STEERING

Steering Linkage - Escalade, Suburban, Tahoe, Yukon

SPECIFICATIONS

FASTENER SPECIFICATIONS

Application	Specification	
	Metric	English
Pitman Arm Nut (at Steering Gear)	370 N.m	273 lb ft
Steering Linkage Idler Arm Nut (at Frame)	165 N.m	122 lb ft
Steering Linkage Idler Arm Nut (at 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 (at 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

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- **CH-45101** Dial Indicator Kit

Equivalent regional tools:**Special Tools**

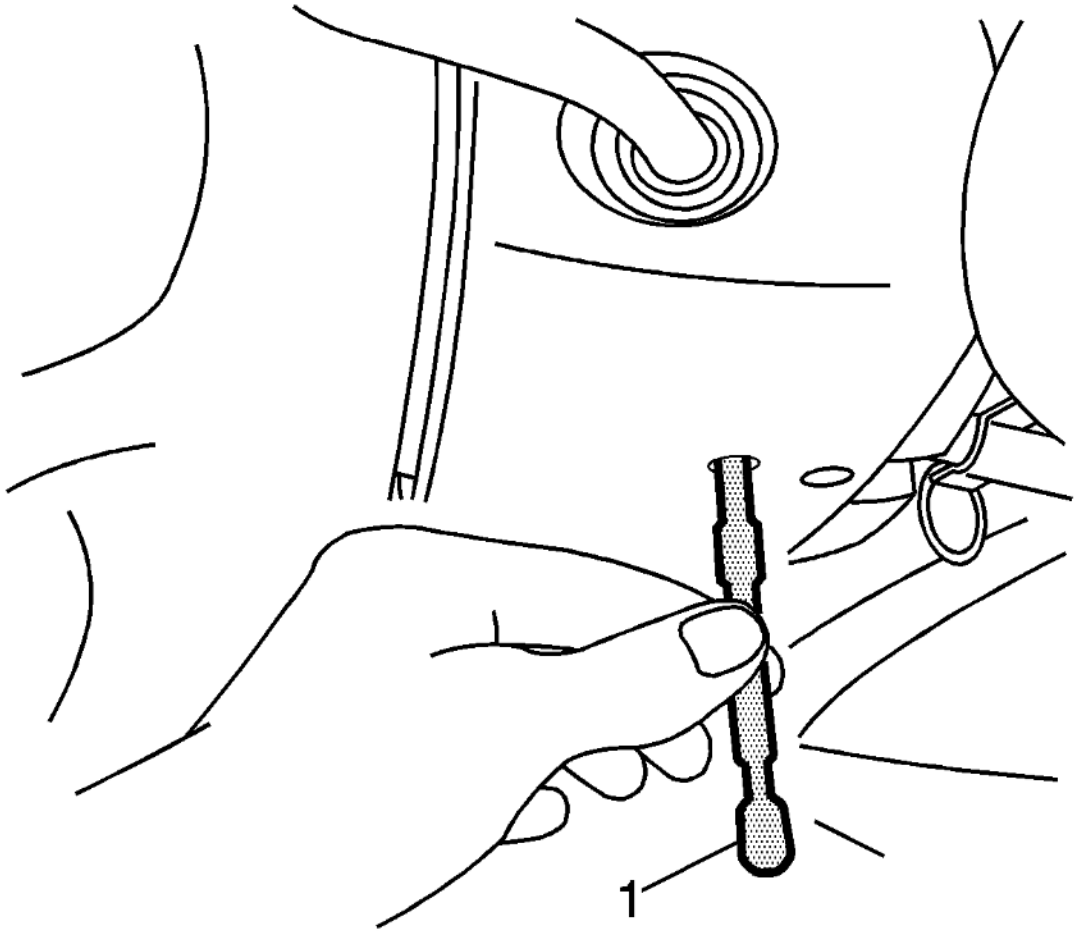

Fig. 1: Steering Wheel Lock Tool
Courtesy of GENERAL MOTORS COMPANY

CAUTION: With wheels of the vehicle facing straight ahead, secure the steering wheel utilizing steering column anti-

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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 became 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. Refer to **Lifting and Jacking the Vehicle**

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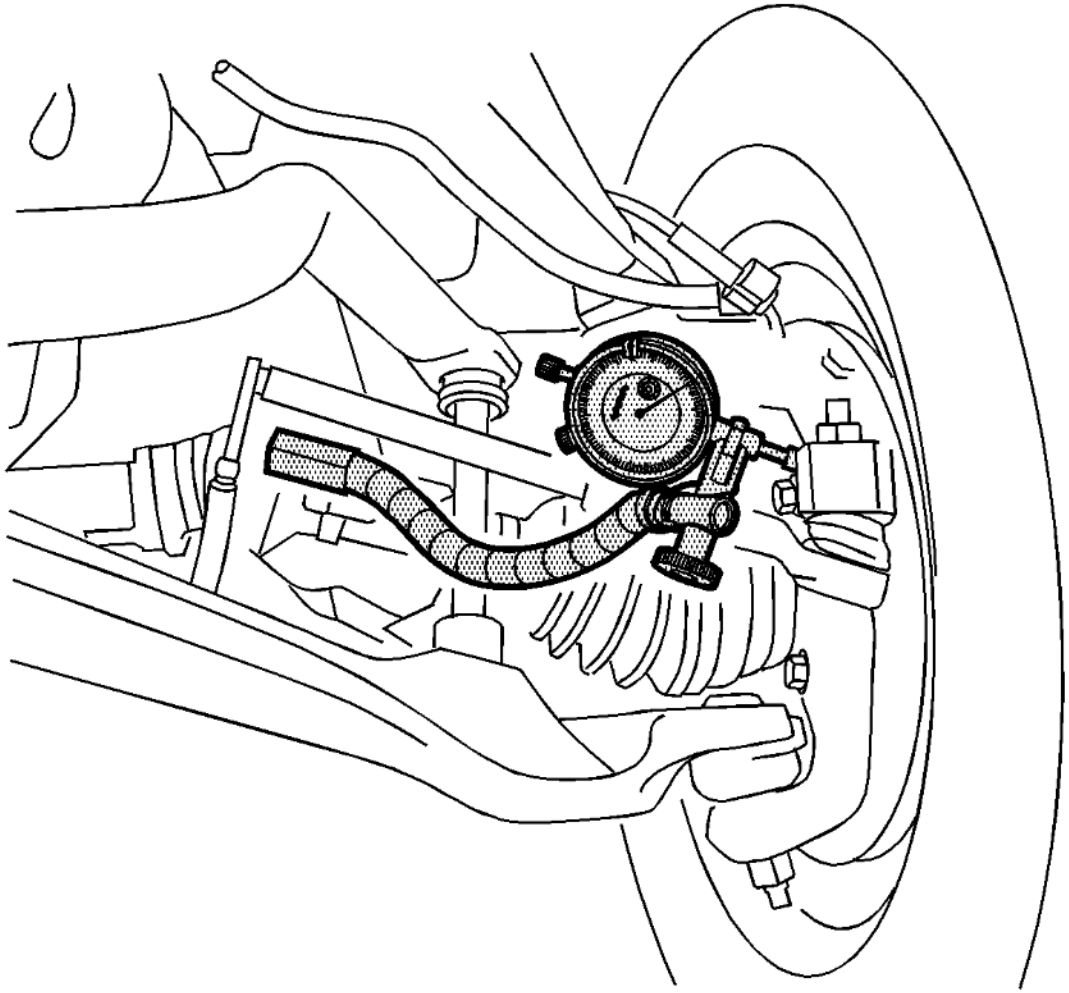

Fig. 2: Dial Indicator Between Outer Tie Rod And Steering Knuckle
Courtesy of GENERAL MOTORS COMPANY

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).

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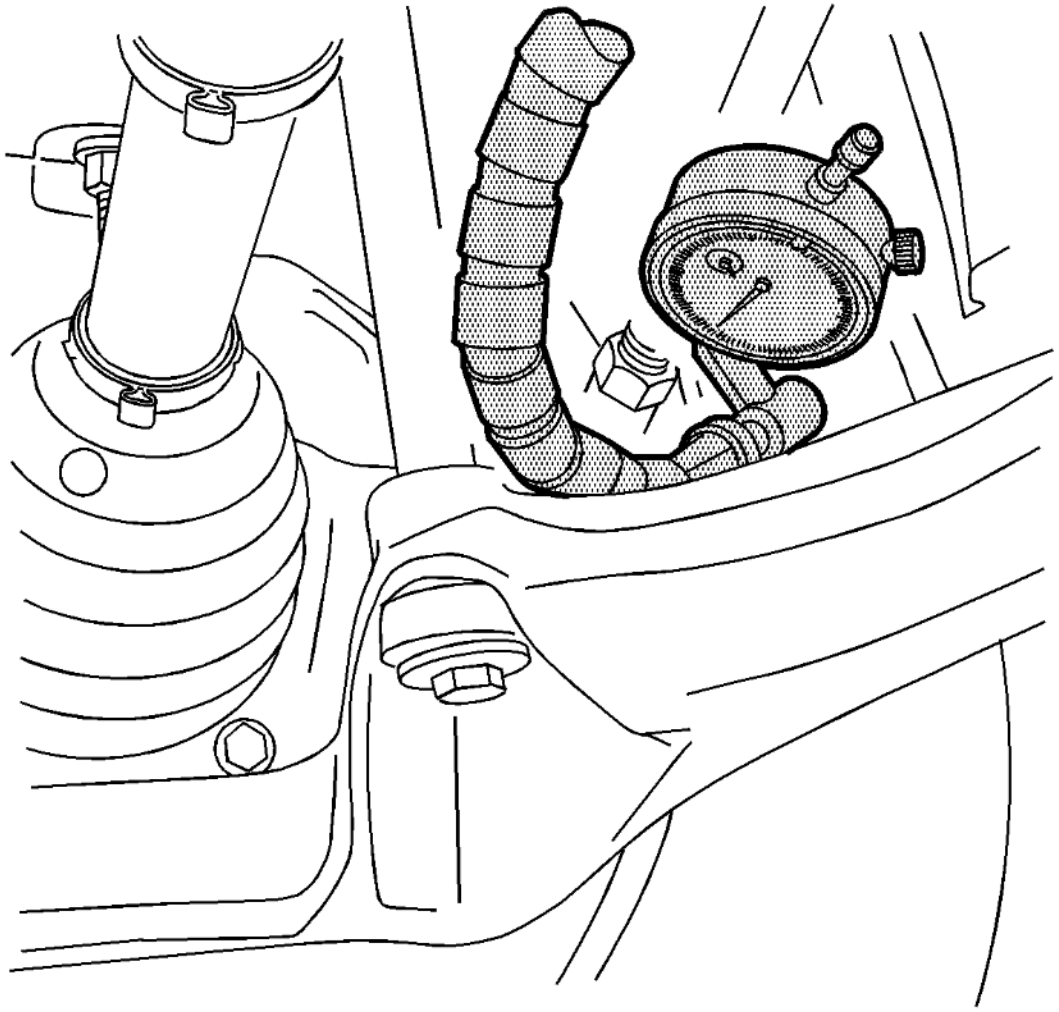

Fig. 3: Dial Indicator Between Outer Tie Rod End & Jam Nut
Courtesy of GENERAL MOTORS COMPANY

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).

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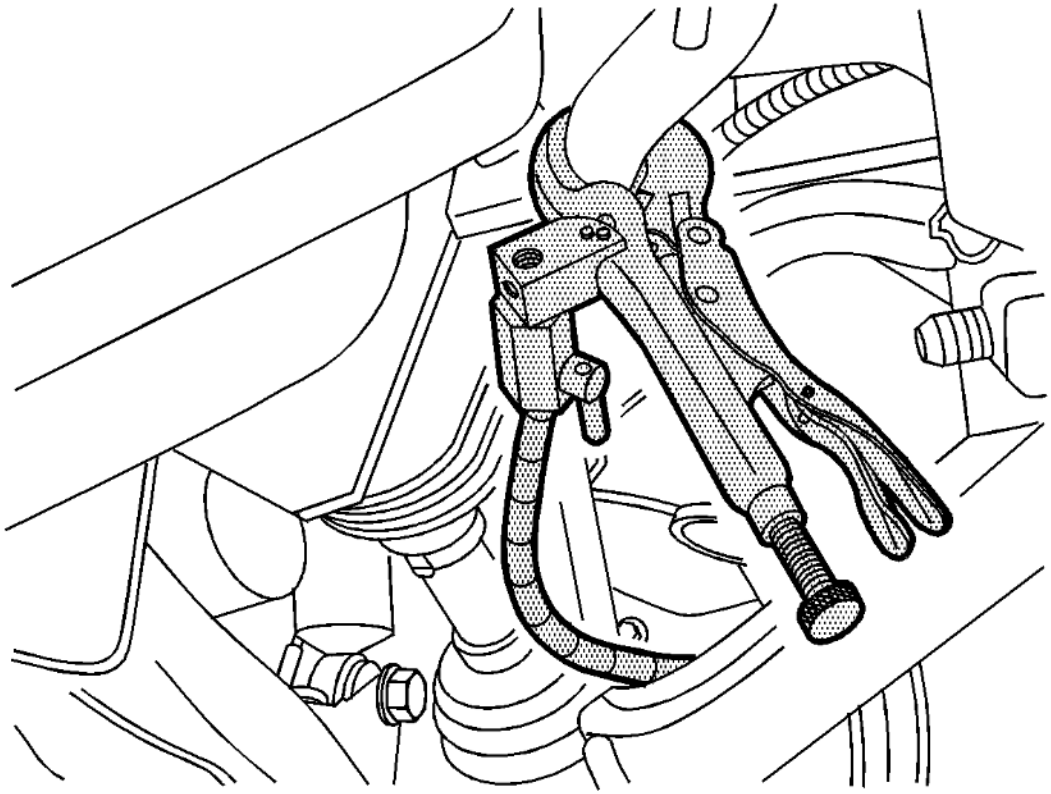

Fig. 4: Dial Indicator Between Pitman Arm And Relay Rod
Courtesy of GENERAL MOTORS COMPANY

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.

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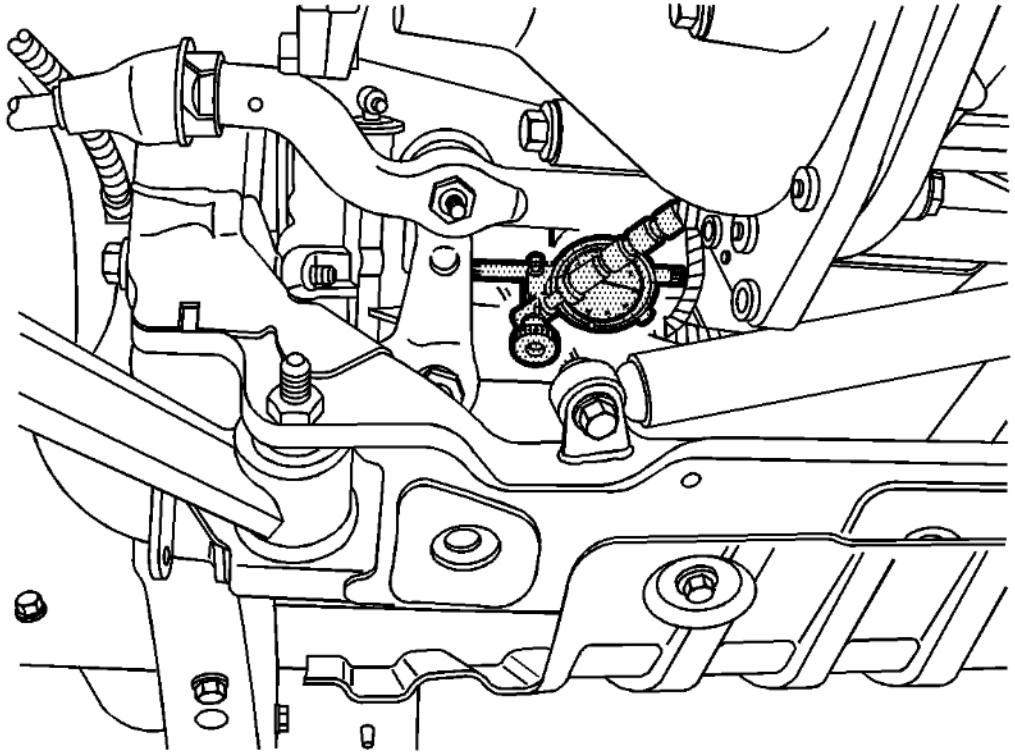

Fig. 5: Measuring Amount Of Movement In Left Side Joint
Courtesy of GENERAL MOTORS COMPANY

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.

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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. Refer to **Lifting and Jacking the Vehicle**

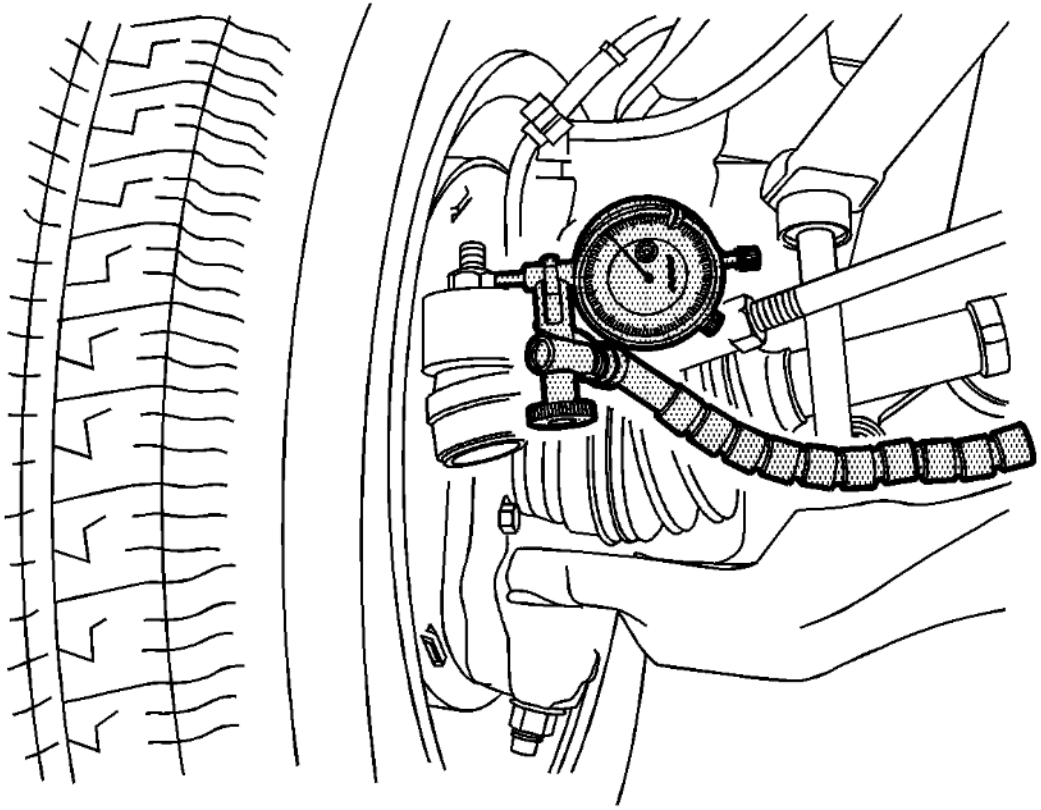

Fig. 6: Dial Indicator Between Outer Tie Rod And Steering Knuckle
Courtesy of GENERAL MOTORS COMPANY

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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.

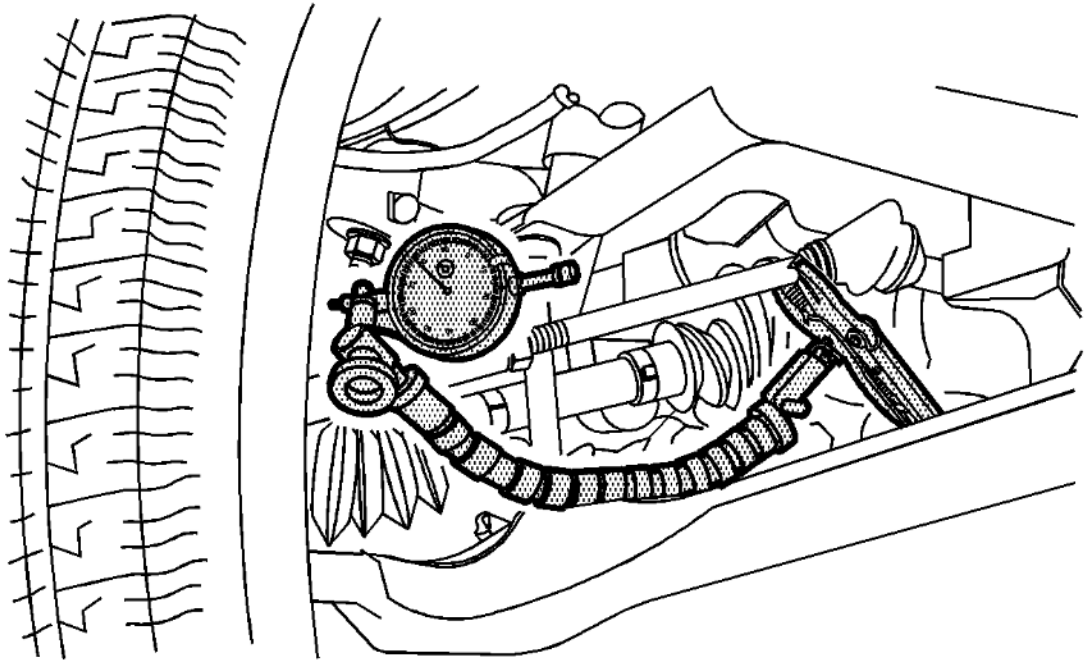

Fig. 7: Noting Amount Of Movement In Right Side Joint
Courtesy of GENERAL MOTORS COMPANY

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

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

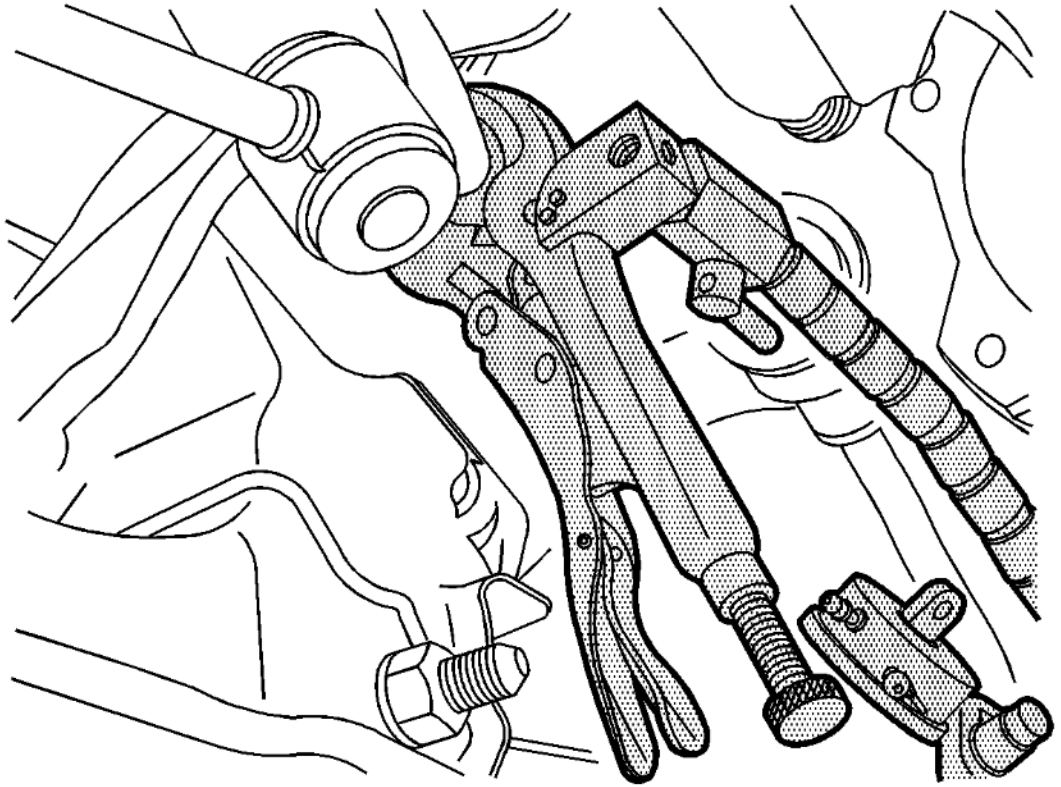

Fig. 8: Dial Indicator Between Outer Tie Rod End And Relay Rod
Courtesy of GENERAL MOTORS COMPANY

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.

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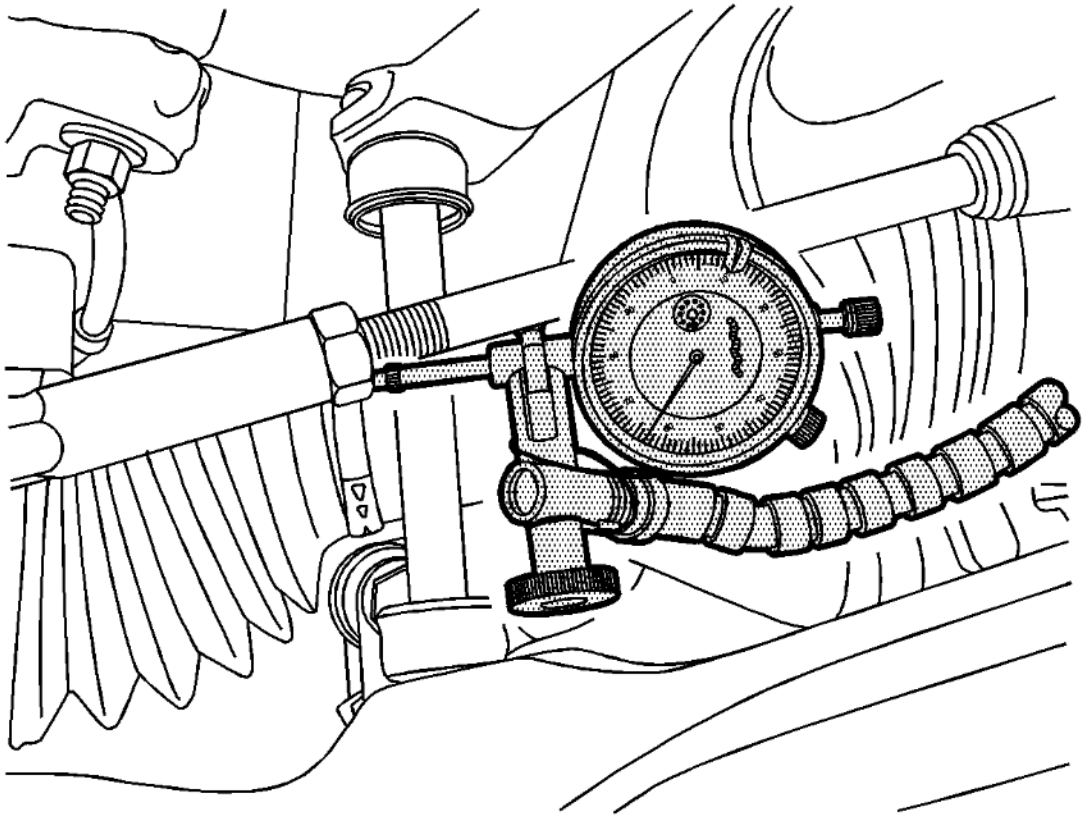

Fig. 9: Noting Amount Of Movement In Right Side Tie Rod End
Courtesy of GENERAL MOTORS COMPANY

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 (HEAVY DUTY)

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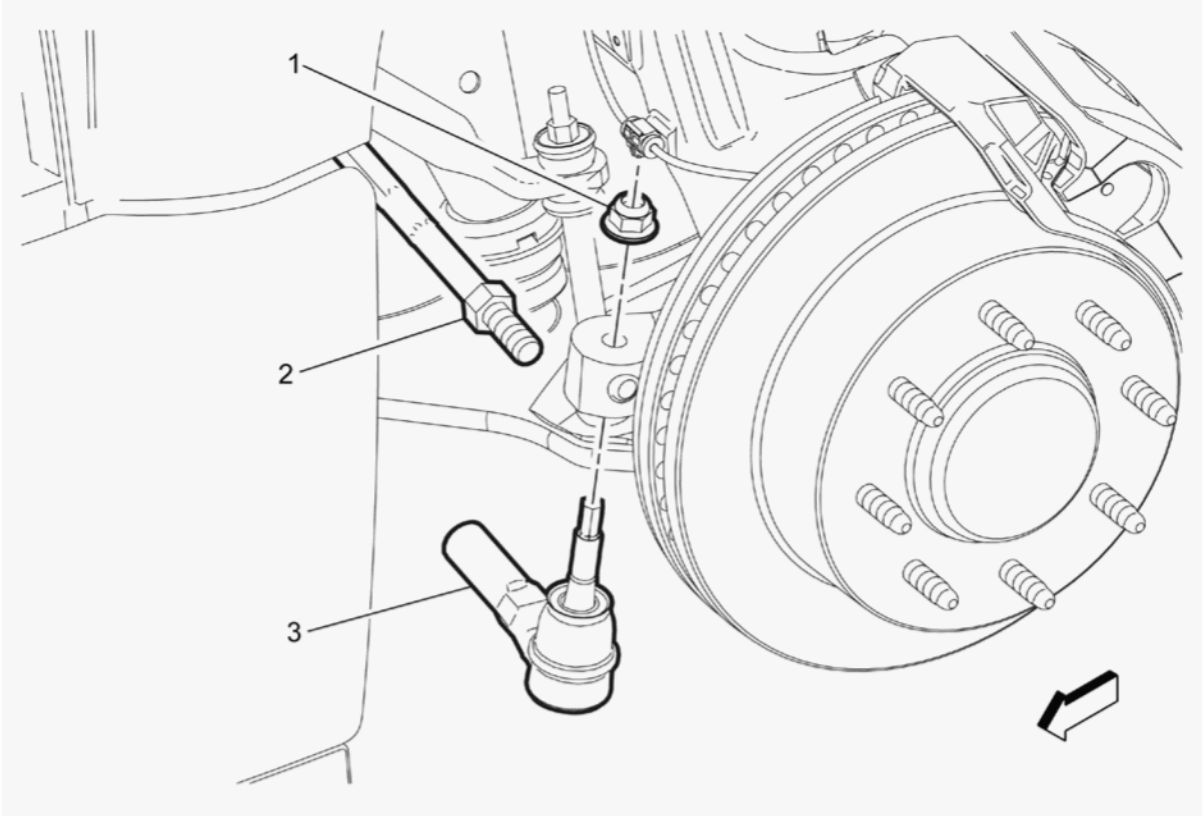

Fig. 10: Steering Linkage Outer Tie Rod (Heavy Duty)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation (8-Lug Wheel)**	
1	Steering Linkage Outer Tie Rod Nut **CAUTION:** **Refer to Fastener Caution .**

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Callout	Component Name
	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:** **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**

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Callout	Component Name
	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** 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. Refer to **Steering Linkage Inner Tie Rod Replacement (Heavy Duty)** 4. Lubricate the steering linkage inner tie rod threads with chassis lubricant. 5. Measure and adjust the front toe. Refer to **Wheel Alignment - Steering Wheel Angle and/or Front Toe Adjustment** **Special Tools** **CH-24319-B** Universal Steering Linkage and Tie Rod Puller

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Callout	Component Name
	Equivalent regional tools:**Special Tools**

STEERING LINKAGE INNER TIE ROD REPLACEMENT (HEAVY DUTY)

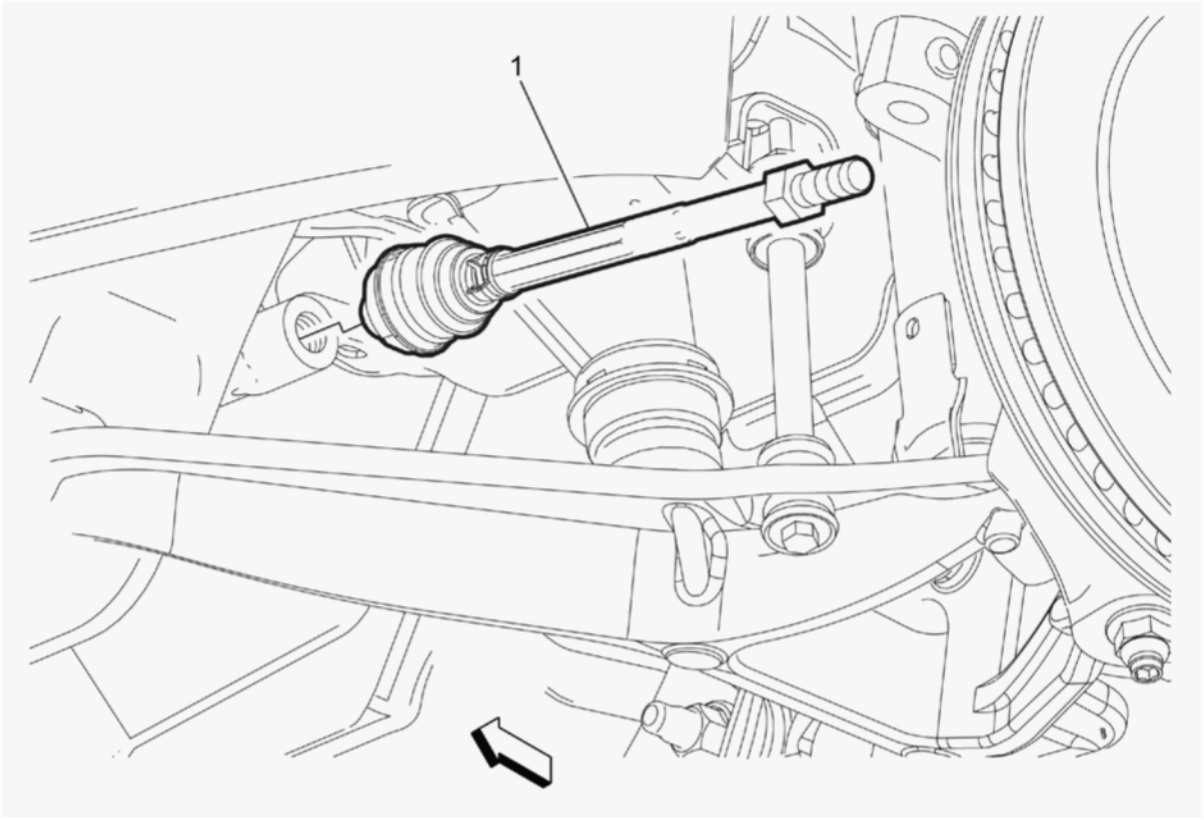

Fig. 11: Steering Linkage Inner Tie Rod (Heavy Duty)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove steering linkage outer tie rod. Refer to **Steering Linkage Outer Tie Rod Replacement (Heavy Duty)**	
1	Steering Linkage Inner Tie Rod **CAUTION:**

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Callout	Component Name
	Refer to **Component Fastener Tightening Caution** . **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. Refer to **Adhesives, Fluids, Lubricants, and Sealers** 4. Measure and adjust the front toe. Refer to **Wheel Alignment - Steering Wheel Angle and/or Front Toe Adjustment** **Tighten** 125 N.m (92 lb ft)

IDLER ARM INSPECTION (HEAVY DUTY)

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**

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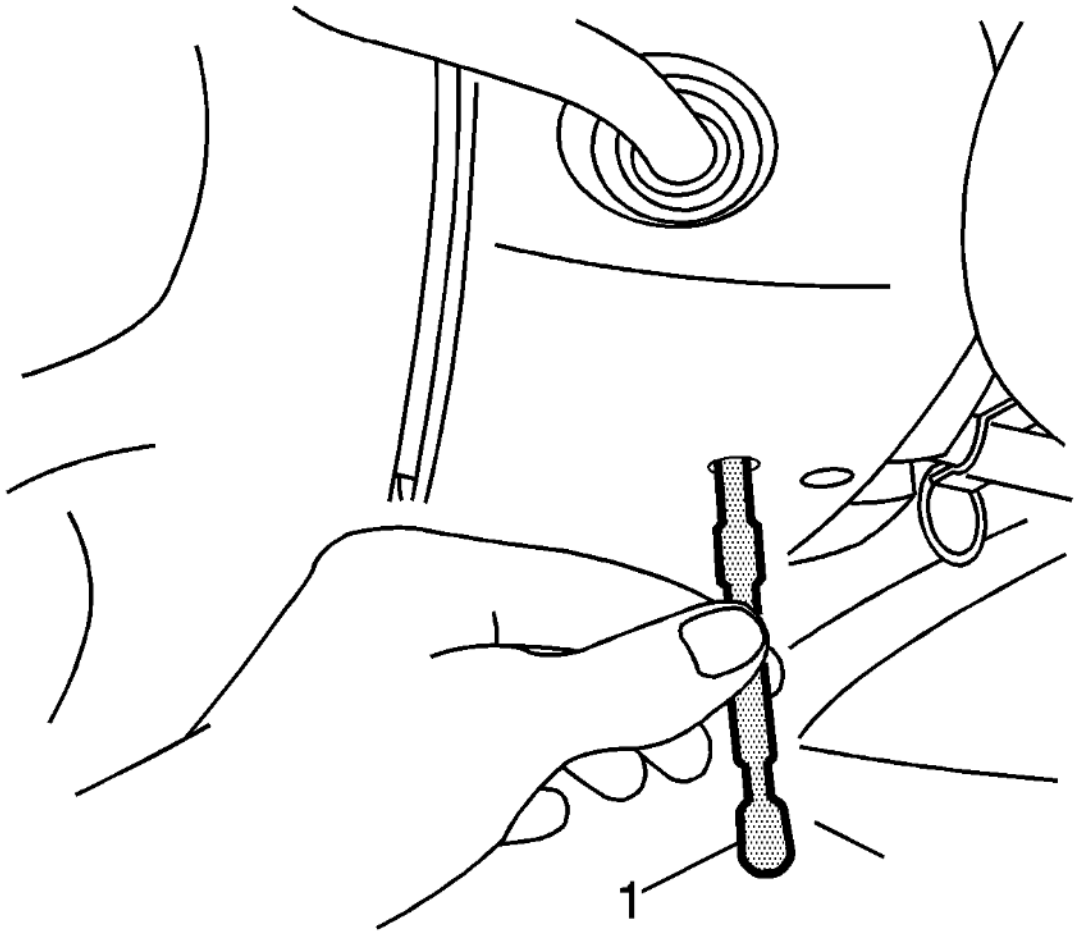

Fig. 12: Steering Wheel Lock Tool
Courtesy of GENERAL MOTORS COMPANY

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:**

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- **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 became 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. Refer to **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.

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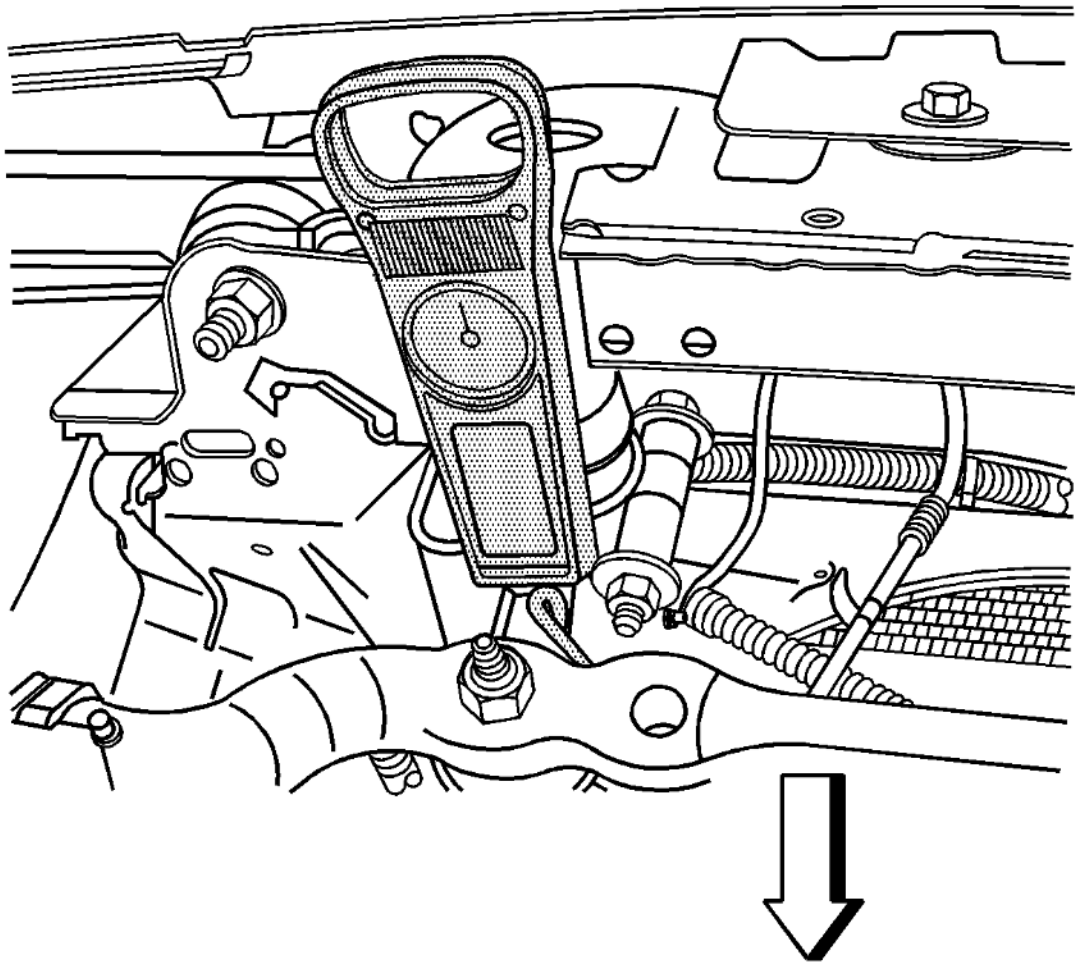

Fig. 13: Placing Special Tool Near Relay Rod End Of Idler Arm
Courtesy of GENERAL MOTORS COMPANY

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

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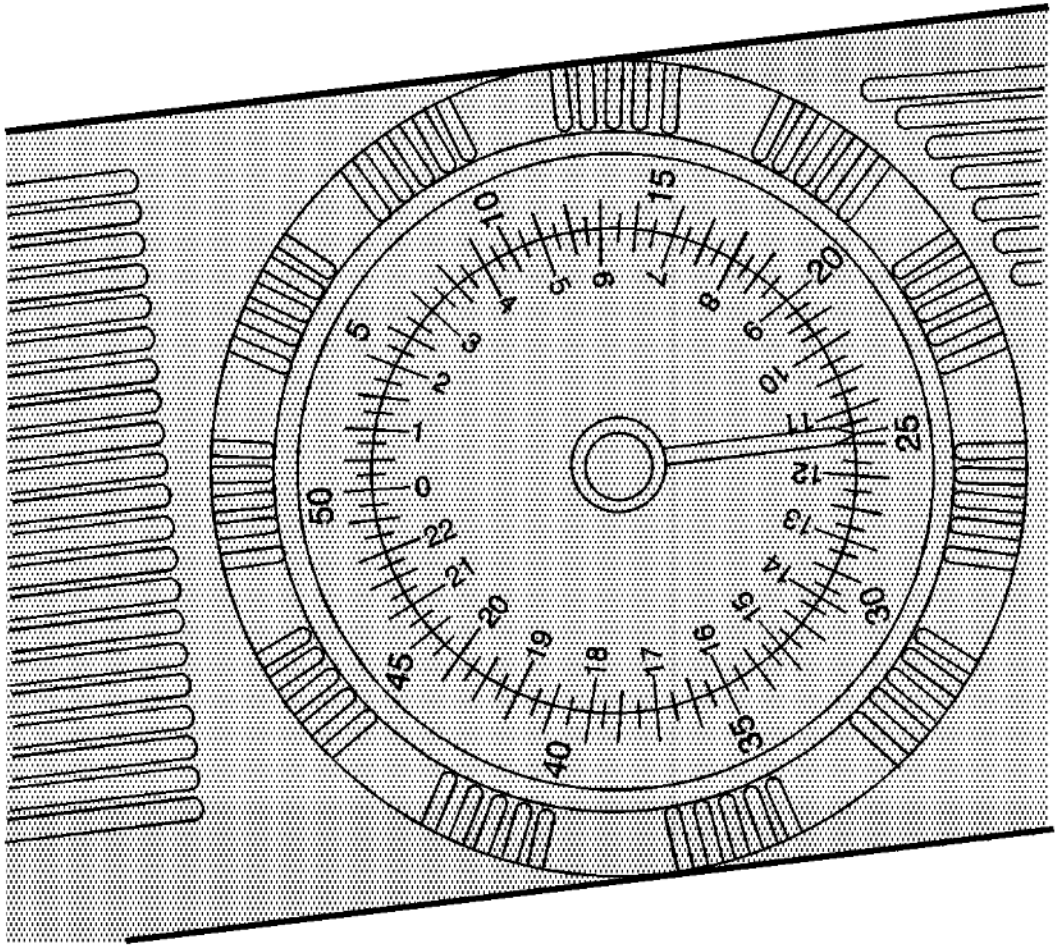

Fig. 14: Measuring Upward/Downward Force
Courtesy of GENERAL MOTORS COMPANY

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

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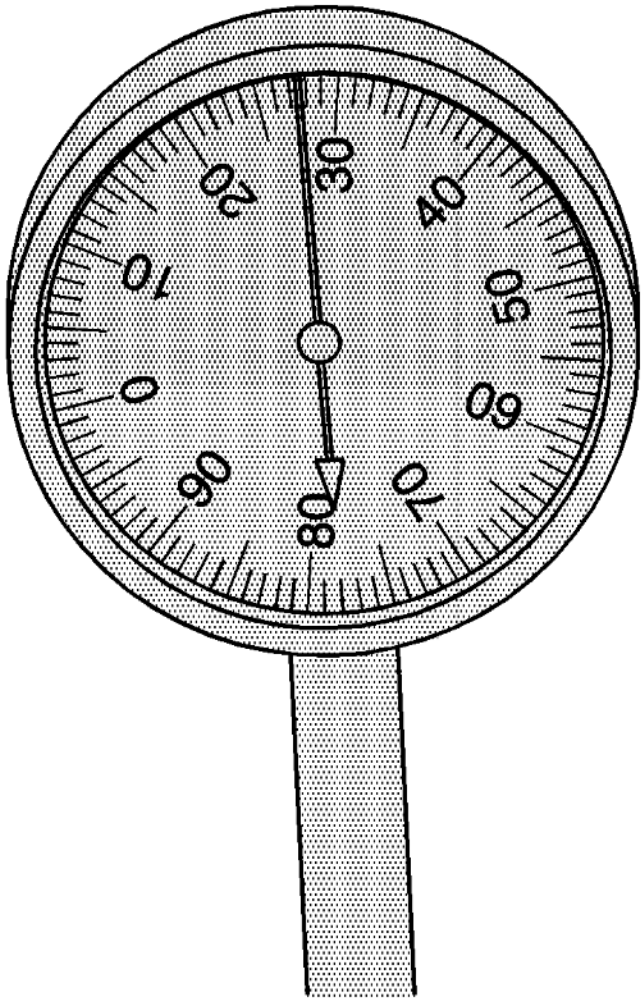

Fig. 15: Measuring Idler Arm Movement (Relay Rod End)
Courtesy of GENERAL MOTORS COMPANY

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

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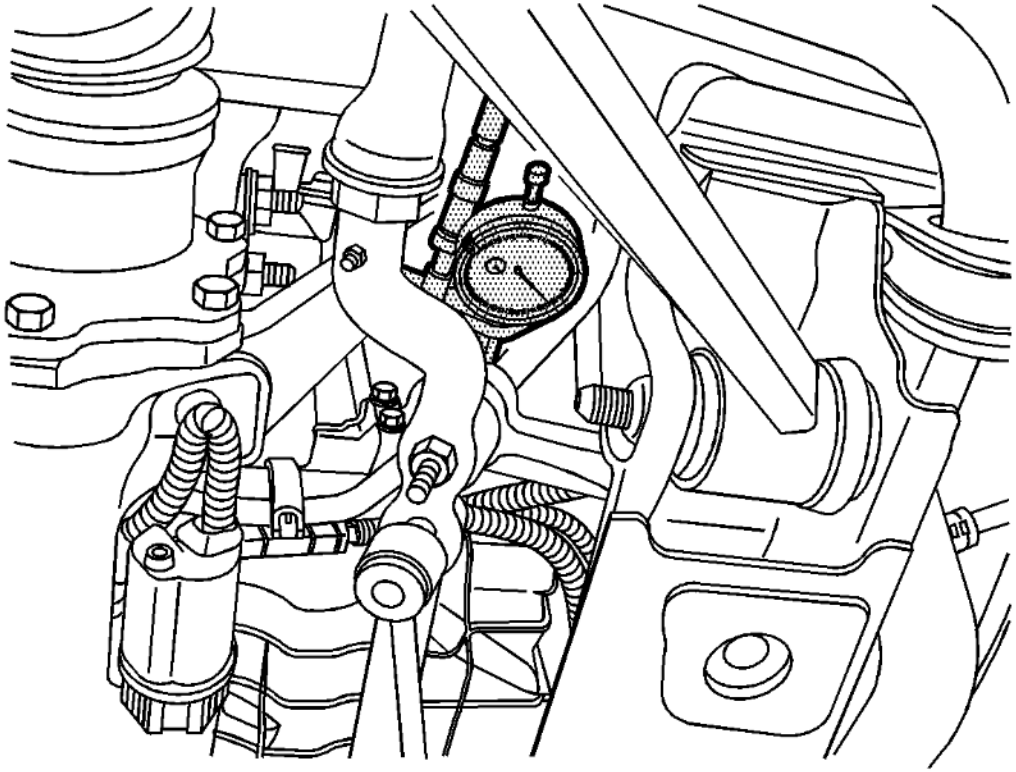

Fig. 16: Installing Dial Indicator At Idler Arm
Courtesy of GENERAL MOTORS COMPANY

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.

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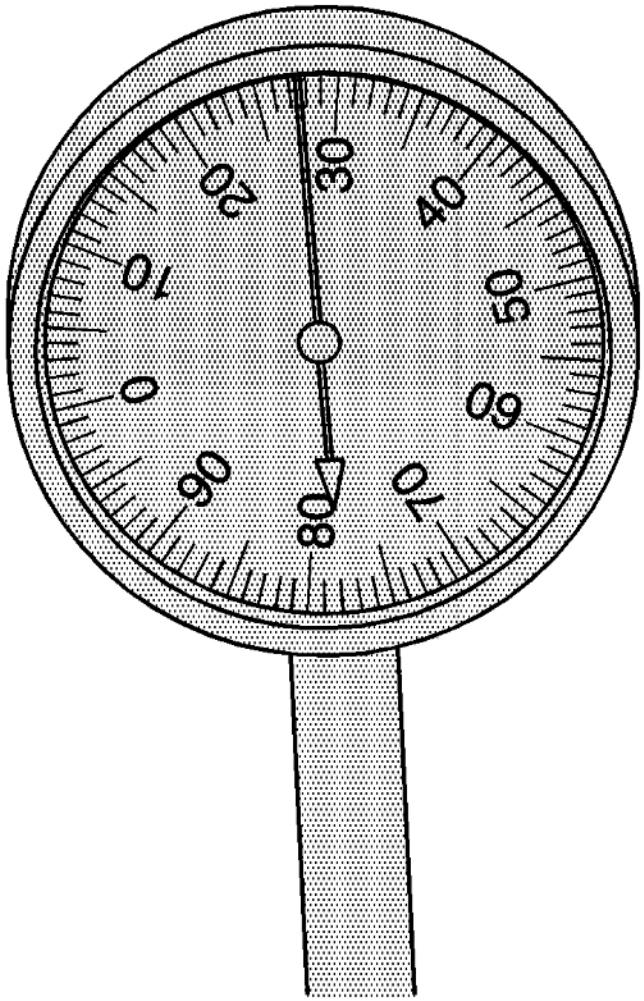

Fig. 17: Measuring Idler Arm Movement
Courtesy of GENERAL MOTORS COMPANY

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.

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IDLER ARM REPLACEMENT (HEAVY DUTY)

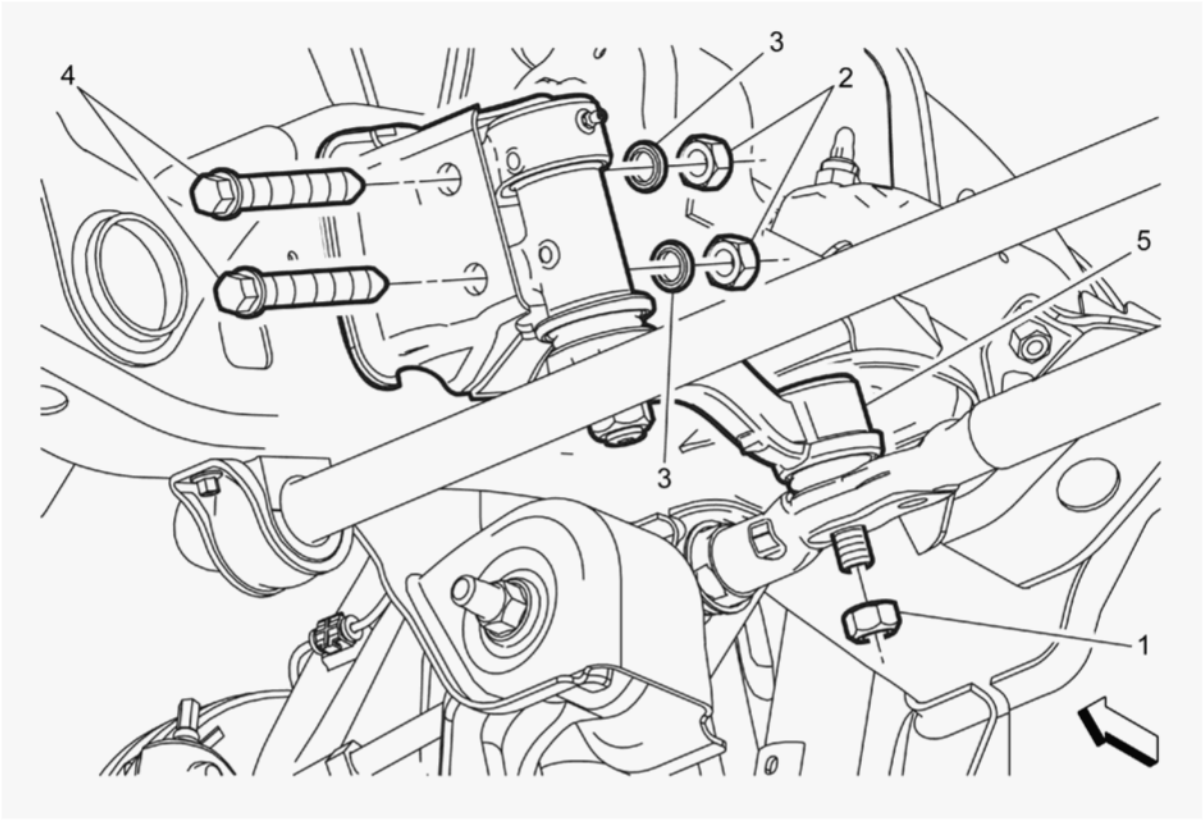

Fig. 18: Idler Arm (Heavy Duty)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Gear Skid Shield. Refer to **Steering Gear Skid Shield Replacement**	

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Callout	Component Name
1	Steering Linkage Idler Arm Nut **CAUTION:** **Refer to Fastener Caution .** **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:**Special Tools**
2	Steering Linkage Idler Arm Nut (Qty: 2) **Tighten** 165 N.m (122 lb ft)
3	Steering Linkage Idler Arm Washer (Qty: 2)
4	Steering Linkage Idler Arm Bolt (Qty: 2)
5	Steering Linkage Idler Arm **Procedure** Measure and adjust the front toe. Refer to **Wheel Alignment - Steering Wheel Angle and/or Front Toe Adjustment**

RELAY ROD REPLACEMENT (HEAVY DUTY)

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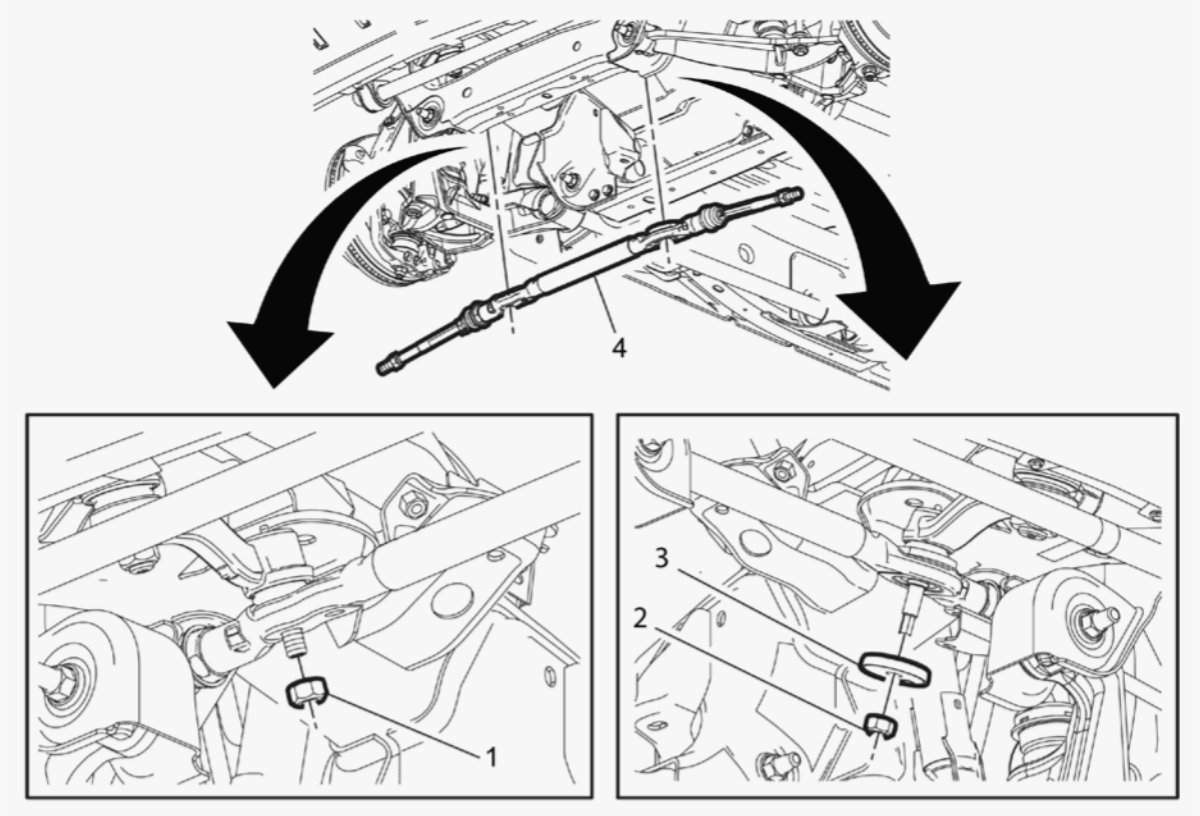

Fig. 19: Relay Rod (Heavy Duty)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove Underbody Skid Shield. Refer to **Underbody Skid Shield Replacement** 2. Remove Steering Linkage Outer Tie Rod. Refer to **Steering Linkage Outer Tie Rod Replacement (Heavy Duty)**(Qty: 2)	
1	Steering Linkage Idler Arm Nut **CAUTION:** **Refer to** **Fastener**

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Callout	Component Name
	Caution . **Tighten** 125 N.m (92 lb ft)
2	Steering Linkage Pitman Arm Nut **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.**

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Callout	Component Name
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. Refer to **Wheel Alignment - Steering Wheel Angle and/or Front Toe Adjustment** **Special Tools** • **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 (HEAVY DUTY)

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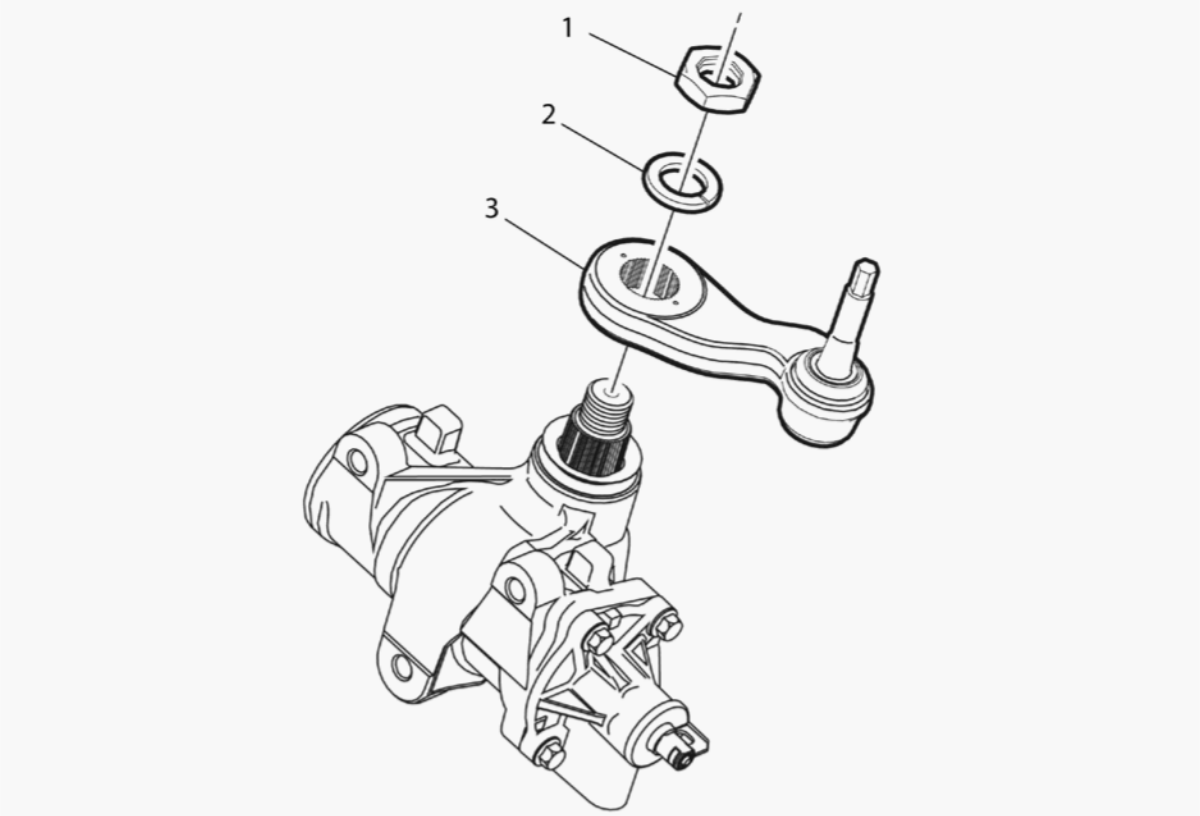

Fig. 20: Pitman Arm (Heavy Duty)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Hydraulic Recirculating Ball Steering Gear. Refer to **Hydraulic Recirculating Ball Steering Gear Replacement (Heavy Duty)**	
1	Pitman Arm Nut **CAUTION:** **Refer to Fastener Caution .**

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Callout	Component Name
	Tighten 370 N.m (273 lb ft)
2	Pitman Arm Washer
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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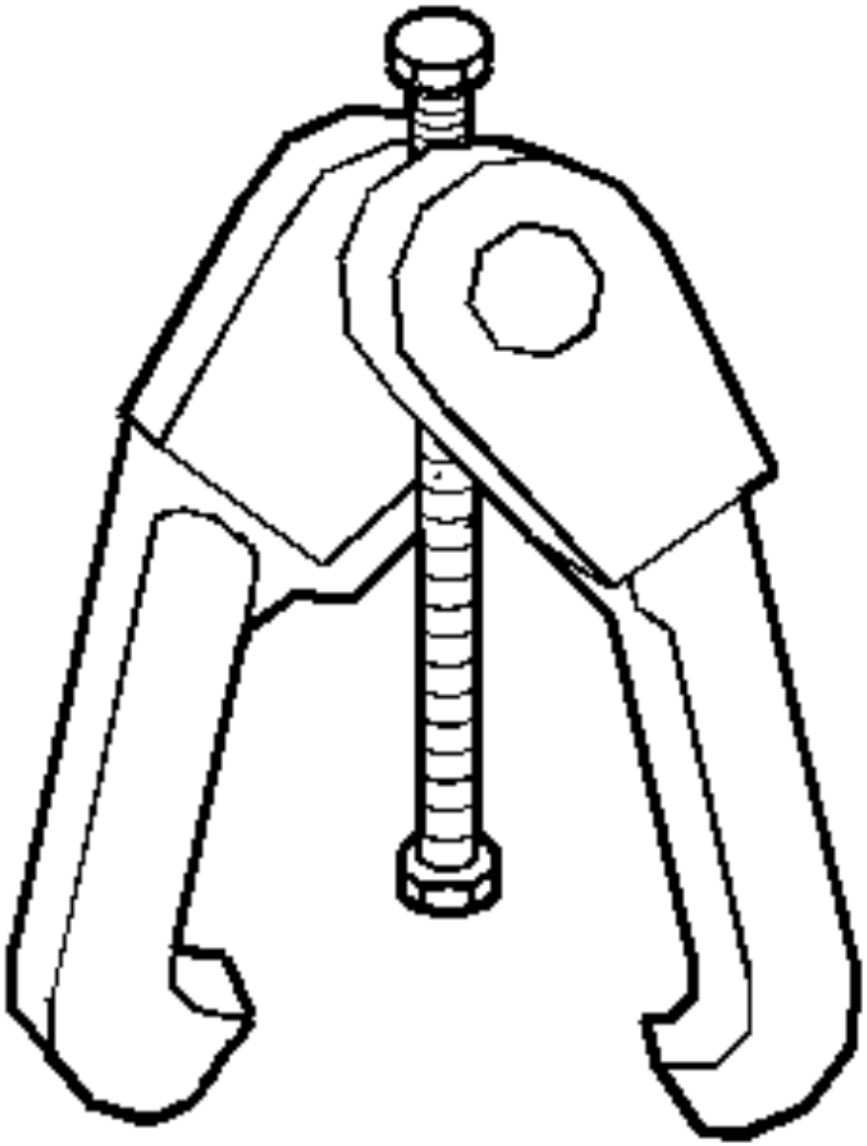
Illustration	Tool Number/Description
	CH-24319-B J-24319-B SA91100C 7503 Universal Steering Linkage and Tie Rod Puller

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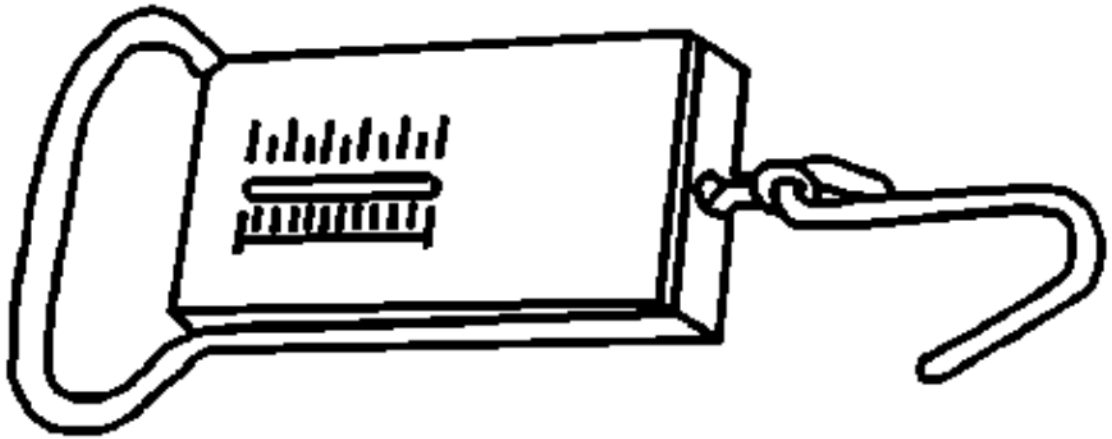
Illustration	Tool Number/Description
	CH-35999 J-35999 Pitman Arm Spring Scale

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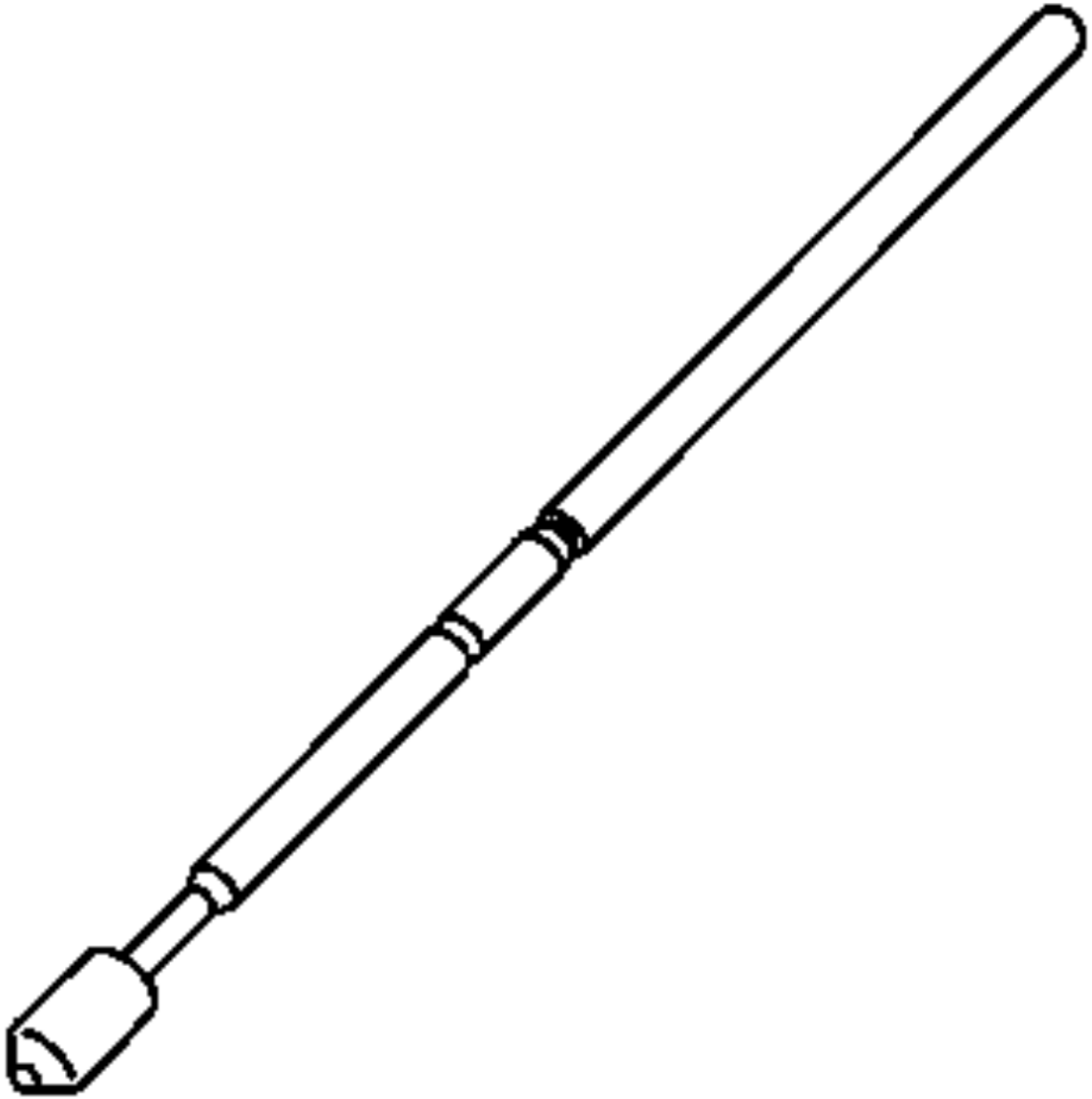
Illustration	Tool Number/Description
	CH-42640 J-42640 Steering Column Anti-Rotation Pin

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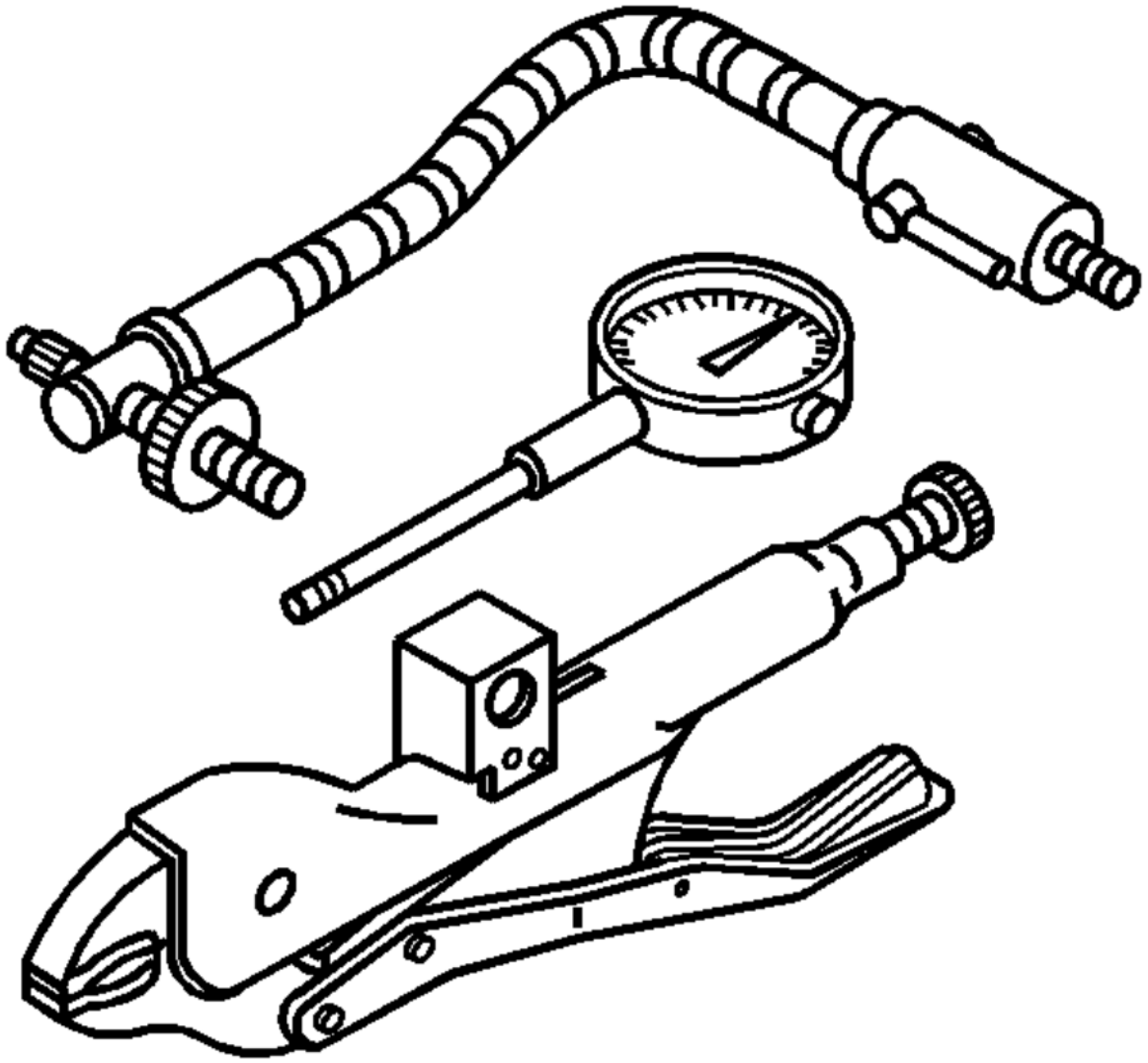
Illustration	Tool Number/Description
	CH-45101 J-45101 Dial Indicator Kit

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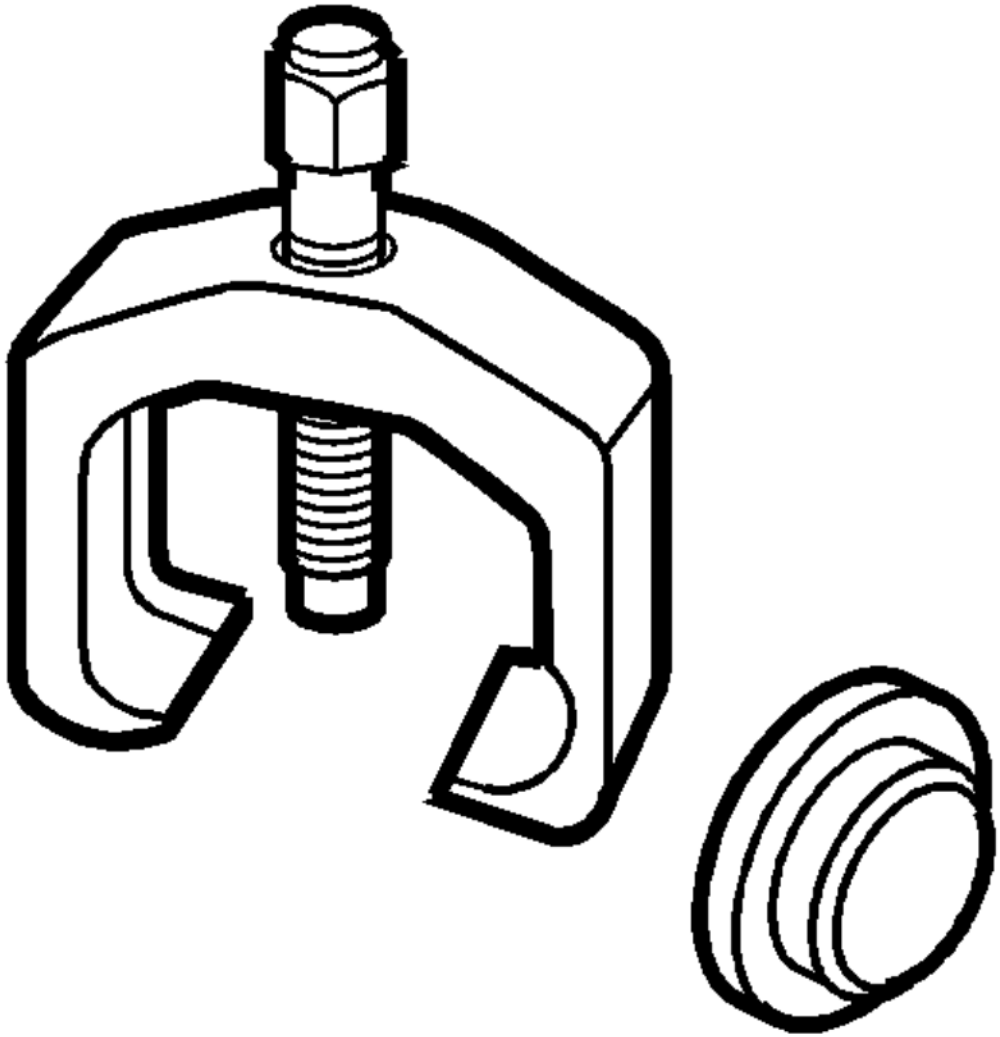
Illustration	Tool Number/Description
	CH-47965 Pitman Arm Separator

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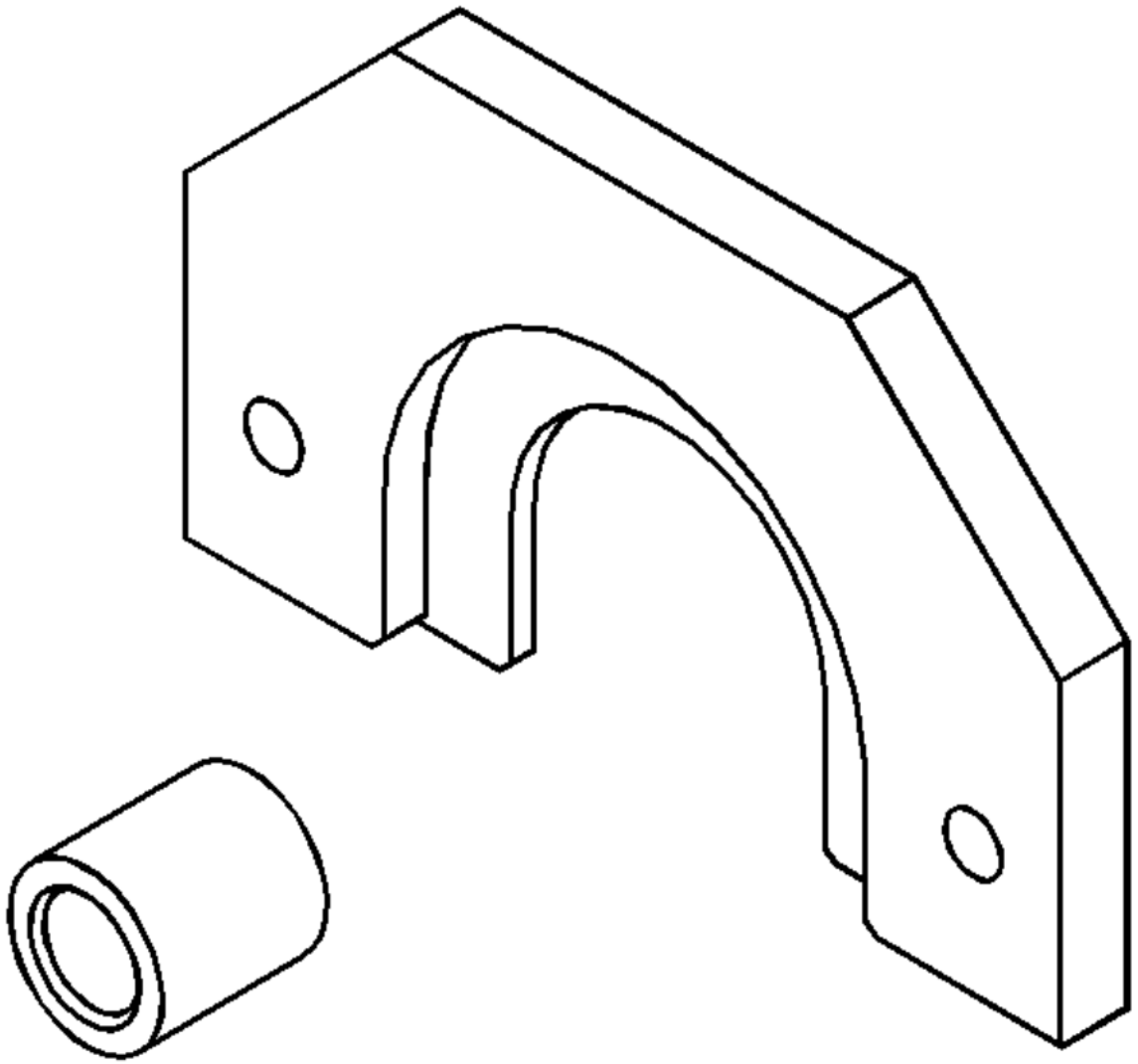
Illustration	Tool Number/Description
	CH-49824 Steering Link Separator

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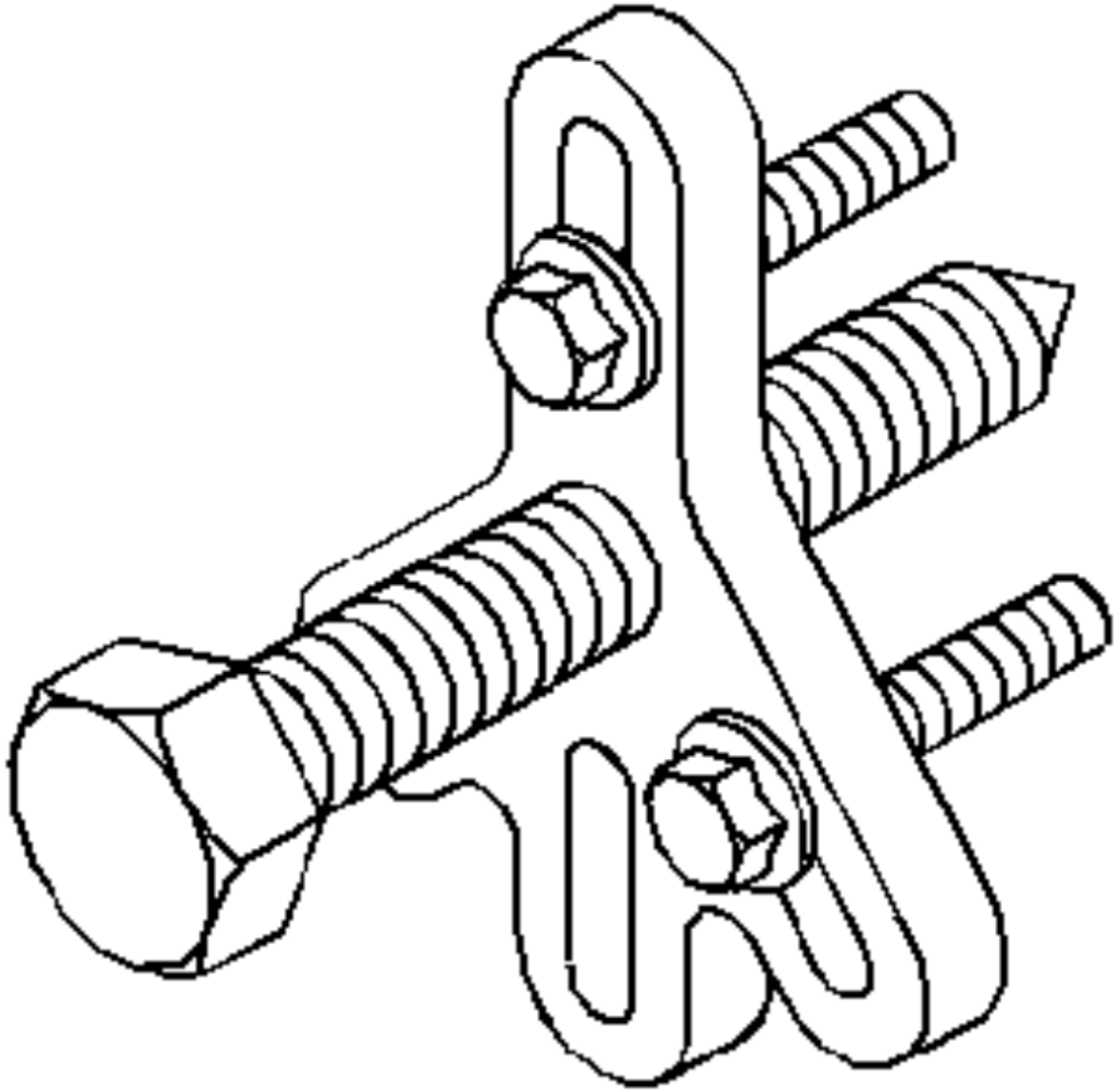
Illustration	Tool Number/Description
	EN-24420-C EN-47982 J-24420-C Harmonic Balancer Puller

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