

**2002 Chevrolet Corvette**

2002 SUSPENSION Front - Corvette

**2002 SUSPENSION****Front - Corvette****SPECIFICATIONS****FASTENER TIGHTENING SPECIFICATIONS****TORQUE SPECIFICATIONS**

<b>Application</b>		<b>Ft. Lbs. (N.m)</b>
<b>Ball Joint Stud Nut <sup>(1)</sup></b>		
	Lower	
Step 1	15 (20)	
Step 2	Additional 210 degrees	
Step 3	41 (55)	
	Upper	
Step 1	15 (20)	
Step 2	Additional 250 degrees	
Step 3	41 (55)	
Crossmember Mount Nut		81 (110)
Hub & Bearing Assembly Nut		96 (130)
Lower Control Arm Mounting Bolt <sup>(2)</sup>		125 (170)
Lower Engine Mount Nut		48 (65)
Power Steering Gear Mounting Bolt		74 (100)
<b>Shock Absorber Bolt</b>		
	Lower	21 (28)
	Upper	19 (26)
Spring Retainer Bolt <sup>(2)</sup>		46 (62)
<b>Stabilizer Bar</b>		
	Insulator Bracket Bolt (At Frame) <sup>(2)</sup>	43 (55)
	Link Nut <sup>(2)</sup>	53 (72)
Tie Rod Jam Nut		44 (60)
<b>Tie Rod-To-Steering Knuckle Nut <sup>(1)</sup></b>		
	Step 1	15 (20)
	Step 2	Additional 160 degrees
	Step 3	33 (45)
Upper Control Arm-To-Frame Nut		48 (65)
Wheel Lug Nut		100 (136)

## 2002 Chevrolet Corvette

### 2002 SUSPENSION Front - Corvette

- (1) After tightening nut to specification, tighten nut further but only as far as necessary to align cotter pin holes. DO NOT loosen nut to align holes. Install cotter pin from rear toward front of vehicle.
- (2) Tighten with vehicle at proper trim height.

## REPAIR INSTRUCTIONS

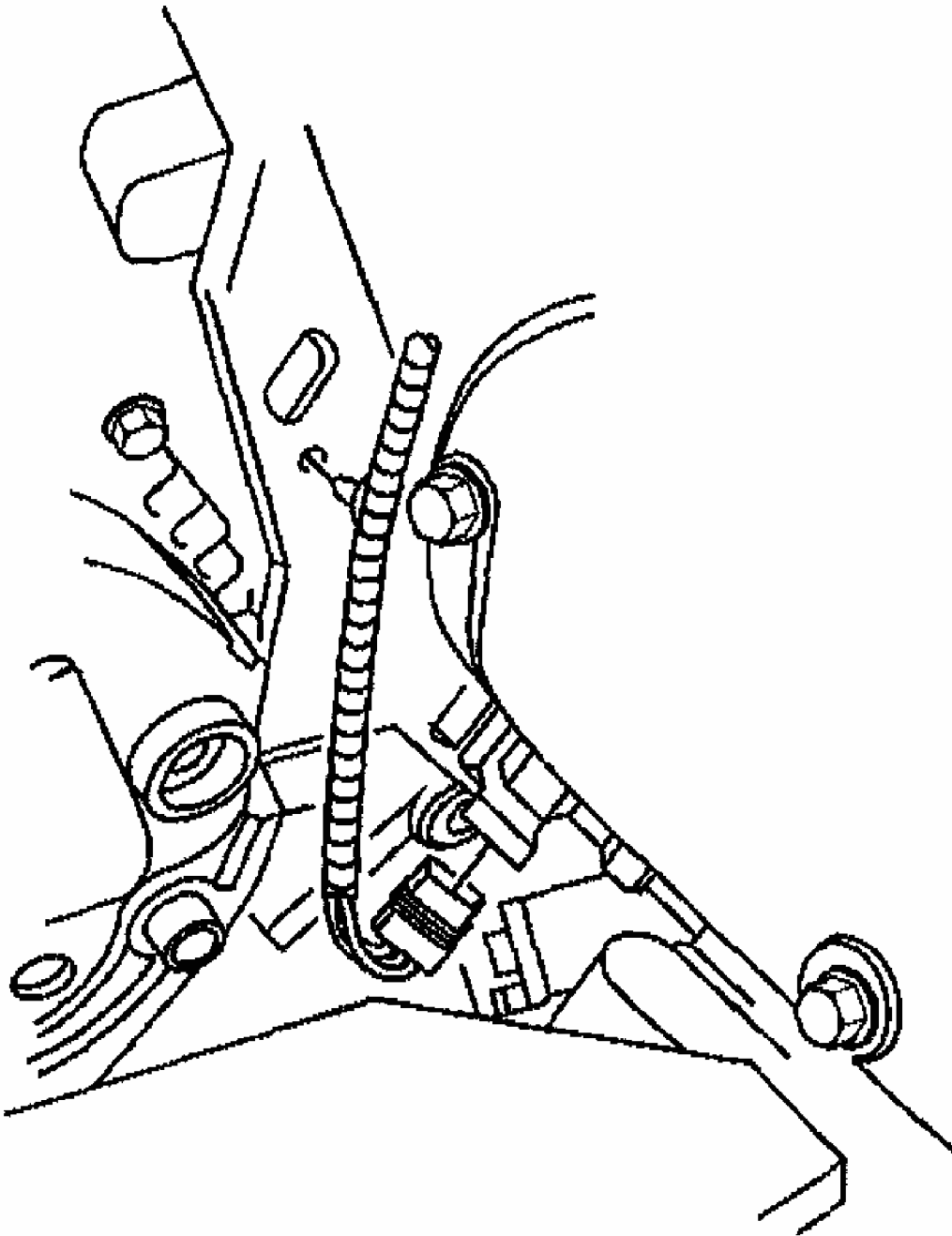
### FRONT SUSPENSION CROSSMEMBER REPLACEMENT

#### Tools Required

- *J 28467-B* Universal Engine Support Fixture
- *J 41803* Engine Support Fixture
- *J 33432-A* Transverse Spring Compressor

#### Removal Procedure

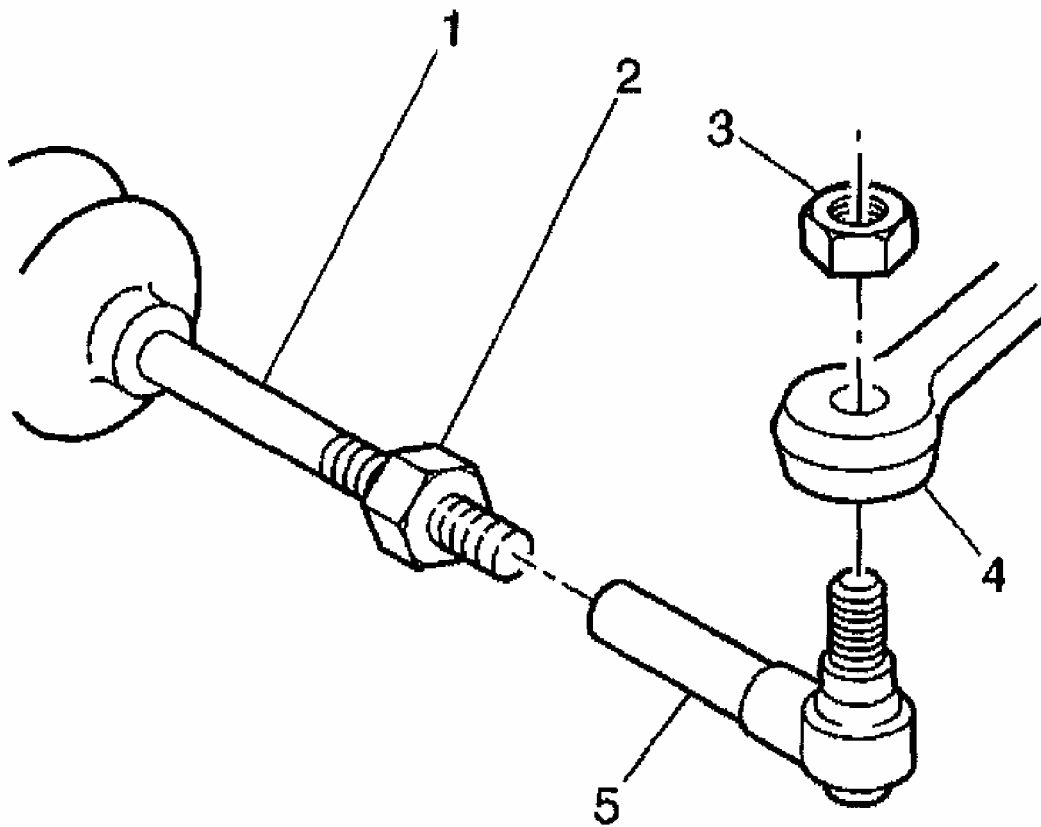
1. Remove the generator from the accessory mounting bracket. Refer to **GENERATOR**.
2. Remove the washer pump/reservoir. Refer to **WASHER SOLVENT CONTAINER REPLACEMENT** in Wipers/Washer Systems.
3. Remove the engine coolant temperature switch electrical connector and reposition.
4. Remove the front headlamp electrical connector and reposition.
5. Install *J 41803* and *J 28467-B* and support the engine.
6. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE** in General Information.
7. Remove the tire and wheel assemblies. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.



G01727752

**Fig. 1: Identifying Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

8. Remove the steering linkage outer tie rod end stud nuts (3). Refer to **OUTER TIE ROD** .

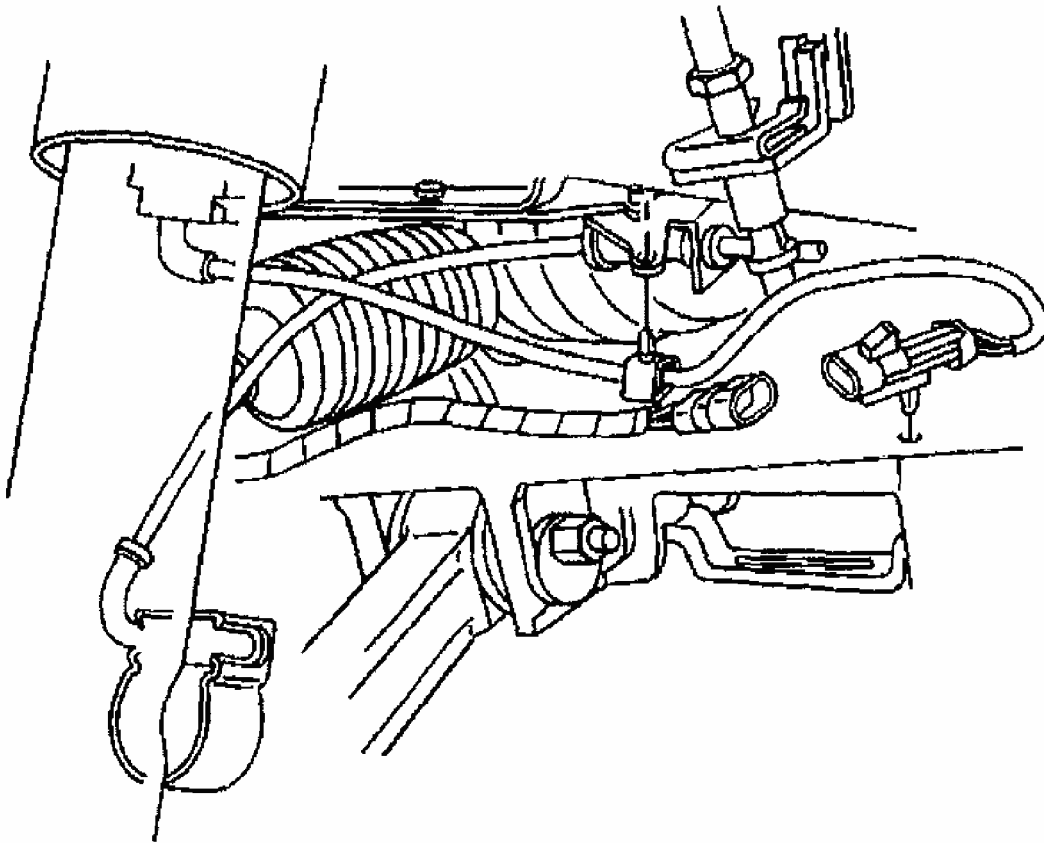


G01727753

**Fig. 2: Steering Linkage Outer Tie Rod End Stud Nuts**  
**Courtesy of GENERAL MOTORS CORP.**

9. Disconnect the shock absorber solenoid electrical connector, if equipped.

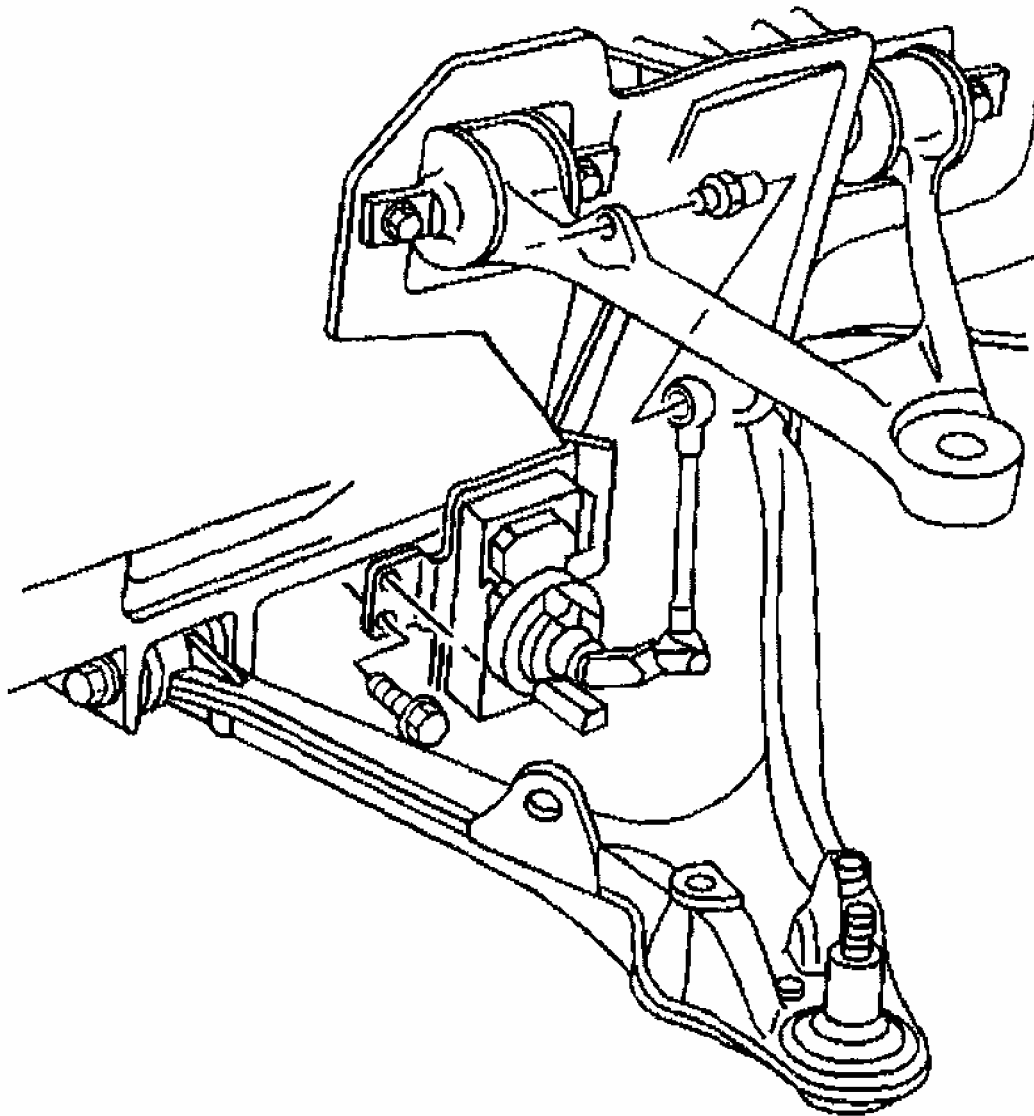




G01727754

**Fig. 3: Shock Absorber Solenoid Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

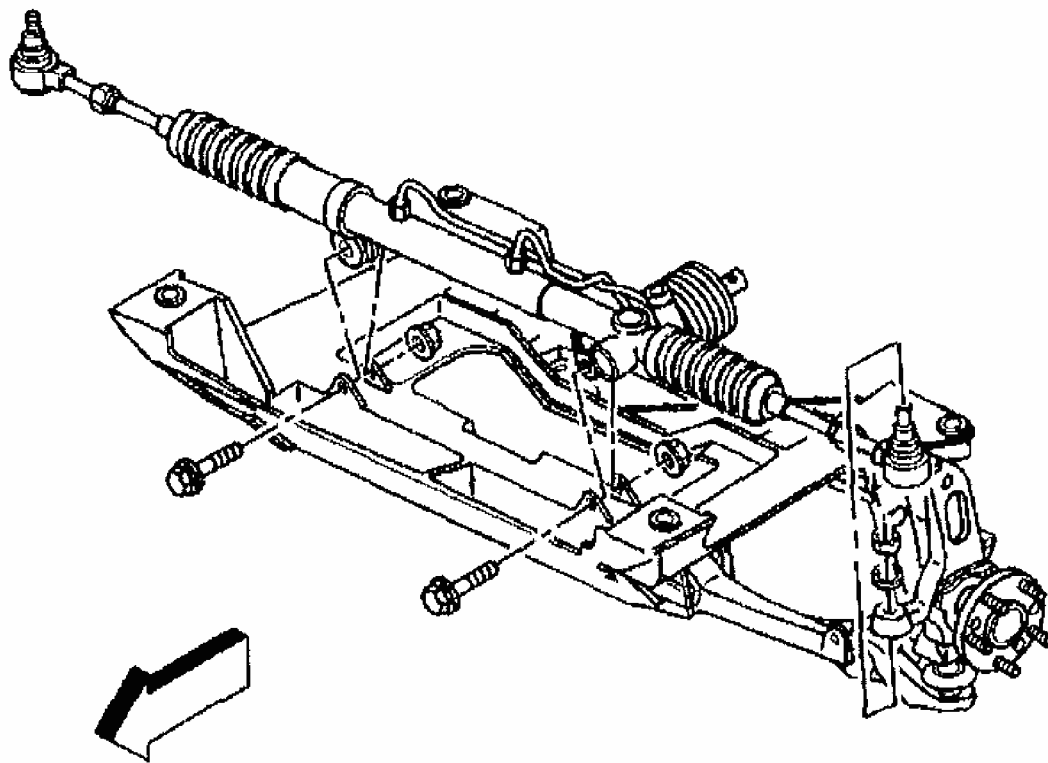
10. Disconnect the real time damping (RTD) sensor links.
11. Remove the stabilizer shaft from the vehicle. **Stabilizer Shaft Replacement** .
12. Disconnect the intermediate shaft lower coupling from the steering gear. Refer to **INTERMEDIATE STEERING SHAFT REPLACEMENT** in Steering Wheel and Column.
13. Remove the bolts from the electronic brake control module/brake pressure modulator valve (EBCM/BPMV) bracket. Refer to **BRAKE PRESSURE MODULATOR VALVE (BPMV) BRACKET** in Antilock Brake System.
14. Support and reposition the EBCM/BPMV and bracket away from the crossmember.



G01727755

**Fig. 4: Removing Real Time Damping (RTD) Sensor Links**  
**Courtesy of GENERAL MOTORS CORP.**

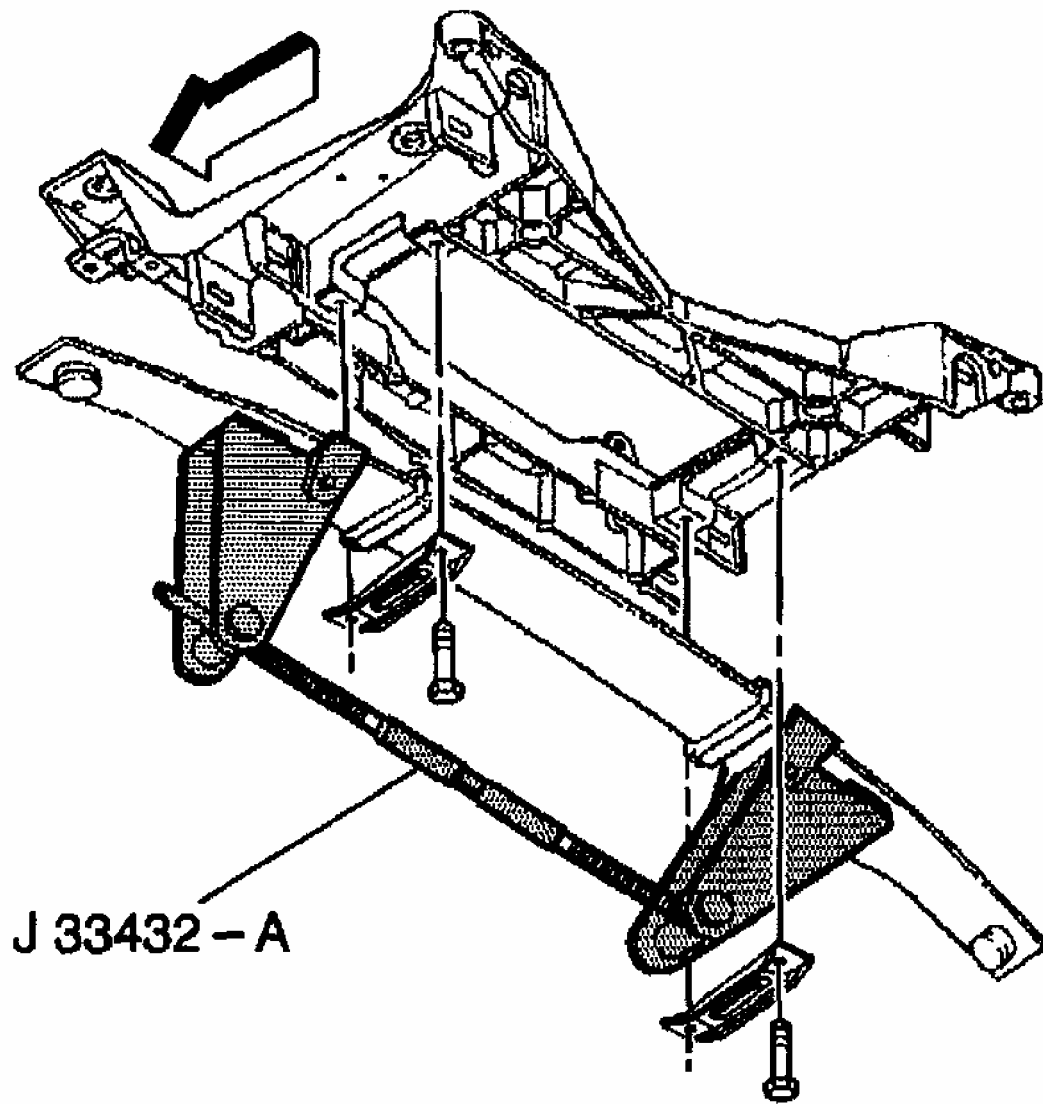
15. Remove the power steering gear mounting bolts.
16. Remove the power steering fluid cooler from the crossmember.
17. Lift the power steering gear off of the crossmember and support.



G01727756

**Fig. 5: Removing/Installing Power Steering Gear & Mounting Bolts**  
Courtesy of GENERAL MOTORS CORP.

18. Using the *J 33432-A* , remove the transverse spring from the vehicle. Refer to **Front Transverse Spring Replacement** .

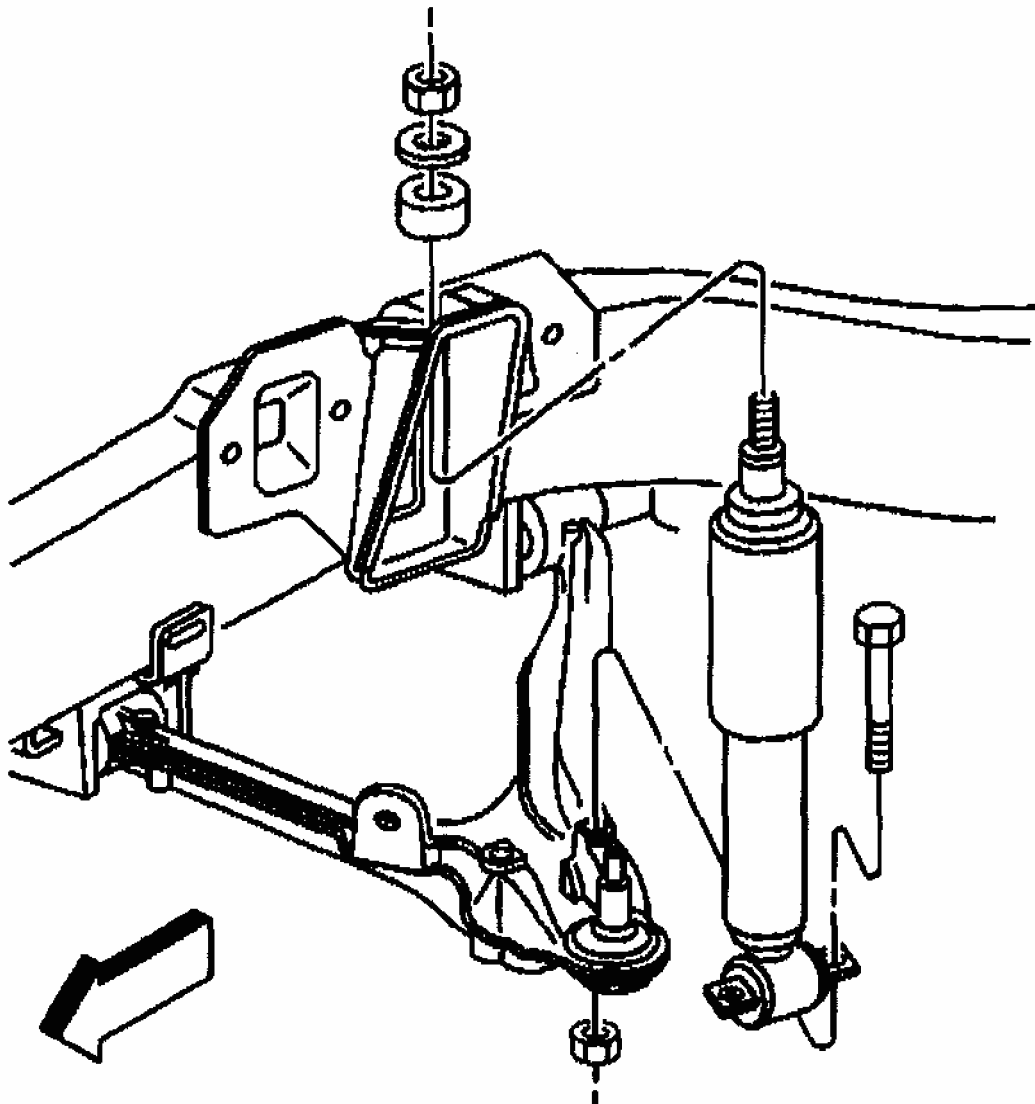


G01727757

**Fig. 6: J 33432-A**

**Courtesy of GENERAL MOTORS CORP.**

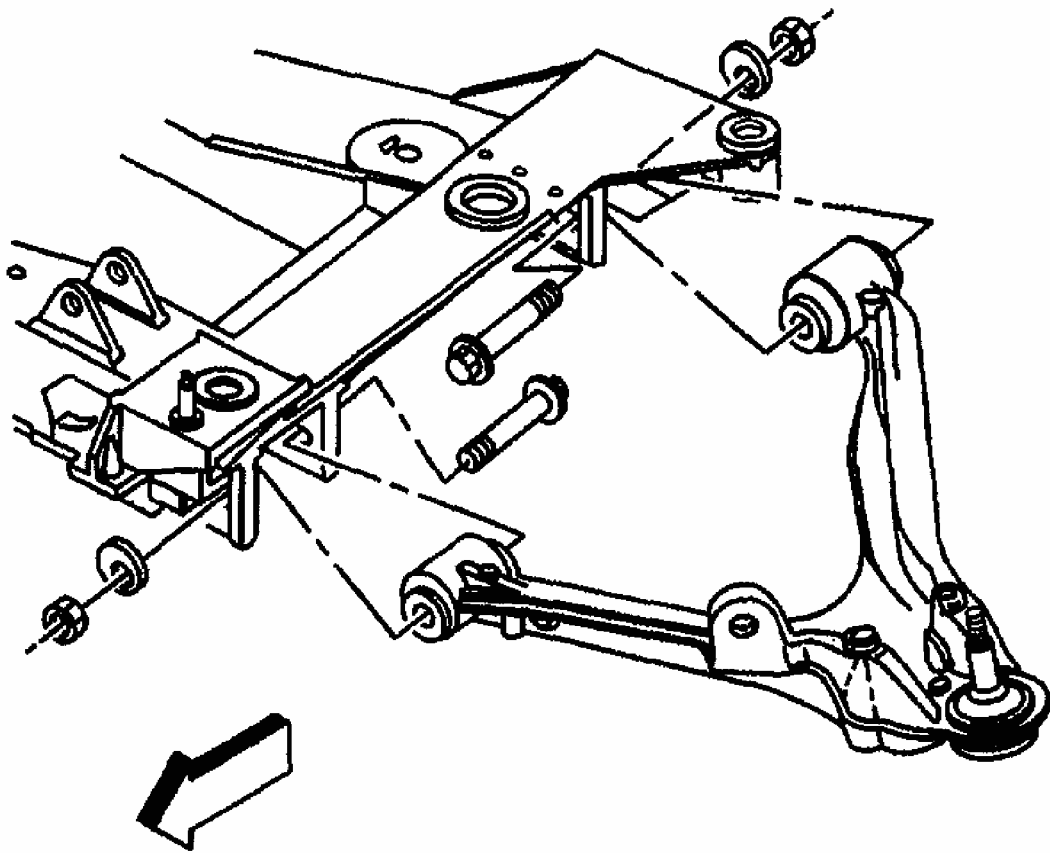
19. Disconnect the lower shock absorber bolts from the lower control arms.



G01727758

**Fig. 7: Removing/Installing Lower Shock Absorber Bolts**  
Courtesy of GENERAL MOTORS CORP.

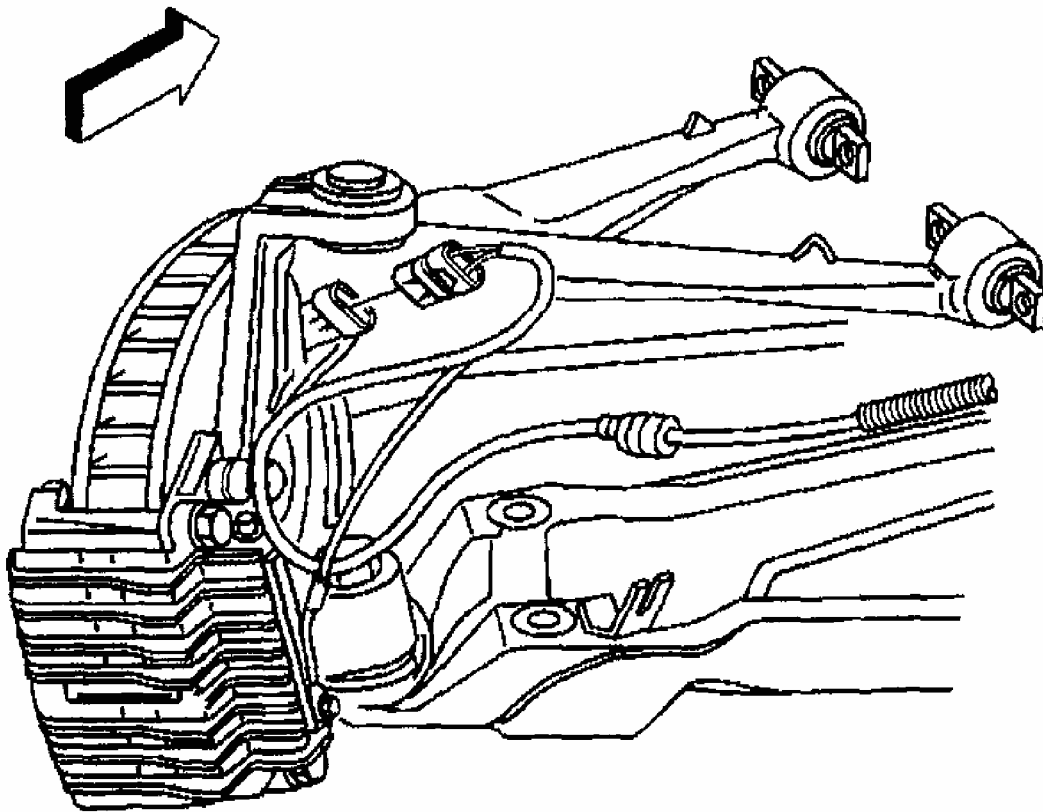
20. Remove the lower control arm bolts from the crossmember.
21. Place a transmission jack under the crossmember.
22. Remove the engine mount lower nuts. Refer to the following procedures:
  - **ENGINE MOUNT REPLACEMENT -- LEFT** in Engine Mechanical - 5.7 L.
  - **ENGINE MOUNT REPLACEMENT -- RIGHT** in Engine Mechanical - 5.7 L.



G01727759

**Fig. 8: Removing/Installing Lower Control Arm & Bolts**  
**Courtesy of GENERAL MOTORS CORP.**

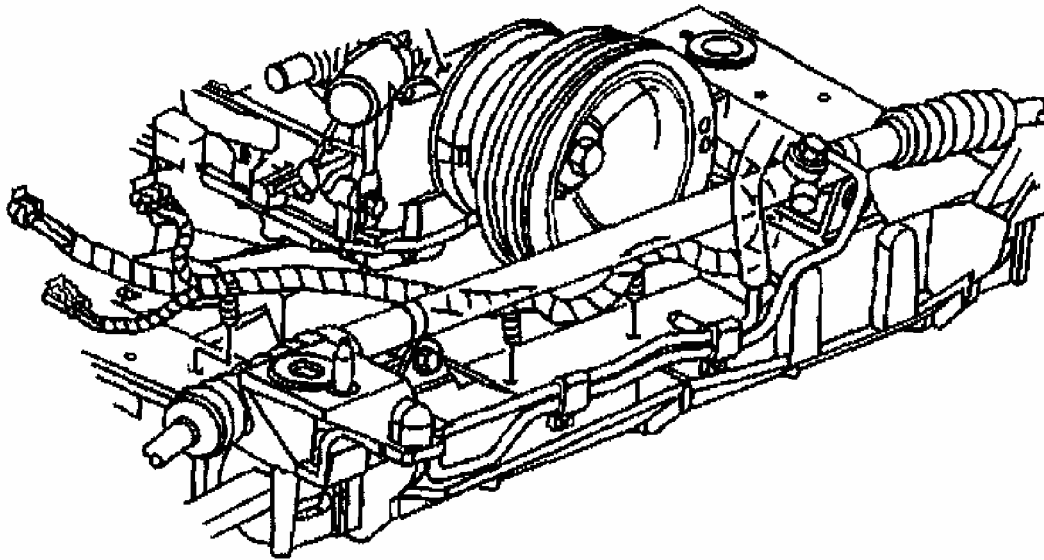
23. Disconnect the wheel speed sensor wiring harness from the crossmember.



G01727760

**Fig. 9: Disconnecting/Connecting Wheel Speed Sensor Wiring Harness**  
Courtesy of GENERAL MOTORS CORP.

24. Disconnect the electrical harness from the clips on the crossmember.
25. Disconnect the brake pipe from the clips on the crossmember.

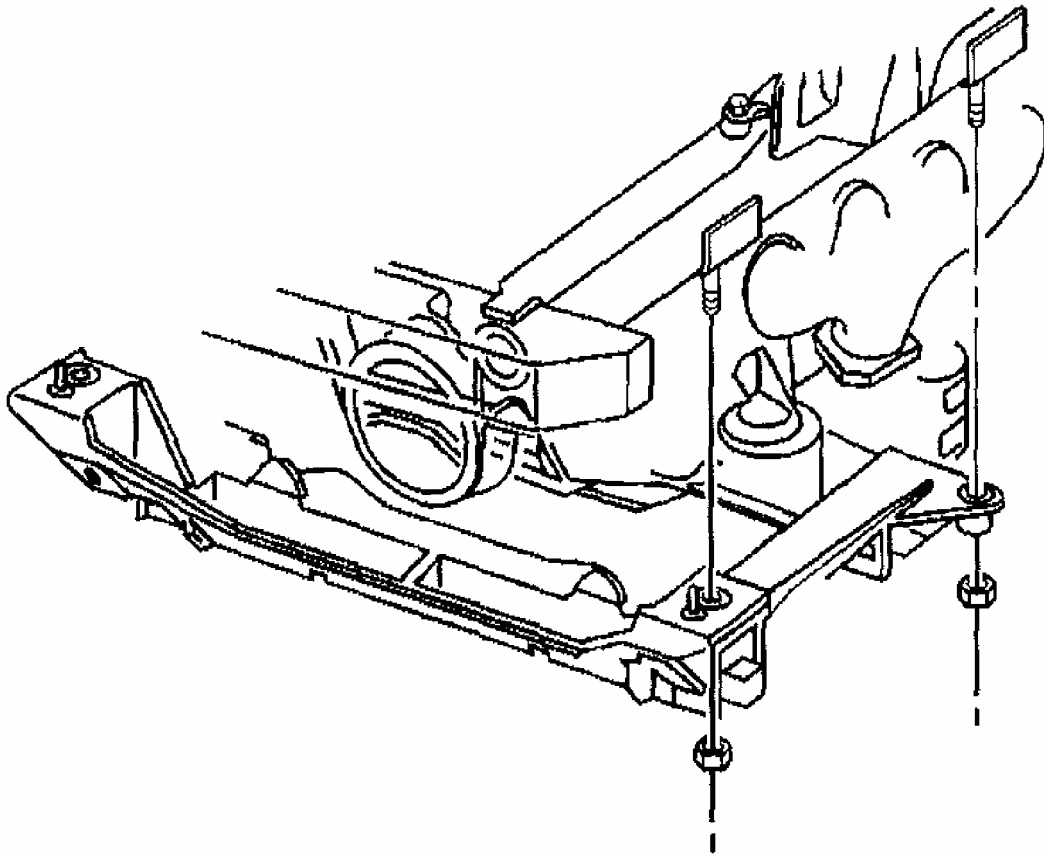


G01727761

**Fig. 10: Removing/Installing Brake Pipe, Electrical Harness & Clips**  
**Courtesy of GENERAL MOTORS CORP.**

26. Remove the crossmember mounting nuts.
27. Lower the crossmember out of the vehicle by removing the transmission jack from under the crossmember.





G01727762

**Fig. 11: Lowering/Raising Crossmember & Nuts**  
**Courtesy of GENERAL MOTORS CORP.**

**Installation Procedure**

1. Raise the crossmember to the vehicle.
  - 1.1. Align the crossmember dowel pins to the frame rails.
  - 1.2. Align the engine mount studs.

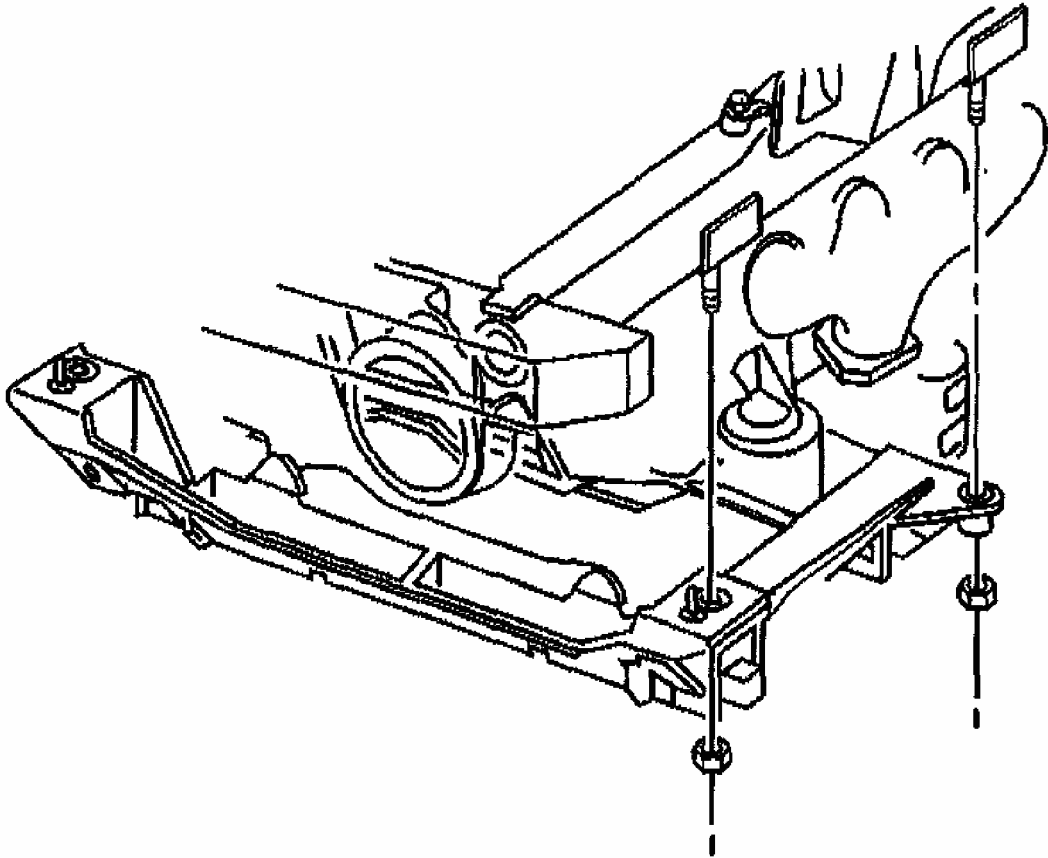
**NOTE:** Refer to **FASTENER NOTICE** in Cautions and Notices.

2. Install new crossmember mounting nuts.

**Tighten**

Tighten the new crossmember mounting nuts to 110 N.m (81 lb ft).

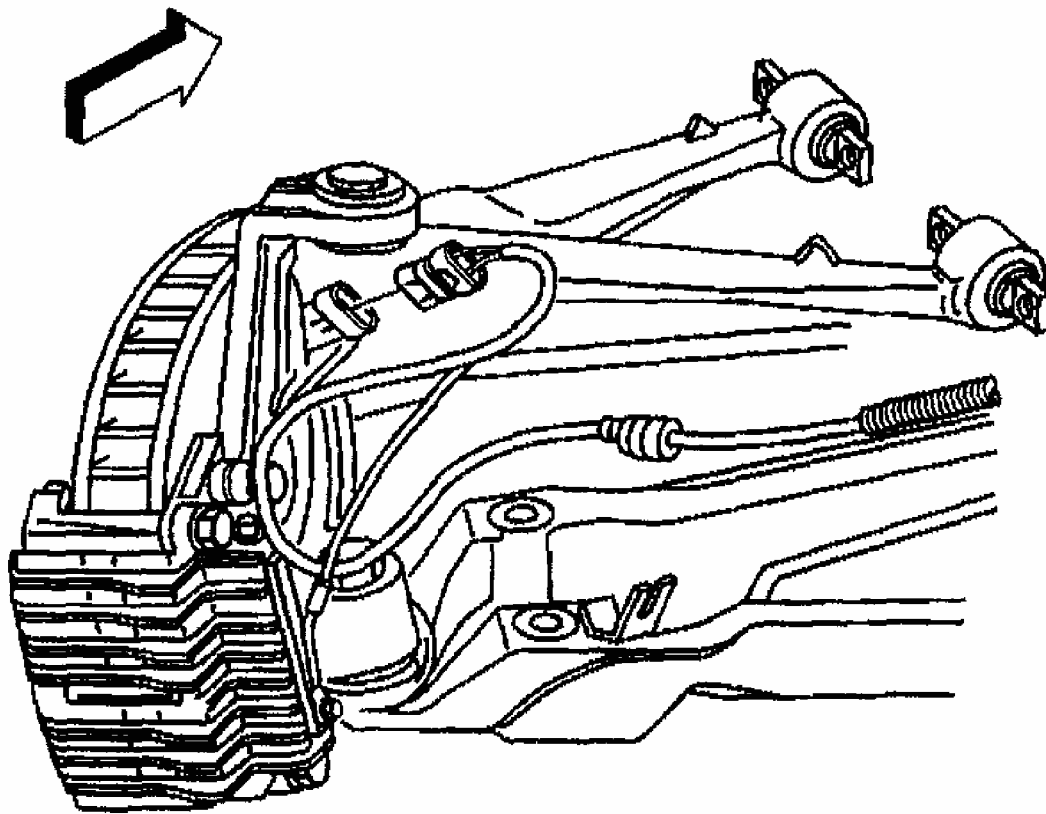
3. Install the engine mount lower nuts. Refer to one of the following procedures:
  - **ENGINE MOUNT REPLACEMENT -- LEFT** in Engine Mechanical
  - **ENGINE MOUNT REPLACEMENT -- RIGHT** in Engine Mechanical



G01727763

**Fig. 12: Installing/Removing Crossmember & Mounting Nuts**  
**Courtesy of GENERAL MOTORS CORP.**

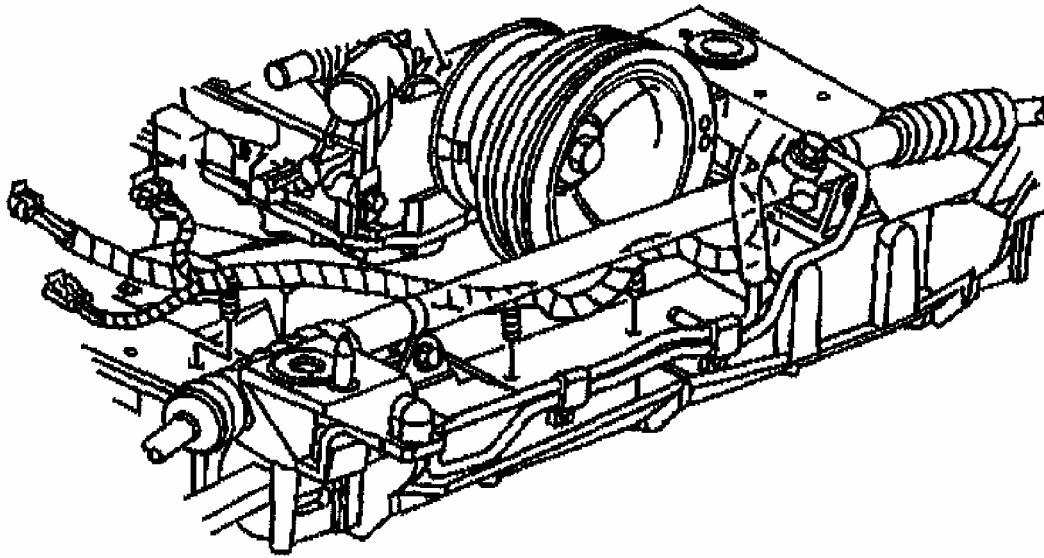
4. Fasten the wheel speed sensor wiring harness retaining clips to the crossmember.
5. Fasten the brake pipe to the retaining clips on the crossmember.



G01727764

**Fig. 13: Wheel Speed Sensor Wiring Harness & Retaining Clips**  
Courtesy of GENERAL MOTORS CORP.

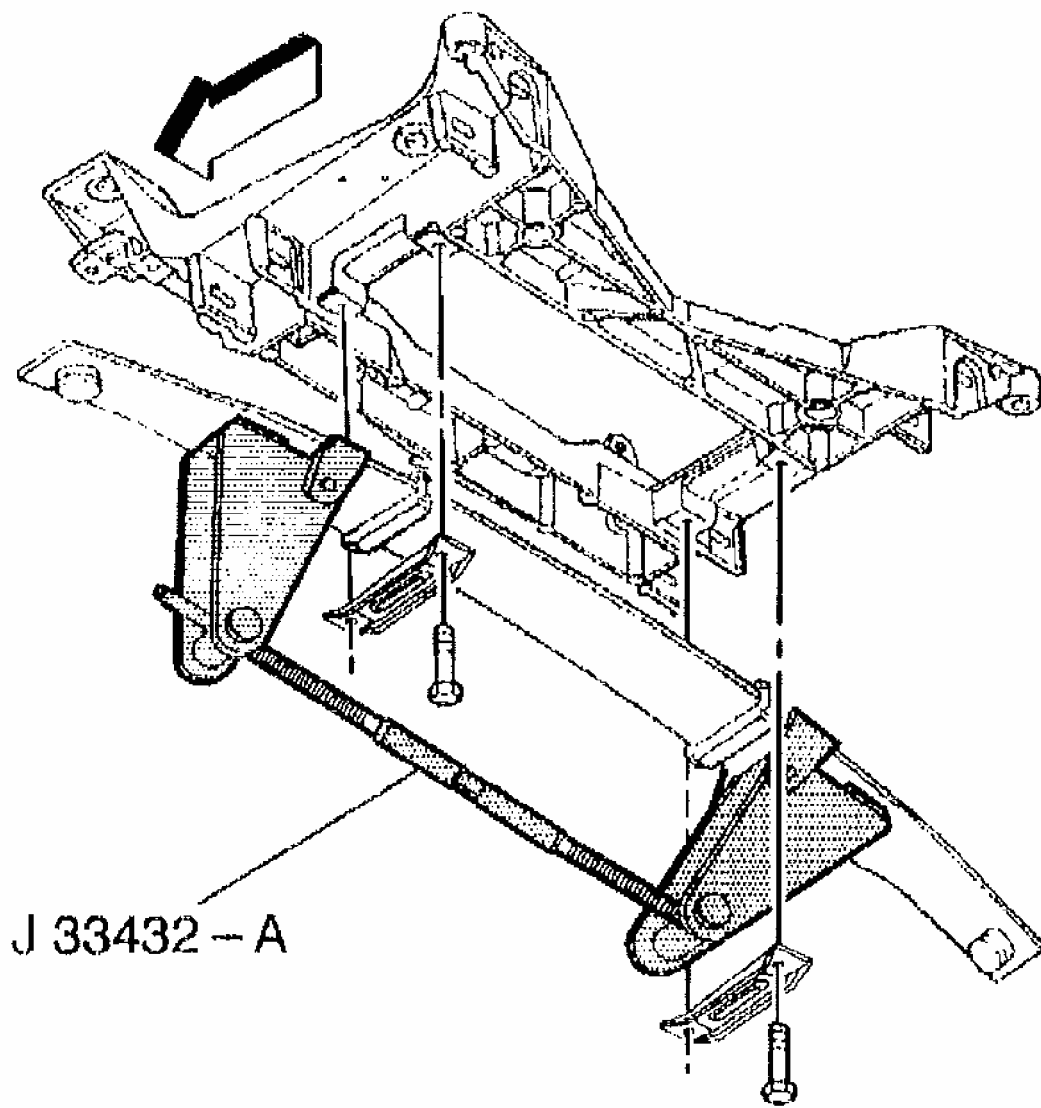
6. Connect the electrical harness to the clips on the crossmember.
7. Connect the brake pipe to the clips on the crossmember.



G01727765

**Fig. 14: Connecting/Disconnecting Electrical Harness, Brake Pipe & Clips**  
Courtesy of GENERAL MOTORS CORP.

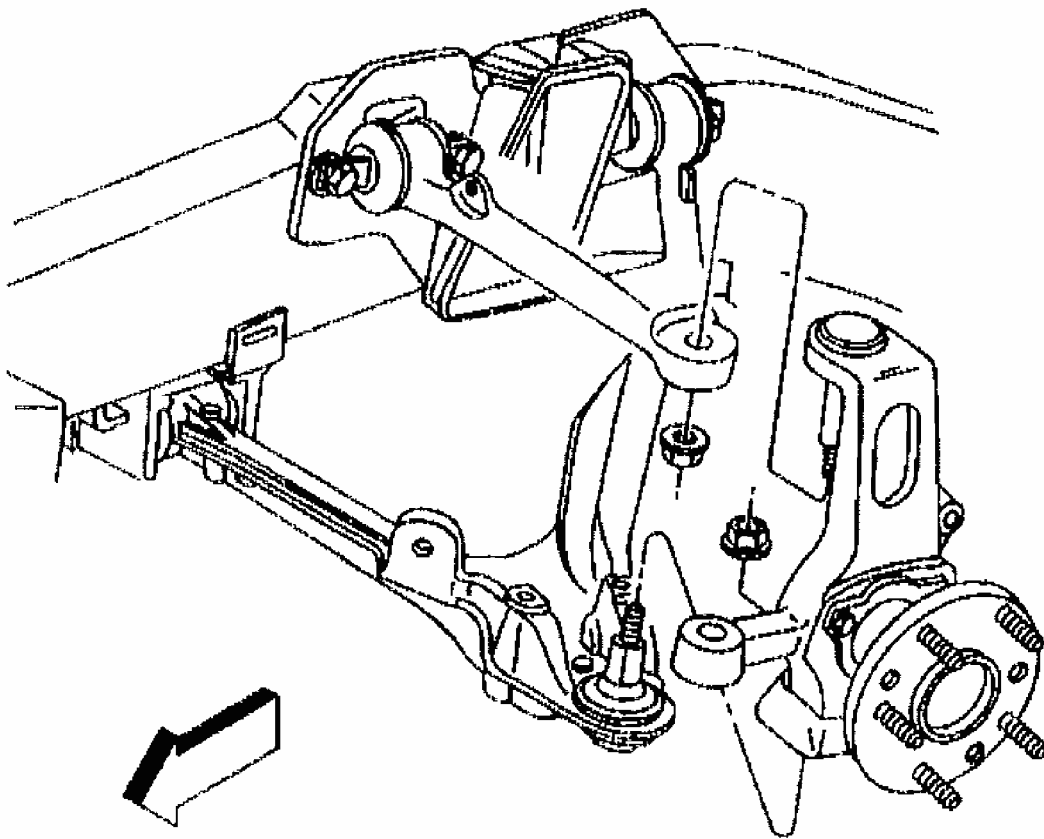
8. Install the transverse spring with the *J 33432-A* connected, to the crossmember. Refer to **Front Transverse Spring Replacement** .



G01727766

**Fig. 15: J 33432-A**  
**Courtesy of GENERAL MOTORS CORP.**

9. Install the lower control arm to the crossmember. Refer to **Lower Control Arm Replacement** .



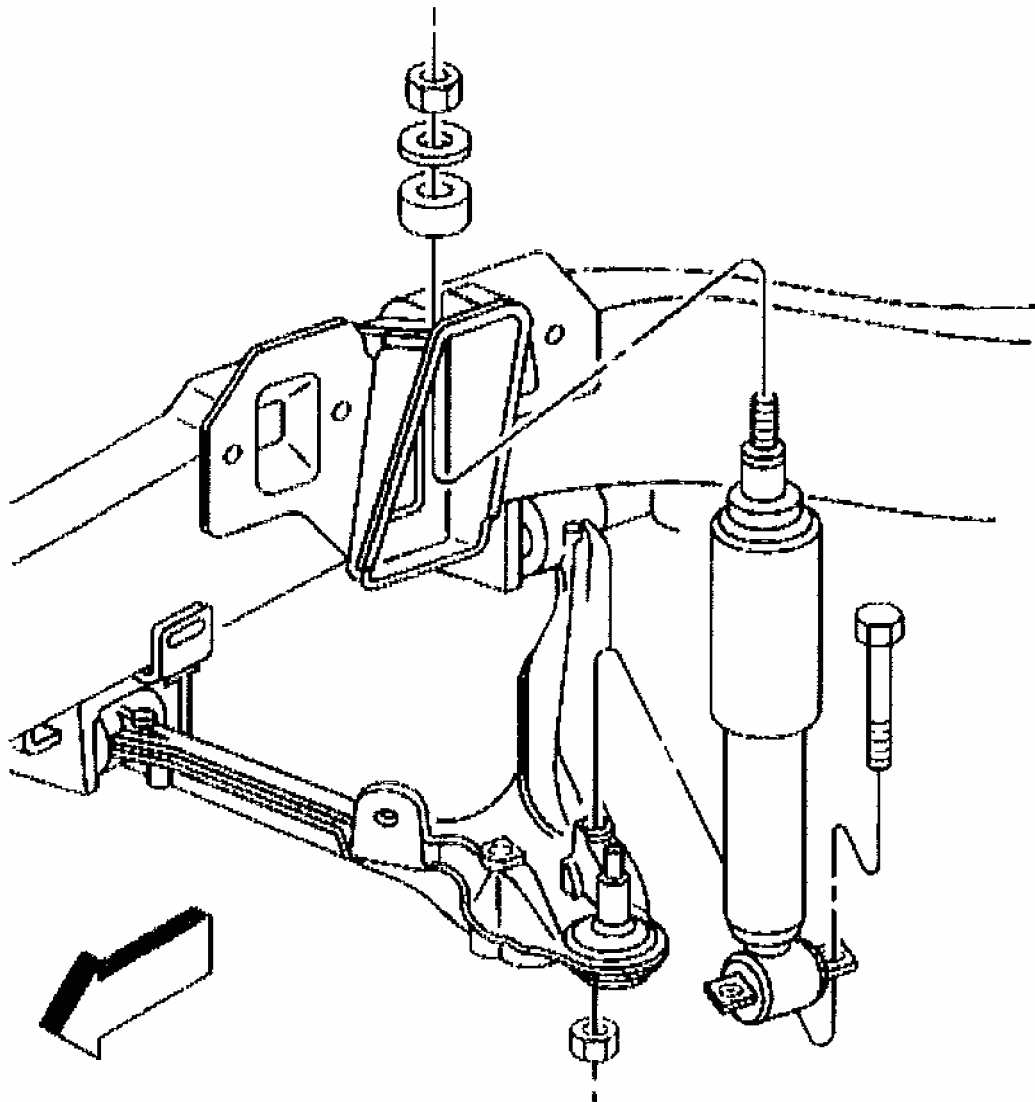
G01727767

**Fig. 16: Installing/Removing Crossmember & Lower Control Arm**  
Courtesy of GENERAL MOTORS CORP.

10. Install the shock absorbers to the lower control arms.

**Tighten**

Tighten the shock absorber lower mounting nuts to 28 N.m (21 lb ft).



G01727768

**Fig. 17: Installing/Removing Shock Absorber & Mounting Nuts**  
Courtesy of GENERAL MOTORS CORP.

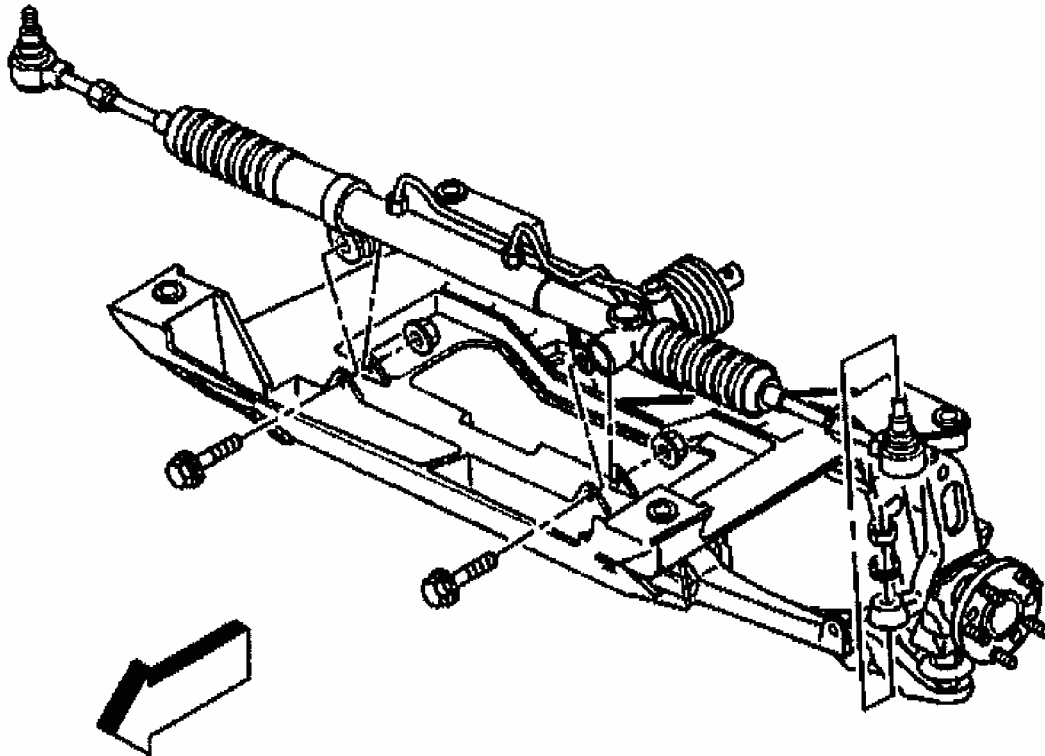
11. Install the power steering gear to the crossmember.

**Tighten**

Tighten the power steering gear mounting bolts to 100 N.m 74 lb ft).

12. Install the bolts to the brake pressure modulator valve bracket. Refer to **BRAKE PRESSURE MODULATOR VALVE (BPMV) BRACKET** in Antilock Brake System.

13. Connect the intermediate shaft to the steering gear. Refer to **INTERMEDIATE STEERING SHAFT REPLACEMENT** in Steering Wheel and Column.

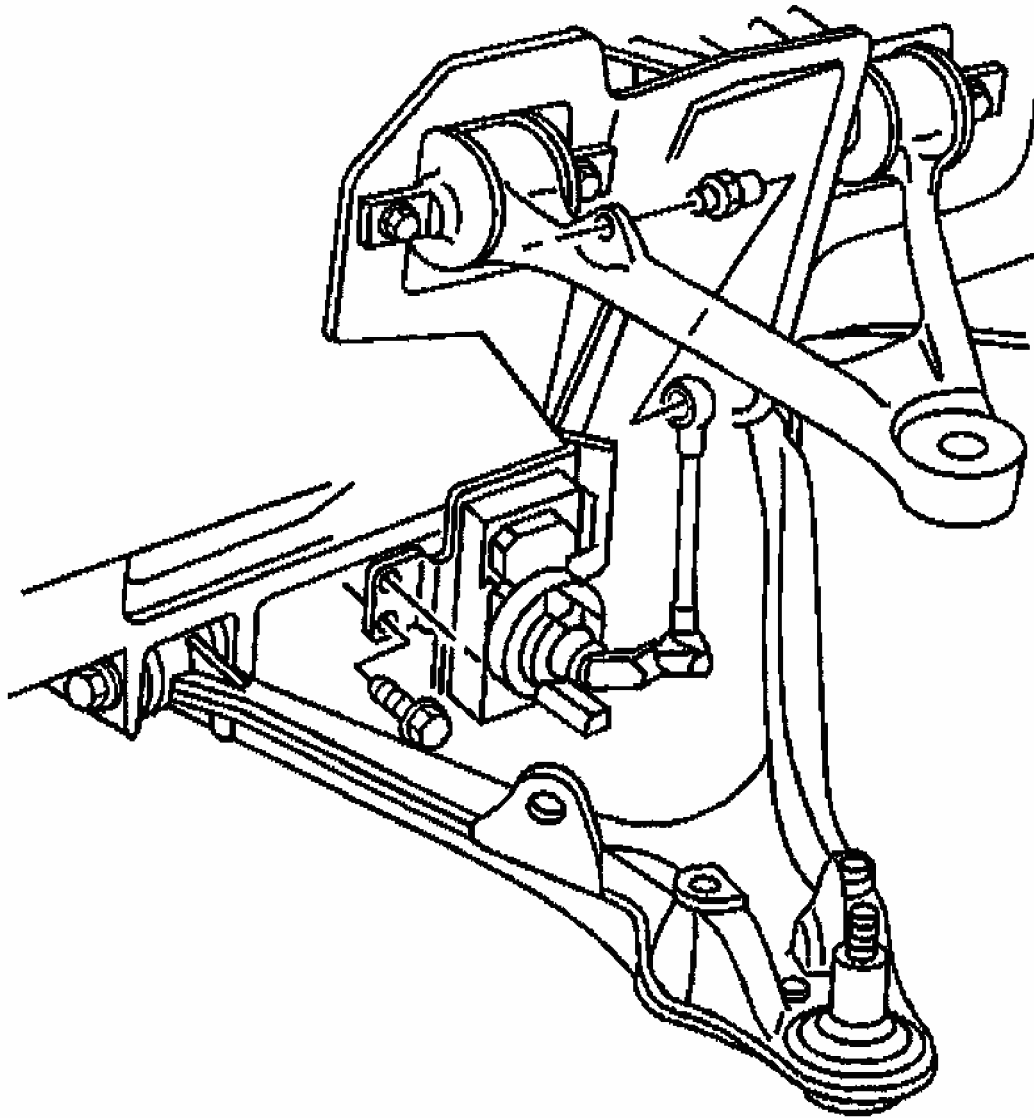


G01727769

**Fig. 18: Installing/Removing Power Steering Gear**  
Courtesy of GENERAL MOTORS CORP.

14. Install the steering linkage outer tie rod ends to the steering knuckles. Refer to **OUTER TIE ROD**.
15. Connect the RTD sensor links to the upper control arm, if equipped.



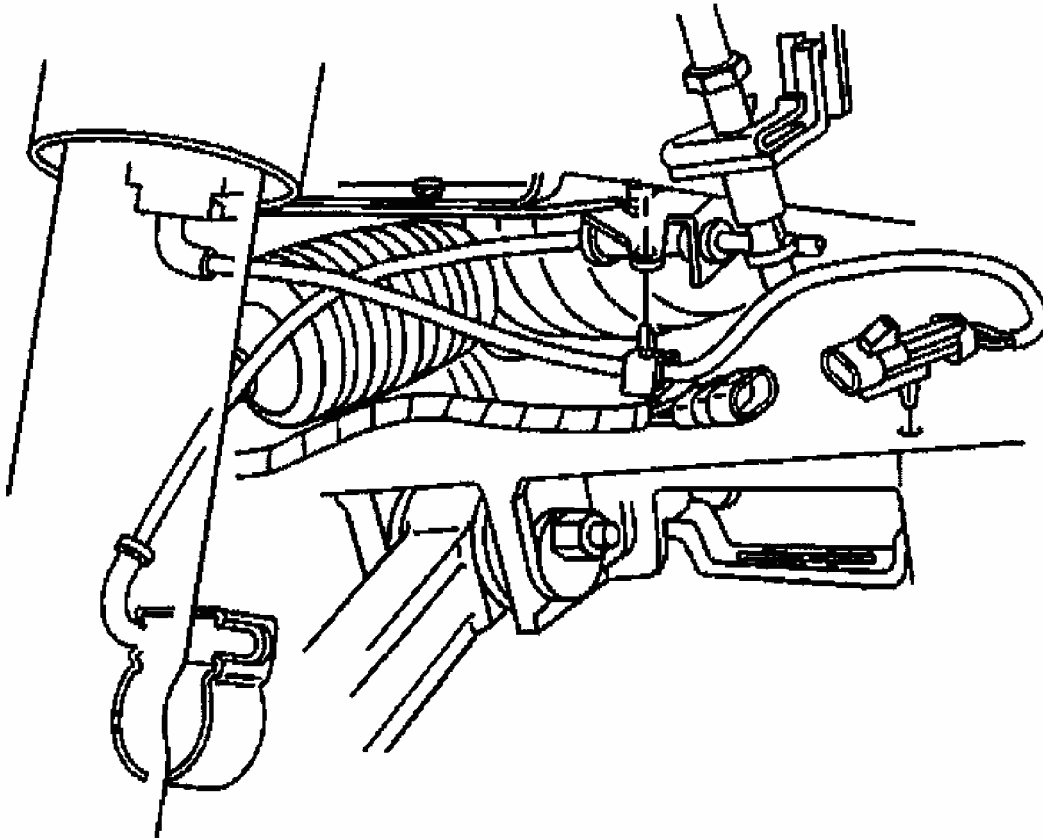


G01727770

**Fig. 19: Connecting RTD Sensor Links**  
**Courtesy of GENERAL MOTORS CORP.**

16. Connect the shock absorber solenoid electrical connector, if equipped.
17. Install the stabilizer shaft to the vehicle. Refer to **Stabilizer Shaft Replacement** .
18. Install the tire and wheel assemblies. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
19. Lower the vehicle.
20. Remove *J 41803* and *J 28467-B* from the engine.
21. Install the generator. Refer to **GENERATOR** in Engine Electrical.

22. Install the washer pump/reservoir. Refer to **WASHER SOLVENT CONTAINER REPLACEMENT** in Wipers/Washer Systems.



G01727771

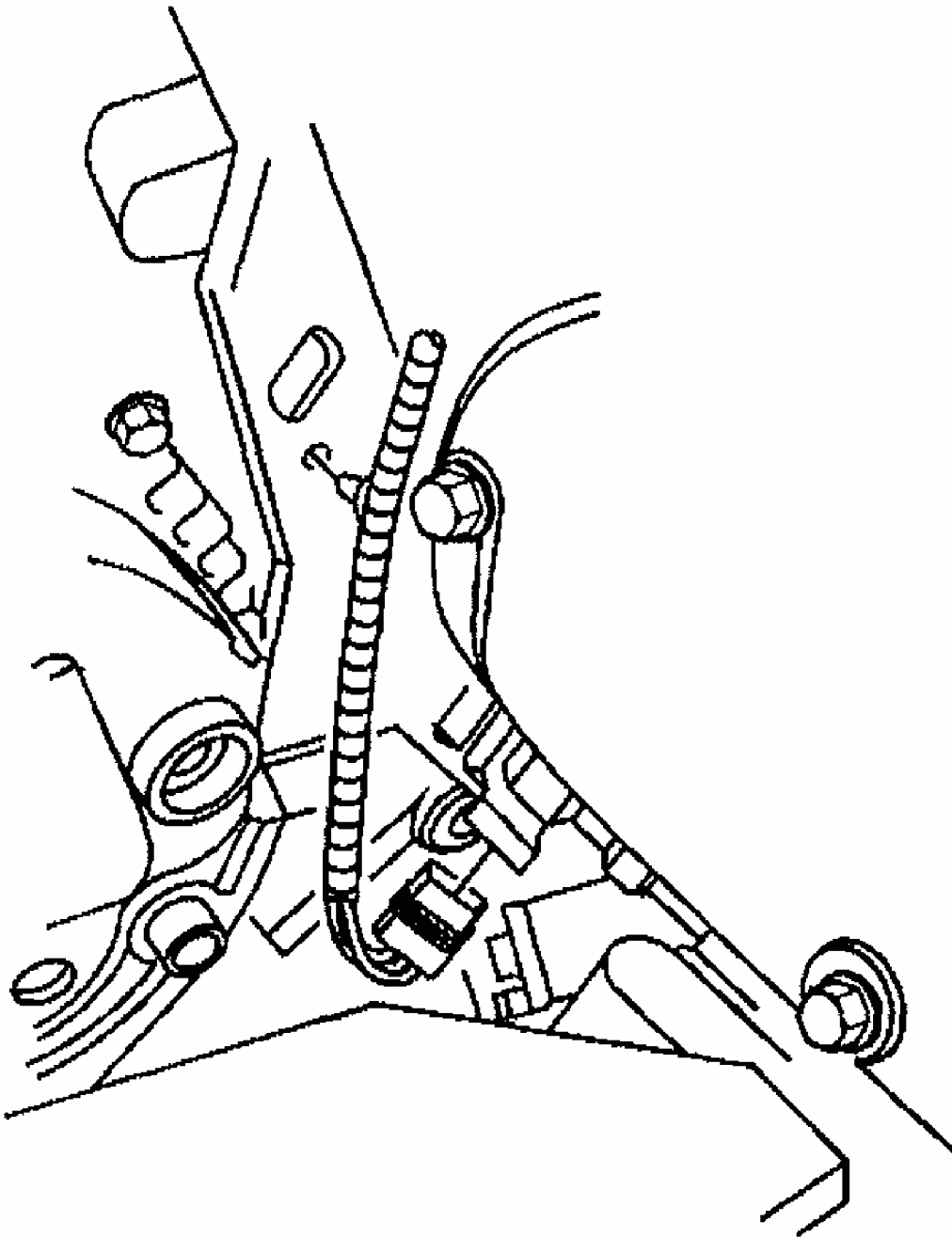
**Fig. 20: Installing Shock Absorber Solenoid Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

23. Install the engine coolant temperature switch electrical connector.
24. Install the front headlamp electrical connector.
25. Connect the negative battery cable.

### **Tighten**

Tighten the negative battery cable to 15 N.m (11 lb ft).

26. Perform a vehicle front end alignment. Refer to **MEASURING WHEEL ALIGNMENT** in Wheel Alignment.



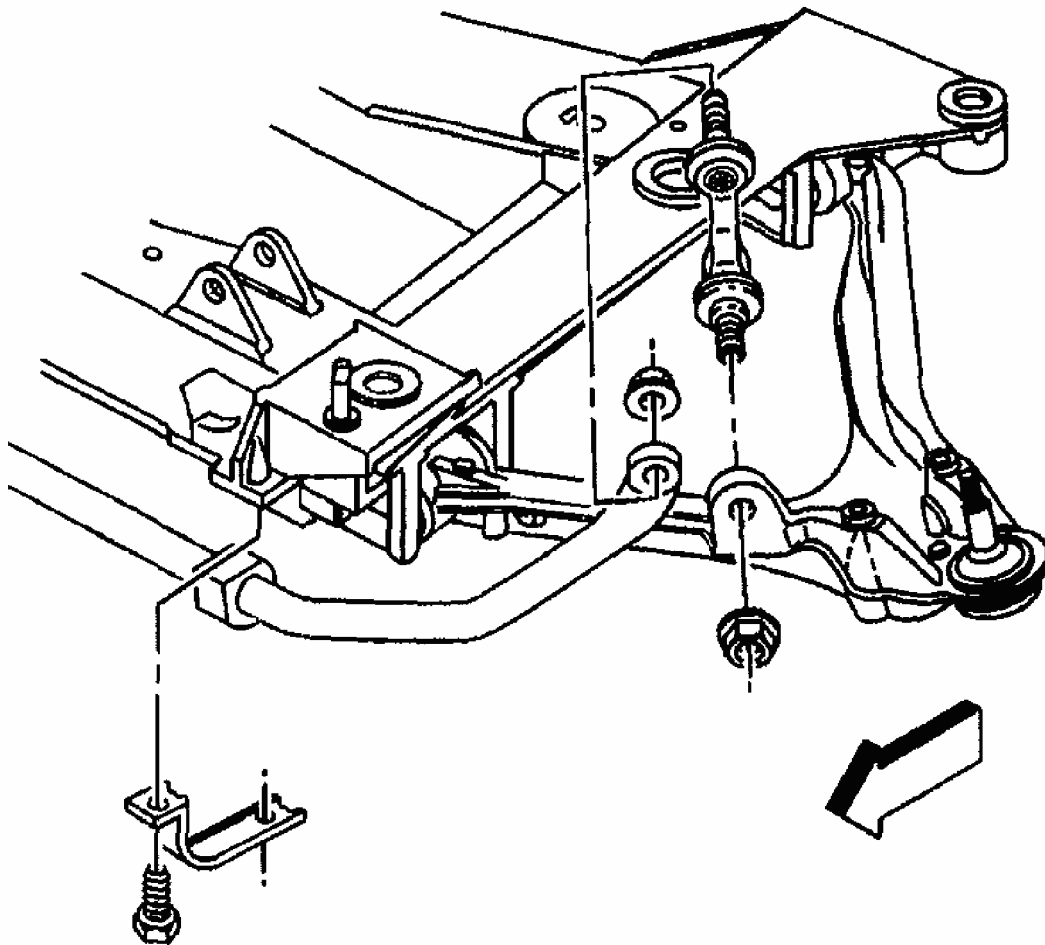
G01727772

**Fig. 21: Installing Electrical Connector**  
**Courtesy of GENERAL MOTORS CORP.**

## **STABILIZER SHAFT REPLACEMENT**

### **Removal Procedure**

1. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE** in General Information.
2. Remove the tire and wheel assemblies. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
3. Remove the stabilizer shaft link nuts from the stabilizer shaft.
4. Remove the stabilizer shaft insulator clamps from the front crossmember.
5. Remove the stabilizer shaft from the vehicle.



G01727773

**Fig. 22: Removing Stabilizer Shaft Link, Insulator & Clamps**  
Courtesy of GENERAL MOTORS CORP.

**Installation Procedure**

1. Install the stabilizer shaft, insulator clamps and bolts to the crossmember.
2. Install the stabilizer shaft links to the stabilizer shaft.

**NOTE:** Refer to **FASTENER NOTICE** in Cautions and Notices.

3. Install the stabilizer shaft link nuts.

**Tighten**

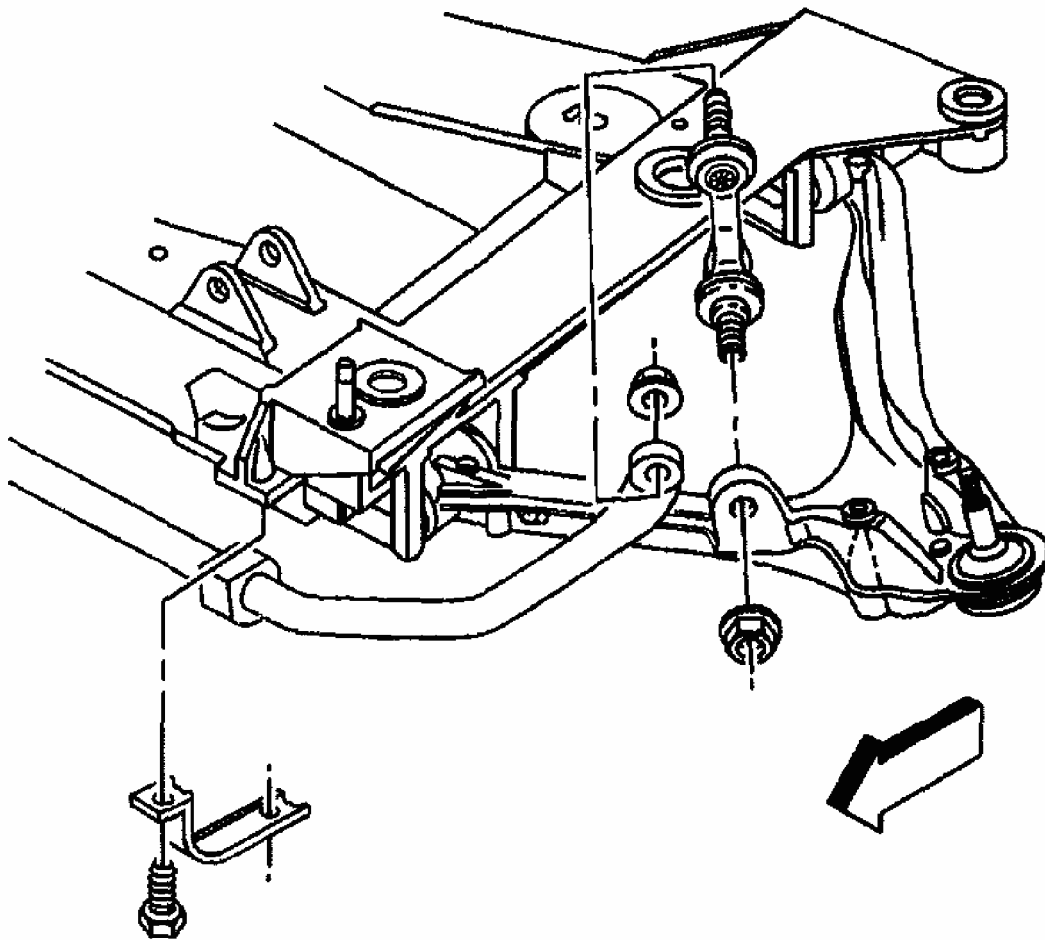
Tighten the stabilizer shaft link nuts to 72 N.m (53 lb ft).

4. Install the stabilizer shaft insulator clamp bolts.

**Tighten**

Tighten the stabilizer shaft insulator clamp bolts to 58 N.m (43 lb ft).

5. Install the tire and wheel assemblies. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
6. Lower the vehicle.



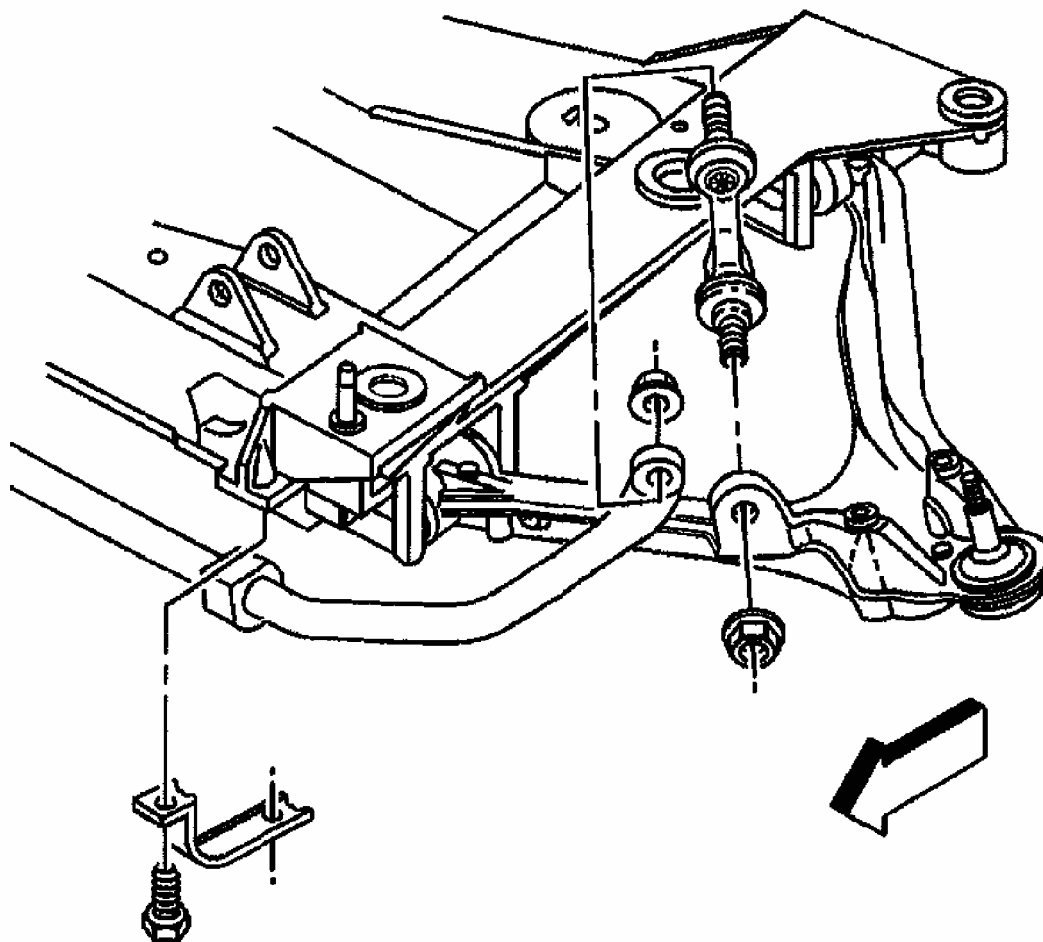
G01727774

**Fig. 23: Installing Stabilizer Shaft Link, Insulator & Clamps**  
Courtesy of GENERAL MOTORS CORP.

#### STABILIZER SHAFT LINK REPLACEMENT

##### Removal Procedure

1. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE** in General Information.
2. Remove the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
3. Remove the stabilizer shaft link nuts.
4. Remove the stabilizer shaft link from the stabilizer shaft and lower control arm.



G01727775

**Fig. 24: Removing Stabilizer Shaft Link & Nuts**  
Courtesy of GENERAL MOTORS CORP.

**Installation Procedure**

1. Install the stabilizer shaft link into the stabilizer shaft and lower control arm.

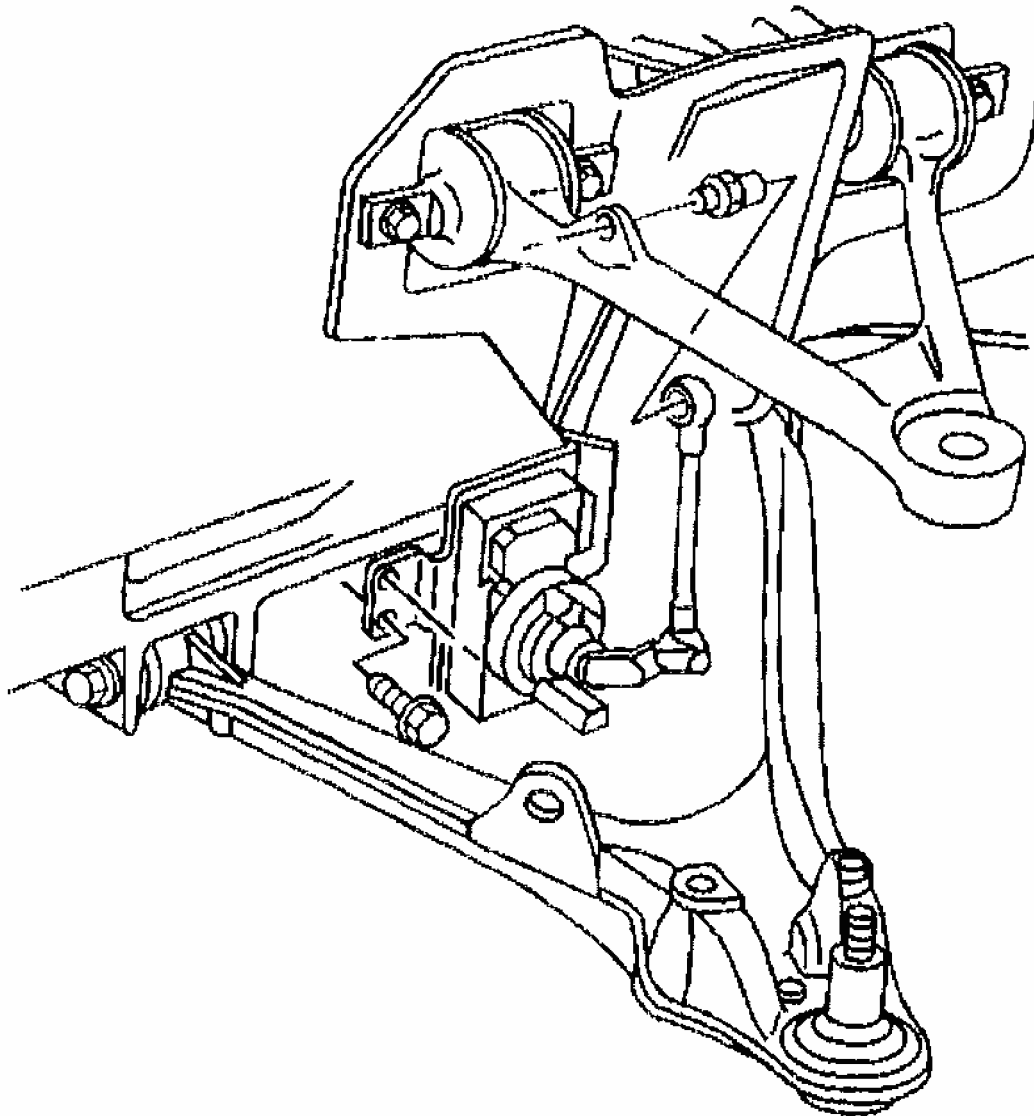
**NOTE:** Refer to FASTENER NOTICE in Cautions and Notices.

2. Install the stabilizer shaft link nuts.

**Tighten**

Tighten the stabilizer shaft link nuts to 72 N.m (53 lb ft).

3. Install the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
4. Lower the vehicle.



G01727776

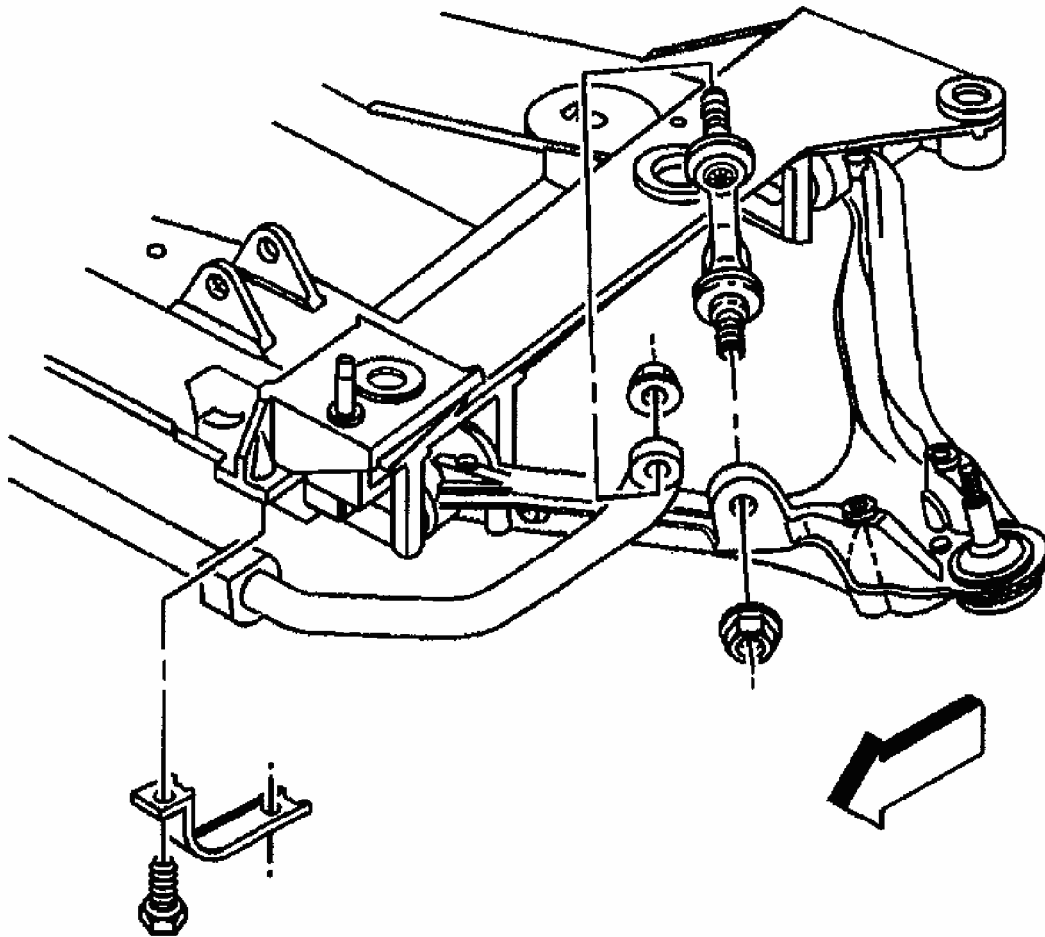
**Fig. 25: Installing Stabilizer Shaft Link & Nuts**  
Courtesy of GENERAL MOTORS CORP.

**STABILIZER SHAFT INSULATOR REPLACEMENT**

**Removal Procedure**



1. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE** in General Information.
2. Remove the tire and wheel assemblies. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
3. Remove the stabilizer shaft from the vehicle. Refer to **Stabilizer Shaft Replacement** .
4. Remove the stabilizer shaft insulators from the stabilizer shaft.



G01727777

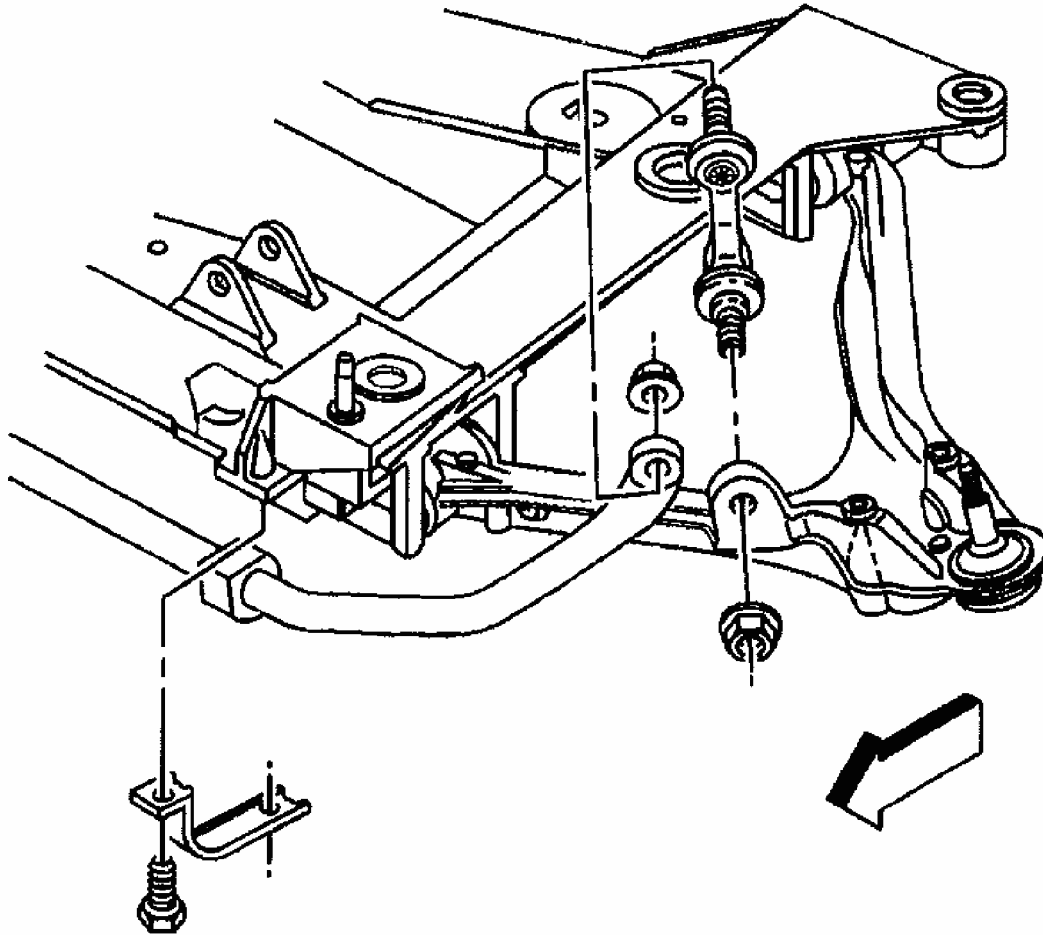
**Fig. 26: Removing Stabilizer Shaft & Insulators**  
Courtesy of GENERAL MOTORS CORP.

**Installation Procedure**

1. Install the stabilizer shaft insulators to the stabilizer shaft.
2. Install the stabilizer shaft to the vehicle. Refer to **Stabilizer Shaft Replacement** .
3. Install the tire and wheel assemblies. Refer to **TIRE & WHEEL REMOVAL &**

**INSTALLATION** in Tires and Wheels.

4. Lower the vehicle.



G01727778

**Fig. 27: Installing Stabilizer Shaft & Insulators**  
Courtesy of GENERAL MOTORS CORP.

**FRONT TRANSVERSE SPRING REPLACEMENT**

**Tools Required**

- *J 33432-A* Transverse Spring Compressor
- *J 42188* Ball Joint Separator

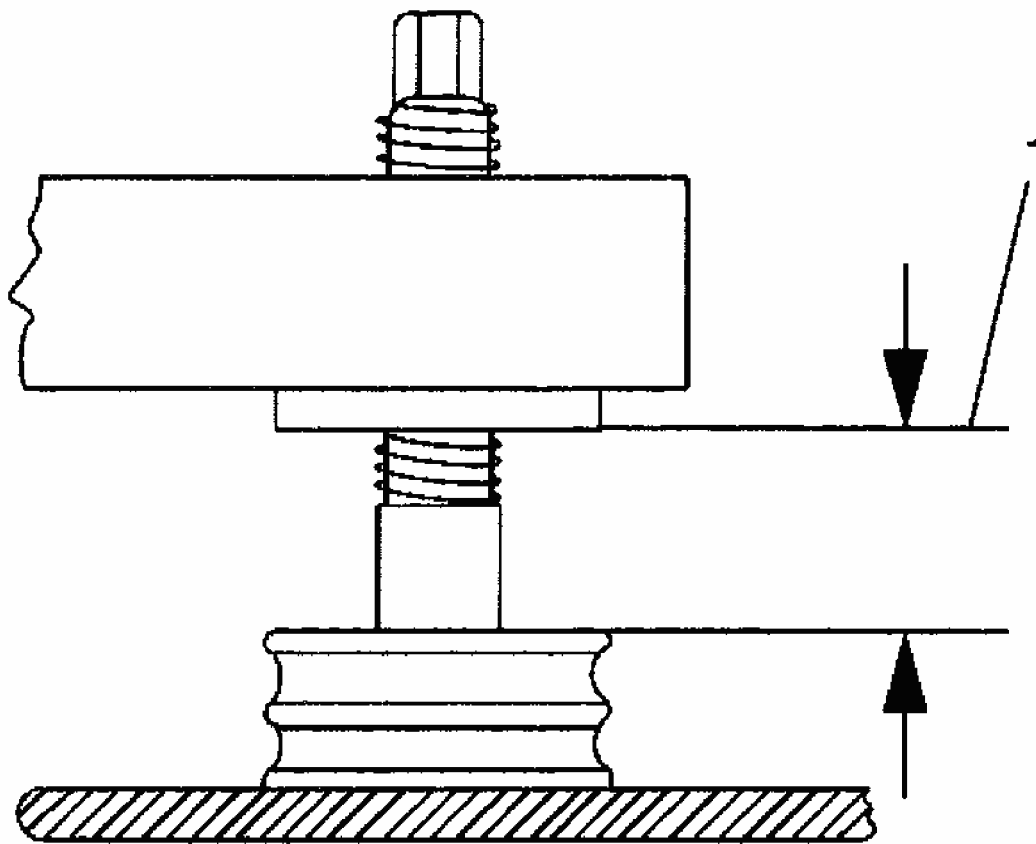
**Removal Procedure**

1. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE**

in General Information.

2. Remove the tire and wheel assemblies. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
3. If the transverse spring is to be replaced, measure the front spring adjuster bolt gap (1).

This measurement will be used in the installation procedure to setup the vehicle trim height.

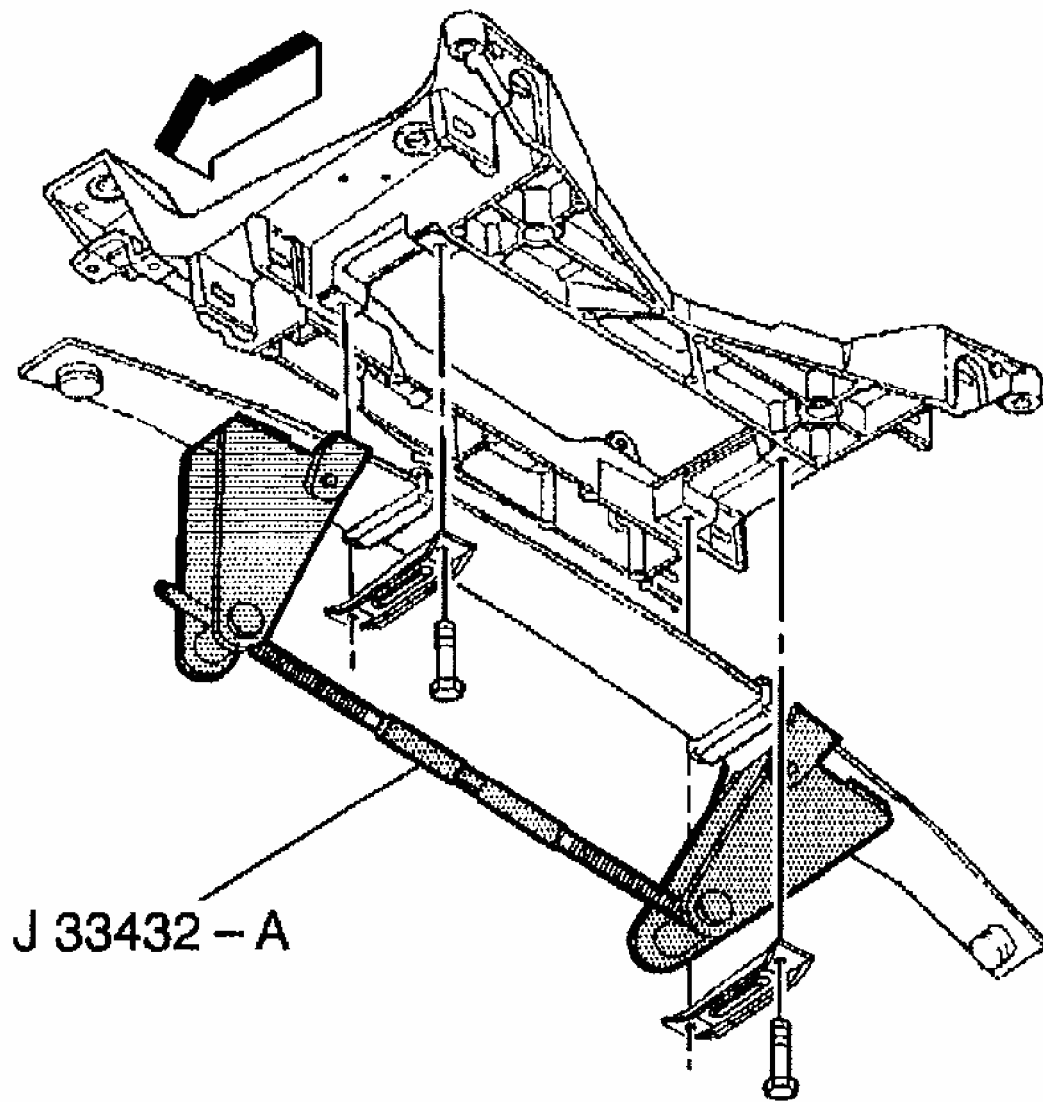


G01727779

**Fig. 28: Illustrating Front Spring Adjuster Bolt Gap**  
Courtesy of GENERAL MOTORS CORP.

**Important:** During this procedure, use care not to scratch the transverse spring.

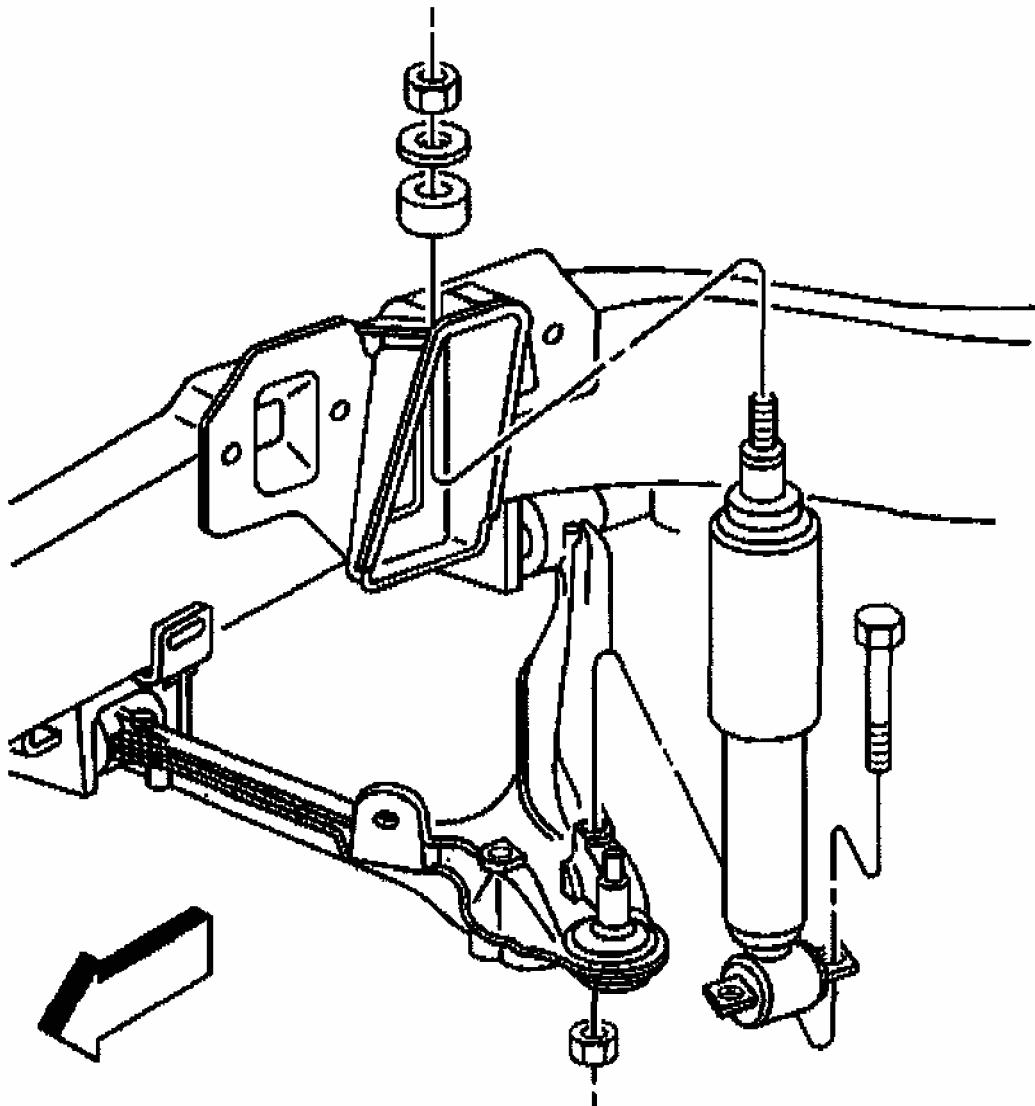
4. Install the transverse spring compressor *J 33432-A* to the transverse spring.
5. Compress the transverse spring.



G01727780

**Fig. 29: J 33432-A**  
**Courtesy of GENERAL MOTORS CORP.**

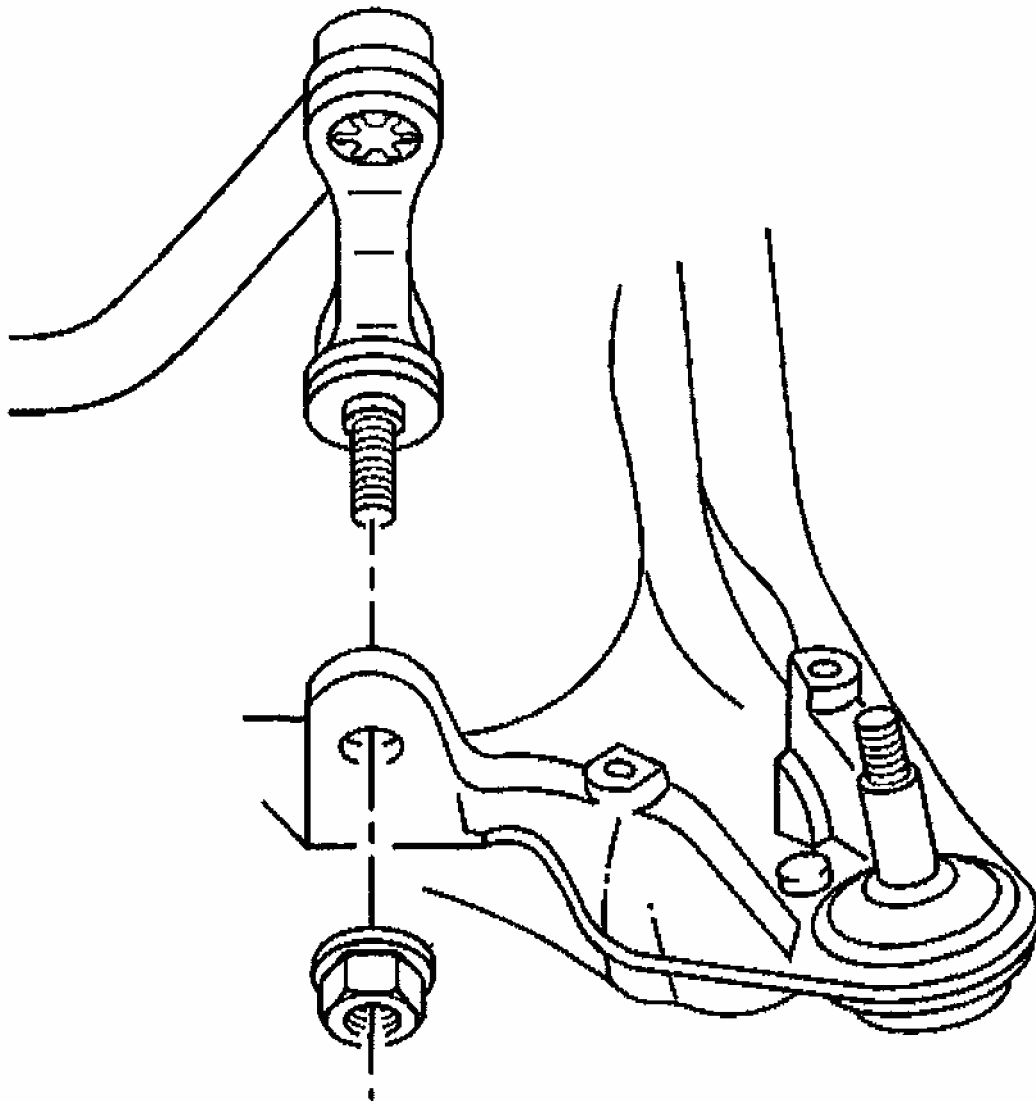
6. Remove the lower shock absorber mounting bolts from one of the lower control arms.



G01727781

**Fig. 30: Removing Lower Shock Absorber Mounting Bolts**  
Courtesy of GENERAL MOTORS CORP.

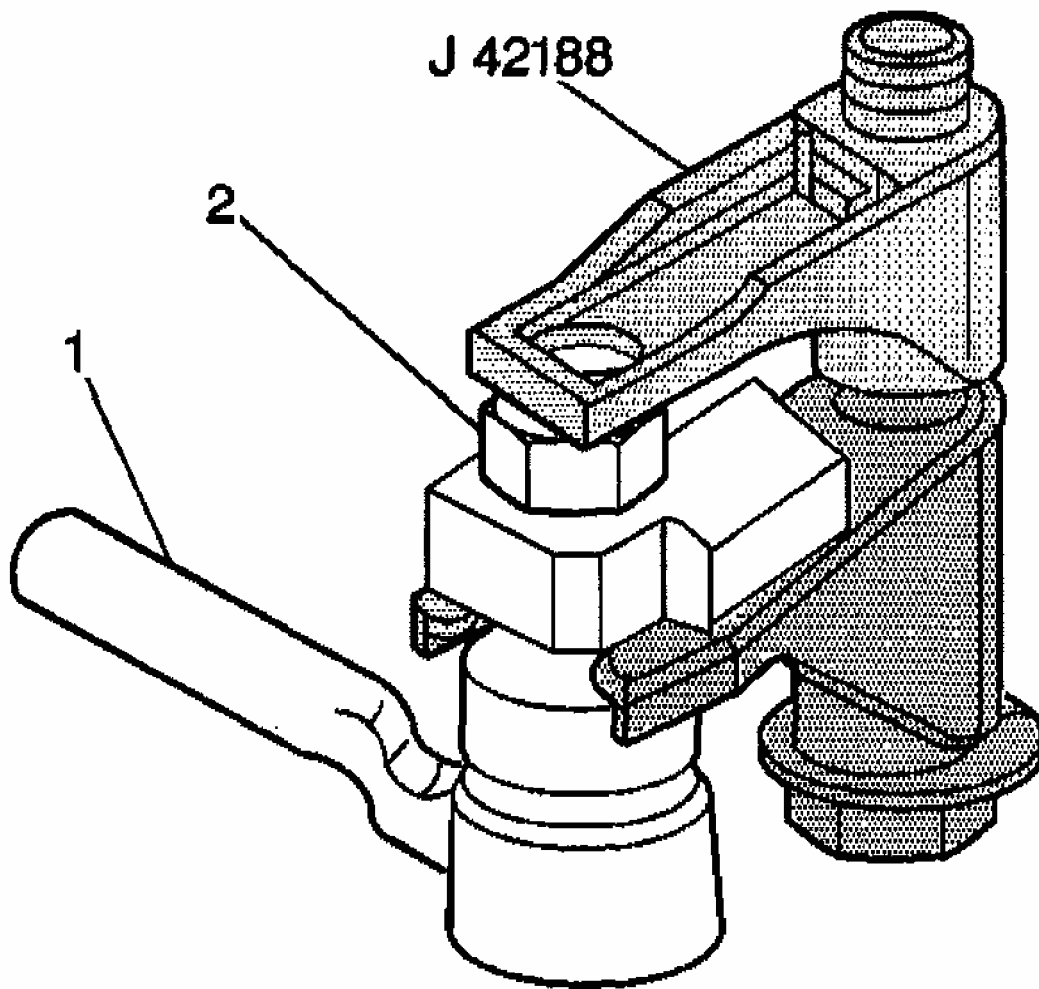
7. Disconnect the stabilizer shaft link from the lower control arm.



G01727782

**Fig. 31: Disconnecting Stabilizer Shaft Link**  
**Courtesy of GENERAL MOTORS CORP.**

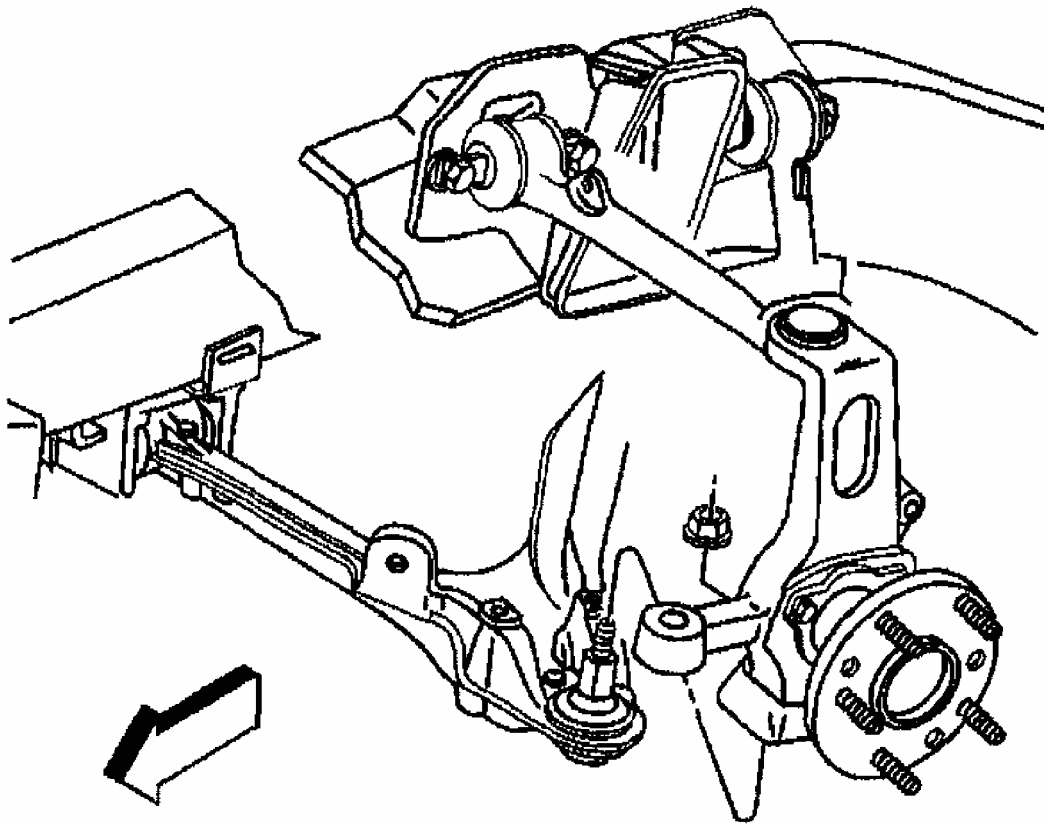
8. Loosen the lower ball joint stud nut (2) on the lower control arm. Do not remove the nut.
9. Separate the lower the ball joint from the steering knuckle using ball joint separator tool *J 42188* .



G01727783

**Fig. 32: View Of J 42188**  
**Courtesy of GENERAL MOTORS CORP.**

10. Remove the ball joint separator tool.
11. Remove the lower ball joint stud nut and discard.
12. Support the lower control arms with jackstands.

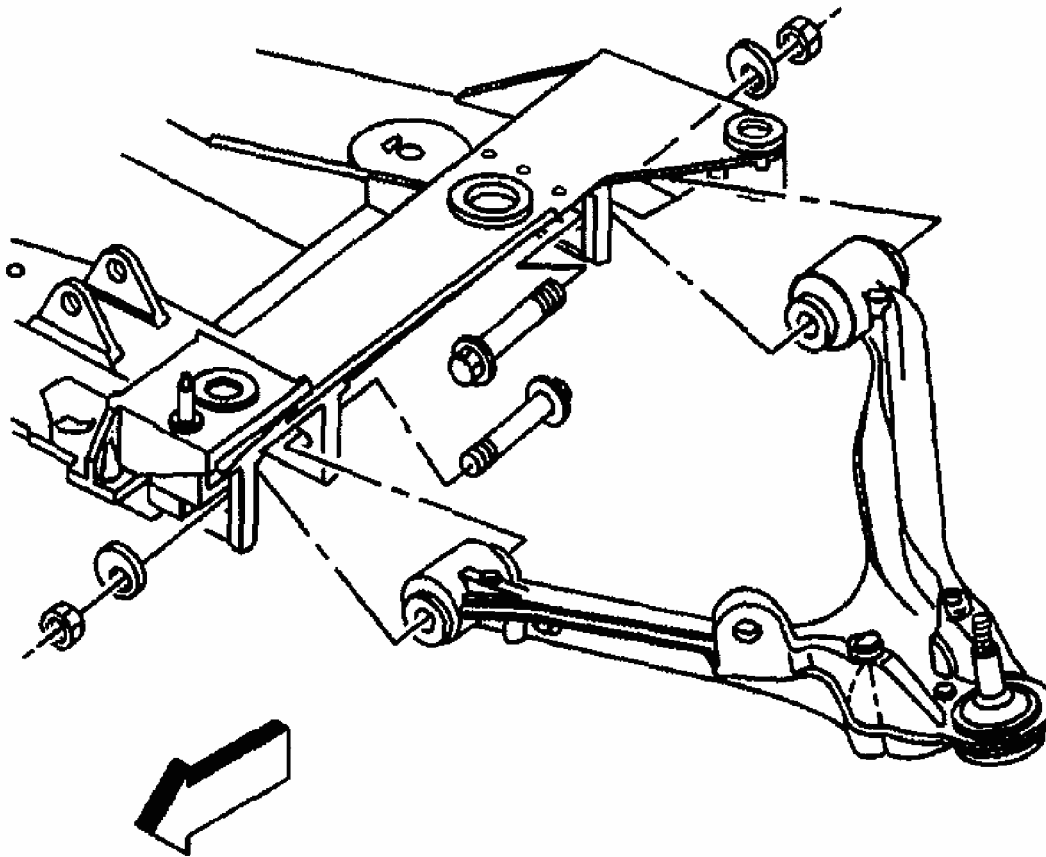


G01727784

**Fig. 33: Removing Lower Ball Joint Stud Nut**  
**Courtesy of GENERAL MOTORS CORP.**

13. Mark the position of the cam bolts for reference at reinstallation.
14. Remove the cam bolts from the lower control arm.
15. Remove the lower control arm.

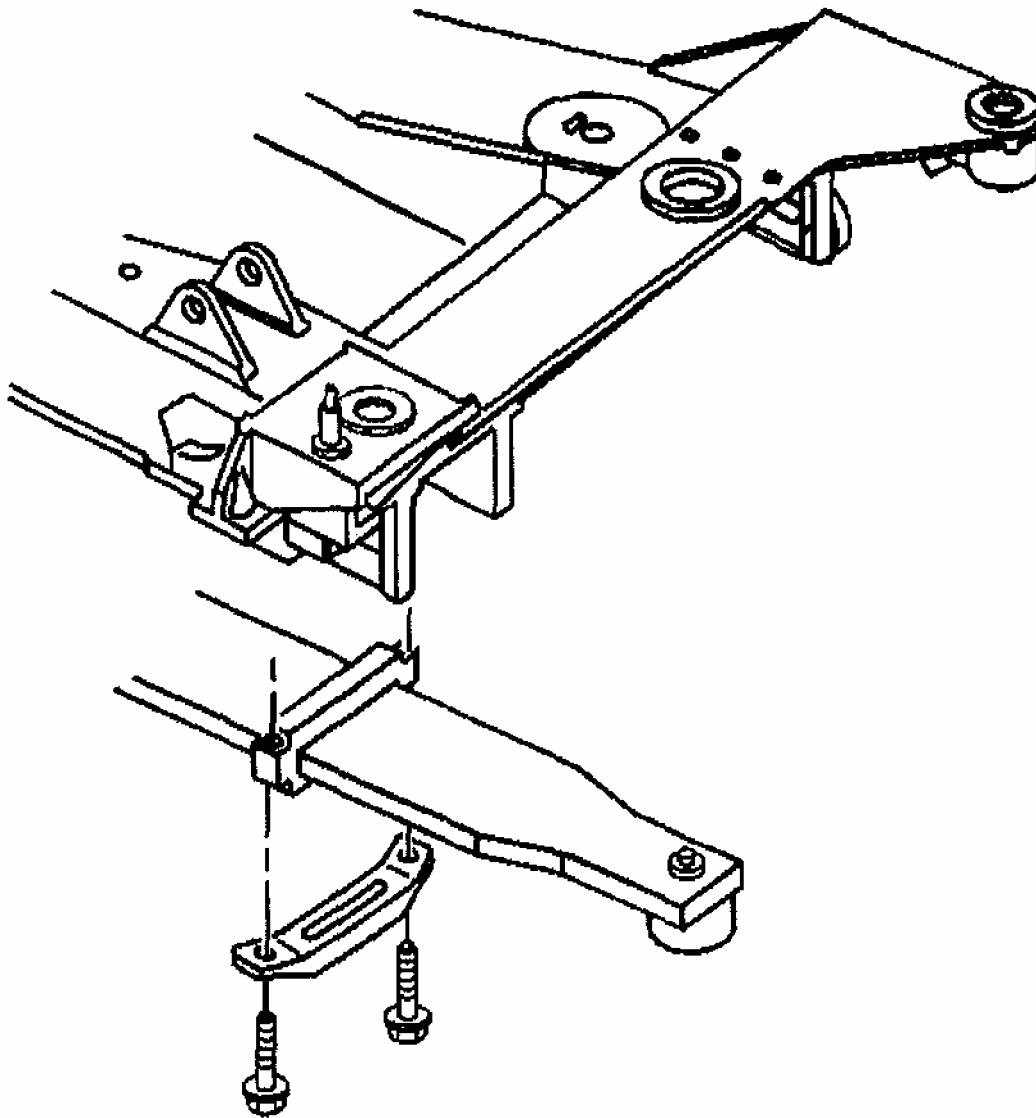




G01727785

**Fig. 34: Removing Lower Control Arm**  
**Courtesy of GENERAL MOTORS CORP.**

16. Remove the transverse spring bolts and retainers.
17. Discard the old transverse spring bolts
18. Remove the transverse spring from the vehicle.
19. Remove the transverse spring compressor from the transverse spring, if the spring is to be replaced.

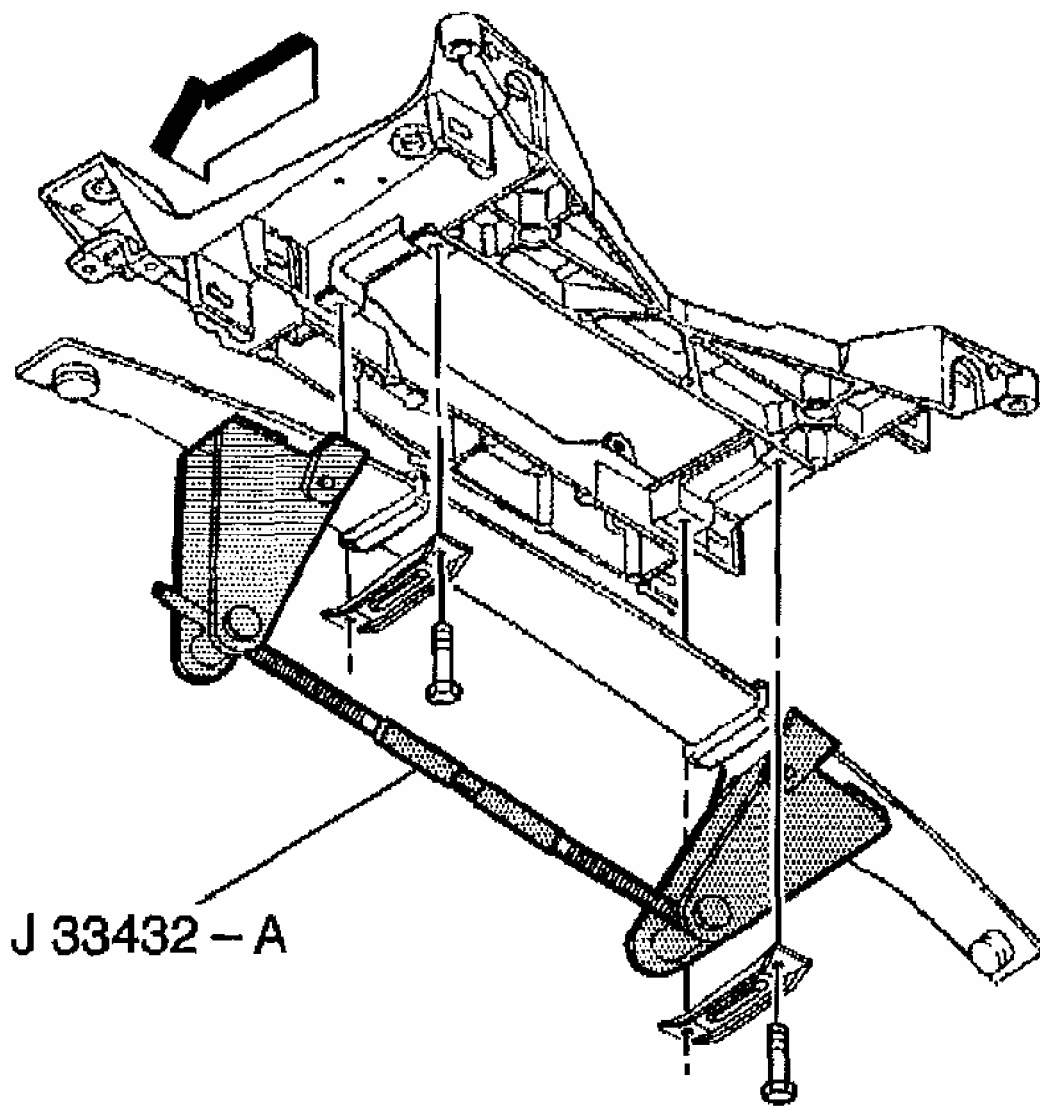


G01727786

**Fig. 35: Removing Transverse Spring, Bolts & Retainers**  
**Courtesy of GENERAL MOTORS CORP.**

**Installation Procedure**

1. Install the transverse spring compressor *J 33432-A* to the transverse spring.
2. Install the transverse spring to the crossmember.



G01727787

**Fig. 36: J 33432-A**

Courtesy of GENERAL MOTORS CORP.

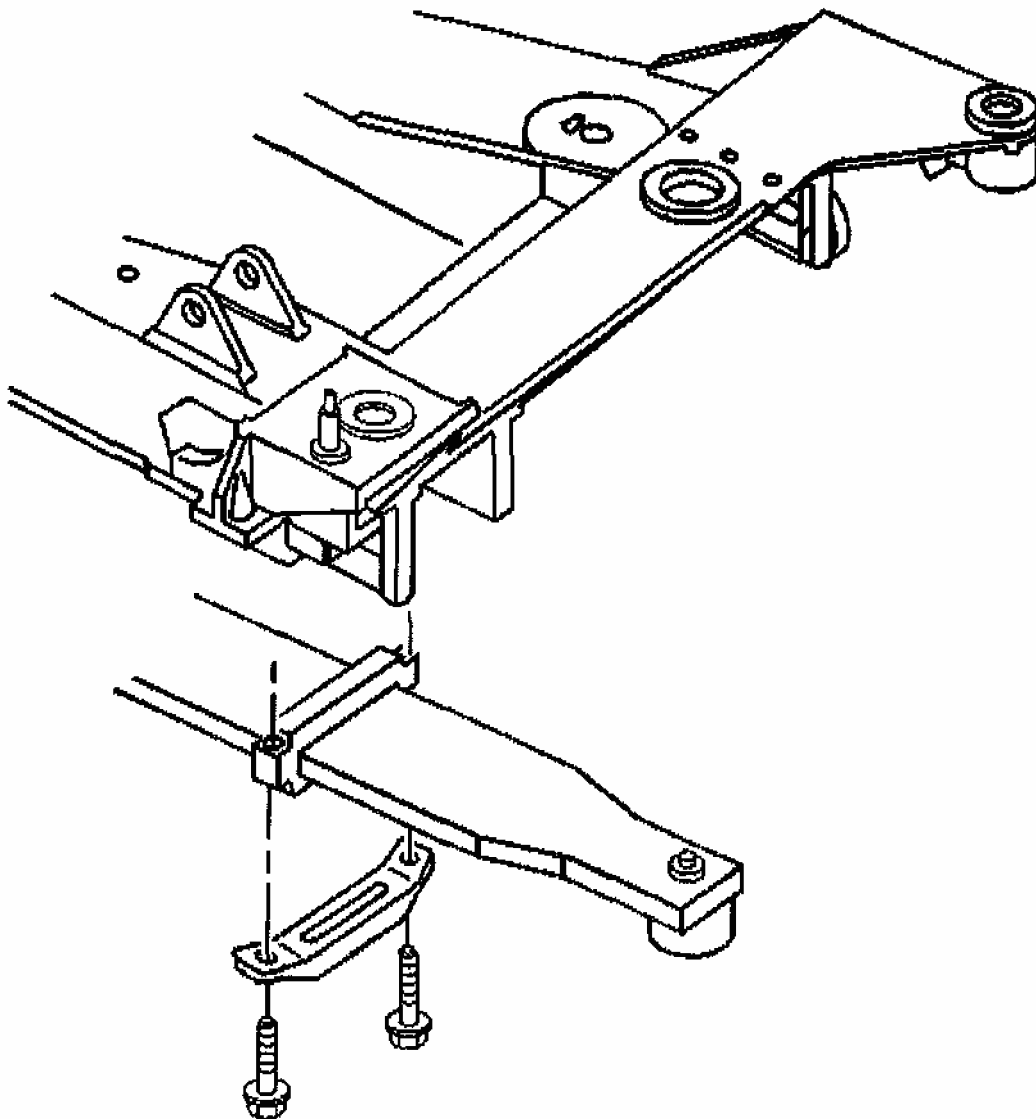
**NOTE:** Refer to FASTENER NOTICE in Cautions and Notices.

**NOTE:** Do not remove the transverse leaf spring compressor tool until after the shock absorber has been installed. The pad on the transverse leaf spring bolt could move out of position resulting in damage to the pad or a rattle in the front suspension.

3. Install the transverse spring retainers and bolts (Use New Bolts) to the crossmember.

**Tighten**

Tighten the transverse spring retainer bolts (Use New Bolts) to 62 N.m (46 lb ft).

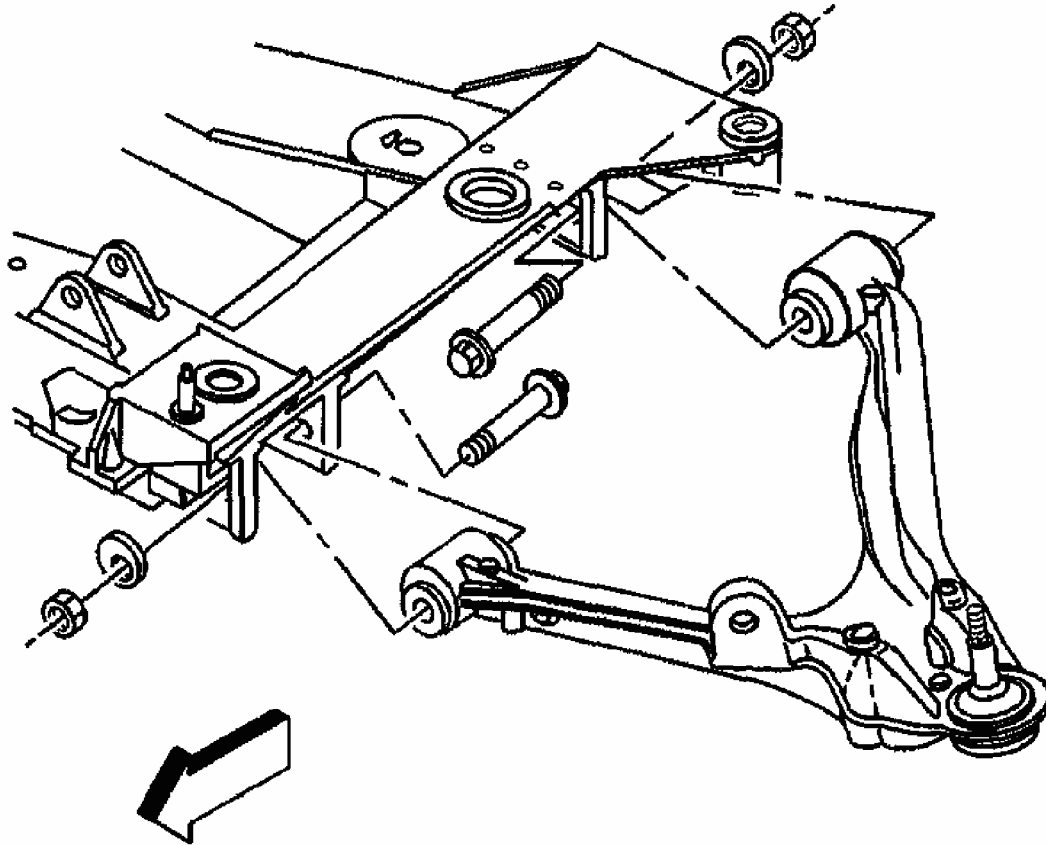


G01727788

**Fig. 37: Installing Transverse Spring, Retainers & Bolts**  
Courtesy of GENERAL MOTORS CORP.

4. Install the lower control arm to the front crossmember.
5. Install the cam bolts to the position that was marked during disassembly.

Due to a required wheel alignment, tighten the cam bolts but do not set to the final torque specification at this time.



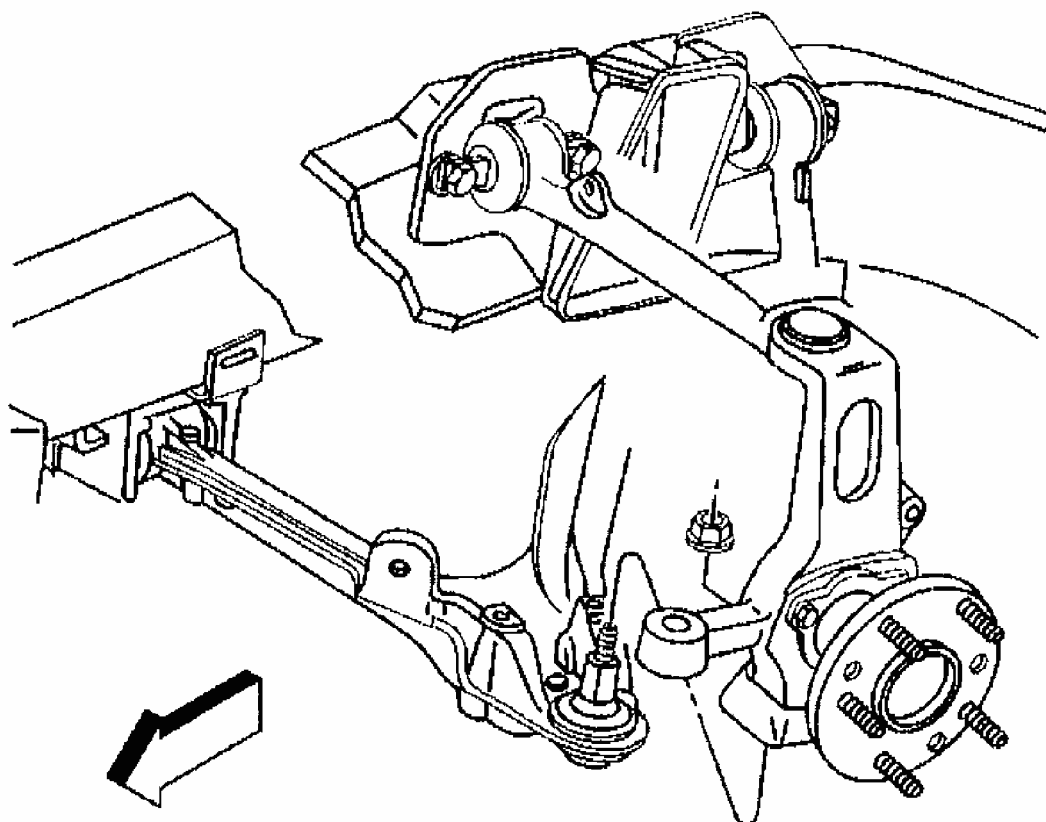
G01727789

**Fig. 38: Installing Lower Control Arm**  
**Courtesy of GENERAL MOTORS CORP.**

6. Install the lower control arm ball joint stud to the steering knuckle.

### **Tighten**

- 6.1. Use a new ball joint stud nut.
- 6.2. Tighten the lower control arm ball joint stud nut to 20 N.m (15 lb ft) to seat the ball joint stud.
- 6.3. Turn the ball joint stud nut an additional 210 degrees.
- 6.4. Check the ball joint stud nut for a minimum final torque of 55 N.m (41 lb ft).



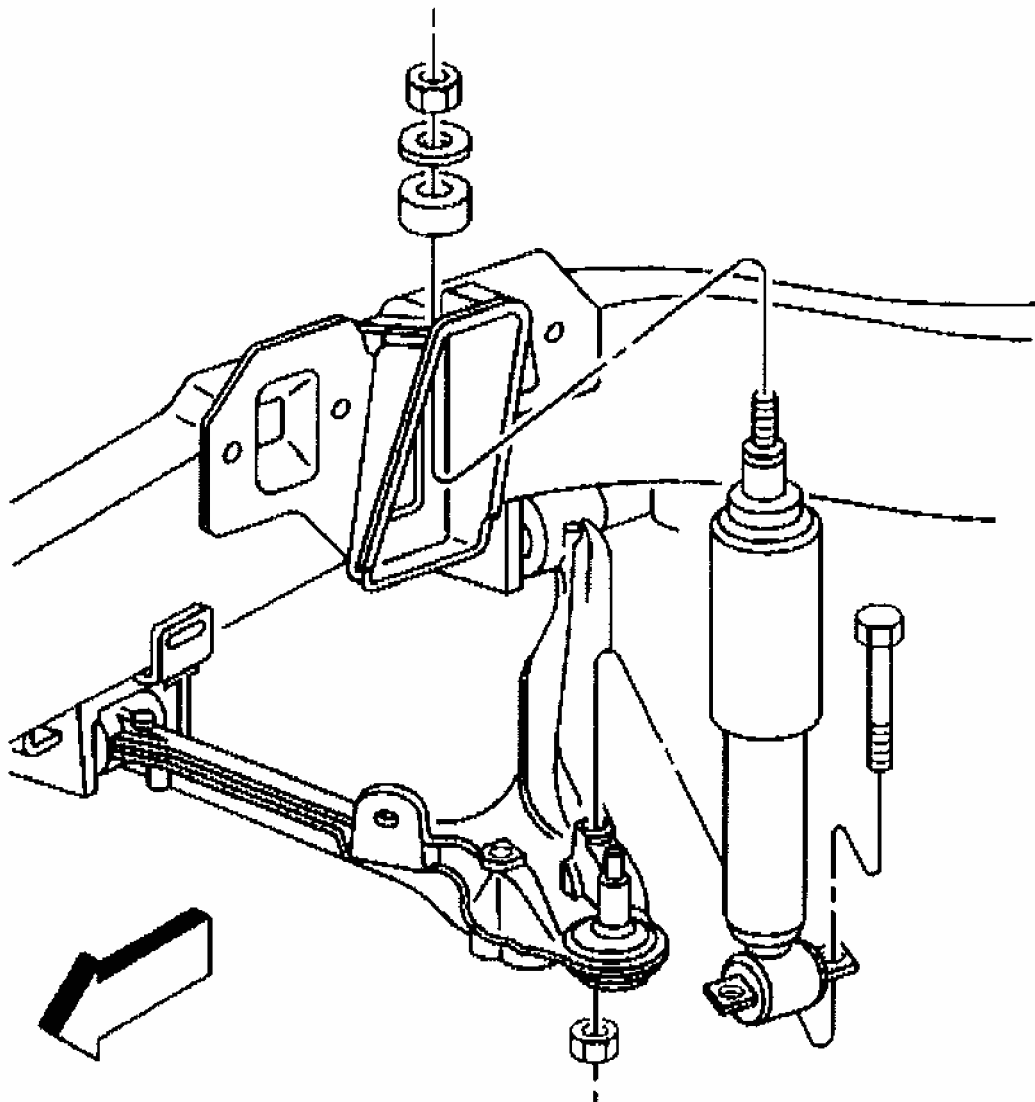
G01727790

**Fig. 39: Installing Lower Control Arm Ball Joint Stud Nut**  
**Courtesy of GENERAL MOTORS CORP.**

7. Support the lower control arm with a jackstand.
8. Install the shock absorber lower mounting bolts.

**Tighten**

Tighten the shock absorber lower mounting nuts to 28 N.m (21 lb ft).



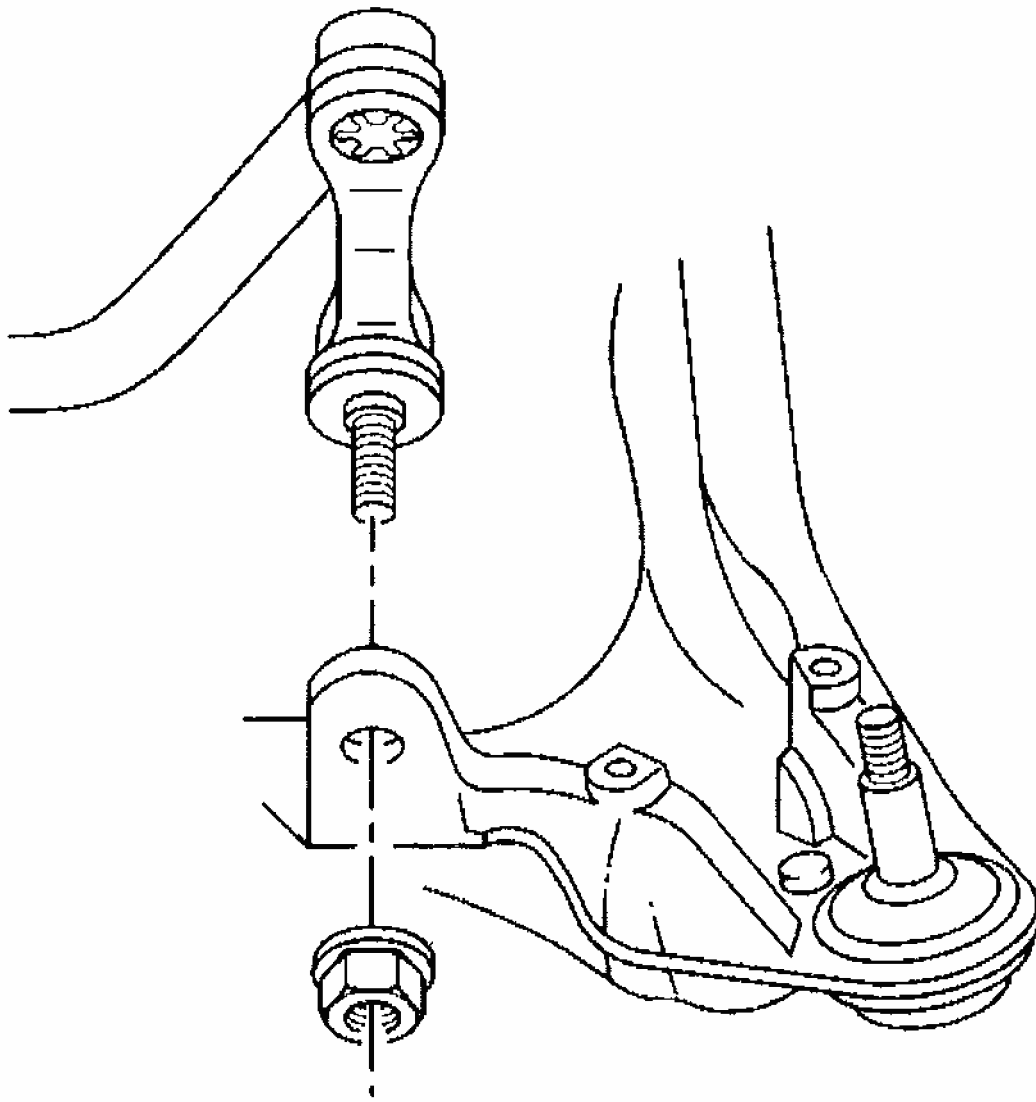
G01727791

**Fig. 40: Tightening Shock Absorber Lower Mounting Nuts**  
**Courtesy of GENERAL MOTORS CORP.**

9. Connect the stabilizer shaft link to the lower control arm.

**Tighten**

Tighten the stabilizer link nut to 72 N.m (53 lb ft).

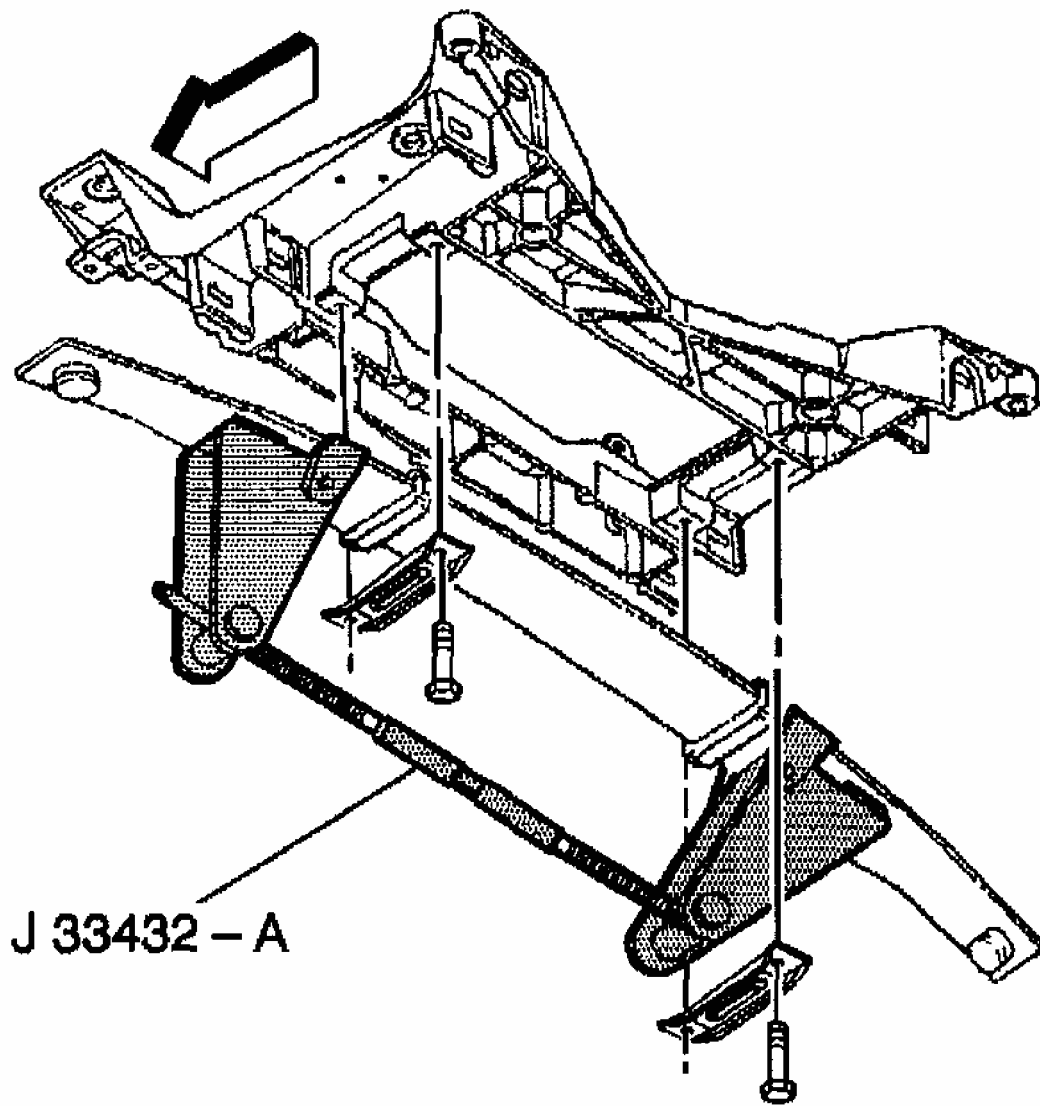


G01727792

**Fig. 41: Installing Stabilizer Shaft Link & Nut**  
**Courtesy of GENERAL MOTORS CORP.**

10. Remove the *J 33432-A* transverse spring compressor from the transverse spring.
11. Remove the jackstands from the lower control arms.
12. Install the tire and wheel assemblies. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
13. Adjust the front trim height. Refer to **TRIM HEIGHT INSPECTION PROCEDURE** in Suspension General Diagnosis.
14. Perform a front wheel alignment. Refer to **MEASURING WHEEL ALIGNMENT** in Wheel Alignment.





G01727793

**Fig. 42: J 33432-A**  
**Courtesy of GENERAL MOTORS CORP.**

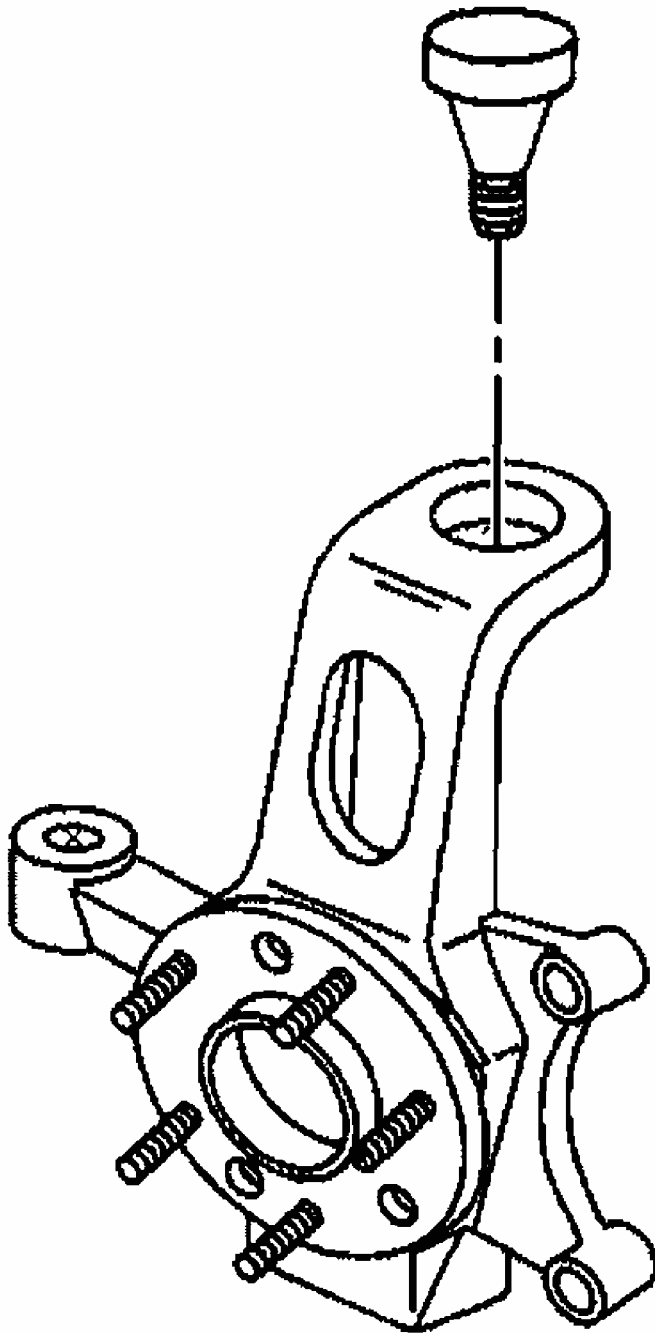
## UPPER BALL JOINT REPLACEMENT

### Tools Required

- *J 9519-E* Ball Joint Remover Kit
- *J 28685* Upper Ball Joint Installer
- *J 21474-5* Upper Ball Joint Remover

### Removal Procedure

1. Remove the steering knuckle from the vehicle. Refer to **Steering Knuckle Replacement** .
2. Remove the ball joint from the steering knuckle using *J 9519-E* and *J 21474-5* .

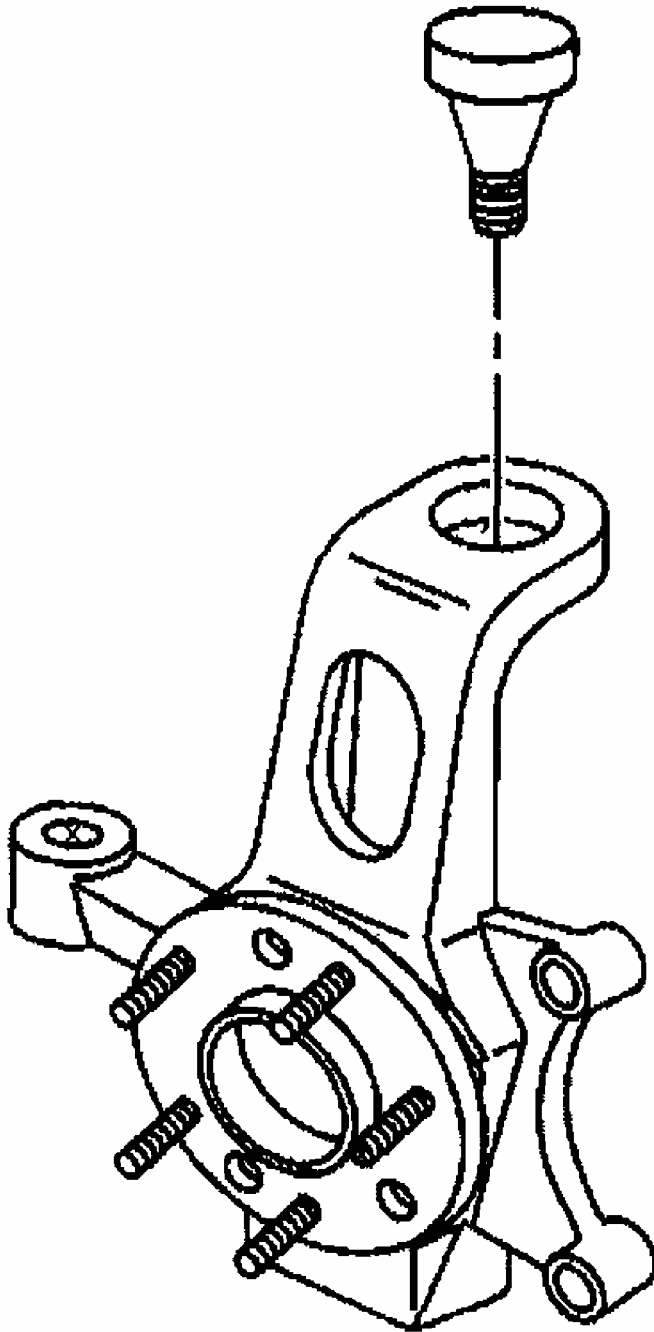


G01727794

**Fig. 43: Removing Ball Joint**  
Courtesy of GENERAL MOTORS CORP.

### Installation Procedure

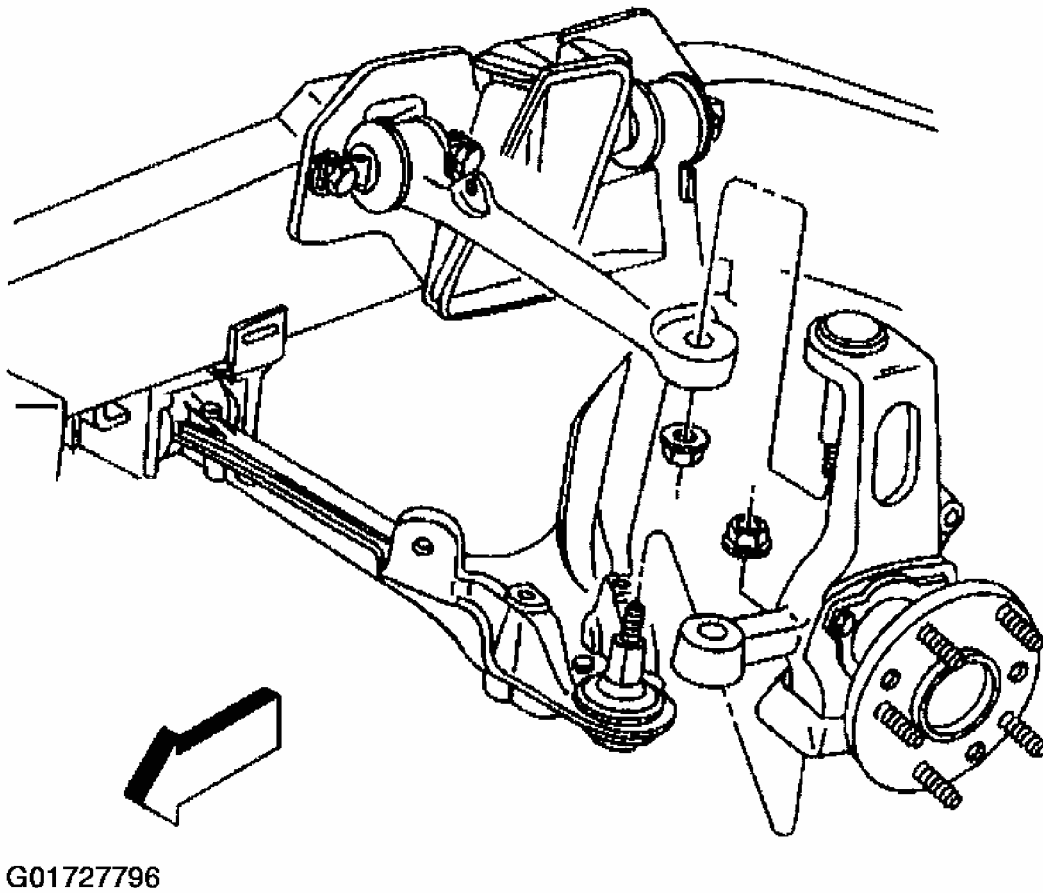
1. Install the ball joint stud into the steering knuckle using *J 9519-E* and *J 28685* .



G01727795

**Fig. 44: Installing Ball Joint**  
Courtesy of GENERAL MOTORS CORP.

2. Install the steering knuckle to the vehicle. Refer to Steering Knuckle Replacement .



**Fig. 45: Installing Steering Knuckle**  
Courtesy of GENERAL MOTORS CORP.

#### WHEEL BEARING/HUB REPLACEMENT - FRONT

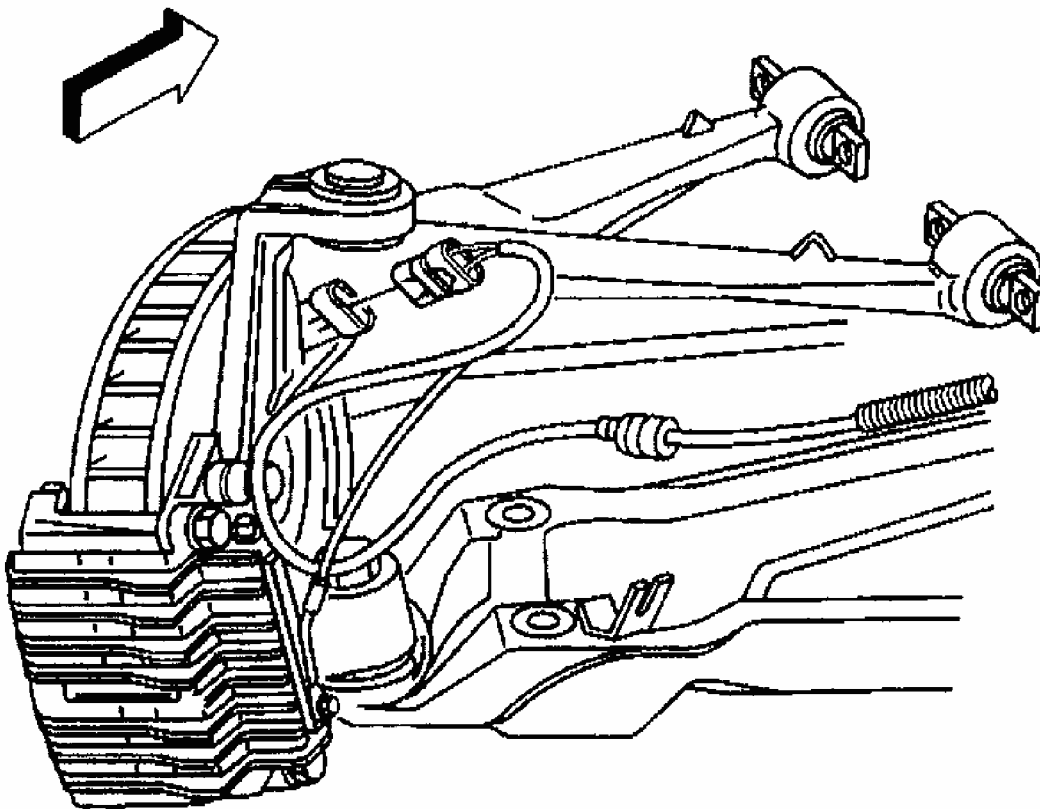
##### Tools Required

*J 42188* Ball Joint Separator

##### Removal Procedure

**NOTE:** The Front and Rear Wheel Hub/Wheel Speed Sensors are not interchangeable. When you are replacing a Wheel Hub/Wheel Speed Sensor be sure to use the correct Wheel Hub/Wheel Speed Sensor part number. Do not mount the Rear Wheel Hub/Wheel Speed Sensor in the front steering knuckle. The Rear Wheel Hub/Wheel Speed Sensor features a splined hole through the

center of the bearing which mates to the drive axle. The Rear Wheel Hub/Wheel Speed Sensor requires the support of the drive axle and the drive axle nut clamped joint to properly carry the vehicle loads. Mounting the Rear Wheel Hub/Wheel Speed Sensor in the front steering knuckle can cause bearing failure and possible damage to the vehicle.

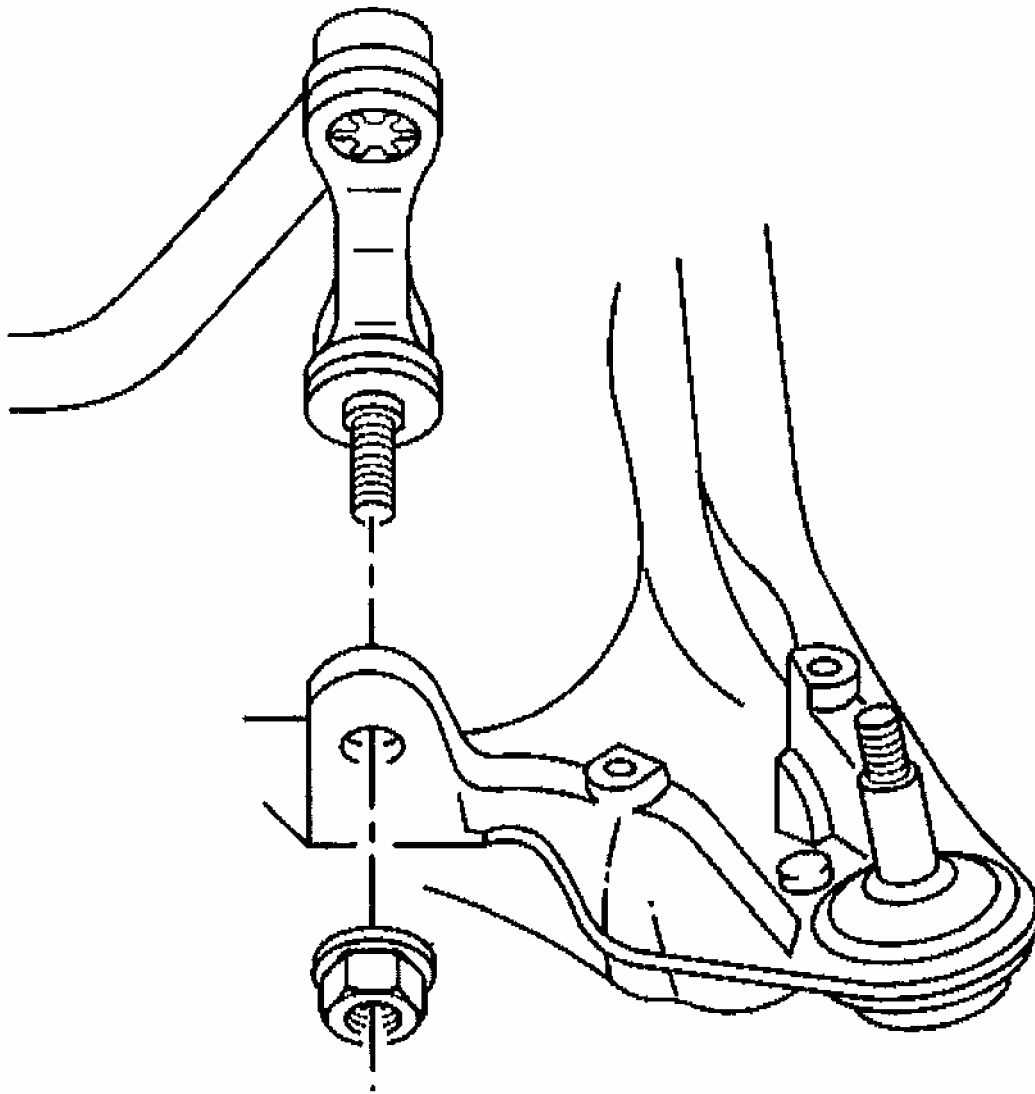


G01727797

**Fig. 46: Disconnecting Wheel Speed Sensor Electrical Connector**  
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 assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
3. Disconnect the wheel speed sensor electrical connector.
4. Remove the brake caliper and rotor. Refer to **FRONT BRAKE ROTOR** and **FRONT BRAKE CALIPER** in Disc Brakes.
5. Remove the stabilizer shaft link from the lower control arm.

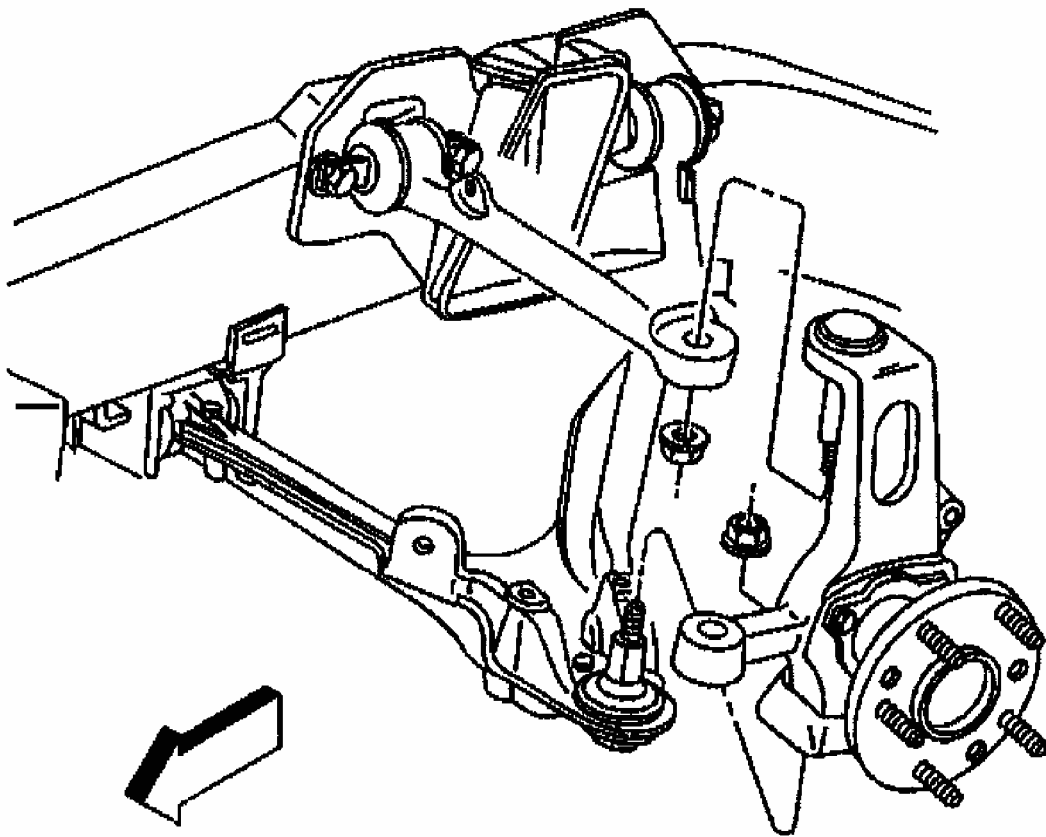
6. Support the lower control arm using a jackstand.



G01727798

**Fig. 47: Removing Stabilizer Shaft Link**  
Courtesy of GENERAL MOTORS CORP.

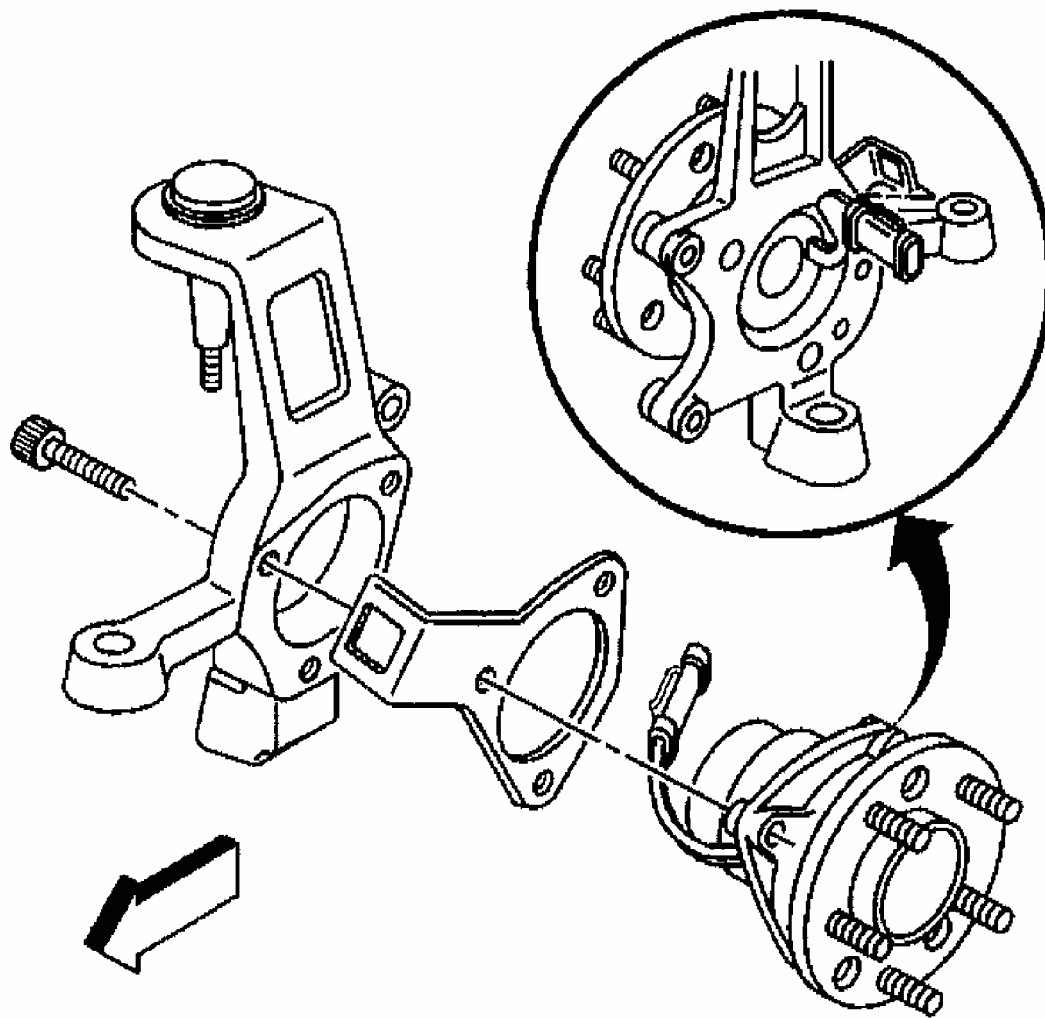
7. Separate the outer tie rod ball stud from the steering knuckle using *J 42188* . Refer to **OUTER TIE ROD** .
8. Separate the lower ball joint stud from the steering knuckle using *J 42188* . Refer to **Lower Control Arm Replacement** .



G01727799

**Fig. 48: Removing Steering Knuckle**  
**Courtesy of GENERAL MOTORS CORP.**

9. Remove the wheel hub mounting bolts.
10. Remove the hub and bearing assembly from the steering knuckle.



G01727800

**Fig. 49: Removing Hub & Bearing Assembly**  
Courtesy of GENERAL MOTORS CORP.

**Installation Procedure**

1. Install the hub and bearing assembly into the steering knuckle.

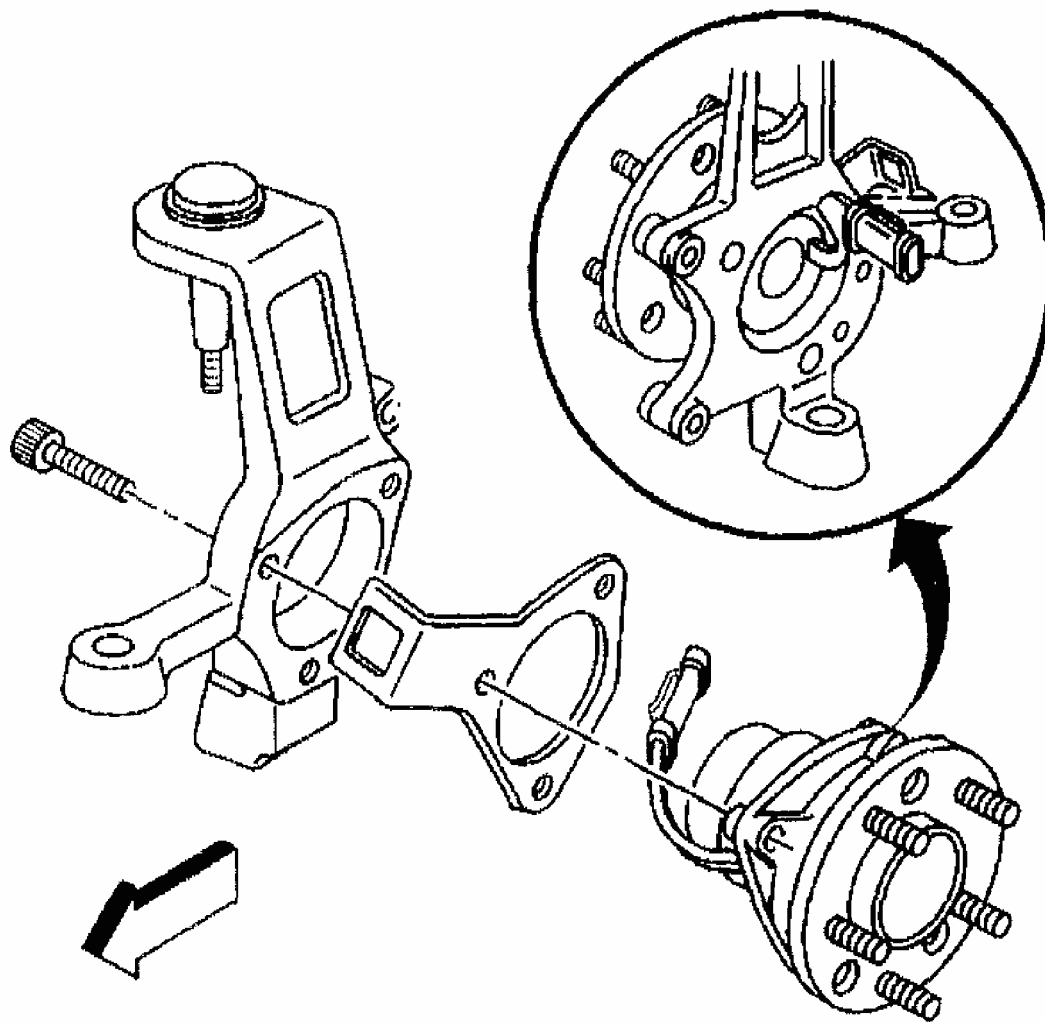
**NOTE:** Refer to **FASTENER NOTICE** in Cautions and Notices.

2. Install the wheel hub mounting bolts.

**Tighten**

Tighten the wheel hub mounting bolts to 130 N.m (96 lb ft).

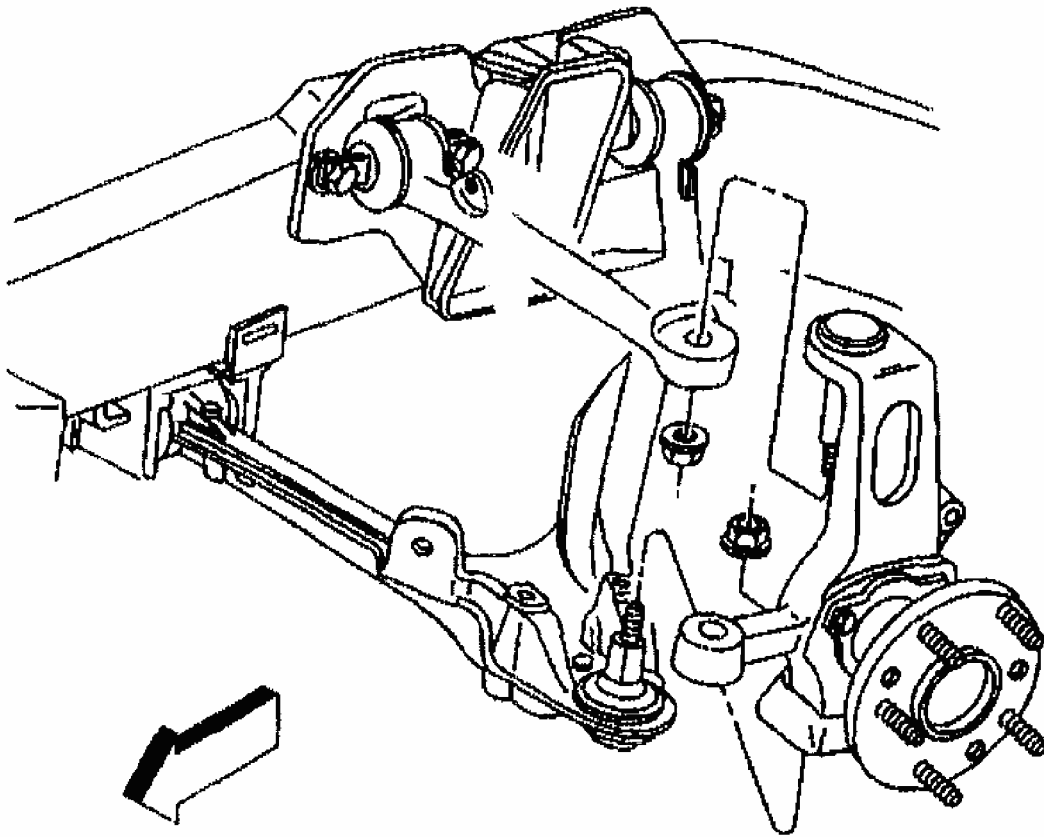




G01727801

**Fig. 50: Installing Hub & Bearing Assembly**  
**Courtesy of GENERAL MOTORS CORP.**

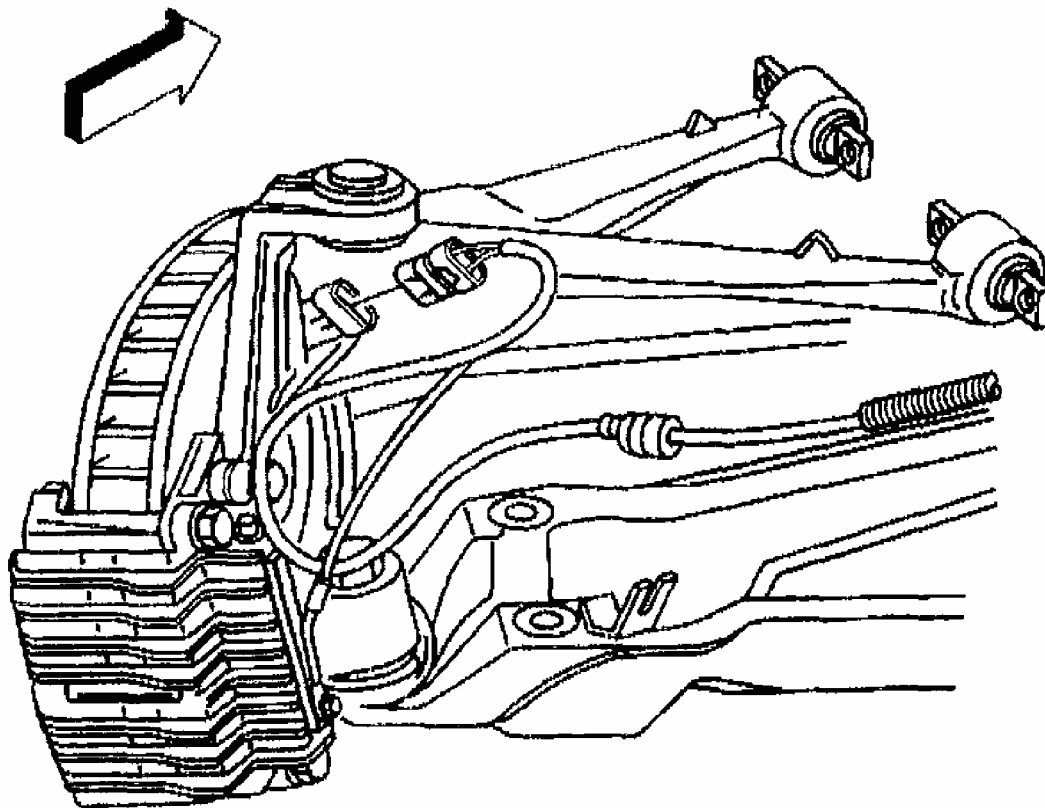
3. Install the lower control arm ball stud to the steering knuckle. Refer to **Lower Control Arm Replacement**.
4. Remove the jackstand.
5. Install the steering linkage outer tie rod ball stud to the steering knuckle. Refer to **OUTER TIE ROD** in Power Steering Systems.



G01727802

**Fig. 51: Installing Steering Knuckle**  
**Courtesy of GENERAL MOTORS CORP.**

6. Connect the wheel speed sensor electrical connector.
7. Install the stabilizer shaft link to the lower control arm. Refer to **Stabilizer Shaft Link Replacement**.
8. Install the brake rotor and caliper. Refer to **FRONT BRAKE ROTOR** and **FRONT BRAKE CALIPER** in Disc Brakes.
9. Install the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
10. Lower the vehicle.
11. Check the front wheel toe and adjust as necessary. Refer to **MEASURING WHEEL ALIGNMENT** in Wheel Alignment.



G01727803

**Fig. 52: Installing Wheel Speed Sensor Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

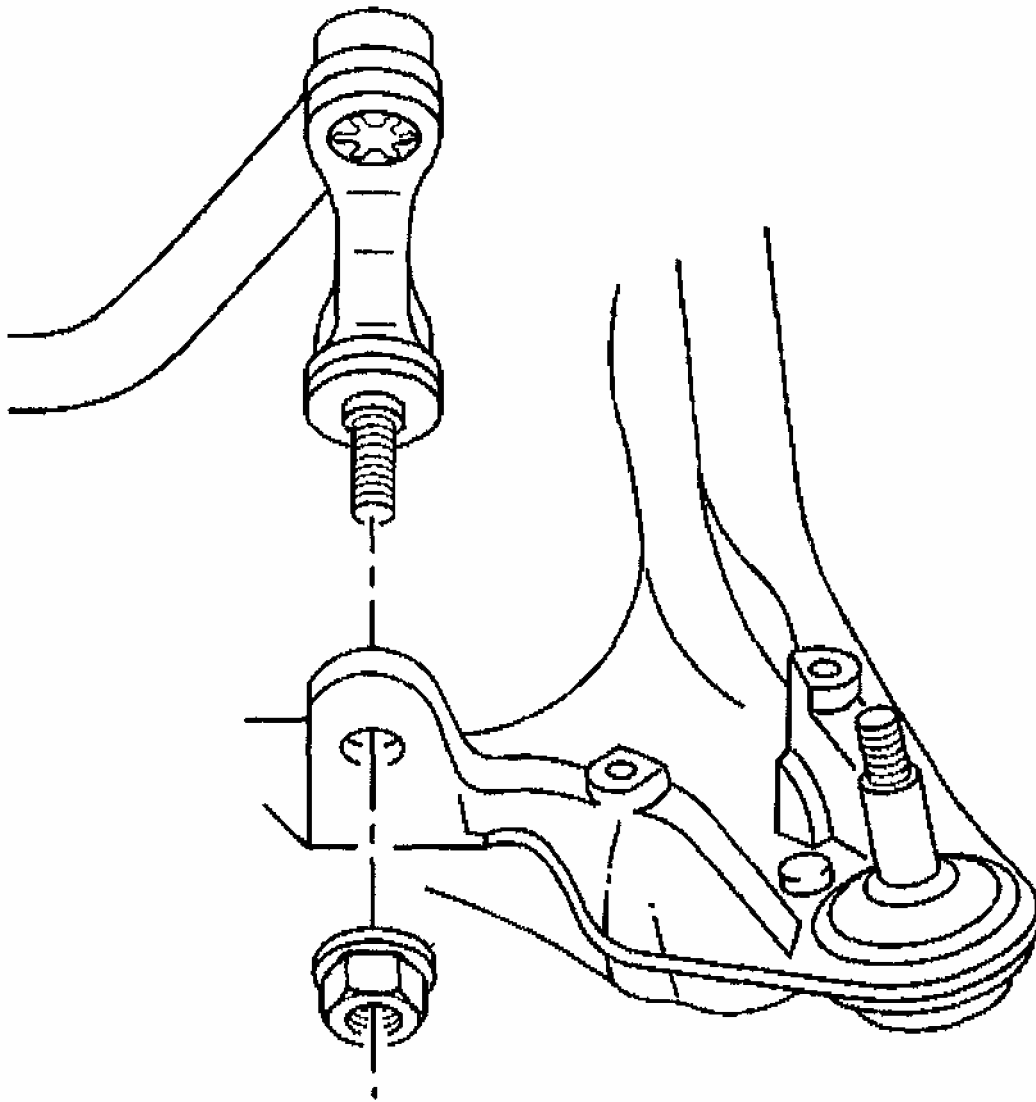
## STEERING KNUCKLE REPLACEMENT

### Tools Required

*J 42188* Ball Joint Separator

### Removal Procedure

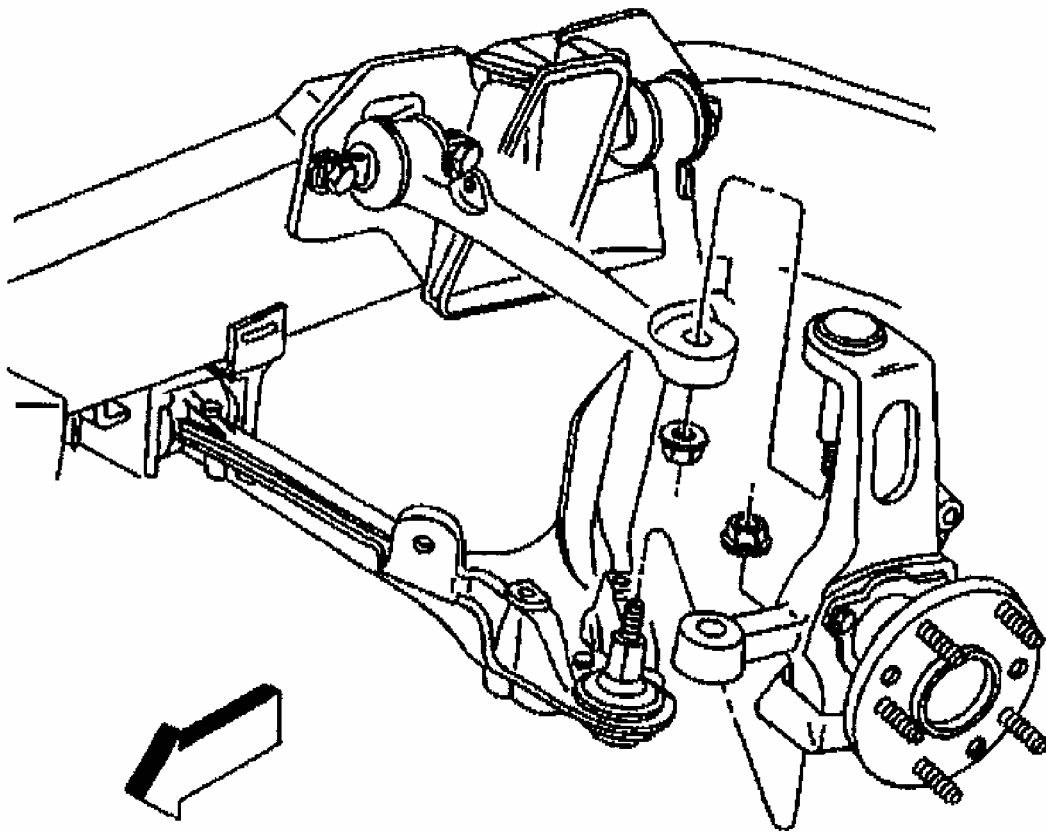
1. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE** in General Information.
2. Remove the brake caliper and rotor. Refer to **FRONT BRAKE ROTOR** and **FRONT BRAKE CALIPER** in Disc Brakes.



G01727804

**Fig. 53: Removing Stabilizer Shaft Link**  
**Courtesy of GENERAL MOTORS CORP.**

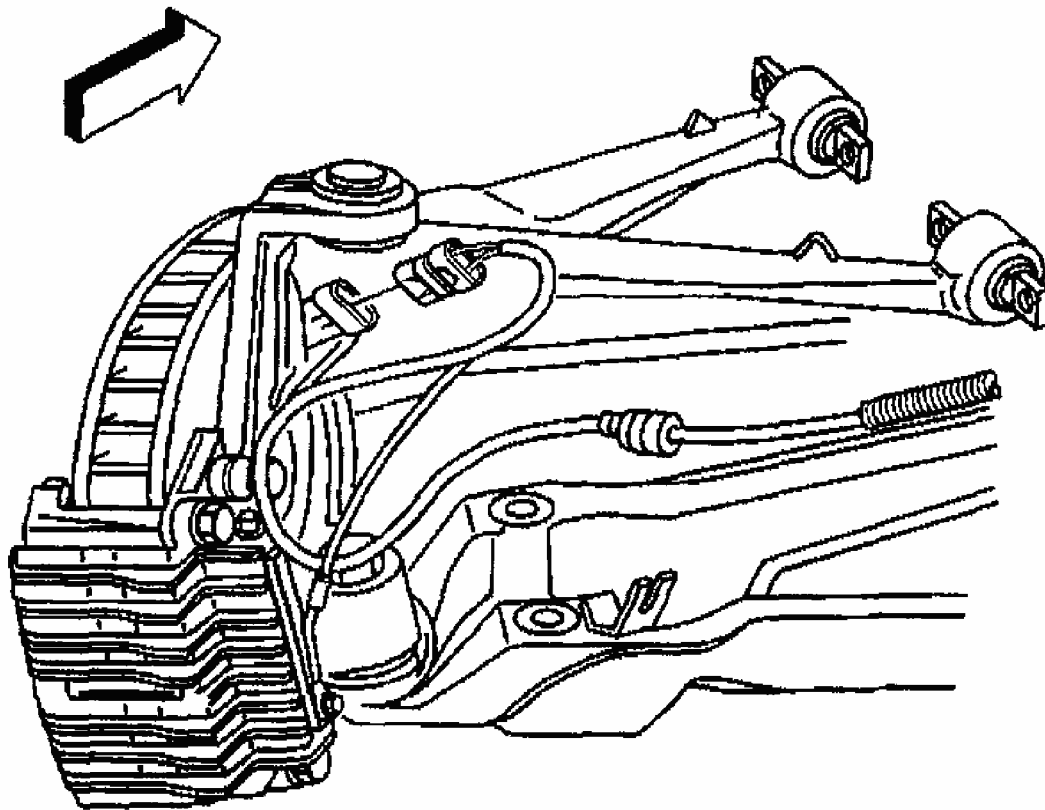
3. Remove the stabilizer shaft link from the lower control arm.



G01727805

**Fig. 54: Removing Steering Linkage Outer Tie Rod Ball Stud Nut**  
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the wheel speed sensor electrical connector.
5. Support the lower control arm using a jackstand.



G01727806

**Fig. 55: Disconnecting Wheel Speed Sensor Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

6. Separate the steering linkage outer tie rod ball stud from the steering knuckle using *J 42188* . Refer to **OUTER TIE ROD** in Power Steering Systems.
7. Separate and remove the upper control arm ball joint stud from the steering knuckle using *J 42188* . Refer to **Upper Control Arm Replacement** .
8. Using *J 42188* separate and remove the lower ball joint stud from the steering knuckle. Refer to **Lower Control Arm Replacement** .
9. Remove the steering knuckle from the vehicle.

#### Installation Procedure

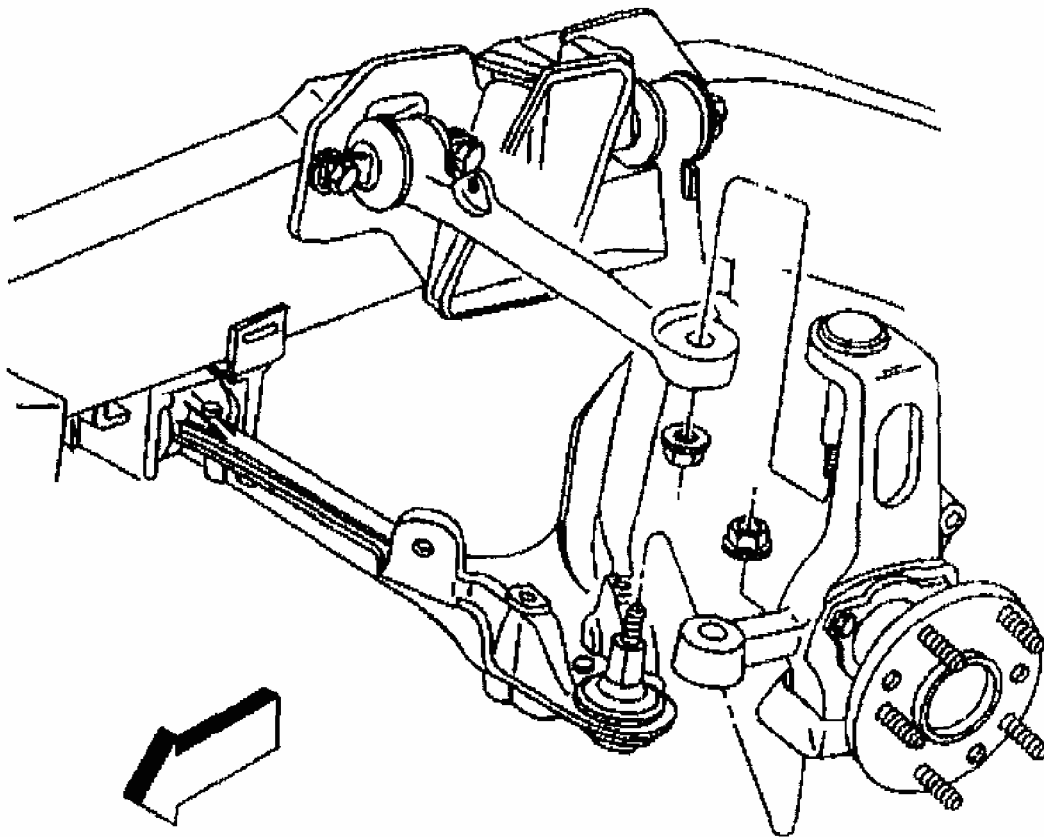
1. Install steering knuckle to the upper control arm and the lower control arm. Refer to **Upper Control Arm Replacement** and **Lower Control Arm Replacement** .
2. Remove the jackstand.
3. Install the steering linkage outer tie rod ball stud to the steering knuckle. Refer to **OUTER TIE ROD** in Power Steering Systems.

**NOTE:** Refer to **FASTENER NOTICE** in Cautions and Notices.

4. Install the stabilizer shaft link to the lower control arm.

**Tighten**

Tighten the stabilizer shaft link nut to 72 N.m (53 lb ft).

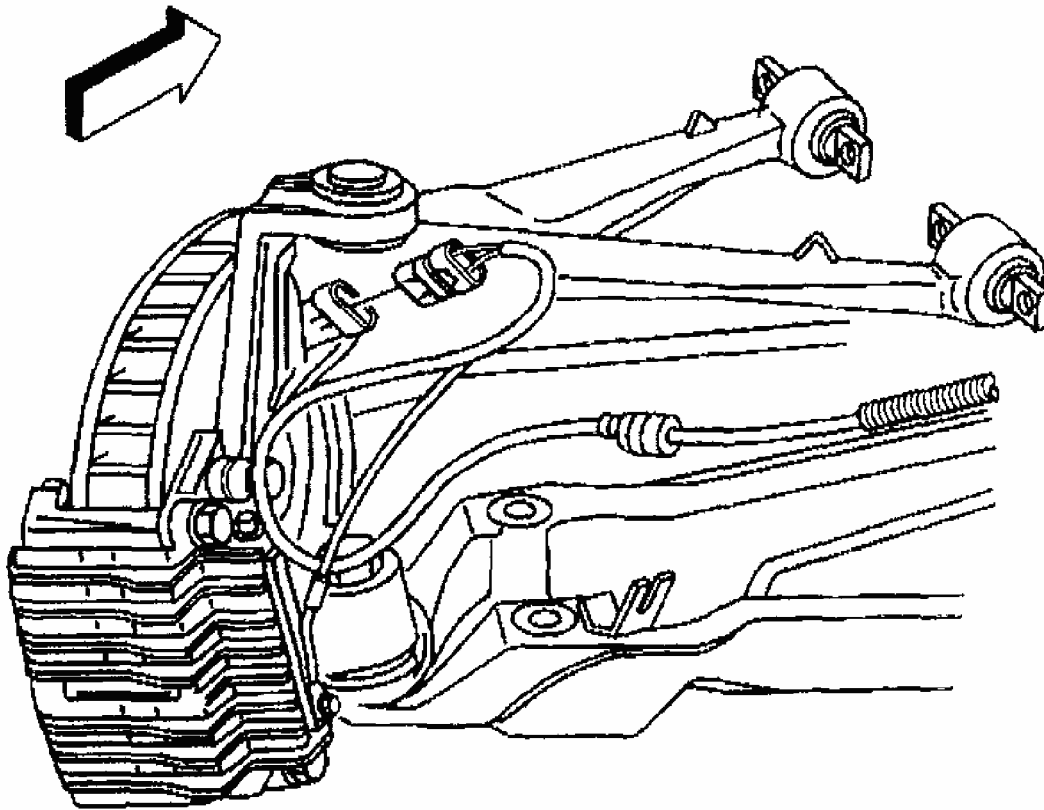


G01727807

**Fig. 56: Installing Steering Knuckle**  
Courtesy of GENERAL MOTORS CORP.

5. Connect the wheel speed sensor electrical connector.
6. Install the brake rotor and caliper. Refer to **FRONT BRAKE ROTOR** and **FRONT BRAKE CALIPER** in Disc Brakes.
7. Install the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
8. Lower the vehicle.

9. Check the front wheel toe and adjust as necessary. Refer to **HYDRAULIC BRAKE SYSTEM DIAGNOSTIC STARTING PO** and **MEASURING WHEEL ALIGNMENT** in Wheel Alignment.



G01727808

**Fig. 57: Connecting Wheel Speed Sensor Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

#### UPPER CONTROL ARM REPLACEMENT

##### Tools Required

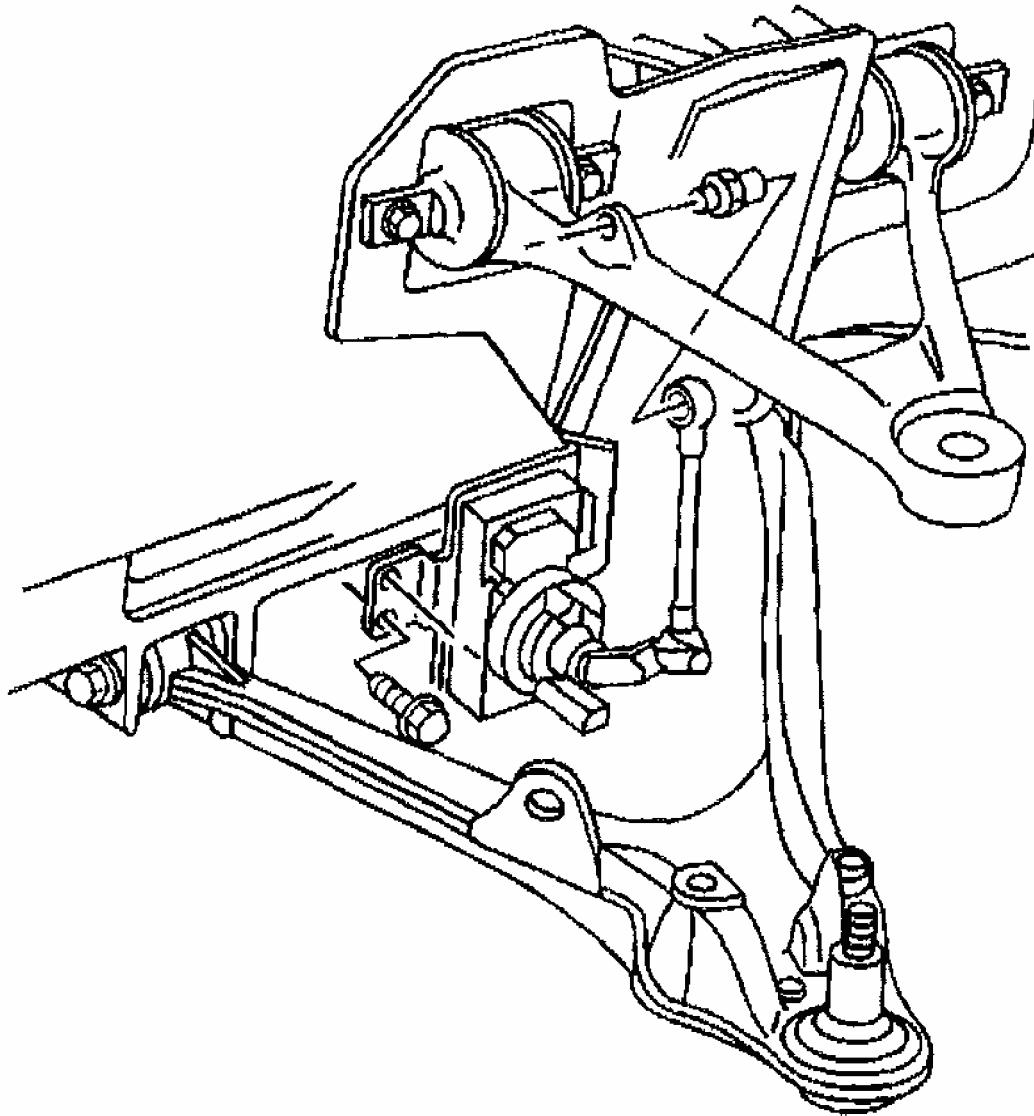
*J 42188* Ball Joint Separator

##### Removal Procedure

1. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE** in General Information.
2. Remove the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.



3. Disconnect the real time damping (RTD) sensor link.
4. Support the lower control arm with a jackstand.

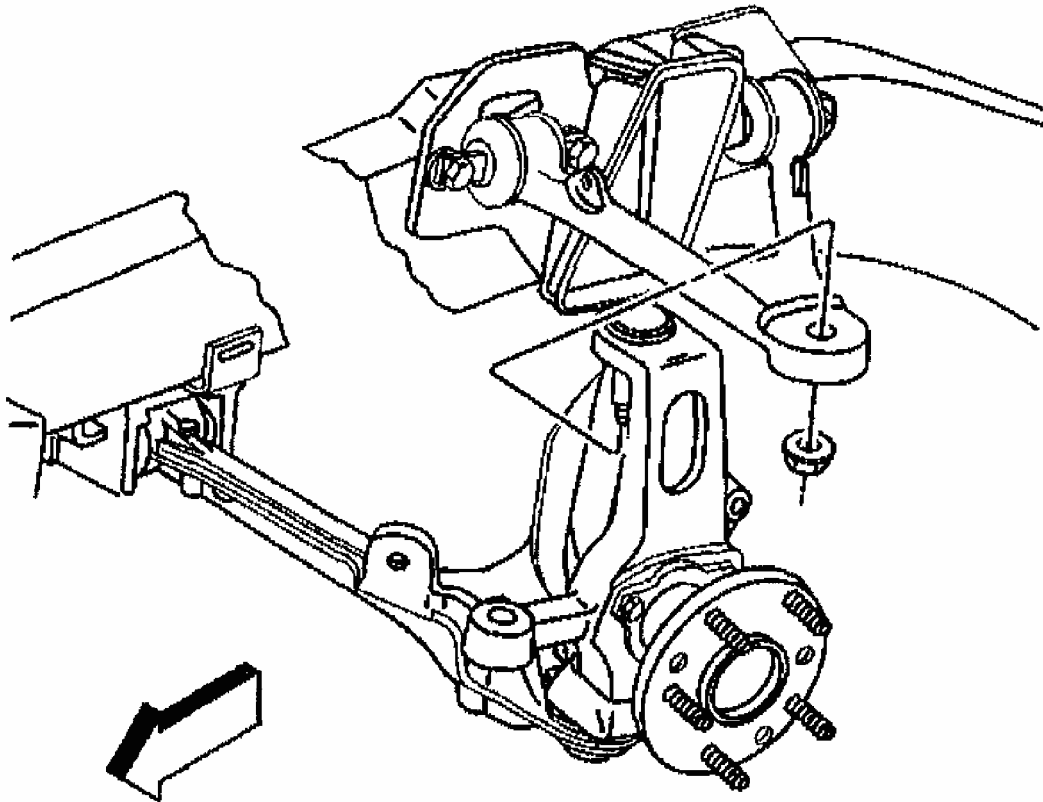


G01727809

**Fig. 58: Removing Real Time Damping (RTD) Sensor Link**  
**Courtesy of GENERAL MOTORS CORP.**

5. Loosen the ball joint stud nut but do not remove the nut.
6. Using tool *J 42188* separate the upper ball joint stud from the upper control arm.
7. Remove tool *J 42188* from the ball joint stud.

Remove the ball joint stud nut from the ball joint stud.

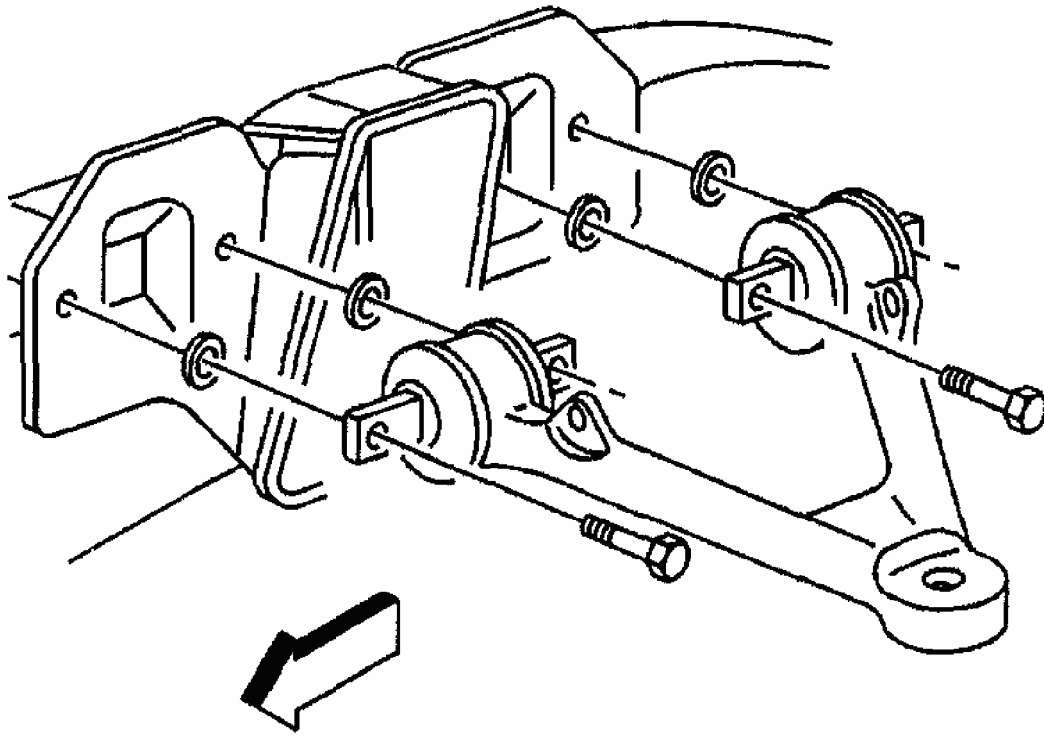


G01727810

**Fig. 59: Removing Ball Joint Stud Nut**  
Courtesy of GENERAL MOTORS CORP.

**Important:** The upper control arm shims will have an effect on the camber and the caster. Make sure to use an equal thickness of shims on both sides of each individual upper control arm bushing.

8. Remove the upper control arm bolts and shims. Note the number and position of the shims for installation purposes.
9. Remove the ball joint stud nut from the vehicle.



G01727811

**Fig. 60: Removing Upper Control Arm, Bolts & Shims**  
Courtesy of GENERAL MOTORS CORP.

**Installation Procedure**

1. Install the upper control arm to the vehicle.

**Important:** The upper control arm shims will have an effect on the camber and the caster. Make sure to use an equal thickness of shims on both sides of each individual upper control arm bushing.

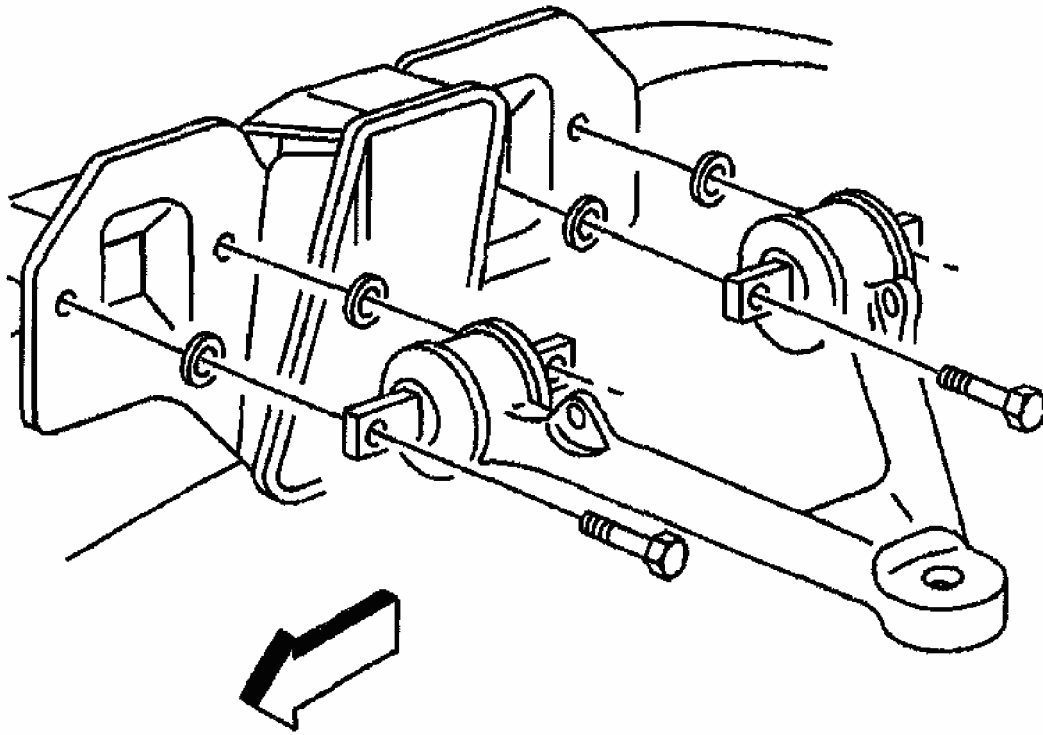
2. Install the upper control arm shims.

**NOTE:** Refer to **FASTENER NOTICE** in Cautions and Notices.

3. Install the upper control arm mounting bolts to the upper control arm and frame rail.

**Tighten**

Tighten the upper control arm mounting bolts to 65 N.m (48 lb ft).



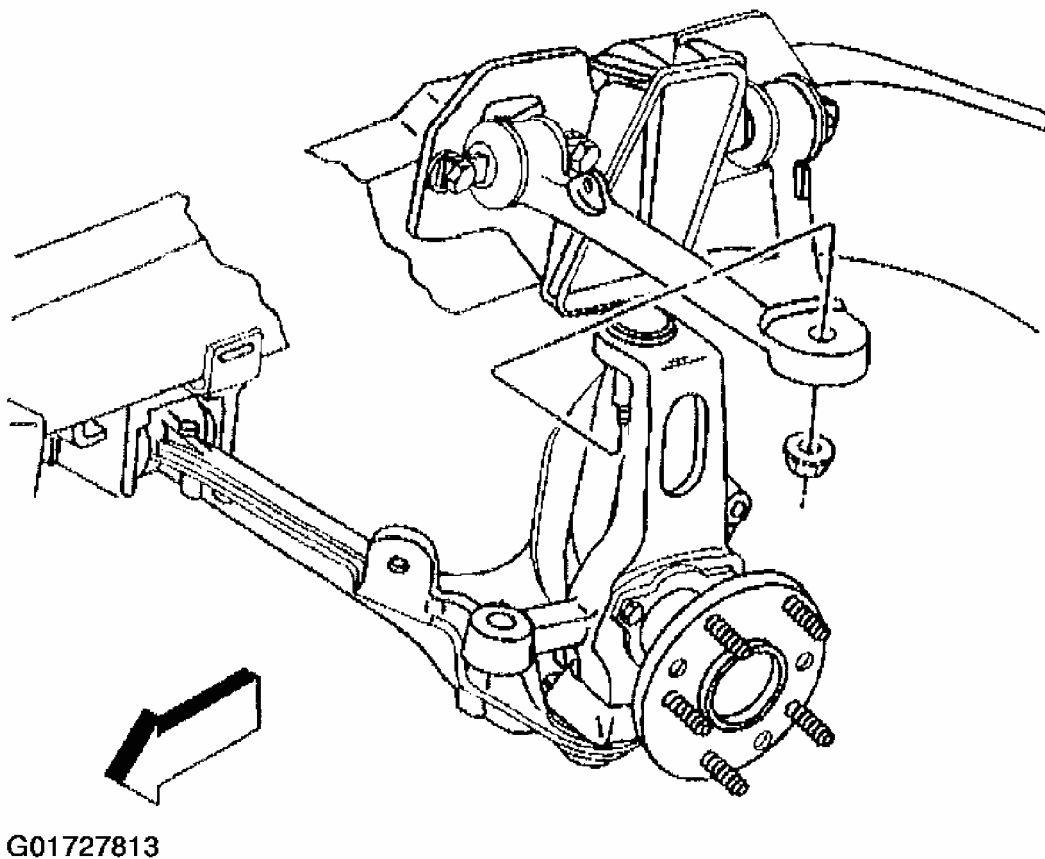
G01727812

**Fig. 61: Installing Upper Control Arm, Bolts & Shims**  
**Courtesy of GENERAL MOTORS CORP.**

4. Install the upper ball joint stud into the upper control arm. It will be necessary to use an Allen wrench to keep the ball joint stud from spinning while tightening the ball joint stud nut.

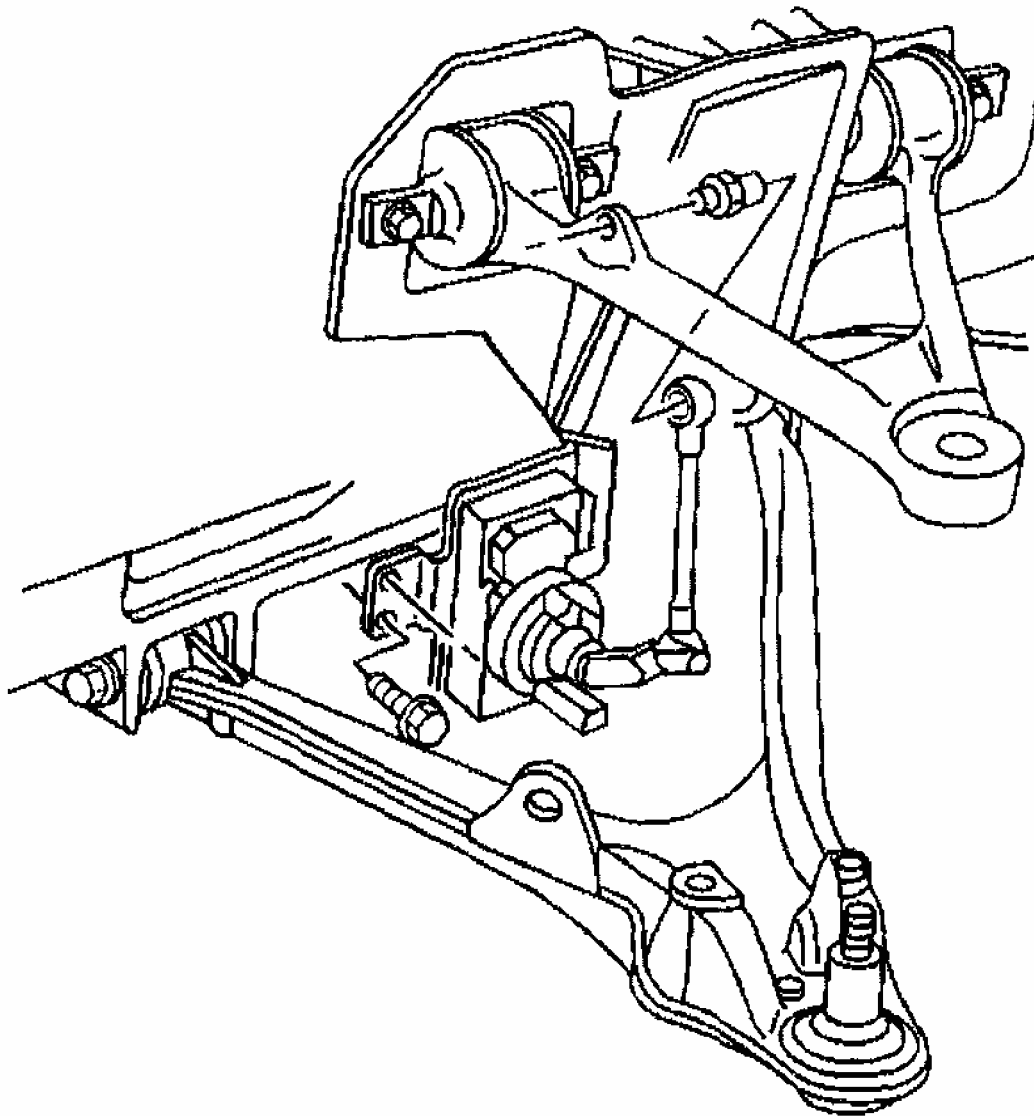
#### **Tighten**

- 4.1. Tighten the upper control arm ball joint stud nut to 20 N.m (15 lb ft) to seat the ball joint stud.
- 4.2. Turn the ball joint nut an additional 250 degrees.
- 4.3. Check the ball joint nut for a minimum final torque of 55 N.m (41 lb ft).



**Fig. 62: Installing Upper Control Arm Ball Joint Stud Nut**  
**Courtesy of GENERAL MOTORS CORP.**

5. Connect the real time damping (RTD) sensor link.
6. Remove the jackstand.
7. Install the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
8. Lower the vehicle.



G01727814

**Fig. 63: Installing Real Time Damping (RTD) Sensor Link**  
**Courtesy of GENERAL MOTORS CORP.**

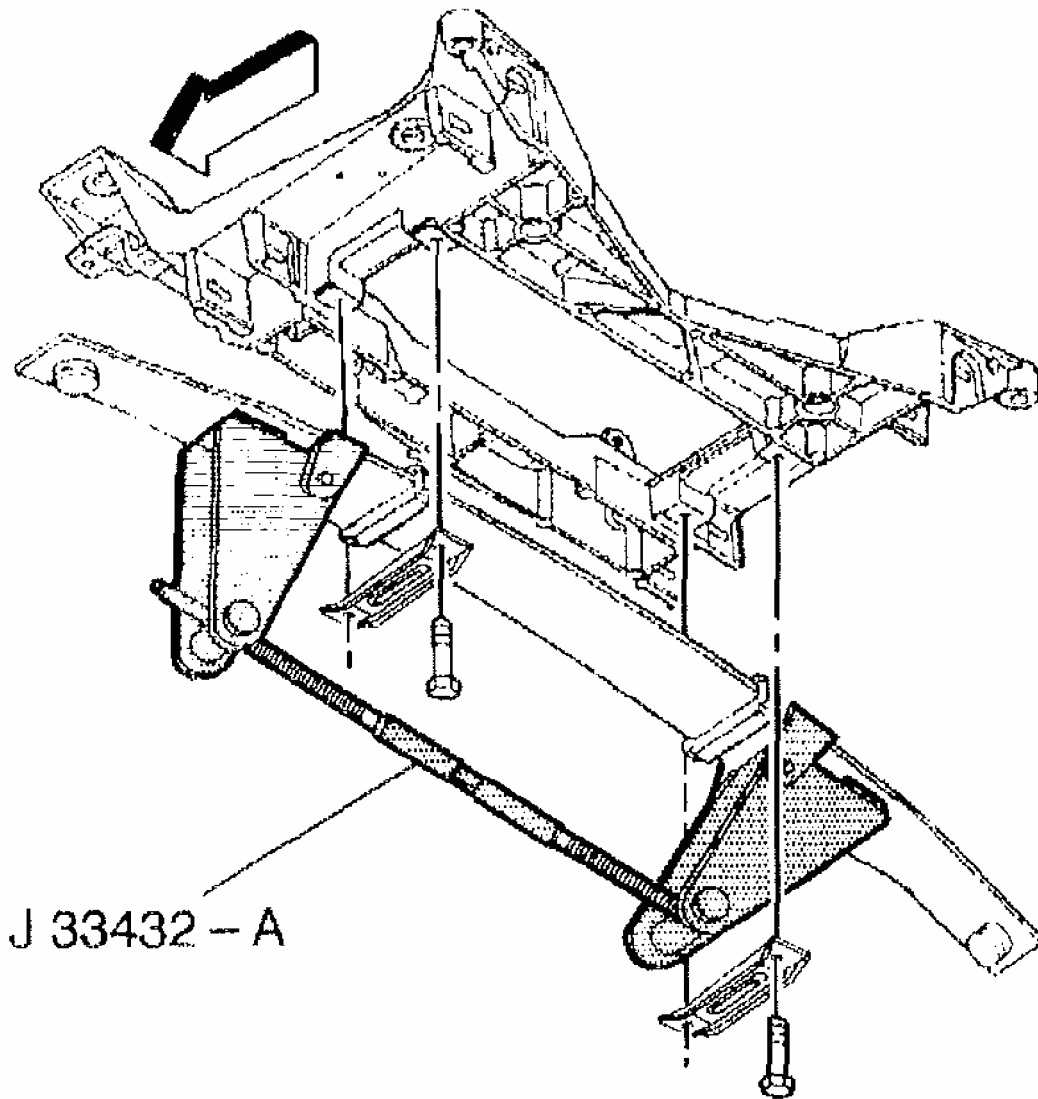
#### **LOWER CONTROL ARM REPLACEMENT**

##### **Tools Required**

- *J 42188* Ball Joint Separator
- *J 33432-A* Transverse Spring Remover

##### **Removal Procedure**

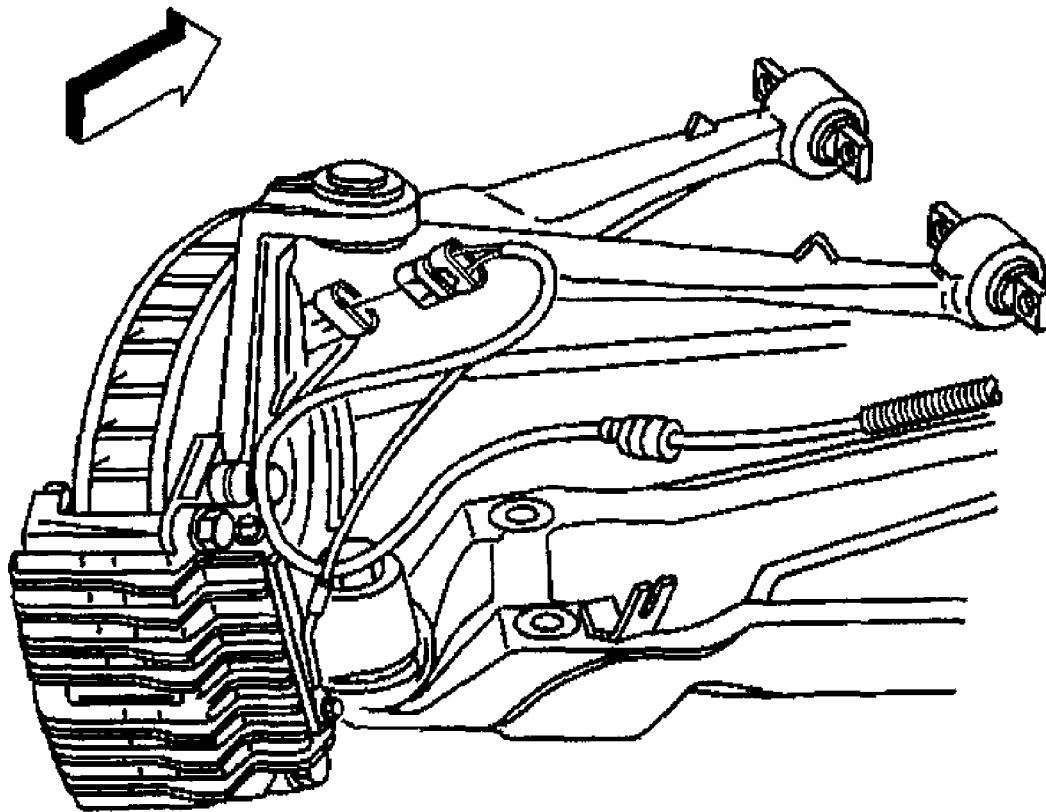
1. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE** in General Information.
2. Remove the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
3. Using the *J 33432-A* , remove the front transverse spring. Refer to **Front Transverse Spring Replacement** .



G01727815

**Fig. 64: Removing Front Transverse Spring**  
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the electrical connector from the wheel speed sensor.

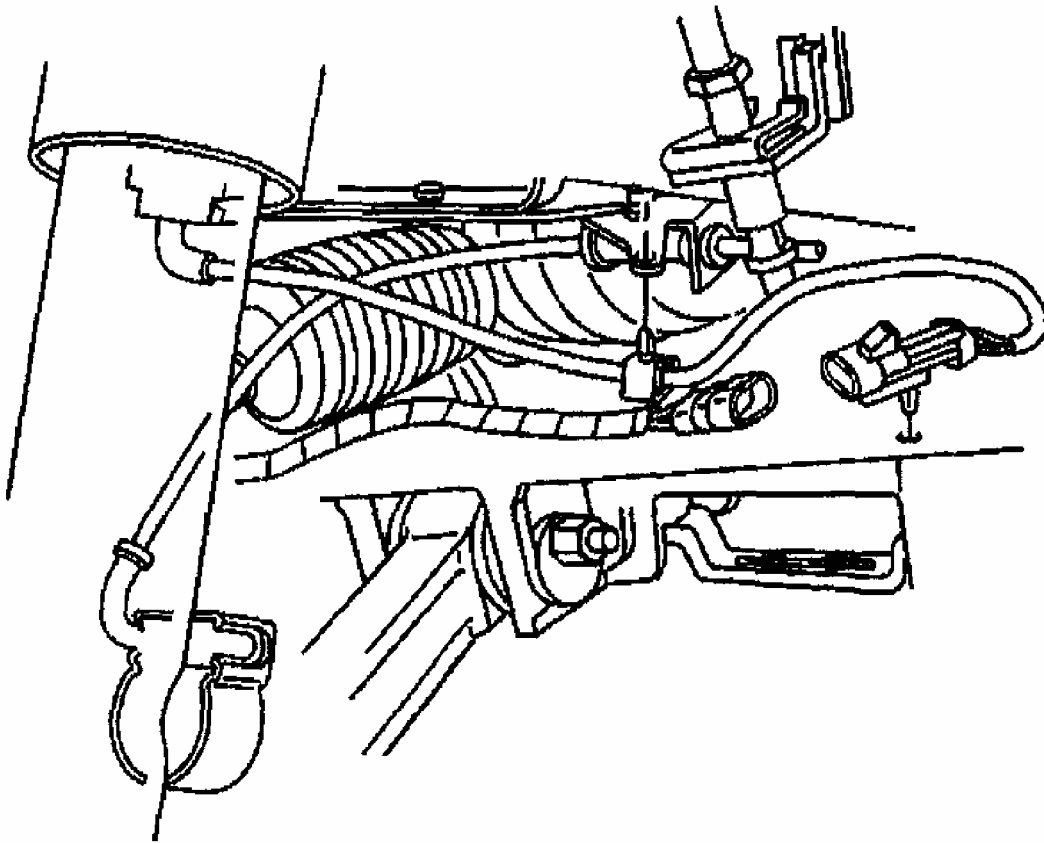


G01727816

**Fig. 65: Disconnecting Electrical Connector From The Wheel Speed Sensor**  
Courtesy of GENERAL MOTORS CORP.

5. Disconnect the real time damping electrical connector from the shock, if equipped.

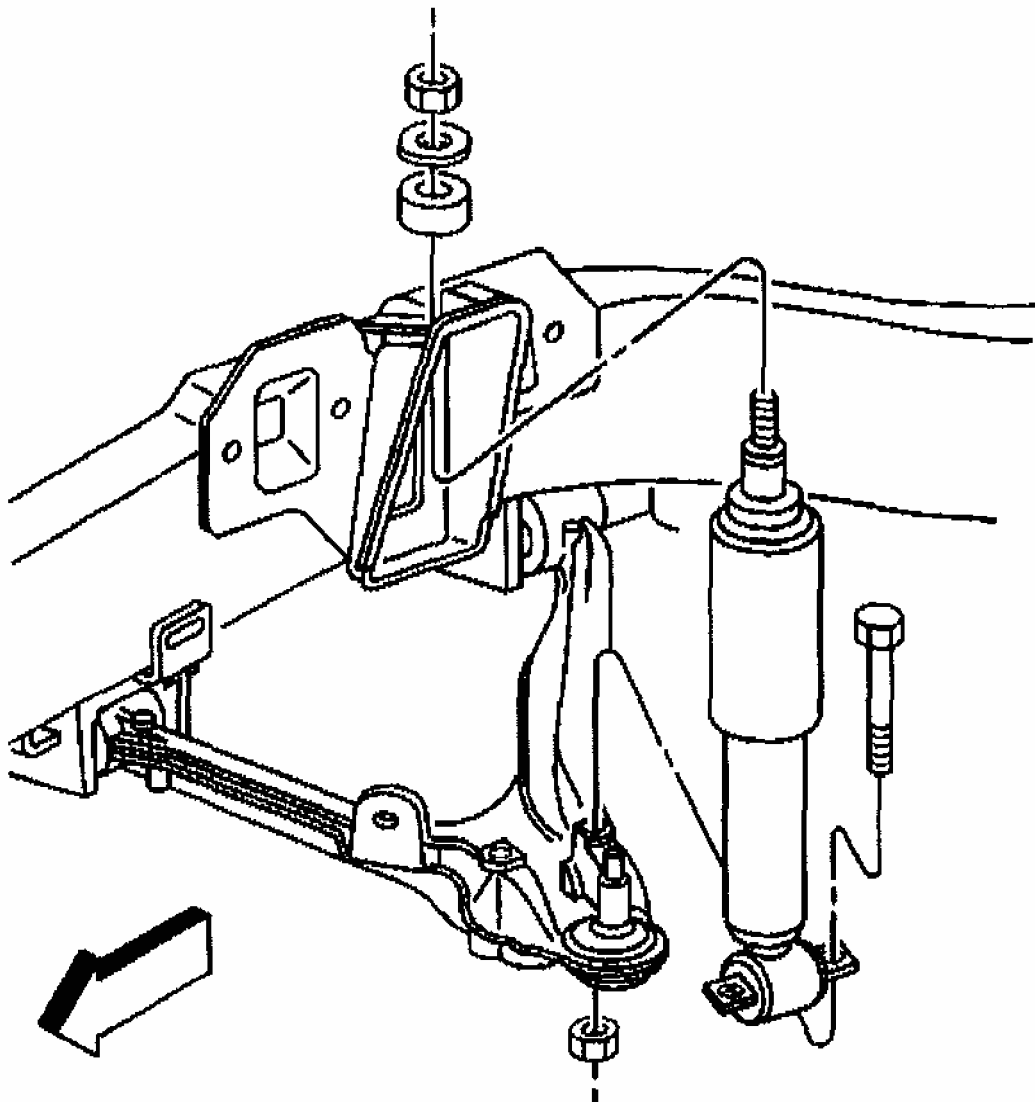




G01727817

**Fig. 66: Disconnecting Real Time Damping Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

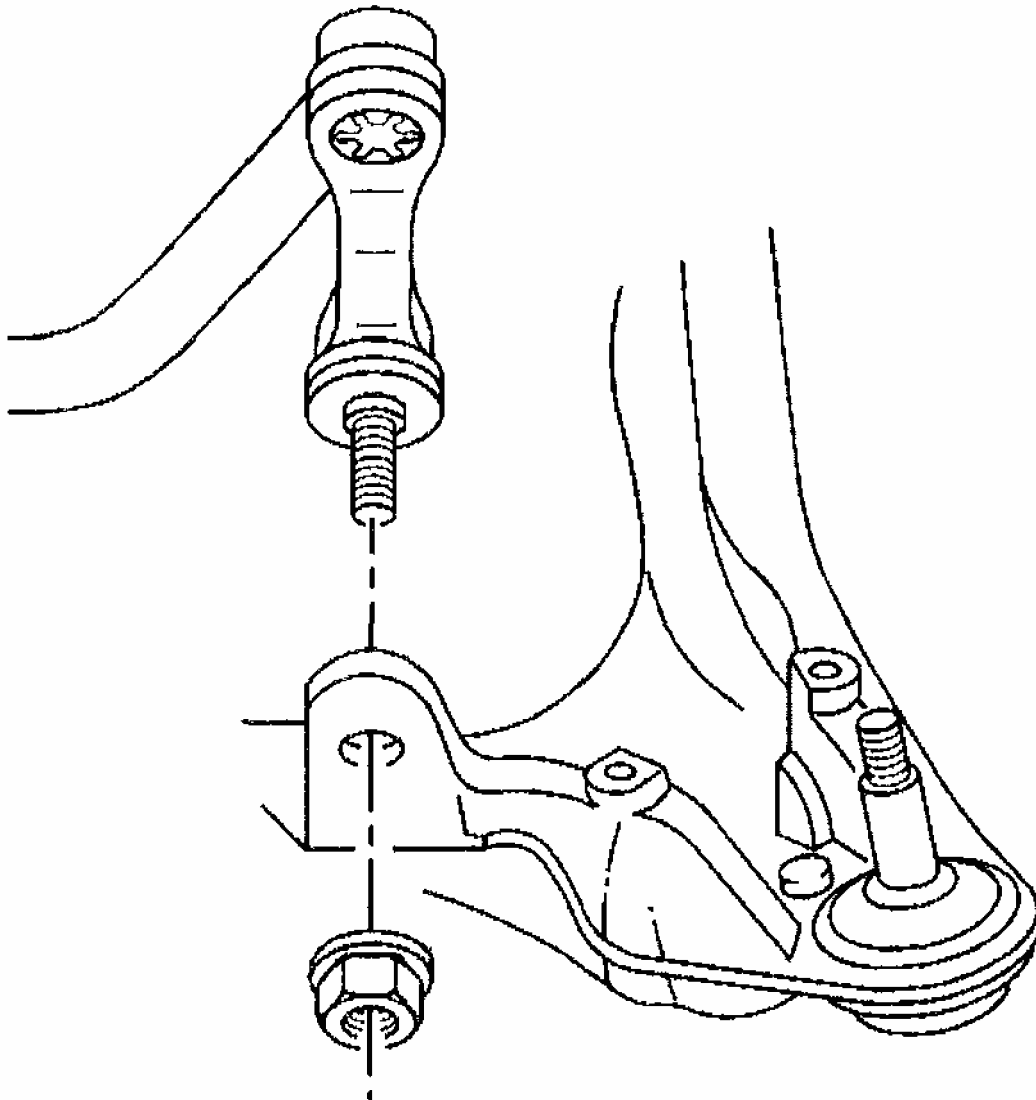
6. Remove the shock absorber from the lower control arm.



G01727818

**Fig. 67: Removing Shock Absorber**  
**Courtesy of GENERAL MOTORS CORP.**

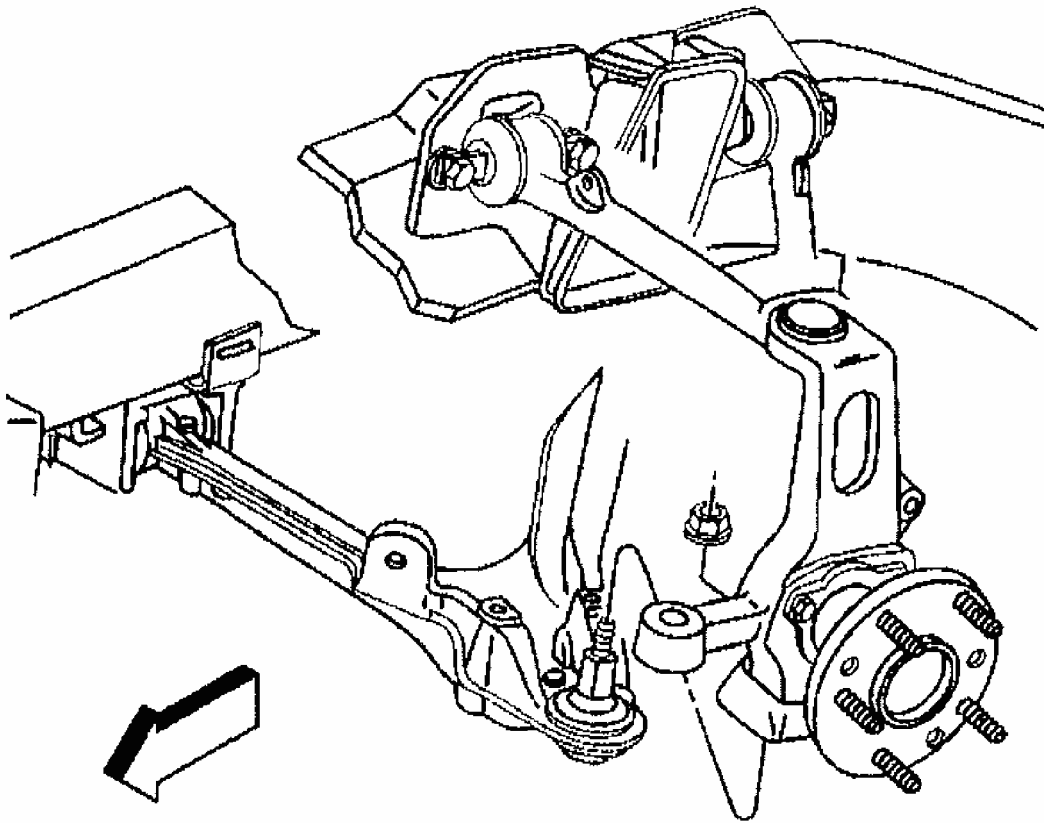
7. Remove the stabilizer shaft link from the lower control arm.



G01727819

**Fig. 68: Removing Stabilizer Shaft Link**  
**Courtesy of GENERAL MOTORS CORP.**

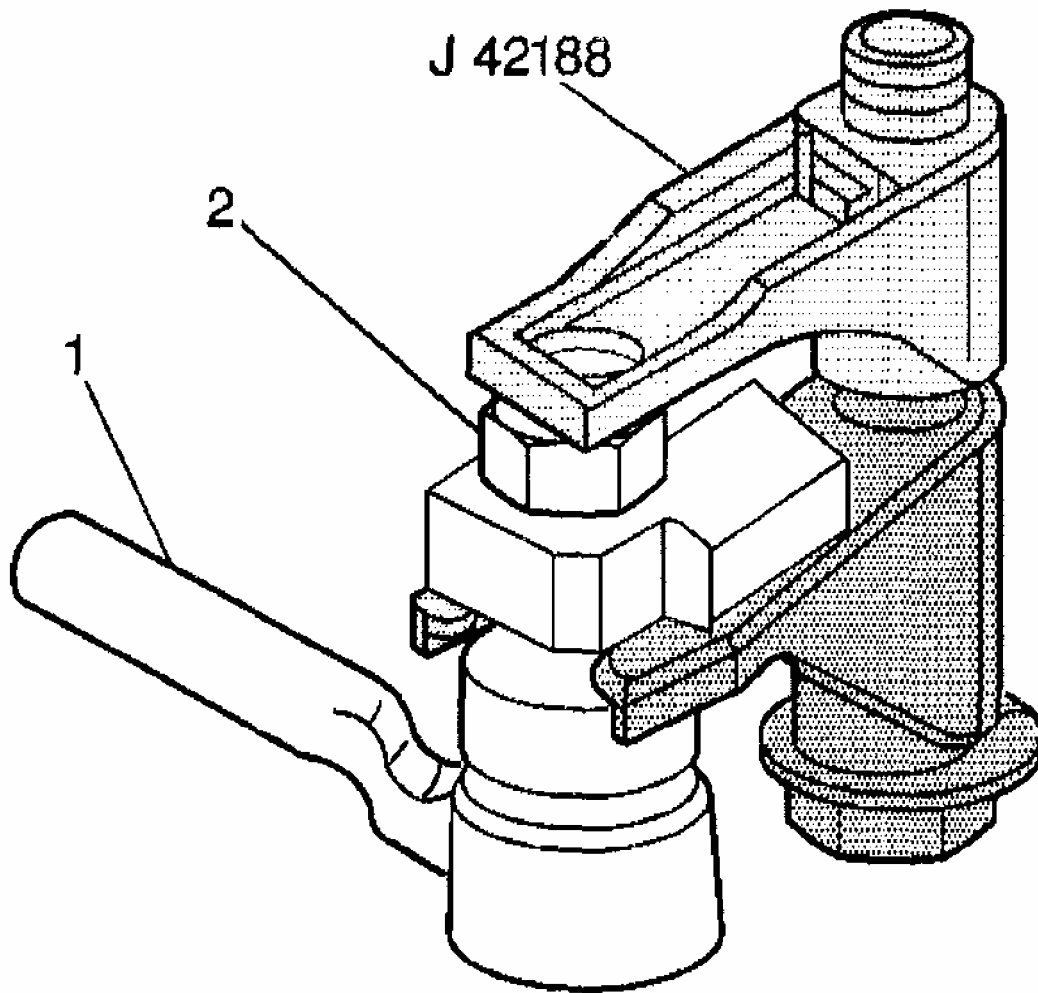
8. Loosen the ball joint stud nut but do not remove the nut.



G01727820

**Fig. 69: Loosening Ball Joint Stud Nut**  
**Courtesy of GENERAL MOTORS CORP.**

9. Using *J 42188* separate the lower ball joint stud from the steering knuckle.
10. Remove *J 42188* and the ball joint stud nut (2).
11. Remove the ball joint stud from the steering knuckle.

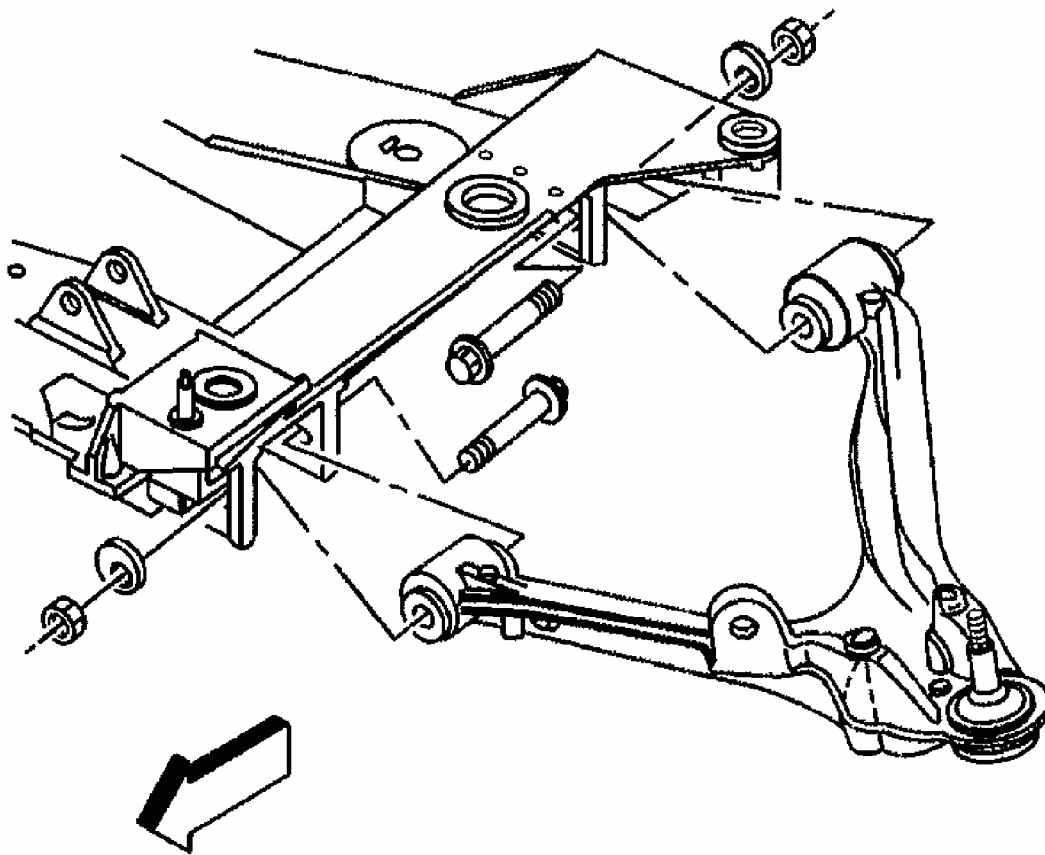


G01727821

**Fig. 70: J 42188**

**Courtesy of GENERAL MOTORS CORP.**

12. Mark the position of the cam bolts for orientation when installing.
13. Remove the cam bolts, washers, and nuts retaining the control arm to the crossmember.
14. Remove the lower control arm from the vehicle.



G01727822

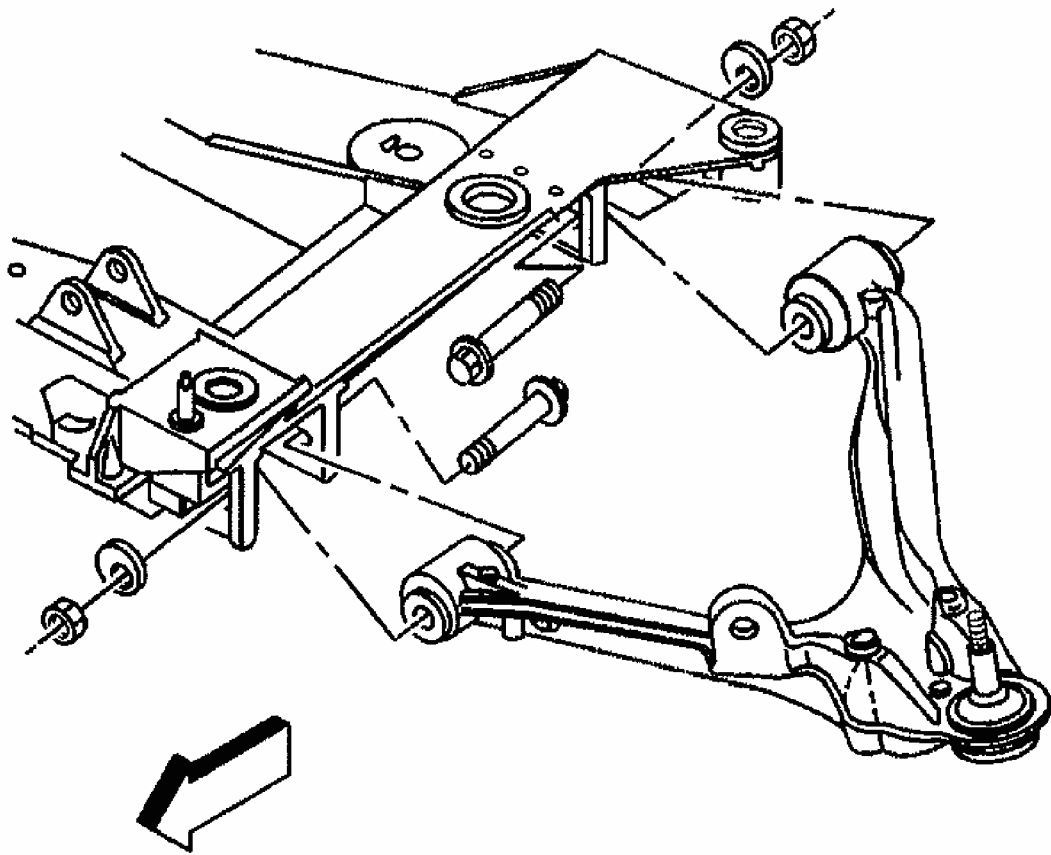
**Fig. 71: Removing Lower Control Arm**  
Courtesy of GENERAL MOTORS CORP.

**Installation Procedure**

1. Install the lower control arm to the vehicle.

Install the cam bolts, washers, and nuts retaining control arm to the crossmember.

- Place the cam bolts at the position marked during disassembly.
- Due to a required wheel alignment, tighten the cam bolts but do not set to final torque specifications at this time.



G01727823

**Fig. 72: Installing Lower Control Arm**  
**Courtesy of GENERAL MOTORS CORP.**

2. Support the lower control arm with a jackstand.
3. Install the lower ball joint stud to the steering knuckle.

**NOTE:** Refer to **FASTENER NOTICE** in Cautions and Notices.

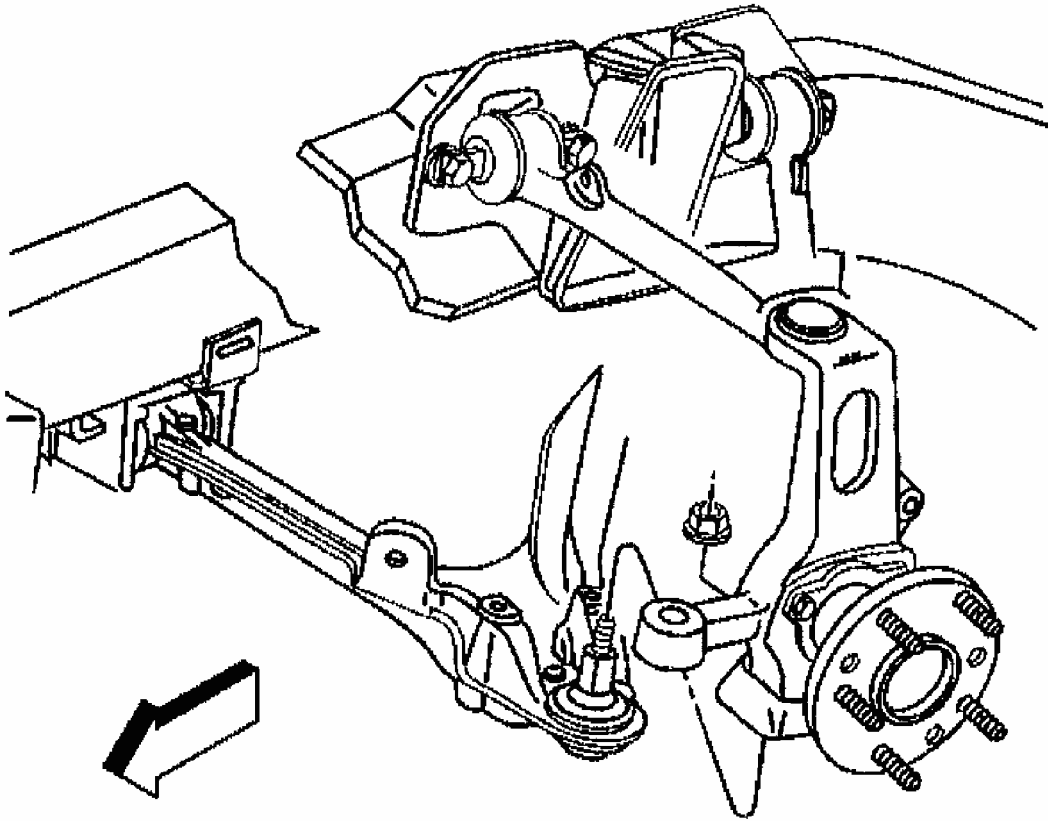
4. Install the lower control arm ball joint stud nut.

It may be necessary to use an Allen wrench to keep the ball joint stud from spinning while tightening the ball joint stud nut.

#### **Tighten**

- 4.1. Tighten the lower control arm ball joint stud nut to 20 N.m (15 lb ft) to seat the ball joint stud.

- 4.2. Turn the ball joint stud nut an additional 210 degrees.
- 4.3. Check the ball joint stud nut for a minimum final torque of 55 N.m (41 lb ft).



G01727824

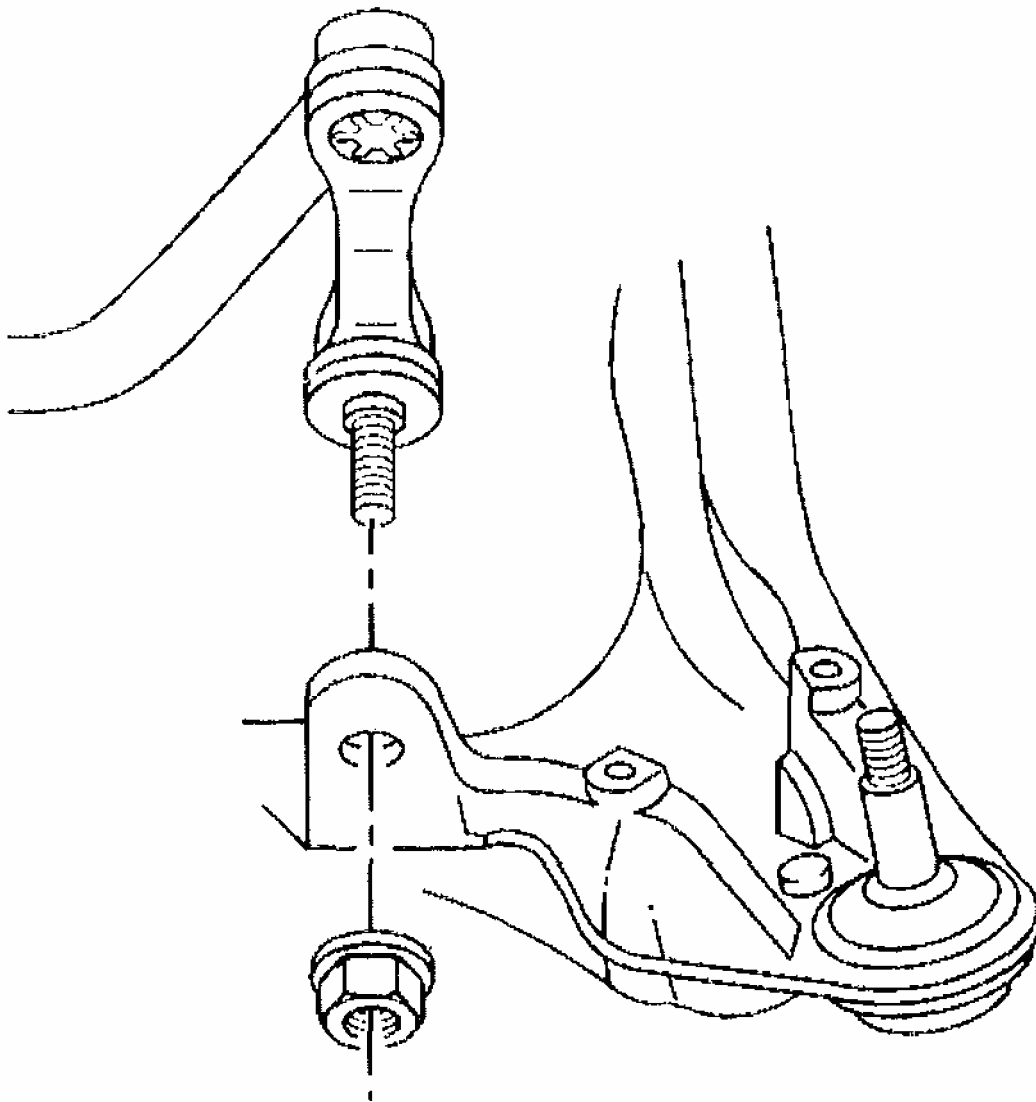
**Fig. 73: Installing Lower Control Arm Ball Joint Stud Nut**  
**Courtesy of GENERAL MOTORS CORP.**

5. Install the stabilizer shaft link to the lower control arm.

**Tighten**

Tighten the stabilizer shaft link nut to 72 N.m (53 lb ft).

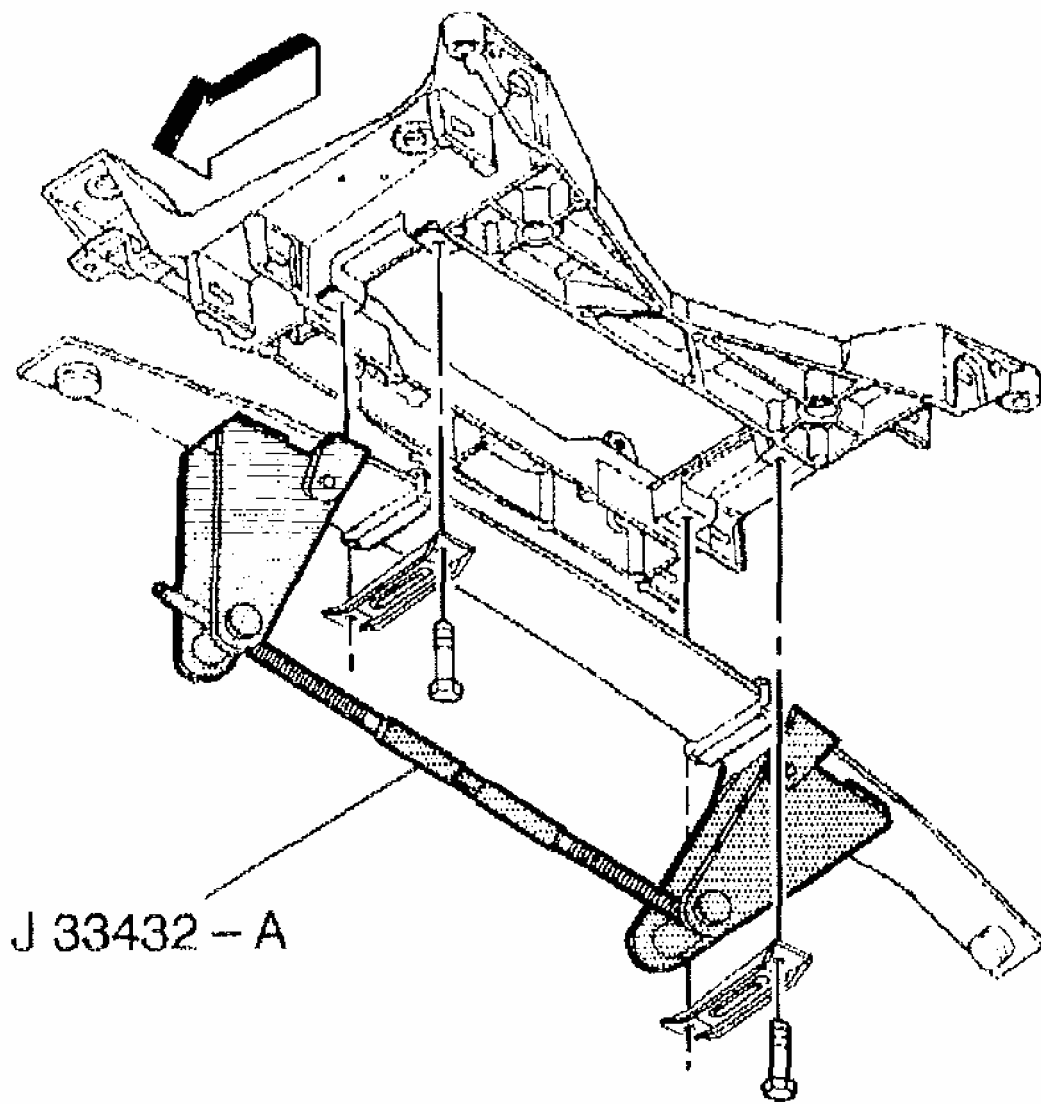




G01727825

**Fig. 74: Installing Stabilizer Shaft Link**  
**Courtesy of GENERAL MOTORS CORP.**

6. Install the front transverse spring. Refer to **Front Transverse Spring Replacement** .
7. Remove the spring compressor tool *J 33432-A* .



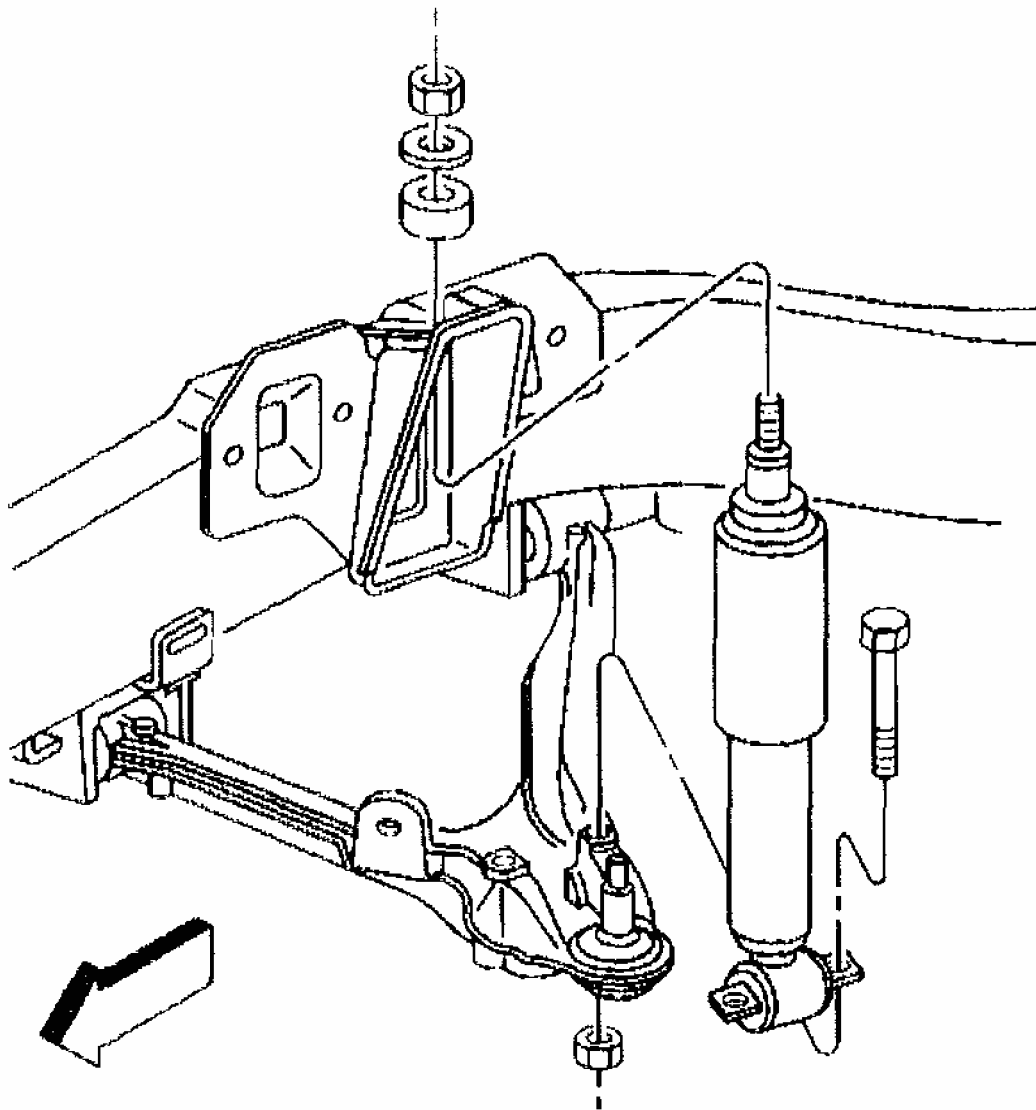
G01727826

**Fig. 75: J 33432-A**  
**Courtesy of GENERAL MOTORS CORP.**

8. Connect the shock absorber to the lower control arm.

**Tighten**

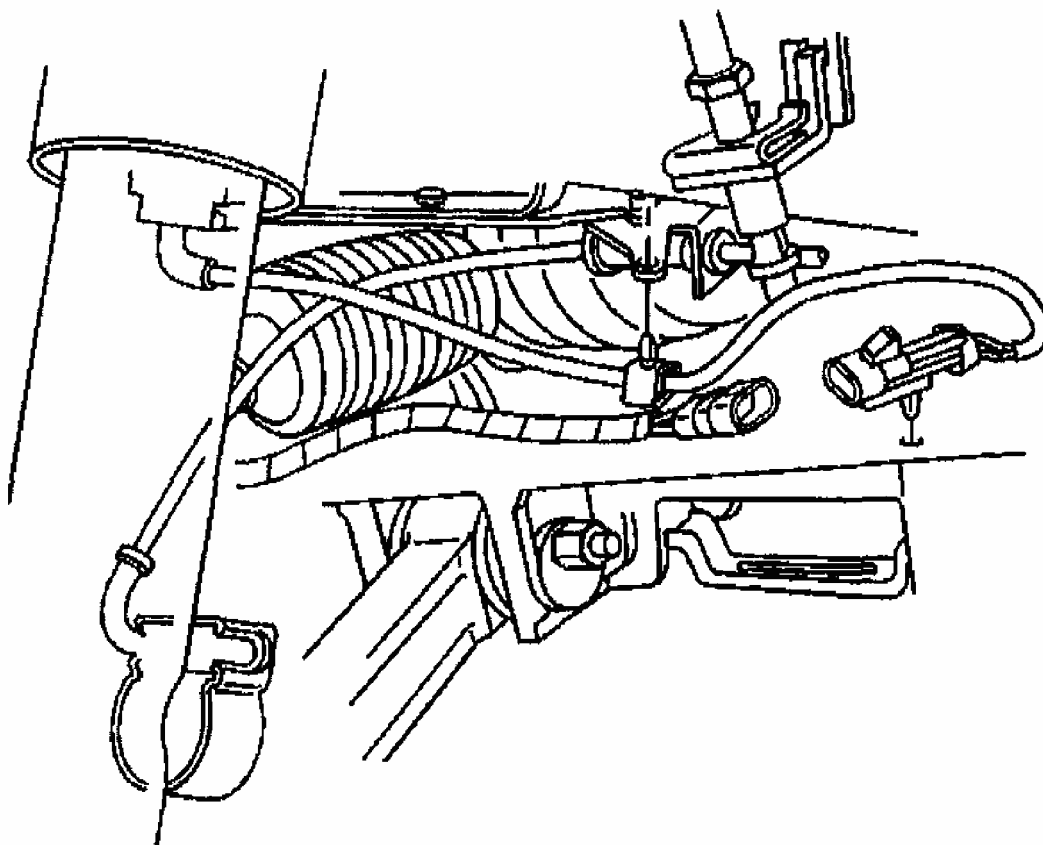
Tighten the shock absorber lower mounting nuts to 28 N.m (21 lb ft).



G01727827

**Fig. 76: Installing Shock Absorber Lower Mounting Nuts**  
Courtesy of GENERAL MOTORS CORP.

9. Connect the real time damping electrical connector to the shock, if equipped.



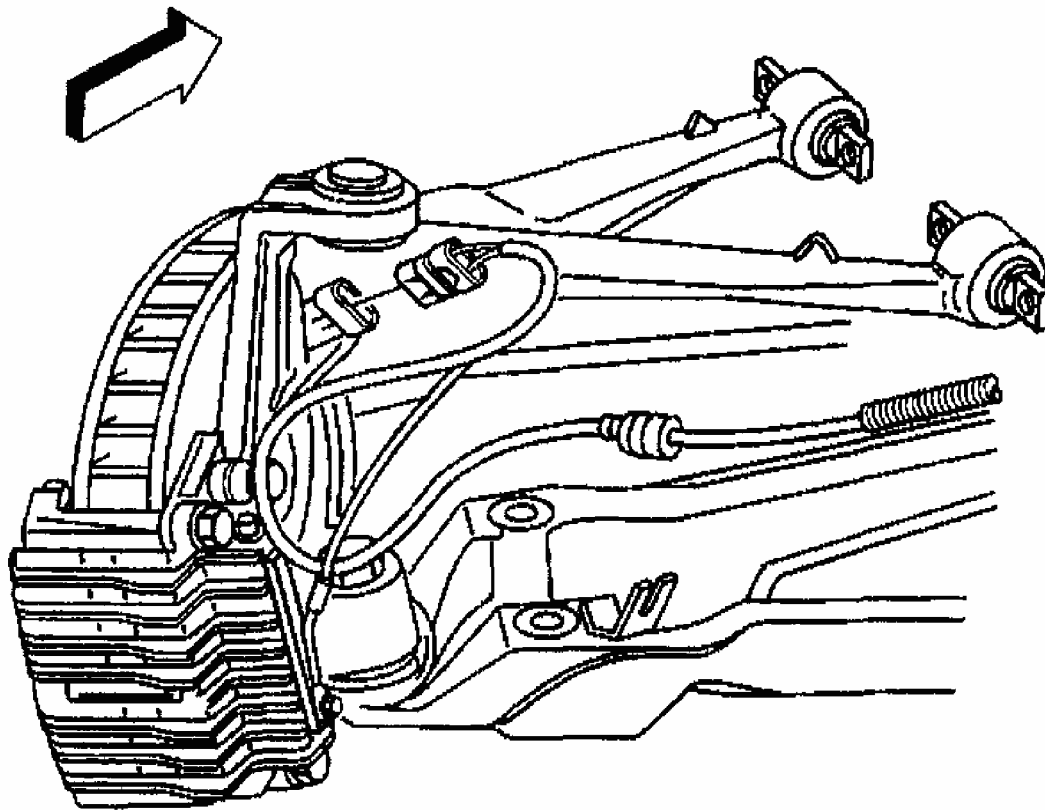
G01727828

**Fig. 77: Connecting Real Time Damping Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

10. Connect the electrical connector to the wheel speed sensor.
11. Remove the jackstands.
12. Install the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
13. Lower the vehicle.
14. Perform a front wheel alignment. Refer to **MEASURING WHEEL ALIGNMENT** in Wheel Alignment.

### **Tighten**

Tighten the lower control arm cam bolt nuts to 170 N.m (125 lb ft).



G01727829

**Fig. 78: Connecting Electrical Connector To Wheel Speed Sensor**  
Courtesy of GENERAL MOTORS CORP.

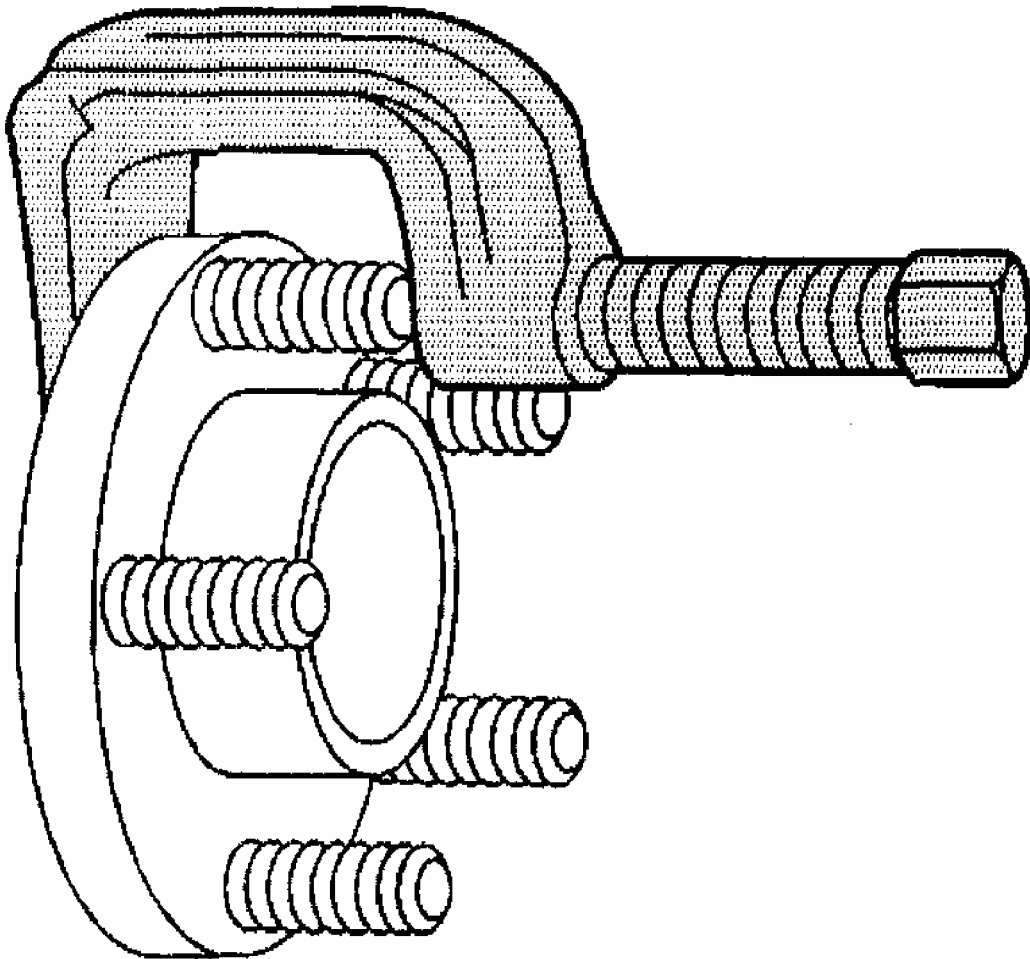
## WHEEL STUD REPLACEMENT

### Tool Required

*J 43631* Ball Joint Separator

### Removal Procedure

1. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE** in General Information.
2. Remove the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
3. Remove the front wheel hub/speed sensor assembly. Refer to **Wheel Bearing/Hub Replacement - Front**
4. Install tool *J 43631* onto the wheel hub and stud.
5. Turn the forcing screw in until the stud is pushed out of the wheel hub.



G01727830

**Fig. 79: J 43631**

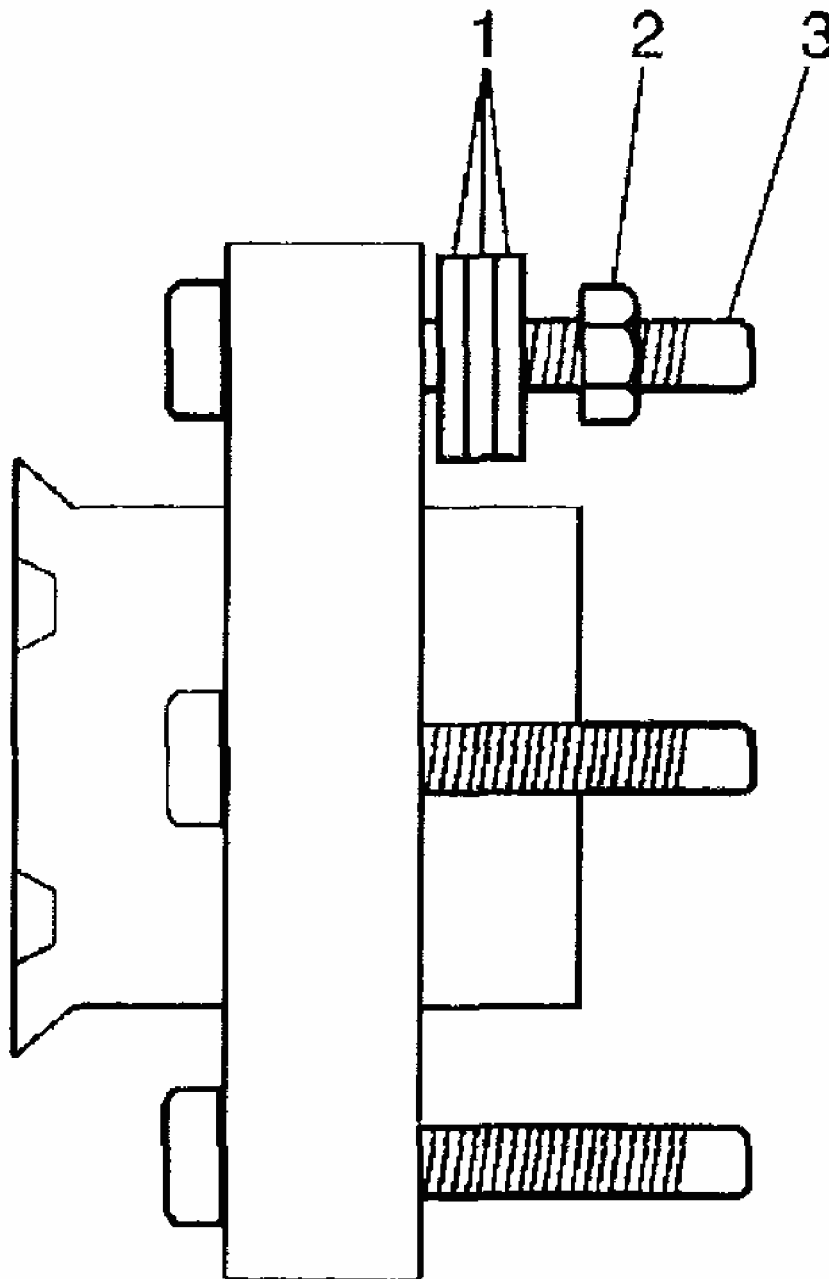
**Courtesy of GENERAL MOTORS CORP.**

**Installation Procedure**

1. Place a new stud in the wheel hub.
2. Install some washers onto the wheel stud.
3. With the flat side of a wheel nut (2) against the washers, tighten the wheel nut until the wheel stud head seats against the wheel hub flange.

**Important:** Make sure that the wheel stud is fully seated against the wheel hub flange.

4. Remove the wheel nut and washers.



G01727831

**Fig. 80: Seating Wheel Stud Heads**  
Courtesy of GENERAL MOTORS CORP.

5. Install the wheel hub/speed sensor assembly into the steering knuckle. Refer to **Wheel Bearing/Hub Replacement - Front** .
6. Install the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.

7. Lower the vehicle.

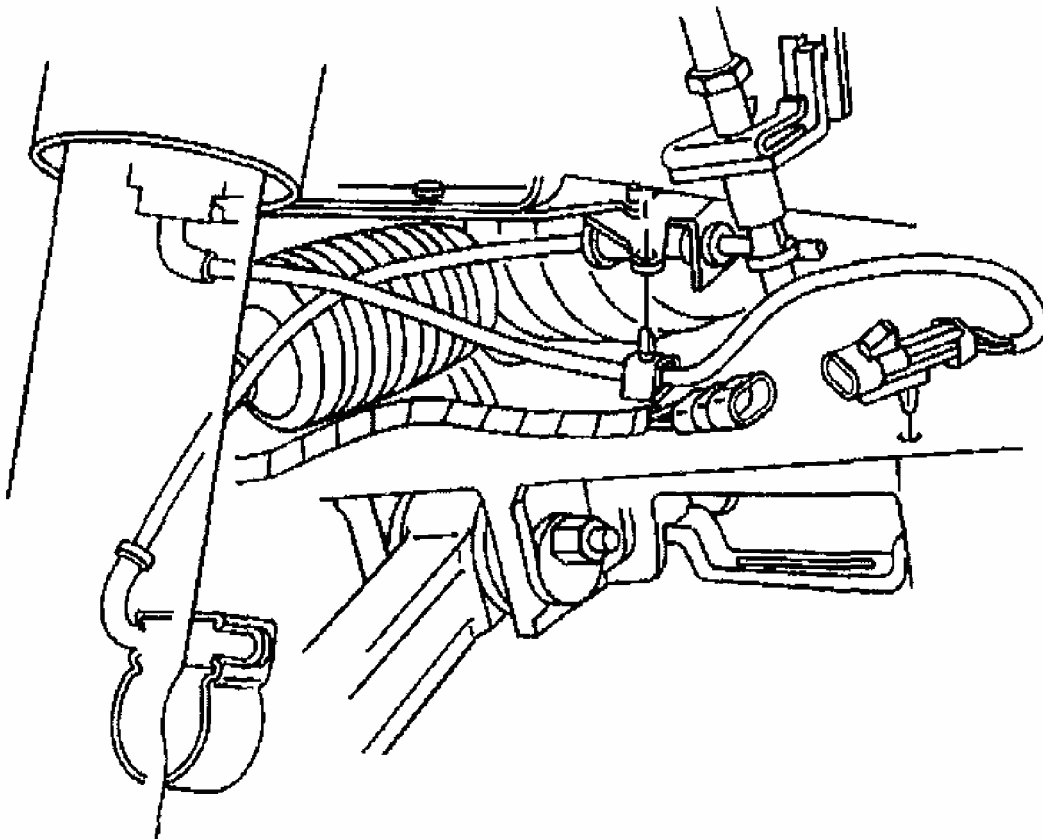
## SHOCK ABSORBER REPLACEMENT

### Tools Required

- *J 33432-A* Transverse Spring Compressor
- *J 43822* Shock Support Tool

### Removal Procedure

1. Raise and support the vehicle. Refer to **LIFTING AND JACKING THE VEHICLE** in General Information.
2. Remove the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
3. Disconnect the real time damping electrical connector from the shock, if equipped.
4. Remove the upper mounting nut, insulator retainer, and insulator.



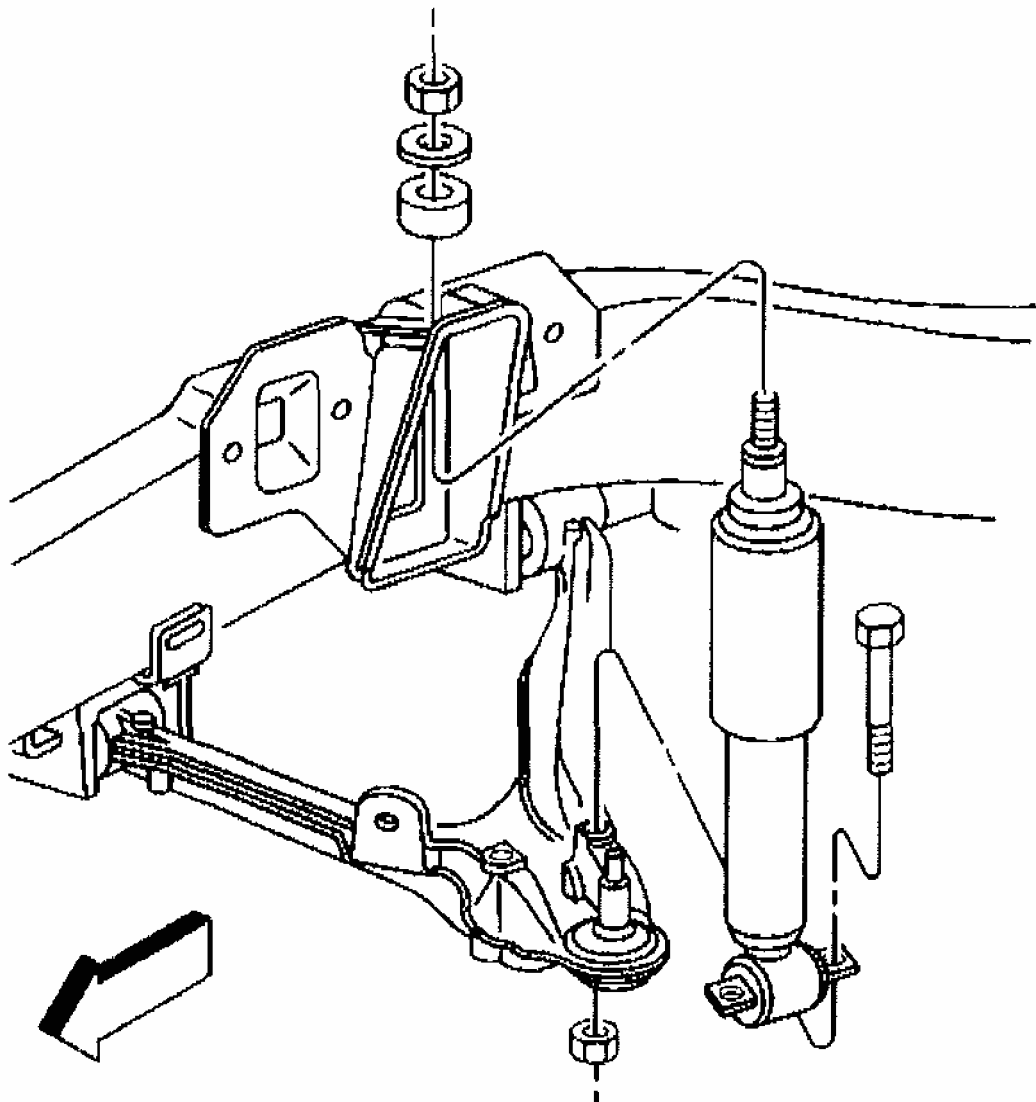


**Fig. 81: Disconnecting Real Time Damping Electrical Connector**  
**Courtesy of GENERAL MOTORS CORP.**

5. Remove the shock absorber lower mounting bolts and nuts.
6. Remove the shock absorber from the upper shock tower and the vehicle.
7. Remove the insulator and retainer from shock absorber.
8. For vehicles equipped with heavy duty shocks (FE3) perform the following steps.

**Important:** During this procedure, use care not to scratch the transverse spring.

- 8.1. Perform steps 1-4.
- 8.2. Using a pry bar compress the shock absorber from the bottom upward.
- 8.3. Install the *J 43822* to the shock absorber while the shock is compressed.
- 8.4. Remove the shock absorber from the shock tower and the vehicle.
- 8.5. Remove *J 43822* from the shock absorber.



G01727833

**Fig. 82: Removing Shock Absorber**  
Courtesy of GENERAL MOTORS CORP.

**Installation Procedure**

1. Install the retainer and insulator to the shock absorber.
2. Install the shock absorber to the upper shock tower.

**NOTE:** Refer to **FASTENER NOTICE** in Cautions and Notices.

3. Install the upper insulator, retainer, and nut.

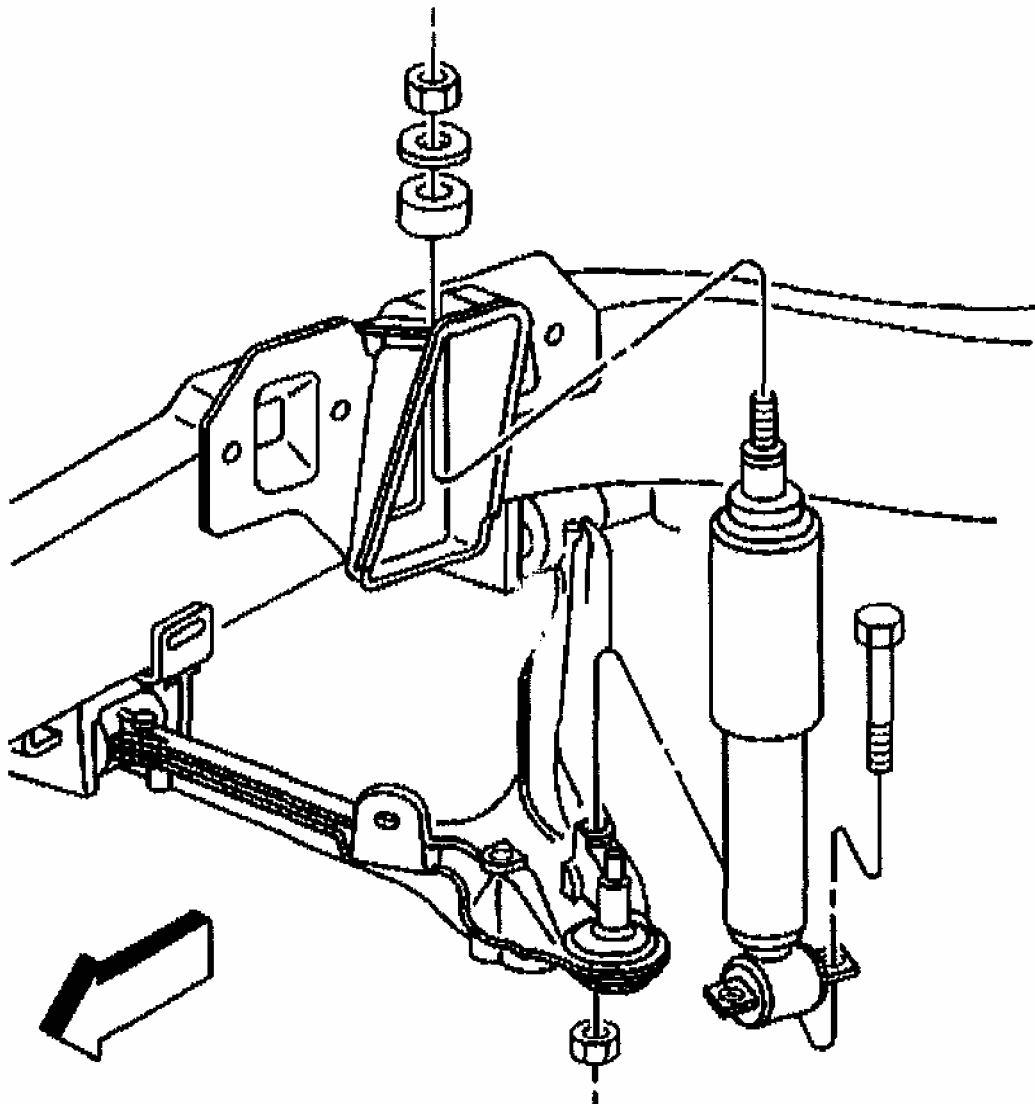
**Tighten**

Tighten the shock absorber upper mounting nut to 26 N.m (19 lb ft).

4. Install the shock absorber lower mounting bolts and nuts.

**Tighten**

Tighten the shock absorber lower mounting nuts to 28 N.m (21 lb ft).



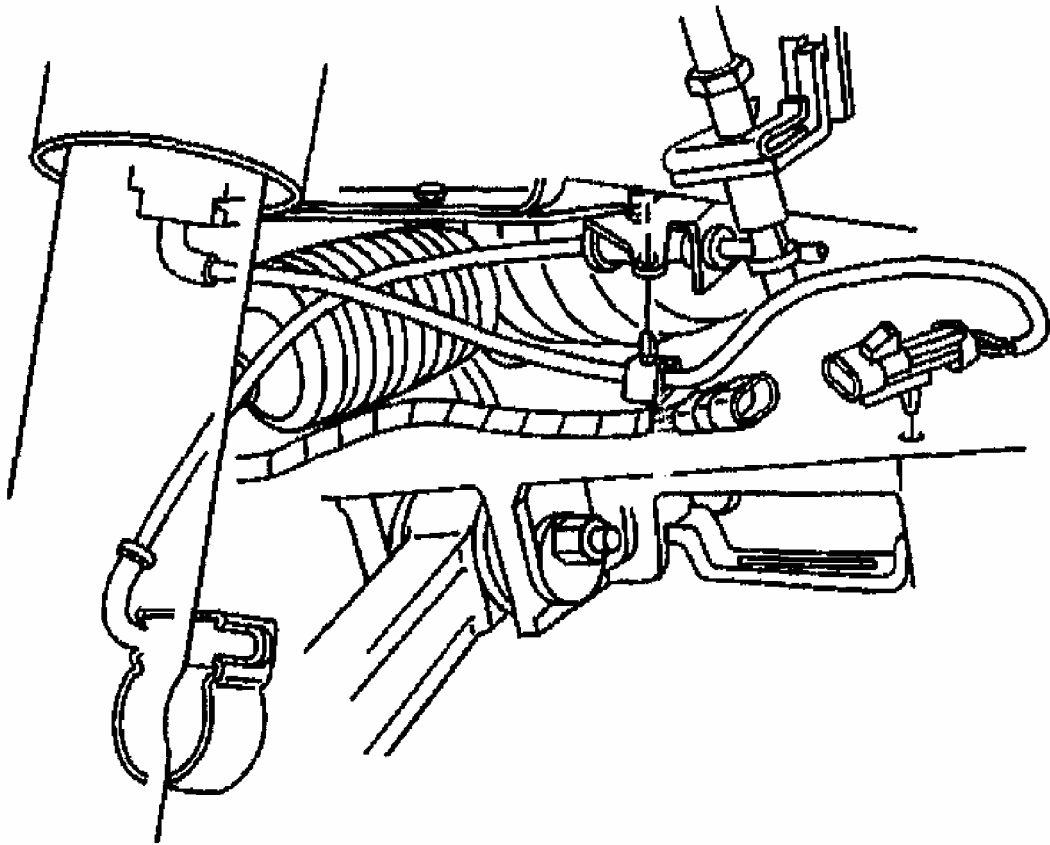
**Fig. 83: Installing Shock Absorber**  
**Courtesy of GENERAL MOTORS CORP.**

5. Connect the real time damping electrical connector to the shock, if equipped.
6. Remove *J 33432-A* from the spring.
7. Install the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.
8. Lower the vehicle.
9. For vehicles equipped with heavy duty shocks (FE3) perform the following steps.
  - 9.1. Install the *J 43822* to the shock absorber.
  - 9.2. Install the shock absorber into the vehicle.
  - 9.3. Install the upper insulator, retainer, and nut.

**Tighten**

Tighten the shock absorber upper mounting nut to 26 N.m (19 lb ft).

- 9.4. Remove *J 43822* from the shock absorber.



G01727835

**Fig. 84: Installing Real Time Damping Electrical Connector**  
Courtesy of GENERAL MOTORS CORP.

9.5. Install *J 33432-A* to the spring and compress.

9.6. Raise the lower control arm and install the shock absorber lower mounting bolts and nuts.

### **Tighten**

Tighten the shock absorber lower mounting nuts to 28 N.m (21 lb ft).

9.7. Remove *J 33432-A* from the spring.

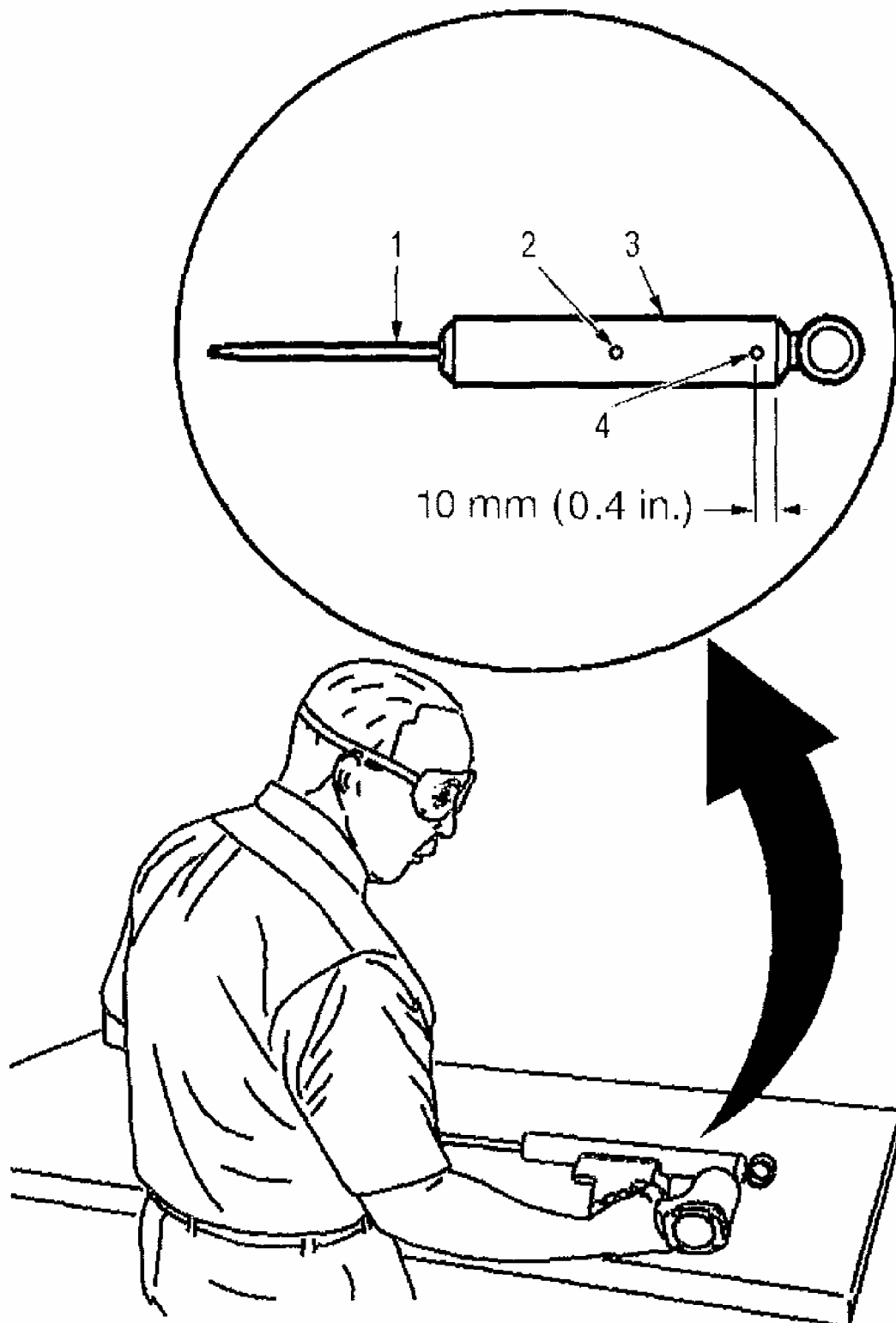
9.8. Install the tire and wheel assembly. Refer to **TIRE & WHEEL REMOVAL & INSTALLATION** in Tires and Wheels.

9.9. Lower the vehicle.

**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.

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.



G01727836

**Fig. 85: Identifying Shock Absorber Drill Hole Locations**

**Courtesy of GENERAL MOTORS CORP.**

## **DESCRIPTION AND OPERATION**

### **GENERAL DESCRIPTION**

The front suspension uses a single lightweight fiberglass transverse spring mounted to the lower control arms.

The upper control arms are made of high-strength forged aluminum. The lower control arms, the crossmember and the steering knuckles are made of cast aluminum.

The hub and bearing assembly is a sealed unit. The hub and bearing assembly eliminates the need for wheel bearing adjustment. The hub and bearing assembly requires no maintenance.

The high-strength tubular steel stabilizer shaft provides stability.

The shock absorbers attach at the upper end to the frame and attach at the lower control arm. The shock absorber helps keep the wheel in contact with the road surface under most road conditions. The shock absorber reduces crash-through at full jounce and rebound.

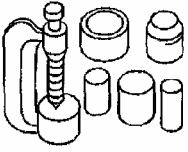
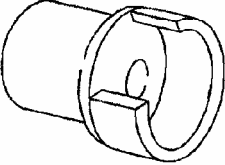
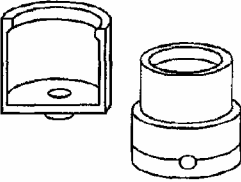
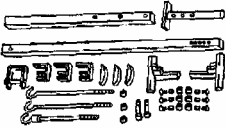
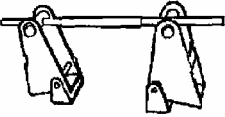
The standard gas shocks and the optional Real Time Damping (RTD) shock absorbers are gas charged to reduce aeration (foaming) of the shock fluid. Aeration of the shock fluid results in unlimited damping control.

### **SPECIAL TOOLS AND EQUIPMENT**



## 2002 Chevrolet Corvette

### 2002 SUSPENSION Front - Corvette

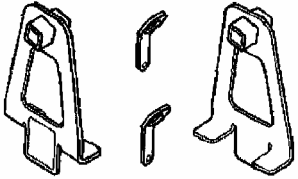
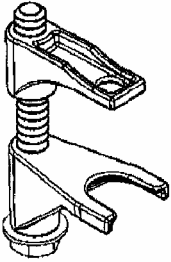
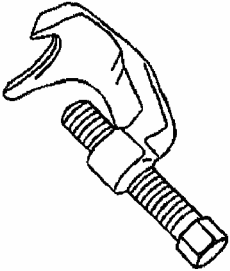

Illustration	Tool Number/ Description
	J 9519-E Ball Joint Removal Kit
	J 21474-5 Upper Ball Joint Remover
	J 28685 Upper Ball Joint Installer
	J 28467 - B Universal Engine Support Fixture
	J 33432-A Transverse Spring Compressor

G01727837

**Fig. 86: Special Tools & Equipment (1 Of 2)**  
**Courtesy of GENERAL MOTORS CORP.**

## 2002 Chevrolet Corvette

### 2002 SUSPENSION Front - Corvette

Illustration	Tool Number/ Description
	J 41803 Engine Support Fixture
	J 42188 Ball Joint Separator
	J 43631 Ball Joint Separator
	J 43822 Shock Support Tool

G01727838

**Fig. 87: Special Tools & Equipment (2 Of 2)**  
**Courtesy of GENERAL MOTORS CORP.**