

2007 Cadillac Escalade

2007 STEERING Steering Linkage - Avalanche, Escalade, Suburban, Tahoe & Yukon

2007 STEERING

Steering Linkage - Avalanche, Escalade, Suburban, Tahoe & Yukon

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Idler Arm to Frame Nut	105 N.m	78 lb ft
Idler Arm to Relay Rod Nut	62 N.m	46 lb ft
Inner Tie Rod End to Relay Rod	100 N.m	74 lb ft
Pitman Arm to Relay Rod Nut	62 N.m	46 lb ft
Pitman Arm to Steering Gear Nut	250 N.m	184 lb ft
Steering Dampener to Frame Bracket Nut	40 N.m	30 lb ft
Steering Dampener to Relay Rod Nut	40 N.m	30 lb ft
Tie Rod to Steering Knuckle 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

Left Side Steering Linkage

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

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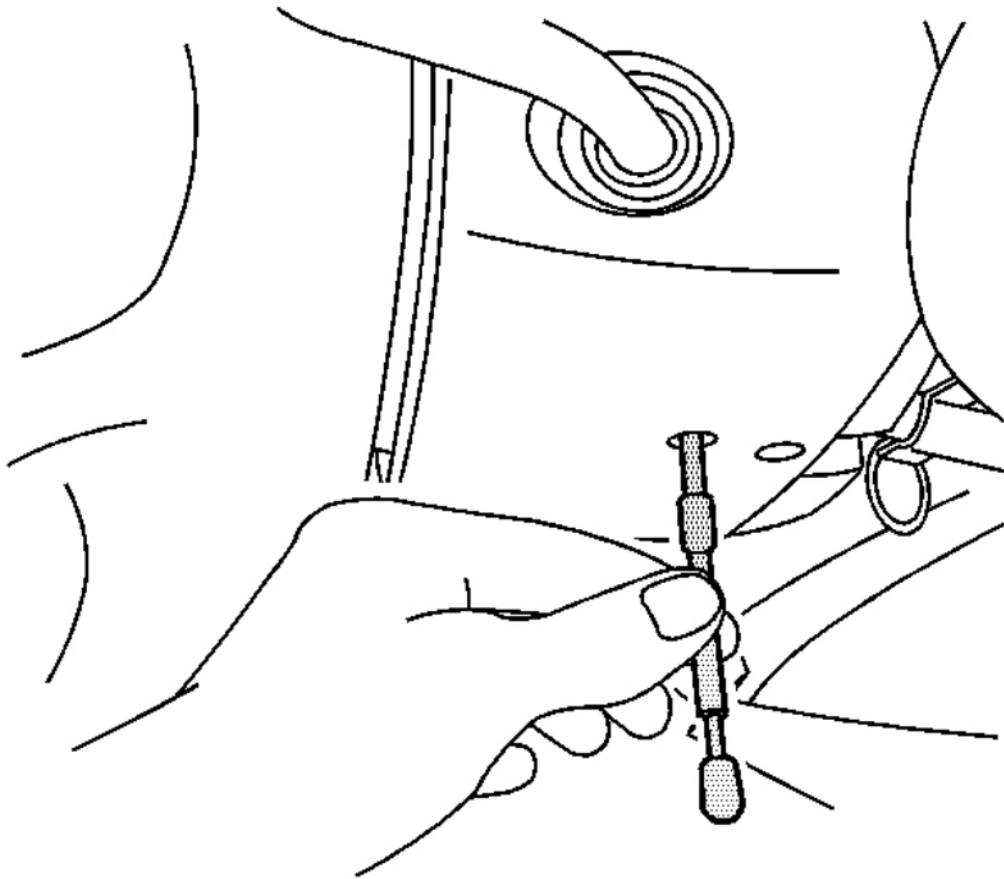


Fig. 1: Identifying J 42640

Courtesy of GENERAL MOTORS CORP.

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

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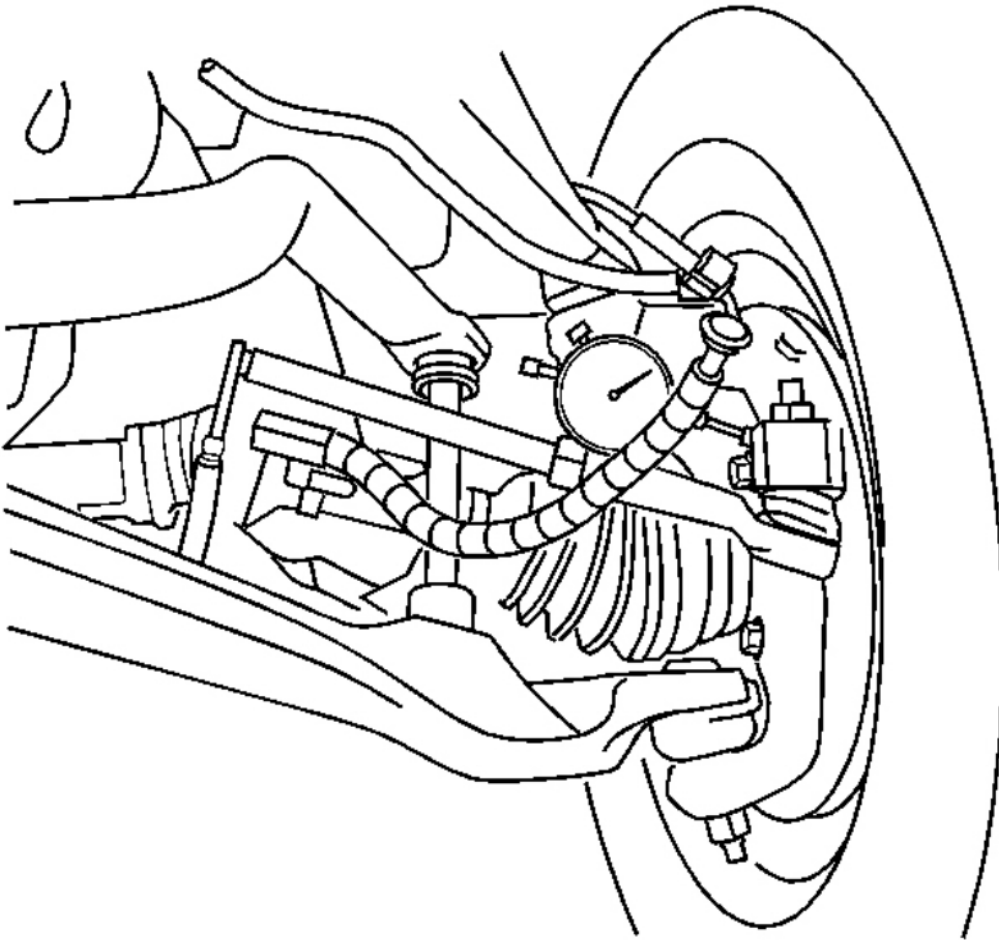


Fig. 2: View Of Dial Indicator Between The Outer Tie Rod & Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

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

Movement should not exceed 1.0 mm (0.039 in).

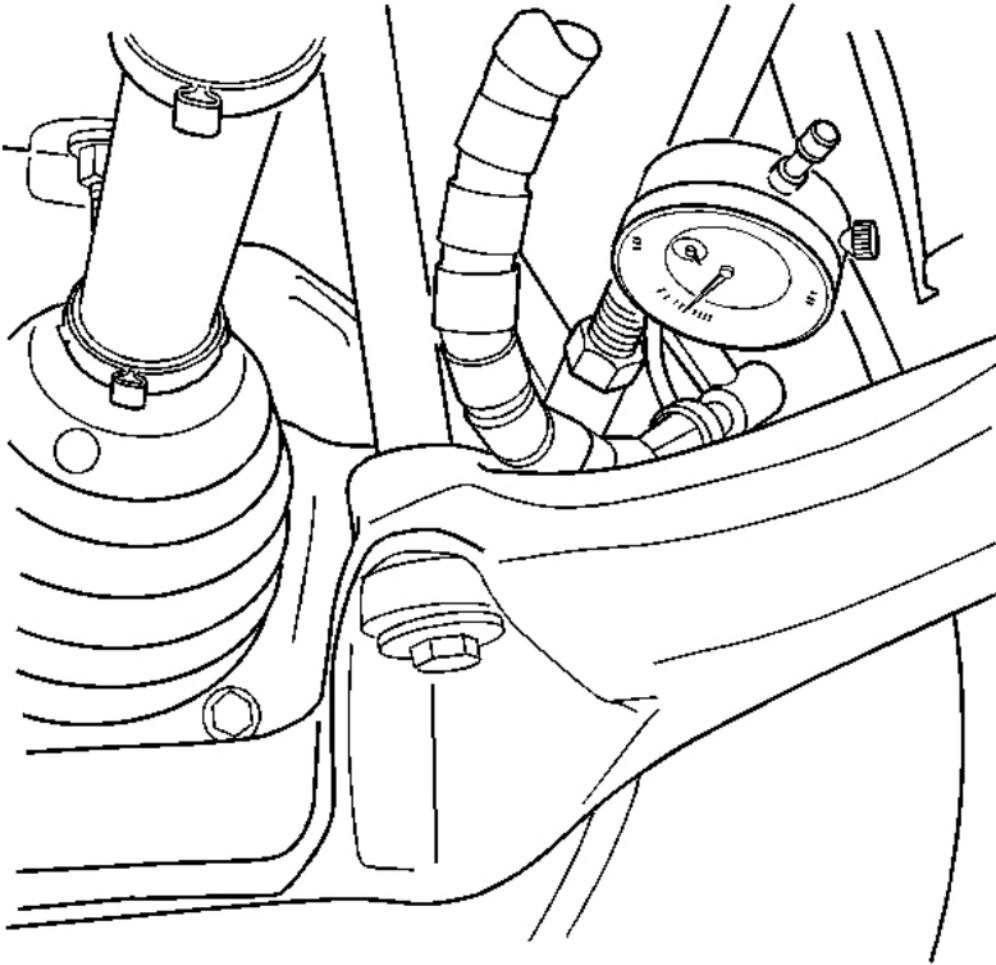


Fig. 3: View Of Dial Indicator Between The Outer Tie Rod End & Jam Nut
Courtesy of GENERAL MOTORS CORP.

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

Movement should not exceed 1.0 mm (0.039 in).

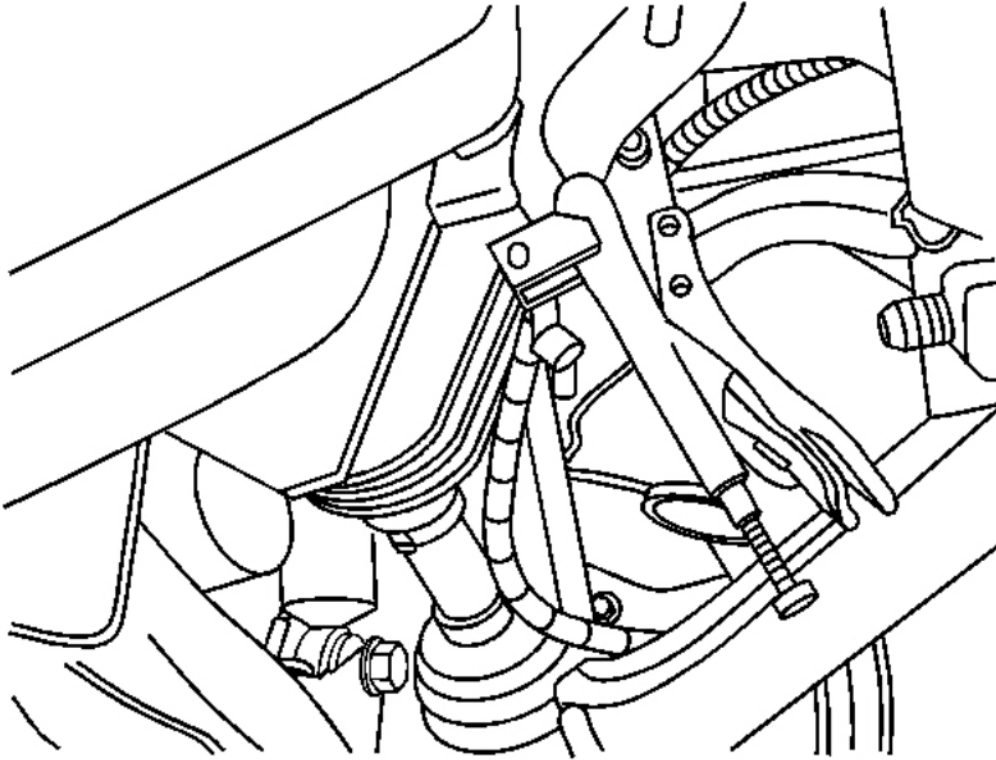


Fig. 4: View Of Dial Indicator Between The Pitman Arm & Relay Rod
Courtesy of GENERAL MOTORS CORP.

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

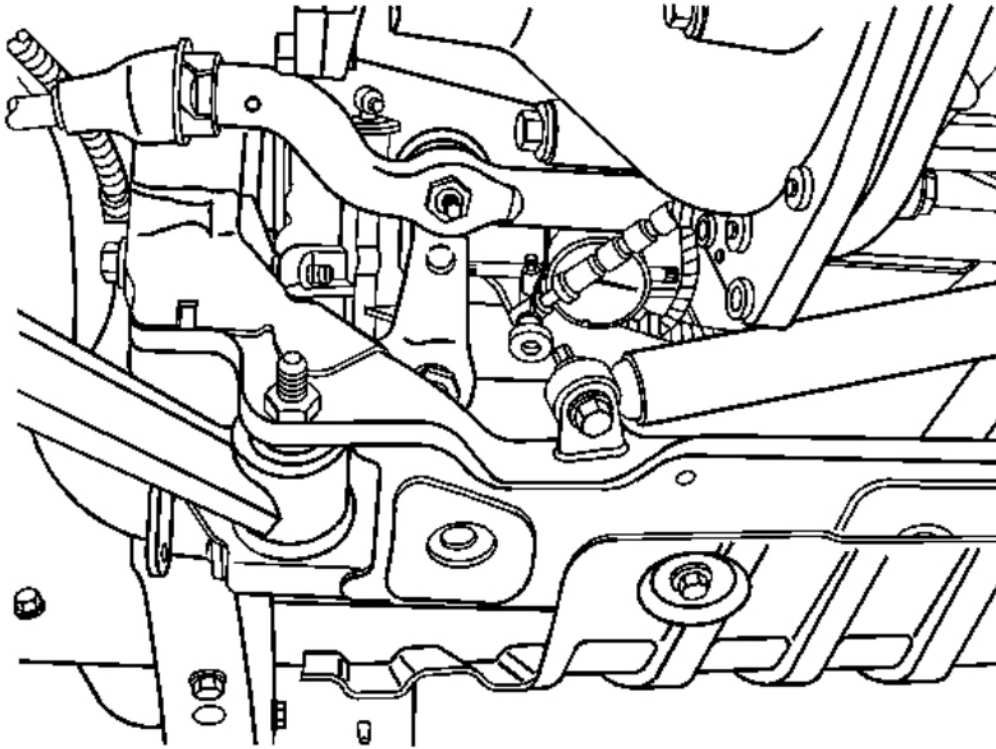


Fig. 5: Measuring Amount Of Movement In The Left Side Joint
Courtesy of GENERAL MOTORS CORP.

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

Movement should not exceed 1.0 mm (0.039 in).

Right Side Steering Linkage

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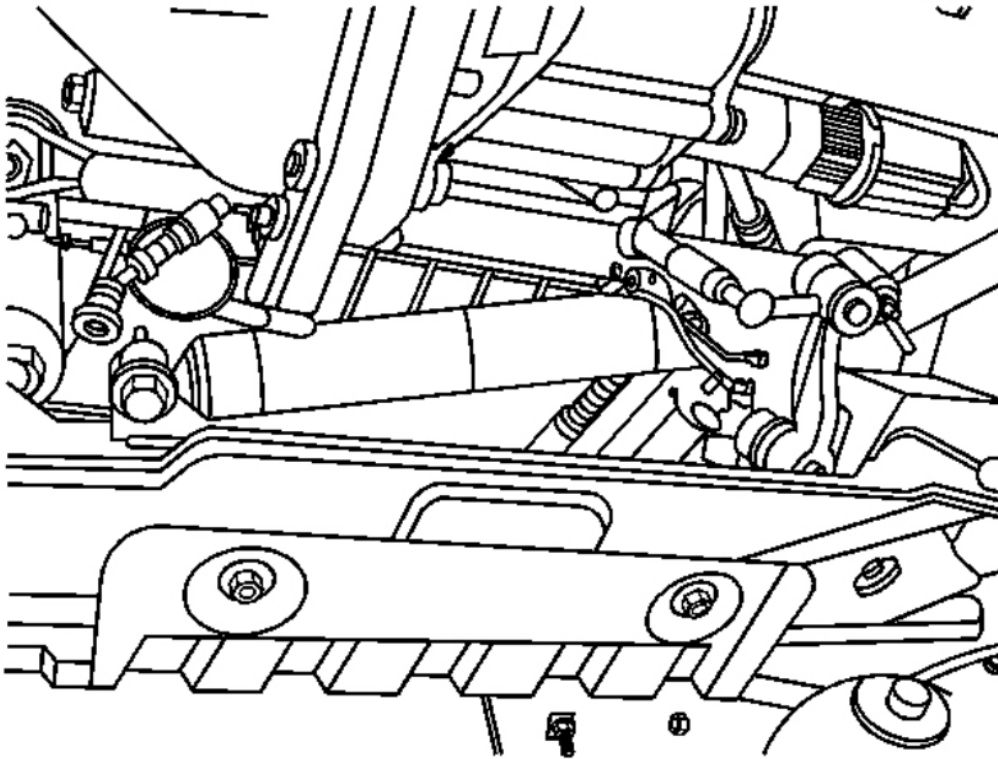


Fig. 6: Elevating The Right Front Of Vehicle

Courtesy of GENERAL MOTORS CORP.

1. Elevate the right front of vehicle and install a suitable vehicle support, maintaining contact between the left front wheel shop floor.

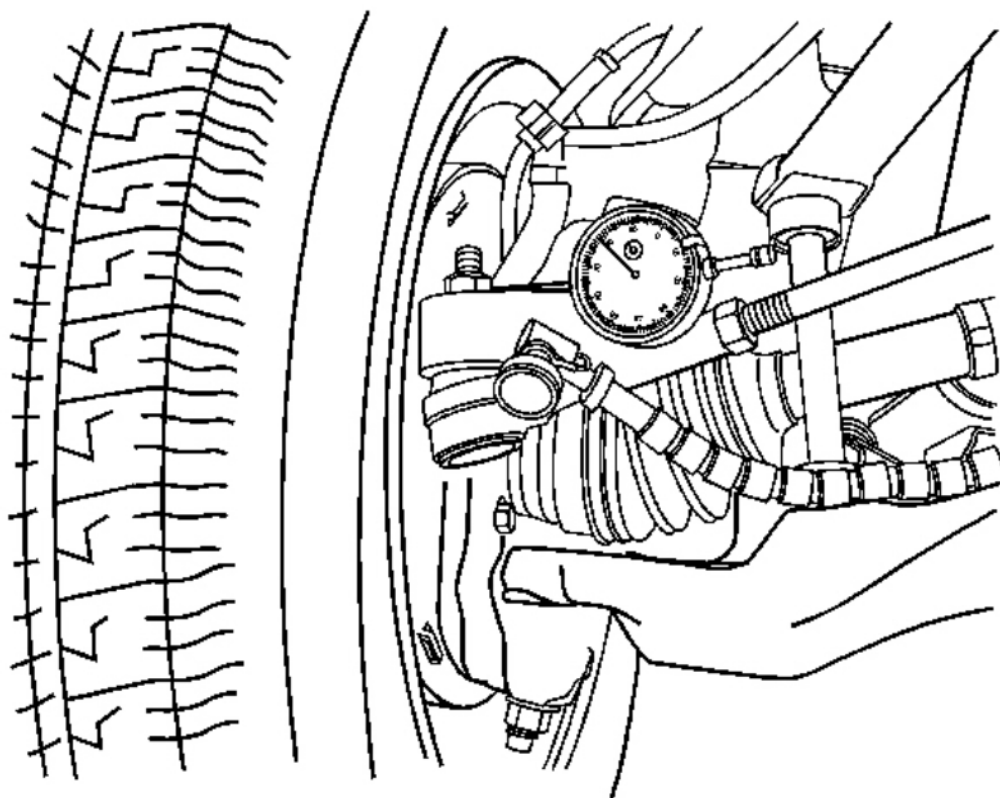


Fig. 7: View Of Dial Indicator Between The Outer Tie Rod & Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

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

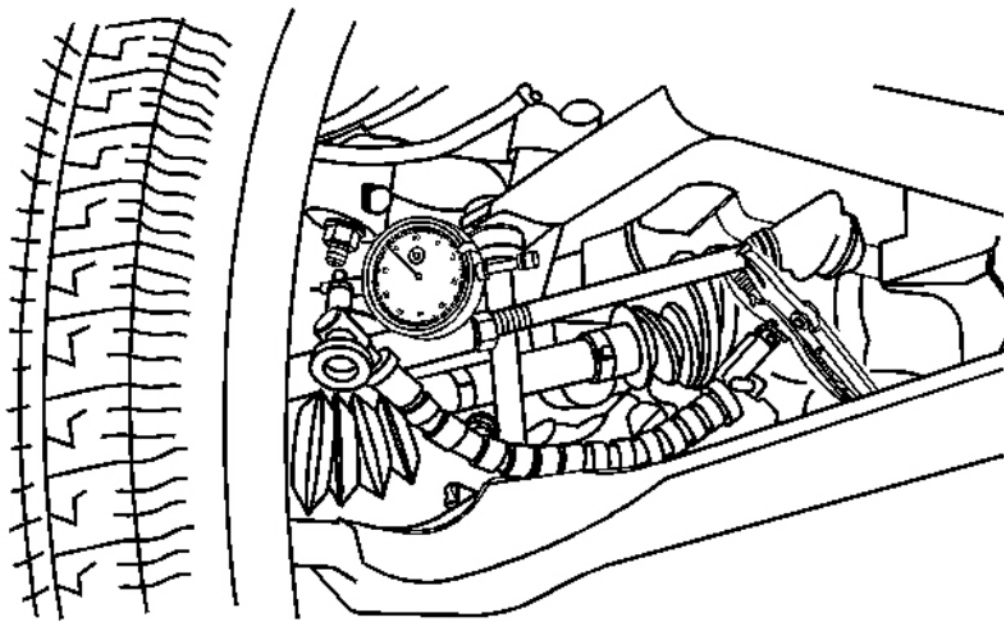


Fig. 8: Noting Amount Of Movement In Right Side Joint
Courtesy of GENERAL MOTORS CORP.

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

Movement should not exceed 1.0 mm (0.039 in).

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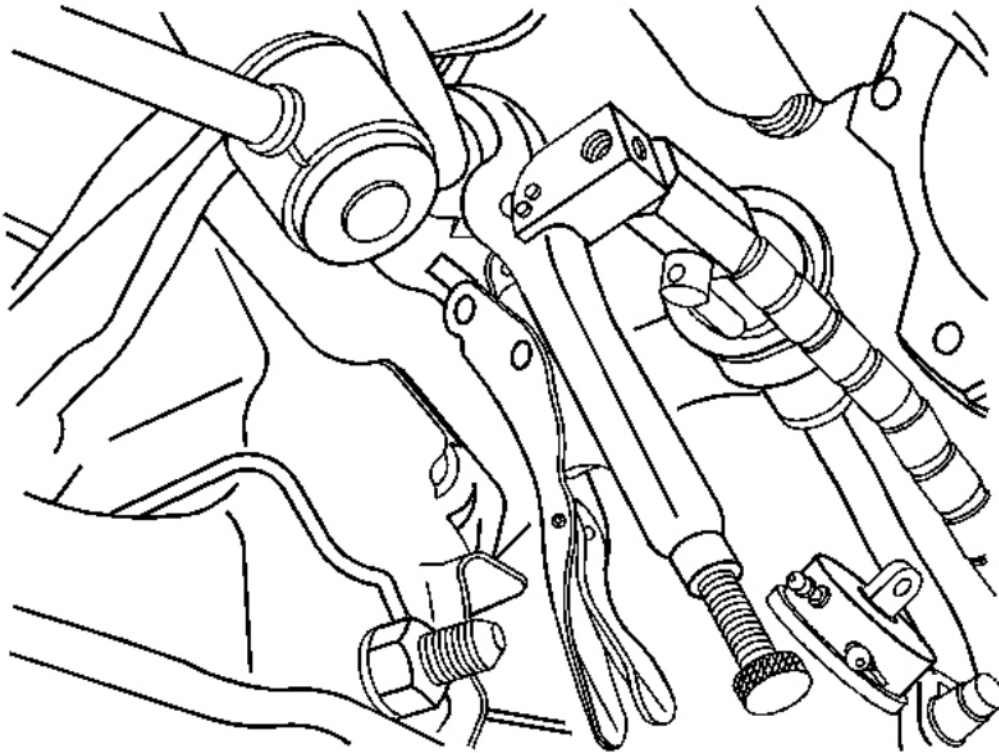


Fig. 9: View Of Dial Indicator Between The Outer Tie Rod End & Relay Rod
Courtesy of GENERAL MOTORS CORP.

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

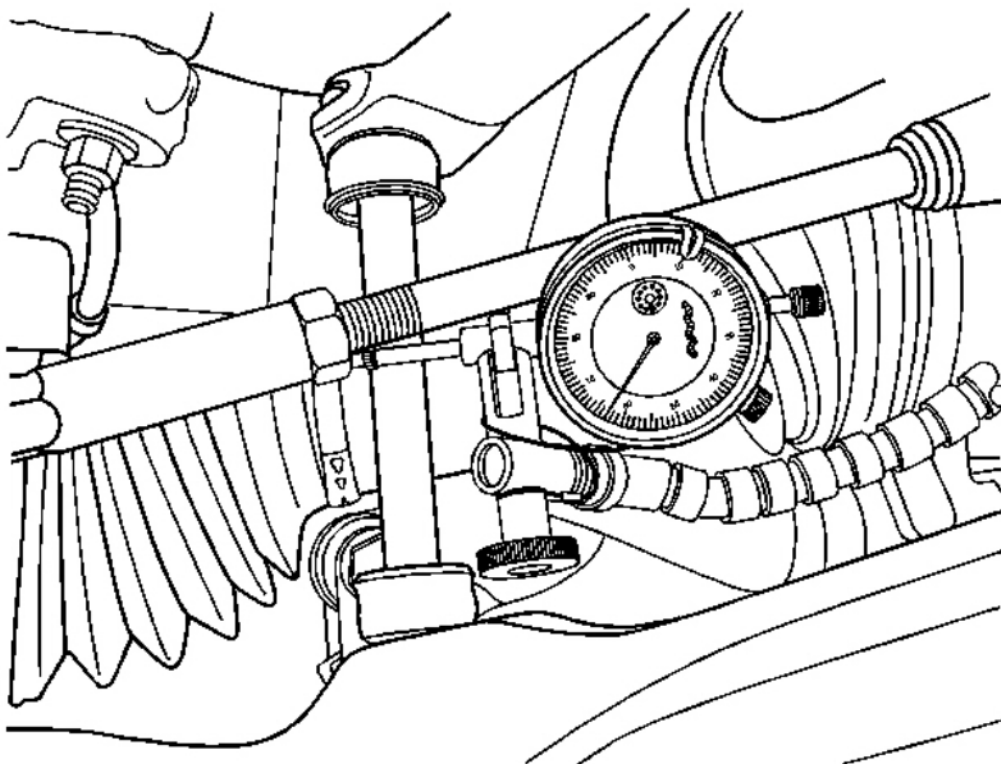


Fig. 10: Noting Amount Of Movement In Right Side Tie Rod End
Courtesy of GENERAL MOTORS CORP.

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

Movement should not exceed 1.0 mm (0.039 in).

TIE ROD REPLACEMENT - OUTER

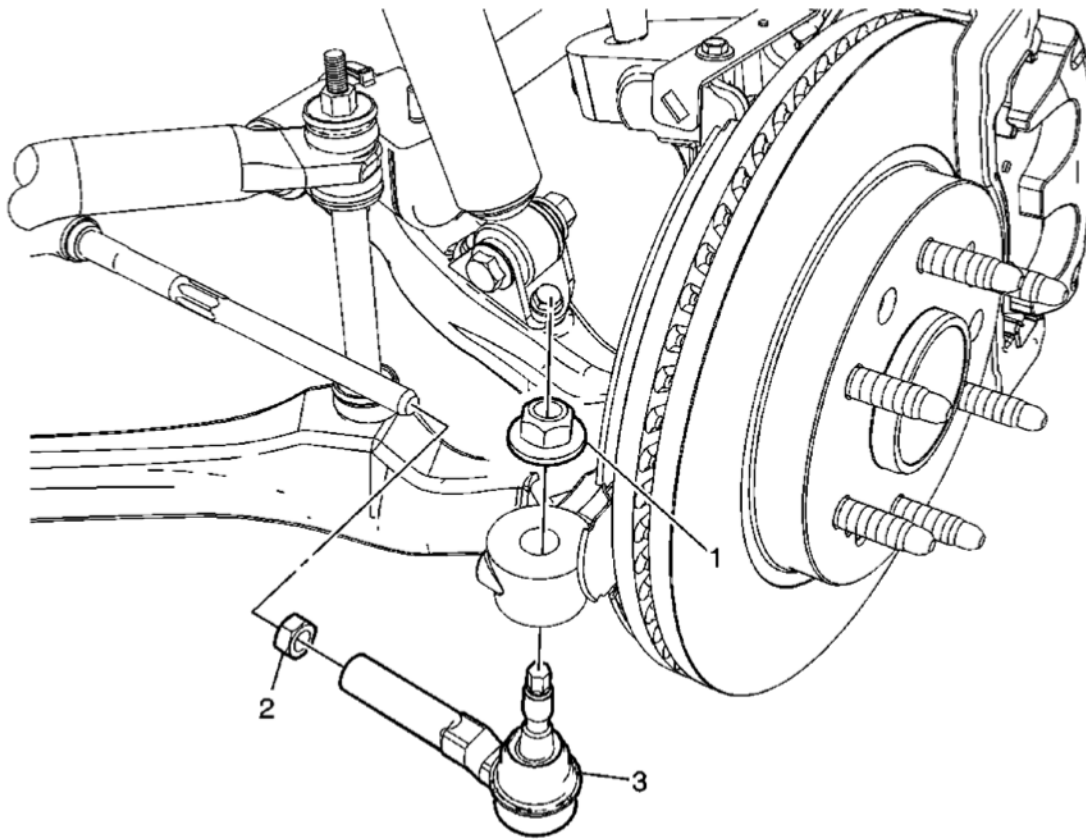


Fig. 11: View Of Outer Tie Rod & Components
Courtesy of GENERAL MOTORS CORP.

Tie Rod Replacement - Outer

Callout	Component Name
Preliminary Procedures: Raise the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .	
1	Outer Tie Rod Nut NOTE: Refer to <u>Fastener Notice</u> . Tighten: 60 N.m (44 lb ft)
2	Outer Tie Rod Jam Nut
	Outer Tie Rod Tip: • Use the J 24319-B , to separate the outer tie rod ball stud from the steering knuckle. • Inspect the inner tie rod for bent or damaged threads. • Clean the tapered surface of the steering knuckle.

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3

- Lubricate the tie rod threads with chassis lubricant. Refer to **Fluid and Lubricant Recommendations** .
- Adjust the front toe. Refer to **Measuring Wheel Alignment** .

Special Tools:

J 24319-B Universal Steering Linkage Puller.

TIE ROD REPLACEMENT - INNER

Tools Required

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

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the engine protection shield, if equipped. Refer to **Engine Shield Replacement** .
3. Remove the outer tie rod end. Refer to **Tie Rod Replacement - Outer**.

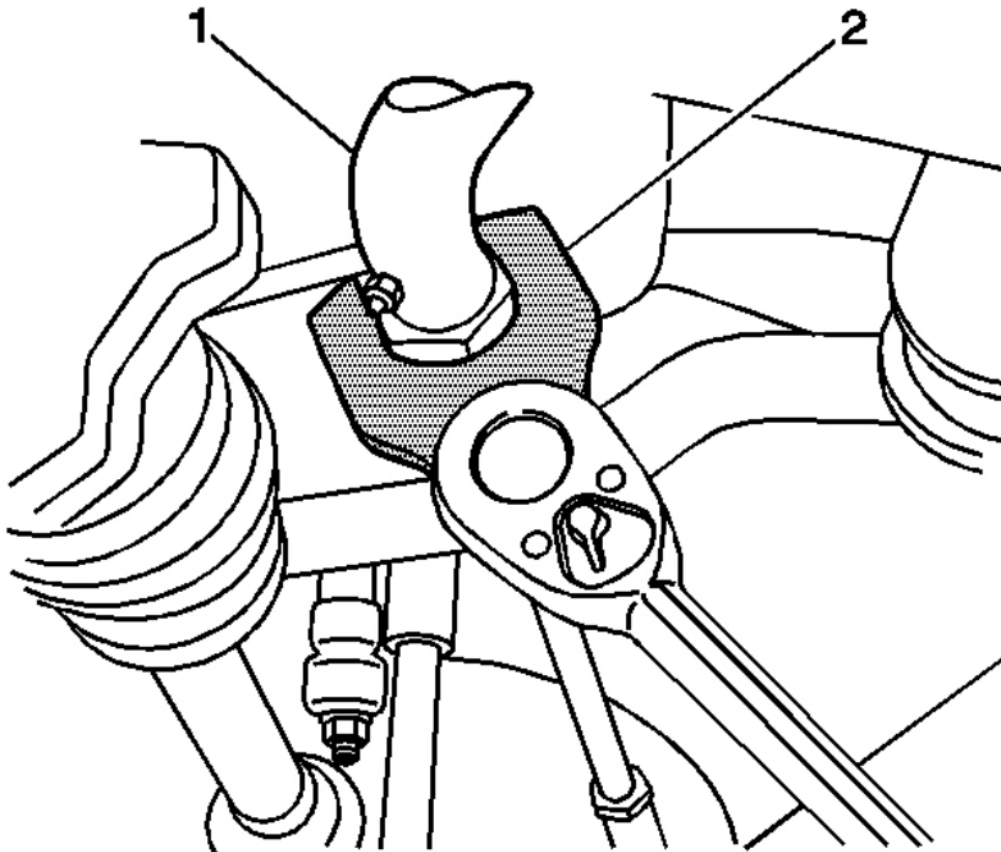


Fig. 12: View Of Inner Tie Rod End & J 34028
Courtesy of GENERAL MOTORS CORP.

4. Remove the inner tie rod end from the relay rod using the **J 34028** (2). See **Special Tools**.

Installation Procedure

IMPORTANT: Perform the following procedure before installing the new tie rod ends:

1. Remove all traces of the oil, grease, or other contaminants.
2. Clean the threads of the 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 inner tie rod.

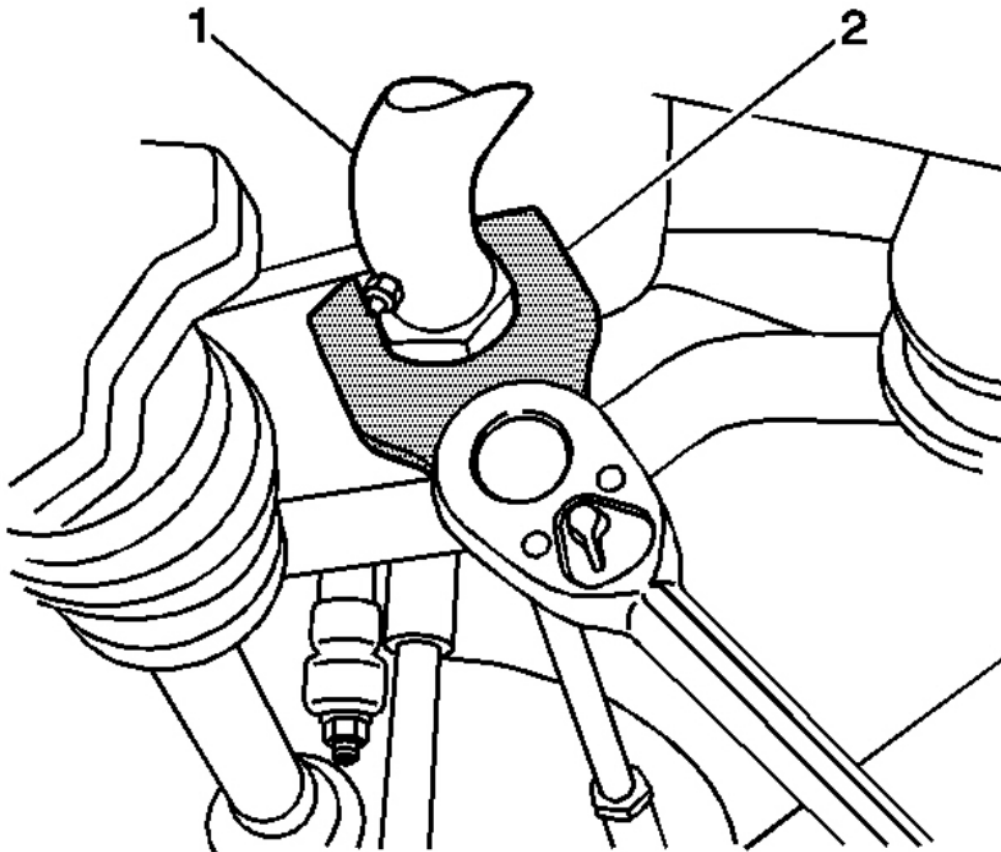


Fig. 13: View Of Inner Tie Rod End & J 34028
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

4. Install the inner tie rod to the relay rod.

Tighten: Using the **J 34028** (2) tighten the tie rod to 100 N. See Special Tools.m (74 lb ft).

5. Install the outer tie rod end. Refer to Tie Rod Replacement - Outer.
6. Install the engine protection shield, if equipped. Refer to Engine Shield Replacement .
7. Lower the vehicle.
8. Verify the wheel alignment. Refer to Wheel Alignment Specifications .

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Tools Required

- **J 35999** Spring Scale. See **Special Tools**.
 - **J 42640** Steering Column Anti-Rotation Pin
 - **J 45101** Hub and Wheel Runout Gage
1. Raise the vehicle on a hoist. Support the vehicle with jackstands. Refer to **Lifting and Jacking the Vehicle**.

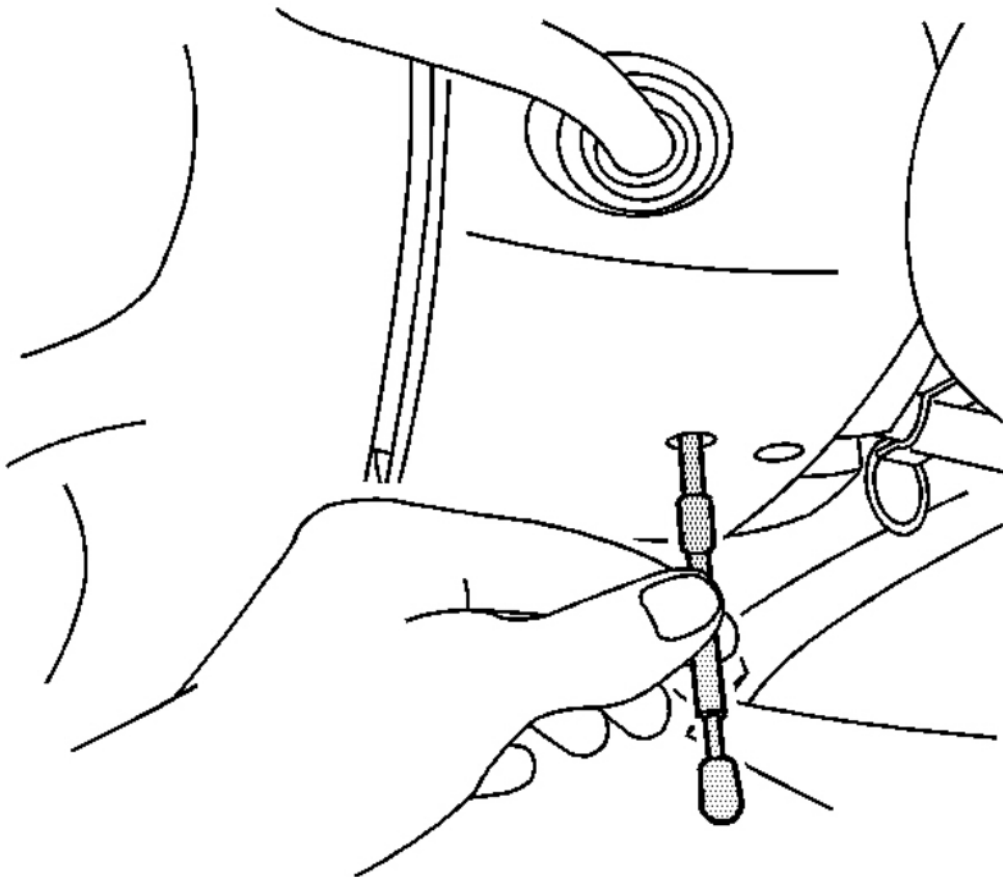


Fig. 14: Identifying J 42640

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 in a straight-ahead position and install the **J 42640** .
3. Install the dial indicator **J 45101** between the idler arm and vehicle frame.

Ensure the gage is at zero before taking a measurement.

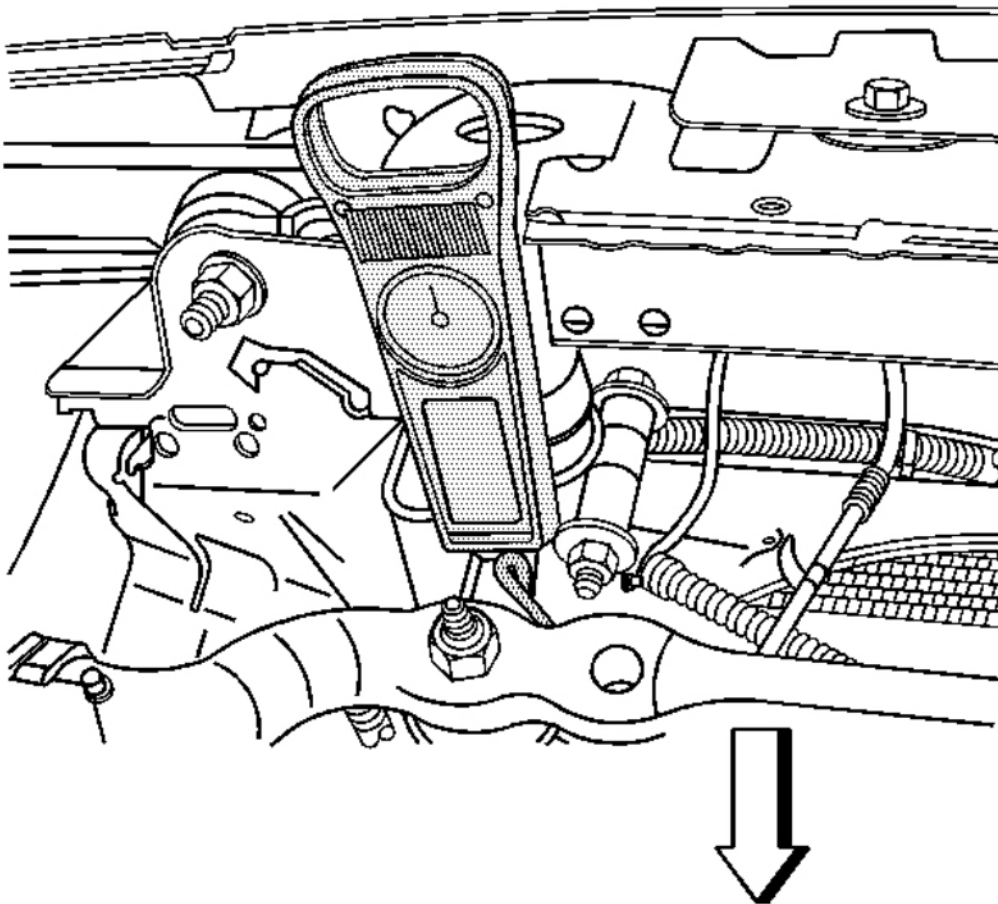


Fig. 15: View Of J 35999 & Relay Rod End Of The Idler Arm
Courtesy of GENERAL MOTORS CORP.

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

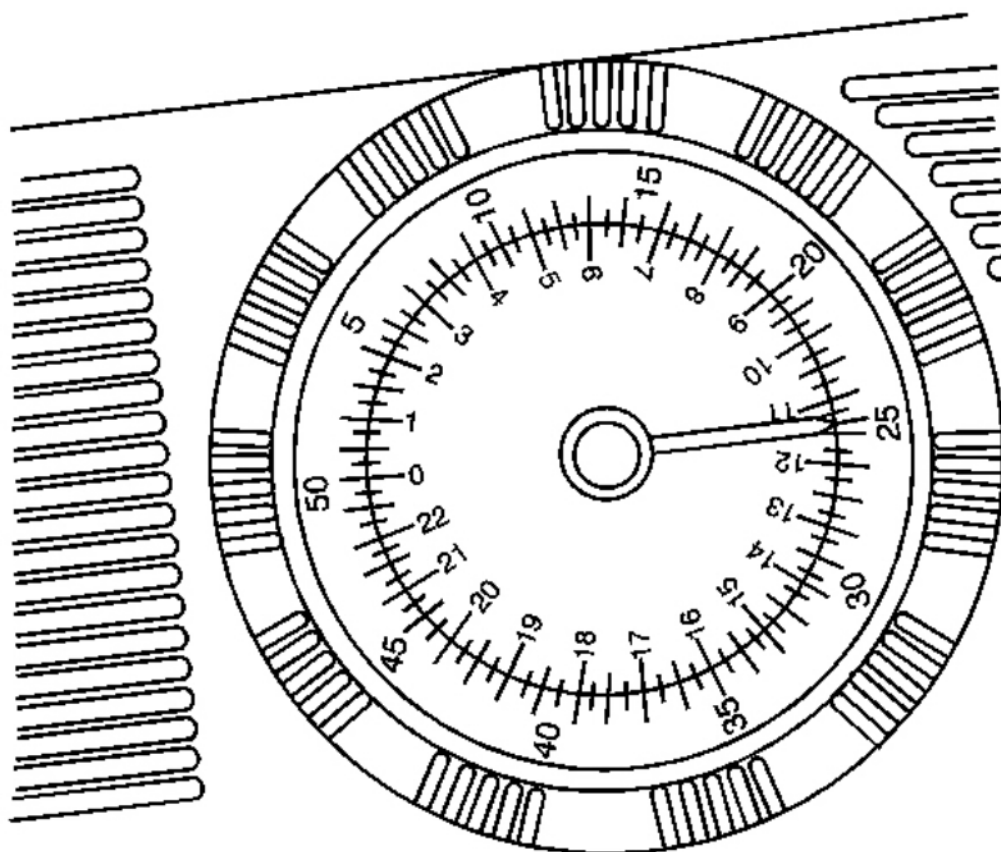


Fig. 16: Measuring The Upward Force
Courtesy of GENERAL MOTORS CORP.

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

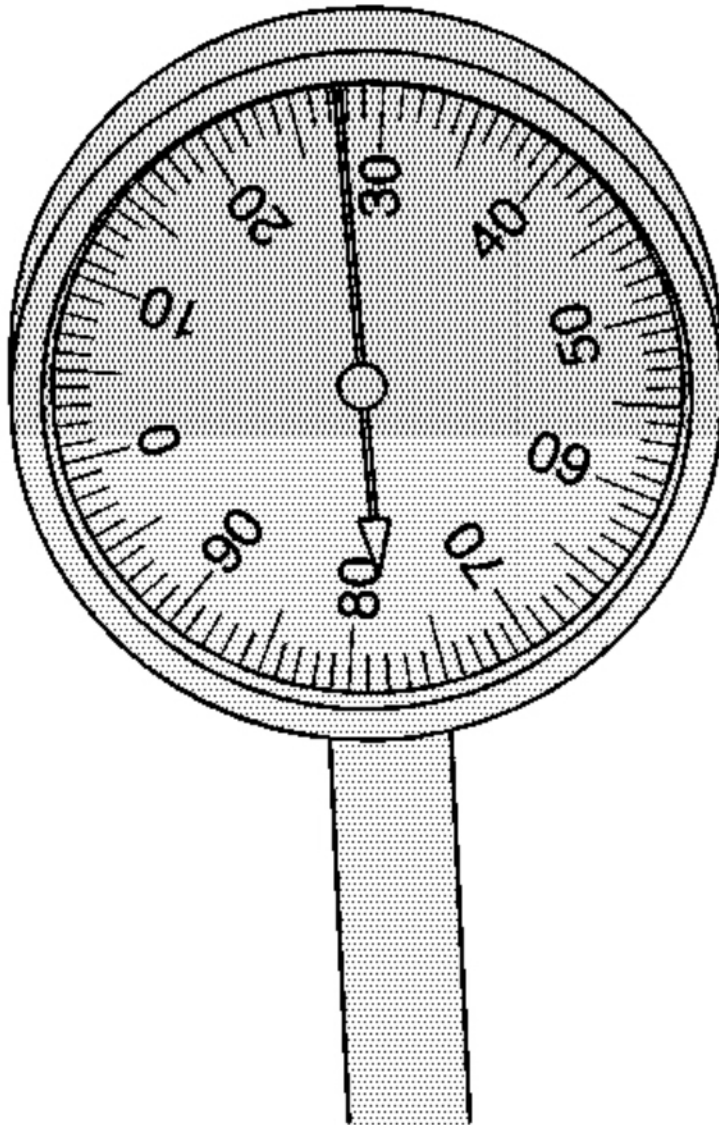


Fig. 17: Measuring Idler Arm Movement (Relay Rod End)
Courtesy of GENERAL MOTORS CORP.

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

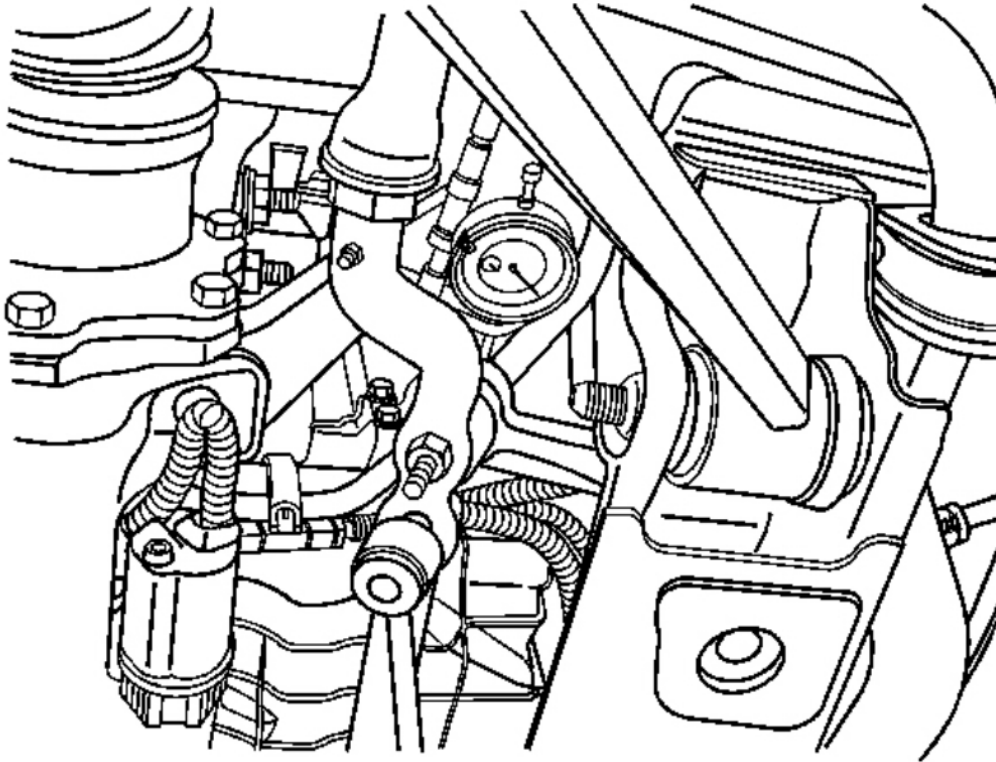


Fig. 18: View Of Dial Indicator At The Idler Arm
Courtesy of GENERAL MOTORS CORP.

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

Zero out the dial indicator and pull outward in order to take a reading.

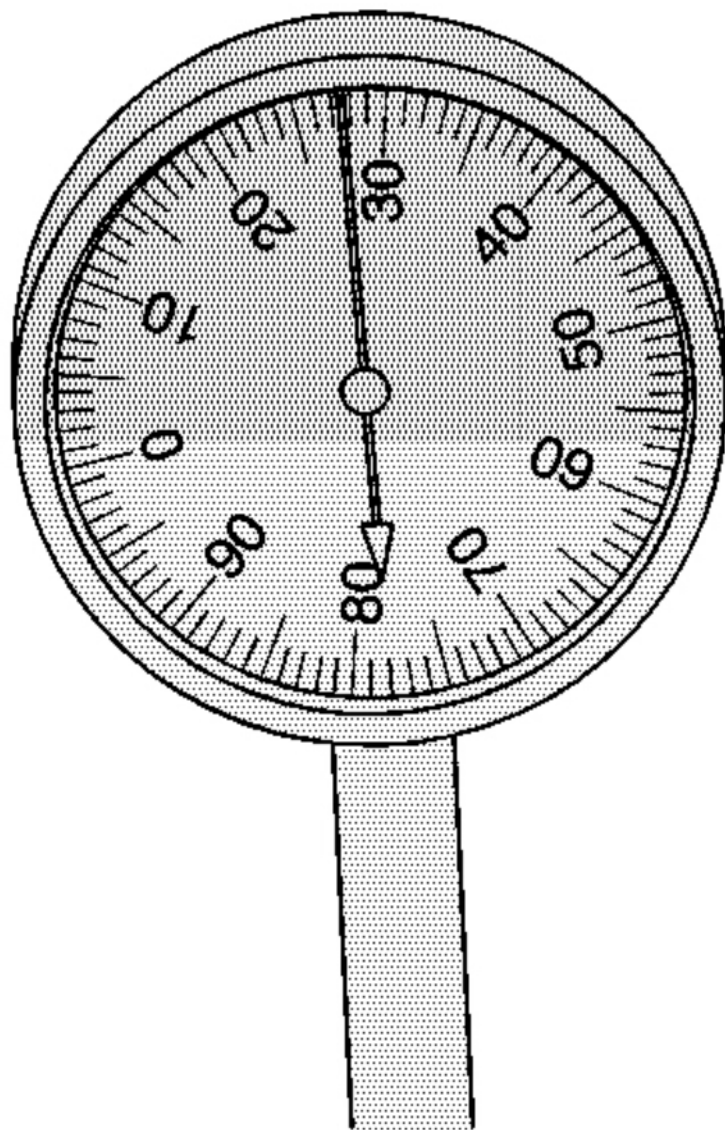


Fig. 19: Measuring Idler Arm Movement (Relay Rod End)
Courtesy of GENERAL MOTORS CORP.

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

If more than 1 mm (0.039 in) exists, replace the idler arm.

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10. Lower the vehicle.

IDLER ARM REPLACEMENT

Tools Required

J 24319-B Universal Steering Linkage 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. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .

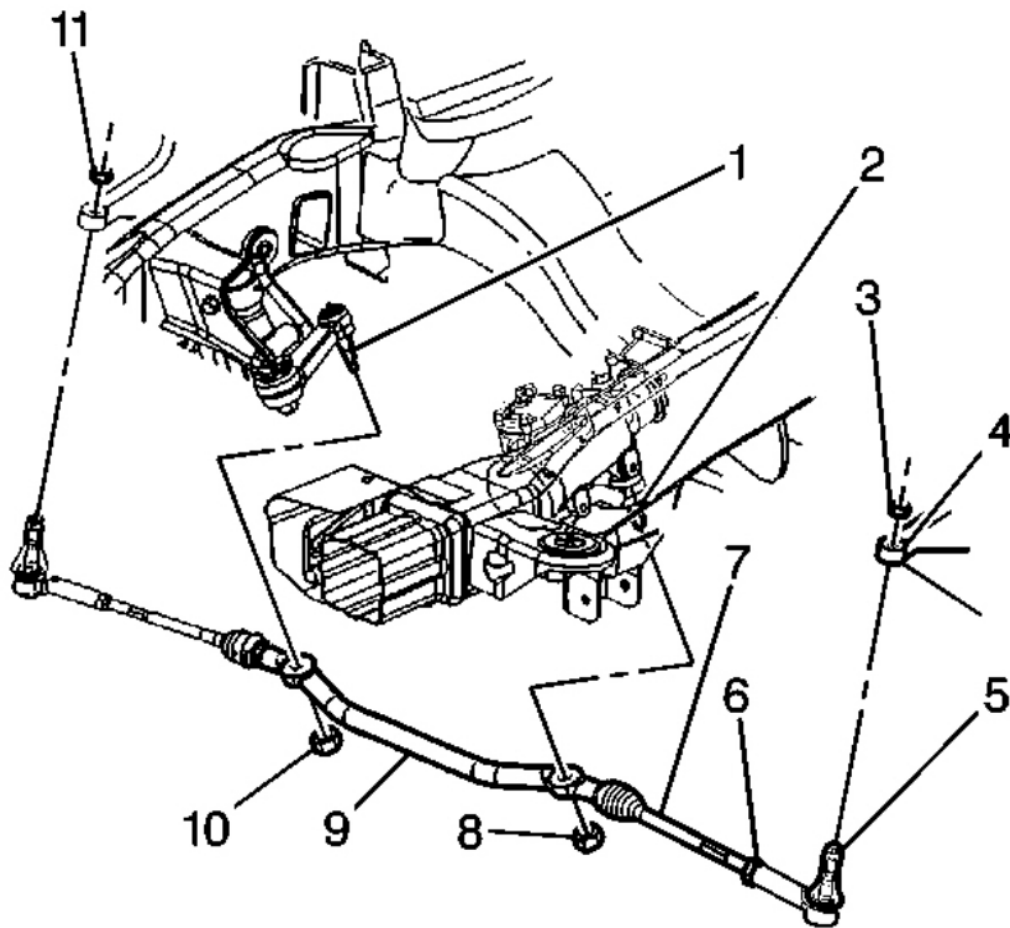


Fig. 20: View Of Relay Rod & Components
Courtesy of GENERAL MOTORS CORP.

2. Remove the engine protection shield, if equipped. Refer to **Engine Shield Replacement** .
3. Remove the idler arm ball stud nut (10).

Do not reuse the idler arm ball stud nut.

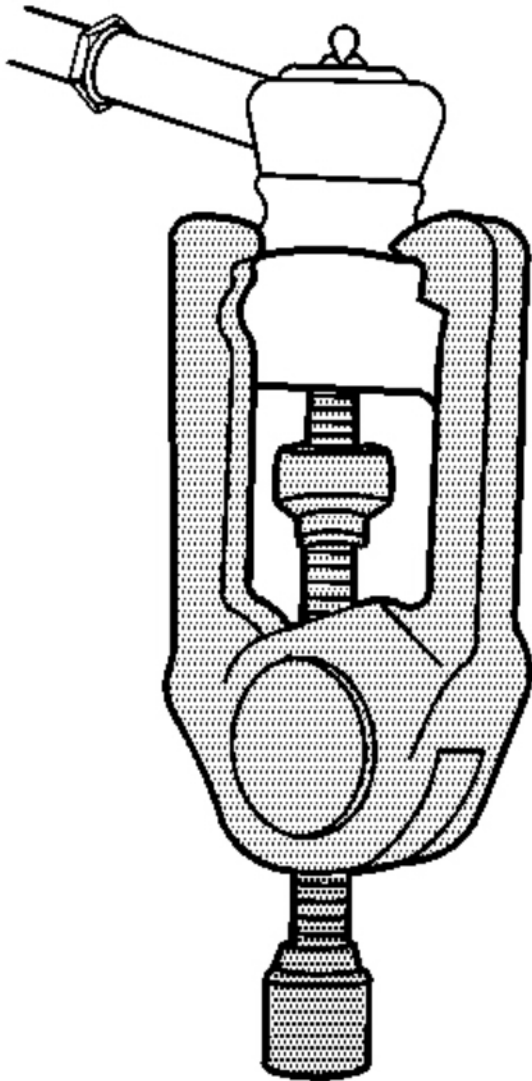


Fig. 21: View Of Outer Tie Rod Assembly & J 24319-B
Courtesy of GENERAL MOTORS CORP.

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

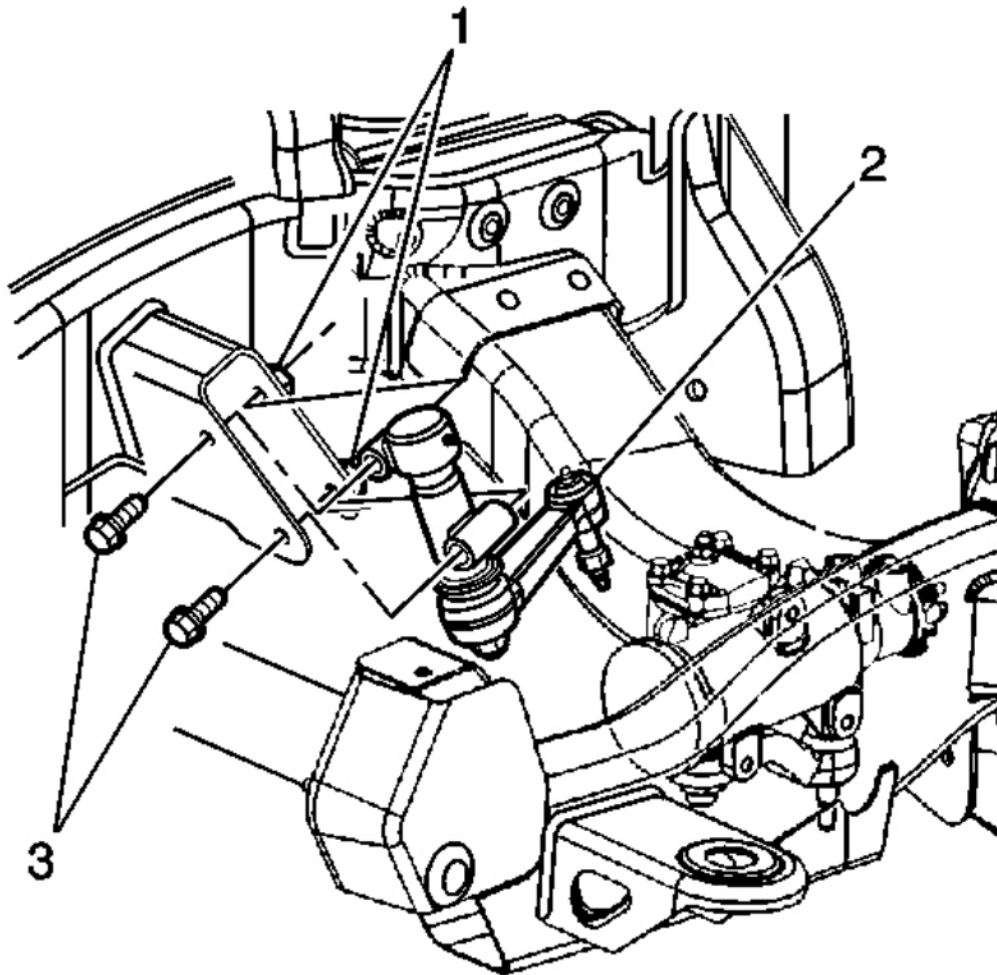


Fig. 22: View Of Idler Arm, Frame Bolts & Nuts
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

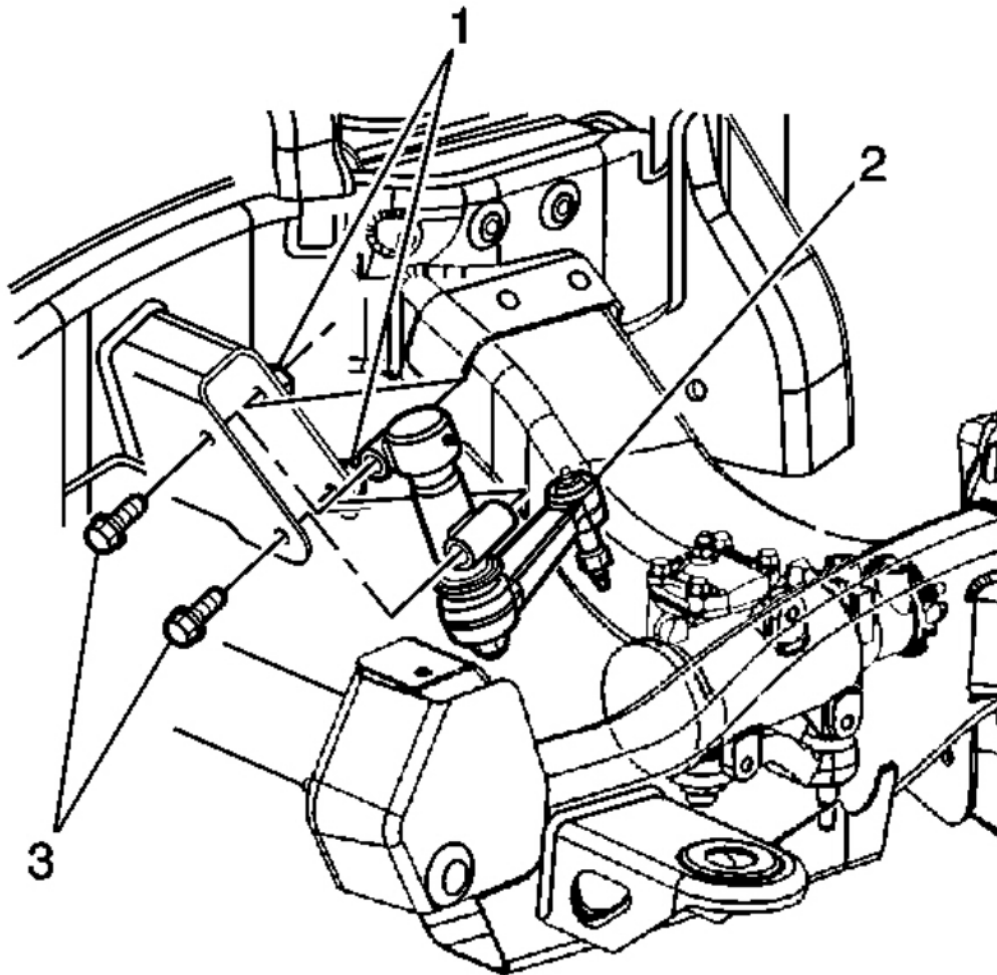


Fig. 23: View Of Idler Arm, Frame Bolts & Nuts

Courtesy of GENERAL MOTORS CORP.

1. Position the idler arm (2) on the frame.

NOTE: Refer to Fastener Notice .

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

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

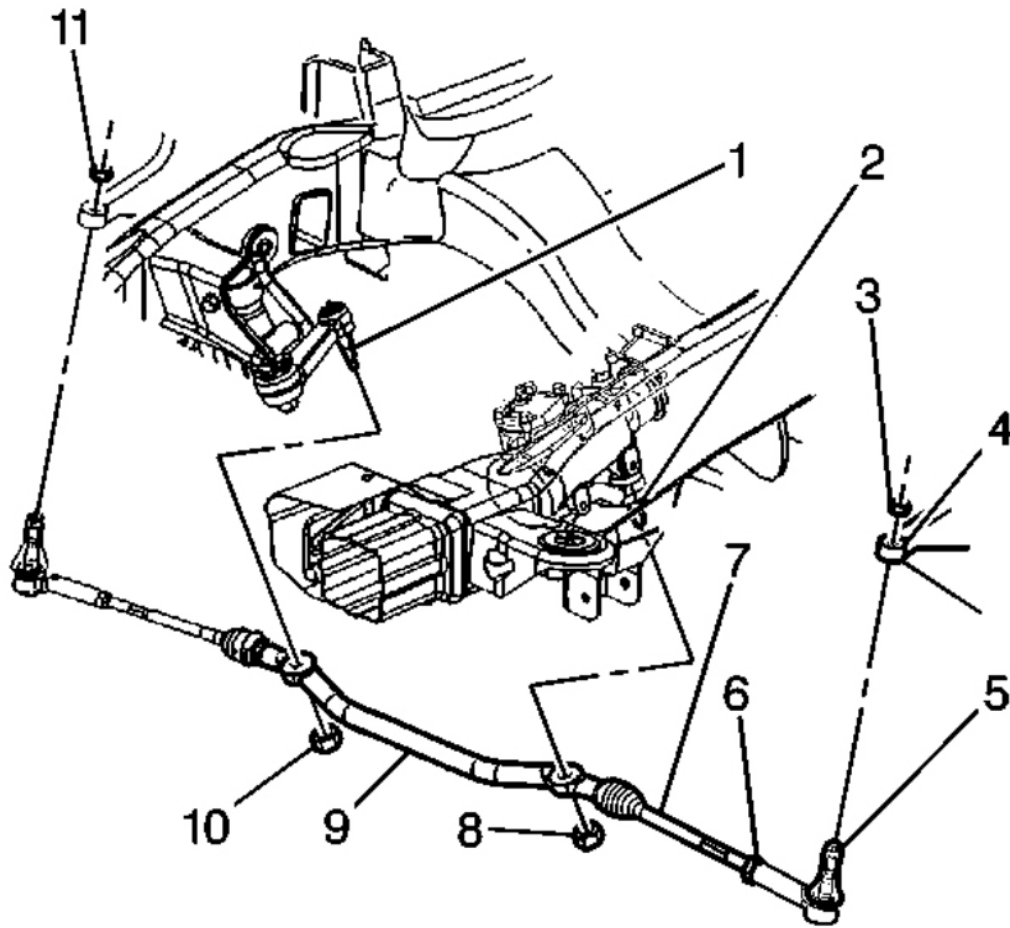


Fig. 24: View Of Relay Rod & Components
Courtesy of GENERAL MOTORS CORP.

3. Install the idler arm ball stud (1) to relay rod (9).

Ensure the seal is on the stud.

4. Install the new idler arm ball stud prevailing torque nut to the idler arm ball stud.

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

5. Install the engine protection shield, if equipped. Refer to **Engine Shield Replacement**.
6. Lower the vehicle.
7. Check the wheel alignment. Refer to **Measuring Wheel Alignment**.

RELAY ROD REPLACEMENT

Tools Required

J 24319-B Universal Steering Linkage Puller

Removal Procedure

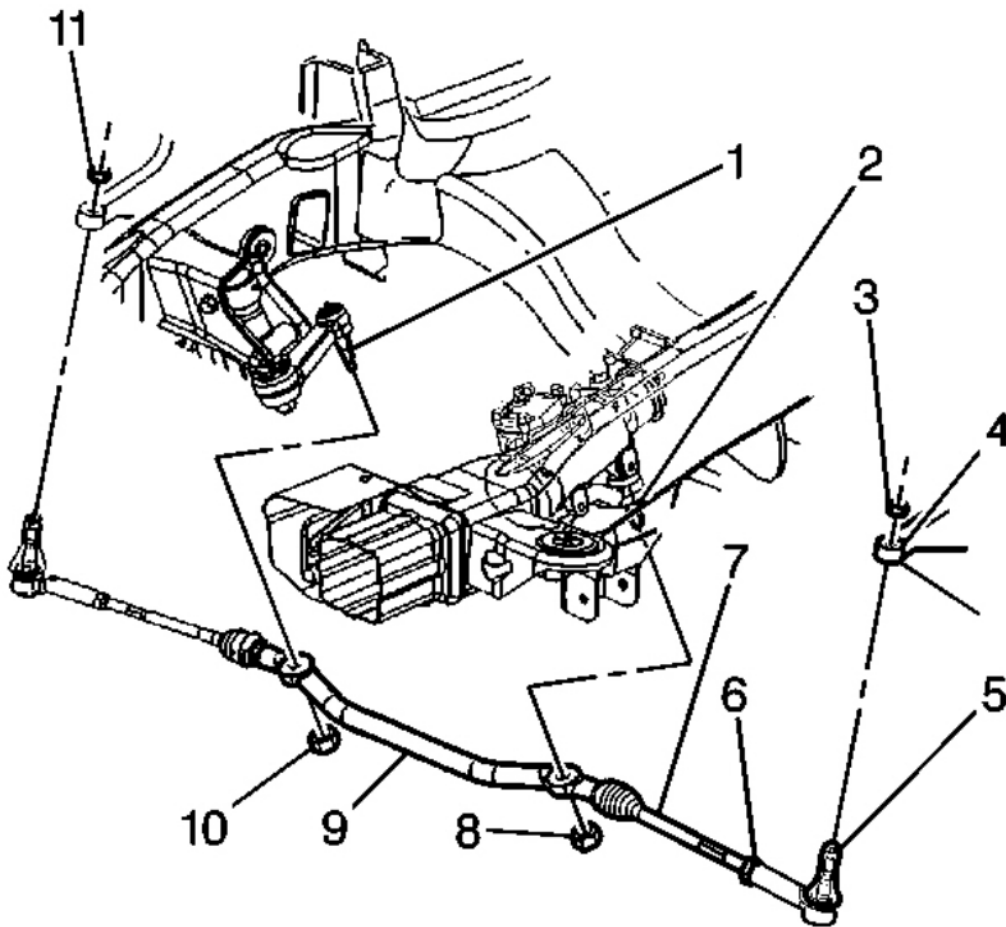


Fig. 25: View Of Relay Rod & Components
Courtesy of GENERAL MOTORS CORP.

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the engine protection shield, if equipped. Refer to **Engine Shield Replacement** .
3. Remove the steering damper from the relay rod, if equipped. Refer to **Steering Damper Replacement**.

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IMPORTANT: Use the proper tool in order to separate all the tie rod and the ball joints.

4. Remove the inner tie rod ends (6). Refer to **Tie Rod Replacement - Inner**.
5. Remove the idler arm ball stud nut (10).

Do not reuse the nut.

6. Remove the pitman arm nut (8).

Do not reuse the nut.

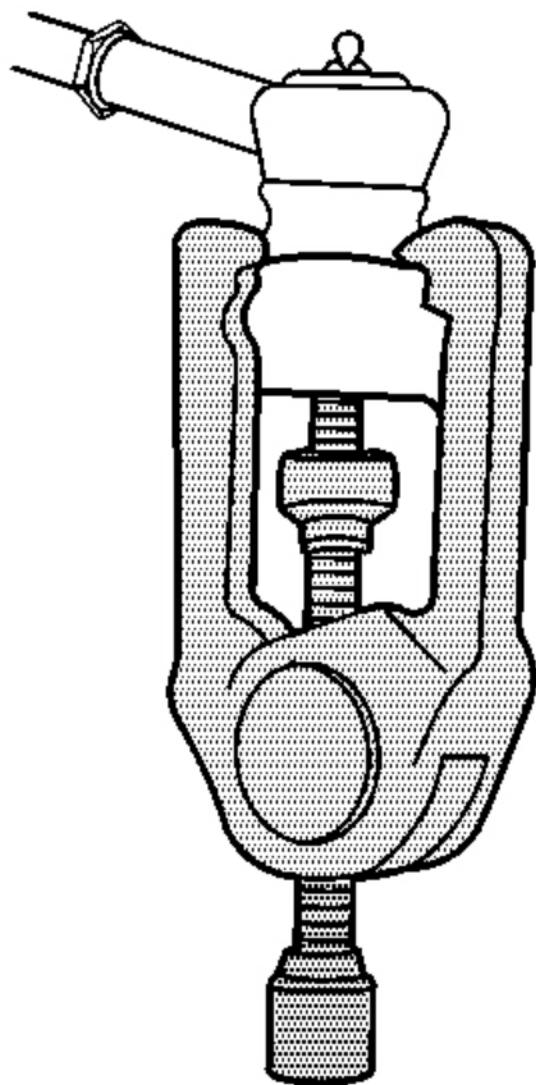


Fig. 26: View Of Outer Tie Rod Assembly
Courtesy of GENERAL MOTORS CORP.

7. Disconnect the idler arm from the relay rod using the **J 24319-B**.
8. Disconnect the pitman arm from the relay rod using the **J 24319-B**.
9. Remove the relay rod from the vehicle.
10. Inspect the threads on the tie rod ends for damage.

11. Inspect the ball stud threads for damage.
12. Inspect the ball stud seals for excessive damage.
13. Clean the threads on the ball studs.

Installation Procedure

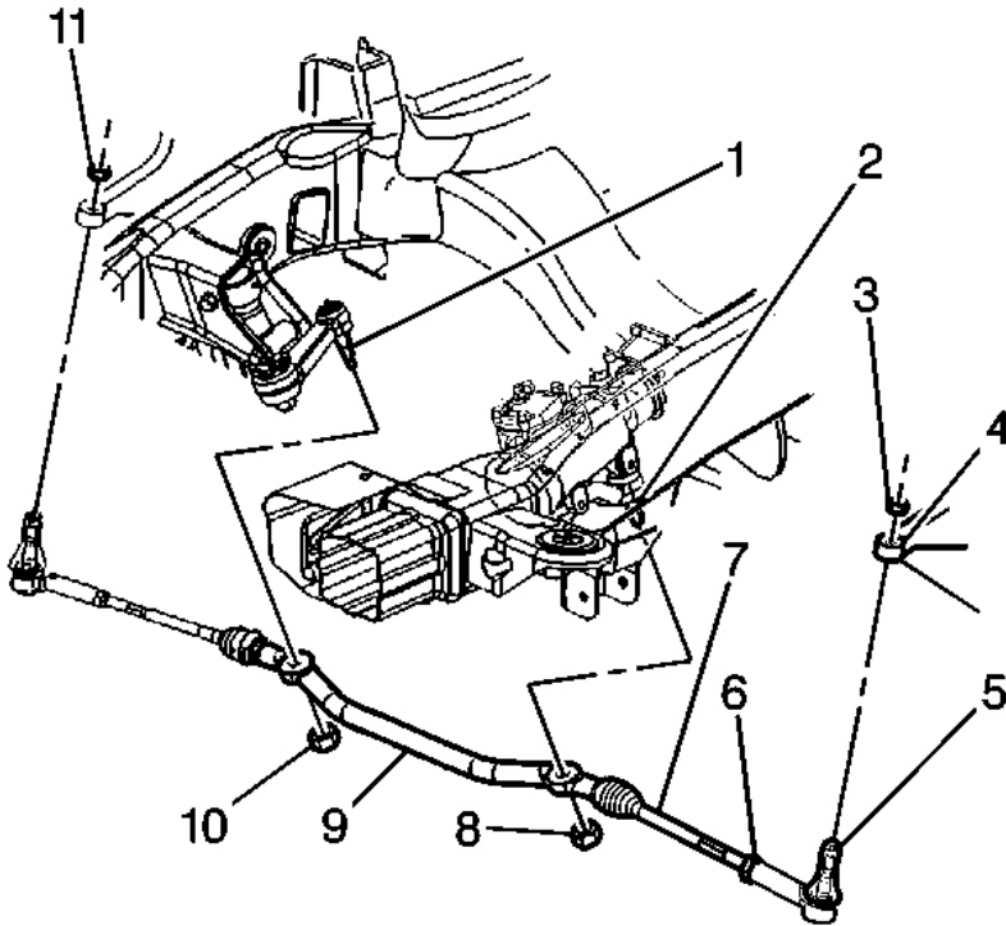


Fig. 27: View Of Relay Rod & Components
Courtesy of GENERAL MOTORS CORP.

1. Install the relay rod (9) to the vehicle.
2. Connect the pitman arm ball stud (2) to the relay rod.
3. Connect the idler arm ball stud (1) to the relay rod.
4. Install the new pitman arm prevailing torque nut.

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NOTE: Refer to Fastener Notice .

5. Install the new idler arm prevailing torque nut.

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

6. Install the inner tie rod ends. Refer to Tie Rod Replacement - Inner.
7. Install the steering damper to the relay rod, if equipped. Refer to Steering Damper Replacement.
8. Install the engine protection shield, if equipped. Refer to Engine Shield Replacement .
9. Lower the vehicle.
10. Check the wheel alignment. Refer to Measuring Wheel Alignment .

STEERING DAMPER REPLACEMENT

Tools Required

J 24319-B Universal Steering Linkage Puller

Removal Procedure

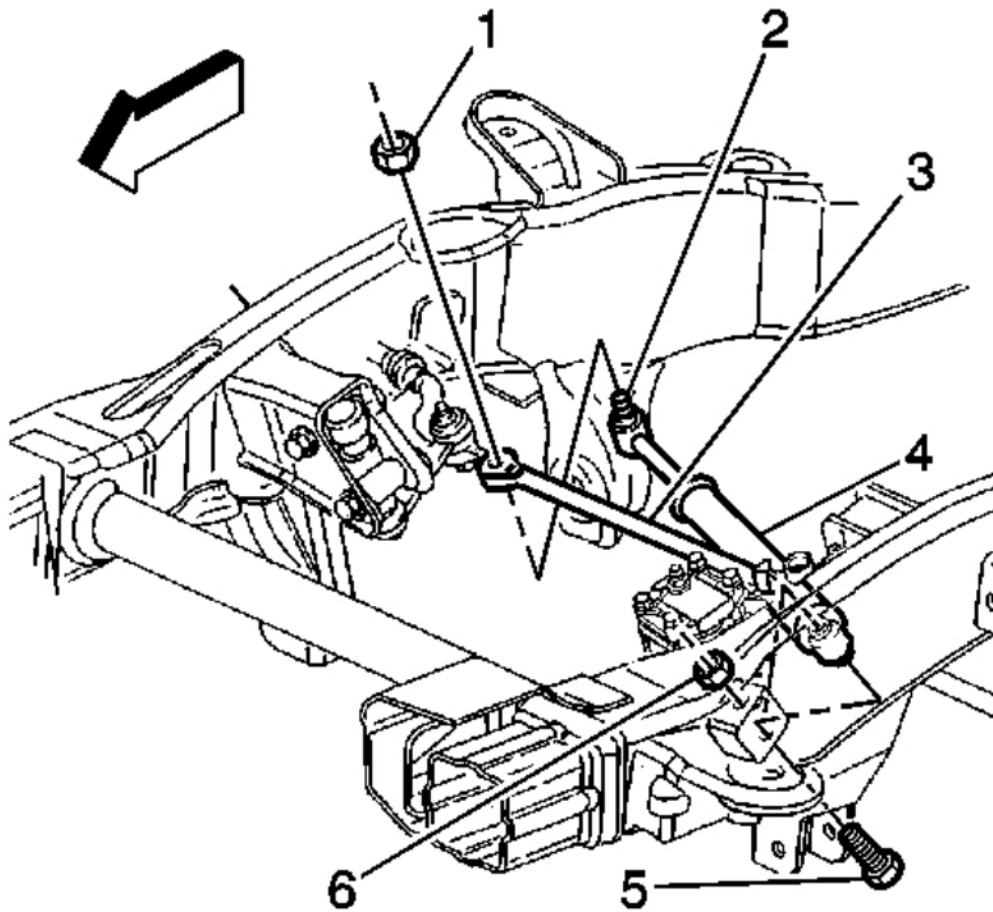


Fig. 28: View Of Steering Damper & Components
Courtesy of GENERAL MOTORS CORP.

1. Raise the vehicle. Support the vehicle with safety stands. Refer to Lifting and Jacking the Vehicle .
2. Remove the engine protection shield, if equipped. Refer to Engine Shield Replacement .

IMPORTANT: Do not reuse the nut.

3. Remove the steering damper (2) ball stud nut (1).

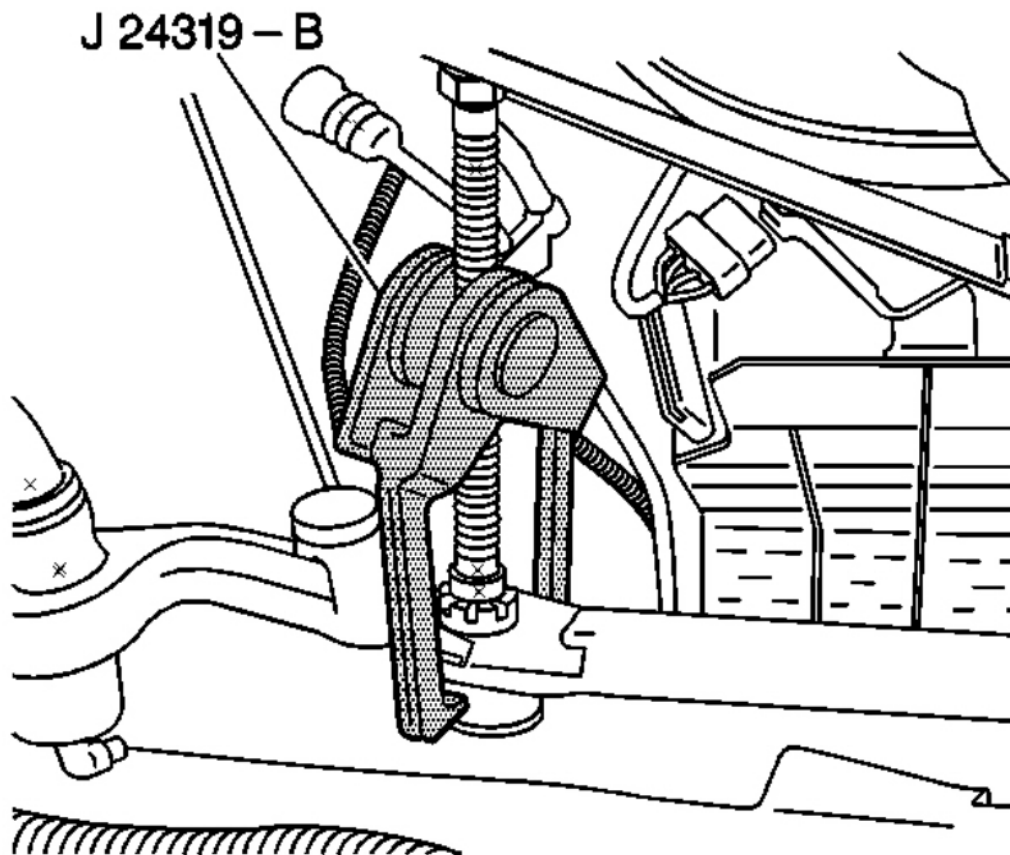
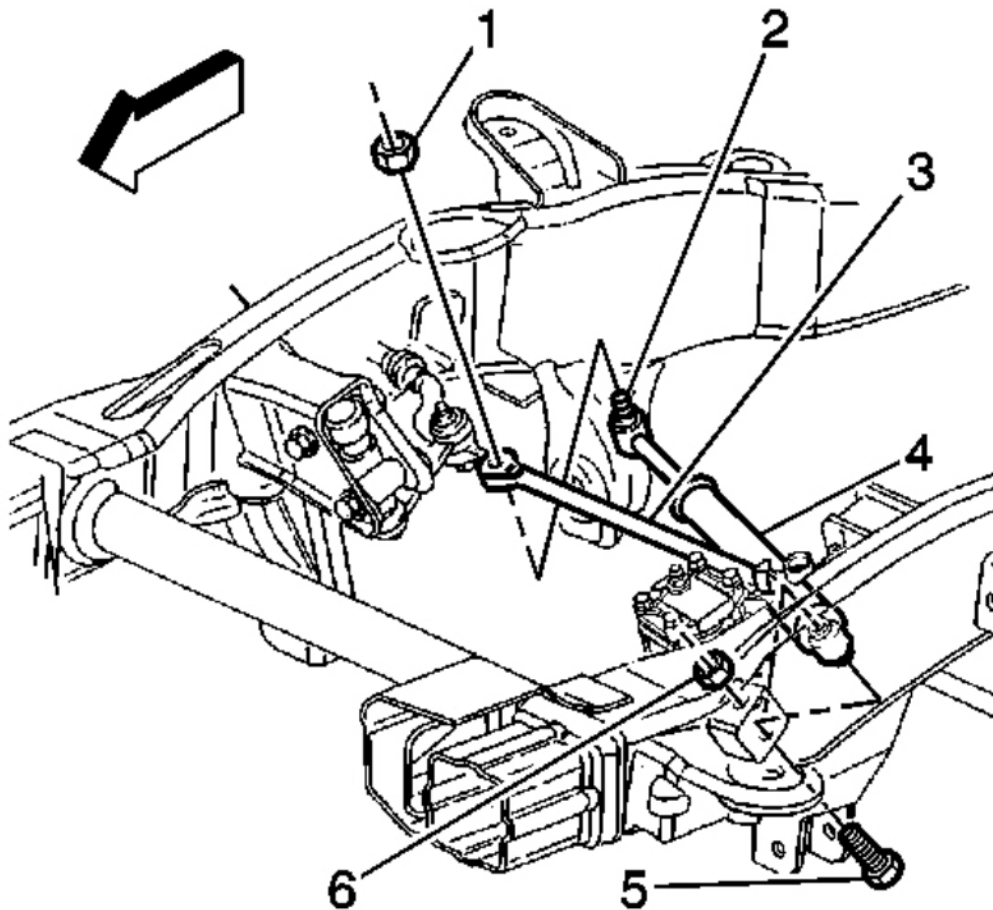


Fig. 29: View Of Steering Damper Ball Stud, Relay Rod & J 24319-B
Courtesy of GENERAL MOTORS CORP.

4. Remove the steering damper ball stud from the relay rod using the **J 24319-B** .



IMPORTANT: Do not reuse the nut.

5. Remove the steering damper mounting bolt (5) and the nut (6).
6. Remove the steering damper (4) from the vehicle.
7. Inspect the following parts:
 - The steering damper for leaks and damage
 - The mounting bolts and the nuts for damage or corrosion

Installation Procedure

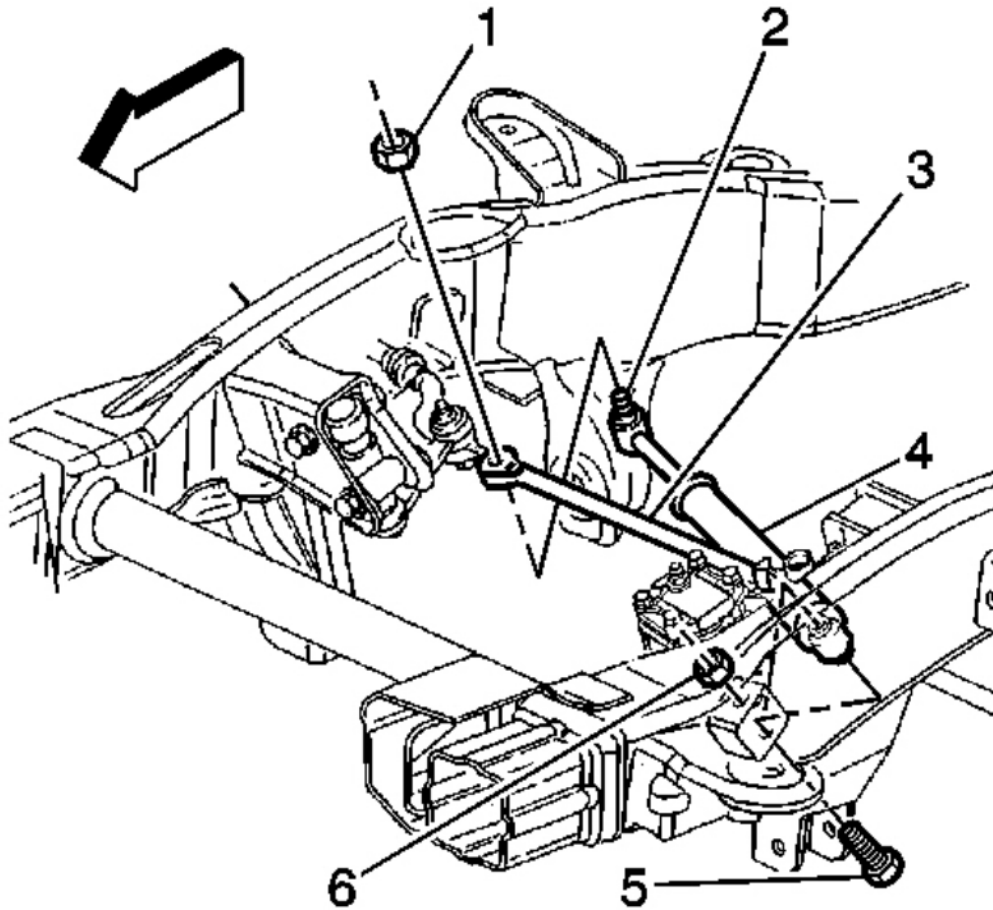


Fig. 31: View Of Steering Damper & Components
Courtesy of GENERAL MOTORS CORP.

1. Install the steering damper (4).
2. Install the mounting bolt (5) and a new prevailing torque nut (6).
3. Install the steering damper ball stud (2) to the relay rod (3).

NOTE: Refer to Fastener Notice .

4. Install the prevailing torque nuts.

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

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5. Install the engine protection shield, if equipped. Refer to **Engine Shield Replacement** .
6. Lower the vehicle.

PITMAN ARM REPLACEMENT

Tools Required

- **J 6632-01** Pitman Arm Puller
- **J 29107-A** Pitman Arm Puller

Removal Procedure

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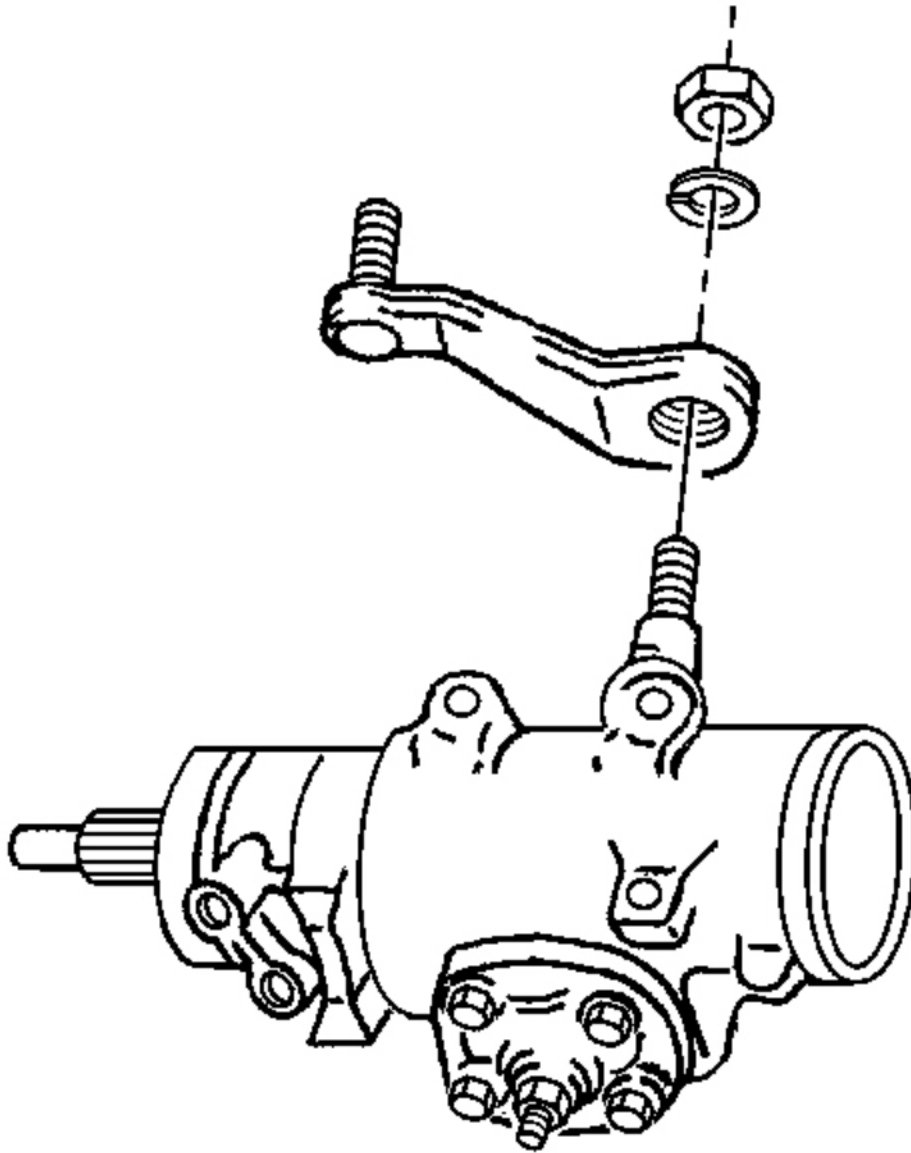


Fig. 32: View Of Pitman Arm, Power Steering Gear, Washer & Nut
Courtesy of GENERAL MOTORS CORP.

1. Raise and suitable support the vehicle. Refer to Lifting and Jacking the Vehicle .
2. Remove the power steering gear. Refer to Power Steering Gear Replacement (Rack and Pinion) or Power Steering Gear Replacement (Non Rack and Pinion) .

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3. Install the power steering gear into a vise.
4. Remove the pitman arm nut and washer.

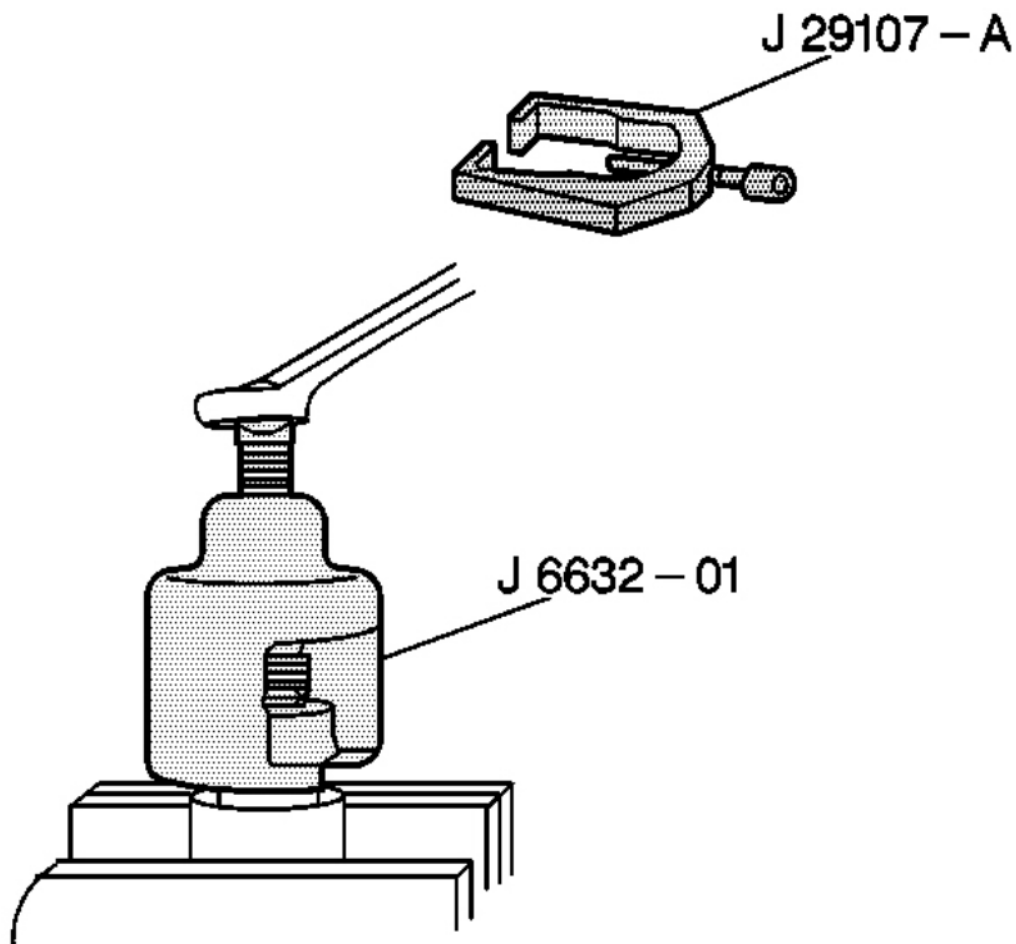


Fig. 33: View Of Pitman Arm, Power Steering Gear (Non Rack and Pinion) & Special Tools
Courtesy of GENERAL MOTORS CORP.

5. Remove the pitman arm from the pitman shaft using J 6632-01 or J 29107-A .

Installation Procedure

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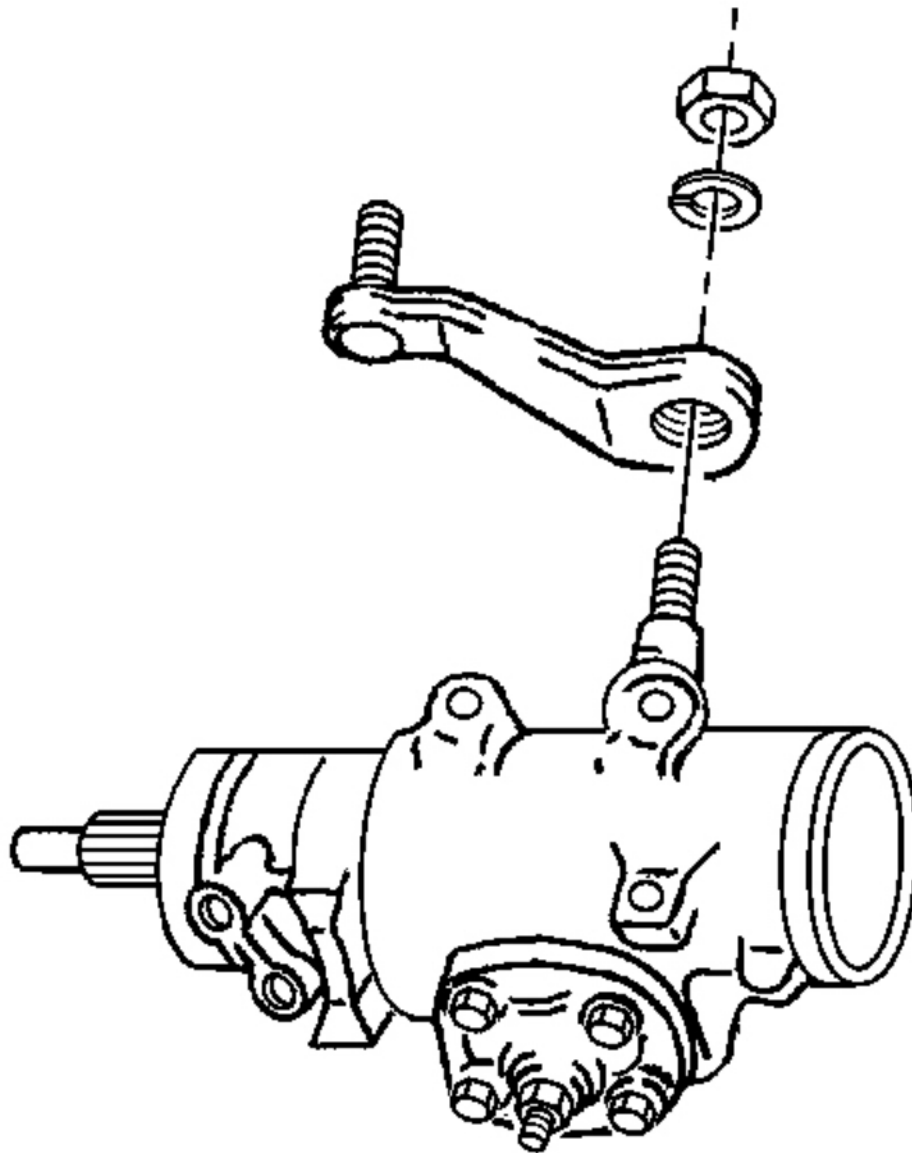


Fig. 34: View Of Pitman Arm, Power Steering Gear, Washer & Nut
Courtesy of GENERAL MOTORS CORP.

1. Install the pitman arm to the power steering gear.

NOTE: Refer to Fastener Notice .

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2. Install a new pitman arm washer and nut.

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

3. Remove the power steering gear from the vise.
4. Install the power steering gear. Refer to **Power Steering Gear Replacement (Rack and Pinion)** or **Power Steering Gear Replacement (Non Rack and Pinion)** .
5. Lower the vehicle.
6. Check the wheel alignment. Refer to **Measuring Wheel Alignment** .

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

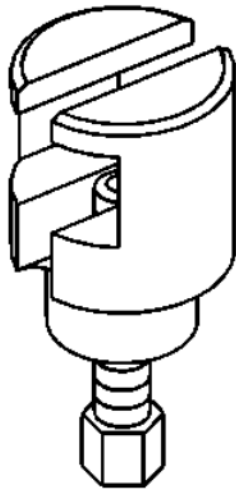
SPECIAL TOOLS

Special Tools

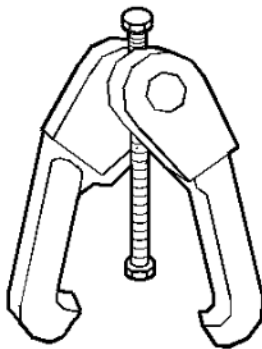
Illustration	Tool Number/ Description

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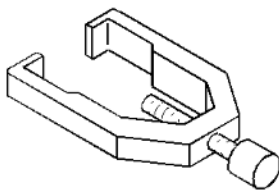
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J 6632-01
Pitman Arm Puller



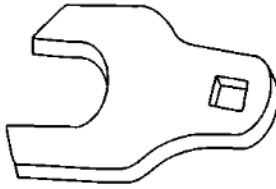
J 24319-B
Steering Linkage and Tie Rod Puller



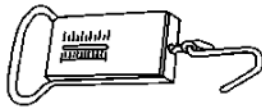
J 29107-A
Pitman Arm Puller

2007 Cadillac Escalade

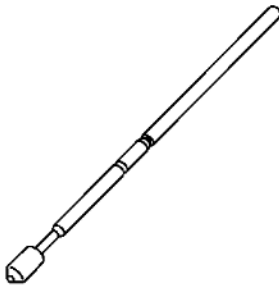
2007 STEERING Steering Linkage - Avalanche, Escalade, Suburban, Tahoe & Yukon



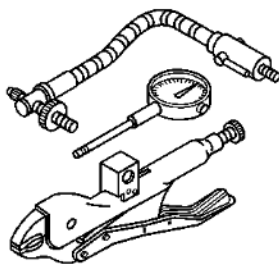
J 34028
Inner Tie Rod Wrench



J 35999
Spring Scale



J 42640
Steering Column Anti-Rotation Pin



J 45101
Hub and Wheel Runout Gage