

SUSPENSION

Front Suspension - Corvette

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Front Spring Retainer Bolt	67	49 lb ft
Front Wheel Bearing Dust Shield Bolt	130	96 lb ft
Lower Control Arm Nut	170	125 lb ft
Shock Absorber Lower Nut	32	24 lb ft
Shock Absorber Upper Bolt	100	74 lb ft
Stabilizer Shaft Insulator Clamp Bolt (1)		
• First Pass	30	22 lb ft
• Final Pass	Plus 50 Degrees	
Stabilizer Shaft Link Nut		
• First Pass	60	44 lb ft
• Final Pass	Plus 30 Degrees	
Steering Knuckle Nut (At Lower Control Arm)		
• First Pass	30	22 lb ft
• Final Pass	Plus 180 Degrees	
Steering Knuckle Nut (At Upper Control Arm)		
• First Pass	30	22 lb ft
• Final Pass	Plus 120 Degrees	
Upper Control Arm Bolt	65	48 lb ft
1. Use NEW fastener.		

ADHESIVES, FLUIDS, LUBRICANTS AND SEALERS

Adhesives, Fluids, Lubricants and Sealers

Application	Type of Material	GM Part Number	
		United States	Canada
Front Wheel Bearing Dust Shield Bolt	Threadlocker	89021297	10953488

REPAIR INSTRUCTIONS

STABILIZER SHAFT REPLACEMENT

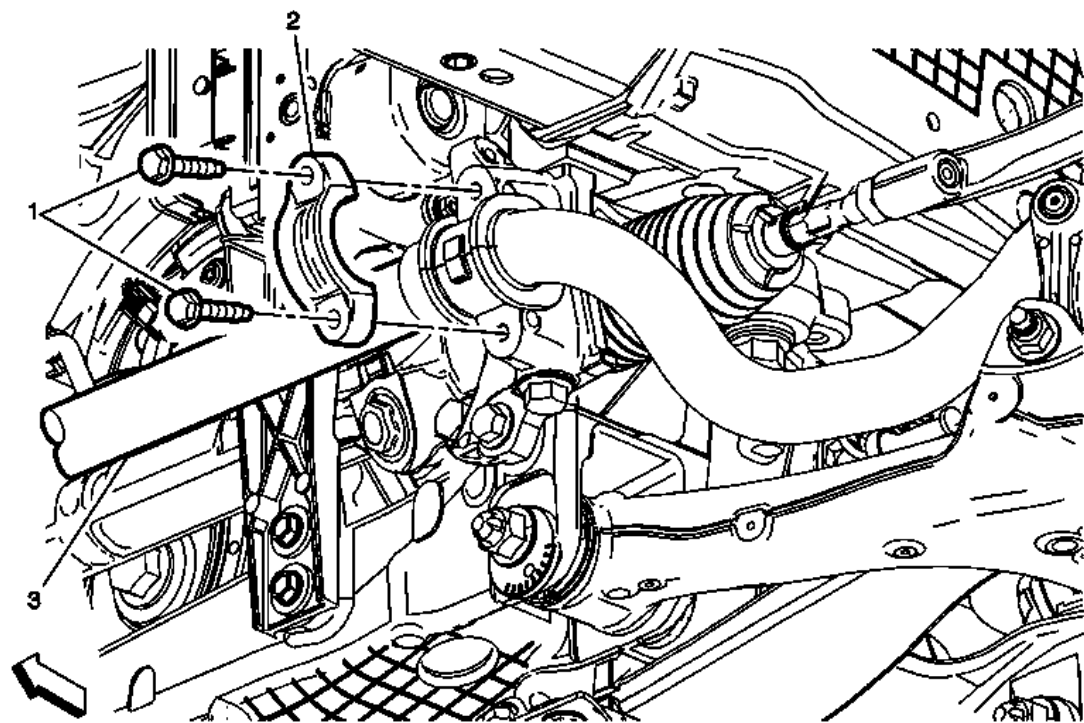


Fig. 1: Stabilizer Shaft
Courtesy of GENERAL MOTORS COMPANY

Stabilizer Shaft Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assemblies. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Disconnect the stabilizer shaft links from the stabilizer shaft. Refer to <u>Stabilizer Shaft Link Replacement</u>.	
	Stabilizer Shaft Insulator Clamp Bolt (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . CAUTION: This vehicle is equipped with torque-to-yield or single use fasteners. Install a NEW torque-to-yield or single use fastener when installing this component. Failure to replace the torque-to-yield or single use fastener could cause damage to the vehicle or

1	Procedure 1. Remove and discard the insulator clamp bolts. Do NOT reuse the bolts, use NEW only. 2. Install the NEW insulator clamp bolts by hand but not to specification. 3. Proceed to tighten the NEW insulator clamp bolts at each insulator clamp to specification by alternating between the top and bottoms bolts at each clamp. Also alternate each clamp during the process. 4. After all NEW insulator clamp bolts have been tightened, ensure a minimum of 50 N.m (37 lb ft) of torque has been achieved for each bolt. Tighten 30 N.m (22 lb ft) + 50 degrees
2	Stabilizer Shaft Insulator Clamp (Qty: 2)
3	Stabilizer Shaft Procedure Transfer the stabilizer shaft insulators. NOTE: Ensure the stabilizer shaft insulators are installed in the same orientation as when removed.

STABILIZER SHAFT LINK REPLACEMENT

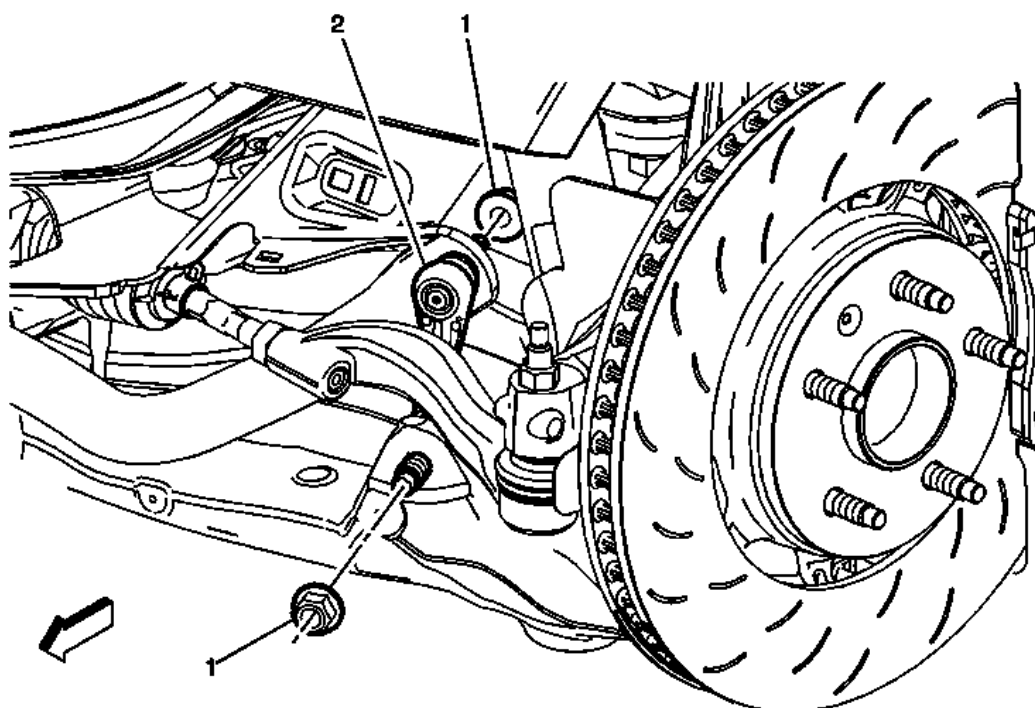


Fig. 2: Stabilizer Shaft Link
 Courtesy of GENERAL MOTORS COMPANY

Stabilizer Shaft Link Replacement

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Stabilizer Shaft Link Nut (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 60 N.m (44 lb ft) + 30 degrees
2	Stabilizer Shaft Link

STABILIZER SHAFT INSULATOR REPLACEMENT

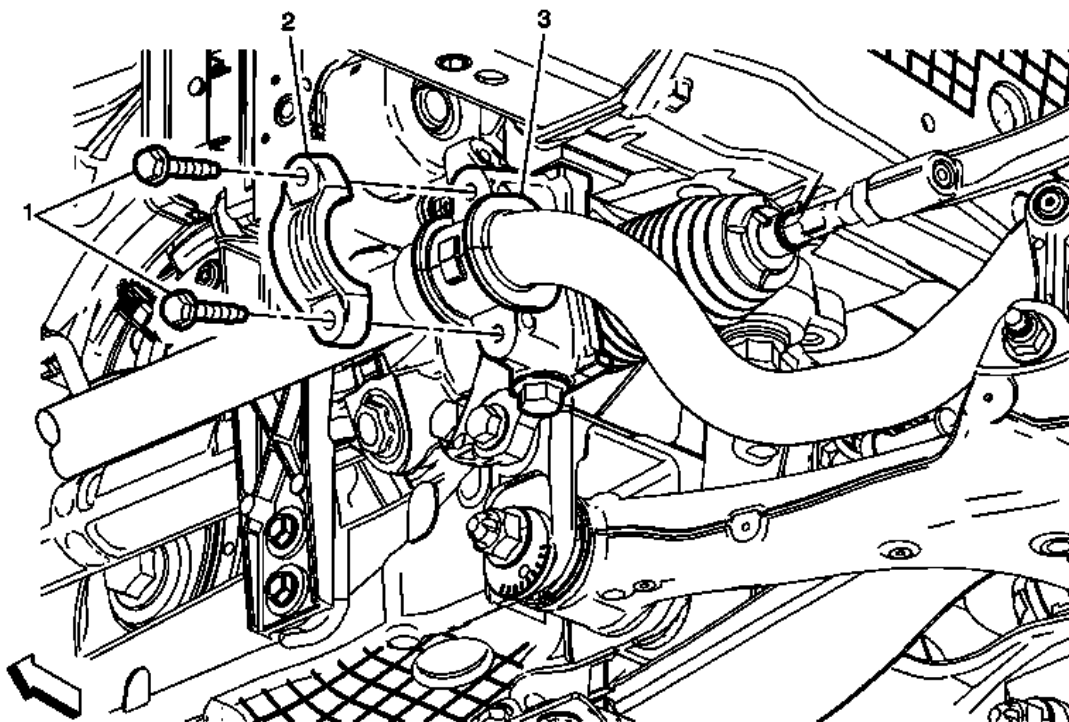


Fig. 3: Stabilizer Shaft Insulator
 Courtesy of GENERAL MOTORS COMPANY

Stabilizer Shaft Insulator Replacement

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assemblies. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Disconnect the stabilizer shaft links from the stabilizer shaft. Refer to <u>Stabilizer Shaft Link Replacement</u>.	
1	Stabilizer Shaft Insulator Clamp Bolt (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . CAUTION: This vehicle is equipped with torque-to-yield or single use fasteners. Install a NEW torque-to-yield or single use fastener when installing this component. Failure to replace the torque-to-yield or single use fastener could cause damage to the vehicle or component. Procedure 1. Remove and discard the insulator clamp bolts. Do NOT reuse the bolts, use NEW only. 2. Install the NEW insulator clamp bolts by hand but not to specification. 3. Proceed to tighten the NEW insulator clamp bolts at each insulator clamp to specification by alternating between the top and bottoms bolts at each clamp. Also alternate each clamp during the process. 4. After all NEW insulator clamp bolts have been tightened, ensure a minimum of 50 N.m (37 lb ft) of torque has been achieved for each bolt. Tighten 30 N.m (22 lb ft) + 50 degrees
2	Stabilizer Shaft Insulator Clamp (Qty: 2) NOTE: Even if servicing one stabilizer shaft insulator, both insulator clamps must be removed to allow enough clearance between the stabilizer shaft and the vehicle to service the individual insulator.
3	Stabilizer Shaft Insulator NOTE: Ensure the shaft insulators are installed in the same orientation as when removed.

FRONT WHEEL BEARING AND HUB REPLACEMENT

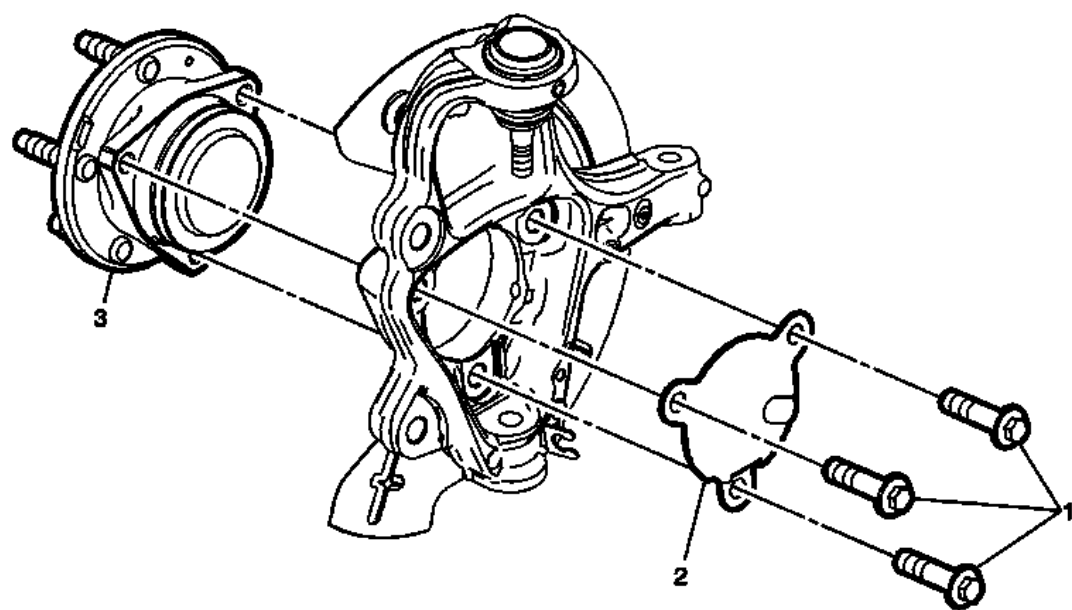


Fig. 4: Front Wheel Bearing and Hub
Courtesy of GENERAL MOTORS COMPANY

Front Wheel Bearing and Hub Replacement

Callout	Component Name
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the front brake rotor. Refer to <u>Front Brake Rotor Replacement</u> . 3. Disconnect the lower control arm from the steering knuckle. Refer to <u>Lower Control Arm Replacement</u>.	
1	Front Wheel Bearing Dust Shield Bolt (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Procedure 1. After removing the bolts, clean all threadlocker from the threads. 2. Before installing the bolts, apply NEW threadlocker to the threads. Refer to

	Tighten 130 N.m (96 lb ft)
2	Front Wheel Bearing Dust Shield
3	Front Wheel Bearing and Hub Assembly

STEERING KNUCKLE REPLACEMENT

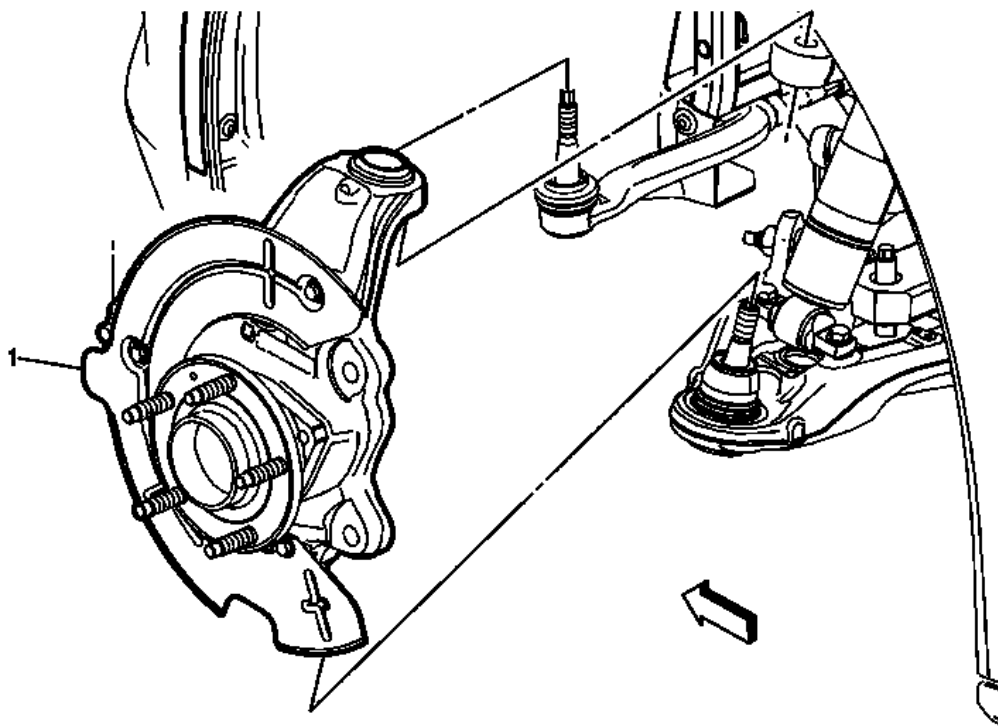


Fig. 5: Steering Knuckle
Courtesy of GENERAL MOTORS COMPANY

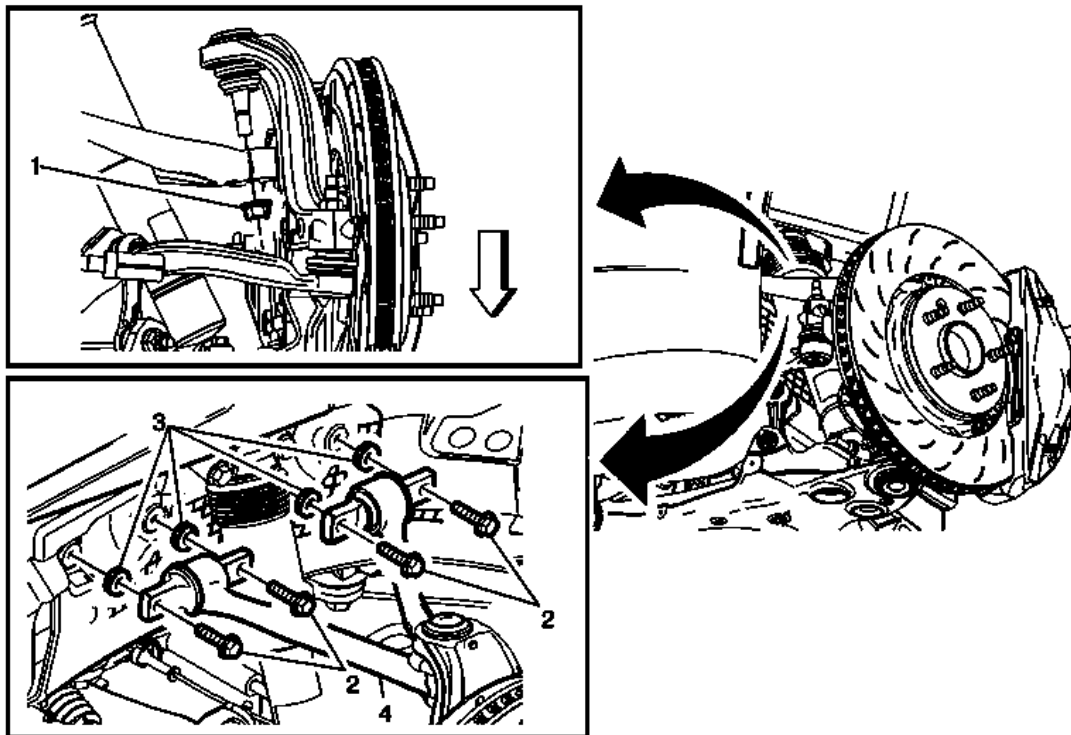
Steering Knuckle Replacement

Callout	Component Name
Preliminary Procedures	
1.	Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .
2.	Remove the front brake rotor. Refer to <u>Front Brake Rotor Replacement</u> .
3.	Disconnect the steering linkage outer tie rod from the steering knuckle. Refer to <u>Steering Linkage Outer Tie Rod Replacement</u> .
4.	Disconnect the lower control arm from the steering knuckle. Refer to <u>Lower Control Arm Replacement</u> .
5.	Disconnect the upper control arm from the steering knuckle. Refer to <u>Upper Control Arm Replacement</u> .

1

Procedure

Transfer components as necessary.

UPPER CONTROL ARM REPLACEMENT**Fig. 6: Upper Control Arm**

Courtesy of GENERAL MOTORS COMPANY

Upper Control Arm Replacement

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Steering Knuckle Nut CAUTION: Refer to <u>Fastener Caution</u> . Procedure Use the J-42188 separator to separate the upper control arm and steering knuckle.

	30 N.m (22 lb ft) + 120 degrees Special Tools J-42188 Ball Joint Separator
2	Upper Control Arm Bolt (Qty: 4) Tighten 65 N.m (48 lb ft)
3	Upper Control Arm Washer (Qty: 8) NOTE: The upper control arm washers must be installed in the same position as removed.
4	Upper Control Arm

LOWER CONTROL ARM REPLACEMENT

Special Tools

J-43631 Ball Joint Remover

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

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
3. Disconnect the stabilizer shaft link from the lower control arm. Refer to **Stabilizer Shaft Link Replacement**.
4. If equipped, disconnect the electronic suspension front position sensor. Refer to **Electronic Suspension Front Position Sensor Replacement** .
5. Disconnect any harnesses or retainers secured to the lower control arm. Note any attaching points to aid in installation.

NOTE: **Position the post jack so the lower shock absorber nuts are not obstructed and the jack does not contact the lower control arm ball joint seal.**

6. Support the lower control arm with a post jack.

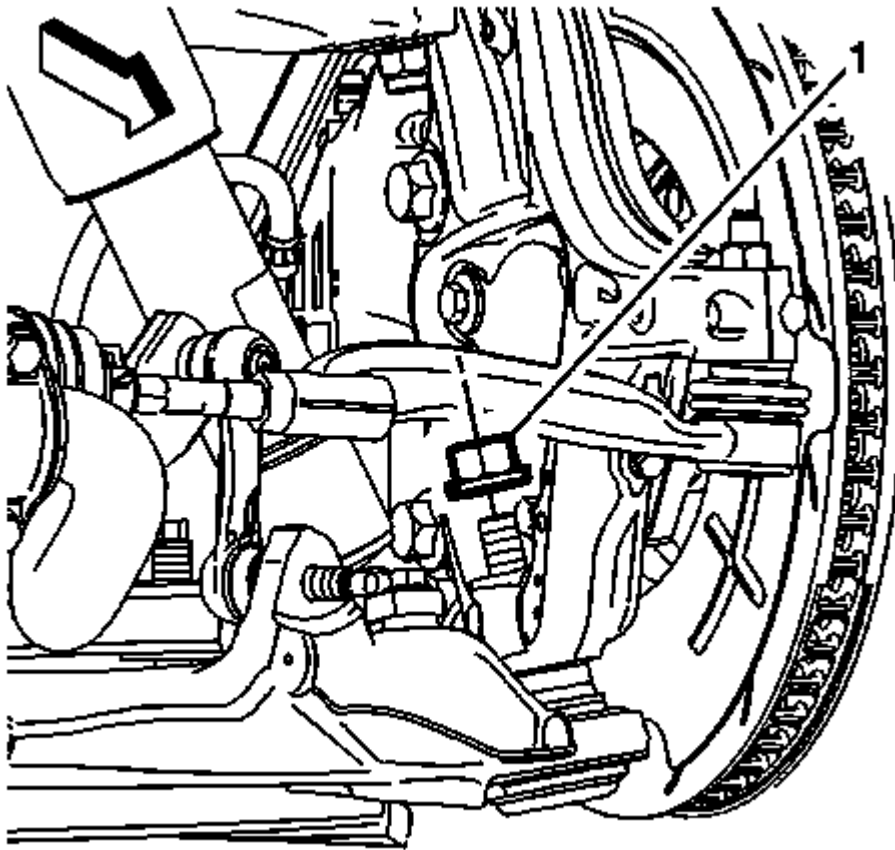


Fig. 7: Steering Knuckle Nut

Courtesy of GENERAL MOTORS COMPANY

7. Remove the steering knuckle nut (1).
8. Use the **J-43631** remover to separate the lower control arm and steering knuckle.
9. Support the steering knuckle.

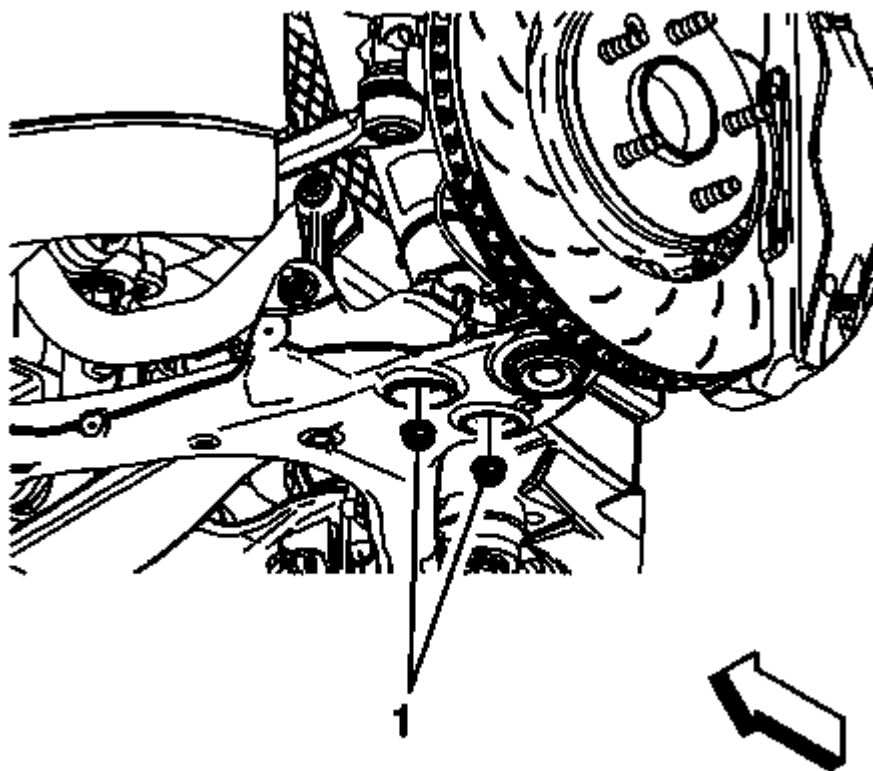


Fig. 8: Shock Absorber Lower Nuts
Courtesy of GENERAL MOTORS COMPANY

10. Remove the shock absorber lower nuts (1).

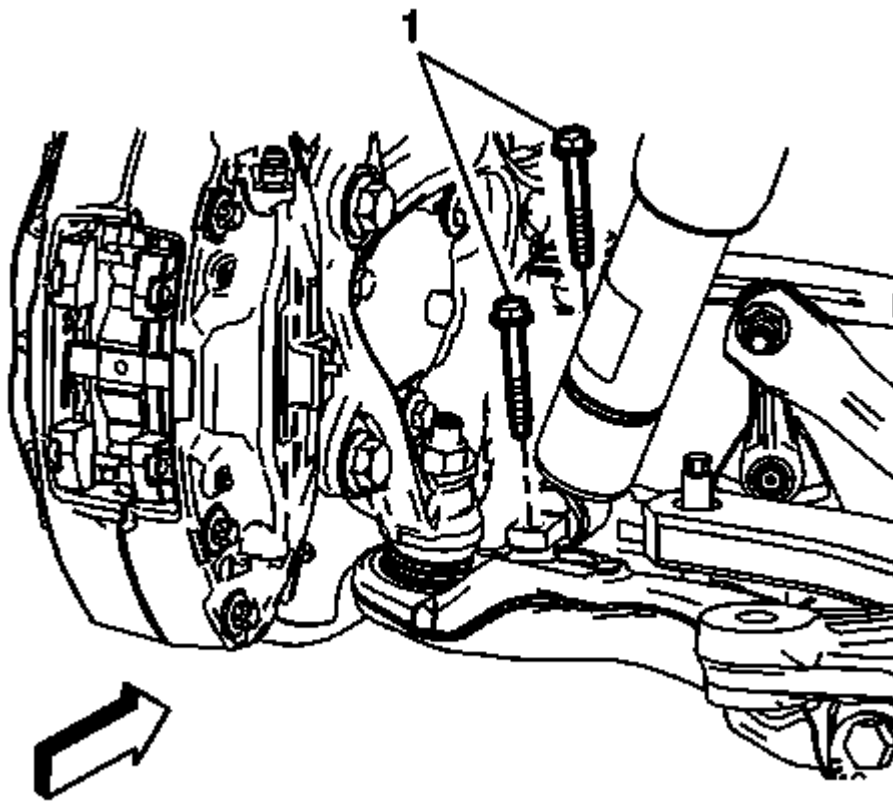


Fig. 9: Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS COMPANY

11. Remove the shock absorber lower bolts (1).
12. Carefully remove the post jack.

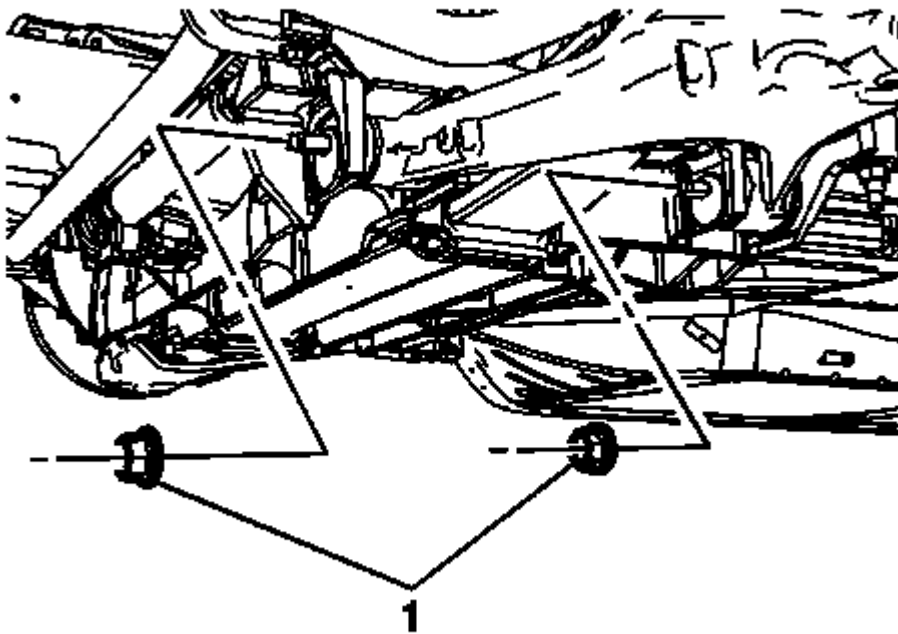


Fig. 10: Lower Control Arm Nuts
Courtesy of GENERAL MOTORS COMPANY

13. Remove the lower control arm nuts (1).

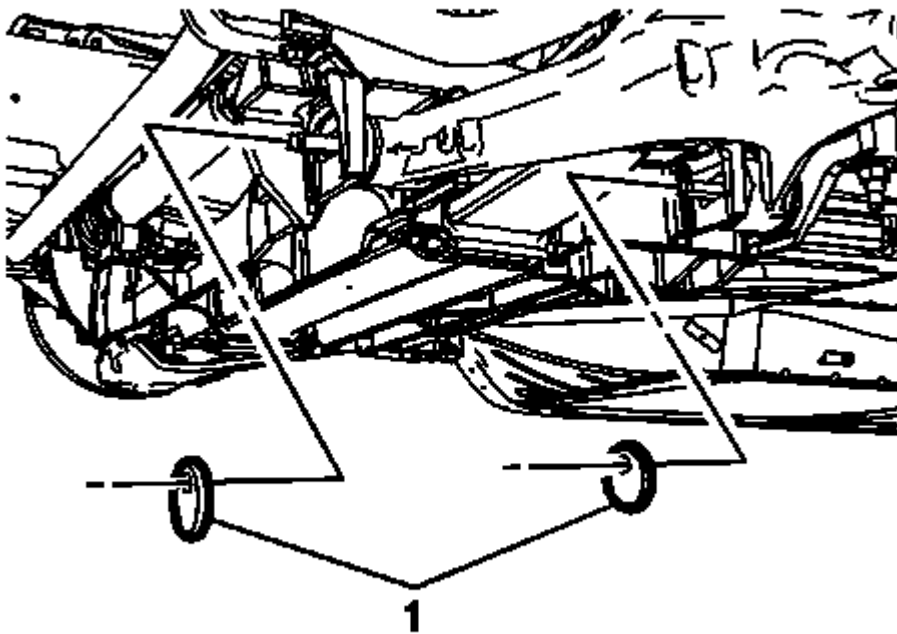


Fig. 11: Lower Control Arm Adjustment Cams
Courtesy of GENERAL MOTORS COMPANY

14. Remove the lower control arm adjustment cams (1).

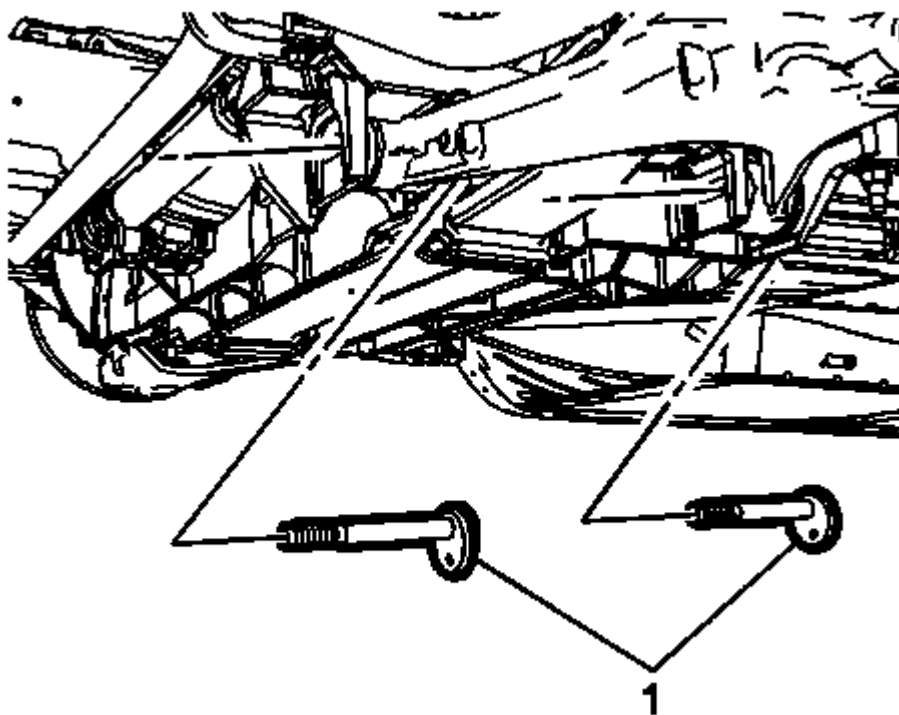


Fig. 12: Lower Control Arm Bolts
Courtesy of GENERAL MOTORS COMPANY

15. Remove the lower control arm bolts (1).
16. Remove the lower control arm from the vehicle.

Installation Procedure

1. Position the lower control arm on the vehicle.

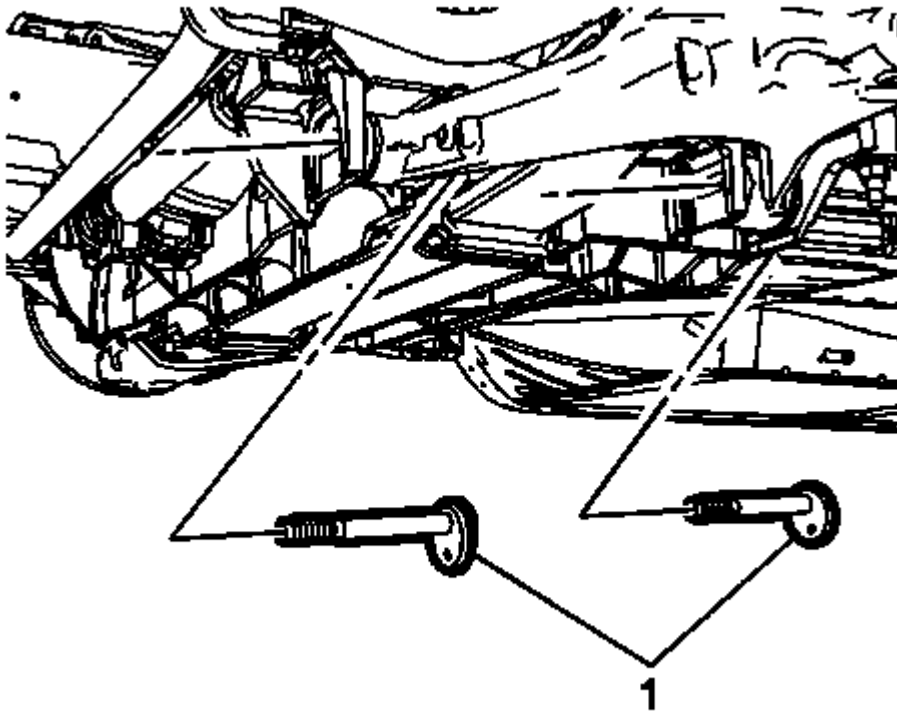


Fig. 13: Lower Control Arm Bolts
Courtesy of GENERAL MOTORS COMPANY

2. Install the lower control arm bolts (1).

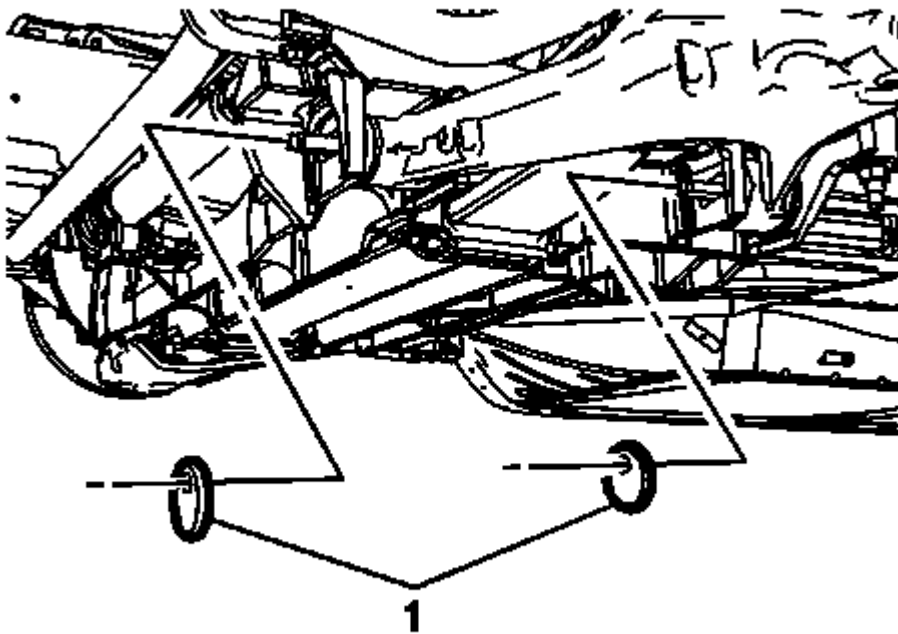


Fig. 14: Lower Control Arm Adjustment Cams
Courtesy of GENERAL MOTORS COMPANY

3. Install the lower control arm adjustment cams (1).

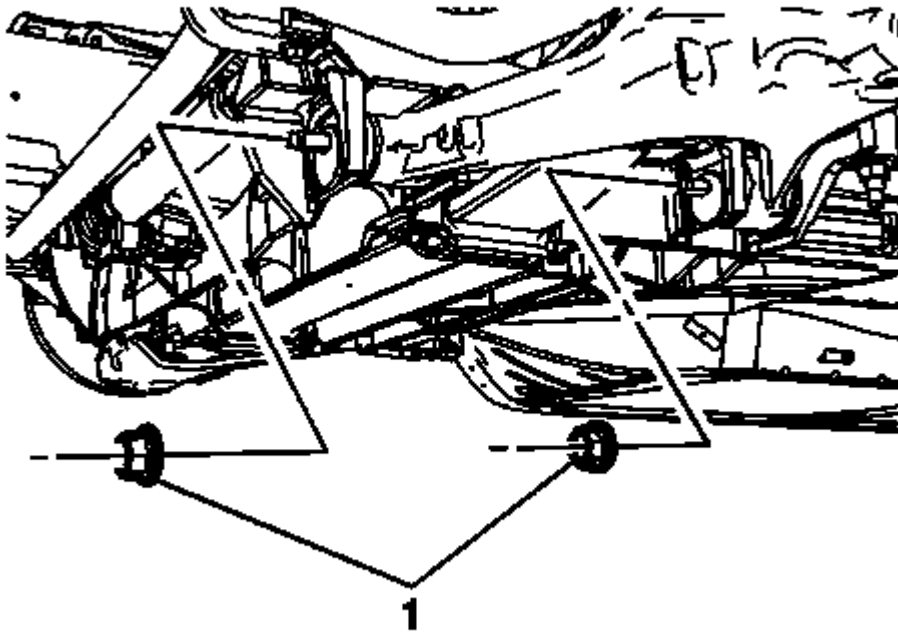


Fig. 15: Lower Control Arm Nuts
Courtesy of GENERAL MOTORS COMPANY

NOTE: Tighten the lower control arm nuts with the vehicle at ride height during the front wheel alignment.

4. Install, but do not tighten, the lower control arm nuts (1).

NOTE: Position the post jack so the lower shock absorber nuts are not obstructed and the jack does not contact the lower control arm ball joint seal.

5. Raise the lower control arm to the lower shock absorber mount with a post jack.

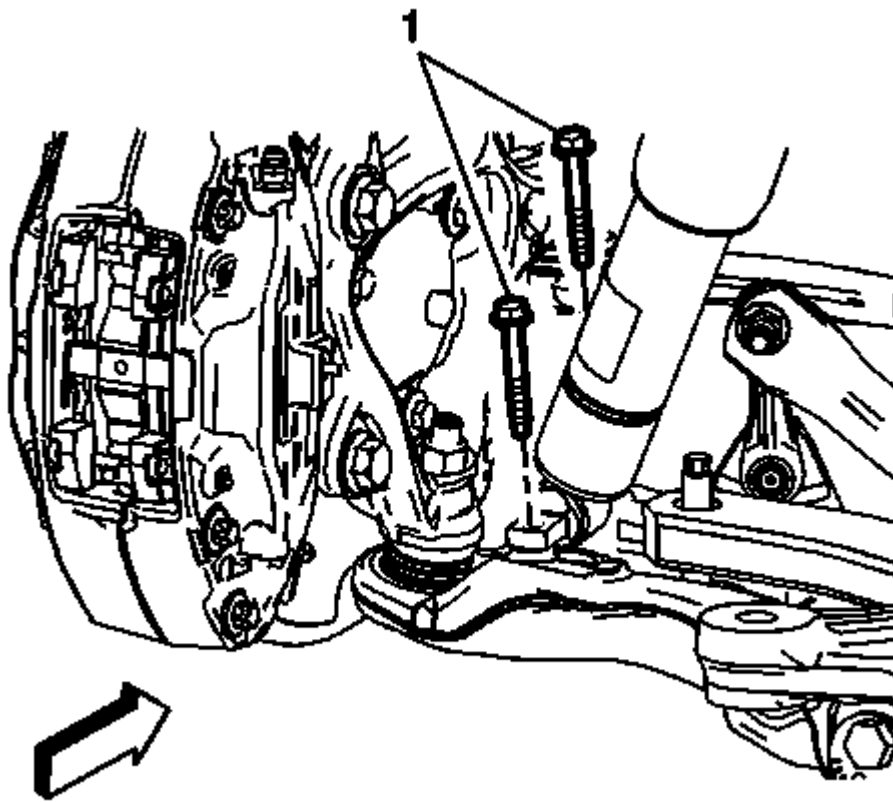


Fig. 16: Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS COMPANY

6. Install the shock absorber lower bolts (1).

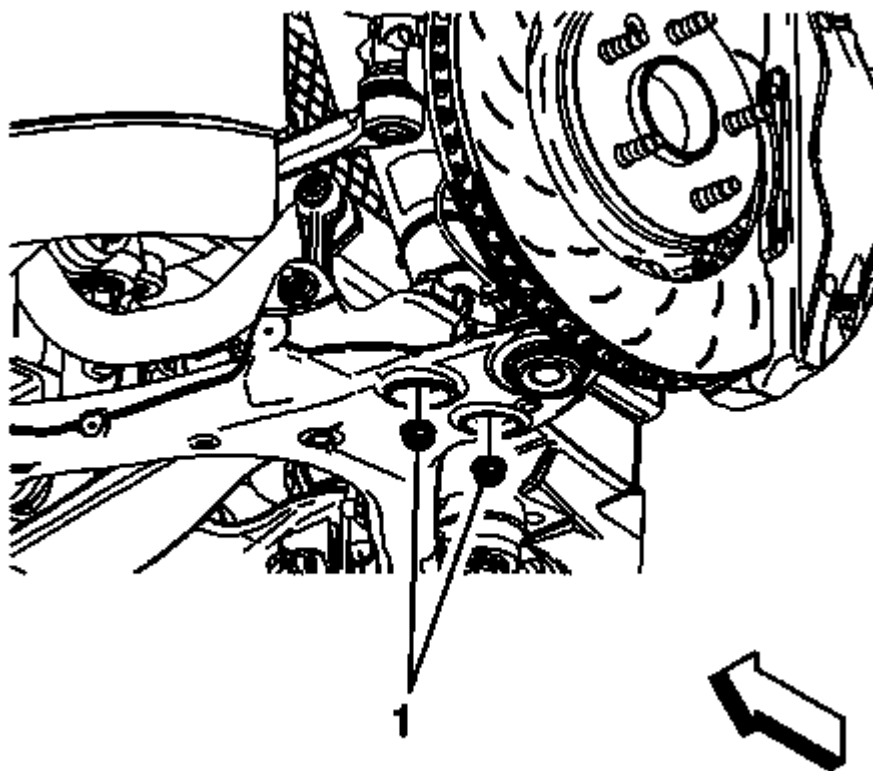


Fig. 17: Shock Absorber Lower Nuts
Courtesy of GENERAL MOTORS COMPANY

7. Install the shock absorber lower nuts (1).

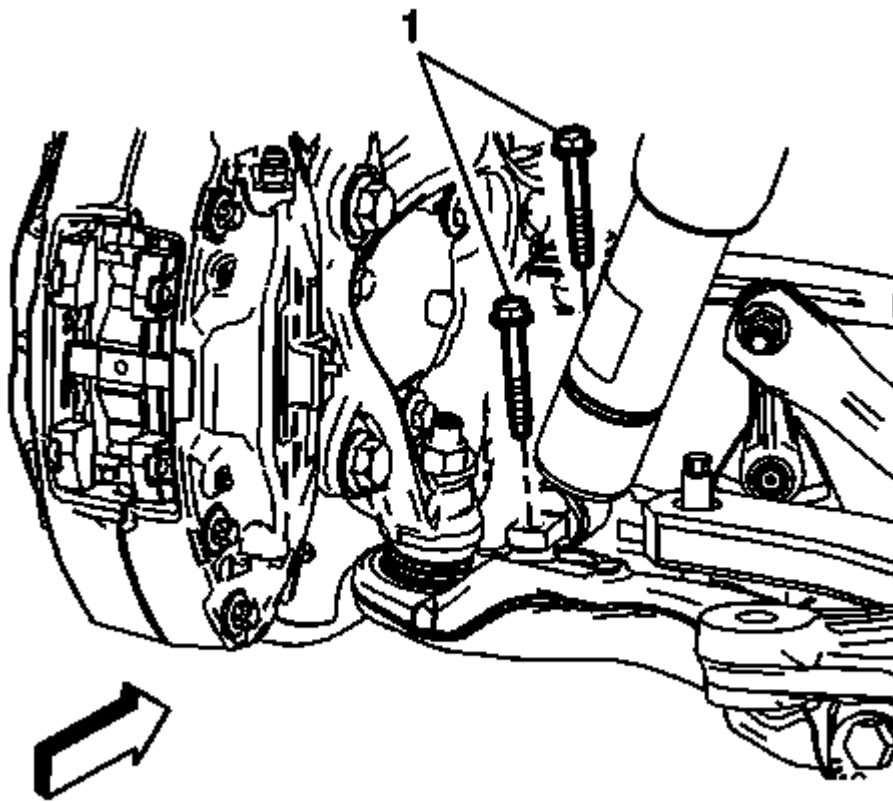


Fig. 18: Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

8. Tighten the shock absorber lower bolts (1) to 32 (24 lb ft).
9. Connect the lower control arm and steering knuckle.

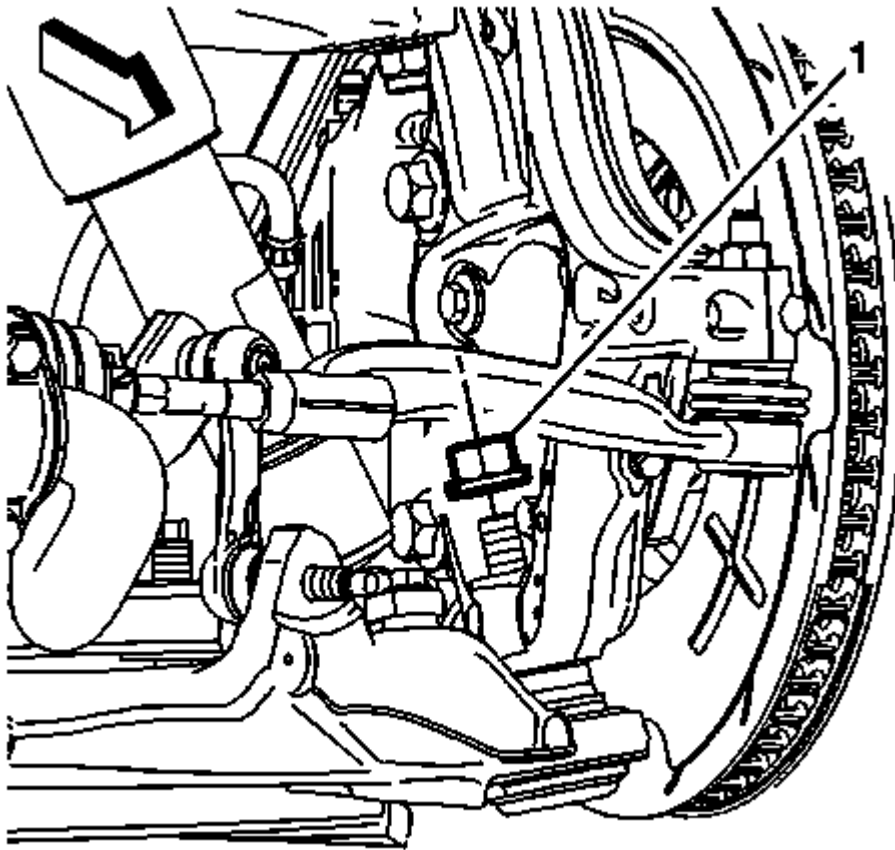


Fig. 19: Steering Knuckle Nut
Courtesy of GENERAL MOTORS COMPANY

10. Install the steering knuckle nut (1) and tighten to 30 N.m (22 lb ft) + 180 degrees.
11. Carefully remove the post jack.
12. Connect any harnesses or retainers previously noted to the lower control arm.
13. If equipped, connect the electronic suspension front position sensor. Refer to **Electronic Suspension Front Position Sensor Replacement** .
14. Connect the stabilizer shaft link to the lower control arm. Refer to **Stabilizer Shaft Link Replacement**.
15. Install the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
16. Measure and adjust the front wheel alignment. Refer to **Wheel Alignment Measurement** .

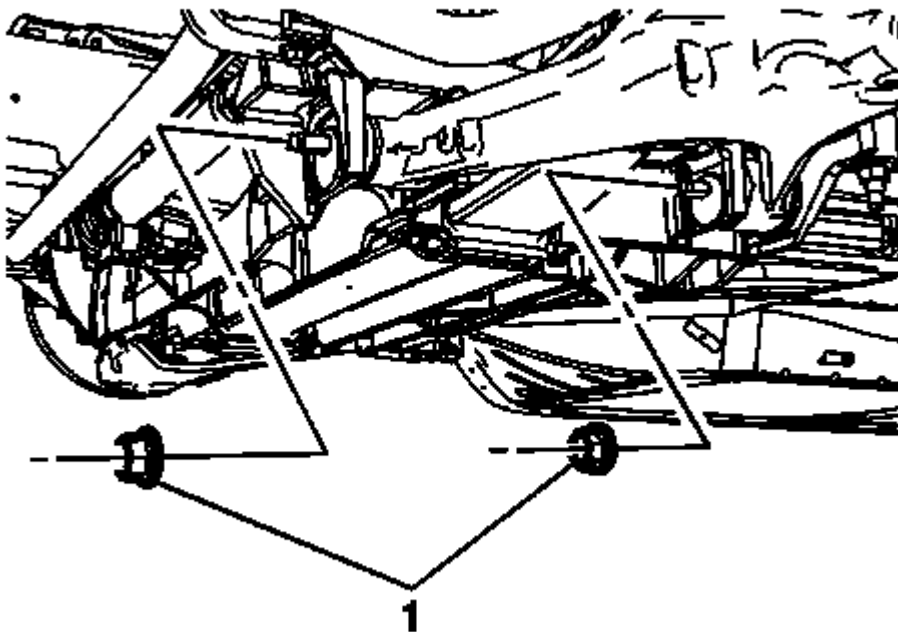


Fig. 20: Lower Control Arm Nuts
Courtesy of GENERAL MOTORS COMPANY

17. After the alignment is complete, verify the trim height is correct and tighten the lower control arm nuts (1) to 170 (125 lb ft).

FRONT SPRING REPLACEMENT

Special Tools

J-33432-B Leaf Spring Compressor

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

Removal Procedure

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

NOTE: It is not necessary to remove both front lower control arms.

3. Remove one of the front lower control arms from the vehicle. Refer to **Lower Control Arm Replacement**.

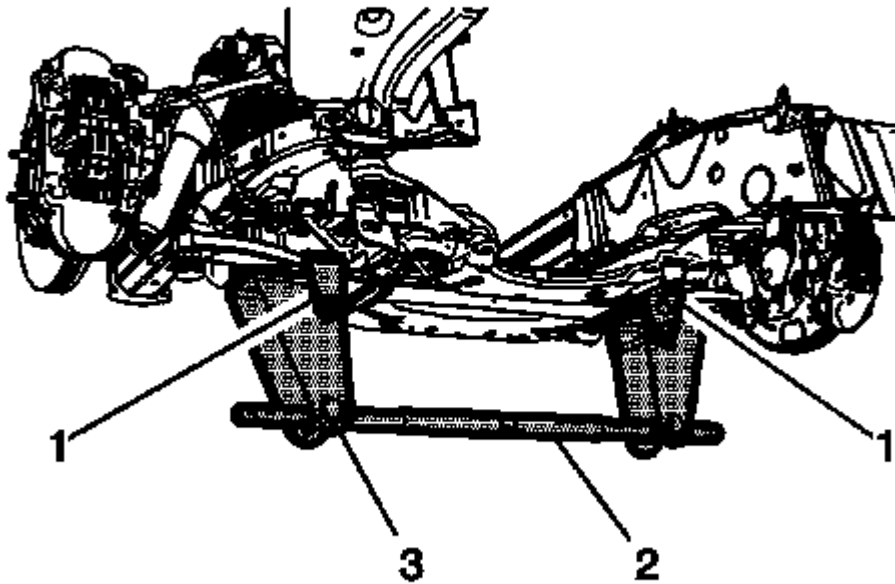


Fig. 21: Using J-33432-B compressor and adapters J-33432--97
Courtesy of GENERAL MOTORS COMPANY

NOTE: Do not scratch the front spring surface.

4. Use the **J-33432-B** compressor (3) and **J-33432-97** adapters (1, 2) to compress the front spring.

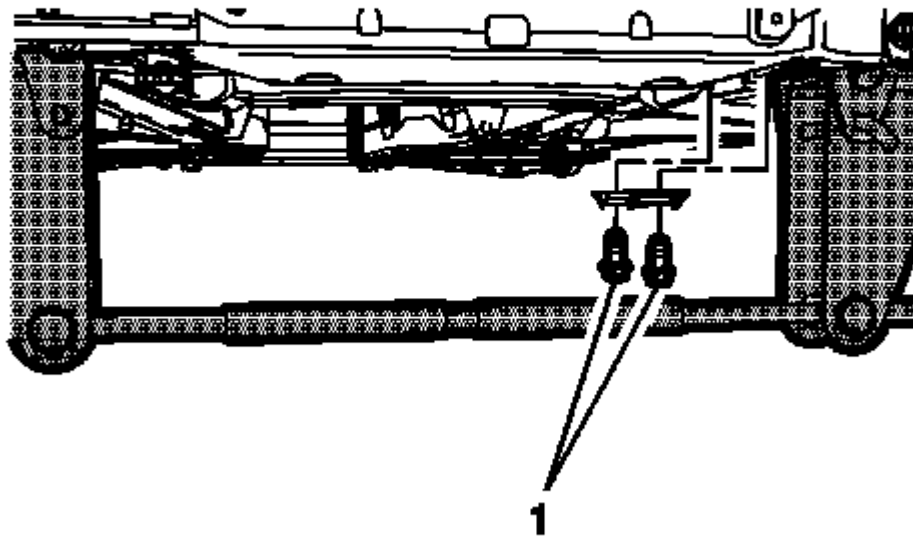


Fig. 22: Transverse Spring Retainer Bolts
Courtesy of GENERAL MOTORS COMPANY

NOTE: Do not reuse the bolts.

5. Remove the front spring retainer bolts (1) and retainers. Discard the bolts.

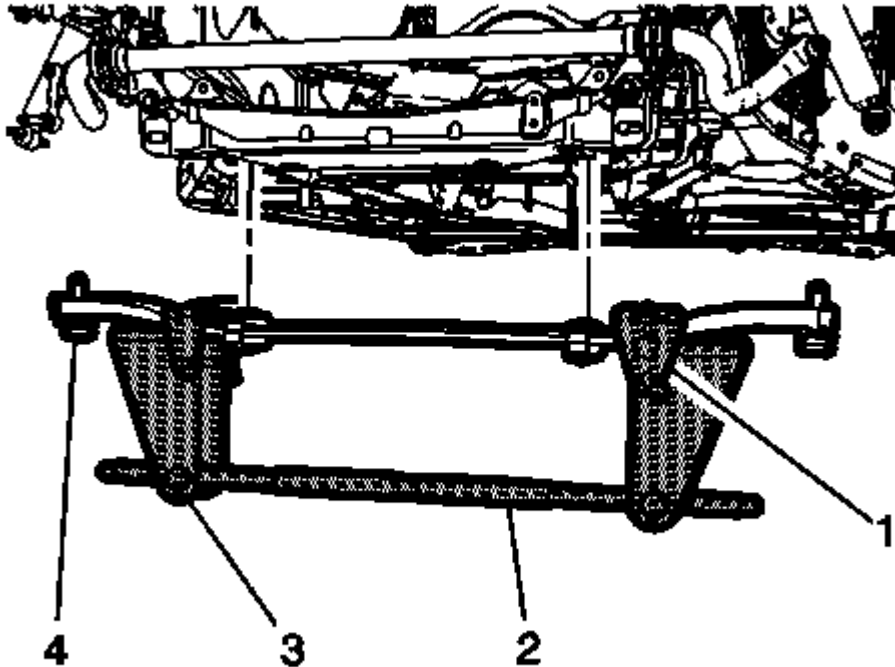


Fig. 23: Transverse Spring

Courtesy of GENERAL MOTORS COMPANY

6. Remove the **J-33432** compressor (3) and front spring (4) from the vehicle.
7. If replacing the front spring, remove the **J-33432-B** compressor (3) and **J-33432-97** adapters (1, 2) from the front transverse spring.
8. If replacing the front spring, measure and record the gap between the surface of the front spring and the spring adjuster pads.
9. If replacing the front spring, remove the spring adjusters.

Installation Procedure

1. If replacing the front spring, install the old spring adjusters on the new spring. Set the spring adjuster gaps to the measurements recorded during removal.

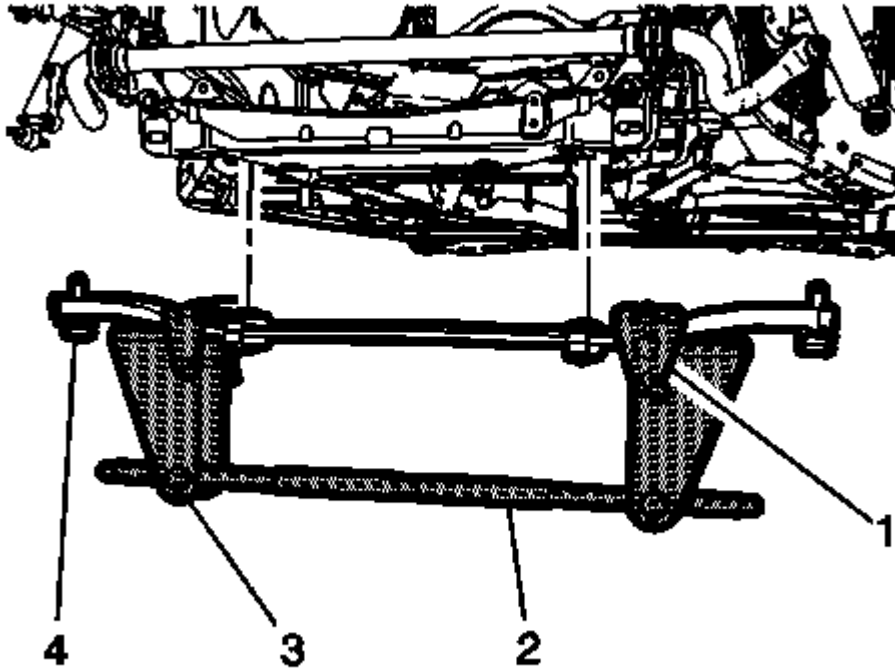


Fig. 24: Transverse Spring

Courtesy of GENERAL MOTORS COMPANY

2. Install the **J-33432-B** compressor (3) and **J-33432-97** adapters (1, 2) on the front spring.
3. Position the front spring (4) and **J-33432-B** compressor (3) and **J-33432-97** adapters (1, 2) on the vehicle.

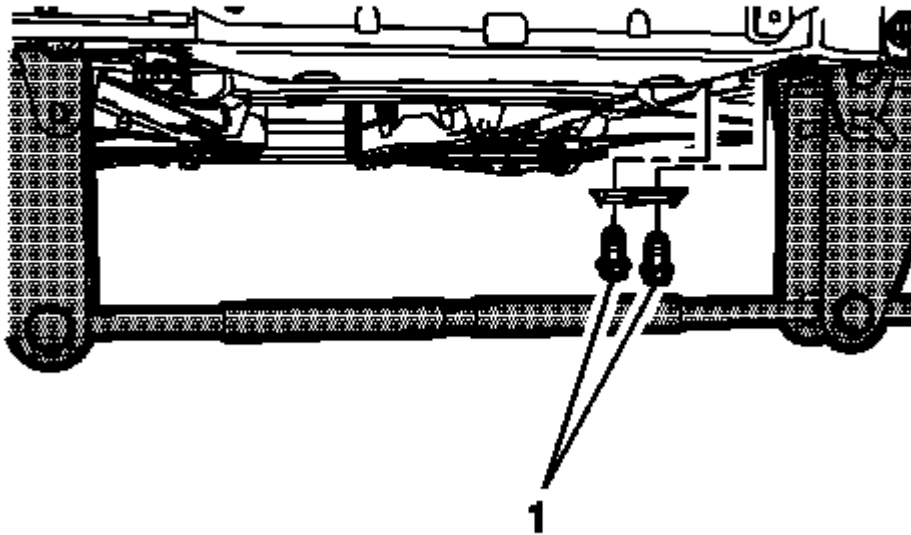


Fig. 25: Transverse Spring Retainer Bolts
Courtesy of GENERAL MOTORS COMPANY

4. Install the front spring retainers and bolts (1). Use NEW bolts only.

CAUTION: Refer to Fastener Caution .

5. Tighten the front spring retainer bolts (1) to 67 (49 lb ft).

CAUTION: 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 suspension.

6. Install the lower control arm assembly. Refer to Lower Control Arm Replacement.

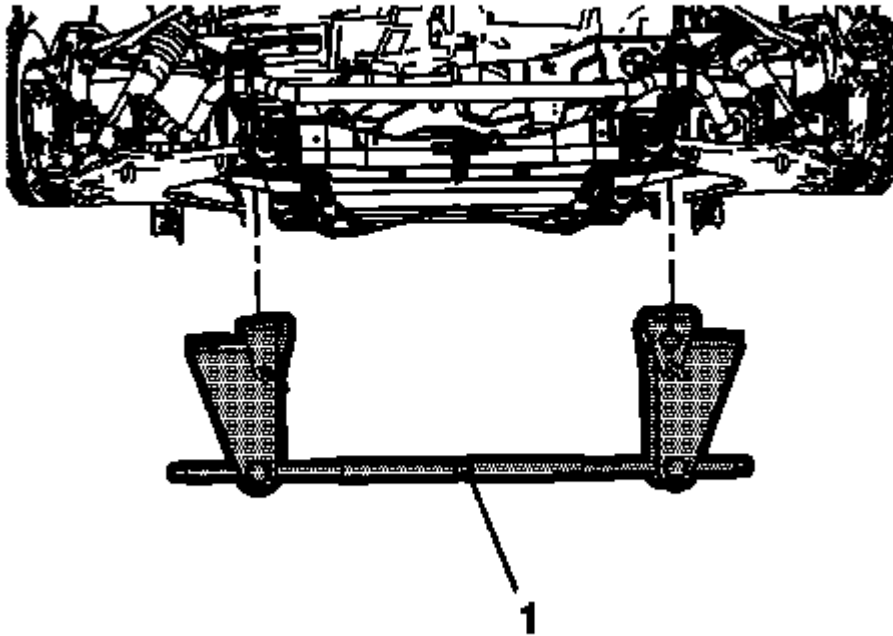


Fig. 26: Compressor And Adapters
Courtesy of GENERAL MOTORS COMPANY

7. Remove the **J-33432-B** compressor (1) and adapters.
8. Install the tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** .
9. Adjust the front trim height. Refer to **Trim Height Specifications** .
10. Measure and adjust the front wheel alignment. Refer to **Wheel Alignment Measurement** .

WHEEL STUD REPLACEMENT

Special Tools

CH-43631 Ball Joint Separator

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

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the front wheel bearing and hub assembly. Refer to **Front Wheel Bearing and Hub**

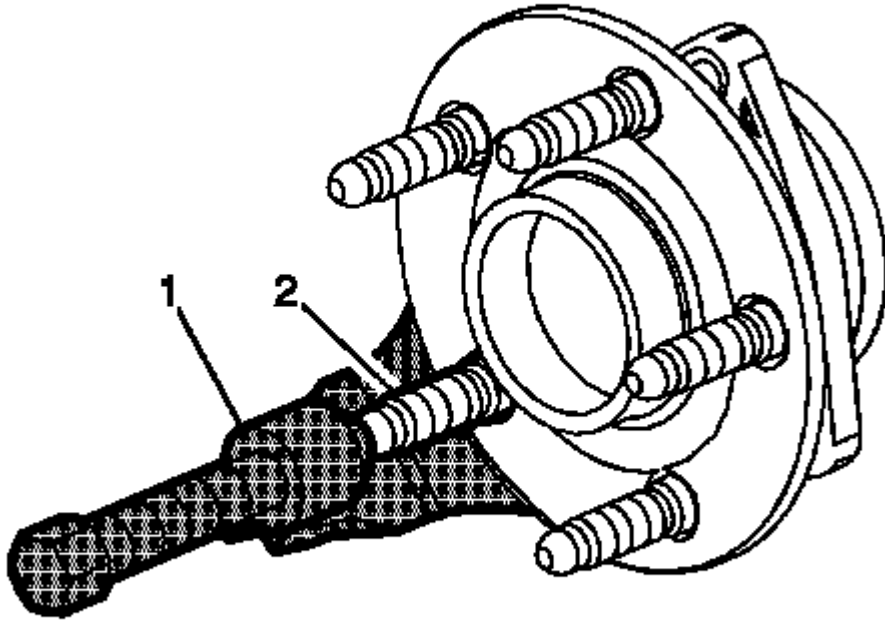


Fig. 27: Use CH-43631 Separator To Remove Wheel Stud
Courtesy of GENERAL MOTORS COMPANY

3. Use the **CH-43631** separator (1) to remove the wheel stud (2) from the front wheel bearing and hub assembly. Discard the stud.

Installation Procedure

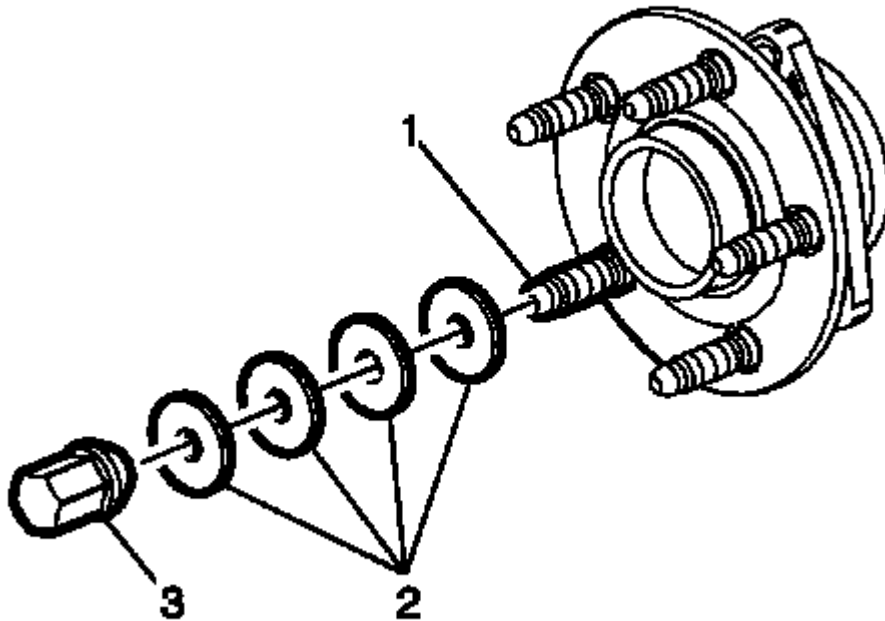


Fig. 28: NEW Wheel Stud, Washers And Old Wheel Nut
Courtesy of GENERAL MOTORS COMPANY

1. Position the NEW wheel stud (1) in the front wheel bearing and hub assembly.
2. Install flat washers (2) and an old wheel nut (3) on the wheel stud (1).
3. Use a suitable tool to prevent the flange on the front wheel bearing and hub assembly from turning.
4. Tighten the wheel nut (3) until the wheel stud (1) is firmly seated.
5. Remove the wheel nut (3) and flat washers (2).
6. Install the front wheel bearing and hub assembly. Refer to **Front Wheel Bearing and Hub Replacement**.

SHOCK ABSORBER REPLACEMENT

Removal Procedure

1. Disconnect the shock absorber electrical connector, if equipped.
2. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
3. Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .

NOTE: Position the jack stand so the shock absorber lower nuts are not obstructed.

4. Support the lower control arm with a jack stand.

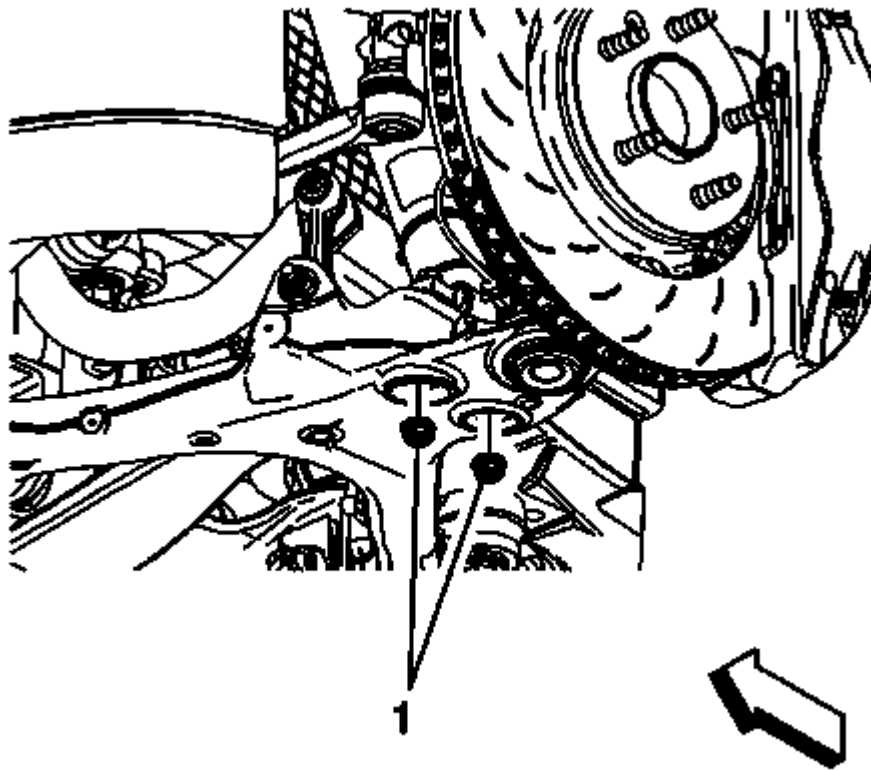


Fig. 29: Shock Absorber Lower Nuts
Courtesy of GENERAL MOTORS COMPANY

5. Remove the shock absorber lower nuts (1).

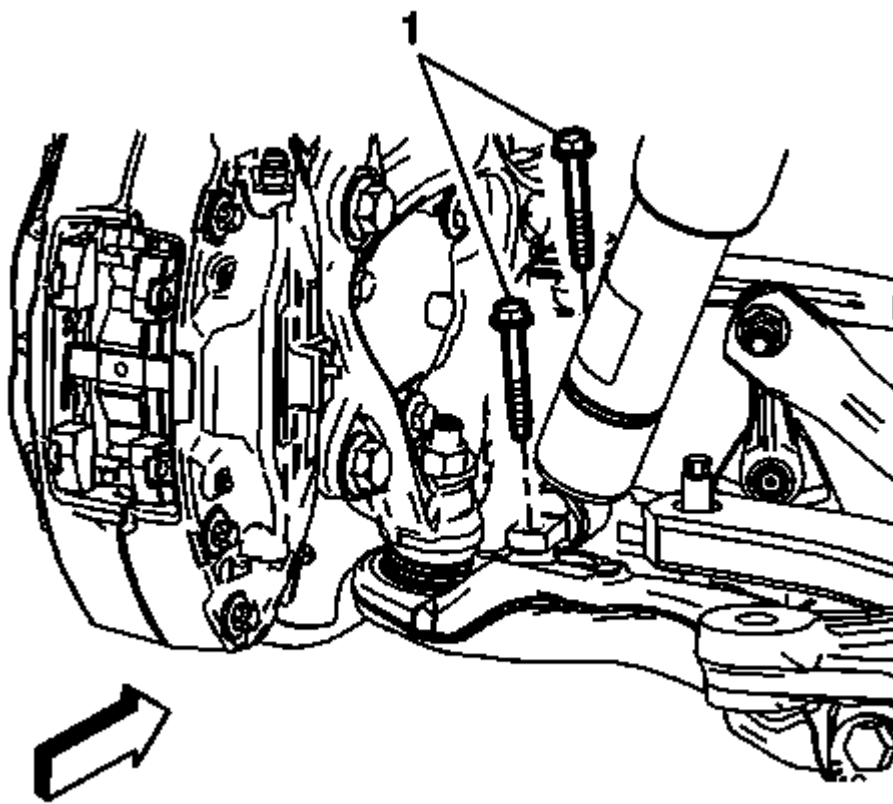


Fig. 30: Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS COMPANY

6. Remove the shock absorber lower bolts (1).

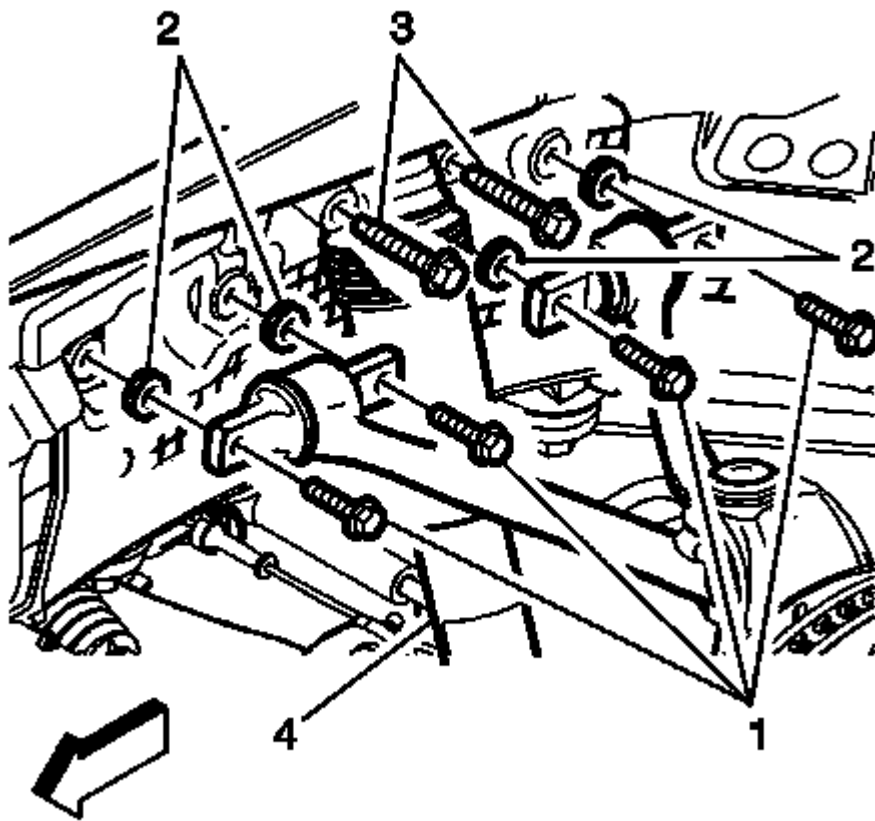


Fig. 31: Upper Control Arm Bolts And Washers
Courtesy of GENERAL MOTORS COMPANY

7. Remove the upper control arm bolts (1) and washers (2).
8. Remove the shock absorber upper bolts (3).
9. Tilt the upper control arm and steering knuckle outward and remove the shock absorber (4) from the vehicle.

Installation Procedure

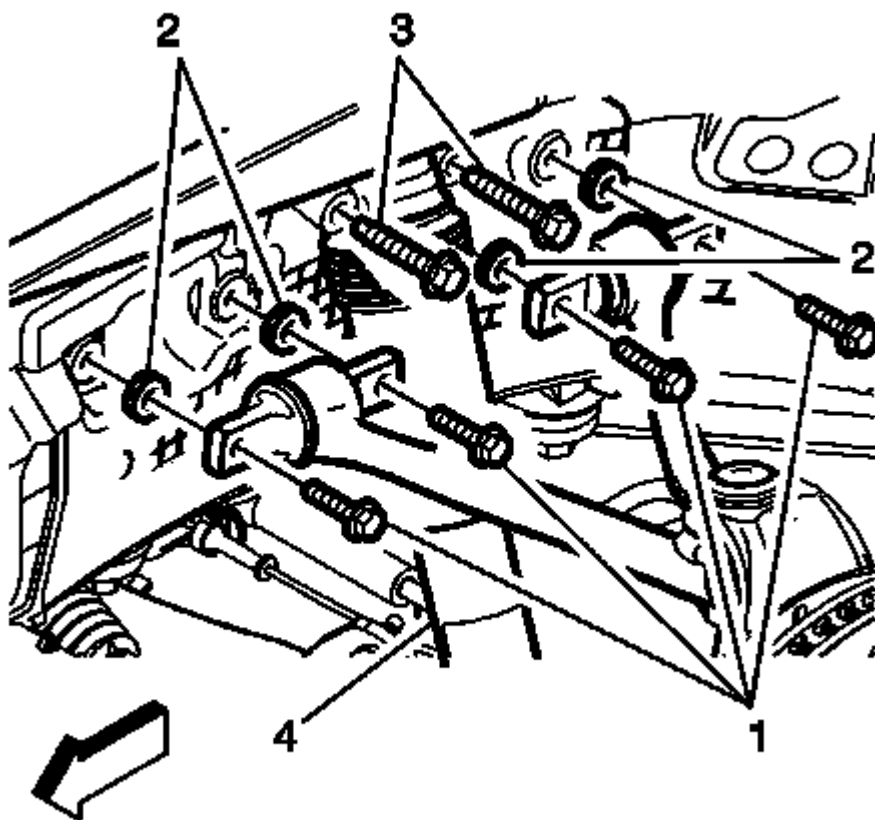


Fig. 32: Upper Control Arm Bolts And Washers
Courtesy of GENERAL MOTORS COMPANY

1. Position the upper control arm (4) on the vehicle.

CAUTION: Refer to Fastener Caution .

NOTE: The upper control arm washers must be installed in the same position as removed. If a washer with a rubber insert is installed, the rubber insert must be against the frame rail. DO NOT stack more than one washer with a rubber insert.

2. Install the shock absorber upper bolts (3) and tighten to 100 (74 lb ft).
3. Install the upper control arm washers (2) and bolts (1) and tighten to 65 (48 lb ft).

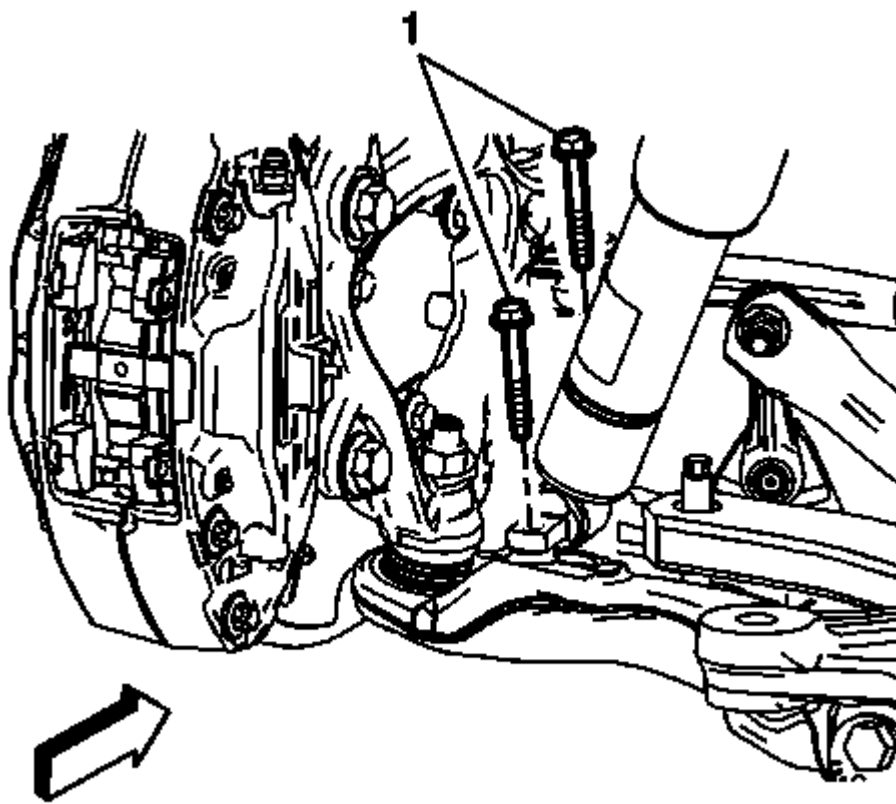


Fig. 33: Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS COMPANY

4. Install the shock absorber lower bolts (1).

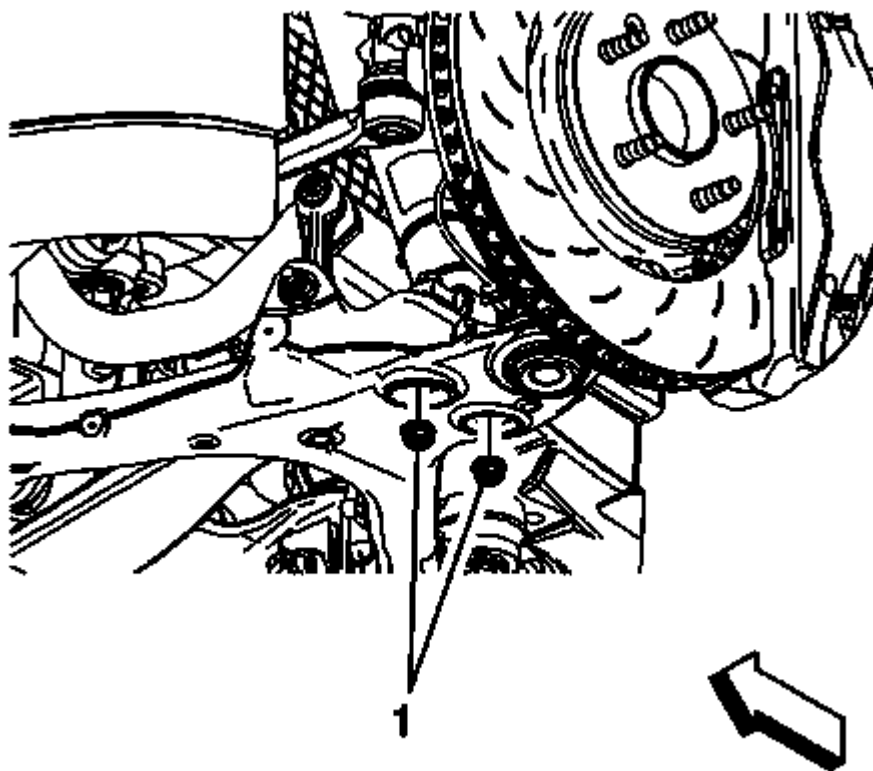


Fig. 34: Shock Absorber Lower Nuts
Courtesy of GENERAL MOTORS COMPANY

5. Install the shock absorber lower nuts (1).

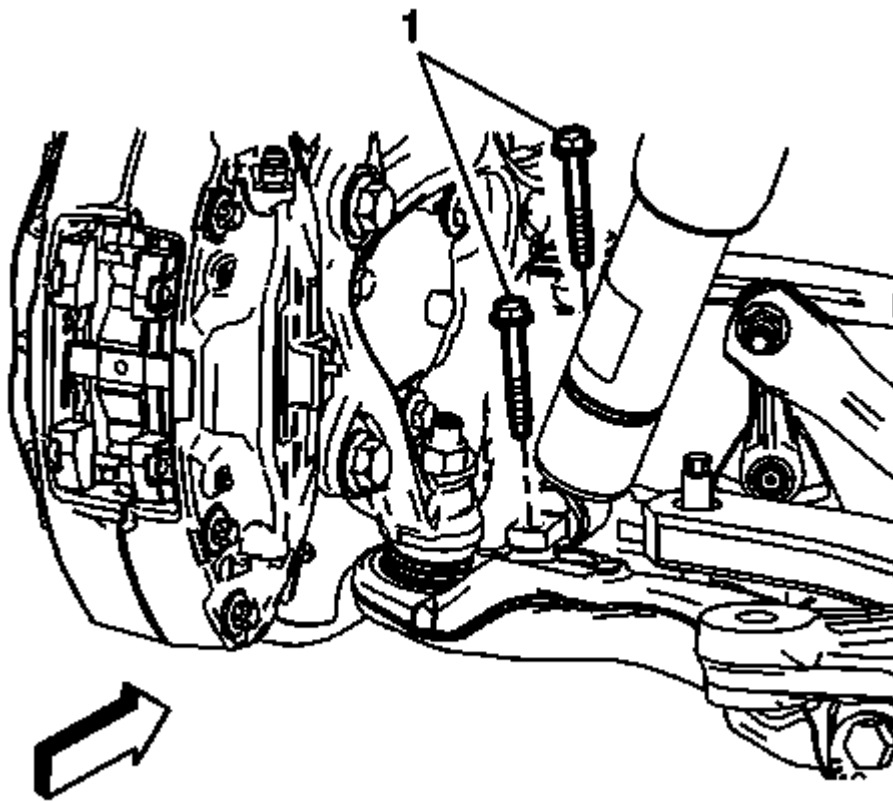


Fig. 35: Shock Absorber Lower Bolts
Courtesy of GENERAL MOTORS COMPANY

6. Tighten the shock absorber lower bolts (1) to 32 (24 lb ft).
7. Remove the jack stand from under the control arm.
8. Install the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .
9. Connect the shock absorber electrical connector, if equipped.

DESCRIPTION AND OPERATION

FRONT SUSPENSION DESCRIPTION AND OPERATION

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.

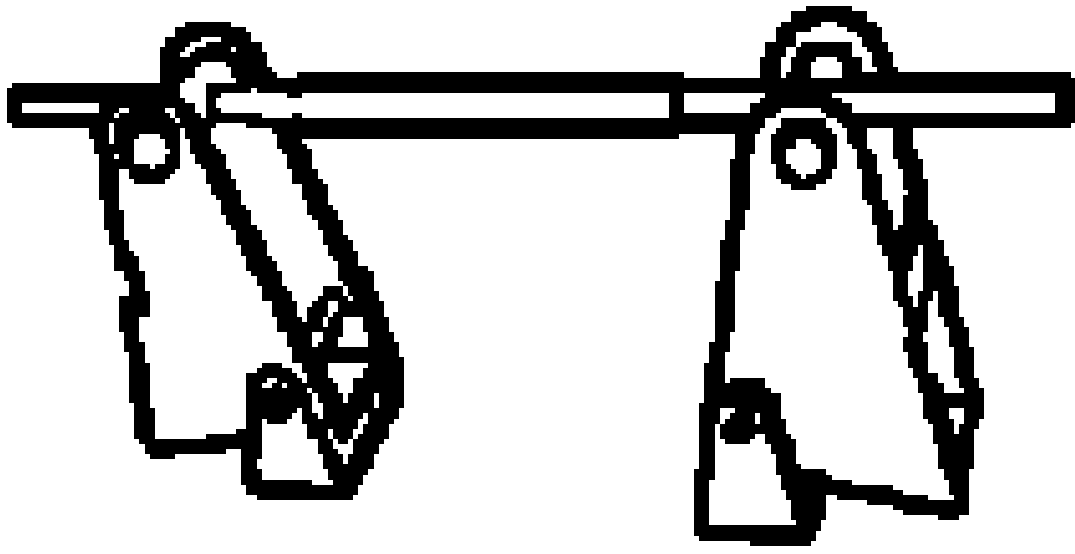
The shock absorbers attach at the upper end to the frame and attach at the lower control arm. The shock absorber helps keep the wheel in contact with the road surface under most road conditions. The shock absorber reduces crash-through at full jounce and rebound.

The standard gas shocks and the optional Electronic Suspension Control (ESC) 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

SPECIAL TOOLS

Illustration	Tool Number/ Description
	CH-33432-B J-33432-B Leaf Spring Compressor



CH-42188-B
J-42188-B
Ball Joint
Separator

CH-43631
CH-49455
J-43631
Ball Joint
Remover

