

2017 Steering
Steering Linkage - Sierra, Silverado

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Application	Specification
	Metric (English)
Pitman Arm Nut @Steering Gear	370 N.m (273 lb ft)
Steering Linkage Idler Arm Nut@Frame	165 N.m (122 lb ft)
Steering Linkage Idler Arm Nut@Steering Linkage Relay Rod	125 N.m (92 lb ft)
Steering Linkage Inner Tie Rod	125 N.m (92 lb ft)
Steering Linkage Outer Tie Rod Nut	
• First Pass:	35 N.m (26 lb ft)
• Final Pass:	85-100 degrees
Steering Linkage Pitman Arm Nut@Steering Linkage Relay Rod	125 N.m (92 lb ft)

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		US	Canada
Steering Linkage Inner Tie Rod	Threadlocker	12345493	10953488

REPAIR INSTRUCTIONS

STEERING LINKAGE INSPECTION

Special Tools

- **CH-42640** Steering Column Anti-Rotation Pin
- **CH-45101** Dial Indicator Kit

Equivalent regional tools:[Special Tools](#)

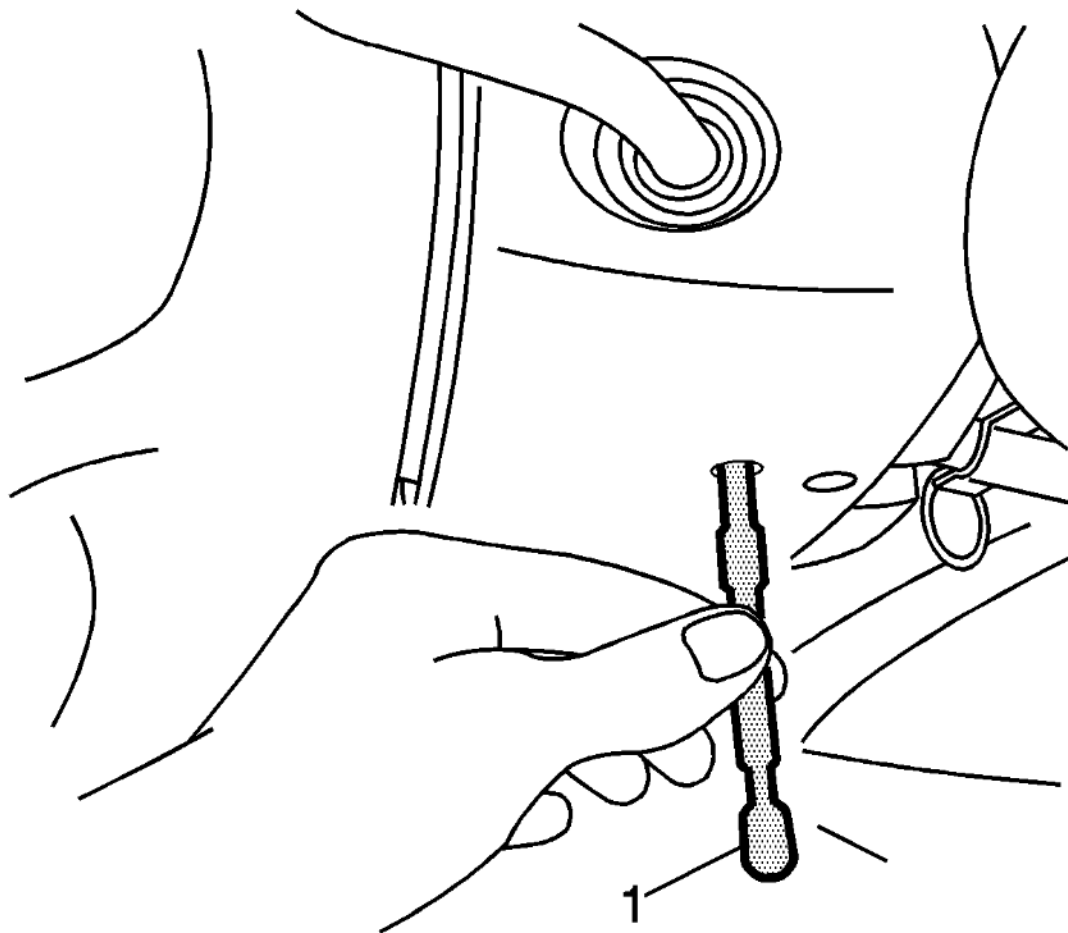


Fig. 1: Locking/Unlocking Steering Column

Courtesy of GENERAL MOTORS COMPANY

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

1. Position the wheels in a straight-ahead position and install the **CH-42640** Steering Column Anti-Rotation Pin (1).

2. Elevate the left front of the vehicle and install a suitable support, maintaining contact between the right front tire and wheel assembly and the shop floor. Lifting and Jacking the Vehicle

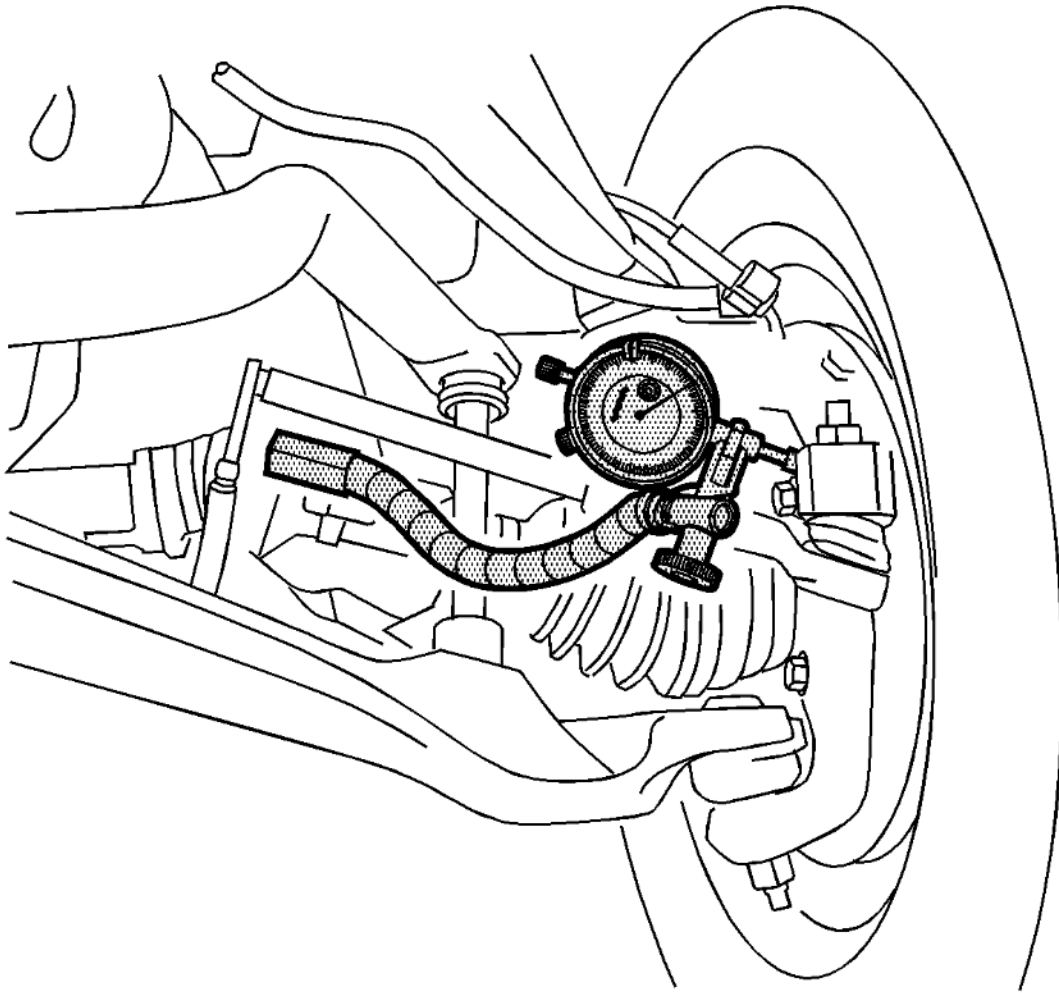


Fig. 2: View Of Dial Indicator Between Outer Tie Rod & Steering Knuckle
Courtesy of GENERAL MOTORS COMPANY

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

The movement should NOT exceed 1 mm (0.039 in).

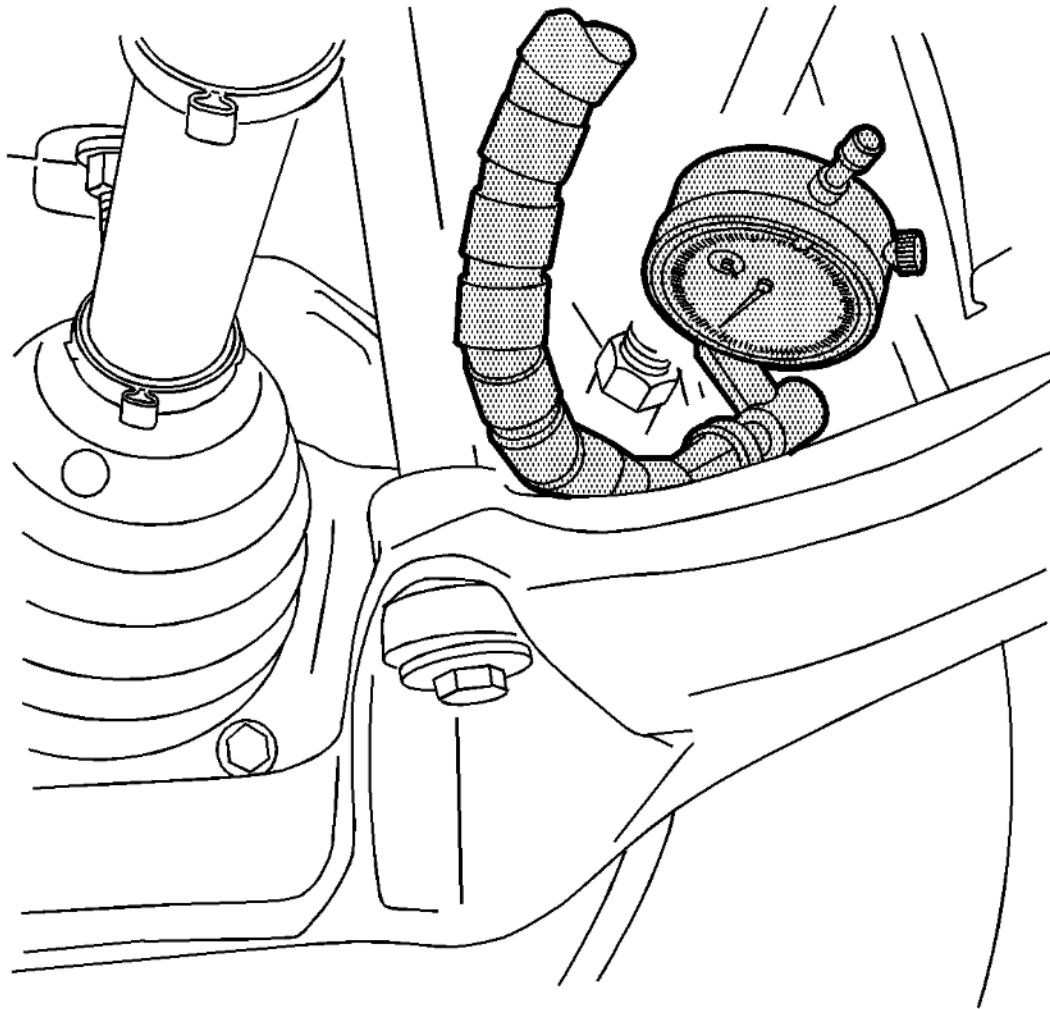


Fig. 3: View Of Dial Indicator Between Outer Tie Rod End And Jam Nut

Courtesy of GENERAL MOTORS COMPANY

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 steering linkage relay rod, as shown, and push slowly inward on the tire with one hand to remove any lash.
6. Place the dial indicator at zero, pull outward on the tire, and note the amount of movement.

The movement should NOT exceed 1 mm (0.039 in).

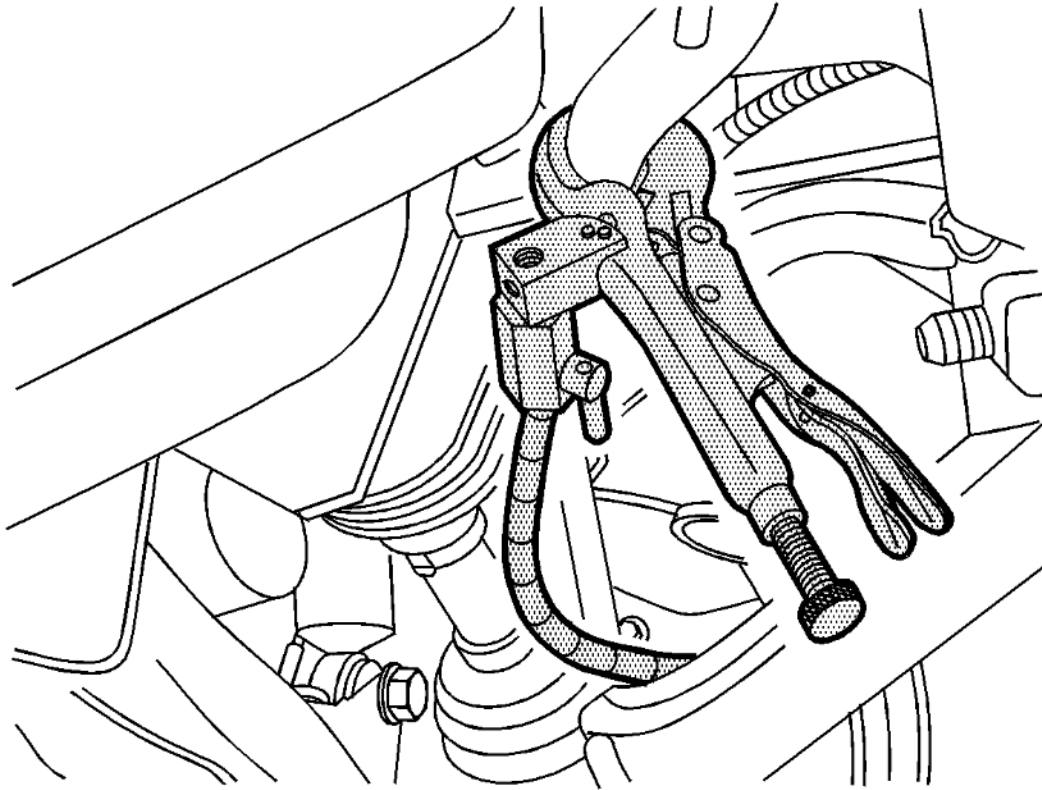


Fig. 4: View Of Dial Indicator Between Pitman Arm And Relay Rod

Courtesy of GENERAL MOTORS COMPANY

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

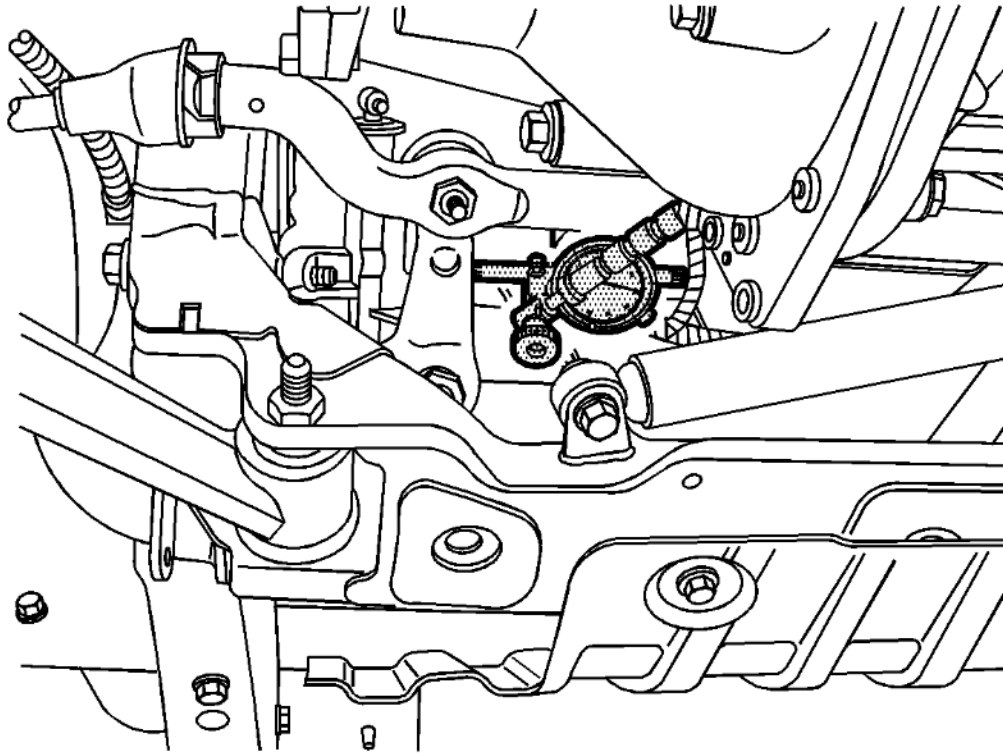


Fig. 5: Measuring Amount Of Movement In Left Side Joint

Courtesy of GENERAL MOTORS COMPANY

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

The movement should NOT exceed 1 mm (0.039 in).

9. Remove the support and lower the vehicle.

Jounce the vehicle several times to settle the steering linkage and front suspension.

10. Elevate the right front of the vehicle and install a suitable support, maintaining contact between the left front tire and wheel assembly and the shop floor. **Lifting and Jacking the Vehicle**

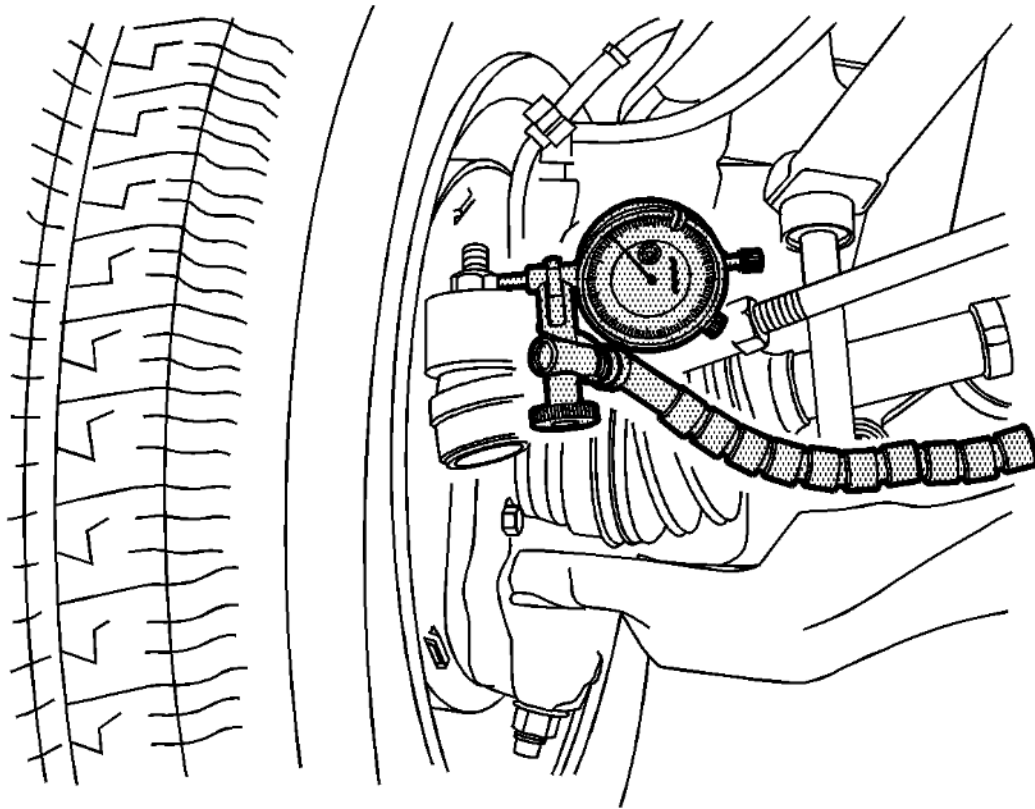


Fig. 6: Installing Dial Indicator Between Outer Tie Rod And Steering Knuckle
Courtesy of GENERAL MOTORS COMPANY

11. Install the dial indicator between the steering linkage outer tie rod and the steering knuckle, as shown, and push slowly inward on the tire with one hand to remove any lash.

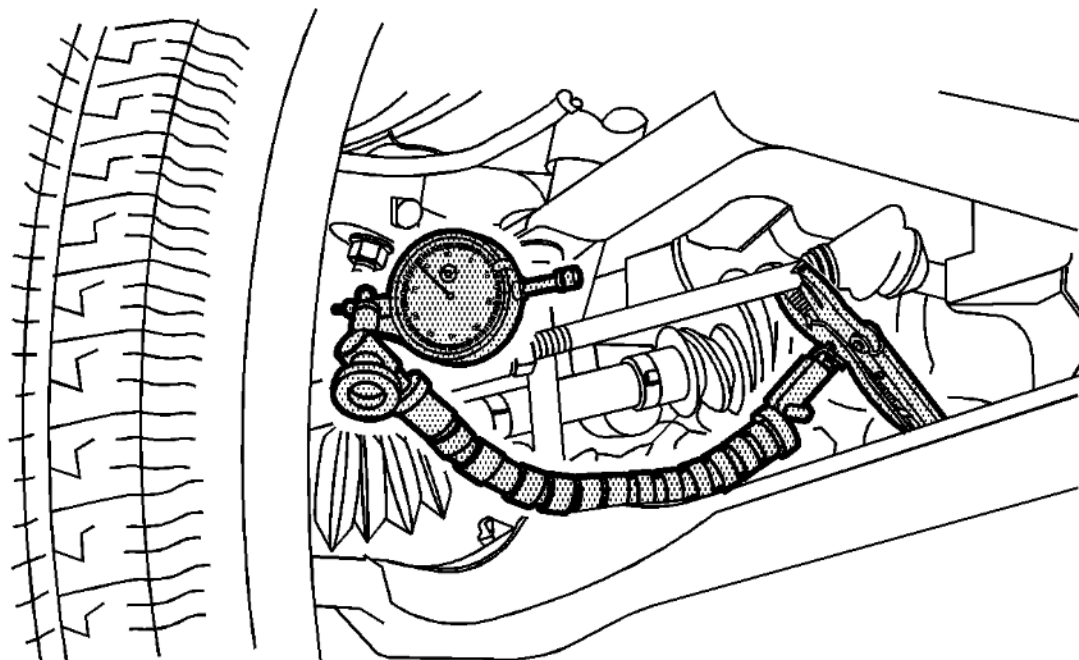


Fig. 7: Noting Amount Of Movement In Right Side Joint

Courtesy of GENERAL MOTORS COMPANY

12. Place the dial indicator at zero, pull outward on the tire, and note the amount of movement.

The movement should NOT exceed 1 mm (0.039 in).

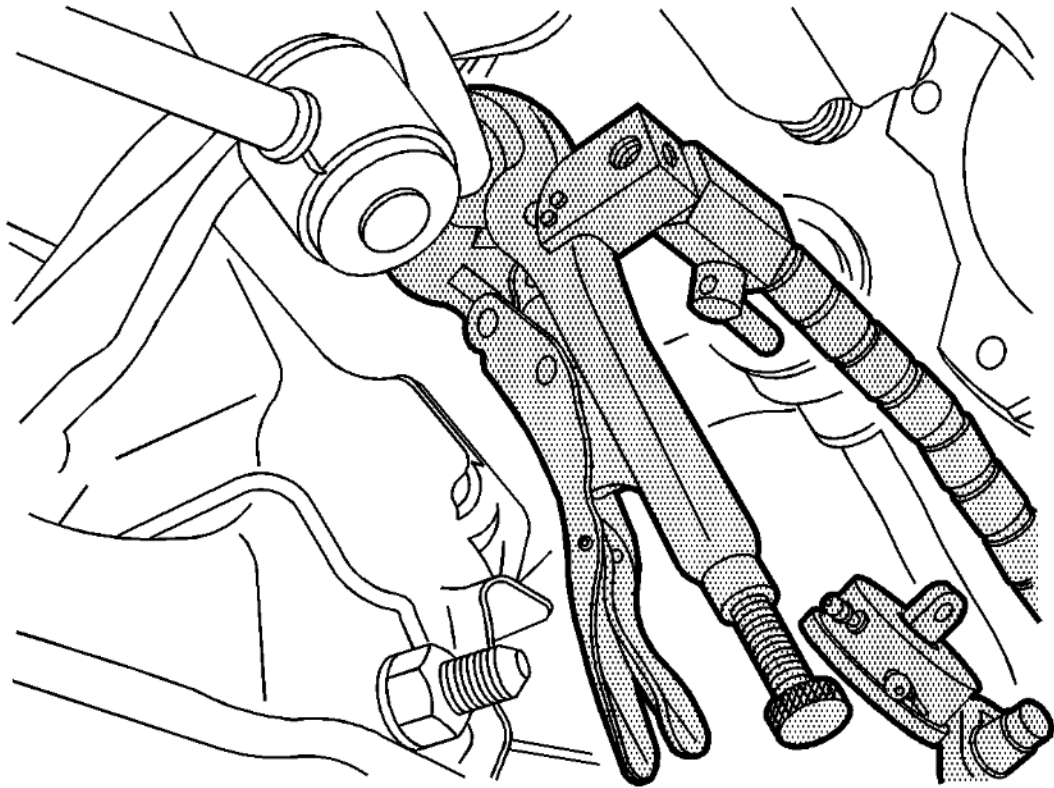


Fig. 8: Installing Dial Indicator Between Outer Tie Rod End And Relay Rod
Courtesy of GENERAL MOTORS COMPANY

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

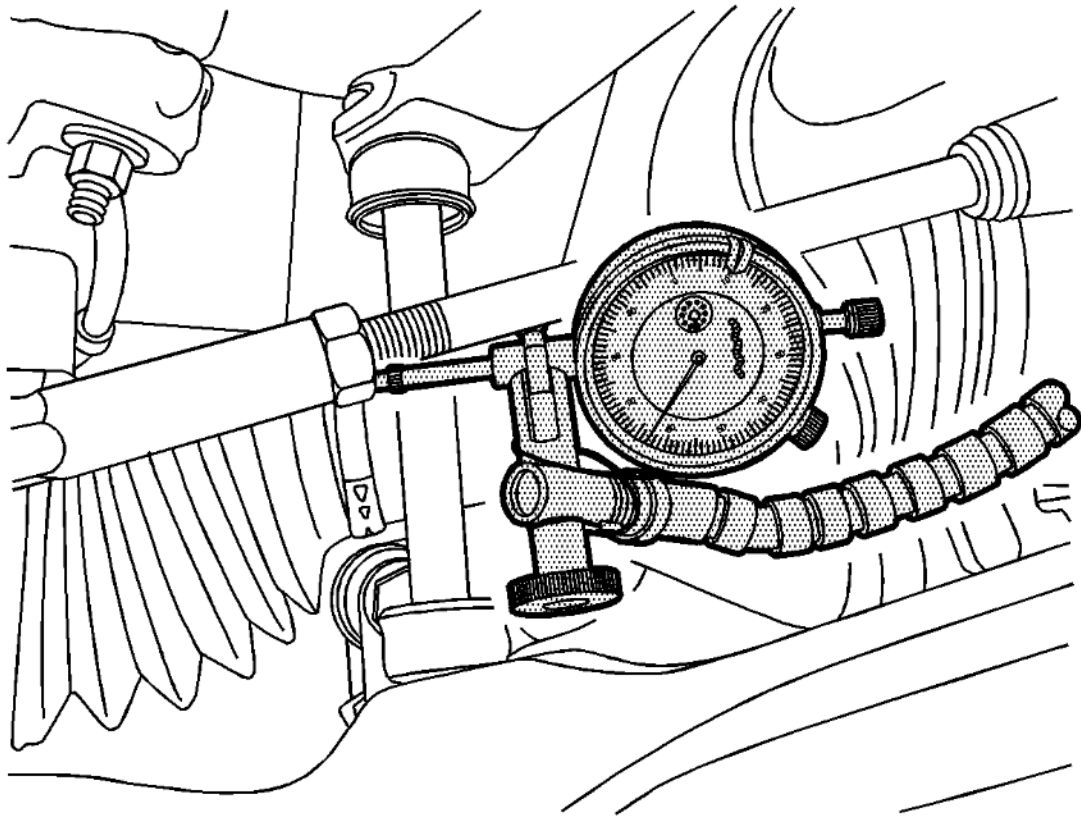


Fig. 9: Noting Amount Of Movement In Right Side Tie Rod End

Courtesy of GENERAL MOTORS COMPANY

14. Place the dial indicator at zero, pull outward on the tire, and note the amount of movement.

The movement should NOT exceed 1 mm (0.039 in).

STEERING LINKAGE OUTER TIE ROD REPLACEMENT

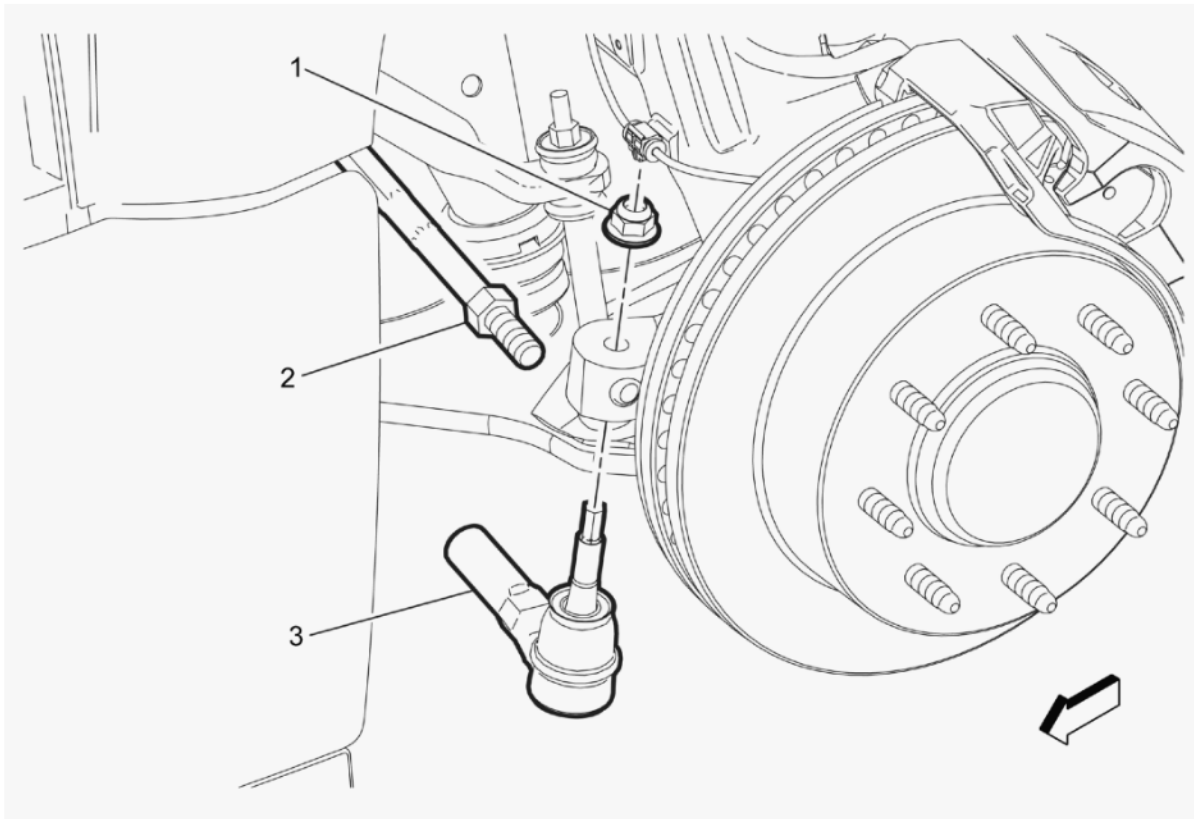


Fig. 10: Steering Linkage Outer Tie Rod
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front tire and wheel assembly. Tire and Wheel Removal and Installation (6-Lug Wheel) Tire and Wheel Removal and Installation (8-Lug Wheel) Tire and Wheel Removal and Installation (Dual Rear Wheels)	
1	Steering Linkage Outer Tie Rod Nut CAUTION: Refer to Fastener Caution . Tighten First Pass: 35 N.m (26 lb ft) Final Pass: (85-100 degrees)
2	Steering Linkage Inner Tie Rod Nut Procedure Place match marks on the steering linkage inner tie rod nut and the steering linkage inner tie rod. NOTE:

Callout	Component Name
	Do NOT tighten the steering linkage inner tie rod nut during installation. Tighten the nut after adjusting the front toe.
3	Steering Linkage Outer Tie Rod CAUTION: Do not attempt to disconnect a steering linkage joint by driving a wedge between the joint and the attached part. Seal damage may result which will cause premature failure of the joint. CAUTION: Ensure the Outer Tie Rod Boot is not twisted or deformed during assembly. If the boot is twisted or deformed, damage to the boot will occur. Procedure

Callout	Component Name
	1. Use the CH-24319-B puller to separate the steering linkage outer tie rod from the steering knuckle. 2. Clean the tapered surface of the steering knuckle. 3. Inspect the steering linkage inner tie rod for bent or damaged threads. If necessary, replace the steering linkage inner tie rod. <u>Steering Linkage Inner Tie Rod Replacement</u> 4. Lubricate the steering linkage inner tie rod threads with chassis lubricant. 5. Measure and adjust the front toe. <u>Wheel Alignment - Steering Wheel Angle and/or Front Toe Adjustment</u> Special Tools CH-24319-B Universal Steering Linkage and Tie Rod Puller Equivalent regional tools: <u>Special Tools</u>

STEERING LINKAGE INNER TIE ROD REPLACEMENT

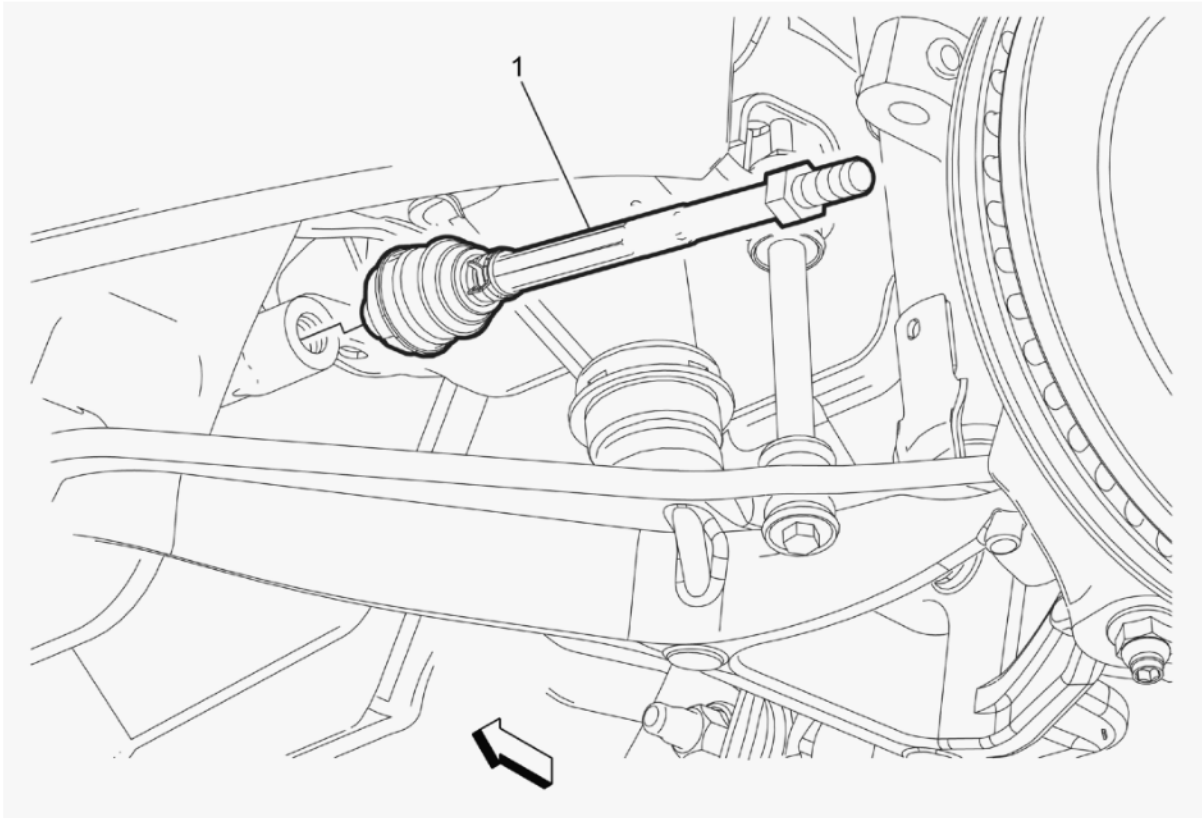


Fig. 11: Steering Linkage Inner Tie Rod
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Steering Linkage Outer Tie Rod Replacement</u>	
1	Steering Linkage Inner Tie Rod CAUTION:

Callout	Component Name
	Refer to <u>Component Fastener Tightening Caution</u> . Procedure 1. Remove all traces of oil, grease or other contaminants from the steering linkage inner tie rod. 2. Remove all traces of OLD threadlocker from the threads of the steering linkage inner tie rod. 3. Apply NEW threadlocker on the threads of the steering linkage inner tie rod. <u>Adhesives, Fluids, Lubricants, and Sealers</u> 4. Measure and adjust the front toe. <u>Wheel Alignment - Steering Wheel Angle and/or Front Toe Adjustment</u> Tighten 125 N.m (92 lb ft)

IDLER ARM INSPECTION

Special Tools

- **CH-35999** Pitman Arm Spring Scale
- **CH-42640** Steering Column Anti-Rotation Pin
- **CH-45101** Dial Indicator Kit

Equivalent regional tools: **Special Tools**

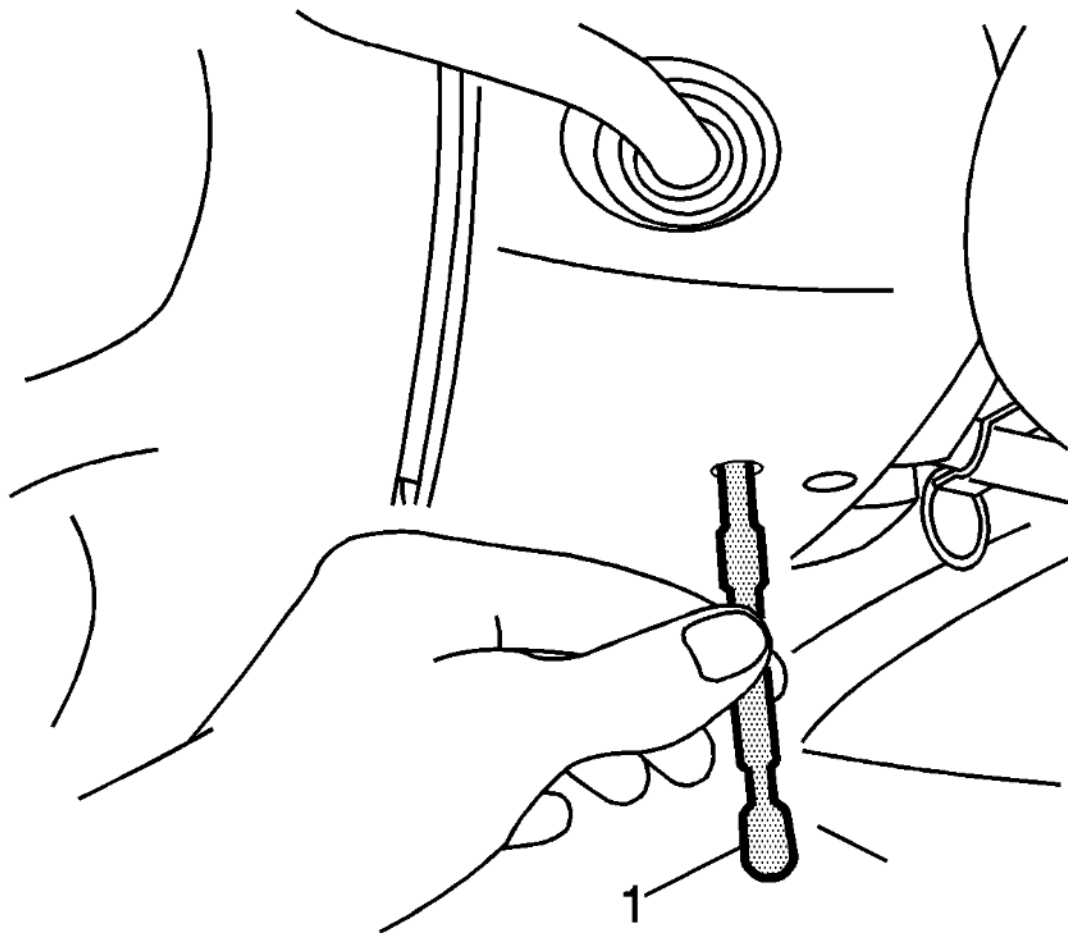


Fig. 12: Locking/Unlocking Steering Column

Courtesy of GENERAL MOTORS COMPANY

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-rotation pin, steering column lock, or a strap to prevent rotation. Locking of the steering column will prevent damage and a possible malfunction of the SIR system. The steering wheel must be secured in position before disconnecting the following components:

- The steering column
- The intermediate shaft(s)
- The steering gear

After disconnecting these components, do not rotate the steering wheel or move the front tires and wheels. Failure to follow this procedure may cause the SIR coil assembly to become un-centered and cause possible damage to the SIR coil. If you think the SIR coil has become un-centered, refer to your specific SIR coil's centering procedure to re-center SIR Coil.

1. Position the wheels in a straight-ahead position and install the **CH-42640** steering column anti-rotation pin (1).

2. Raise and support the vehicle. [Lifting and Jacking the Vehicle](#)
3. Install the **CH-45101** dial indicator kit between the steering linkage idler arm and the vehicle frame and push the tire slowly inward with one hand to remove any lash.

Place the dial indicator at zero before taking any measurements.

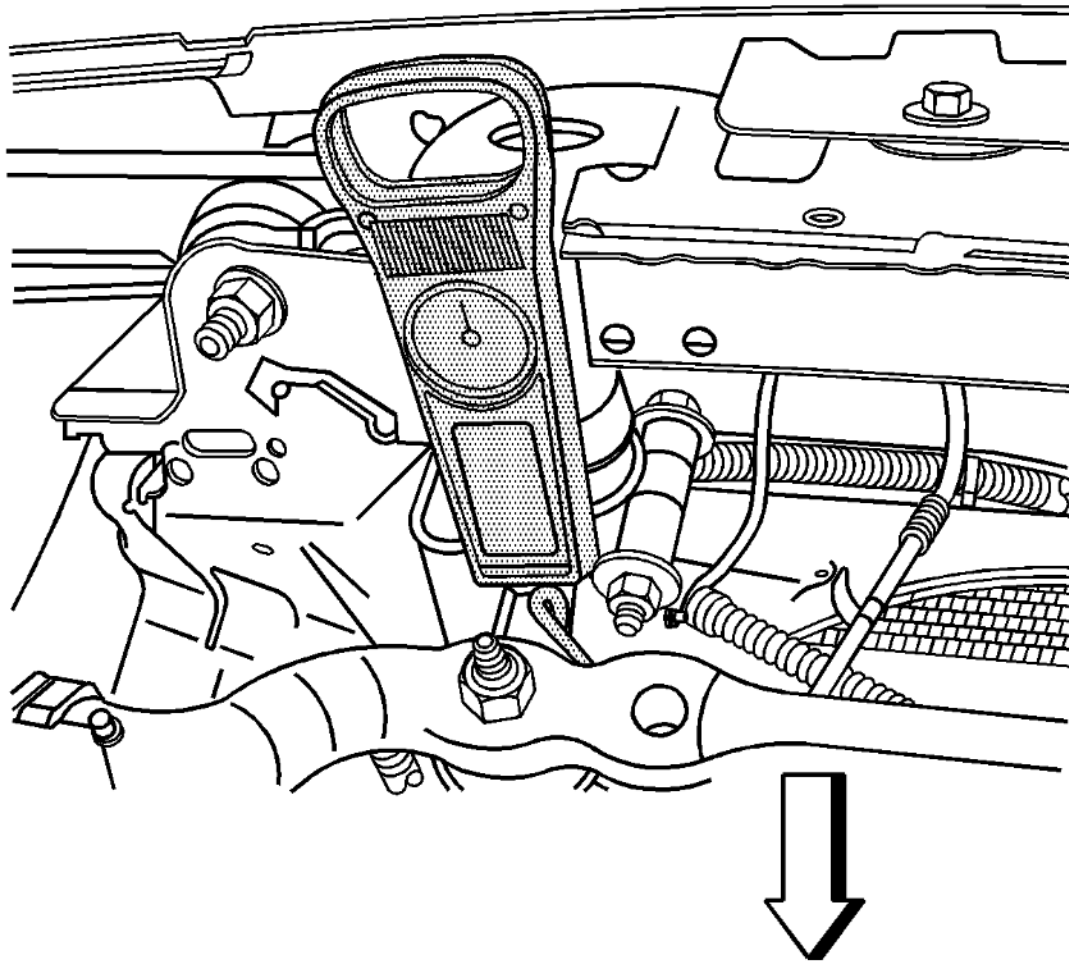


Fig. 13: Placing Pitman Arm Spring Scale Near Relay Rod End Of Idler Arm

Courtesy of GENERAL MOTORS COMPANY

4. Place the **CH-35999** pitman arm spring scale near the end of the steering linkage idler arm nearest the steering linkage relay rod.

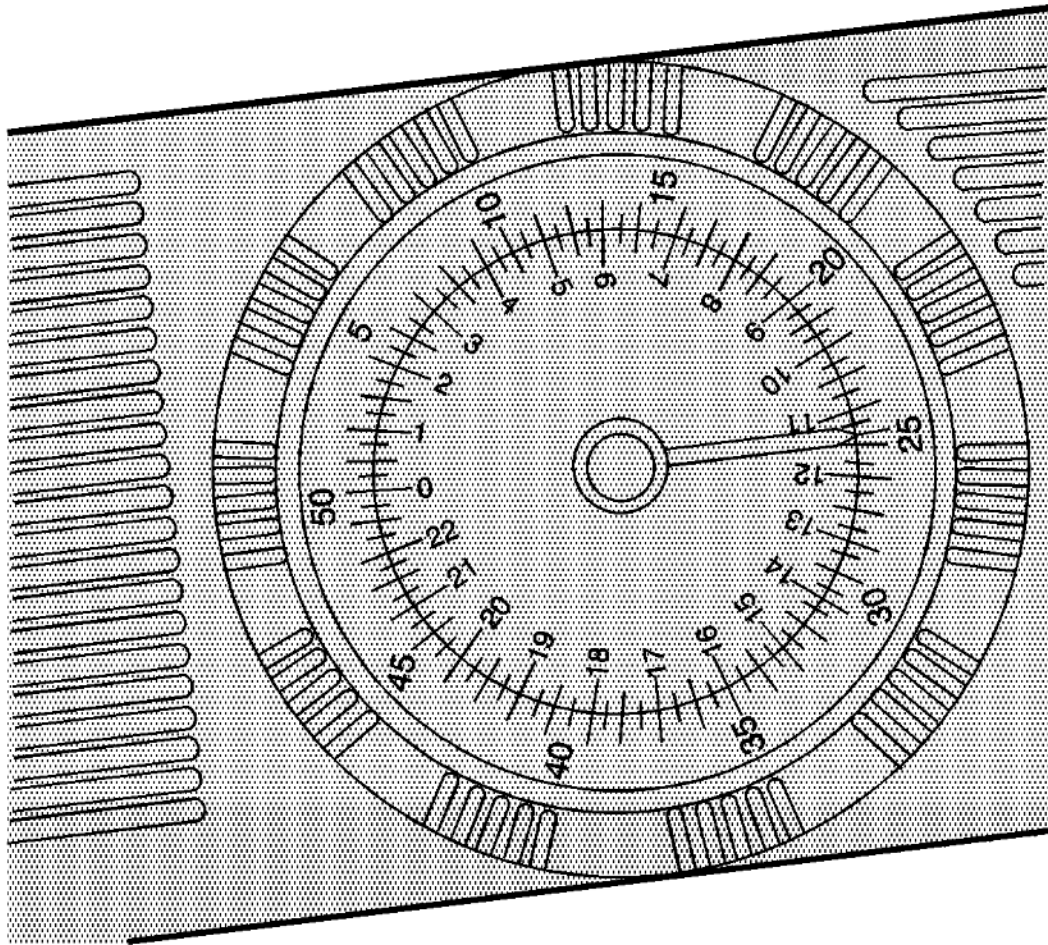


Fig. 14: Measuring Upward Force

Courtesy of GENERAL MOTORS COMPANY

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

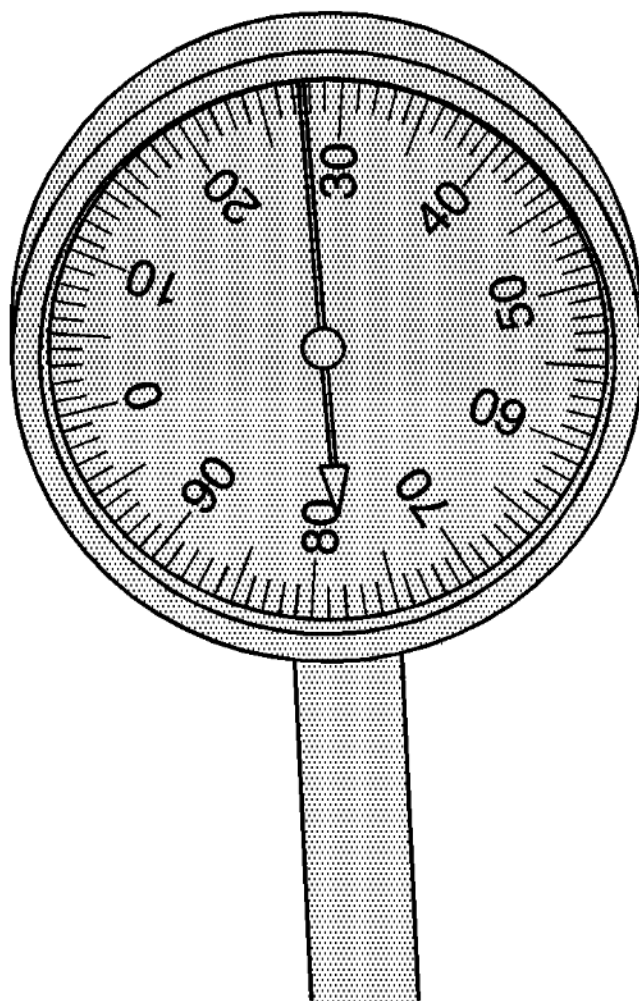


Fig. 15: Measuring Idler Arm Movement (Relay Rod End)

Courtesy of GENERAL MOTORS COMPANY

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

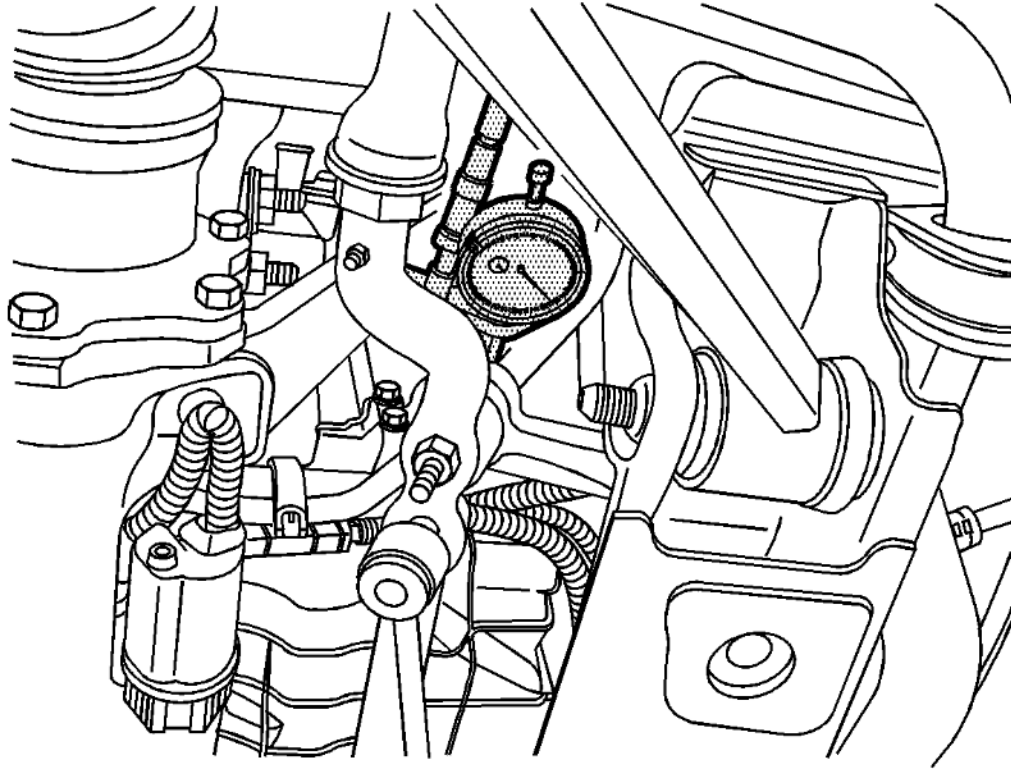


Fig. 16: View Of Dial Indicator At Idler Arm
Courtesy of GENERAL MOTORS COMPANY

7. Install the **CH-45101** dial indicator kit at the steering linkage idler arm and push the tire slowly inward with one hand to remove any lash.

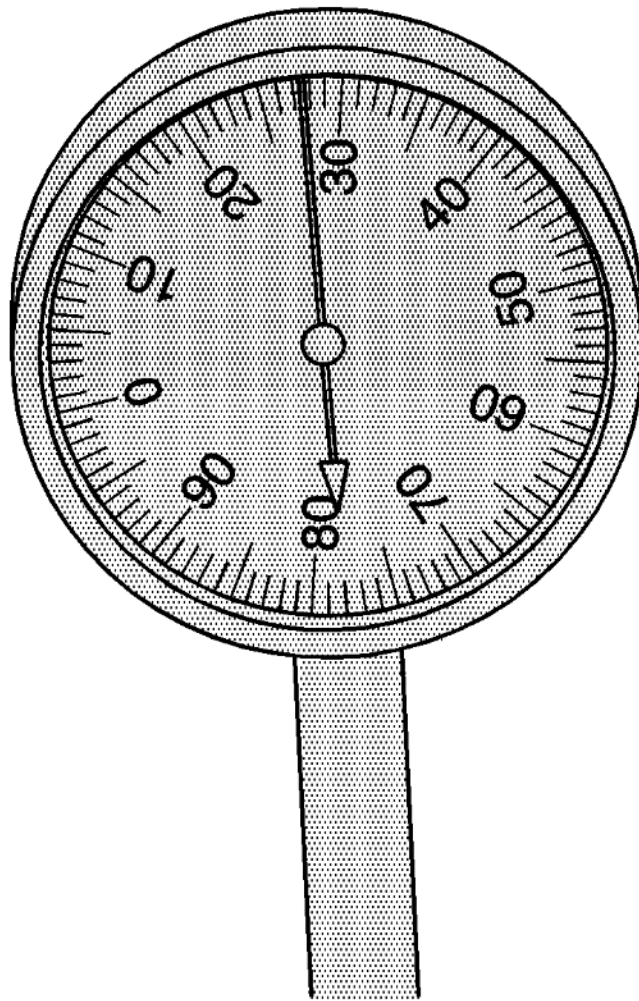


Fig. 17: Measuring Idler Arm Movement (Relay Rod End)

Courtesy of GENERAL MOTORS COMPANY

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

The movement should NOT exceed 1 mm (0.039 in).

9. If the movement exceeds 1 mm (0.039 in) then replace the steering linkage idler arm.

IDLER ARM REPLACEMENT

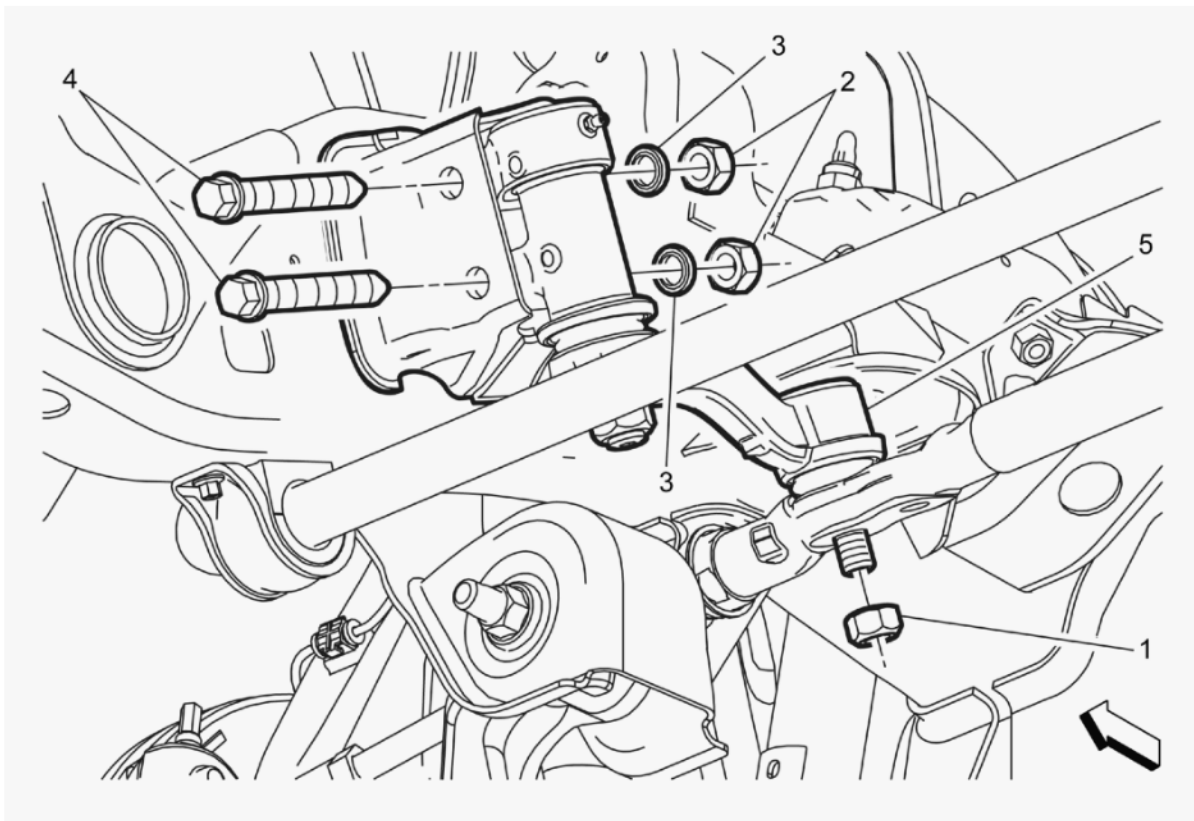


Fig. 18: Idler Arm

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
<u>Underbody Splash Shield Replacement</u>	
1	Steering Linkage Idler Arm Nut CAUTION: Refer to <u>Fastener Caution</u> . Procedure Use the CH-24319-B puller to separate the steering linkage relay rod from the steering linkage idler arm. Tighten 125 N.m (92 lb ft) Special Tools CH-24319-B Universal Steering Linkage and Tie Rod Puller Equivalent regional tools:<u>Special Tools</u>
2	Steering Linkage Idler Arm Nut Tighten 165 N.m (122 lb ft)
3	Steering Linkage Idler Arm Washer
4	Steering Linkage Idler Arm Bolt

Callout	Component Name
5	Steering Linkage Idler Arm Procedure Measure and adjust the front toe. <u>Wheel Alignment - Steering Wheel Angle and/or Front Toe Adjustment</u>

RELAY ROD REPLACEMENT

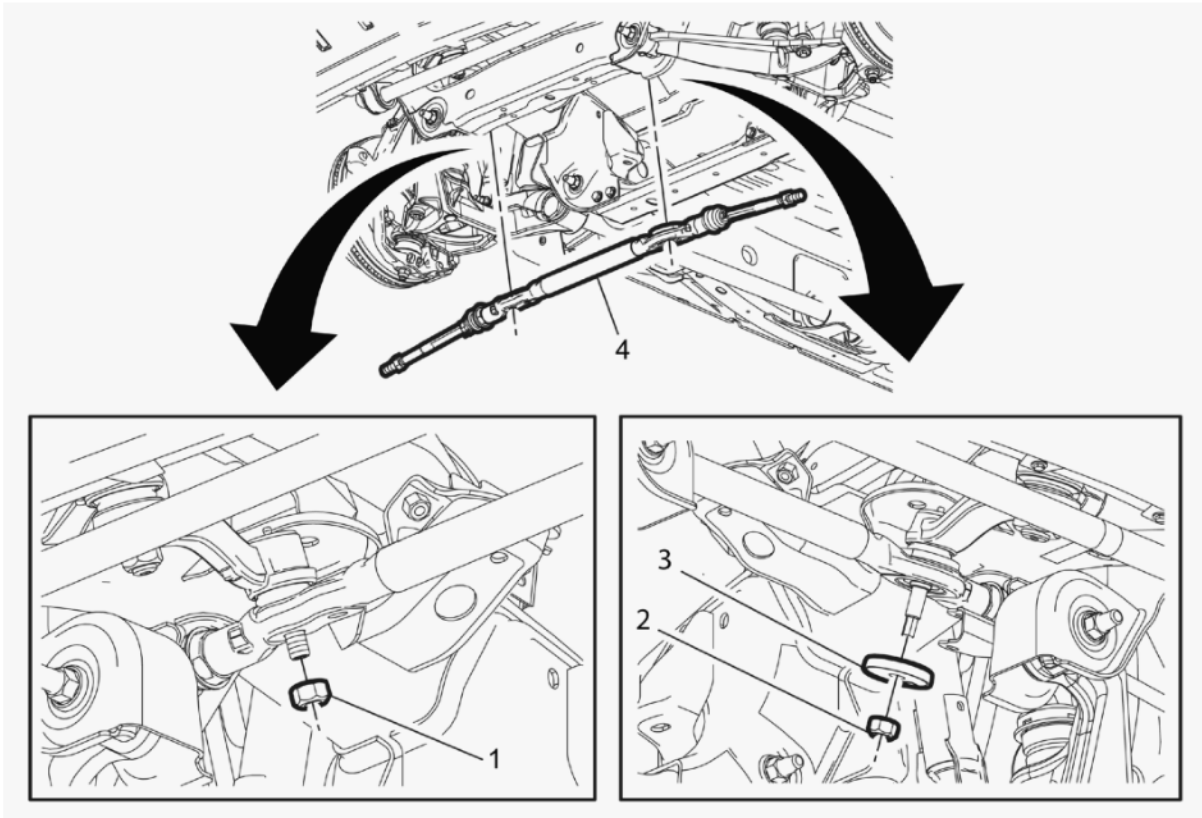


Fig. 19: Relay Rod
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures <u>Underbody Skid Shield Replacement</u> <u>Steering Linkage Outer Tie Rod Replacement</u>	
1	Steering Linkage Idler Arm Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten 125 N.m (92 lb ft)

Callout	Component Name
2	Steering Linkage Pitman Arm Nut CAUTION: Hold the pitman arm stud with a suitable tool to prevent the pitman arm ball stud from rotating while removing/installing the steering linkage pitman arm nut. If the pitman arm stud is not secured with a suitable tool, damage to the steering linkage relay rod bushing may occur. Tighten 125 N.m (92 lb ft)
3	Steering Linkage Relay Rod Spacer NOTE: The steering linkage relay rod spacer is NOT present on all vehicle configurations.
4	Steering Linkage Relay Rod Procedure 1. Use the CH-24319-B puller to separate the steering linkage relay rod from the steering linkage idler arm. 2. Use the CH-49824 separator and EN-24420-C puller to separate the steering linkage relay rod from the pitman arm. 3. Transfer components as necessary. 4. Inspect the threads and seals on all steering related components. Repair or replace any components as necessary. 5. Measure and adjust the front toe. <u>Wheel Alignment - Steering Wheel Angle and/or Front Toe Adjustment</u> Special Tools

Callout	Component Name
	• CH-24319-B Universal Steering Linkage and Tie Rod Puller • CH-49824 Steering Link Separator • EN-24420-C Harmonic Balancer Puller
Equivalent regional tools: Special Tools	

PITMAN ARM REPLACEMENT (WITHOUT NV8)

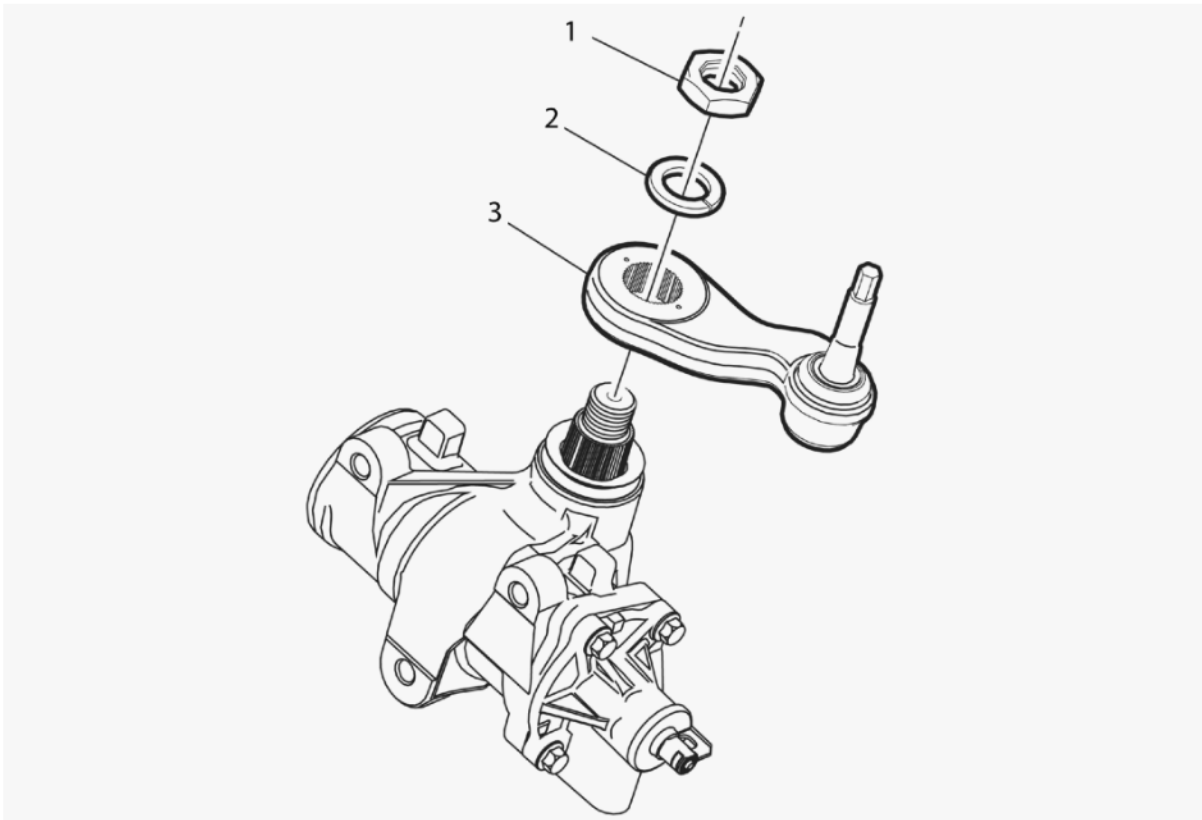


Fig. 20: Pitman Arm (Without NV8)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Hydraulic Recirculating Ball Steering Gear Replacement (Heavy Duty, Without NV8)	
1	Pitman Arm Nut CAUTION: Refer to Fastener Caution . Tighten 370 N.m (273 lb ft)
2	Pitman Arm Washer

Callout	Component Name
3	Pitman Arm Procedure Use the CH-47965 separator to separate the pitman arm from the steering gear. Special Tools CH-47965 Pitman Arm Separator Equivalent regional tools: Special Tools

PITMAN ARM REPLACEMENT (WITH NV8)

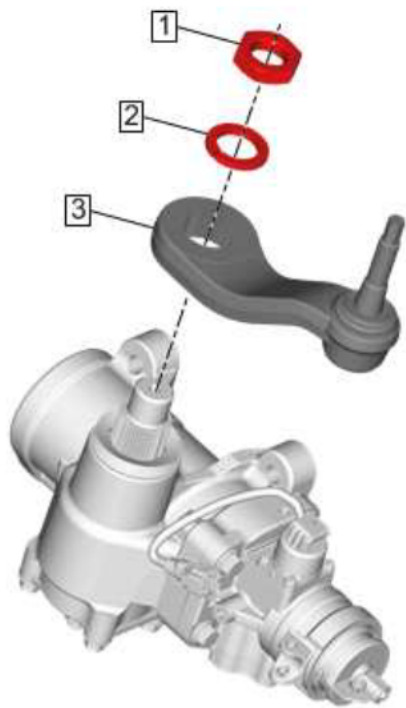


Fig. 21: Pitman Arm (With NV8)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Hydraulic Recirculating Ball Steering Gear Replacement (Heavy Duty, With NV8)	
1	Pitman Arm Nut CAUTION: Refer to Fastener Caution . Tighten 370 N.m (273 lb ft)
2	Pitman Arm Washer

Callout	Component Name
3	Pitman Arm Procedure Use the CH-47965 separator to separate the pitman arm from the steering gear. Special Tools CH-47965 Pitman Arm Separator Equivalent regional tools:Special Tools

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
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Illustration	Tool Number/ Description
	CH-24319-B J-24319-B SA91100C 7503 Universal Steering Linkage and Tie Rod Puller

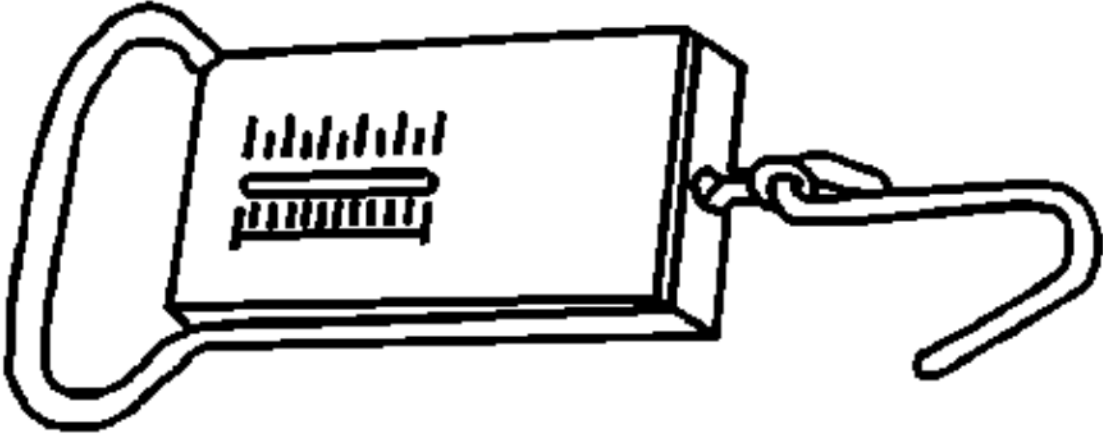
Illustration	Tool Number/ Description
	CH-35999 J-35999 Pitman Arm Spring Scale

Illustration	Tool Number/ Description
	CH-42640 J-42640 Steering Column Anti- Rotation Pin

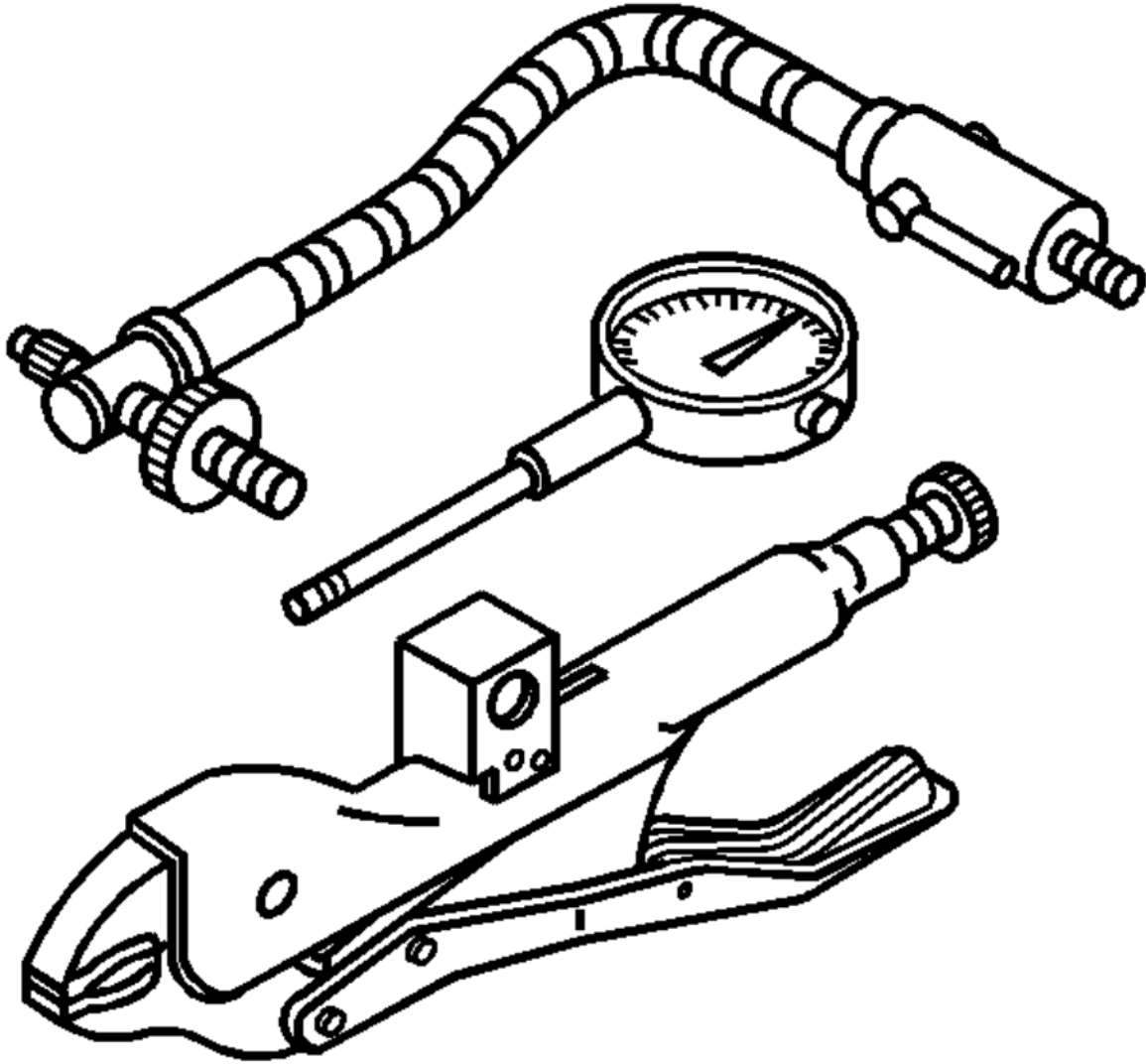
Illustration	Tool Number/ Description
	CH-45101 J-45101 Dial Indicator Kit

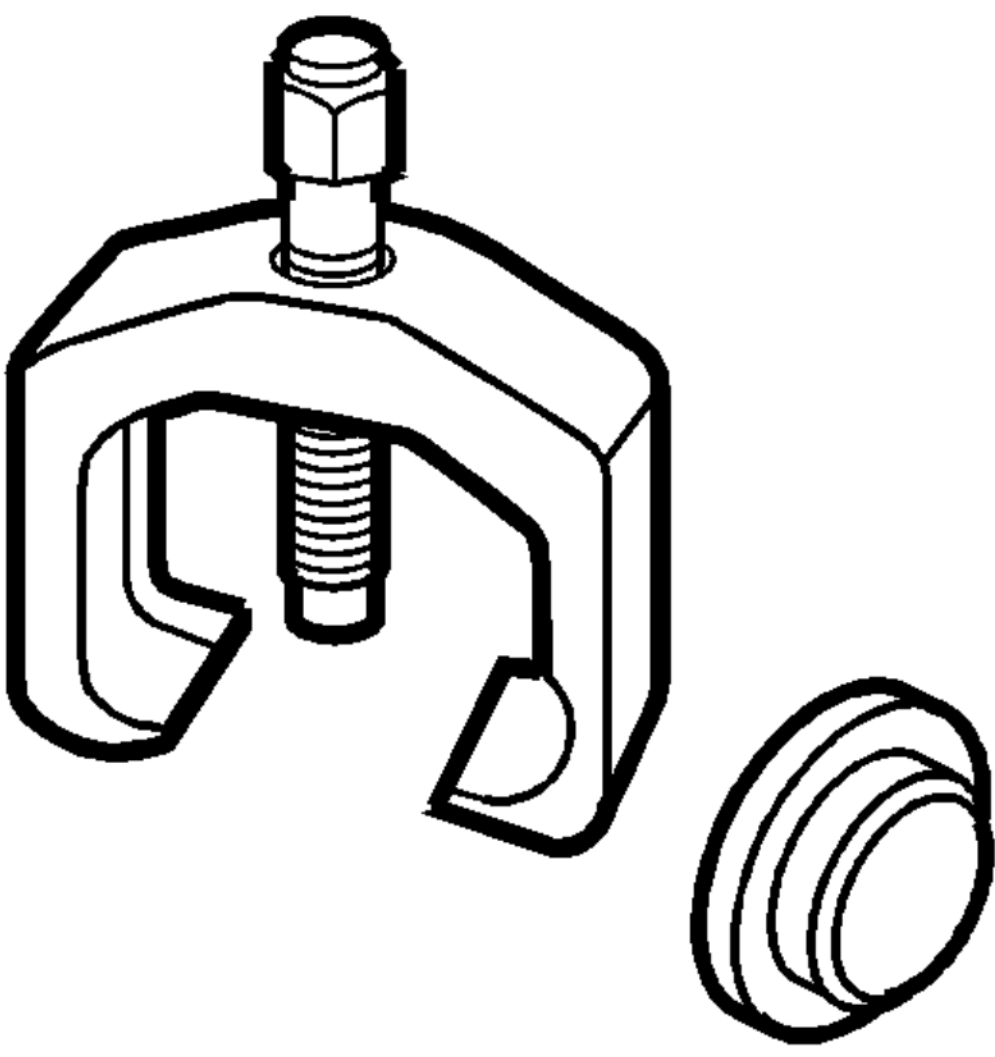
Illustration	Tool Number/ Description
	CH-47965 Pitman Arm Separator

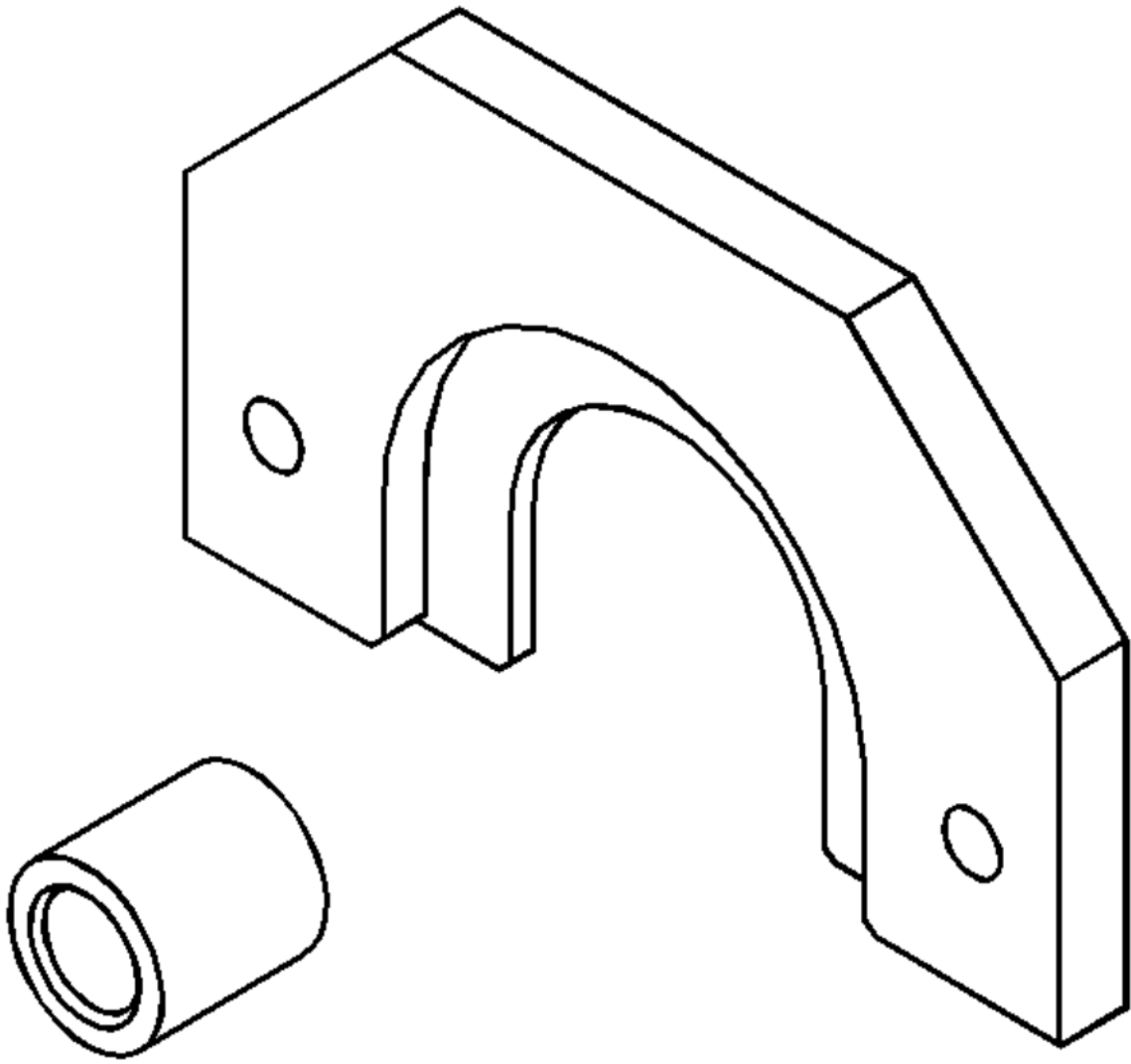
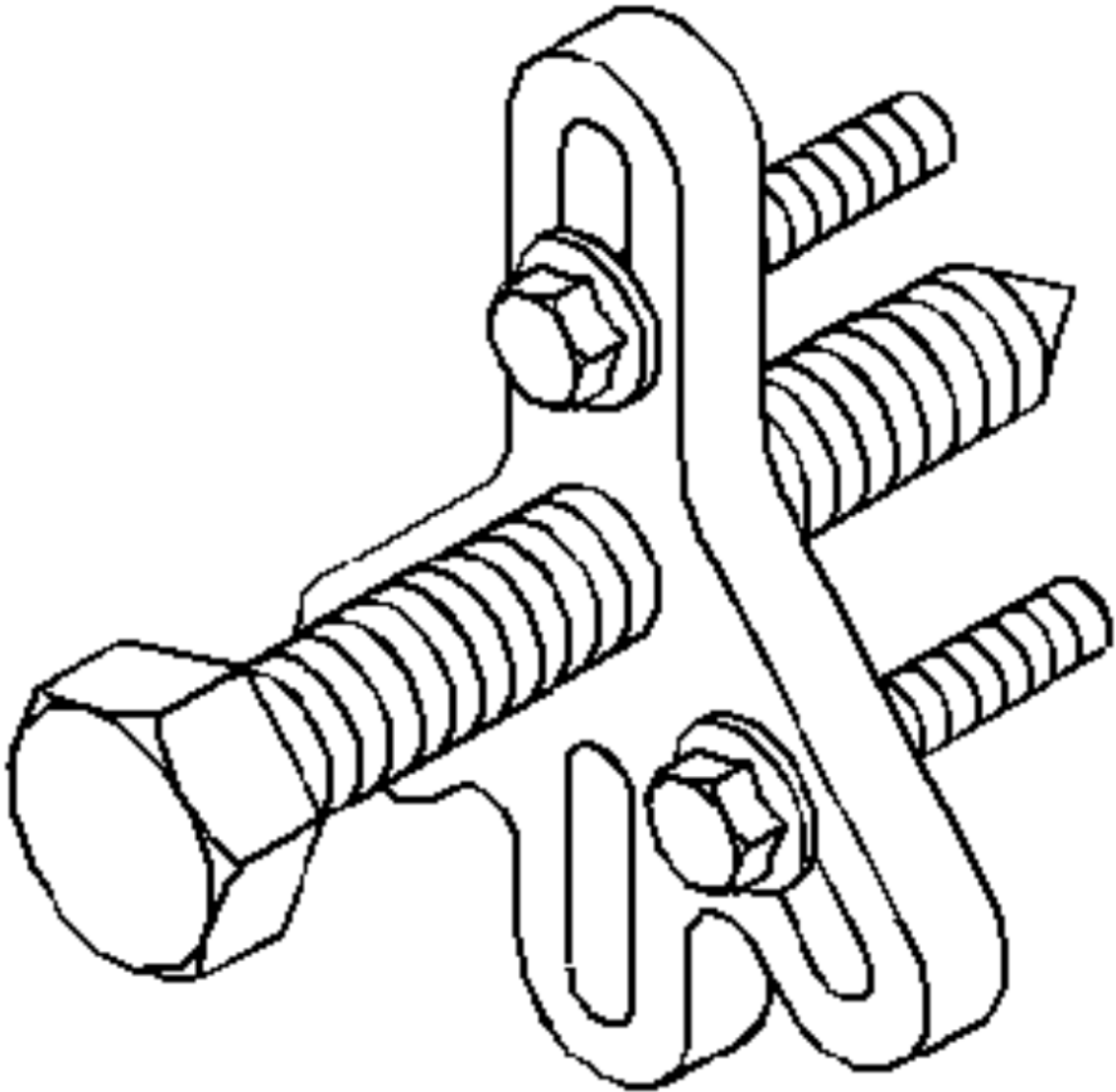
Illustration	Tool Number/ Description
	CH-49824 Steering Link Separator

Illustration	Tool Number/ Description
	EN-24420-C EN-47982 J-24420-C Harmonic Balancer Puller

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