

2008 Chevrolet Silverado 1500

2008 STEERING Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

2008 STEERING

Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Idler Arm Nut (at the Relay Rod)	62 N.m	46 lb ft
Idler Arm Nut (at the Vehicle Frame)	105 N.m	78 lb ft
Pitman Arm Nut (at the Relay Rod)	62 N.m	46 lb ft
Pitman Arm Nut (at the Steering Gear)	250 N.m	184 lb ft
Steering Linkage Shock Absorber Nut	40 N.m	30 lb ft
Steering Linkage Inner Tie Rod	100 N.m	74 lb ft
Steering Linkage Outer Tie Rod Nut	60 N.m	44 lb ft

REPAIR INSTRUCTIONS

STEERING LINKAGE INSPECTION

Tools Required

- **J 45101** Hub and Wheel Runout Gage
- **J 42640** Steering Column Anti-Rotation Pin

Inspection

1. Elevate the left front of the vehicle and install suitable vehicle support maintaining contact between the right front tire/wheel assembly and the shop floor.

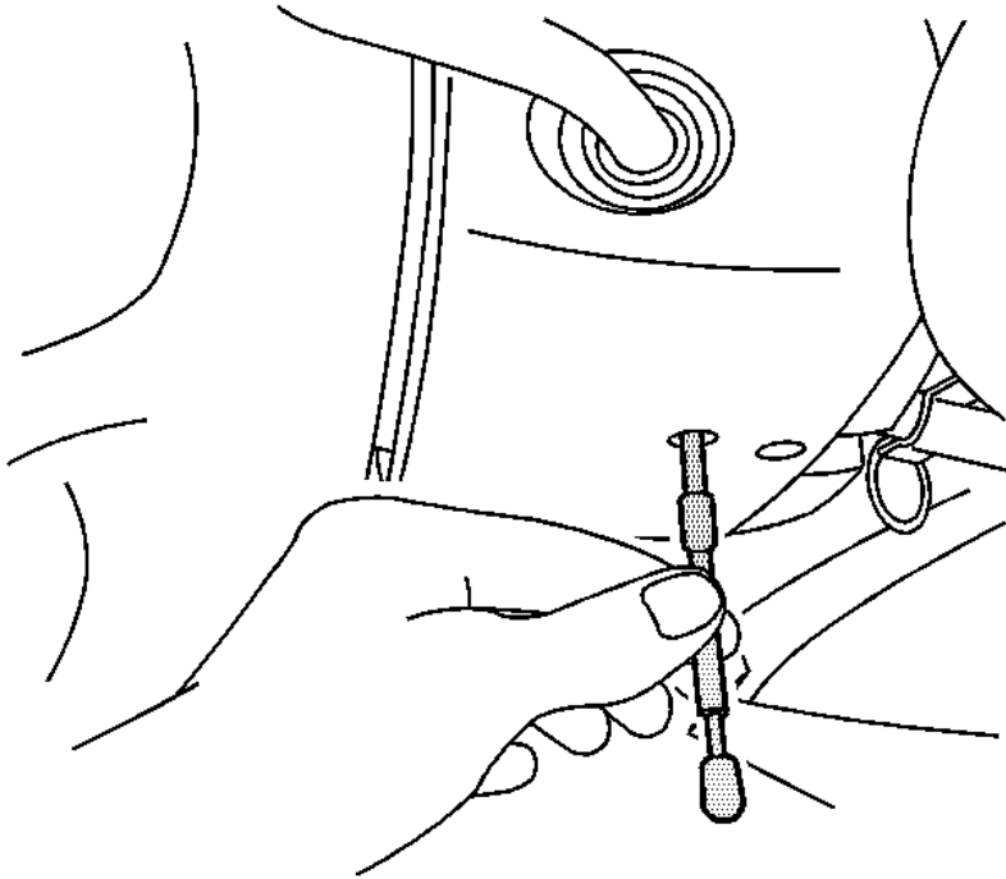


Fig. 1: Identifying J 42640

Courtesy of GENERAL MOTORS CORP.

2. Position the wheels in a straight-ahead position and install anti-rotation pin **J 42640** .

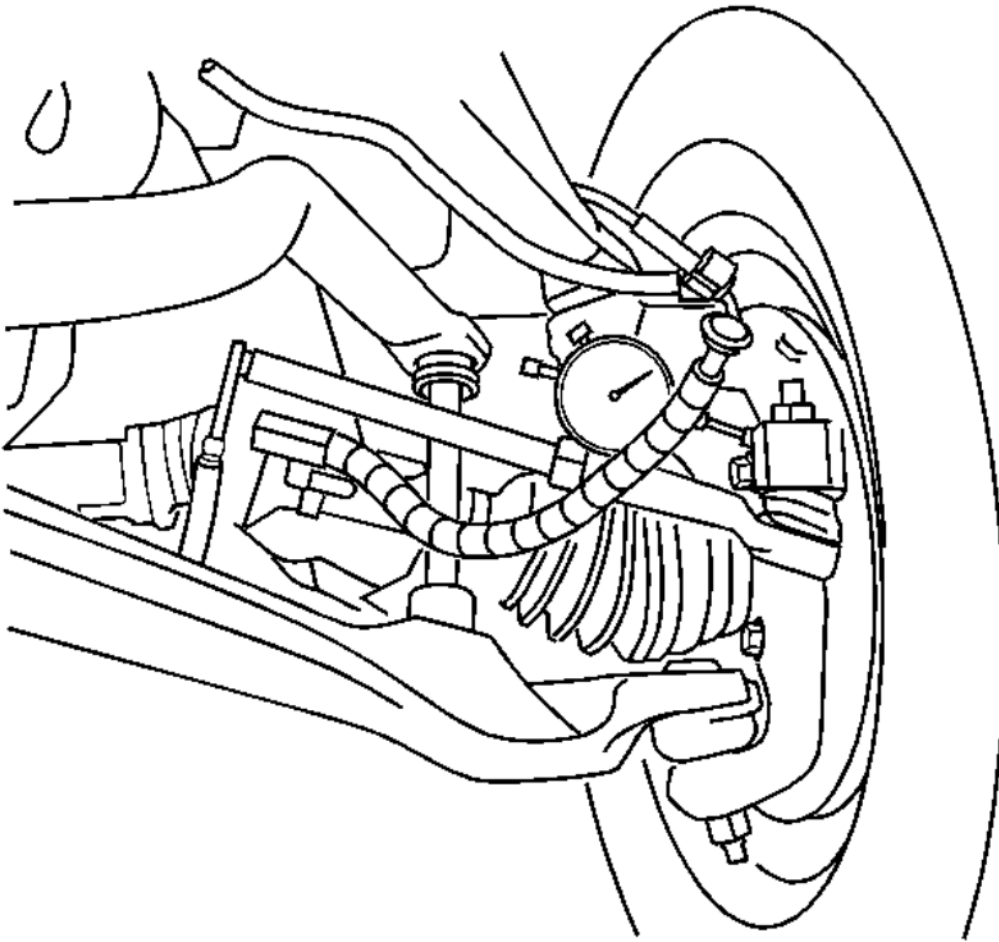


Fig. 2: Installing Dial Indicator Between Outer Tie Rod And Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

3. Install a dial indicator between the steering linkage outer tie rod and the steering knuckle as shown and push slowly inward with one hand to remove the lash.
4. Place the dial indicator at zero, pull outward on the tire, and note the amount of movement in the joint.

The movement should not exceed 1.0 mm (0.039 in).

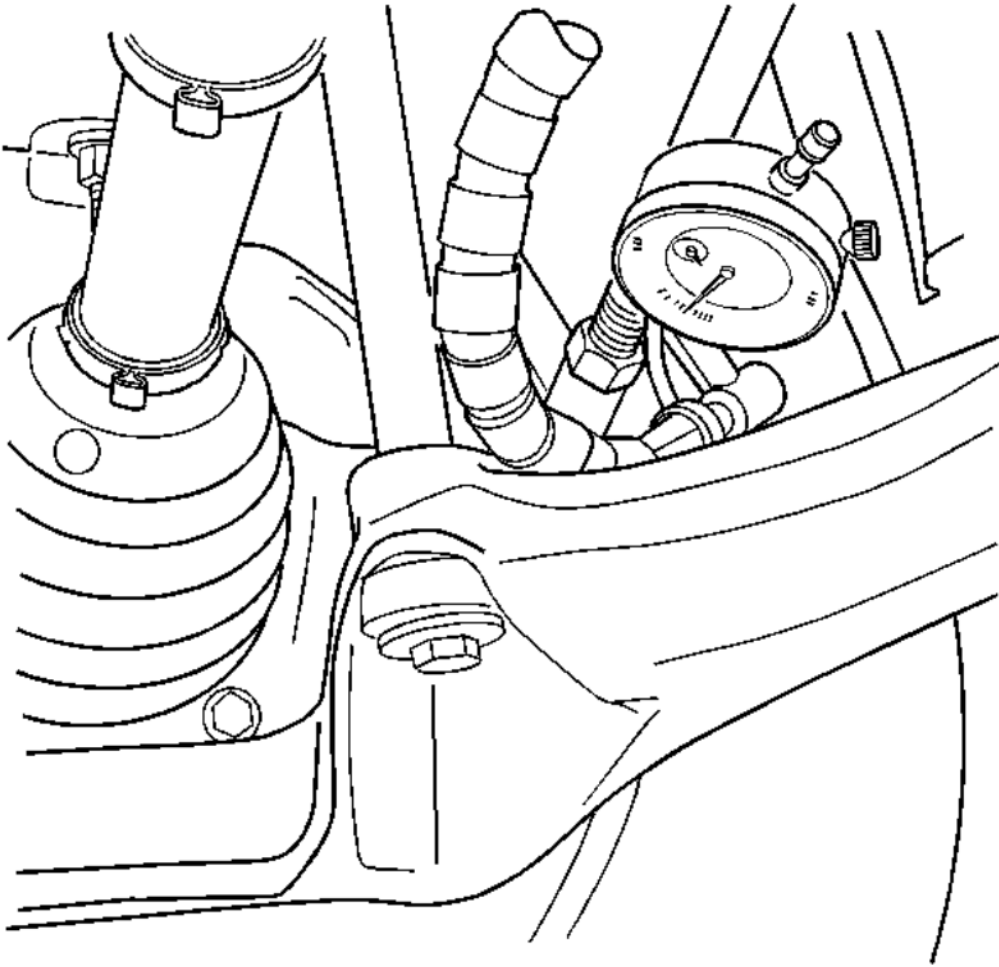


Fig. 3: Installing Dial Indicator Between Outer Tie Rod End And Jam Nut
Courtesy of GENERAL MOTORS CORP.

5. Install the dial indicator between the steering linkage outer tie rod and the steering linkage inner tie rod nut and attach the other end to the relay rod as shown and push slowly inward on the tire with one hand to remove the lash.
6. Place the dial indicator at zero, pull outward, and note the amount of movement in the joint.

The movement should not exceed 1.0 mm (0.039 in).

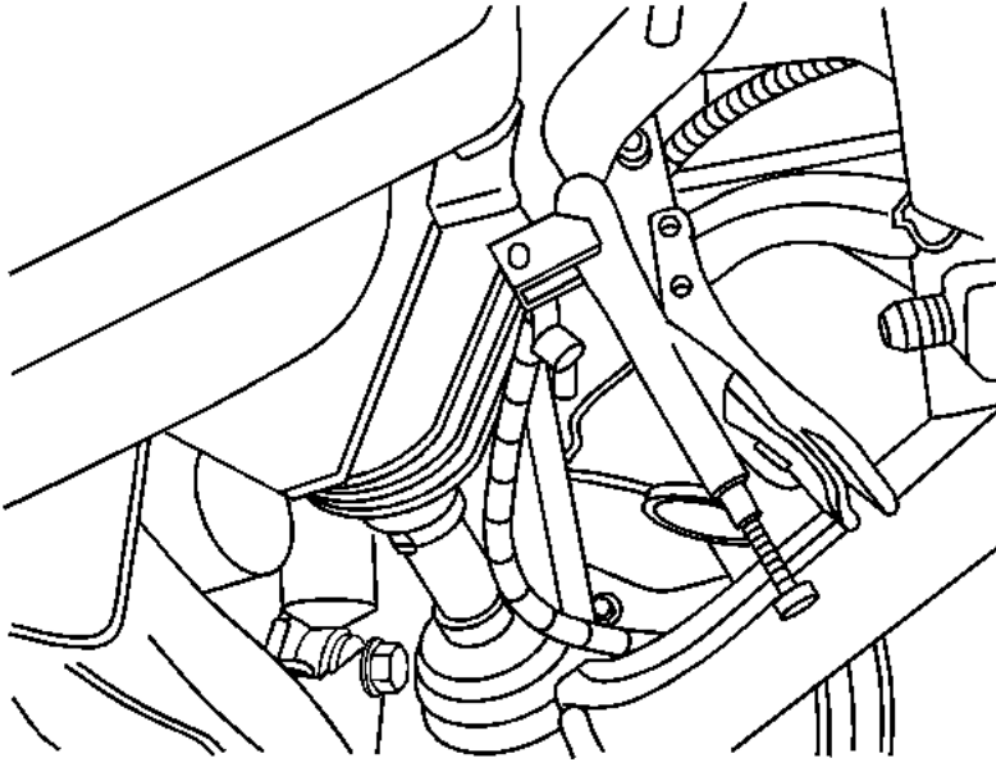


Fig. 4: Installing Dial Indicator Between Pitman Arm And Relay Rod
Courtesy of GENERAL MOTORS CORP.

7. Install the dial indicator between the pitman arm and the relay rod as shown and push slowly inward on the tire with one hand to remove the lash.

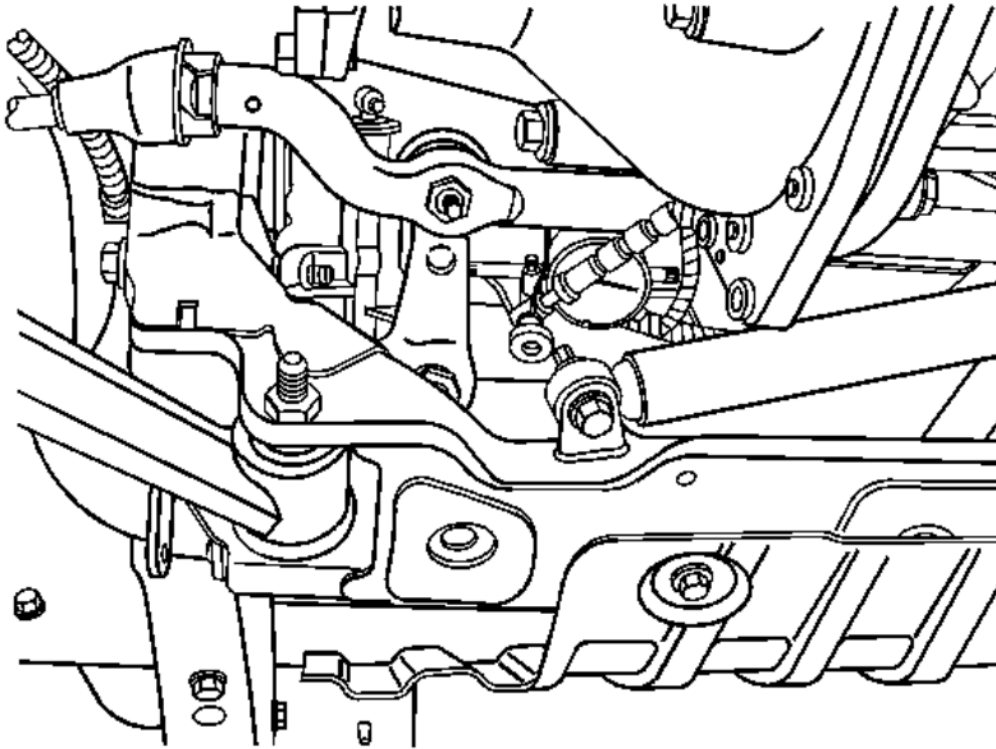


Fig. 5: Measuring Amount Of Movement In Left Side Joint
Courtesy of GENERAL MOTORS CORP.

8. Place the dial indicator at zero, pull outward, and note the amount of movement in the joint.

The movement should not exceed 1.0 mm (0.039 in).

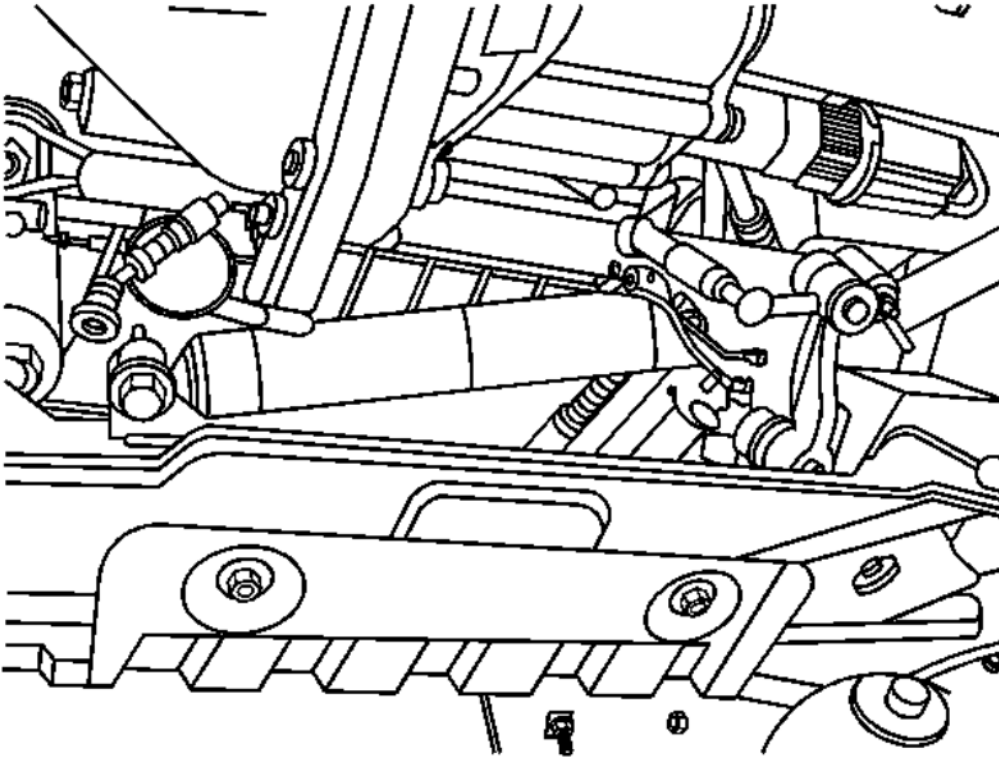


Fig. 6: Elevating Right Front Of Vehicle
Courtesy of GENERAL MOTORS CORP.

9. Elevate the right front of vehicle and install a suitable vehicle support maintaining contact between the left front tire/wheel assembly and the shop floor.

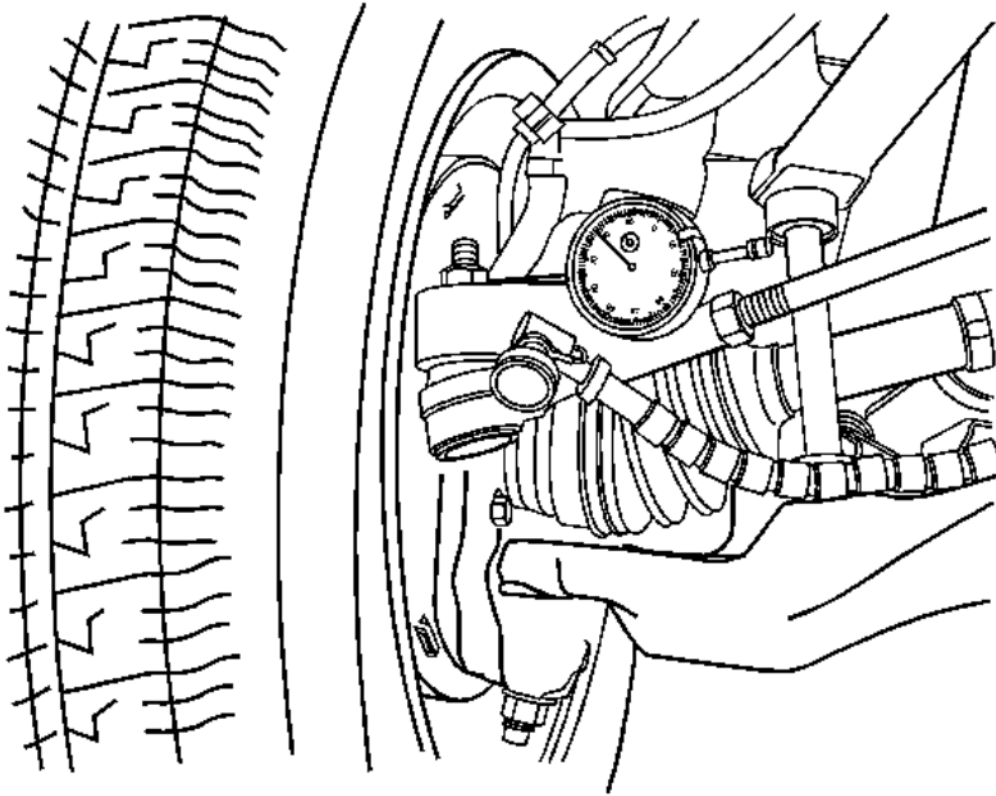


Fig. 7: Installing Dial Indicator Between Outer Tie Rod And Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

10. Install a dial indicator between the steering linkage outer tie rod and the steering knuckle as shown and push slowly inward with one hand to remove the lash.

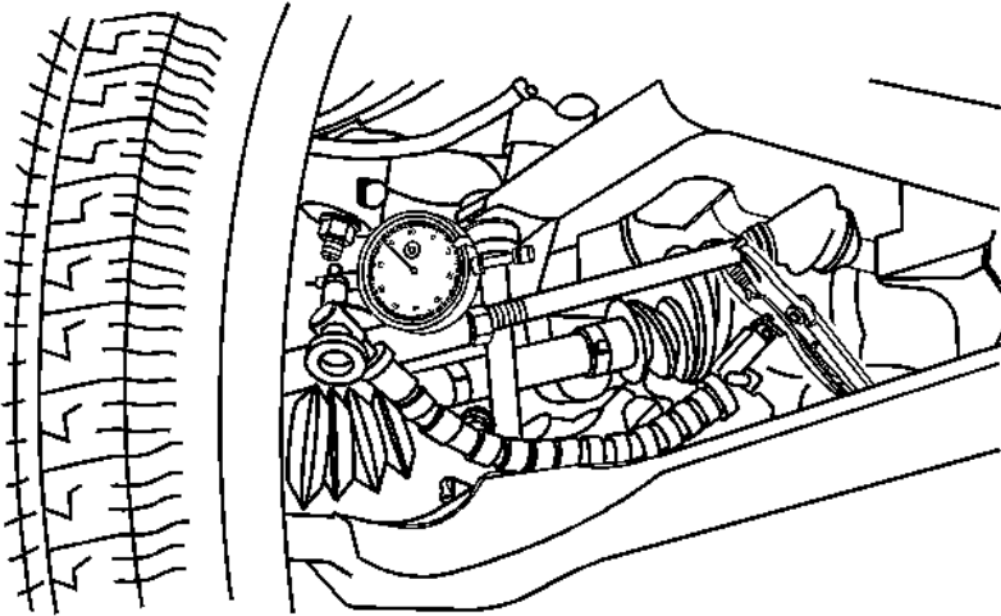


Fig. 8: Noting Amount Of Movement In Right Side Joint
Courtesy of GENERAL MOTORS CORP.

11. Place the dial indicator at zero, pull outward, and note the amount of movement in the joint.

The movement should not exceed 1.0 mm (0.039 in).

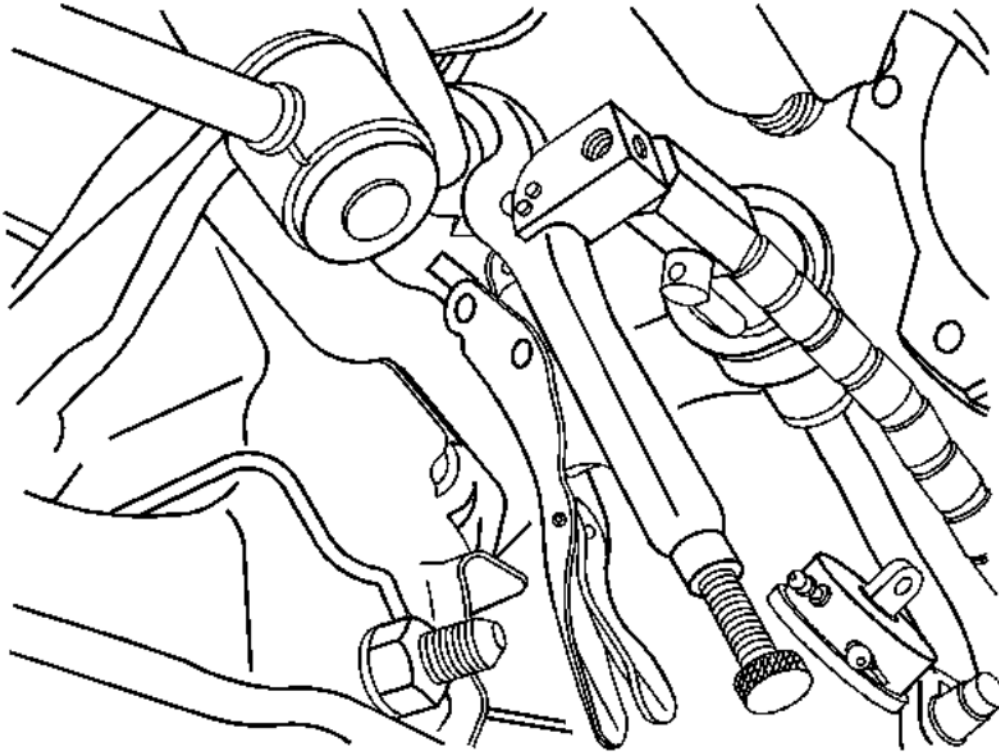


Fig. 9: Installing Dial Indicator Between Outer Tie Rod End And Relay Rod
Courtesy of GENERAL MOTORS CORP.

12. Install the dial indicator between the steering linkage outer tie rod end and the relay rod as shown and push slowly inward with one hand to remove the lash.

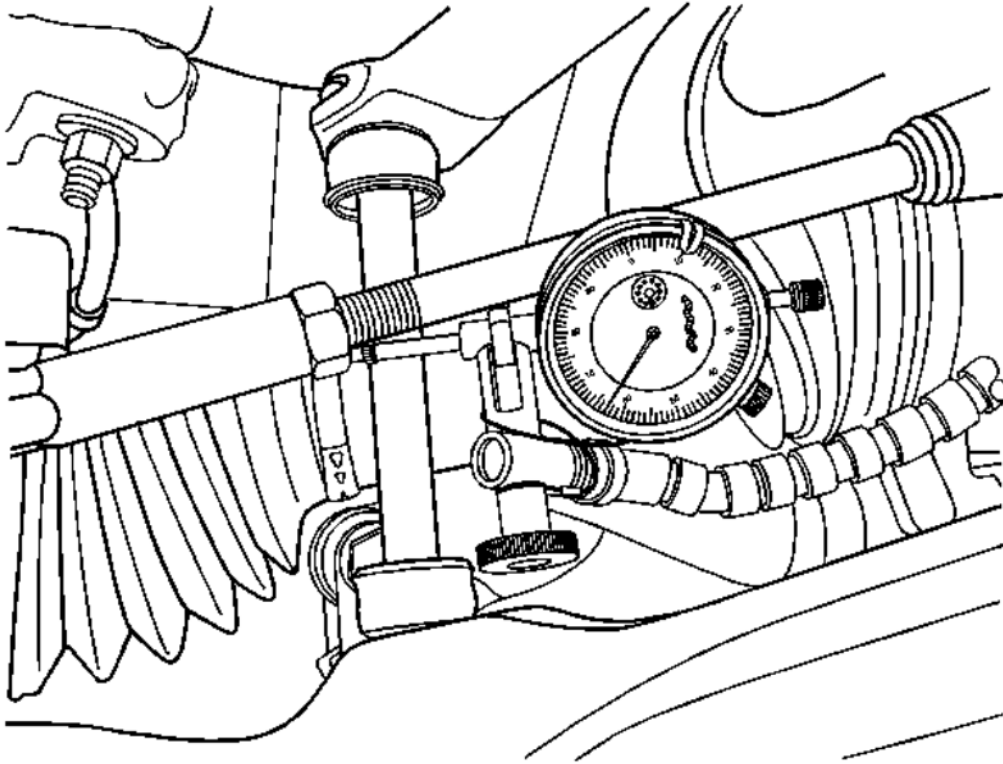


Fig. 10: Noting Amount Of Movement In Right Side Tie Rod End
Courtesy of GENERAL MOTORS CORP.

13. Place the dial indicator at zero, pull outward, and note the amount of movement in the joint.

The movement should not exceed 1.0 mm (0.039 in).

STEERING LINKAGE OUTER TIE ROD REPLACEMENT

2008 Chevrolet Silverado 1500

2008 STEERING Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

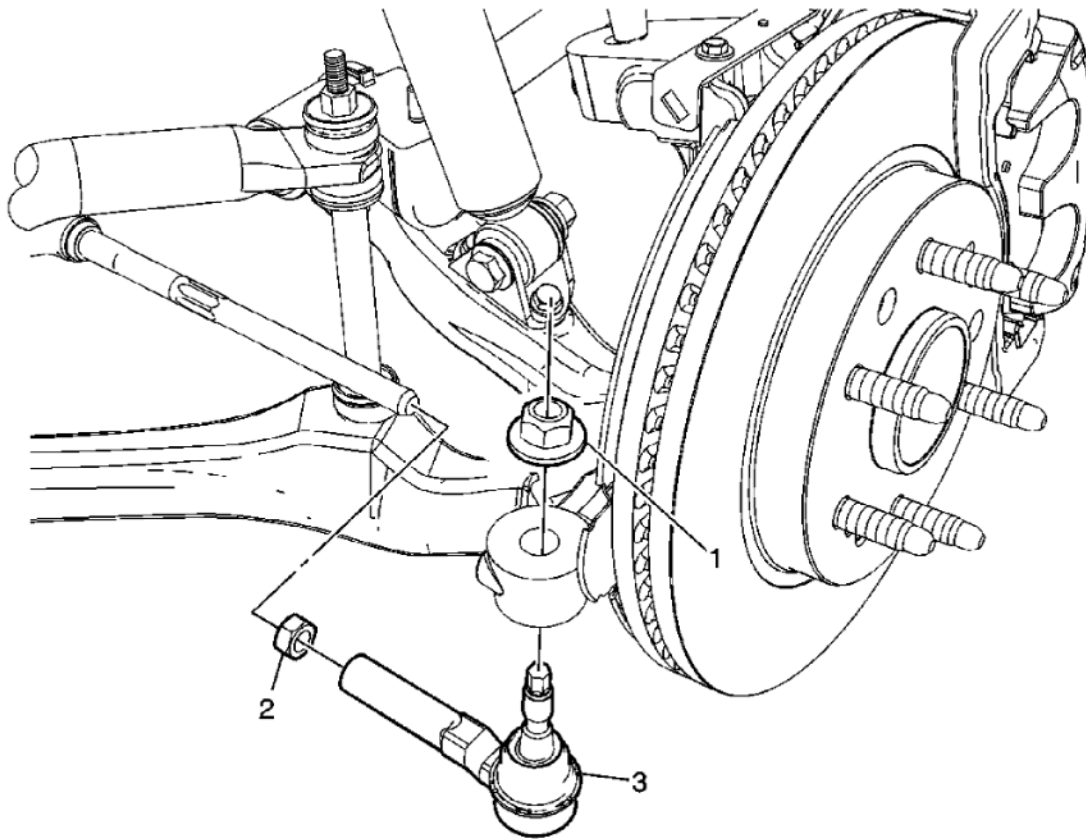


Fig. 11: Steering Linkage Outer Tie Rod
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove the front tire/wheel. Refer to <u>Tire and Wheel Removal and Installation</u> .	
1	Steering Linkage Outer Tie Rod Nut NOTE: Refer to <u>Fastener Notice</u> . Tighten: 60 N.m (44 lb ft)
2	Steering Linkage Inner Tie Rod Nut Procedure: Only loosen the steering linkage inner tie rod nut. Do not remove it.
	Steering Linkage Outer Tie Rod Procedure

2008 Chevrolet Silverado 1500

2008 STEERING Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

3

1. Use puller **J 24319-B** to separate the steering linkage outer tie rod from the steering knuckle.
2. Inspect the steering linkage inner tie rod for bent or damaged threads. Repair or replace the steering linkage inner tie rod as necessary. Refer to **Steering Linkage Inner Tie Rod Replacement**.
3. Clean the tapered surface of the steering knuckle.
4. Lubricate the steering linkage inner tie rod threads with chassis lubricant. Refer to **Fluid and Lubricant Recommendations** .
5. Adjust the front toe. Refer to **Front Toe Adjustment** .

Special Tools:

J 24319-B Steering Linkage and Tie Rod Puller

STEERING LINKAGE INNER TIE ROD REPLACEMENT

Tools Required

J 34028 Inner Tie Rod Wrench. See **Special Tools**.

Removal Procedure

1. Remove the engine shield, if equipped. Refer to **Engine Shield Replacement** .
2. Remove the steering linkage outer tie rod. Refer to **Steering Linkage Outer Tie Rod Replacement**.

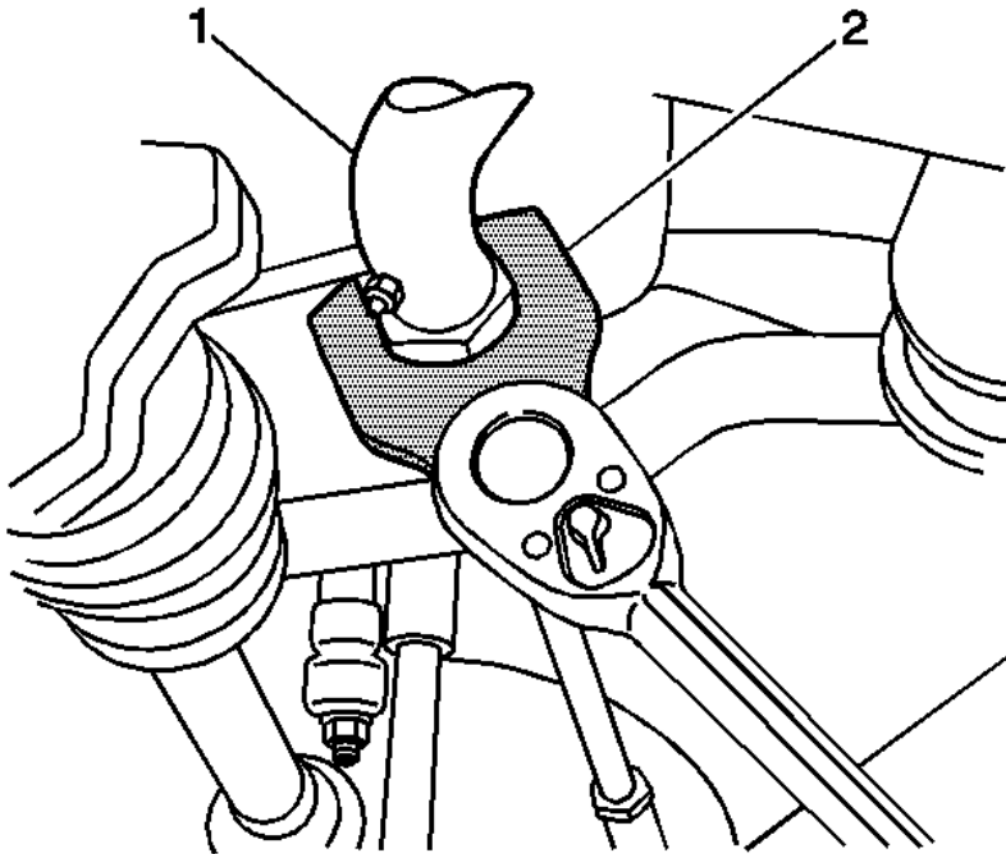


Fig. 12: Inner Tie Rods Ends
Courtesy of GENERAL MOTORS CORP.

3. Remove the steering linkage inner tie rod (1) from the relay rod using wrench **J 34028** (2). See **Special Tools**.

Installation Procedure

1. Remove all traces of oil, grease, or other contaminants.
2. Clean the threads of the steering linkage inner tie rod with denatured alcohol or the equivalent and allow to dry.
3. Apply red LOCTITE™ threadlocker, GM P/N 12345493 (Canadian P/N 10953488) to the threads of the steering linkage inner tie rod.

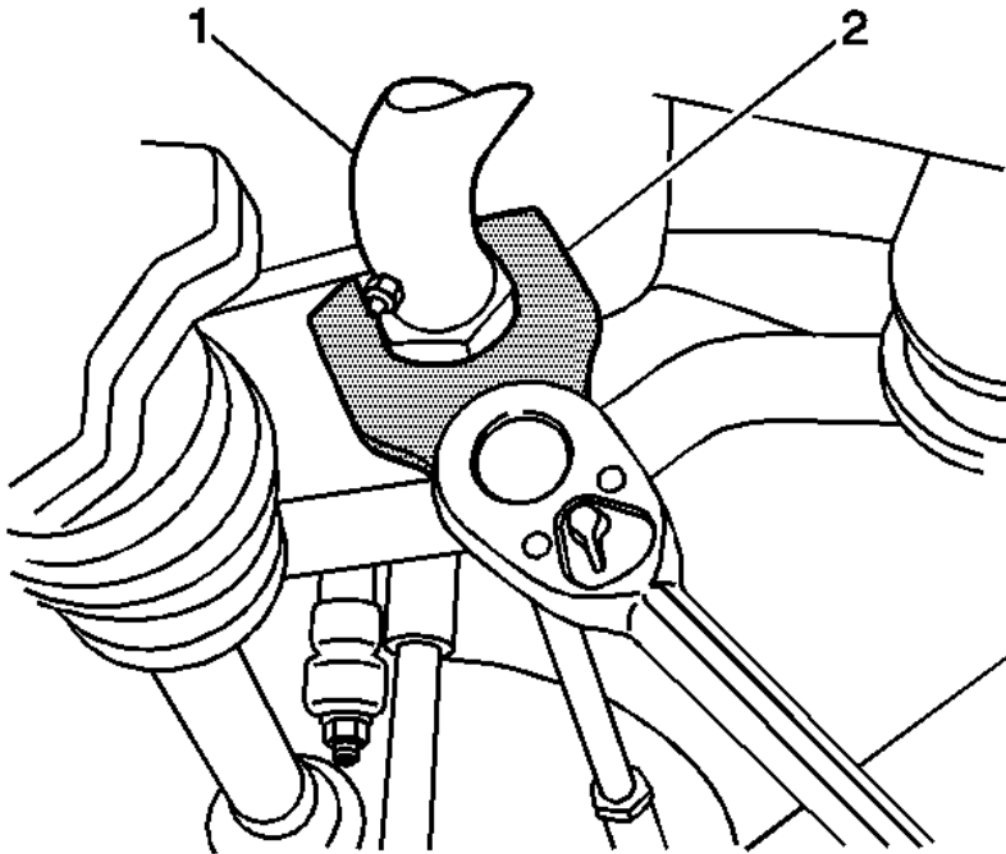


Fig. 13: Inner Tie Rods Ends

Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

4. Install the steering linkage inner tie rod (1) to the relay rod using wrench **J 34028** (2). See Special Tools.

Tighten: Tighten the steering linkage inner tie rod to 100 N.m (74 lb ft).

5. Install the steering linkage outer tie rod. Refer to Steering Linkage Outer Tie Rod Replacement.
6. Install the engine shield, if equipped. Refer to Engine Shield Replacement .

2008 Chevrolet Silverado 1500

2008 STEERING Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

7. Adjust the front toe. Refer to **Front Toe Adjustment** .

IDLER ARM INSPECTION

Tools Required

- **J 35999** Spring Scale. See **Special Tools**.
- **J 42640** Steering Column Anti-Rotation Pin
- **J 45101** Hub and Wheel Runout Gage

Inspection

1. Raise the vehicle on a hoist and support it with jackstands. Refer to **Lifting and Jacking the Vehicle** .

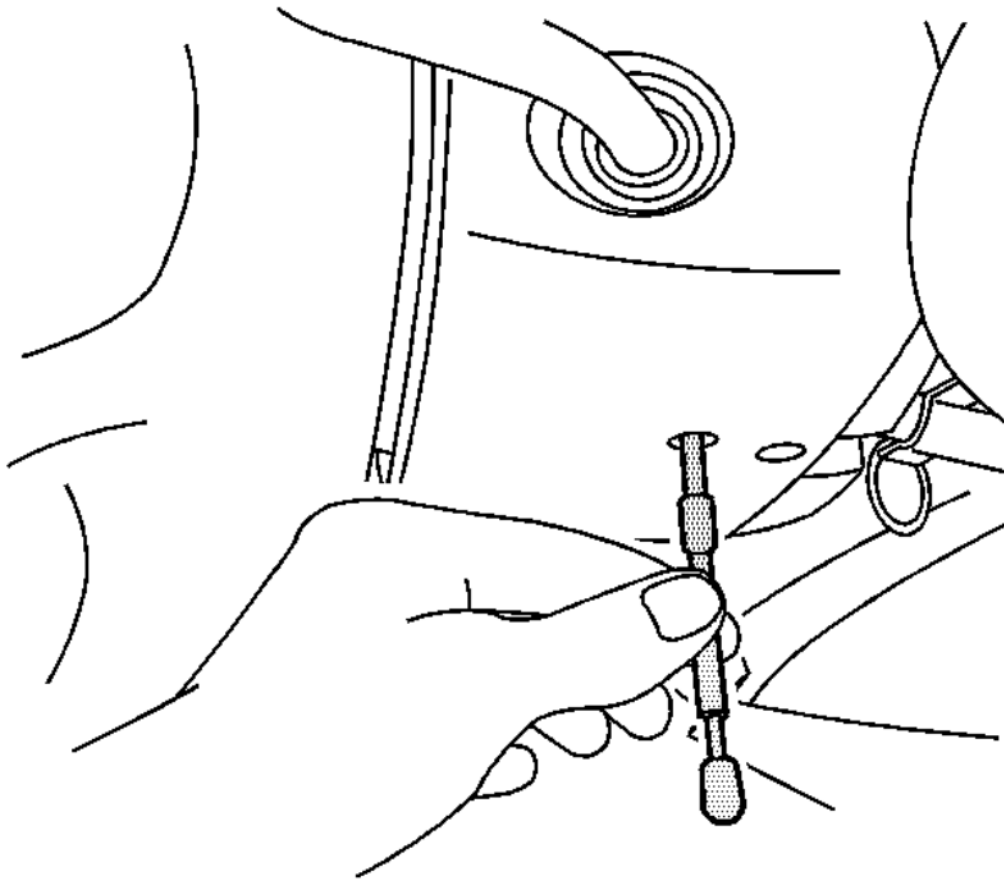


Fig. 14: Identifying J 42640

Courtesy of GENERAL MOTORS CORP.

NOTE: The wheels of the vehicle must be straight ahead and the steering column in the LOCK position before disconnecting the steering column or intermediate shaft from the steering gear. Failure to do so will cause the SIR coil assembly to become uncentered, which may cause damage to the coil assembly.

2. Position the wheels straight-ahead and install anti-rotation pin **J 42640** .
3. Install runout gauge **J 45101** between the idler arm and the vehicle frame.

Ensure the runout gage is at zero before taking the measurement.

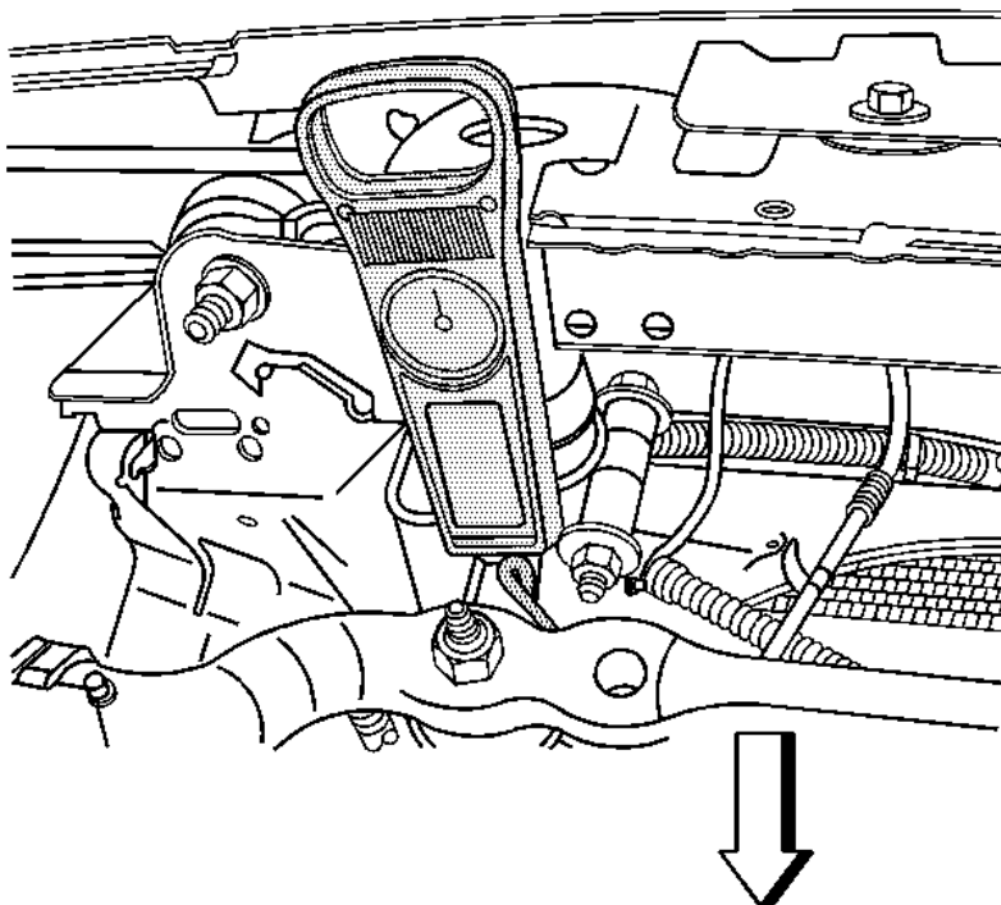


Fig. 15: Placing J 35999 Near Relay Rod End Of Idler Arm
Courtesy of GENERAL MOTORS CORP.

4. Place scale **J 35999** near the relay rod end of the idler arm. See **Special Tools**.

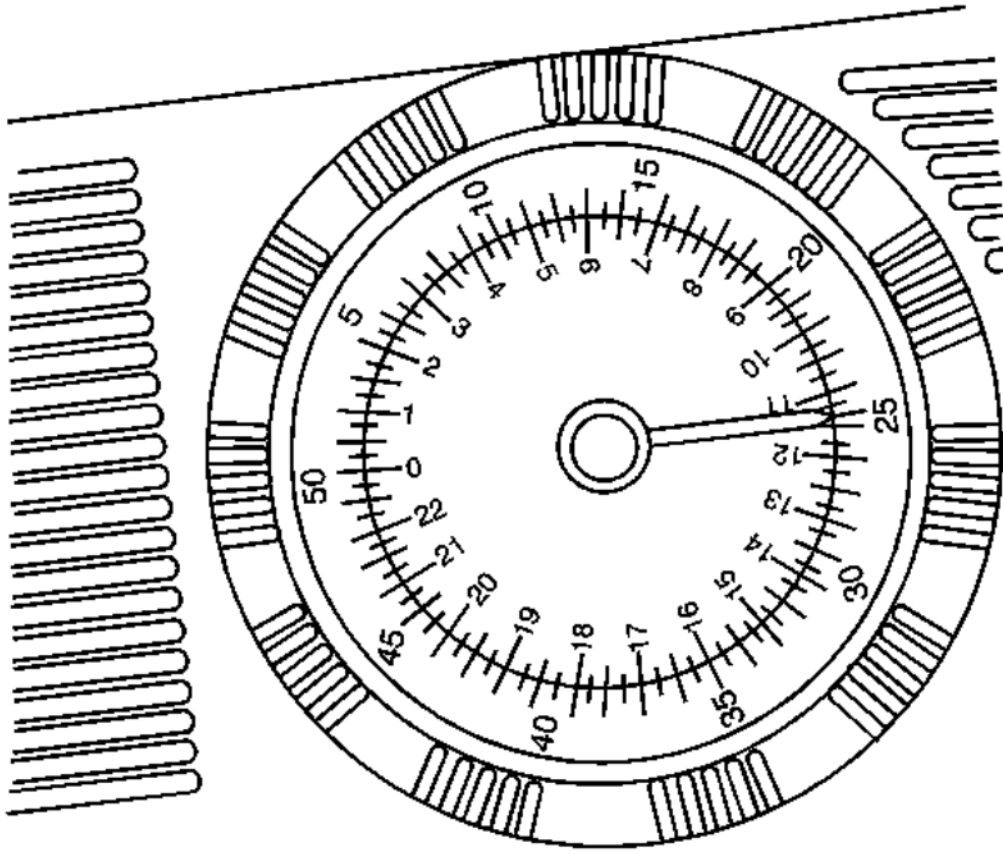


Fig. 16: Measuring Upward Force
Courtesy of GENERAL MOTORS CORP.

5. Exert a 110 N.m (25 lb) force upward and then downward while measuring the total distance the idler arm moves.

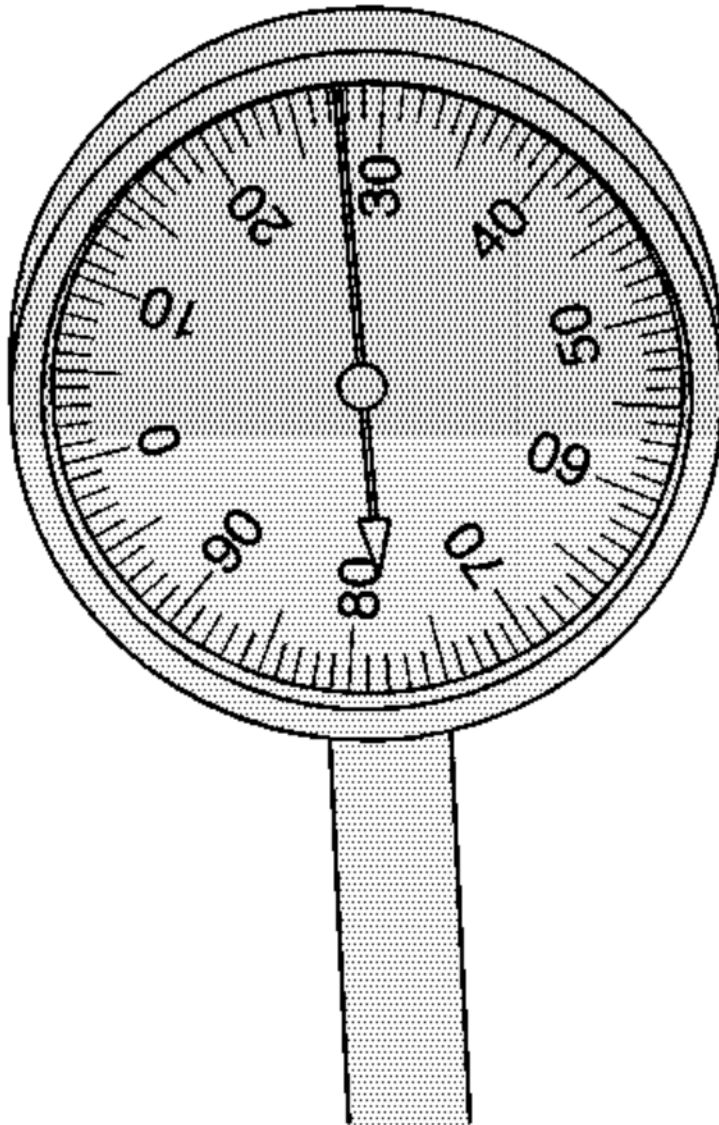


Fig. 17: Measuring Idler Arm Movement (Relay Rod End)
Courtesy of GENERAL MOTORS CORP.

6. If the movement exceeds 2 mm (0.078 in) then replace the idler arm.

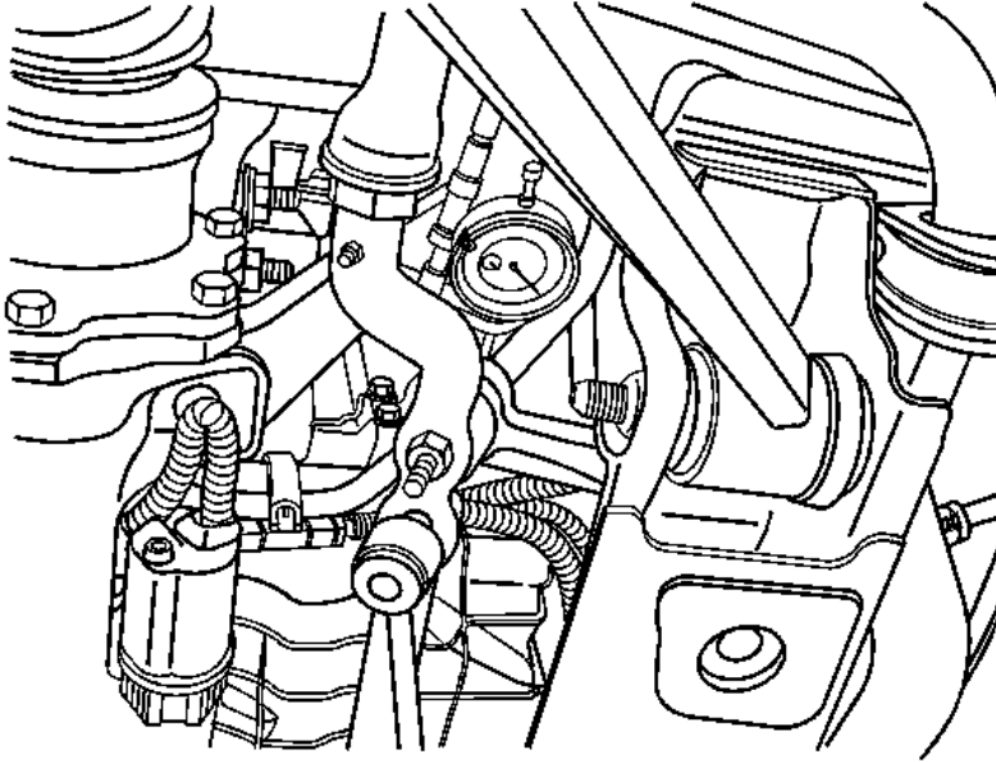


Fig. 18: Installing Dial Indicator At The Idler Arm
Courtesy of GENERAL MOTORS CORP.

7. Install the runout gauge at the idler arm.
8. Push the tire inward slowly with one hand to remove any lash.

Zero out the runout gauge and pull outward in order to take a reading.

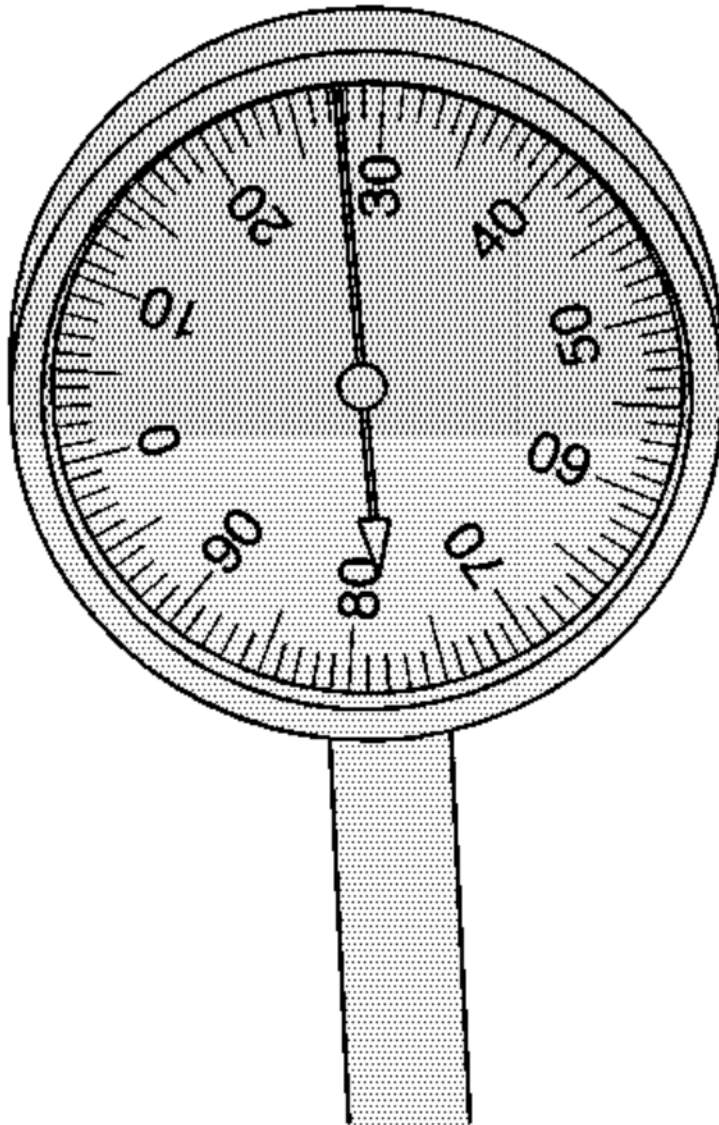


Fig. 19: Measuring Idler Arm Movement (Relay Rod End)
Courtesy of GENERAL MOTORS CORP.

9. Allow only 1 mm (0.039 in) of movement at the idler arm ball stud.

If the movement is more than 1 mm (0.039 in) then replace the idler arm.

2008 Chevrolet Silverado 1500

2008 STEERING Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

IDLER ARM REPLACEMENT

Tools Required

J 24319-B Steering Linkage and Tie Rod Puller

Removal Procedure

NOTE: Do not attempt to free the ball stud by using a pickle fork or wedge type tool, because seal or bushing damage could result. Use the proper tool to separate all ball joints.

1. Remove the engine shield, if equipped. Refer to **Engine Shield Replacement** .

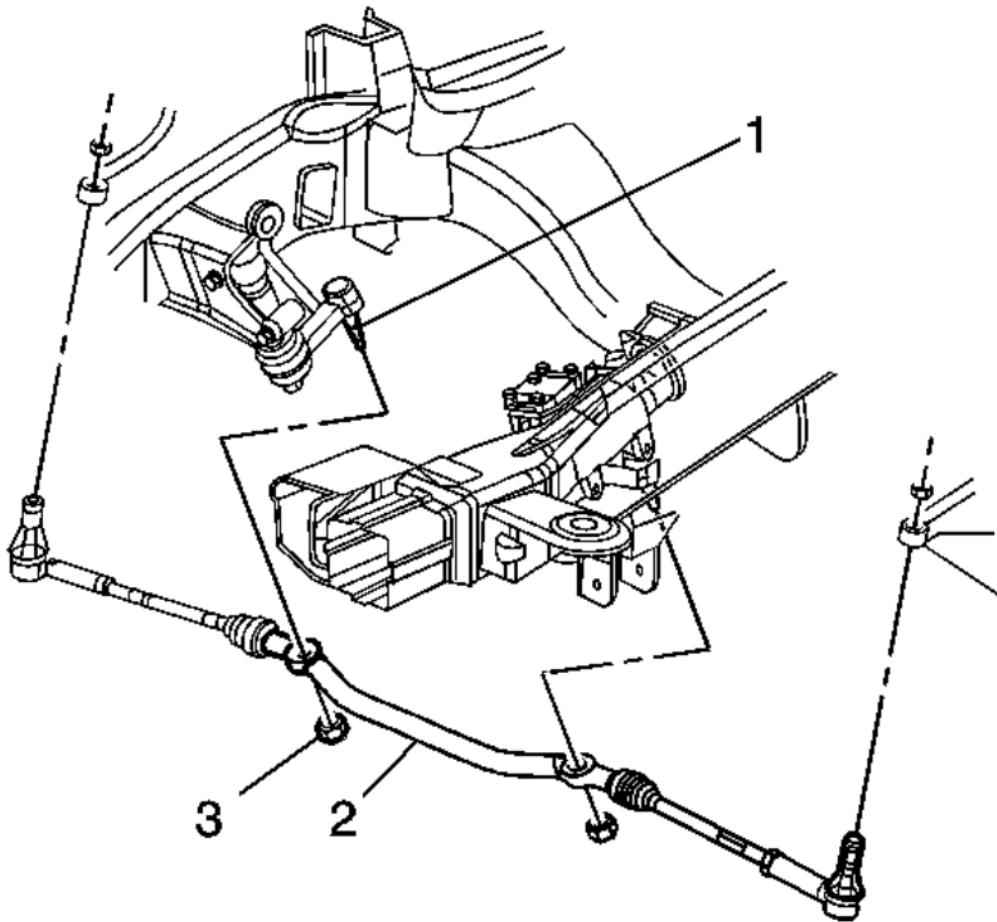


Fig. 20: View Of Idler Arm & Relay Rod
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Discard the idler arm nut.

2. Remove the idler arm nut (3) from the idler arm (1).
3. Separate the idler arm (1) from the relay rod (2).

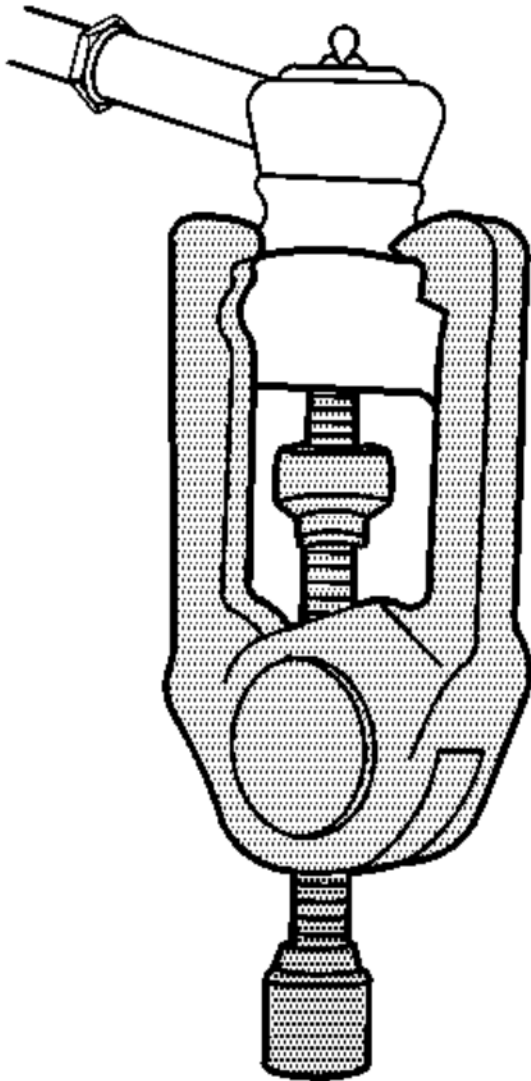


Fig. 21: Removing Outer Tie Rod Assembly From Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

4. Remove the idler arm from the relay rod using puller **J 24319-B** .

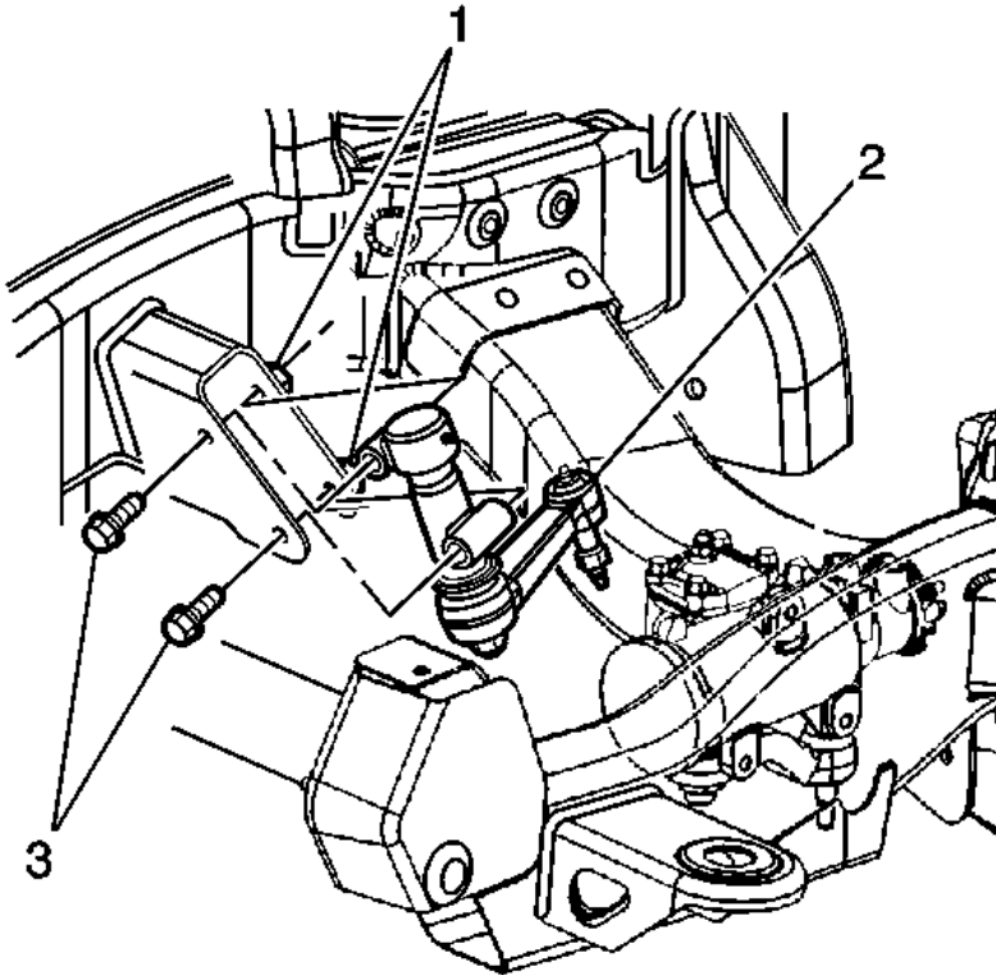


Fig. 22: View Of Idler Arm, Frame Bolts & Nuts
Courtesy of GENERAL MOTORS CORP.

5. Remove the idler arm bolts (3) and the nuts (1) at the vehicle frame.
6. Remove the idler arm (2) from the vehicle.

Installation Procedure

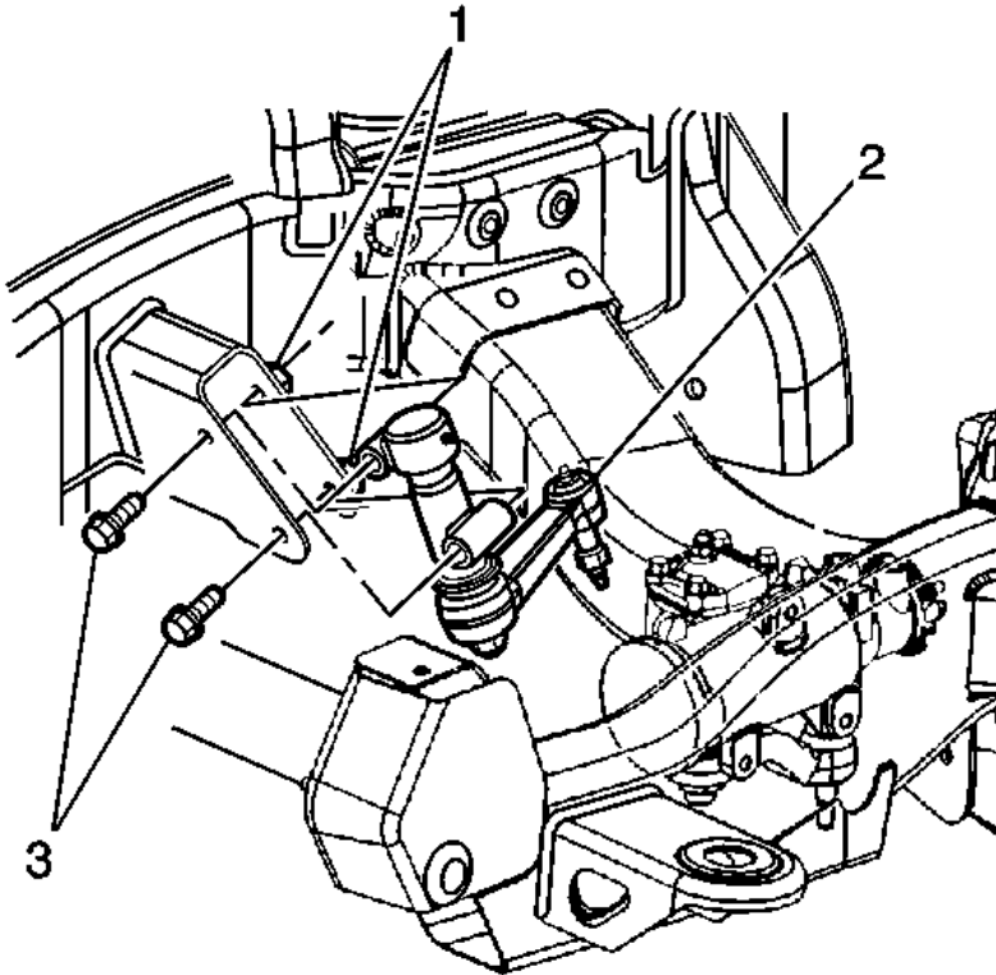


Fig. 23: View Of Idler Arm, Frame Bolts & Nuts
Courtesy of GENERAL MOTORS CORP.

1. Position the idler arm (2) to the vehicle frame.

NOTE: Refer to Fastener Notice .

2. Install the idler arm bolts (3) and nuts (1) to the frame.

Tighten: Tighten the bolts and nuts to 105 N.m (78 lb ft).

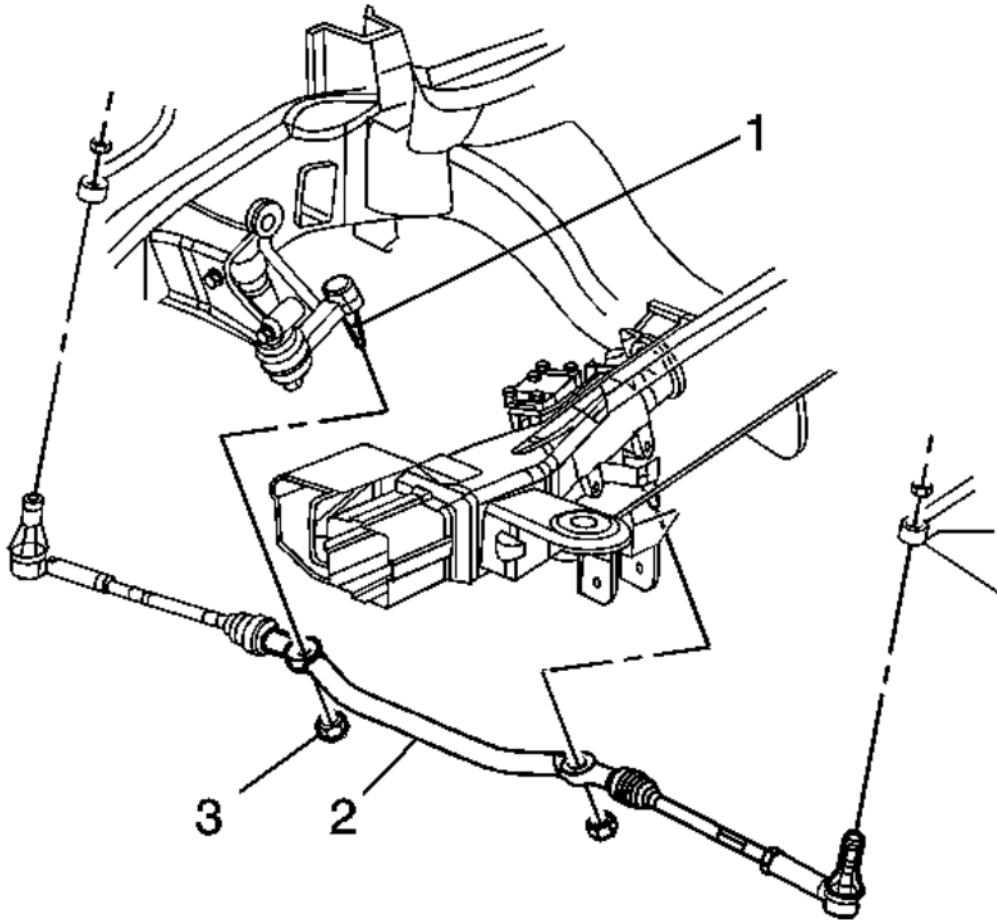


Fig. 24: View Of Idler Arm & Relay Rod
Courtesy of GENERAL MOTORS CORP.

3. Install the idler arm (1) to the relay rod (2).

IMPORTANT: Do not reuse the old idler arm nut.

4. Install the new idler arm nut (3) to the idler arm (1).

Tighten: Tighten the nut to 62 N.m (46 lb ft).

5. Install the engine shield, if equipped. Refer to [Engine Shield Replacement](#) .

2008 Chevrolet Silverado 1500

2008 STEERING Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

6. Adjust the front toe. Refer to **Front Toe Adjustment** .

RELAY ROD REPLACEMENT

Tools Required

J 24319-B Steering Linkage and Tie Rod Puller

Removal Procedure

1. Remove the engine shield, if equipped. Refer to **Engine Shield Replacement** .
2. Remove the steering linkage shock absorber from the relay rod, if equipped. Refer to **Steering Linkage Shock Absorber Replacement**.

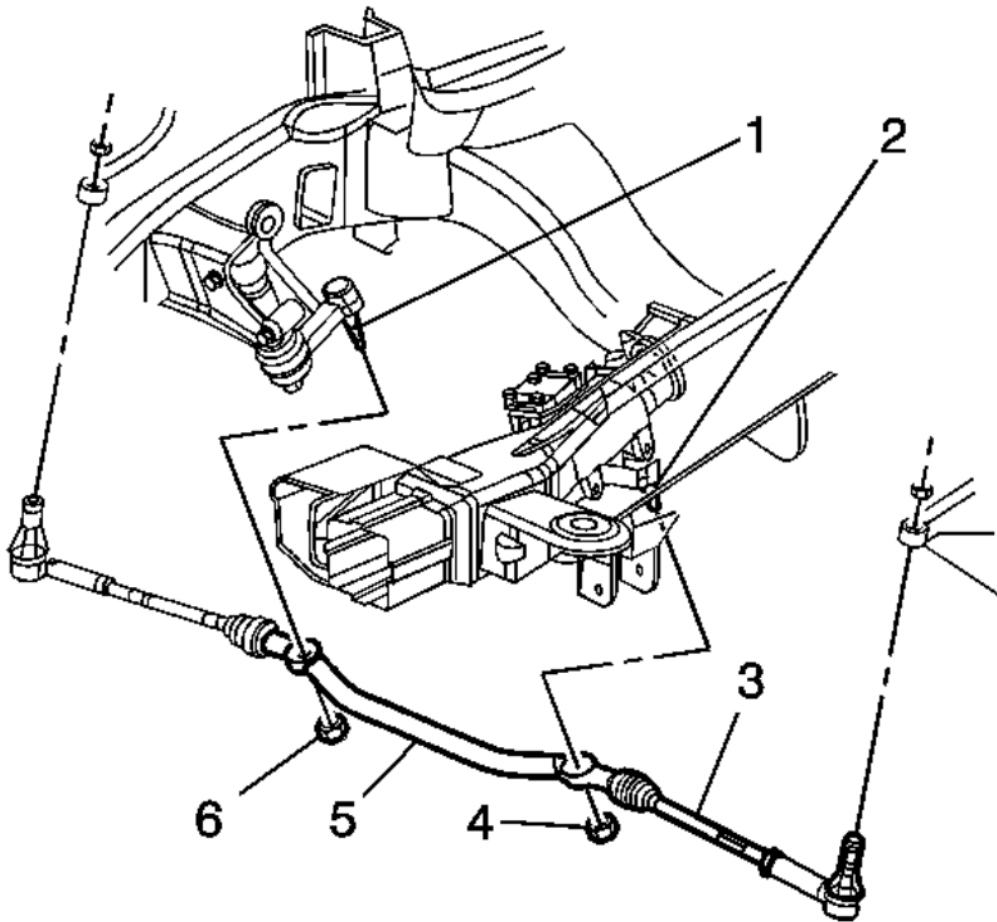


Fig. 25: View Of Idler Arm & Relay Rod
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Discard the idler arm nut (6) and the pitman arm nut (4).

3. Remove the steering linkage inner tie rods (3). Refer to [Steering Linkage Inner Tie Rod Replacement](#).
4. Remove the idler arm nut (6) and separate the idler arm (1) from the relay rod (5) using puller **J 24319-B**.
5. Remove the pitman arm nut (4) and separate the pitman arm (2) from the relay rod (5) using puller **J 24319-B**.

6. Remove the relay rod (5) from the vehicle.
7. Inspect the threads and seals on all steering related components. Repair or replace components as needed.

Installation Procedure

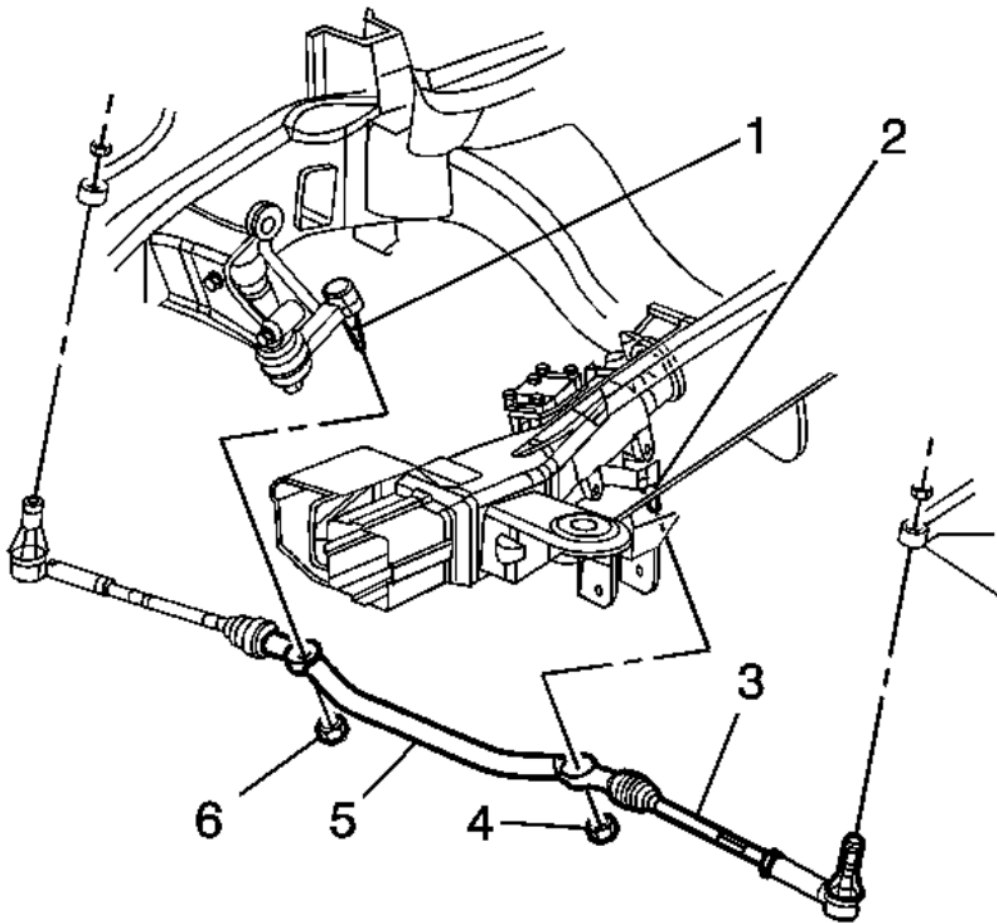


Fig. 26: View Of Idler Arm & Relay Rod
Courtesy of GENERAL MOTORS CORP.

1. Install the relay rod (5) to the vehicle.
2. Install the pitman arm (2) to the relay rod (5).
3. Install the idler arm (1) to the relay rod (5).

NOTE: Refer to Fastener Notice .

IMPORTANT: Use a new pitman arm nut.

4. Install the pitman arm nut (4).

Tighten: Tighten the nut to 62 N.m (46 lb ft).

IMPORTANT: Use a new idler arm nut.

5. Install the idler arm nut (6).

Tighten: Tighten the nut to 62 N.m (46 lb ft).

6. Install the steering linkage inner tie rods (3). Refer to Steering Linkage Inner Tie Rod Replacement.
7. Install the steering linkage shock absorber to the relay rod, if equipped. Refer to Steering Linkage Shock Absorber Replacement.
8. Install the engine shield, if equipped. Refer to Engine Shield Replacement .
9. Adjust the front toe. Refer to Front Toe Adjustment .

STEERING LINKAGE SHOCK ABSORBER REPLACEMENT

Tools Required

J 24319-B Steering Linkage and Tie Rod Puller

Removal Procedure

1. Remove the engine shield, if equipped. Refer to Engine Shield Replacement .

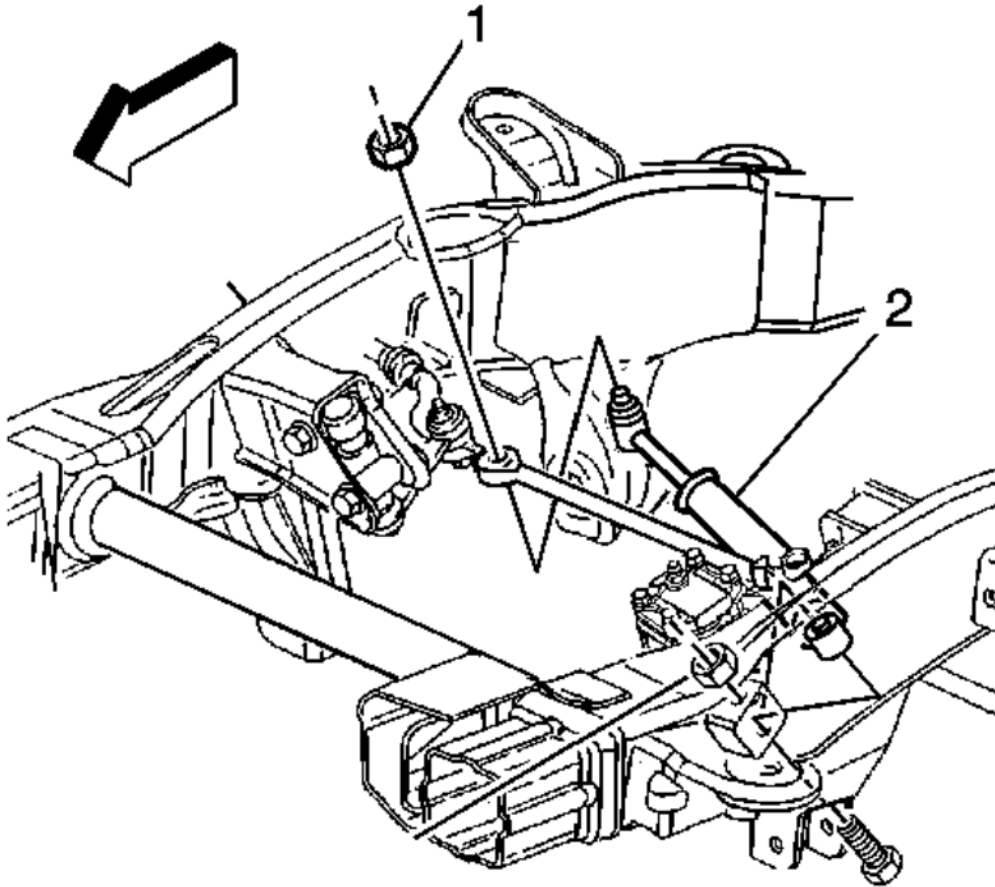


Fig. 27: View Of Linkage Shock Absorber
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Discard the steering linkage shock absorber nut.

2. Remove the steering linkage shock absorber nut (1) from the steering linkage shock absorber (2).

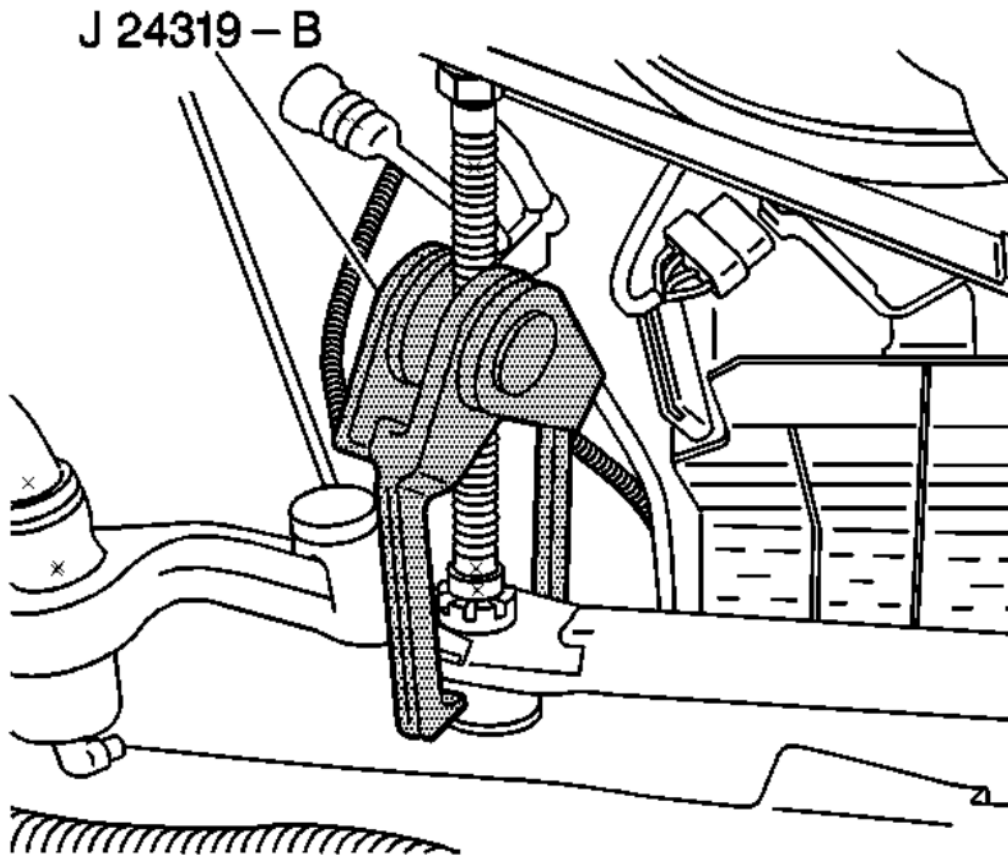


Fig. 28: Removing Steering Damper Ball Stud From Relay Rod
Courtesy of GENERAL MOTORS CORP.

3. Remove the steering linkage shock absorber from the relay rod using puller **J 24319-B** .

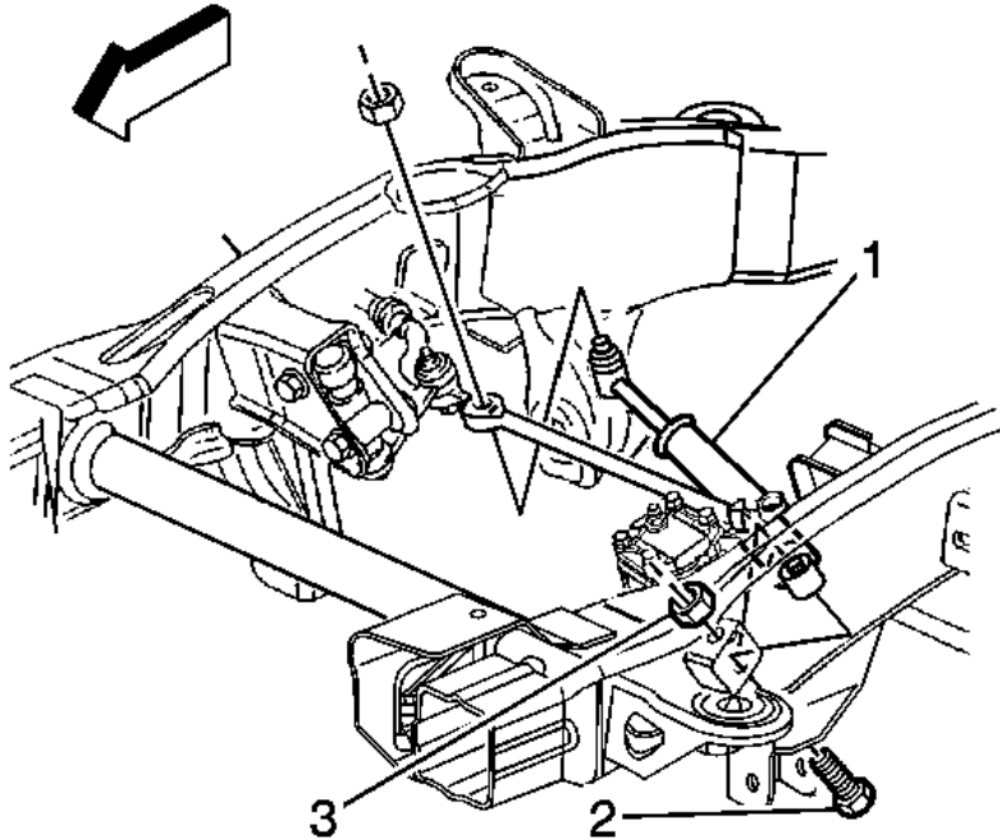


Fig. 29: View Of Linkage Shock Absorber
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Discard the steering linkage shock absorber nut.

4. Remove the steering linkage shock absorber bolt (2) and nut (3).
5. Remove the steering linkage shock absorber (1) from the vehicle.
6. Inspect the following parts:
 - The steering linkage shock absorber for leaks and damage
 - The steering linkage shock absorber bolt for damage or corrosion

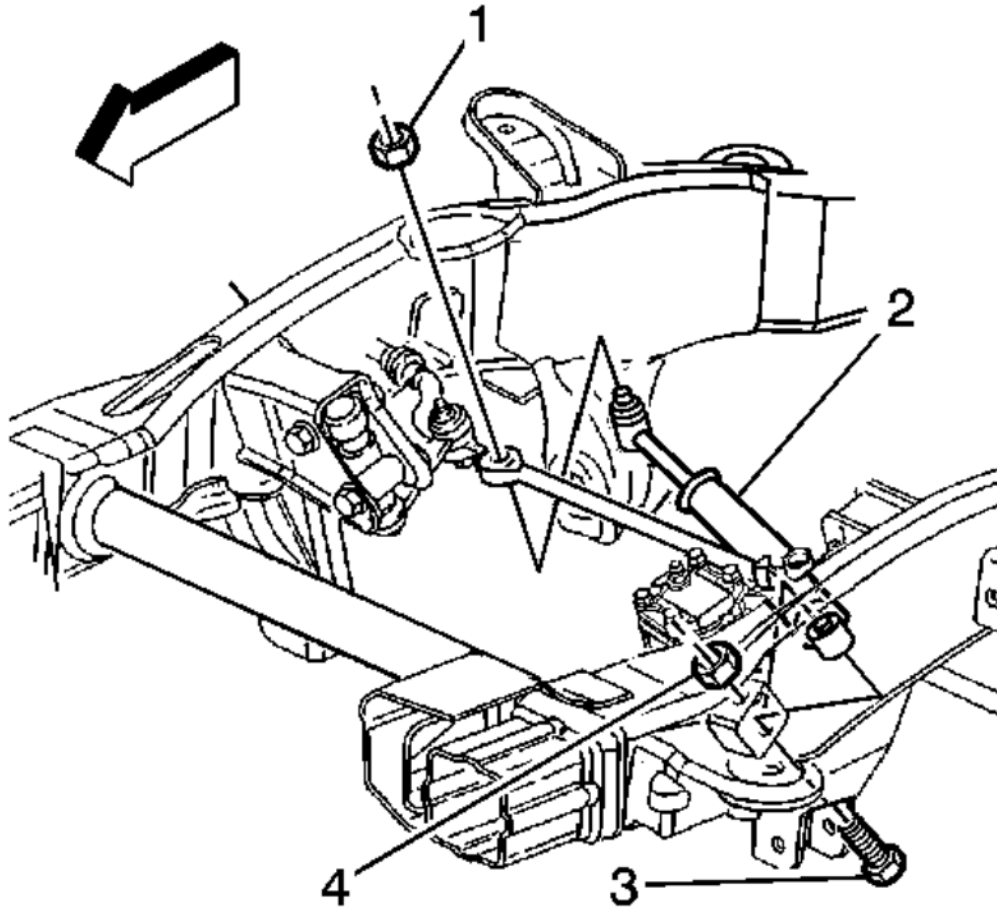


Fig. 30: View Of Linkage Shock Absorber
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Use new steering linkage shock absorber nuts.

1. Install the steering linkage shock absorber (2) to the vehicle.
2. Install the steering linkage shock absorber (4) and nuts (1, 3).

NOTE: Refer to Fastener Notice .

3. Tighten the steering linkage shock absorber nuts (1, 3).

2008 Chevrolet Silverado 1500

2008 STEERING Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado

Tighten: Tighten the nuts to 40 N.m (30 lb ft).

4. Install the engine shield, if equipped. Refer to **Engine Shield Replacement** .

PITMAN ARM REPLACEMENT

Tools Required

- **J 6632-01** Pitman Arm Puller. See **Special Tools**.
- **J 29107-A** Pitman Arm Puller. See **Special Tools**.

Removal Procedure

1. Remove the steering gear. Refer to **Steering Gear Replacement (Rack and Pinion)** or **Steering Gear Replacement (Non-Rack and Pinion)** .
2. Place the steering gear into a vise.

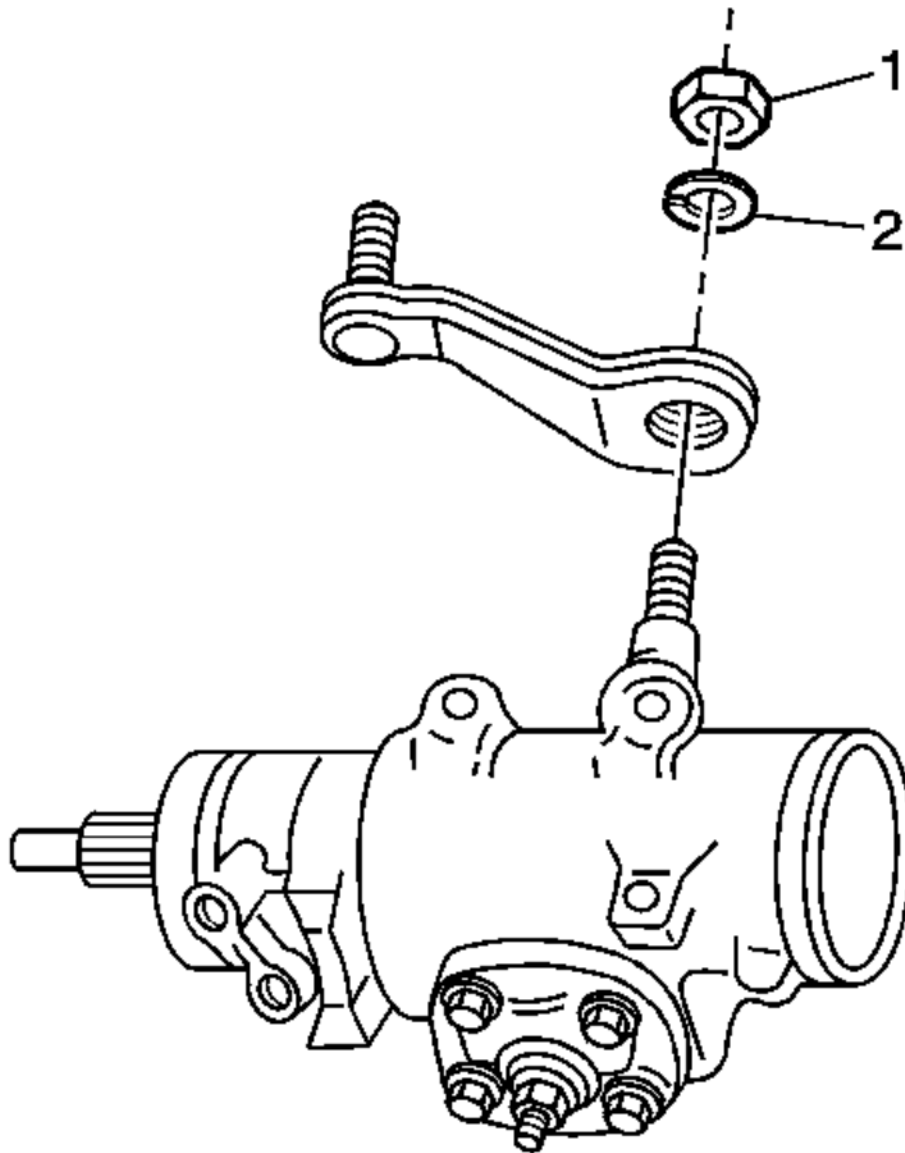


Fig. 31: View Of Steering Gear And Pitman Arm
Courtesy of GENERAL MOTORS CORP.

3. Remove the pitman arm nut (1) and washer (2).

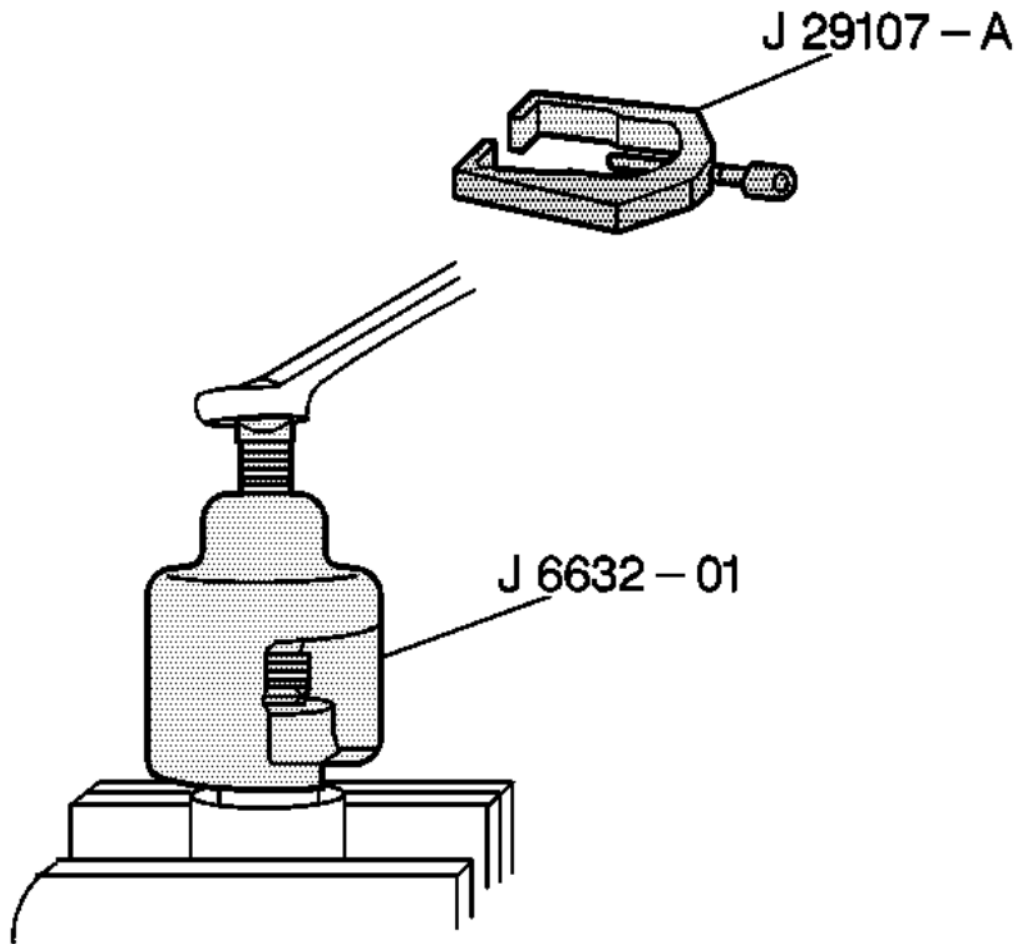


Fig. 32: Remove Pitman Arm From Power Steering Gear (Non Rack and Pinion)
Courtesy of GENERAL MOTORS CORP.

4. Remove the pitman arm from the pitman arm shaft using puller **J 6632-01** or puller **J 29107-A** . See **Special Tools**.

Installation Procedure

1. Install the pitman arm onto the steering gear.

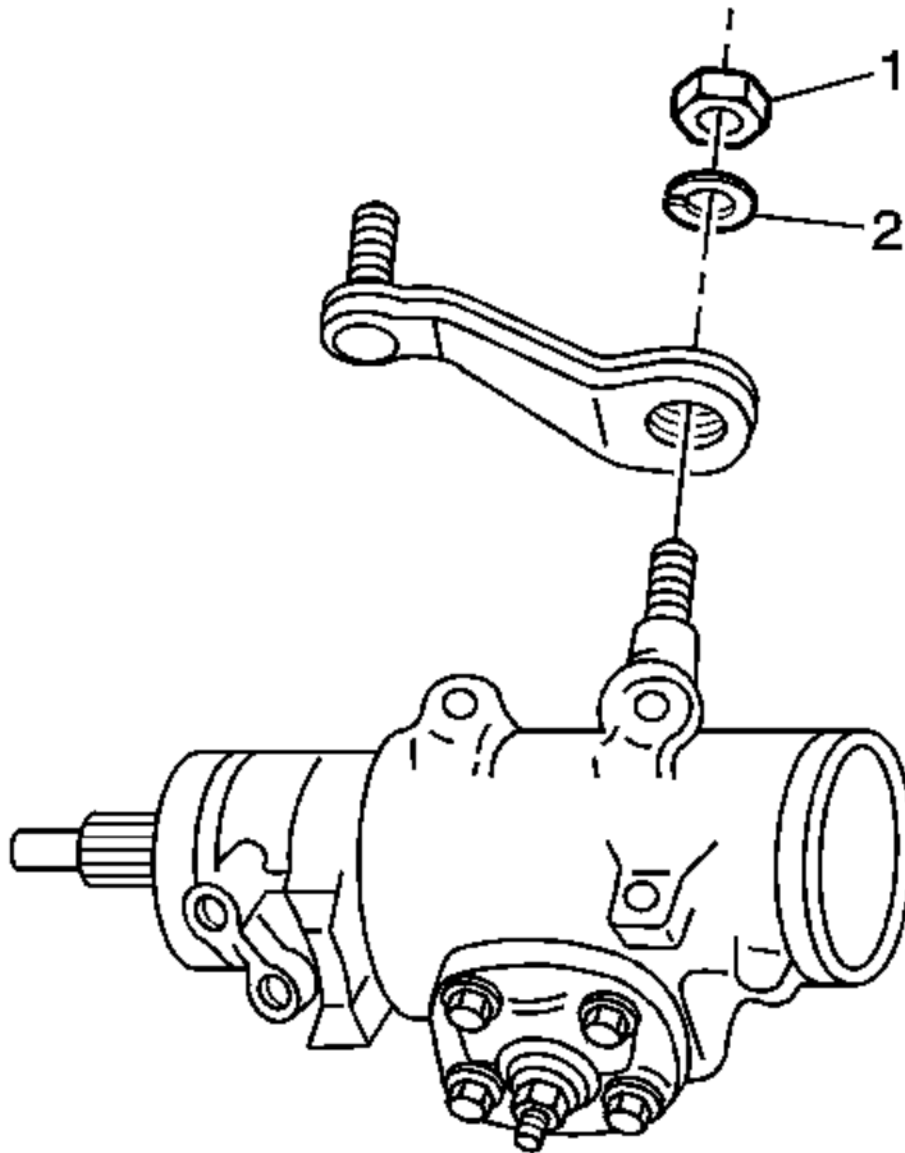


Fig. 33: View Of Steering Gear And Pitman Arm
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice.

2. Install a new pitman arm washer (2) and nut (1).

Tighten: Tighten the nut to 250 N.m (184 lb ft).

3. Remove the steering gear from the vise.
4. Install the steering gear. Refer to **Steering Gear Replacement (Rack and Pinion)** or **Steering Gear Replacement (Non-Rack and Pinion)** .
5. Adjust the front toe. Refer to **Front Toe Adjustment** .

DESCRIPTION AND OPERATION

STEERING LINKAGE DESCRIPTION AND OPERATION

The steering linkage consists of the following components:

- A pitman arm
- An idler arm
- A relay rod
- 2 adjustable tie rods

When you turn the steering wheel, the steering gear rotates the pitman arm which forces the relay rod to one side. The tie rods connect to the relay rod with the ball studs. The tie rods transfer the steering force to the wheels. Use the tie rods in toe adjustments. The tie rods are adjustable. The pitman arm support the relay rod. The idler arm pivots on a support attached to the frame rail and the ball stud attaches to the relay rod.

The 2 tie rod are threaded into the tube and secured with jam nuts. Right and left hand threads are used in order to permit the adjustment of toe.

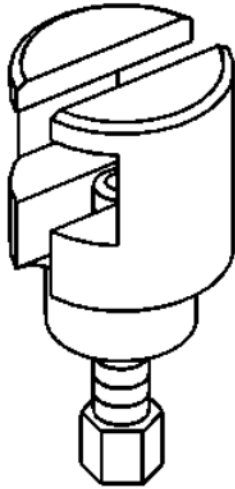
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

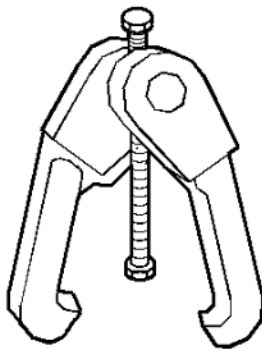
Illustration	Tool Number/ Description

2008 Chevrolet Silverado 1500

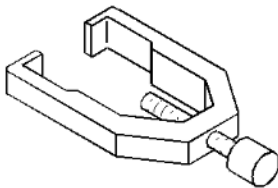
2008 STEERING Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado



J 6632-01
Pitman Arm Puller



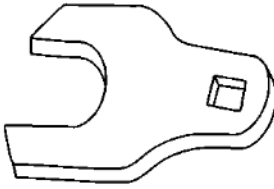
J 24319-B
Steering Linkage and Tie Rod Puller



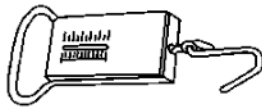
J 29107-A
Pitman Arm Puller

2008 Chevrolet Silverado 1500

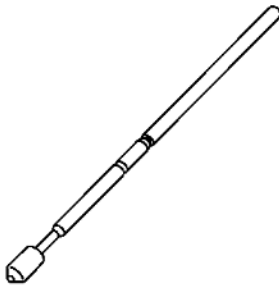
2008 STEERING Steering Linkage - Cab & Chassis Sierra, Cab & Chassis Silverado, Sierra & Silverado



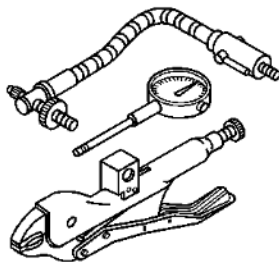
J 34028
Inner Tie Rod Wrench



J 35999
Spring Scale



J 42640
Steering Column Anti-Rotation Pin



J 45101
Hub and Wheel Runout Gage