: Tighten the wheel stud nut to 130 N.m (95 ft. lb.), drawing in the wheel stud.

2004 Isuzu Ascender LS
2004 SUSPENSION Front Suspension - Ascender

3. Remove the nut and the washers.
4. Install the rotor. Refer to **Brake Rotor Replacement - Front** in Disc Brakes.
5. Install the tire and the wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
6. Lower the vehicle.

WHEEL HUB, BEARING, AND SEAL REPLACEMENT (RWD)

Removal Procedure

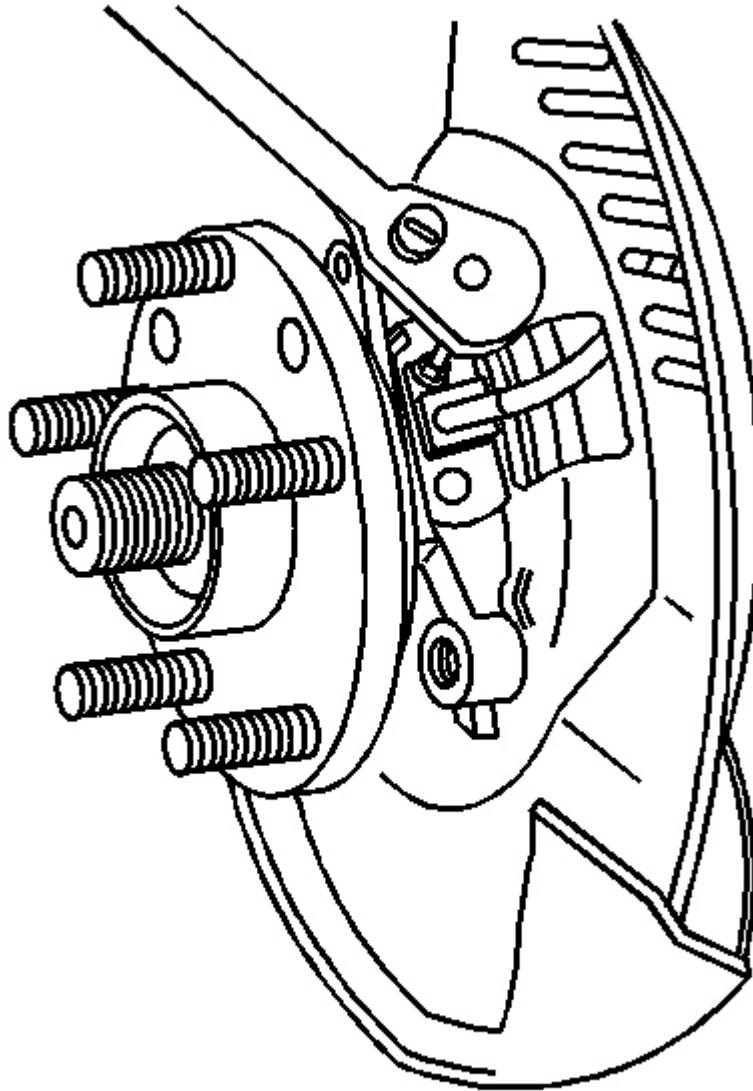


Fig. 67: Removing/Installing Wheel Speed Sensor Mounting Bolt
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the brake rotor. Refer to **Brake Rotor Replacement - Front** in Disc Brakes.
4. Remove the ABS sensor mounting bolt from the wheel hub and bearing.

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

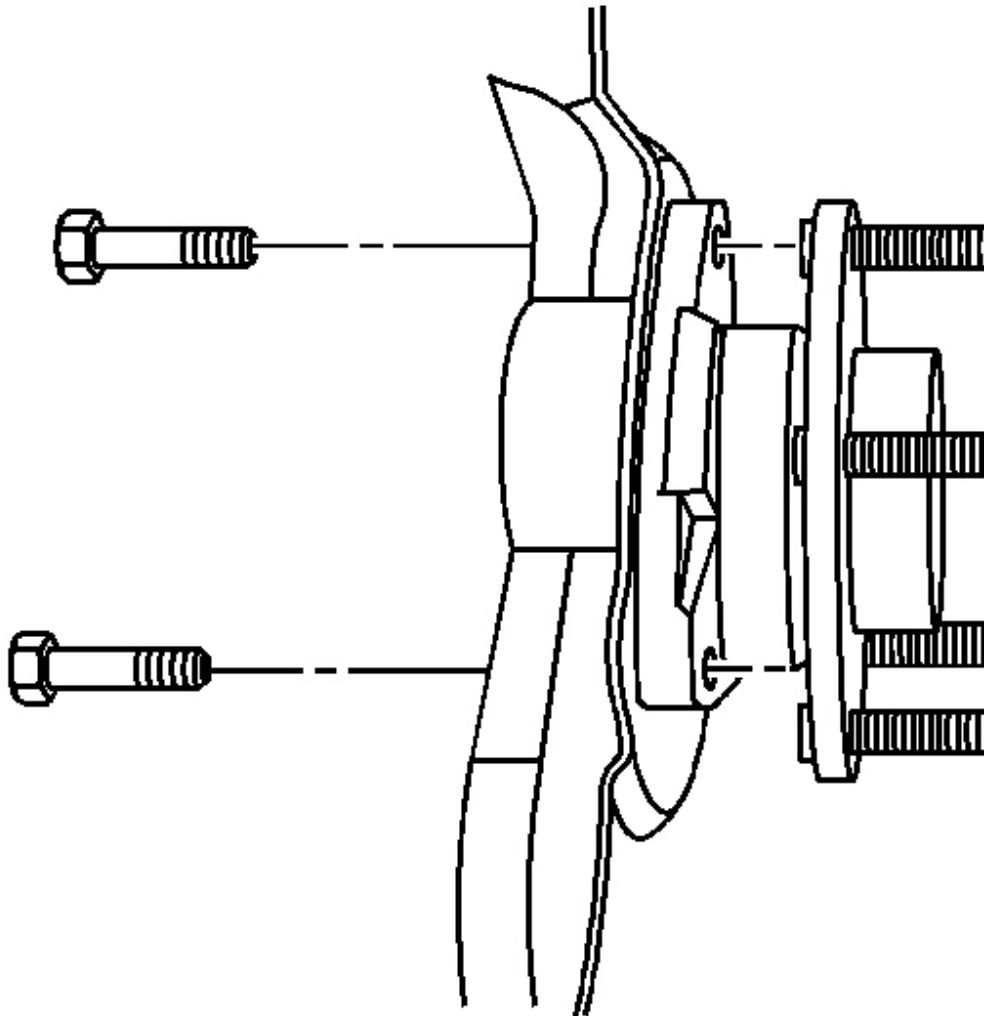


Fig. 68: Removing/Installing Wheel Hub Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

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

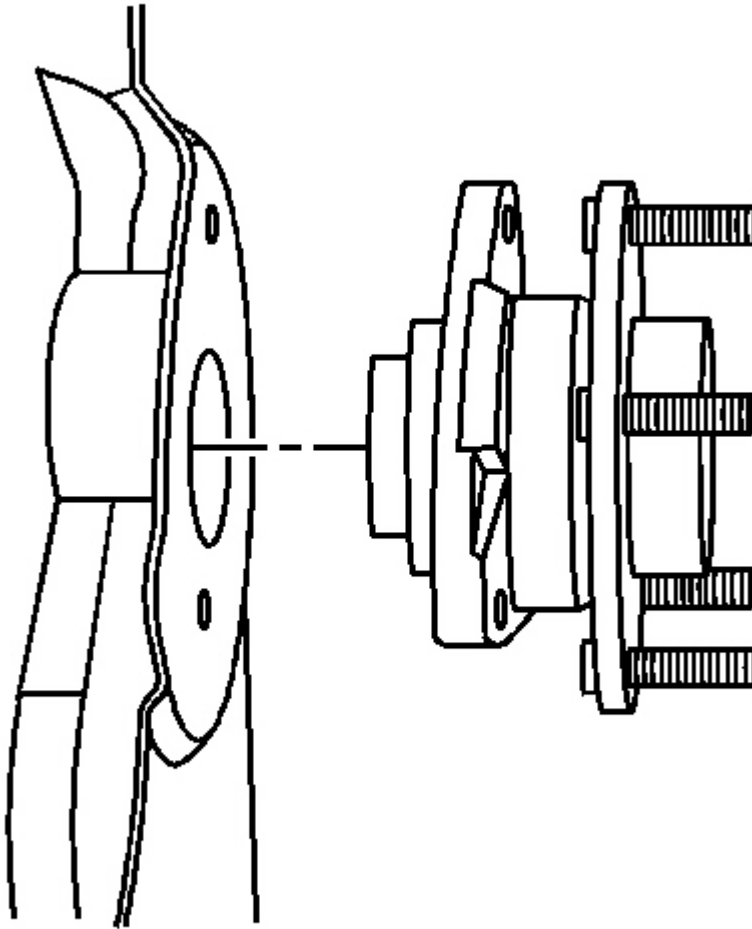


Fig. 69: Removing/Installing Wheel Hub & Bearing At Knuckle
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

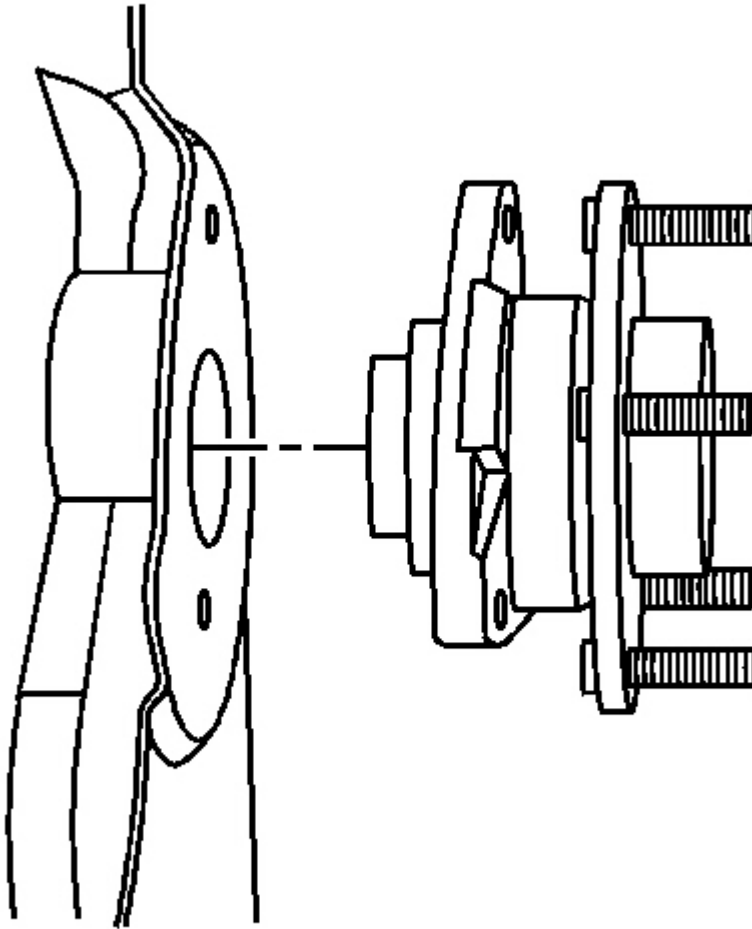


Fig. 70: Removing/Installing Wheel Hub & Bearing At Knuckle
Courtesy of GENERAL MOTORS CORP.

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.

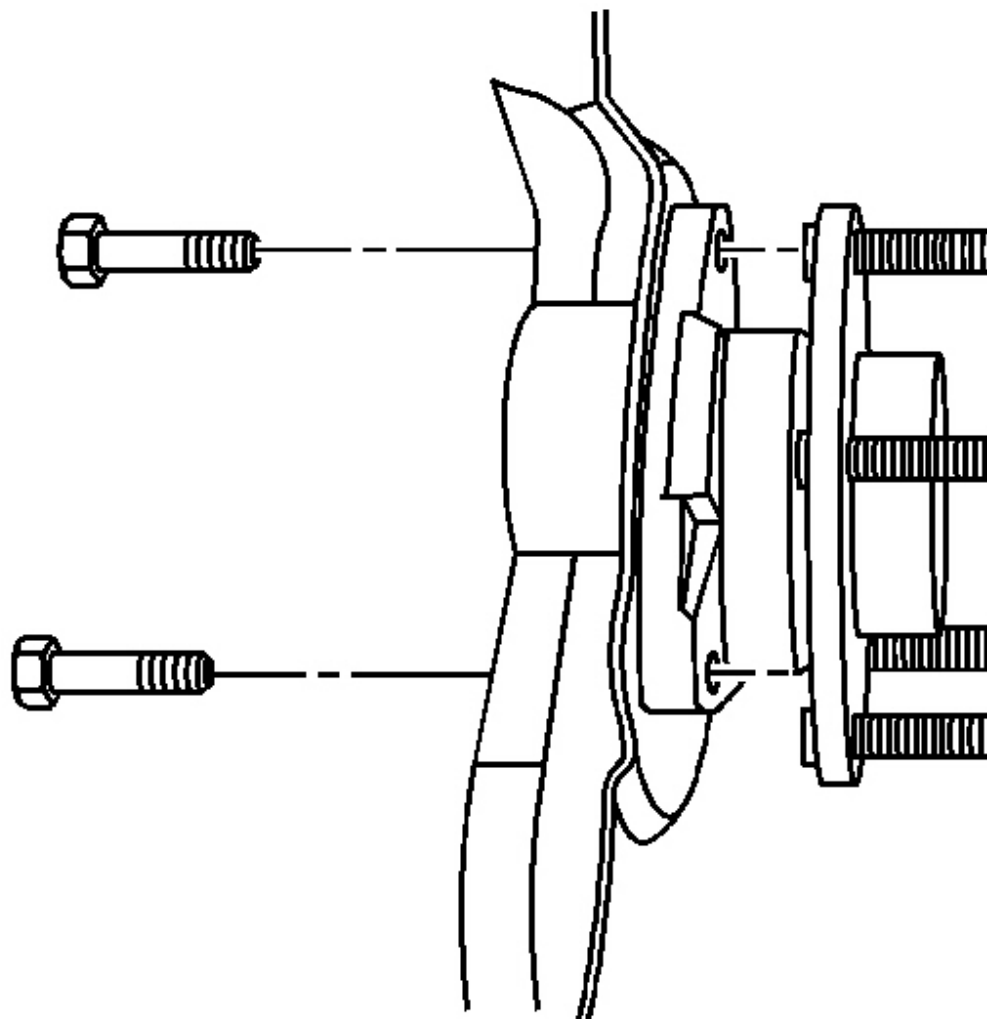


Fig. 71: Removing/Installing Wheel Hub Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

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 ft. lb.).

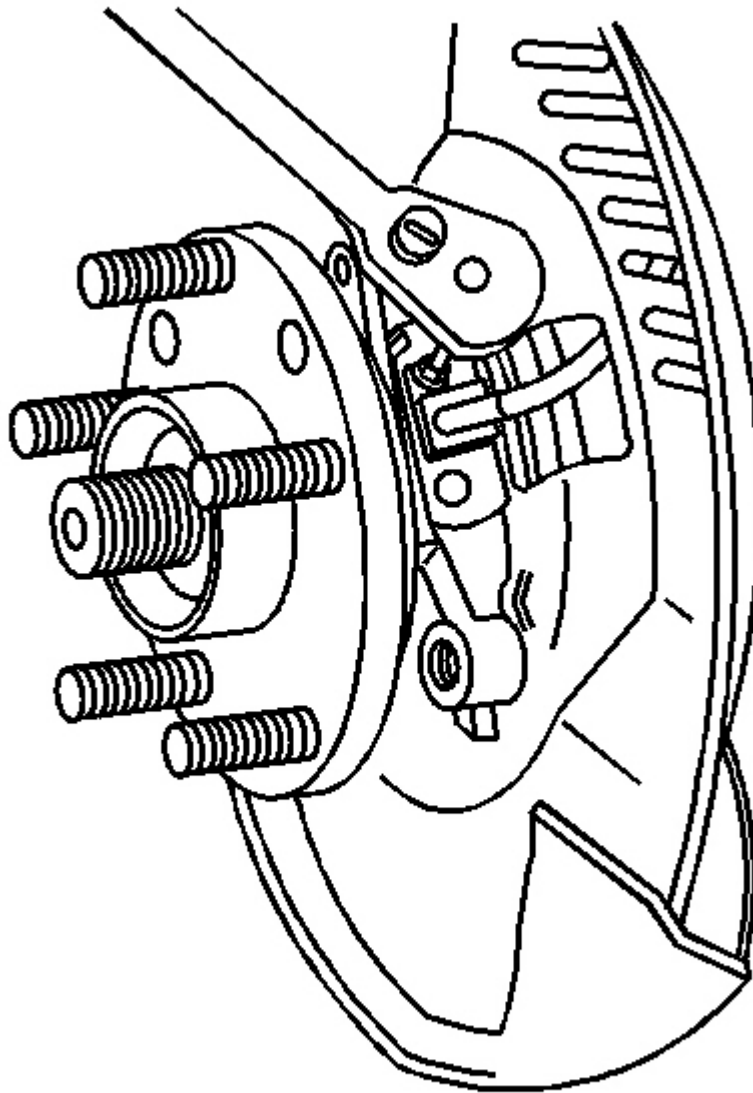


Fig. 72: Removing/Installing Wheel Speed Sensor Mounting Bolt
Courtesy of GENERAL MOTORS CORP.

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 ft. lb.).

6. Install the brake rotor. Refer to **Brake Rotor Replacement - Front** in Disc Brakes.
7. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
8. Lower the Vehicle.

WHEEL HUB, BEARING, AND SEAL REPLACEMENT (4WD)

Removal Procedure

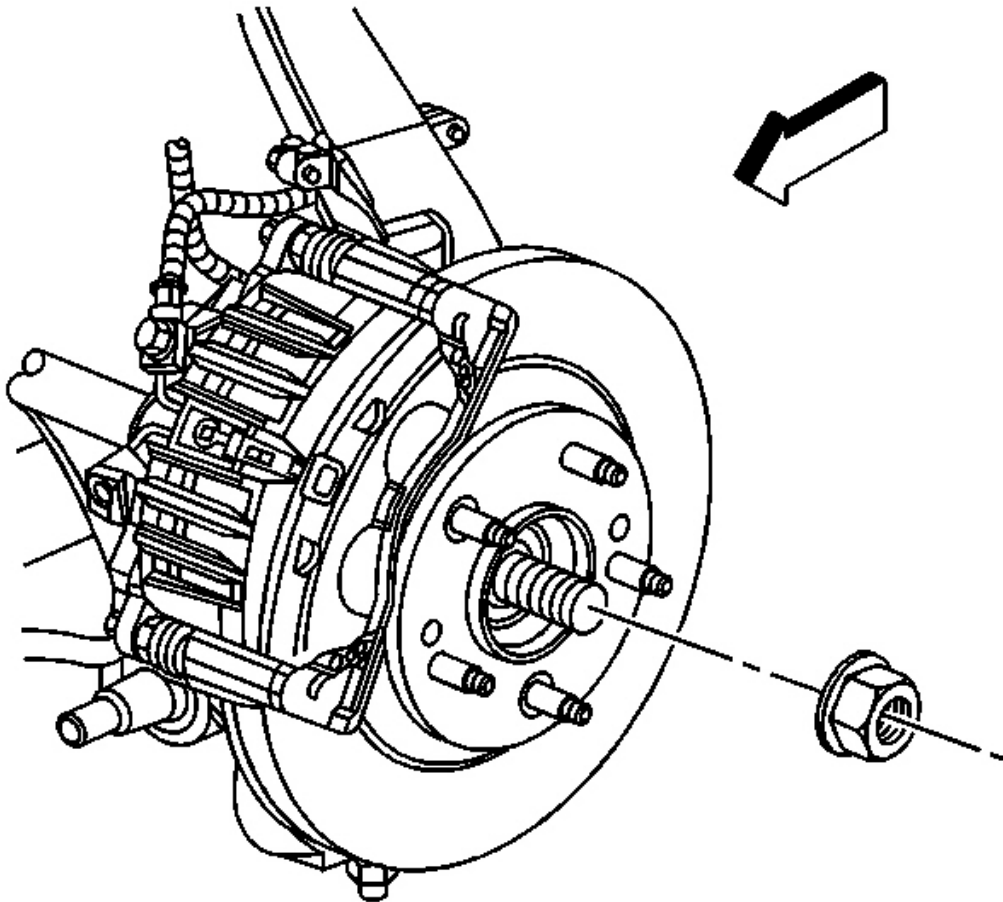


Fig. 73: Removing/Installing Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS CORP.

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** in General Information.

4. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
5. Remove the brake rotor. Refer to **Brake Rotor Replacement - Front** in Disc Brakes.

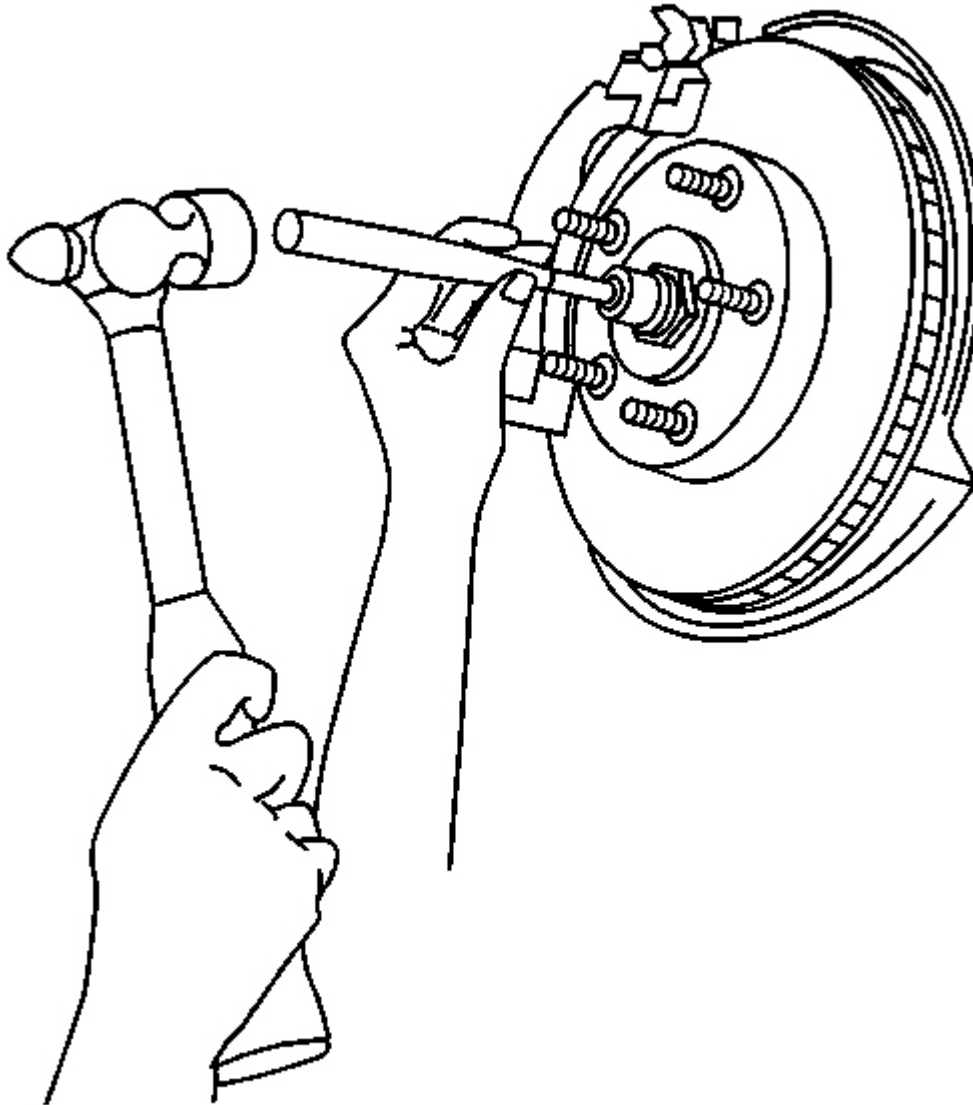


Fig. 74: Disengaging Wheel Drive Shaft From Wheel Hub & Bearing
Courtesy of GENERAL MOTORS CORP.

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.

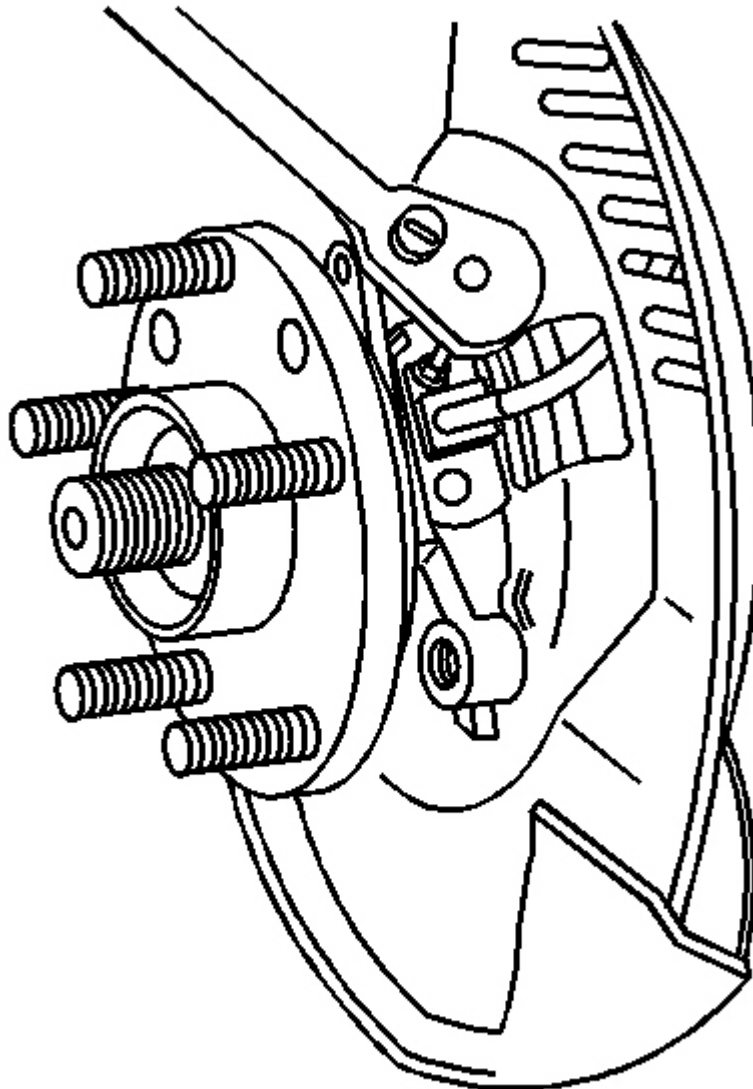


Fig. 75: Removing/Installing Wheel Speed Sensor Mounting Bolt
Courtesy of GENERAL MOTORS CORP.

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

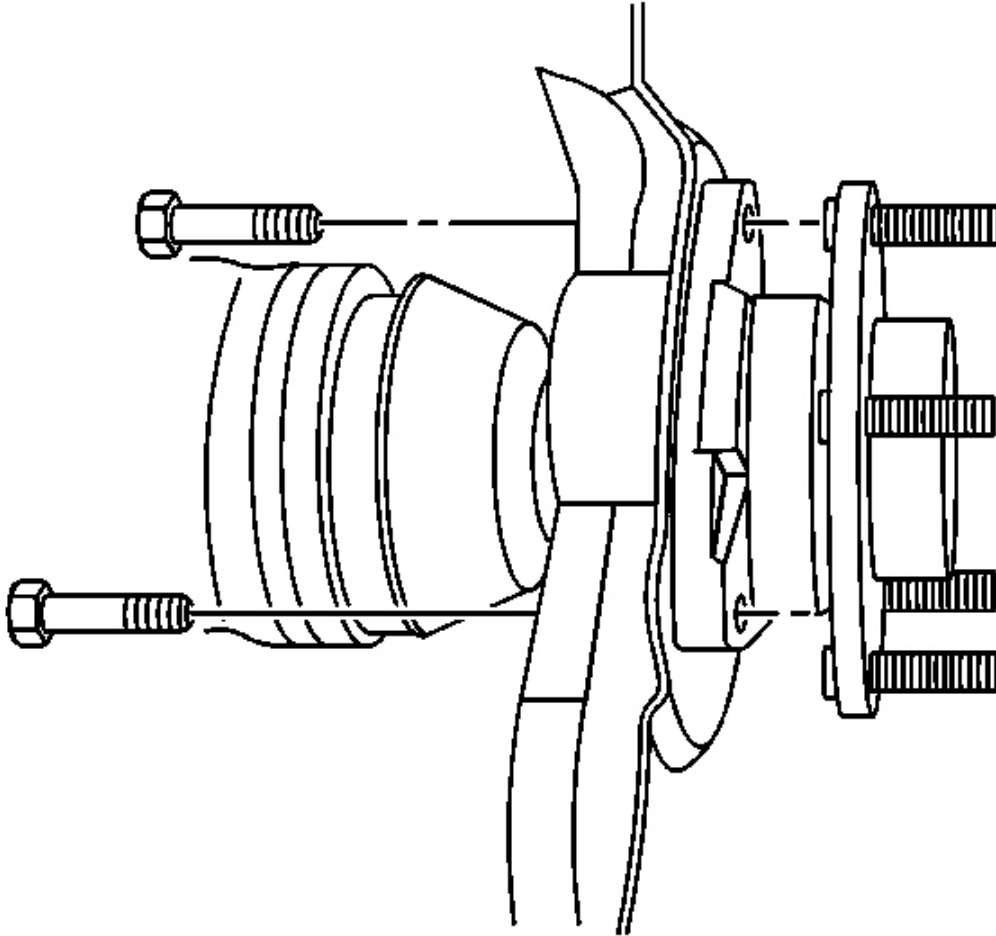


Fig. 76: Removing/Installing Hub & Bearing Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

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

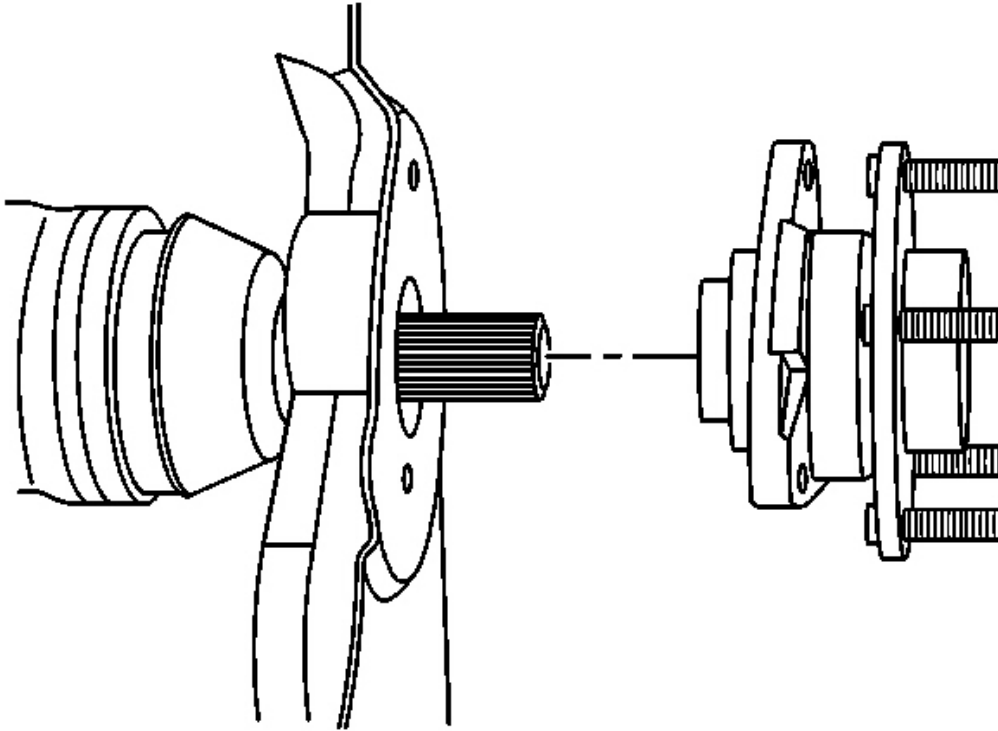


Fig. 77: Removing/Installing Hub & Bearing
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

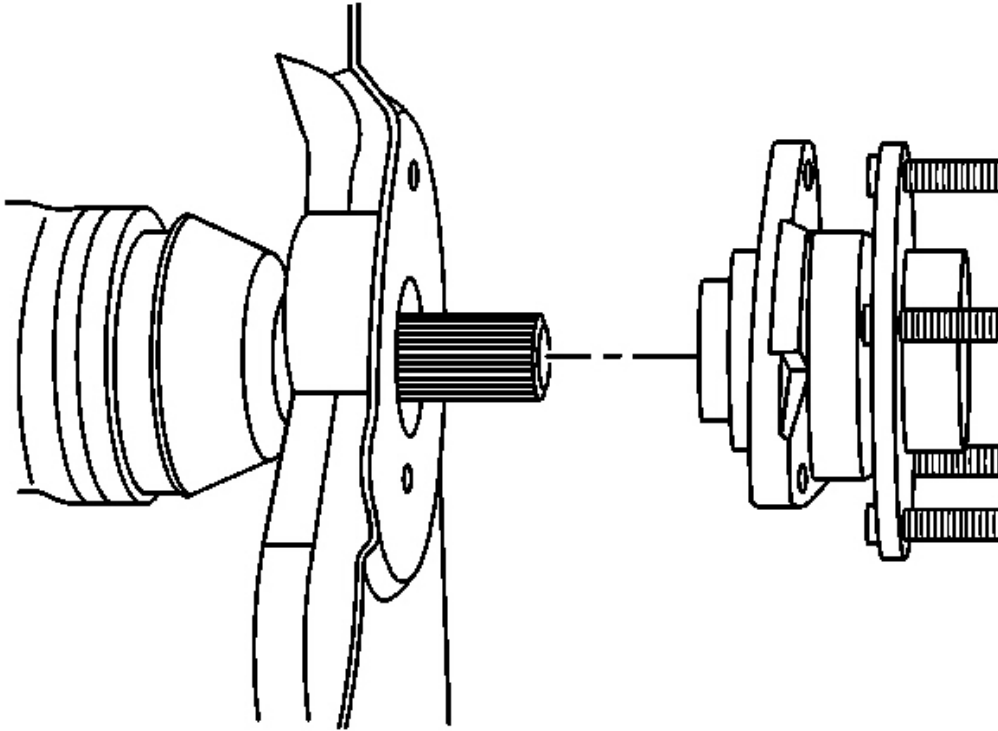


Fig. 78: Removing/Installing Hub & Bearing
Courtesy of GENERAL MOTORS CORP.

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.

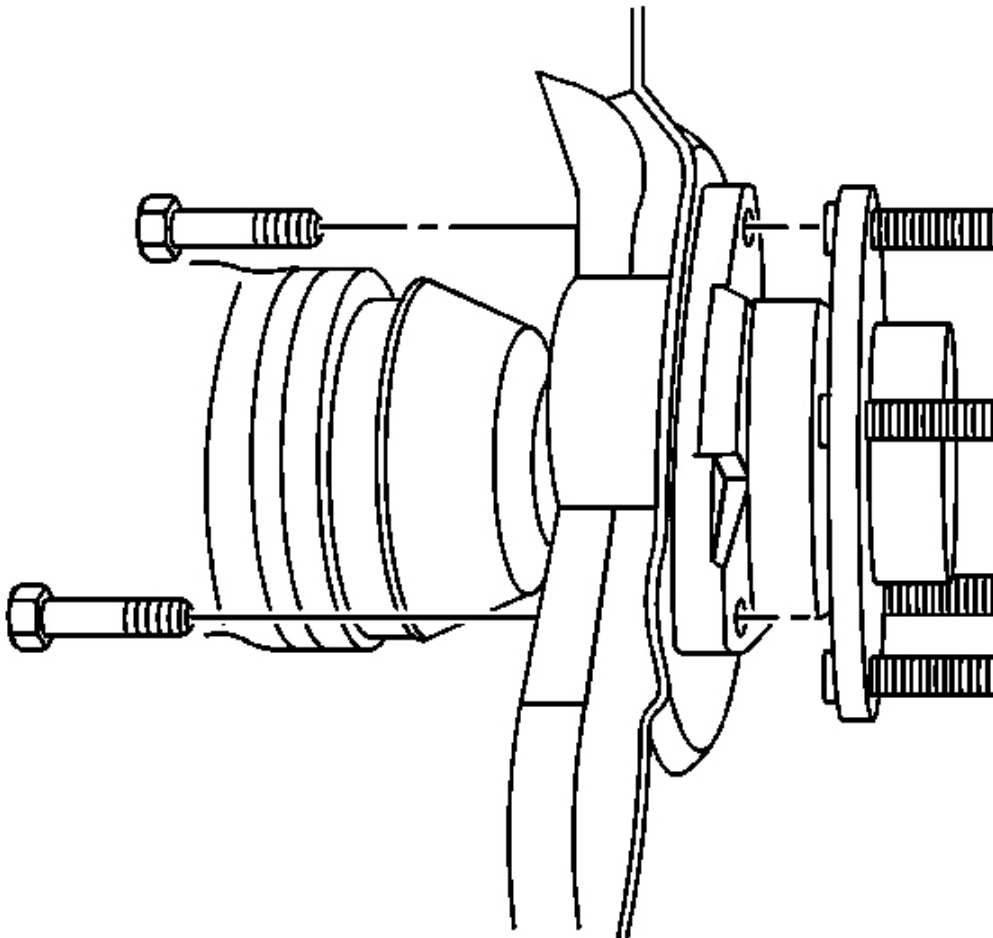


Fig. 79: Removing/Installing Hub & Bearing Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

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 ft. lb.).

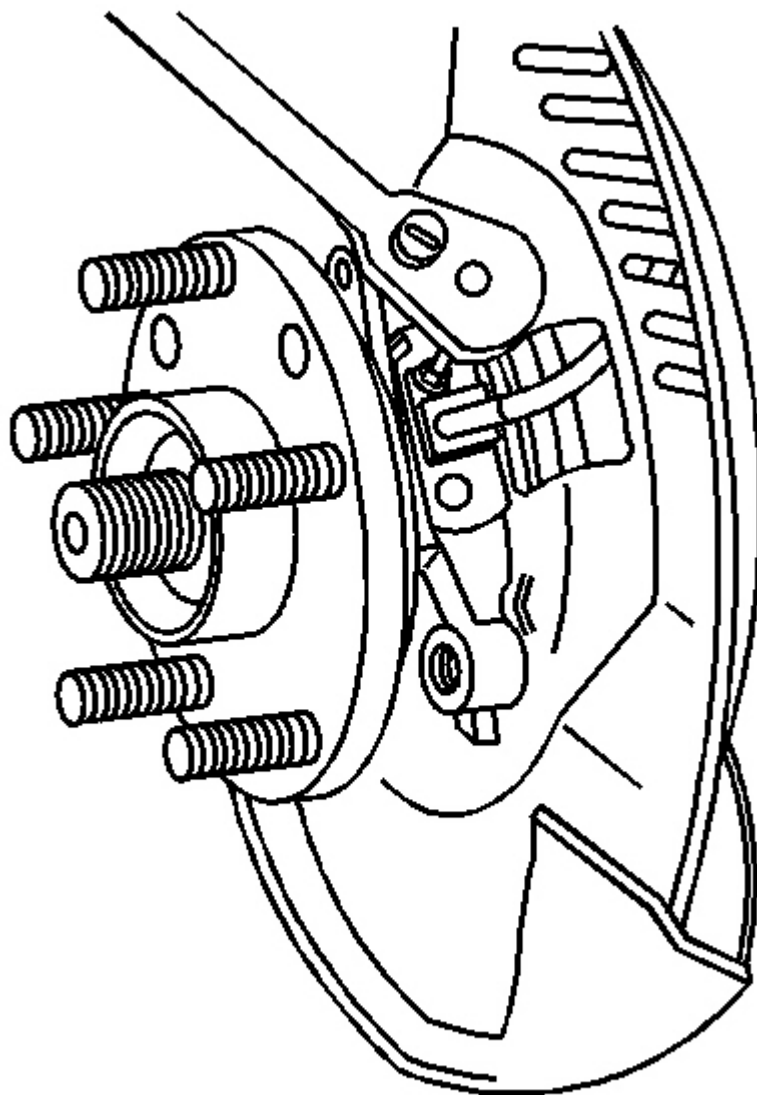


Fig. 80: Removing/Installing Wheel Speed Sensor Mounting Bolt
Courtesy of GENERAL MOTORS CORP.

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 ft. lb.).

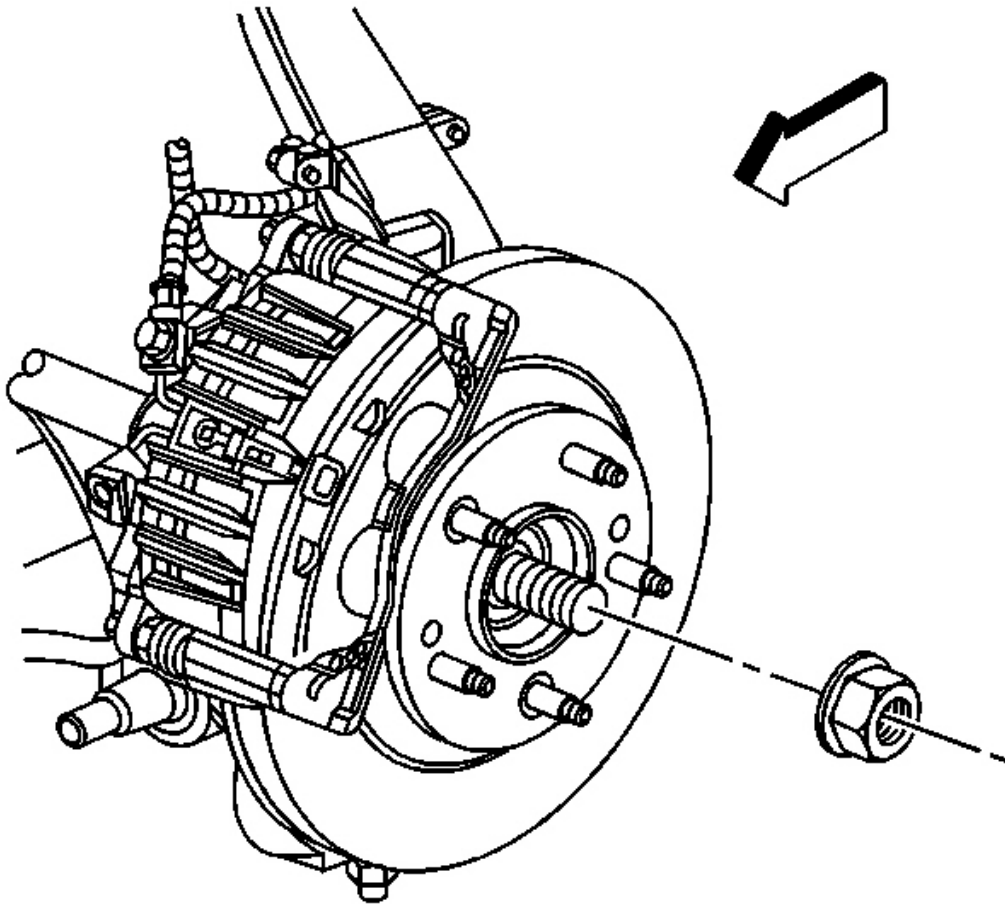


Fig. 81: Removing/Installing Wheel Drive Shaft Nut
Courtesy of GENERAL MOTORS CORP.

6. Install the brake rotor. Refer to **Brake Rotor Replacement - Front** in Disc Brakes.
7. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
8. Lower the vehicle.
9. Install the drive axle nut.

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

10. Install the tire and wheel center cap.

SHOCK MODULE REPLACEMENT

Tools Required

J 24319-B Steering Linkage and Tie Rod Puller

Removal Procedure

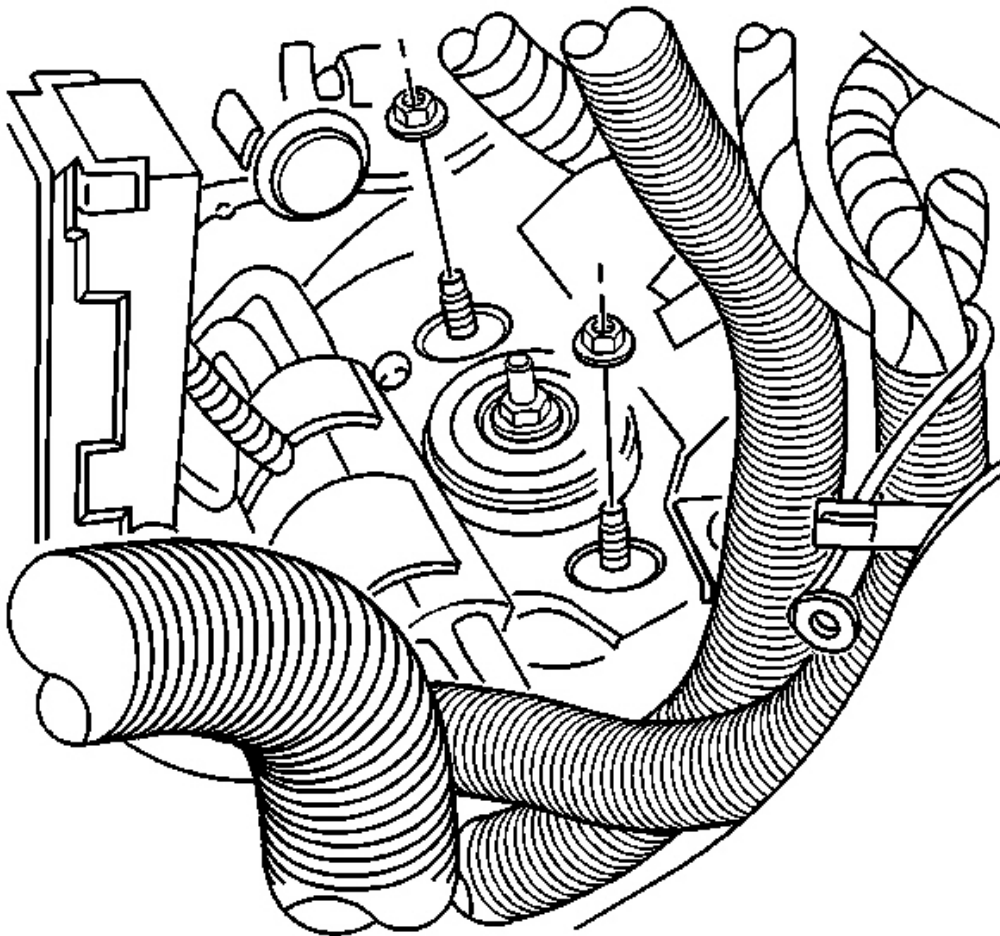


Fig. 82: Removing/Installing Shock Module Retaining Nuts
Courtesy of GENERAL MOTORS CORP.

1. Remove the shock module upper retaining nuts.

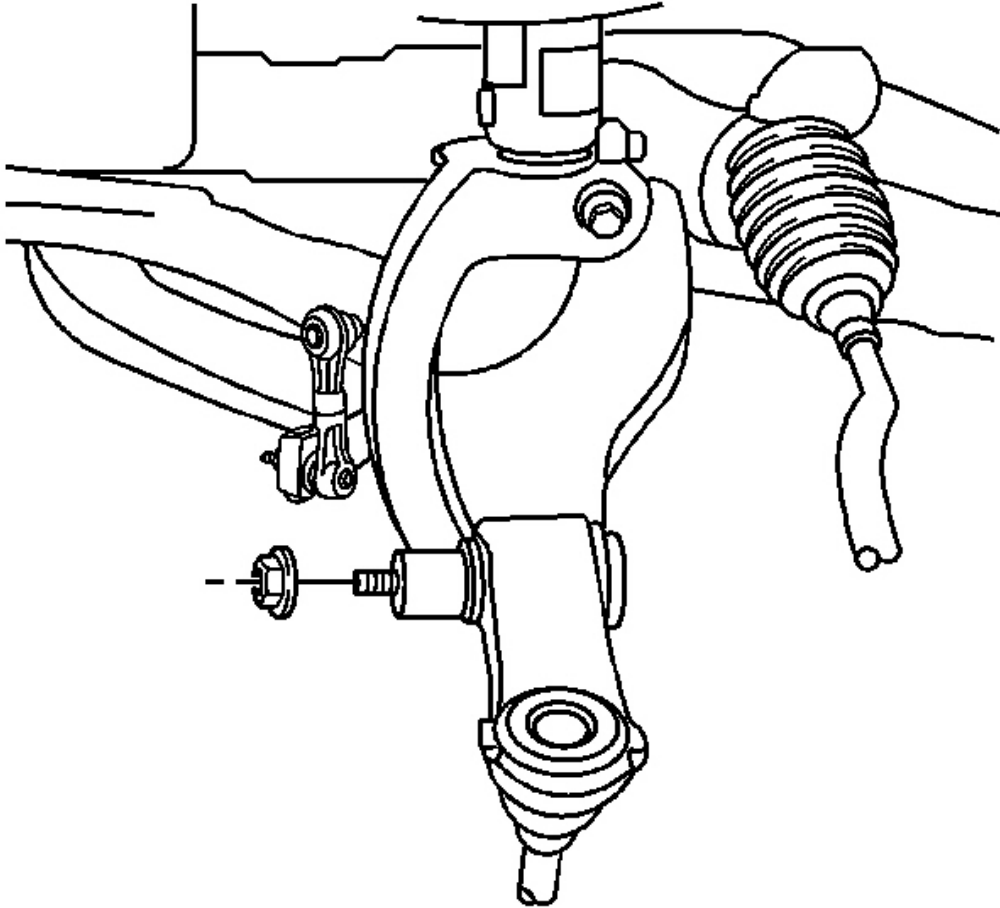


Fig. 83: Removing/Installing Shock Module Yoke Lower Mounting Nut
Courtesy of GENERAL MOTORS CORP.

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** in General Information.
3. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tire and Wheels.
4. Remove the shock module yoke to lower control arm retaining nut.

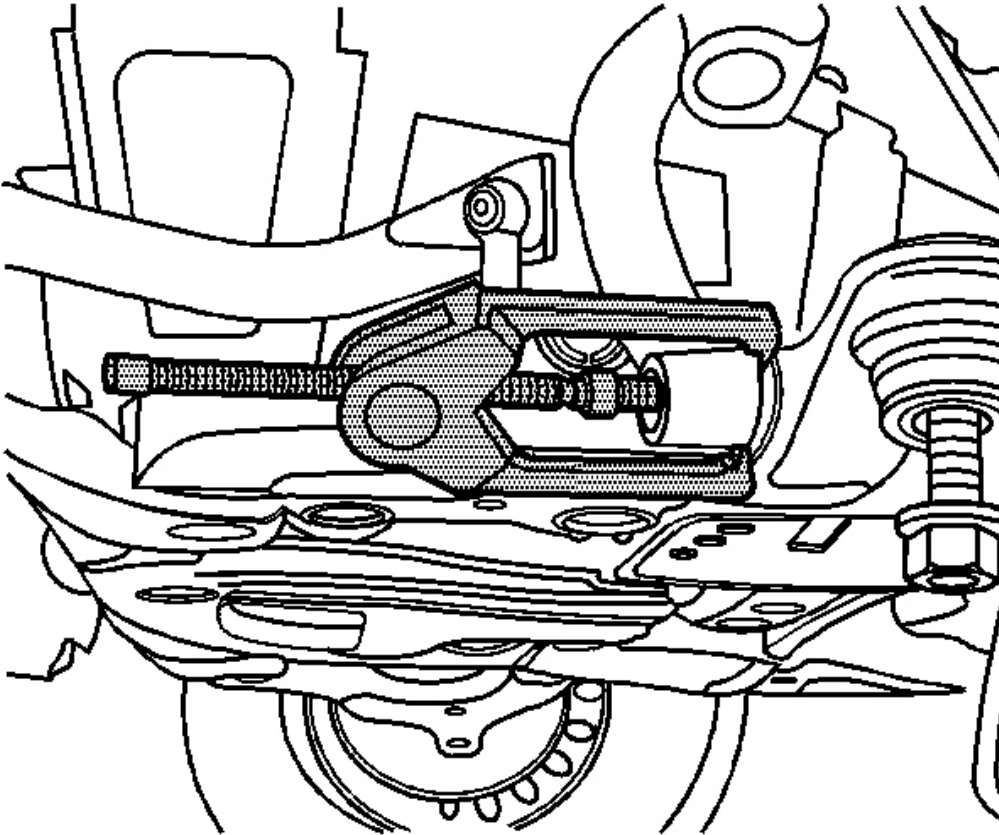


Fig. 84: Disconnecting Shock Module Yoke From Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

5. Remove the shock module yoke from the lower control arm using **J 24319-B** .

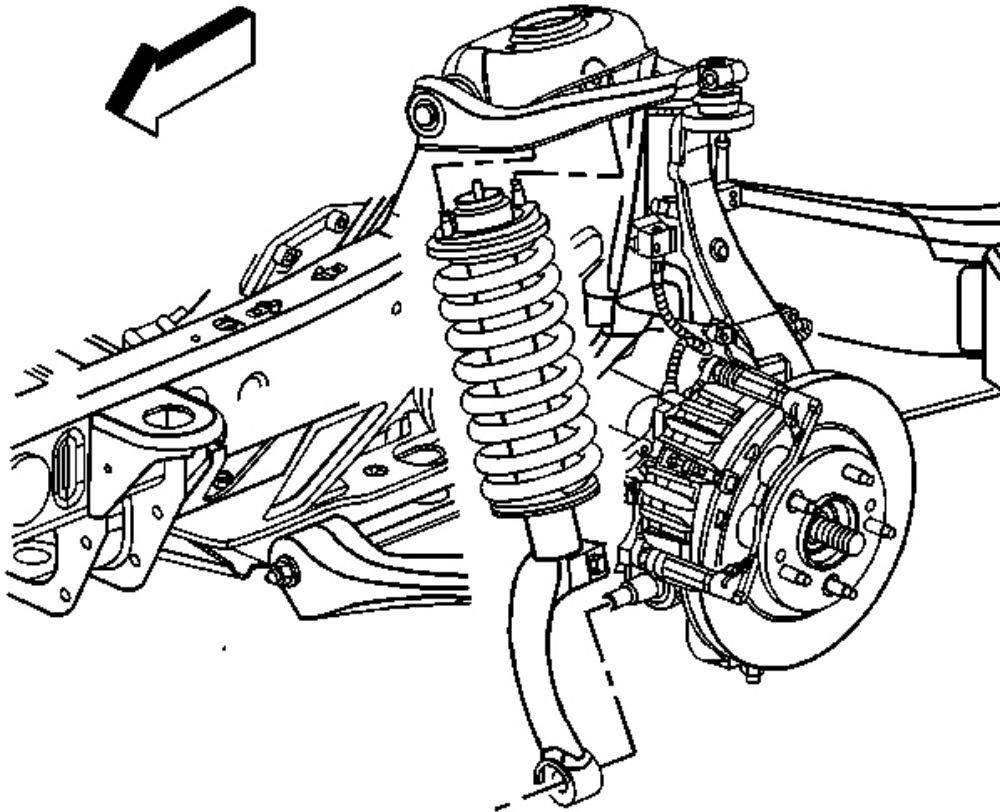


Fig. 85: Removing/Installing Shock Module
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

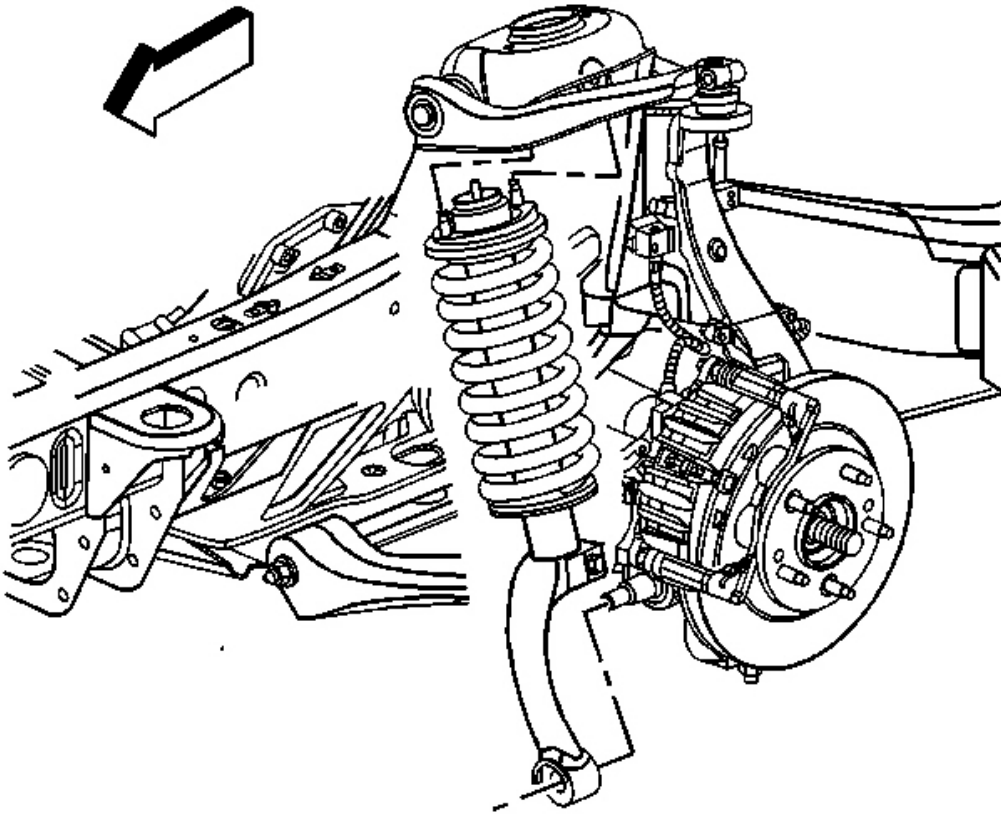


Fig. 86: Removing/Installing Shock Module
Courtesy of GENERAL MOTORS CORP.

1. Install the shock module to the shock tower and lower control arm.
2. Install the shock module yoke to the lower control arm.
3. Lower the vehicle.

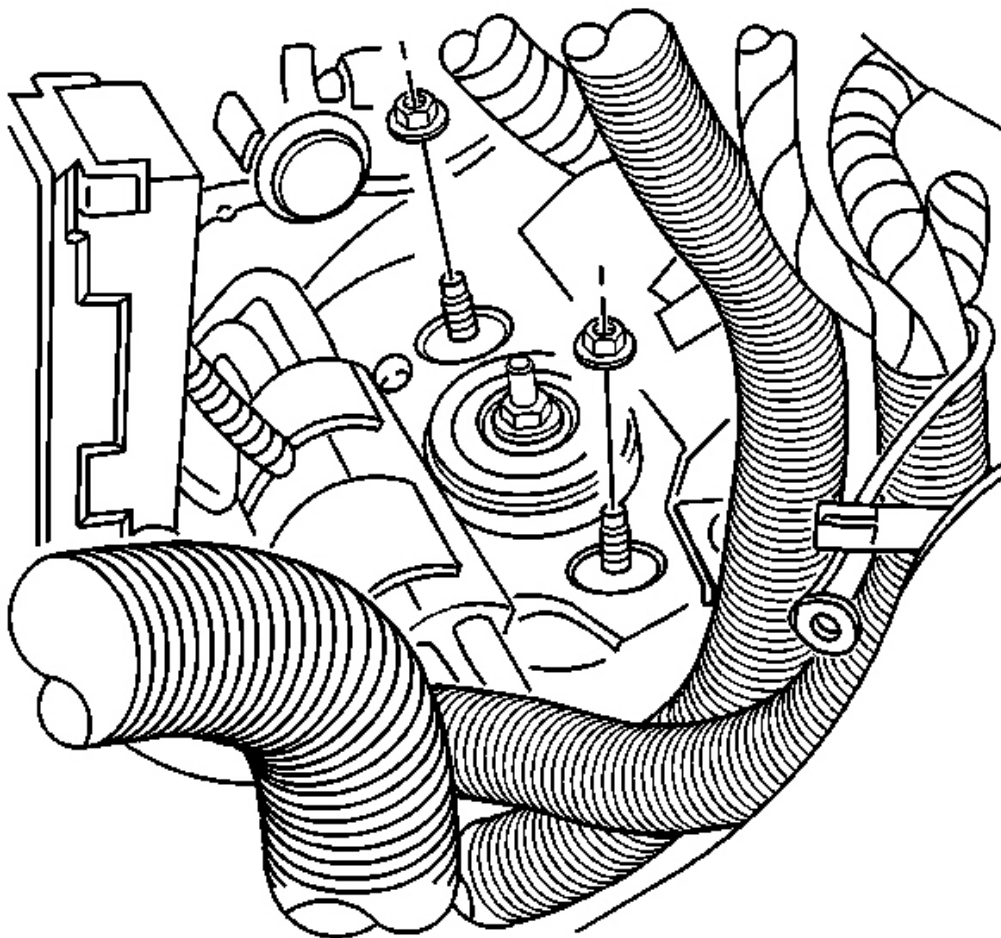


Fig. 87: Removing/Installing Shock Module Retaining Nuts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Install the shock module upper retaining nuts.

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

5. Raise the vehicle.

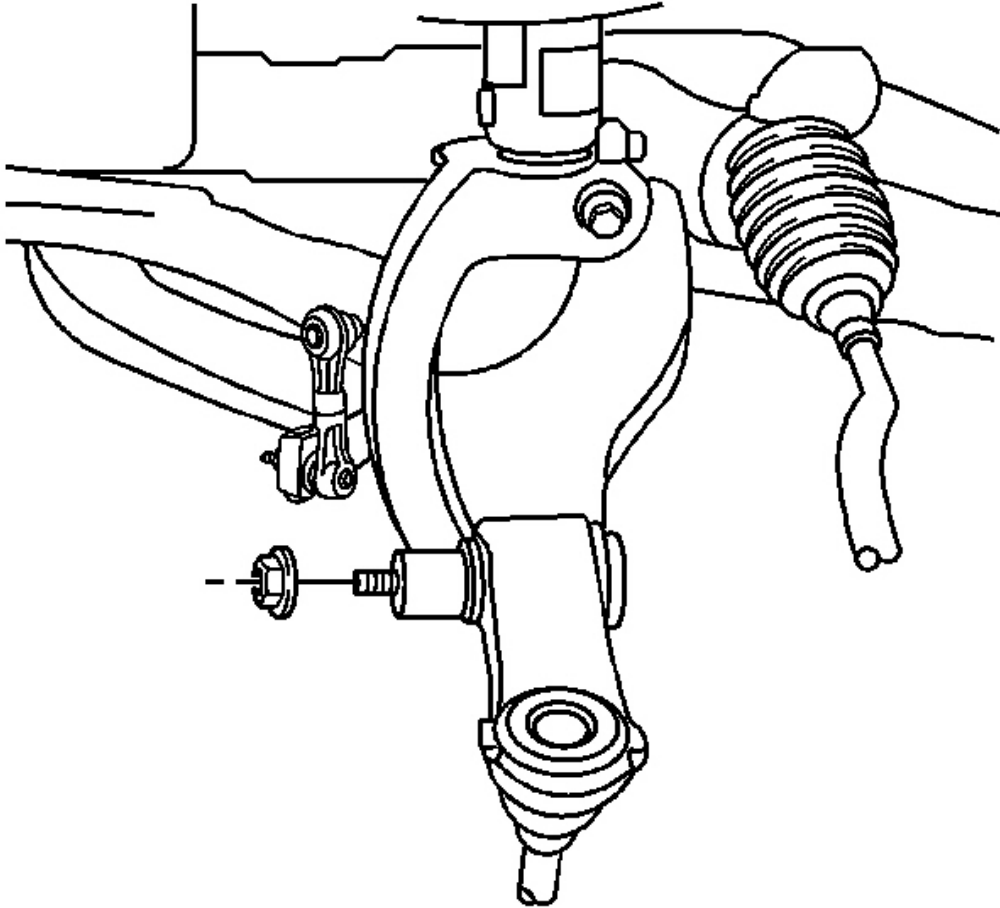


Fig. 88: Removing/Installing Shock Module Yoke Lower Mounting Nut
Courtesy of GENERAL MOTORS CORP.

6. Install the shock module yoke to lower control arm retaining nut.

Tighten: Tighten the shock module yoke to lower control arm retaining nut to 110 N.m (81 ft. lb.).

7. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tire and Wheels.
8. Lower the vehicle.

SHOCK, SHOCK COMPONENT, AND/OR SPRING REPLACEMENT

Tools Required

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

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the shock module from the vehicle. Refer to **Shock Module Replacement**.

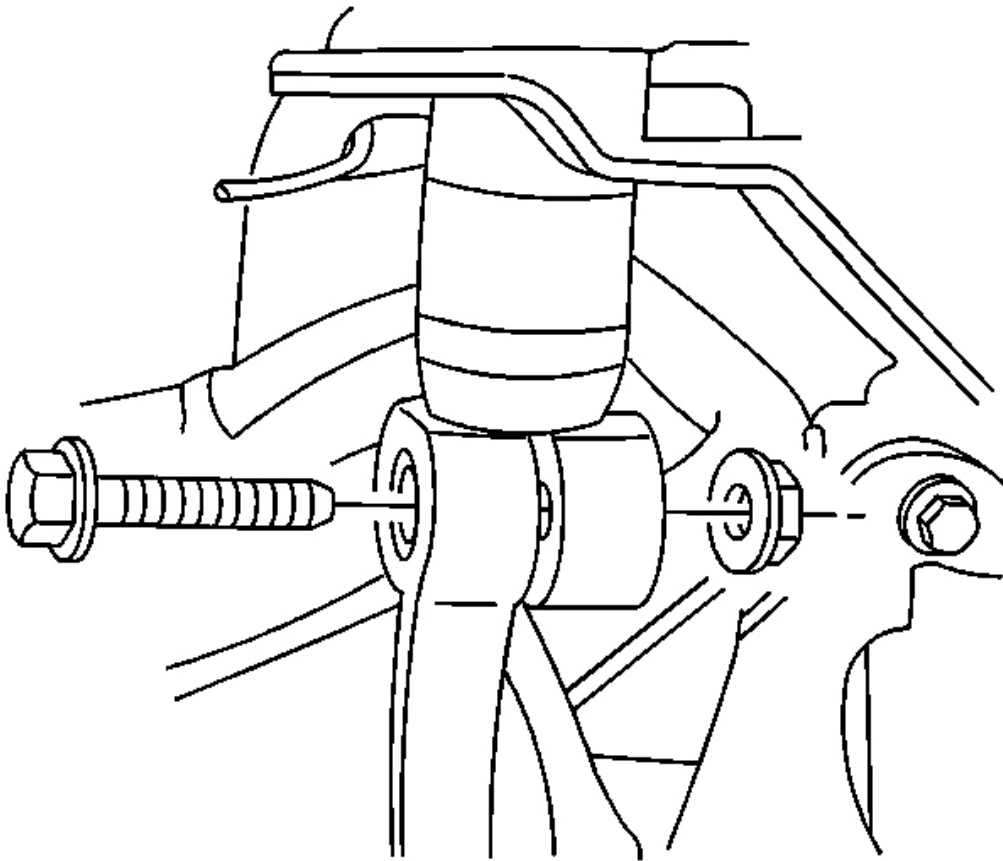


Fig. 89: View Of Shock Module Yoke To Shock Absorber Pinch Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

4. Remove the shock module yoke to shock absorber pinch bolt and nut.

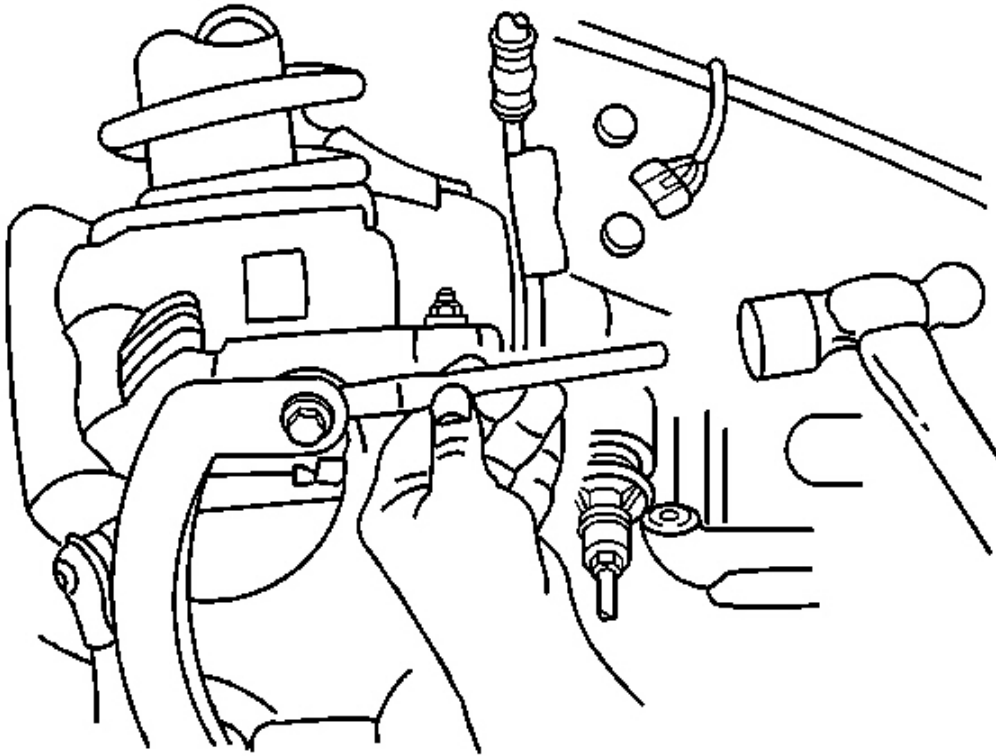


Fig. 90: Spreading Shock Module Yoke
Courtesy of GENERAL MOTORS CORP.

5. Spread the shock module yoke at the pinch bolt using a flat-bladed tool.
6. Remove the shock module yoke from the shock absorber.

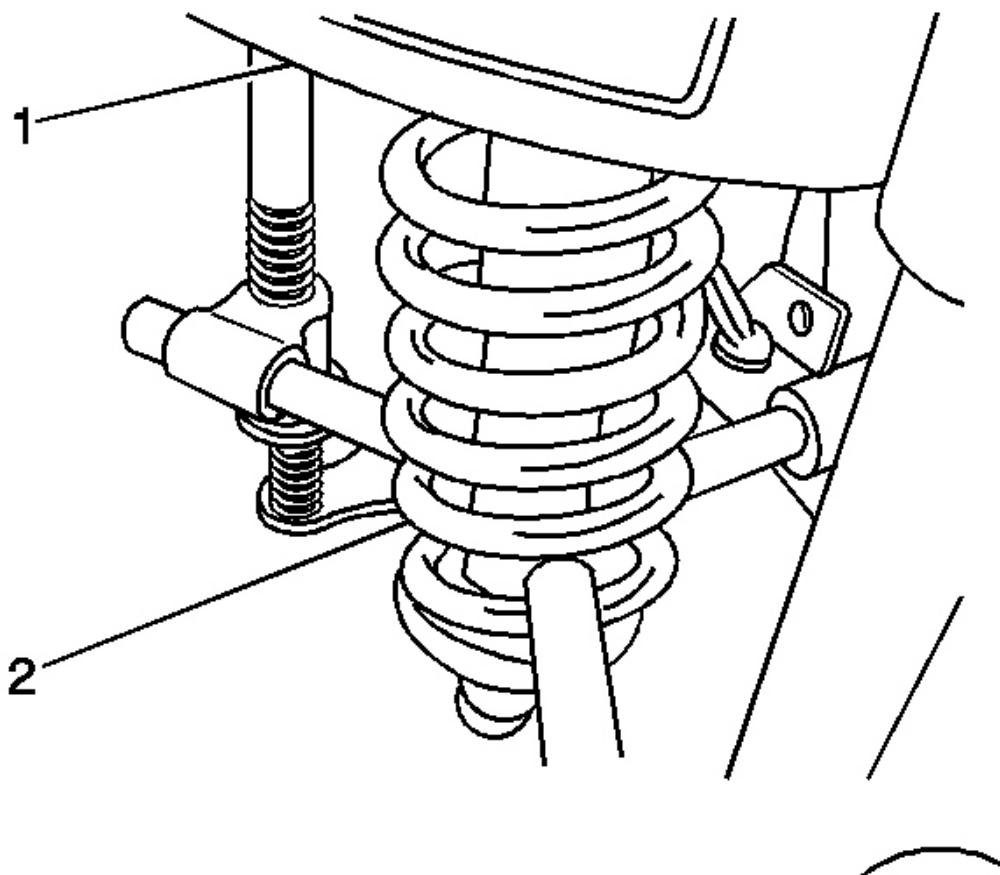


Fig. 91: Compressing/Releasing Lower Part Of Shock Spring
Courtesy of GENERAL MOTORS CORP.

7. Install pieces of heater hose to the shock module spring where **J 45400** contacts lower part of spring. See **Special Tools and Equipment**.
8. Install the shock module (2) into the **J 45400** (1). See **Special Tools and Equipment**.

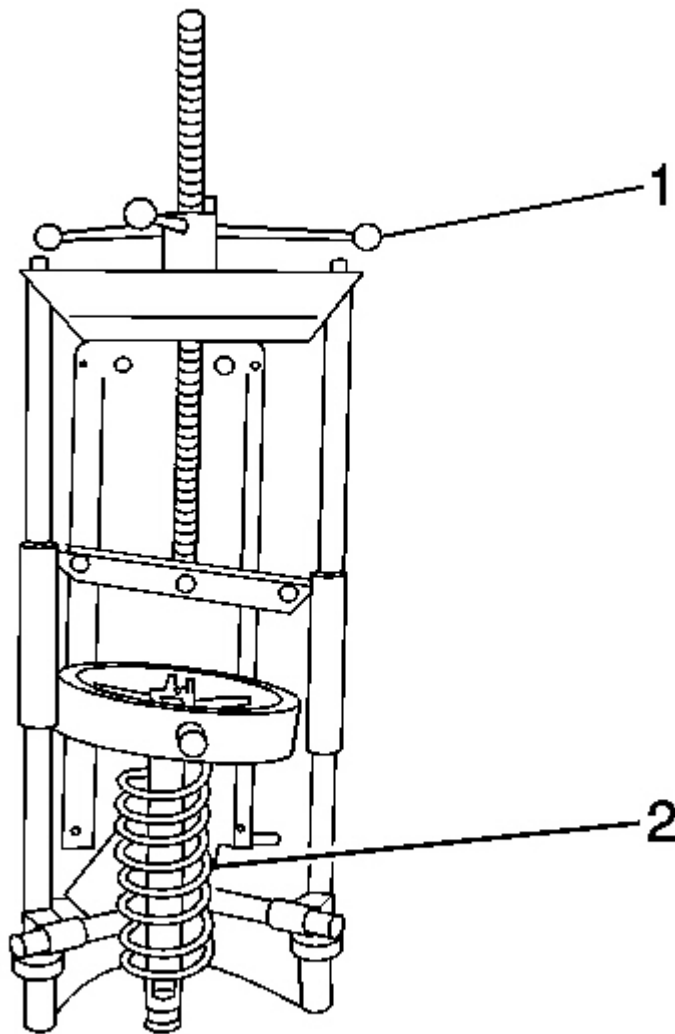


Fig. 92: View Of Compressor Forcing Screw & Coil Spring
Courtesy of GENERAL MOTORS CORP.

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

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

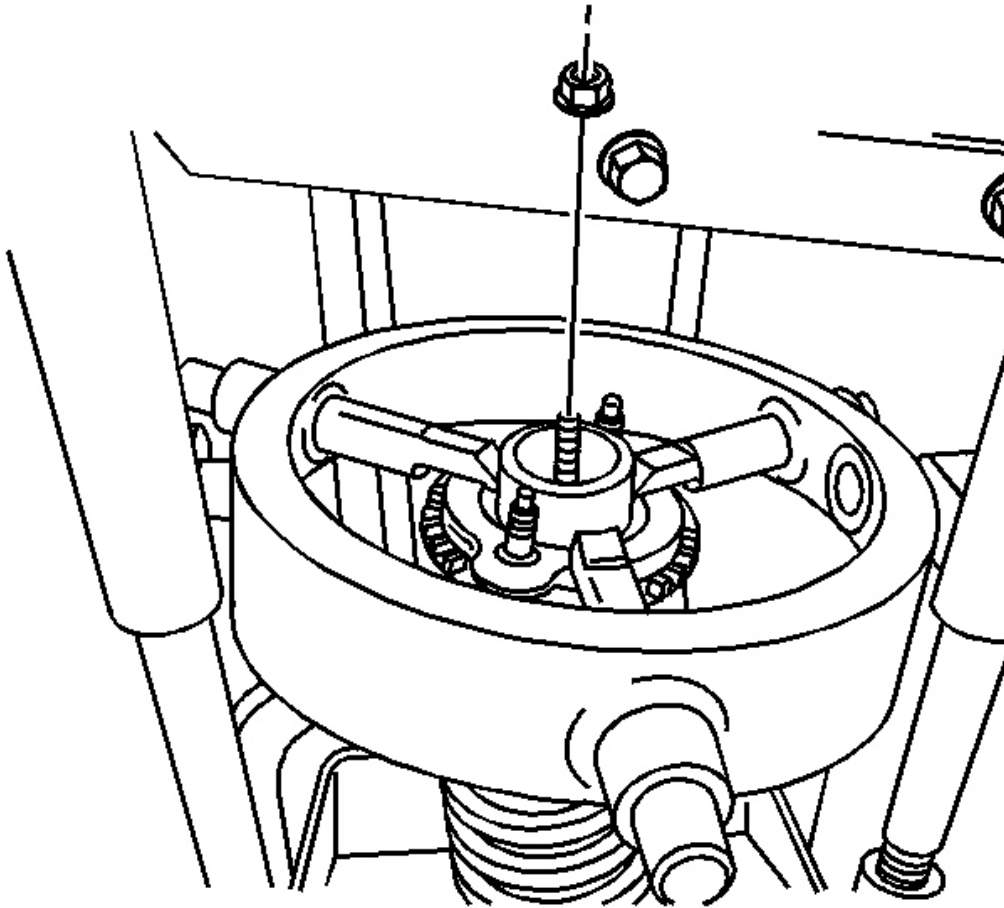


Fig. 93: Removing/Installing Shock Absorber Upper Retaining Nut
Courtesy of GENERAL MOTORS CORP.

10. Remove the shock absorber upper retaining nut.
11. Remove the shock absorber from the shock module.
12. Loosen the compressor forcing screw until the upper mounting plate and coil spring may be removed.
13. Remove the upper mounting plate and coil spring from the **J 45400** . See **Special Tools and Equipment**.

Installation Procedure

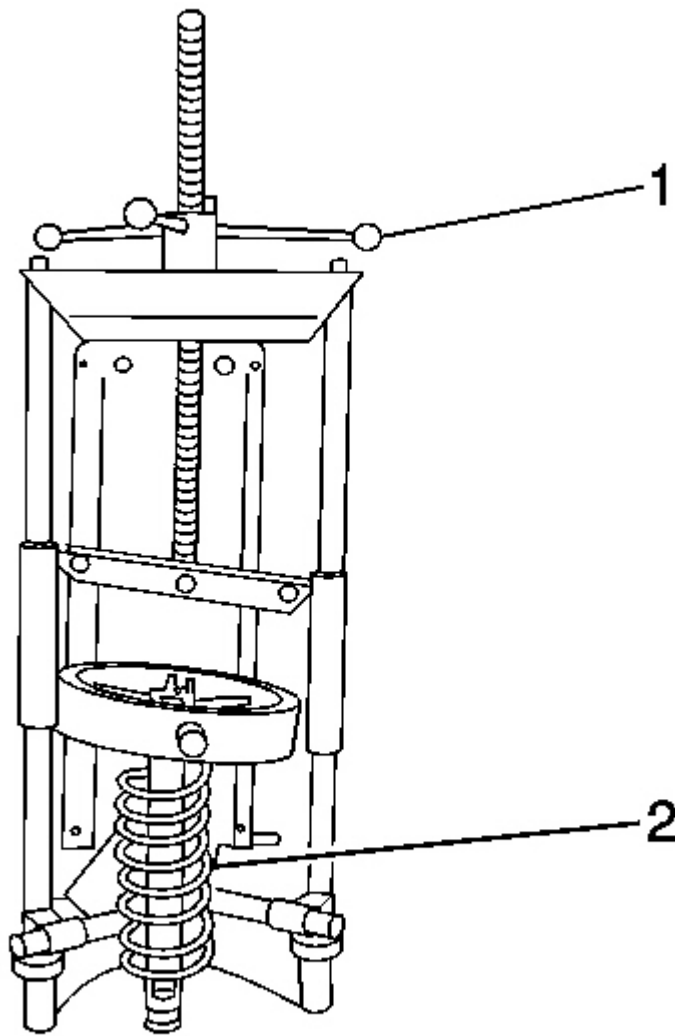


Fig. 94: View Of Compressor Forcing Screw & Coil Spring
Courtesy of GENERAL MOTORS CORP.

1. Install the coil spring and upper mounting plate to the **J 45400** . See **Special Tools and Equipment**.
2. Turn the spring compressor forcing screw (1) until the coil spring is compressed.
3. Install the shock absorber to the shock module.

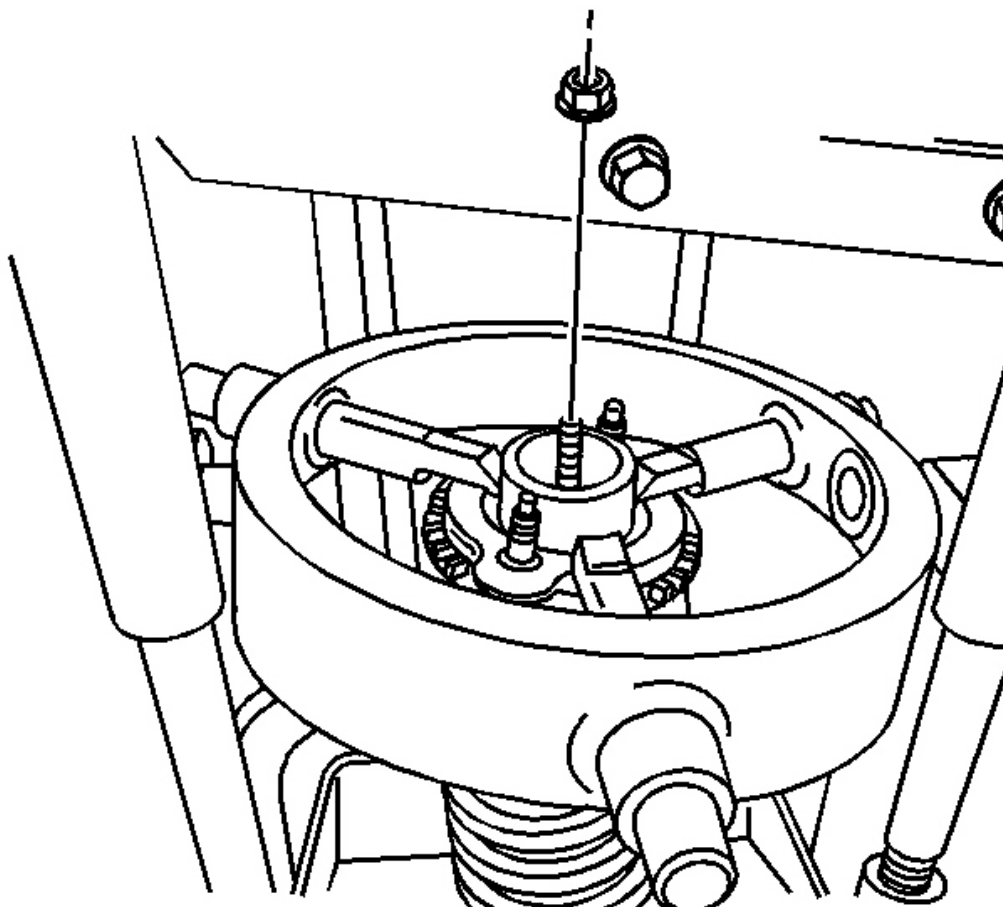


Fig. 95: Removing/Installing Shock Absorber Upper Retaining Nut
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to **Fastener Notice** in Cautions and Notices.

4. Install the shock absorber retaining nut.

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

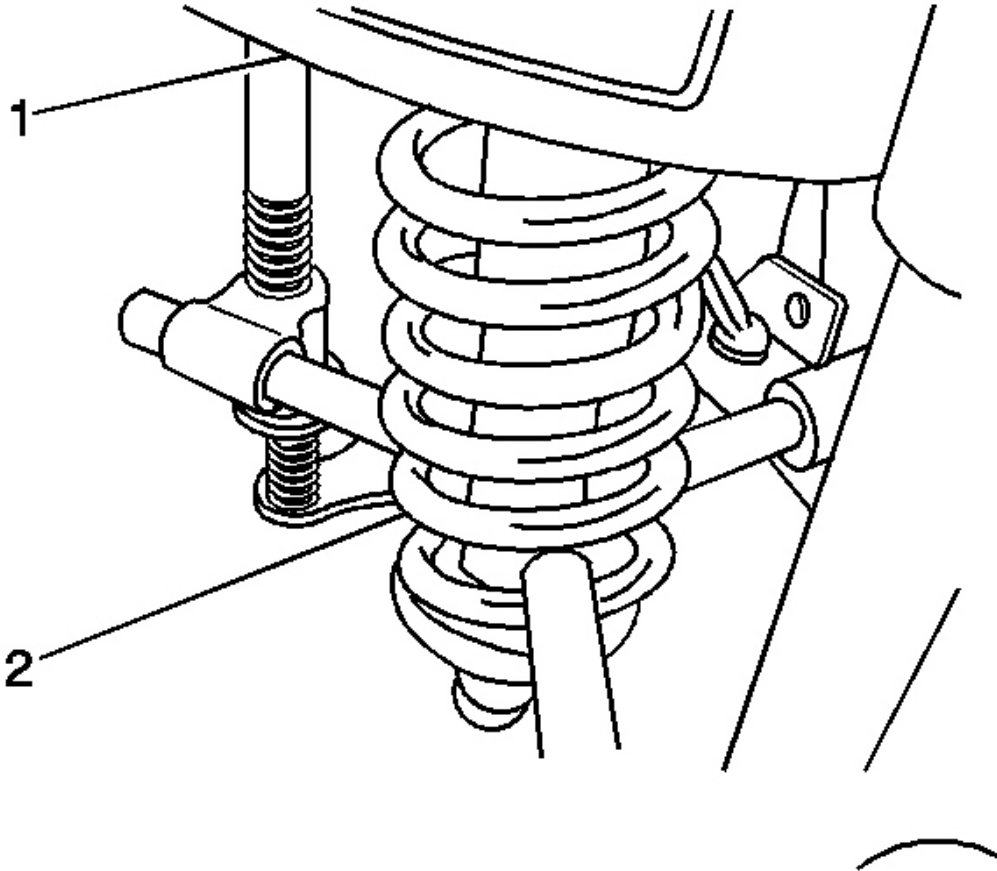


Fig. 96: Compressing/Releasing Lower Part Of Shock Spring
Courtesy of GENERAL MOTORS CORP.

5. Remove the shock module (2) from the **J 45400** (1). See **Special Tools and Equipment**.
6. Remove the pieces of heater hose from the shock module spring.

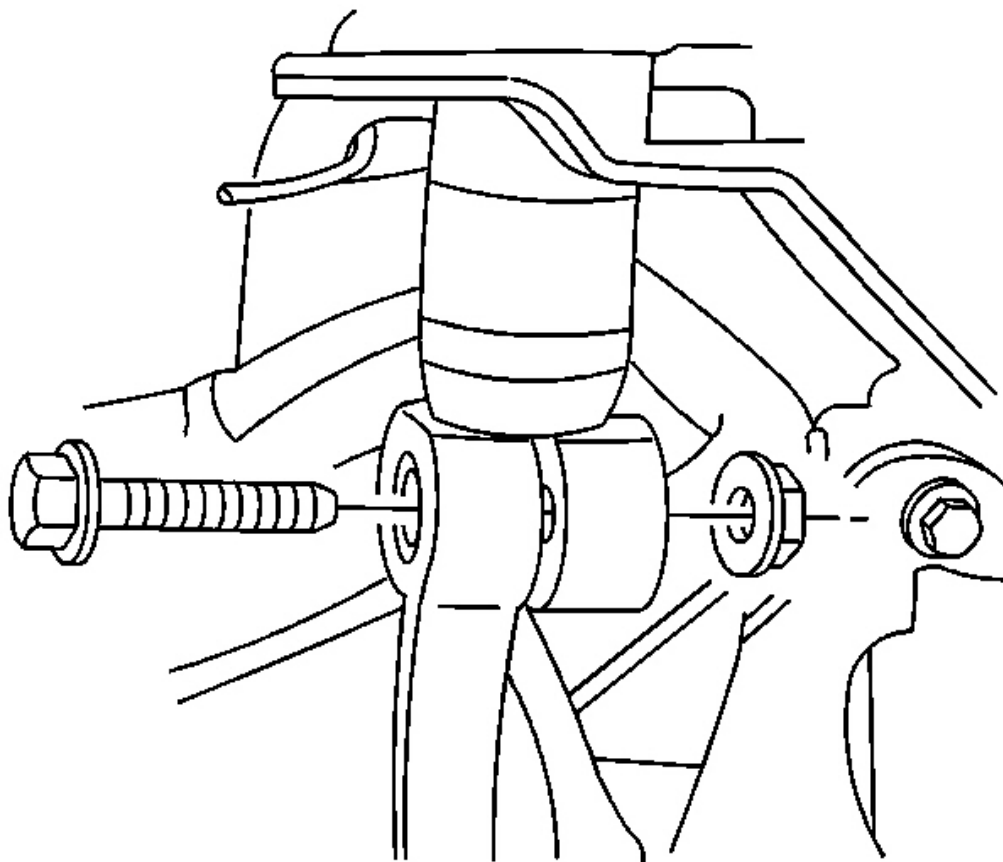


Fig. 97: View Of Shock Module Yoke To Shock Absorber Pinch Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

7. Install the shock module yoke to the shock absorber.
8. Install the shock module yoke to shock absorber pinch bolt and nut.

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

9. Install the shock module to the vehicle. Refer to **Shock Module Replacement**.
10. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
11. Lower the vehicle.

SHOCK MODULE YOKE REPLACEMENT

Tools Required

J 24319-B Steering Linkage and Tie Rod Puller

Removal Procedure

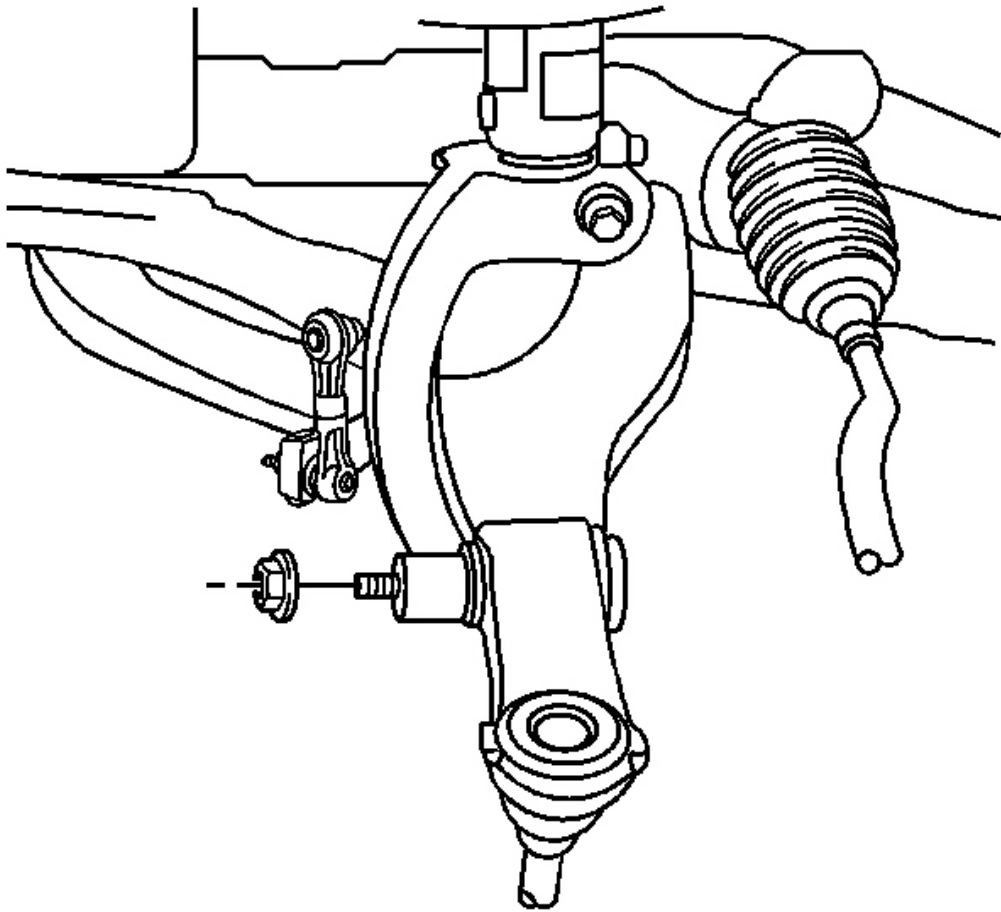


Fig. 98: Removing/Installing Shock Module Yoke Lower Mounting Nut
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the shock module yoke to lower control arm mounting nut.

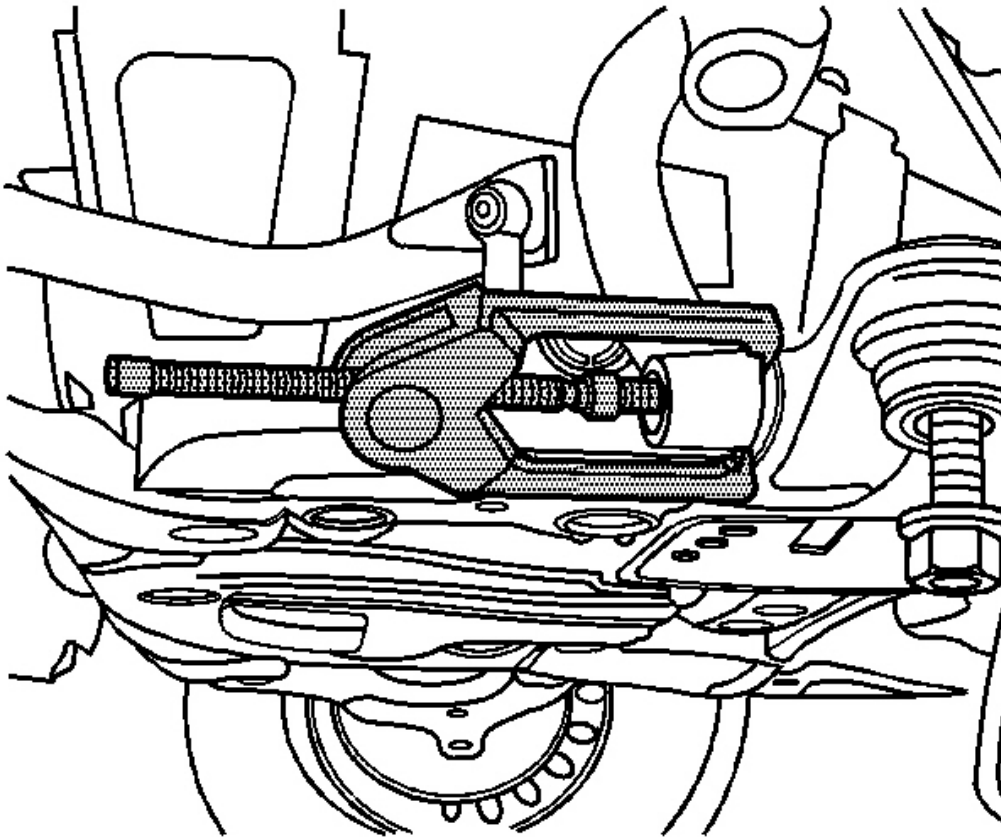


Fig. 99: Disconnecting Shock Module Yoke From Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

4. Install **J 24319-B** to the shock module yoke to lower control arm stud.
5. Disconnect the shock module yoke from the lower control arm using **J 24319-B** .

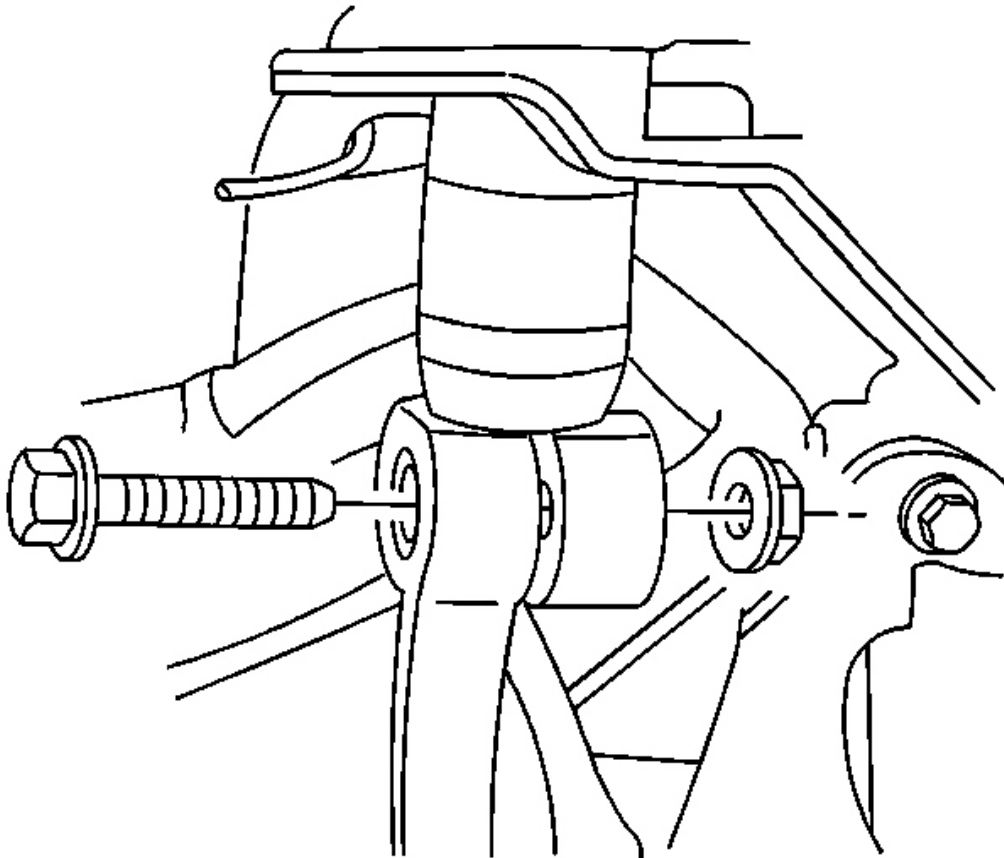


Fig. 100: View Of Shock Module Yoke To Shock Absorber Pinch Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

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

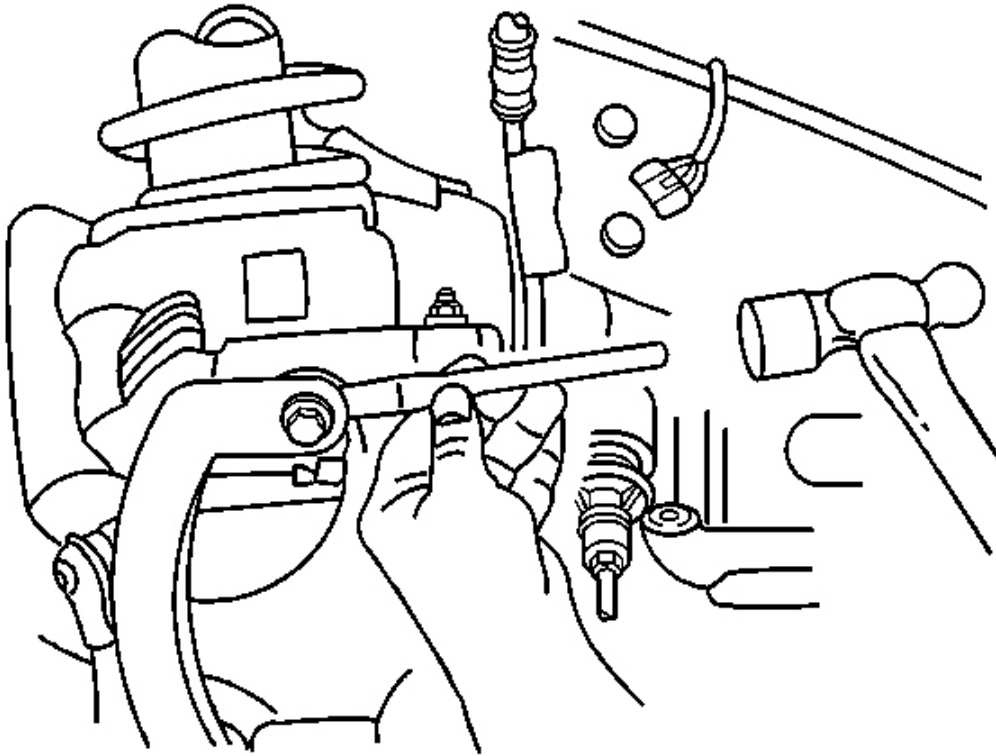


Fig. 101: Spreading Shock Module Yoke
Courtesy of GENERAL MOTORS CORP.

7. Spread the shock module yoke at the pinch bolt using a flat bladed tool.
8. Remove the shock module yoke from the shock absorber.

Installation Procedure

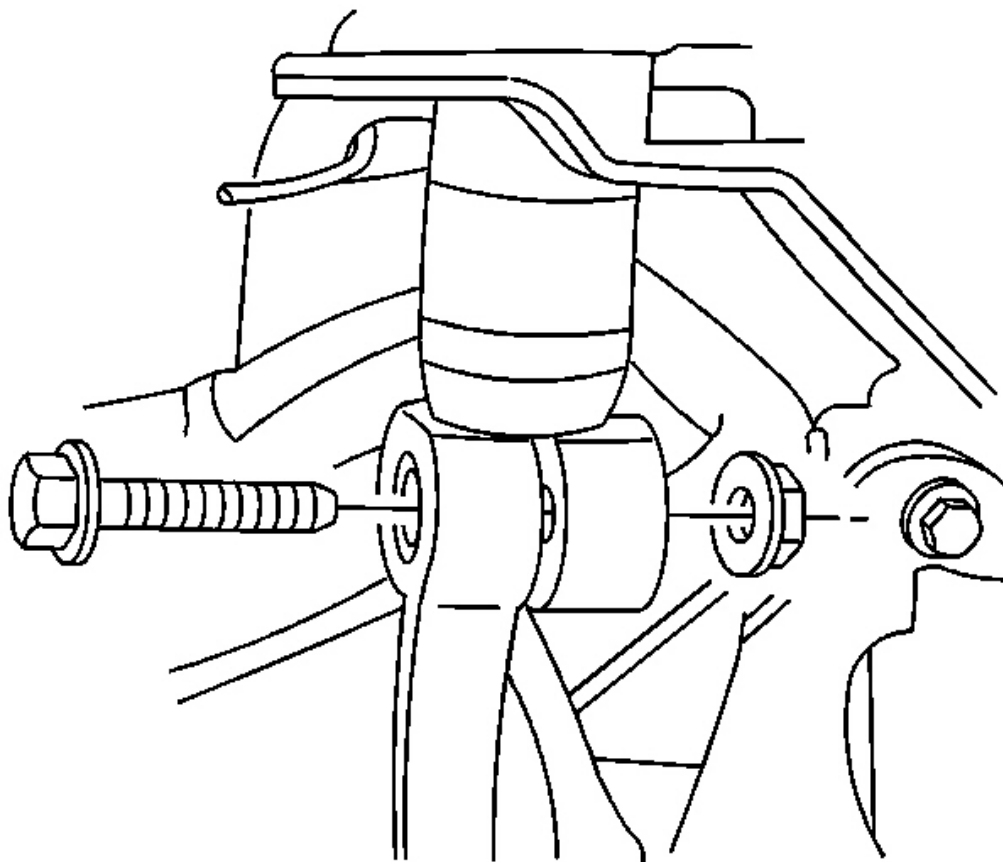


Fig. 102: View Of Shock Module Yoke To Shock Absorber Pinch Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

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

NOTE: Refer to Fastener Notice in Cautions and Notices.

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

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

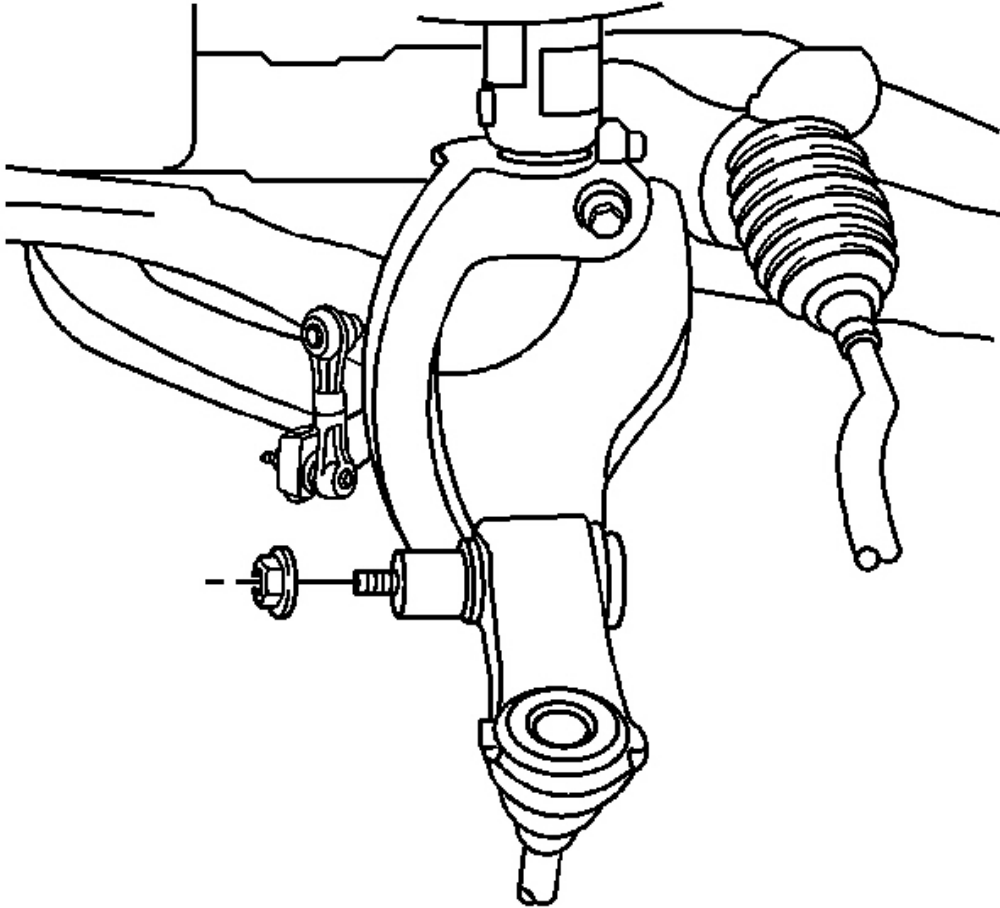


Fig. 103: Removing/Installing Shock Module Yoke Lower Mounting Nut
Courtesy of GENERAL MOTORS CORP.

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 110 N.m (81 ft. lb.).

4. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
5. Lower the vehicle.

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,

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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 center-punching and drilling the shock absorber. Use care not to puncture the shock absorber tube with the center-punch.

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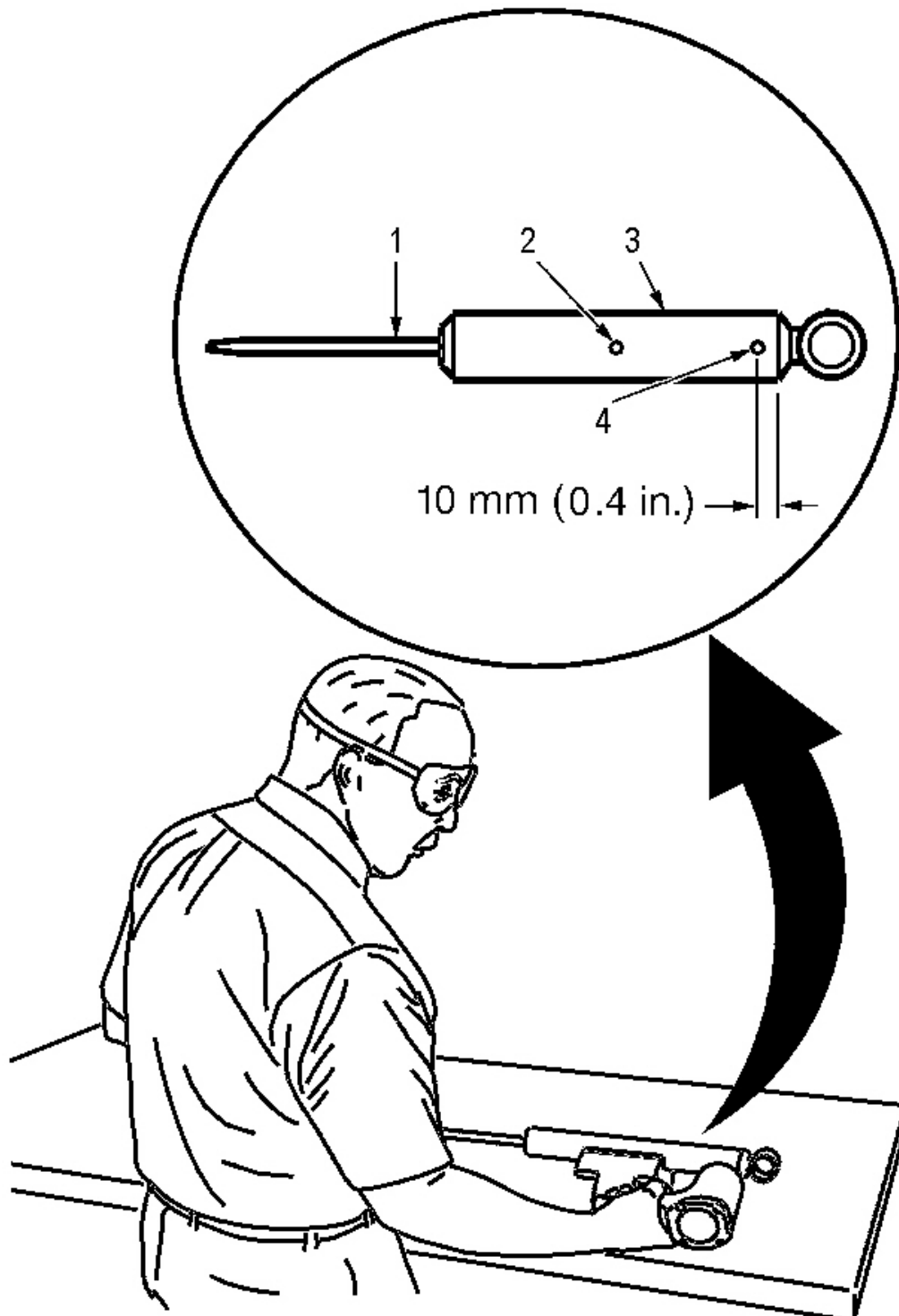


Fig. 104: Drilling Hole In Shock Absorber At Centerpunched Locations
Courtesy of GENERAL MOTORS CORP.

1. Make an indentation 10 mm (0.4 in) from the bottom (4) of the tube (3) using a center-punch.
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 center-punch (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 center-punch.
5. Drill a second hole in the shock absorber at the center-punch (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 (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.

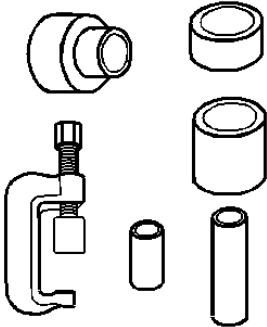
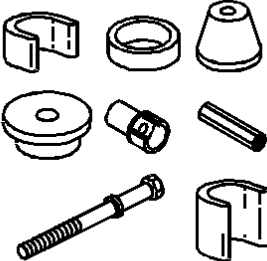
A shock absorber is used in conjunction with this system in order to dampen out the oscillations of the coil spring. A shock absorber is a basic hydraulic cylinder. The shock is filled with oil and has a moveable shaft that connects to a piston inside the shock absorber. Valves inside the shock absorber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

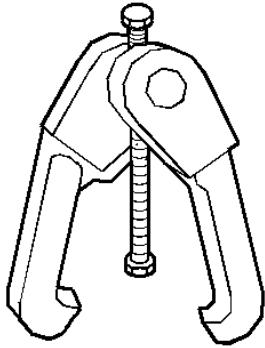
SPECIAL TOOLS

Special Tools

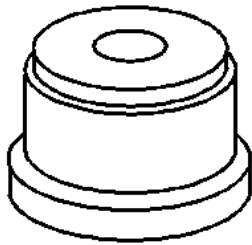
Illustration	Tool Number/Description
	J 9519-E Lower Ball Joint Remover and Installer
	J 21474-01 Control Arm Bushing Service Set

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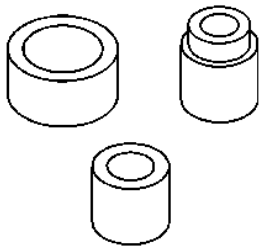
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J 24319-B
Steering Linkage and Tie Rod Puller



J 34874
Booster Seal Remover/Installer

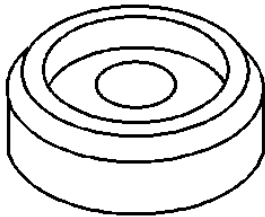
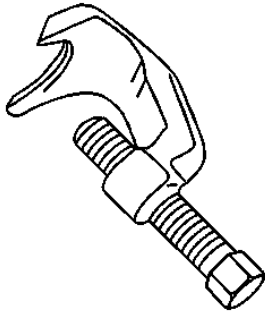


J 41435
Ball Joint Installer

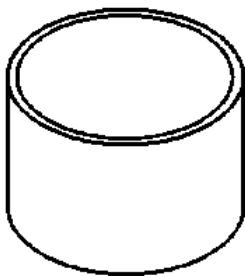
J 43631
Ball Joint Remover

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J 45105 - 1
Ball Joint Flaring Adapter

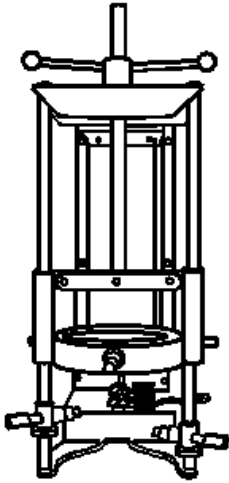
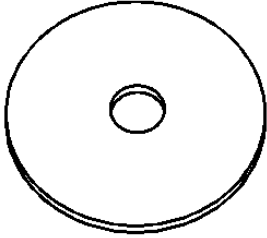


J 45105 - 2
Receiver

J 45117
Ball Joint Installation Spacer

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J 45400
Strut Spring Compressor