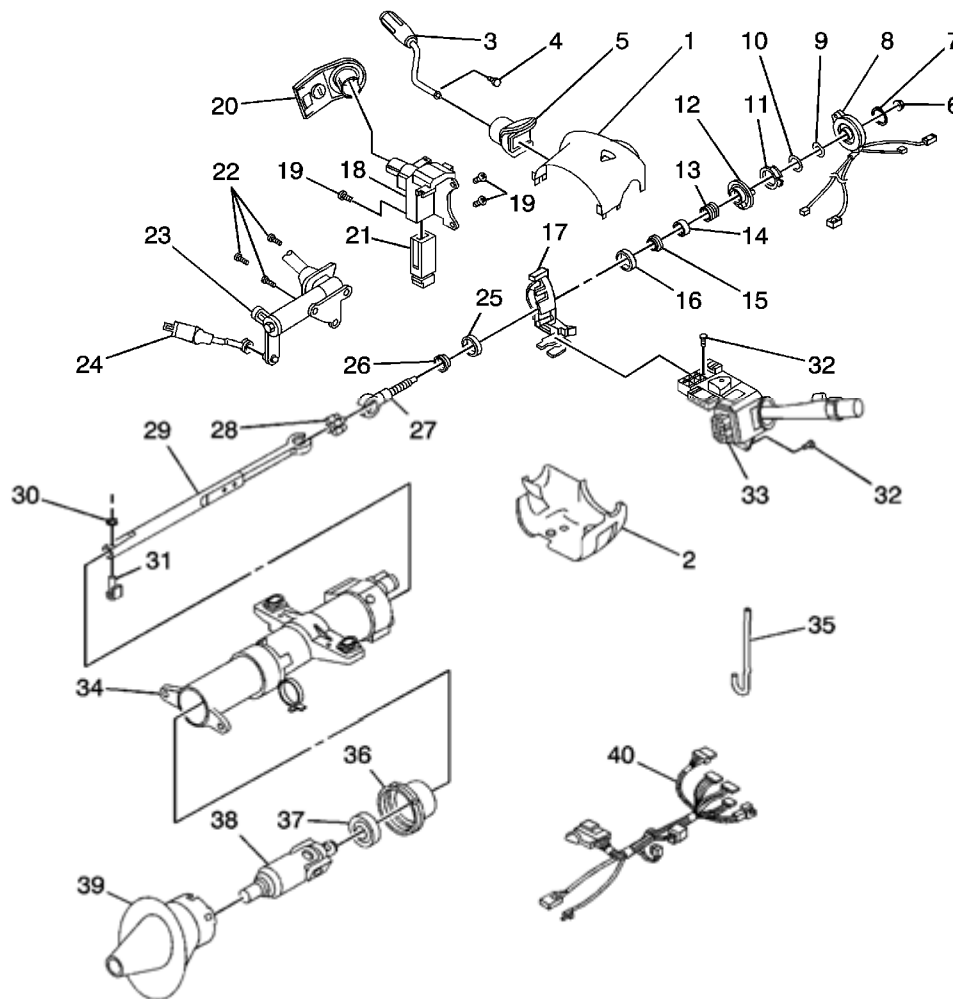


Fastener Tightening Specifications

Application	Specification	
	Metric	English
Intermediate Steering Shaft Bearing Nut	30 N·m	22 lb ft
Intermediate Steering Shaft Lower Bolt	61 N·m	45 lb ft
Intermediate Steering Shaft Seal Bolt	2 N·m	18 lb in
Intermediate Steering Shaft Yoke Upper Bolt	30 N·m	22 lb ft
Lower Intermediate Steering Shaft Bolt	30 N·m	22 lb ft
Shift Lever Bolt	20 N·m	15 lb ft
Steering Column Nut	25 N·m	18 lb ft
Steering Wheel Nut	41 N·m	30 lb ft
Transmission Control Bolt	10 N·m	89 lb in
Turn Signal Multifunction Switch Bolt	3 N·m	27 lb in
Upper Intermediate Steering Shaft Nut	30 N·m	22 lb ft

Steering Column Disassembled View (Standard Column)

Standard Column



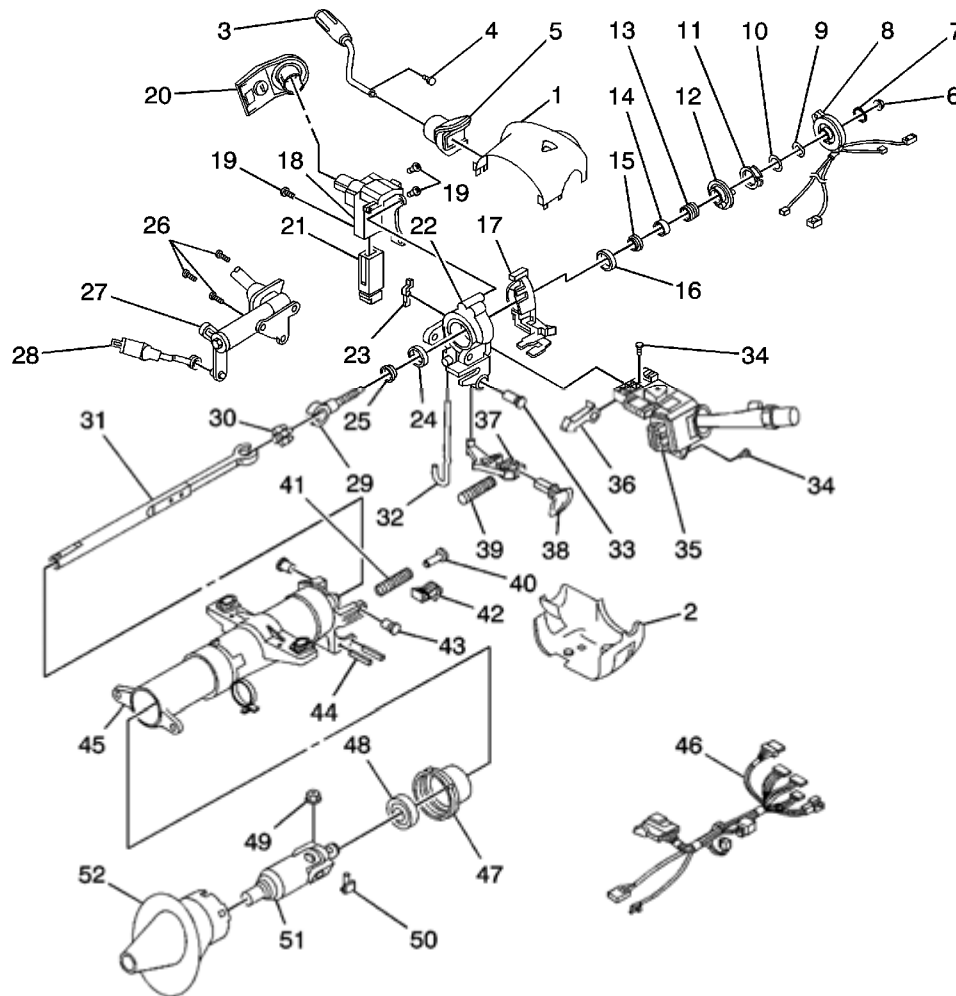
- (1) Upper Trim Cover
- (2) Lower Trim Cover
- (3) Shift Lever
- (4) Shift Lever Screw
- (5) Shift Lever Seal
- (6) Flange Prevailing Torque Nut
- (7) Retaining Ring
- (8) Inflatable Restraint Steering Wheel Module Coil

- (9) Wave Washer
- (10) Bearing Retainer
- (11) Cam Orientation Plate
- (12) Turn Signal Cancel Cam Assembly
- (13) Upper Bearing Spring
- (14) Upper Bearing Inner Race Seat
- (15) Inner Race
- (16) Bearing Assembly
- (17) Switch Mounting Bracket
- (18) Ignition Lock Cylinder Case
- (19) TORX Head Screws
- (20) Coded Key Controller
- (21) Ignition Switch Assembly
- (22) TORX Head Screw
- (23) Linear Shift Assembly
- (24) Electrical Actuator
- (25) Bearing Assembly
- (26) Inner Race
- (27) Race and Upper Shaft Assembly
- (28) Centering Sphere
- (29) Lower Steering Shaft Assembly
- (30) Hex Head Nut
- (31) Pinch Bolt
- (32) Pan Head Tapping Screw
- (33) Turn Signal and Multifunction Switch Assembly
- (34) Steering Column Jacket Assembly
- (35) Anti-rotation Pin
- (36) Adapter and Bearing Assembly
- (37) Bearing Assembly
- (38) Intermediate Shaft
- (39) Inner Boot Seal
- (40) Wire Harness Assembly

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Steering Column Disassembled View (Tilt Column)

Tilt Column



- (1) Upper Trim Cover
- (2) Lower Trim Cover
- (3) Shift Lever
- (4) Shift Lever Screw
- (5) Shift Lever Seal
- (6) Flange Prevailing Torque Nut
- (7) Retaining Ring
- (8) Inflatable Restraint Steering Wheel Module Coil
- (9) Wave Washer
- (10) Bearing Retainer

- (11) Cam Orientation Plate
- (12) Turn Signal Cancel Cam Assembly
- (13) Upper Bearing Spring
- (14) Upper Bearing Inner Race Seat
- (15) Inner Race
- (16) Bearing Assembly
- (17) Switch Mounting Bracket
- (18) Ignition Lock Cylinder Case
- (19) TORX Head Screws
- (20) Coded Key Controller
- (21) Ignition Switch Assembly
- (22) Steering Column Tilt Head Assembly
- (23) Tilt Bumper
- (24) Bearing Assembly
- (25) Inner Race
- (26) TORX Head Screw
- (27) Linear Shift Assembly
- (28) Electrical Actuator
- (29) Race and Upper Shaft Assembly
- (30) Centering Sphere
- (31) Lower Steering Shaft Assembly
- (32) Anti-rotation Pin
- (33) Shoe Pivot Pin
- (34) Pan Head Tapping Screw
- (35) Turn Signal and Multifunction Switch Assembly
- (36) Steering Wheel Lock Shoe
- (37) Shoe Release Lever Assembly
- (38) Tilt Knob
- (39) Compression Spring
- (40) Spring Guide
- (41) Tilt Spring
- (42) Steering Wheel Lock Support Shoe
- (43) Pivot Pin
- (44) Spring Pin
- (45) Steering Column Jacket Assembly
- (46) Wire Harness Assembly
- (47) Adapter and Bearing Assembly
- (48) Bearing Assembly
- (49) Hex Head Nut
- (50) Pinch Bolt
- (51) Intermediate Shaft
- (52) Inner Boot Seal

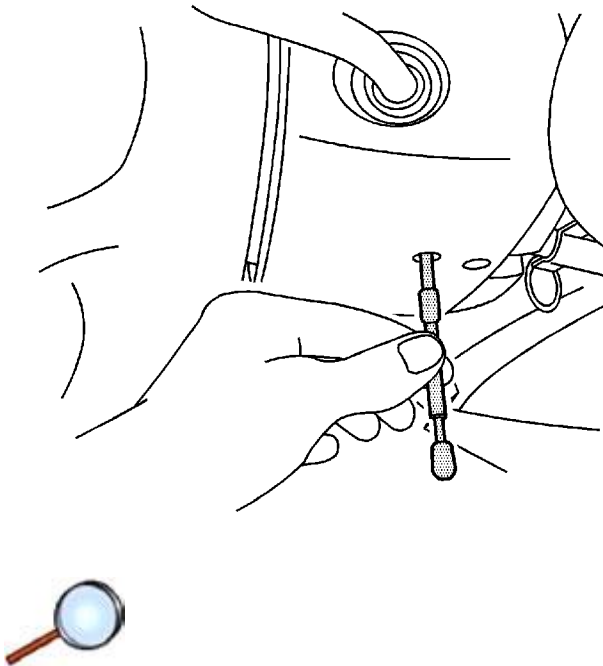
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Intermediate Steering Shaft Seal Replacement

Special Tools

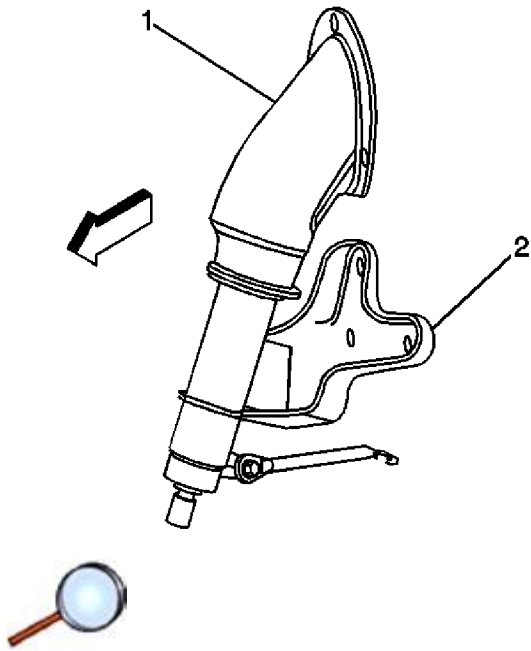
[J 42640](#) Steering Column Anti-Rotation Pin

Removal Procedure



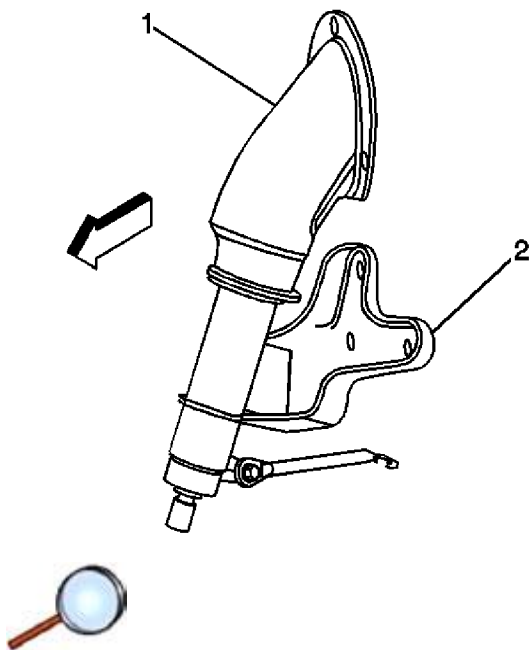
Caution: The wheels of the vehicle must be straight ahead and the steering column in the LOCK position before disconnecting the steering column or intermediate shaft from the steering gear. Failure to do so will cause the SIR coil assembly to become uncentered, which may cause damage to the coil assembly.

1. Install the [J 42640](#) in the steering column lower access hole.
2. Remove the intermediate shaft bearing. Refer to [Intermediate Steering Shaft Bearing Replacement](#).

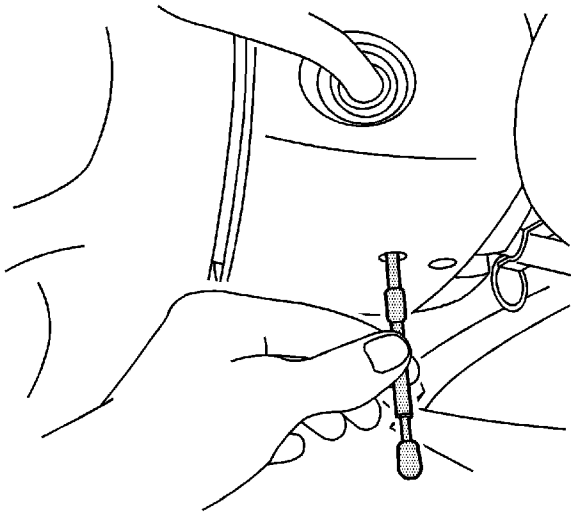


3. Remove the intermediate shaft seal (1) from the intermediate shaft bearing (2).

Installation Procedure



1. Install the intermediate shaft seal (1) to the intermediate shaft bearing (2).



2. Install the intermediate shaft bearing. Refer to [Intermediate Steering Shaft Bearing Replacement](#).
3. Remove the [J 42640](#) from the steering column lower access hole.

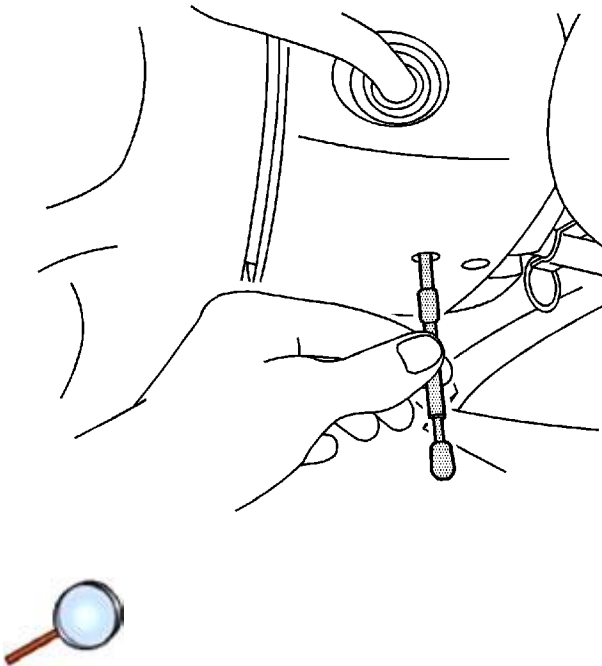
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Upper Intermediate Steering Shaft Replacement

Special Tools

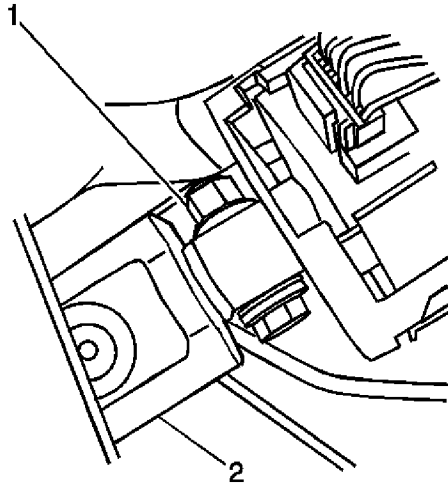
[J 42640](#) Steering Column Anti-Rotation Pin

Removal Procedure



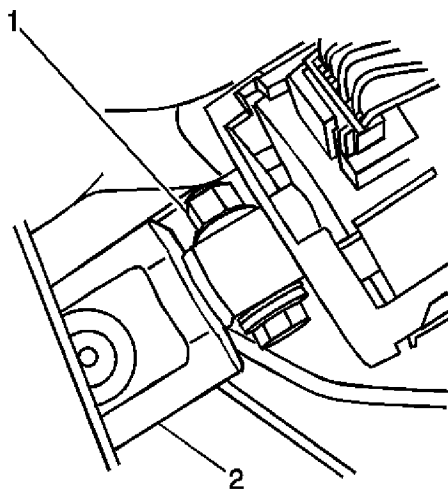
Caution: The wheels of the vehicle must be straight ahead and the steering column in the LOCK position before disconnecting the steering column or intermediate shaft from the steering gear. Failure to do so will cause the SIR coil assembly to become uncentered, which may cause damage to the coil assembly.

1. Install the [J 42640](#) in the steering column lower access hole.
2. Remove the intermediate shaft bearing. Refer to [Intermediate Steering Shaft Bearing Replacement](#).



3. Remove the upper intermediate shaft (2) to steering column retaining nut and bolt (1).
4. Disconnect the upper intermediate shaft from the steering column and remove the upper intermediate shaft.

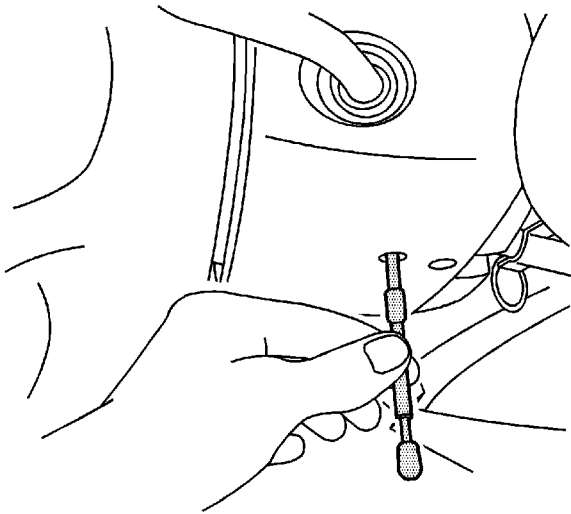
Installation Procedure



1. Install the upper intermediate shaft and connect the upper intermediate shaft to the steering column.

Caution: Refer to [Fastener Caution](#) in the Preface section.

2. Install the upper intermediate shaft (2) to steering column retaining nut and bolt (1) and tighten to **62 N·m (46 lb ft)**.



3. Install the intermediate shaft bearing. Refer to [Intermediate Steering Shaft Bearing Replacement](#).
4. Remove the [J 42640](#) from the steering column lower access hole.

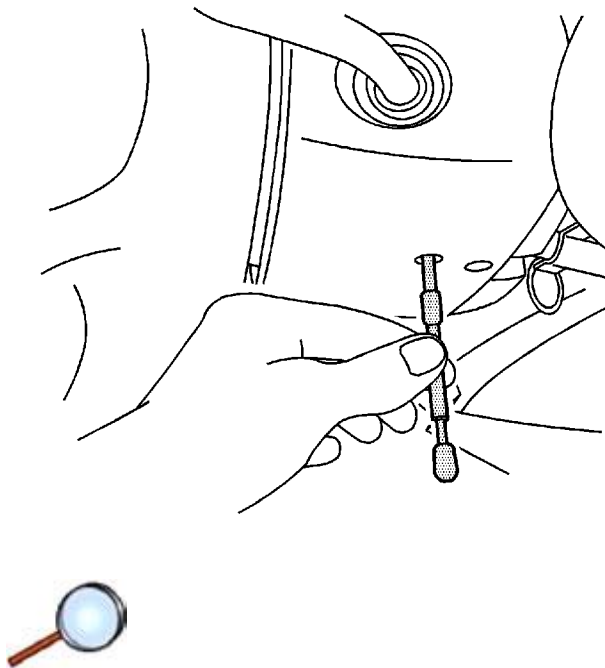
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Lower Intermediate Steering Shaft Replacement

Special Tools

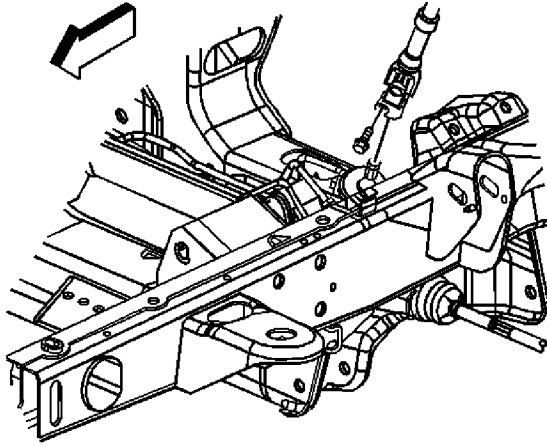
[J 42640](#) Steering Column Anti-Rotation Pin

Removal Procedure

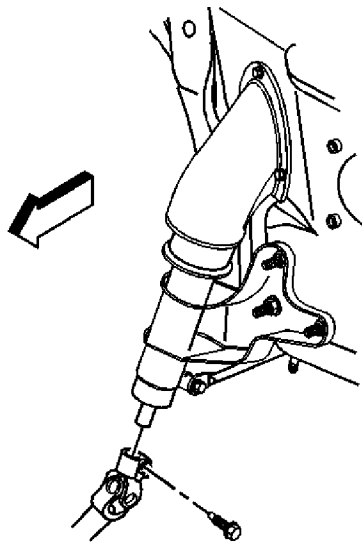


Caution: The wheels of the vehicle must be straight ahead and the steering column in the LOCK position before disconnecting the steering column or intermediate shaft from the steering gear. Failure to do so will cause the SIR coil assembly to become uncentered, which may cause damage to the coil assembly.

1. Install the [J 42640](#) in the steering column lower access hole.
2. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).

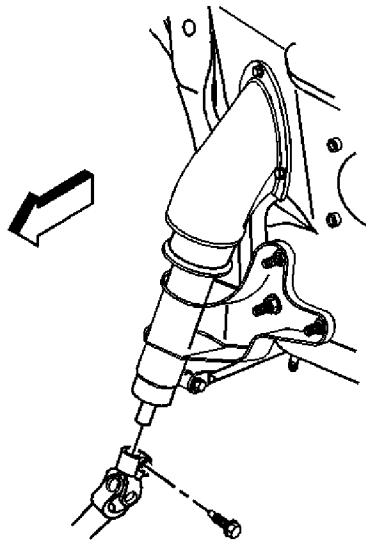


3. Mark the lower intermediate shaft to the power steering gear to aid in reassembly.
4. Remove the lower intermediate shaft to power steering gear retaining bolt.
5. Disconnect the lower intermediate shaft from the power steering gear.



6. Remove the lower intermediate shaft to the intermediate shaft bearing retaining bolt.
7. Disconnect the lower intermediate shaft from the intermediate shaft bearing.
8. Remove the lower intermediate shaft from the vehicle.

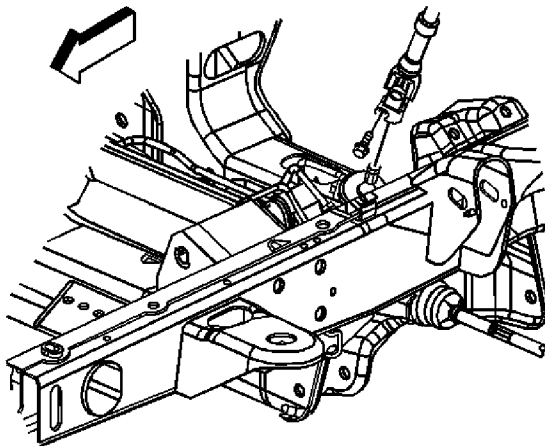
Installation Procedure



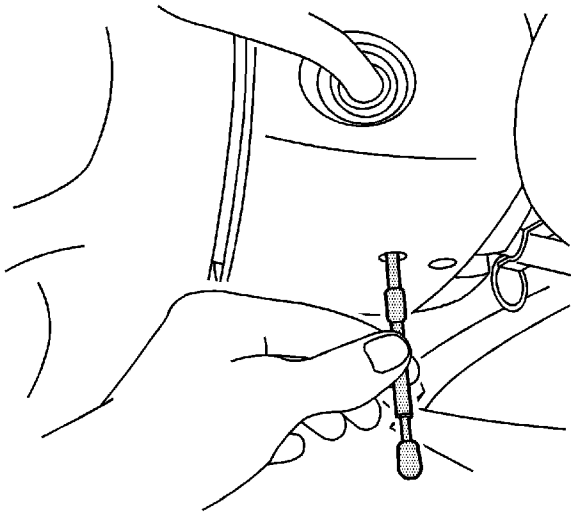
1. Install the lower intermediate shaft to the vehicle.
2. Connect the lower intermediate shaft to the intermediate shaft bearing.

Caution: Refer to [Fastener Caution](#) in the Preface section.

3. Install the lower intermediate shaft to the intermediate shaft bearing retaining bolt and tighten to **30 N·m (22 lb ft)**.



4. Align the marks made at removal and install the lower intermediate shaft to the power steering gear.
5. Install the lower intermediate shaft to the power steering gear retaining bolt and tighten to **61 N·m (45 lb ft)**.
6. Lower the vehicle.



7. Remove the [J 42640](#) from the steering column lower access hole.

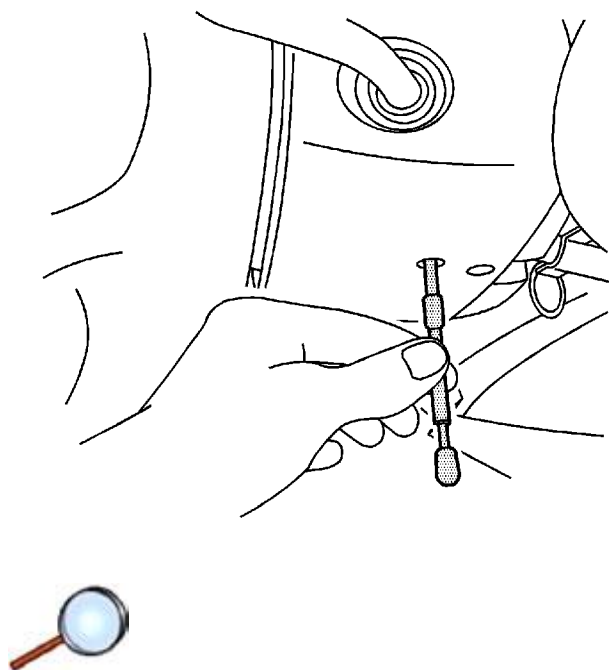
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Intermediate Steering Shaft Bearing Replacement

Special Tools

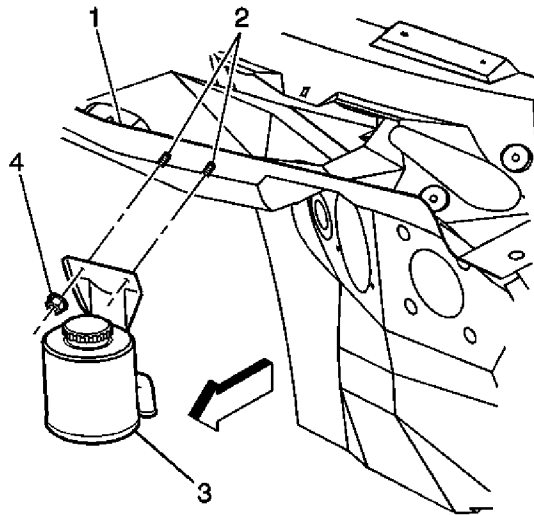
[J 42640](#) Steering Column Anti-Rotation Pin

Removal Procedure

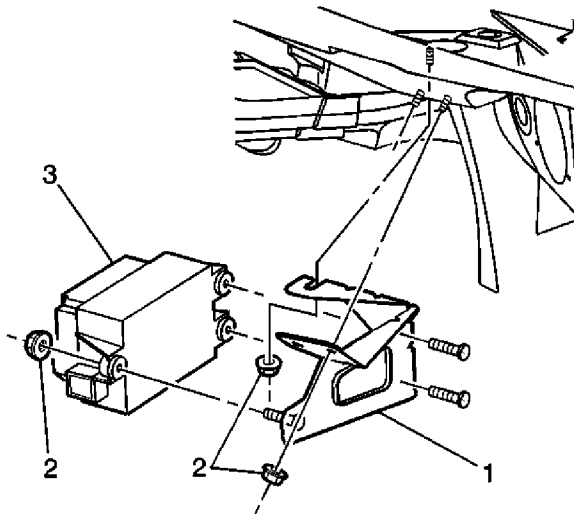


Caution: The wheels of the vehicle must be straight ahead and the steering column in the LOCK position before disconnecting the steering column or intermediate shaft from the steering gear. Failure to do so will cause the SIR coil assembly to become uncentered, which may cause damage to the coil assembly.

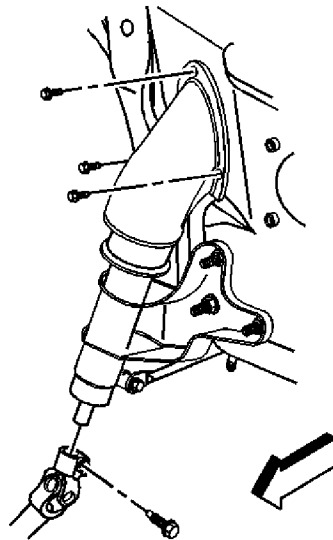
1. Install the [J 42640](#) in the steering column lower access hole.
2. Remove the lower intermediate shaft. Refer to [Lower Intermediate Steering Shaft Replacement](#).



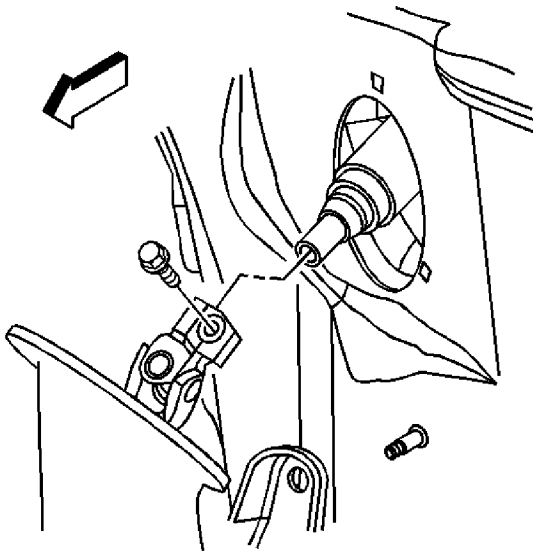
3. Remove the power steering reservoir (3) mounting nuts (4). Position power steering reservoir out of the way.



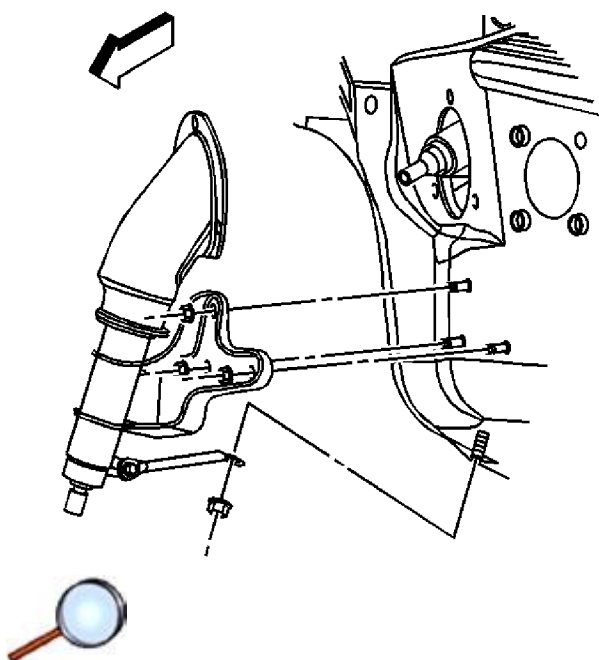
4. Remove the cruise control module (3) mounting nuts (2). Position the cruise control module out of the way, if equipped.
5. Remove the charged air cooler. Refer to [Charged Air Cooler Replacement](#).



6. Remove the intermediate shaft seal to the cowl mounting screws.

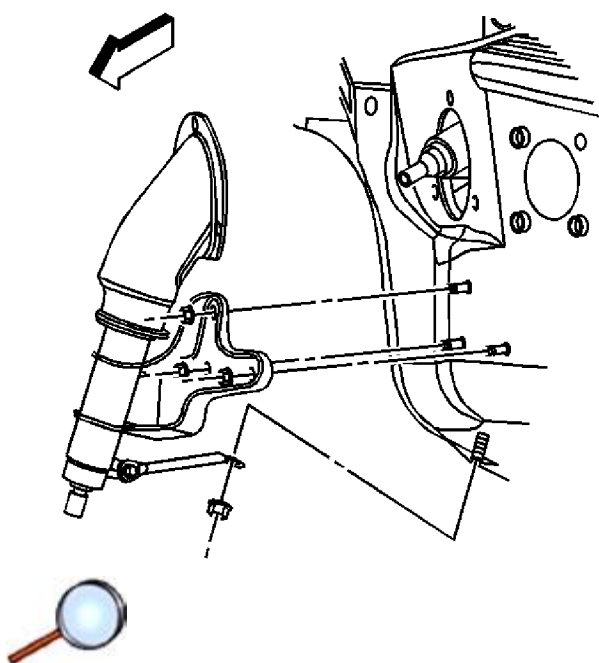


7. Pull the intermediate shaft seal down and remove the upper intermediate shaft to intermediate shaft bearing retaining bolt.



8. Remove the intermediate shaft bearing bracket retaining nuts.
9. Remove the intermediate shaft lower brace retaining nut.
10. Remove the intermediate shaft bearing from the studs on the cowl and disconnect the intermediate shaft bearing from the upper intermediate shaft.
11. Remove the intermediate shaft bearing.
12. Remove the intermediate shaft seal.

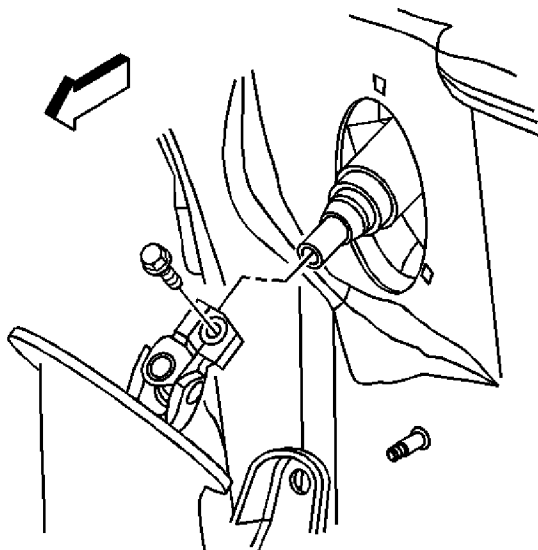
Installation Procedure



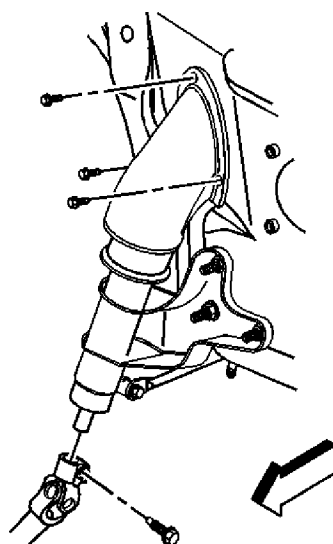
1. Install the intermediate shaft seal.
2. Connect the intermediate shaft bearing to the upper intermediate shaft.
3. Connect the intermediate shaft bearing to the studs on the cowl.

Caution: Refer to [Fastener Caution](#) in the Preface section.

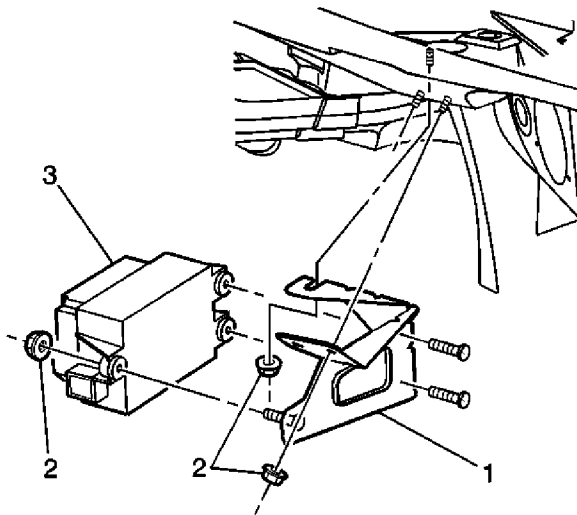
4. Install the intermediate shaft bearing lower brace retaining nut and tighten to **30 N·m (22 lb ft)**.
5. Install the intermediate shaft bearing bracket retaining nuts and tighten to **30 N·m (22 lb ft)**.



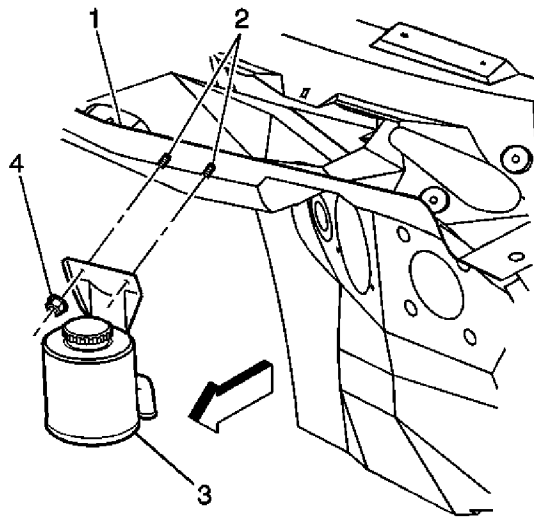
6. Install the upper intermediate shaft to the intermediate shaft bearing retaining bolt and tighten to **30 N·m (22 lb ft)**.



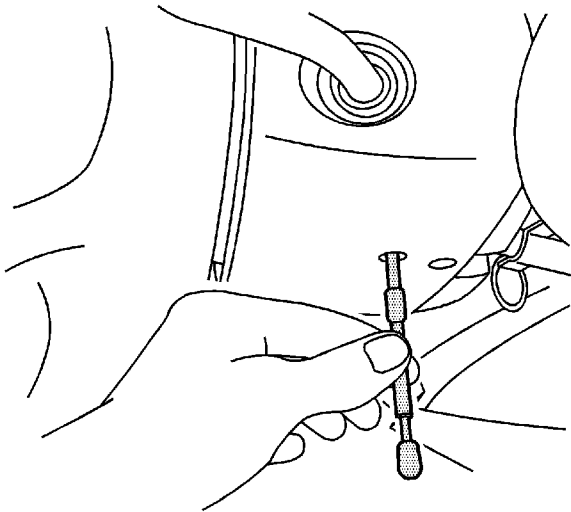
7. Install the intermediate shaft seal upper retaining screws and tighten to **2 N·m (18 lb in)**.
8. Install the charged air cooler. Refer to [Charged Air Cooler Replacement](#).



9. Reposition the cruise control module (3) and install the cruise control module mounting nuts (2), if equipped. Tighten the nuts to **5 N·m (44 lb in)**.



10. Reposition the power steering reservoir (3) and install the power steering reservoir mounting nuts (4) and tighten to **11 N·m (97 lb in)**.



11. Install the lower intermediate shaft. Refer to [Upper Intermediate Steering Shaft Replacement](#).
12. Remove the [J 42640](#) from the steering column lower access hole.

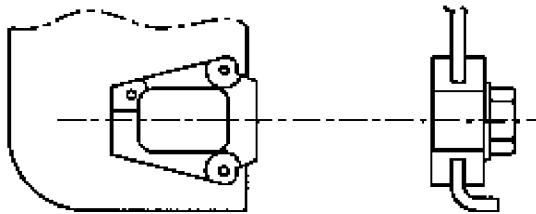
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Steering Column Accident Damage Inspection

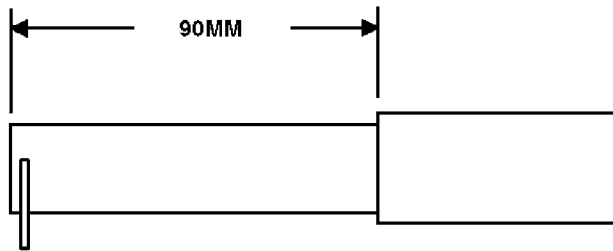
Caution: Vehicles involved in accidents that result in any of the following kinds of damage or situations, may also have a damaged or misaligned steering column:

- Frame damage
- Major body damage
- Sheet metal damage
- If the steering column has been impacted
- If the supplemental inflatable restraints system was deployed

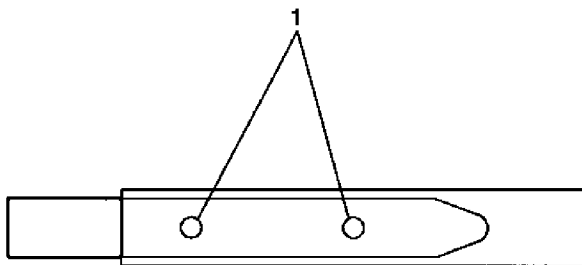
Inspection Procedure



- Inspect the capsules on the steering column bracket assembly. All capsules must be securely seated in the bracket slots and inspected for any loose conditions when pushed or pulled by hand.
- Observe how the bracket is attached to the jacket assembly.
 - If the capsules are not securely seated and the bracket is bolted to the jacket assembly, replace only the bracket.
 - If the capsules are not securely seated and the bracket is welded to the jacket assembly, replace only the jacket assembly.



- Inspect for jacket assembly collapse by measuring the distance from the lower edge of the upper jacket to a defined point on the lower jacket. Replace the jacket assembly if the measured dimensions are not within specifications.



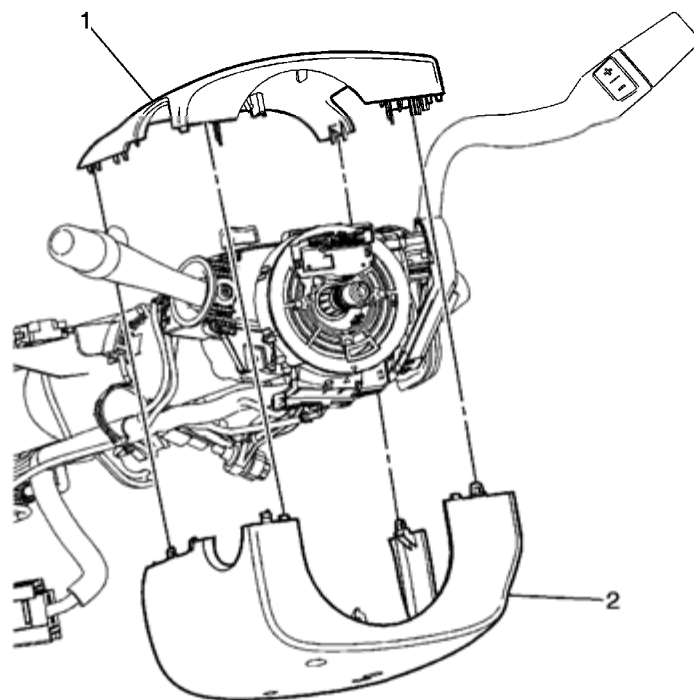
Caution: Before the shaft is rotated, remove the inflatable restraint coil assembly from the steering column and allow it to hang freely. Failure to do so may damage the coil assembly.

- Visually inspect the steering shaft for sheared injected plastic (1). If the steering shaft shows sheared plastic, replace the steering shaft.
- Any frame damage that could cause a bent steering shaft must have the steering shaft runout checked. Using a dial indicator at the lower end of the steering shaft, rotate the

steering wheel. The runout must not exceed 1.60 mm (0.06 in).

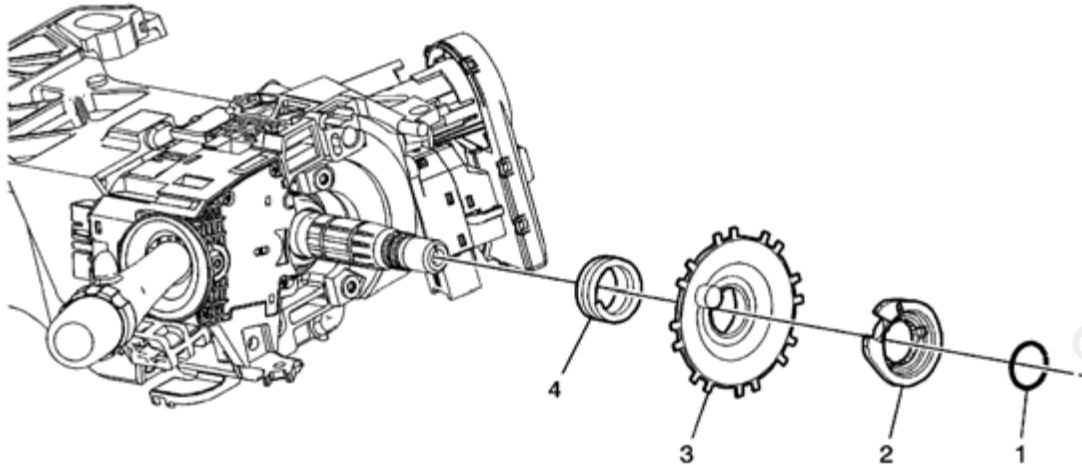
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Steering Column Trim Cover Replacement



Callout	Component Name
Preliminary Procedure	
Remove the steering wheel. Refer to Steering Wheel Replacement .	
1	Steering Column Upper Trim Cover Procedure 1. Use light pressure to dislocate the steering column upper trim cover from the steering column lower trim cover. 2. Separate the shift lever seal from the steering column upper trim cover.
2	Steering Column Lower Trim Cover Procedure 1. Remove the tilt lever. Refer to Tilt Lever Replacement. 2. Separate the shift lever seal from the steering column lower trim cover.

Turn Signal Cancel Cam and Steering Shaft Upper Bearing Spring Replacement

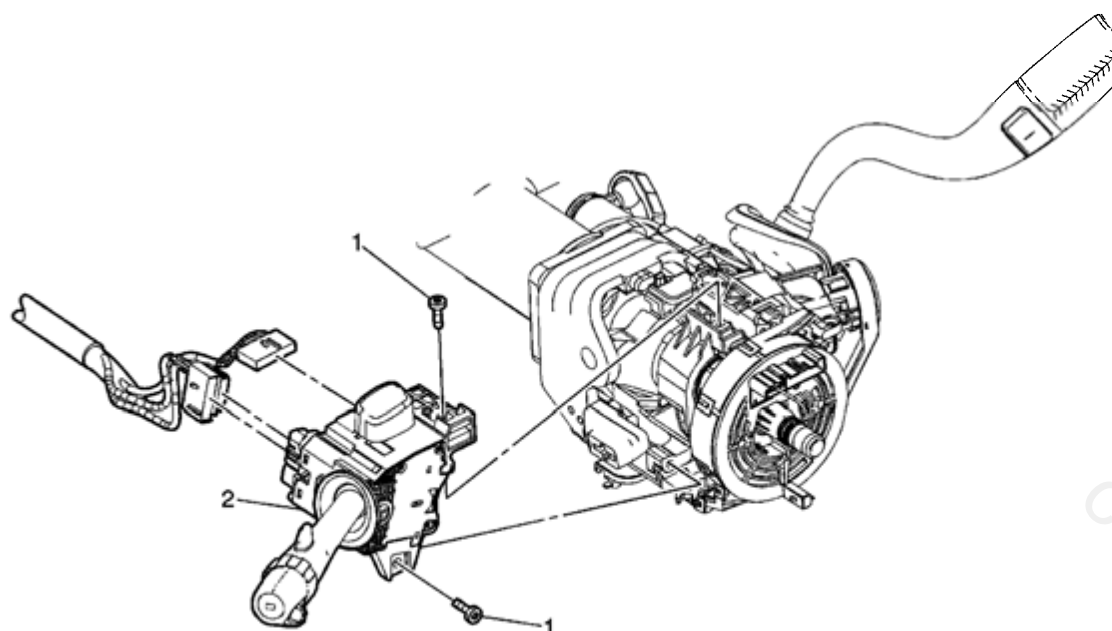


Callout	Component Name
Preliminary Procedure	
Remove the inflatable restraint steering wheel module coil. Refer to Inflatable Restraint Steering Wheel Module Coil Replacement .	
1	Steering Shaft Lock Plate Retaining Ring
	Procedure
	Use compressor J 23653-SIR and adapter J 42137 to remove the steering shaft lock plate retaining ring.
	Tip Do not reuse the steering shaft lock plate retaining ring. Replace it.
	Special Tools
	• J 23653-SIR Steering Column Lock Plate Compressor

	• J 42137 Cam Orientation Plate Adapter
2	Steering Shaft Lock Plate Tip The steering shaft lock plate can only be installed one way, align the it to the solitary larger spline on the steering shaft.
3	Turn Signal Cancel Cam Tip Ensure the turn signal cancel cam is aligned to the turn signal multifunction switch when reinstalling.
4	Steering Shaft Upper Bearing Spring

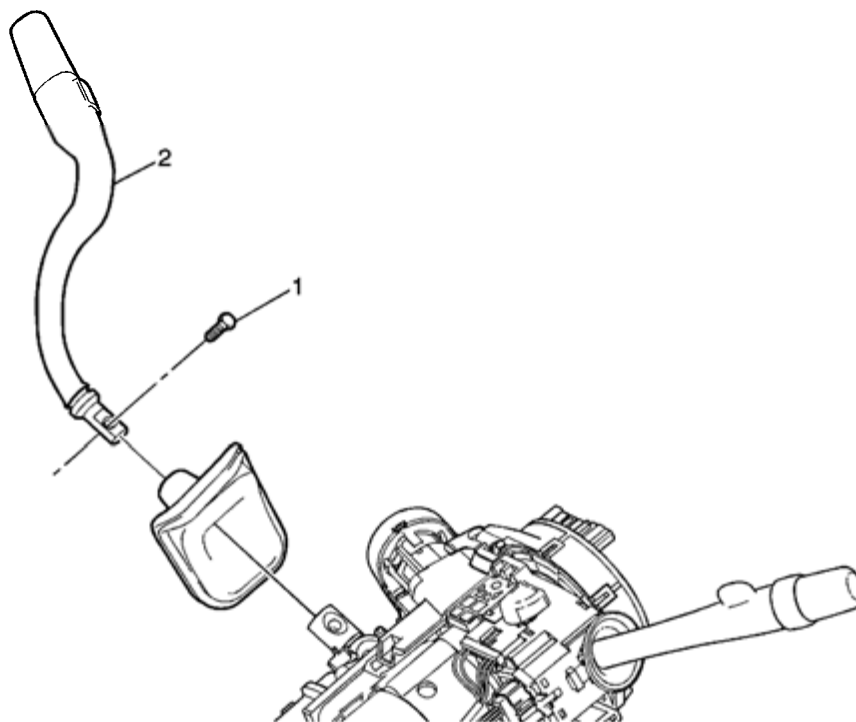
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Turn Signal Multifunction Switch Replacement



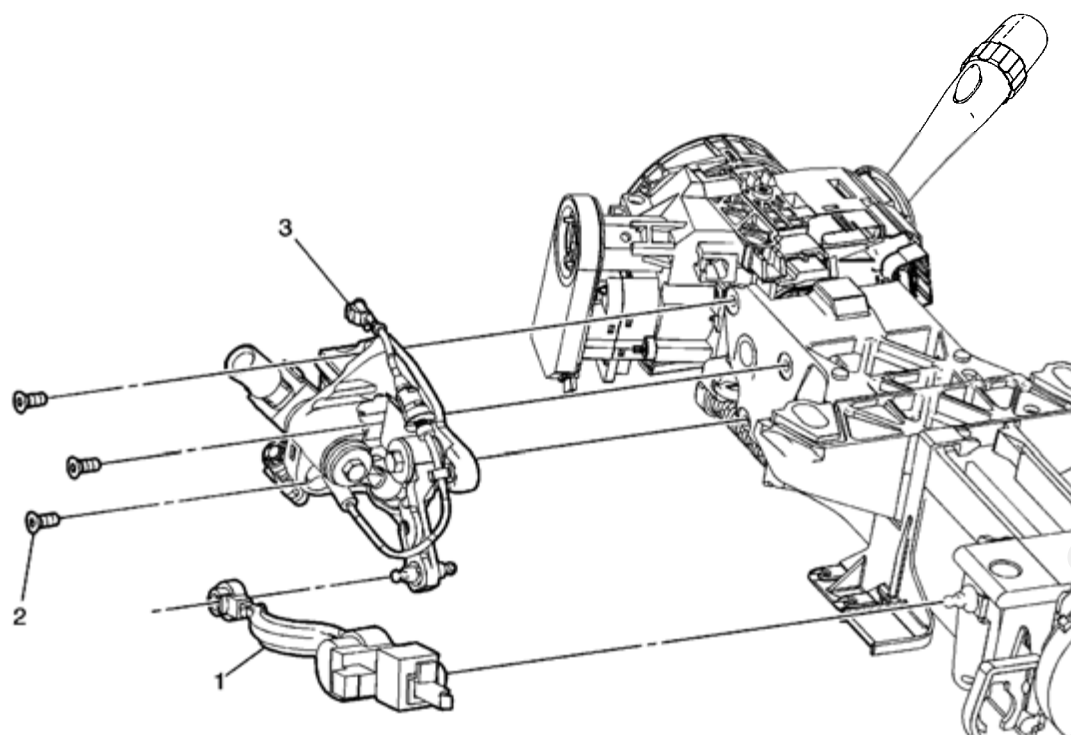
Callout	Component Name
Preliminary Procedure	
Remove the steering column trim covers. Refer to Steering Column Trim Covers Replacement .	
1	Turn Signal Multifunction Switch Bolt (Qty: 2) Caution: Refer to Fastener Caution in the Preface section. Tighten 3 N·m (27 lb in)
2	Turn Signal Multifunction Switch Procedure Disconnect any electrical connectors as needed.

Shift Lever Replacement



Callout	Component Name
Preliminary Procedure	
Remove the steering column trim covers. Refer to Steering Column Trim Covers Replacement .	
1	Shift Lever Bolt Caution: Refer to Fastener Caution in the Preface section. Tighten 20 N·m (15 lb in)
2	Shift Lever Procedure Disconnect any electrical connectors as needed. Tip Transfer the shift lever boot as needed.

Transmission Control Replacement



Callout	Component Name
Preliminary Procedure Remove the shift lever. Refer to Shift Lever Replacement .	
1	Automatic Transmission Shift Lock Control Actuator Procedure 1. Use the appropriate tool to remove the automatic transmission shift lock control actuator. 2. After repairs, the automatic transmission shift lock control actuator may need to be adjusted. Refer to Automatic Transmission Shift Lock Control Actuator Replacement.
2	Transmission Control Bolt (Qty: 3) Caution: Refer to Fastener Caution in the Preface section. Tighten 10 N·m (89 lb in)
	Transmission Control © 2010 General Motors Corporation. All rights reserved.

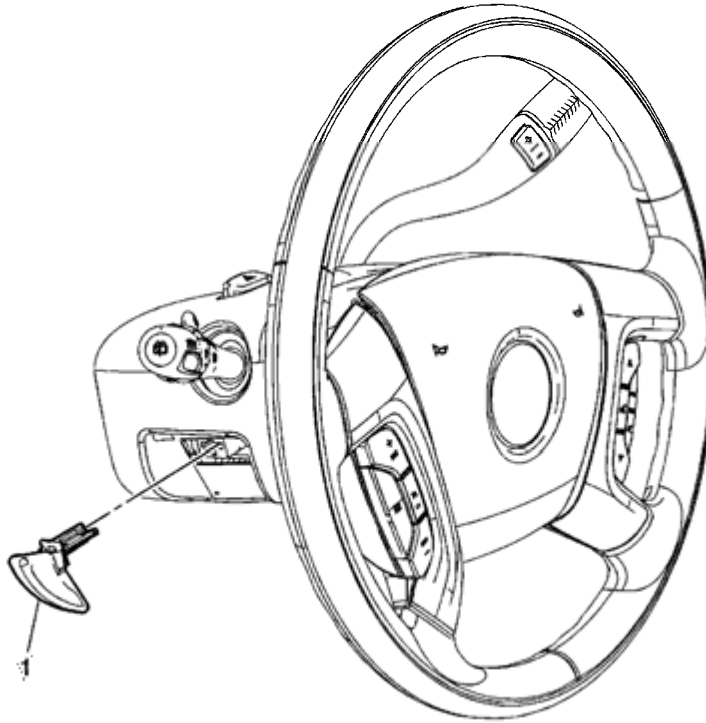
Procedure

3

Turn the ignition lock cylinder to the OFF-LOCK position and remove the park lock cable from the ignition lock cylinder case.

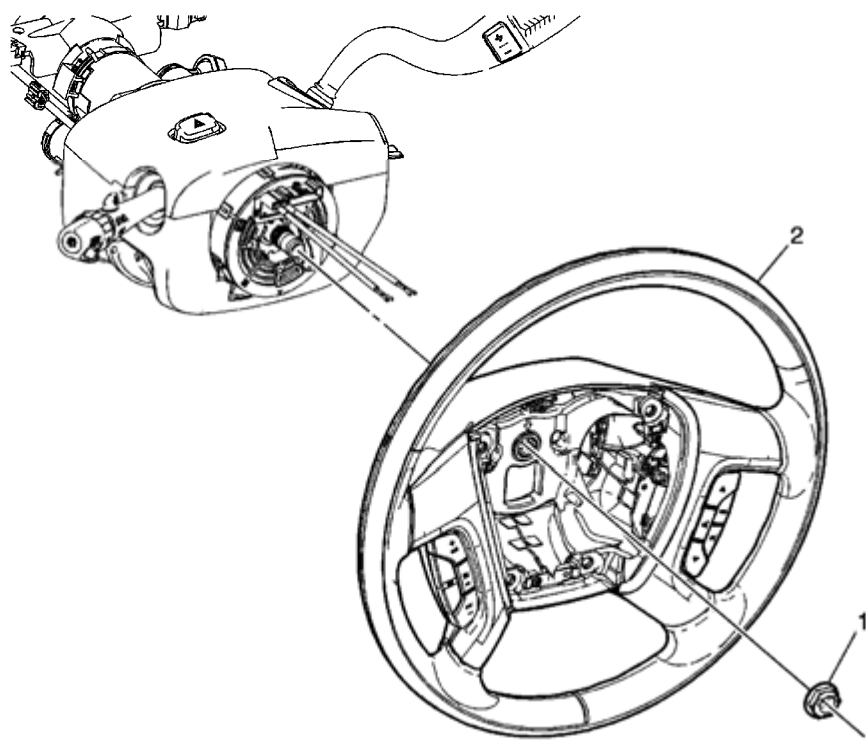
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Tilt Lever Replacement



Callout	Component Name
1	Tilt Lever
Procedure	
Remove by pulling straight outwards.	

Steering Wheel Replacement



Callout	Component Name
Preliminary Procedure Remove the inflatable restraint steering wheel module. Refer to Inflatable Restraint Steering Wheel Module Replacement .	
1	Steering Wheel Nut Caution: Refer to Fastener Caution in the Preface section. Tighten 41 N·m (30 lb ft)
2	Steering Wheel Procedure 1. Disconnect any electrical connectors as needed. 2. Use puller J 1859-A and puller legs J 36541-A or J 42578 to remove the steering wheel.

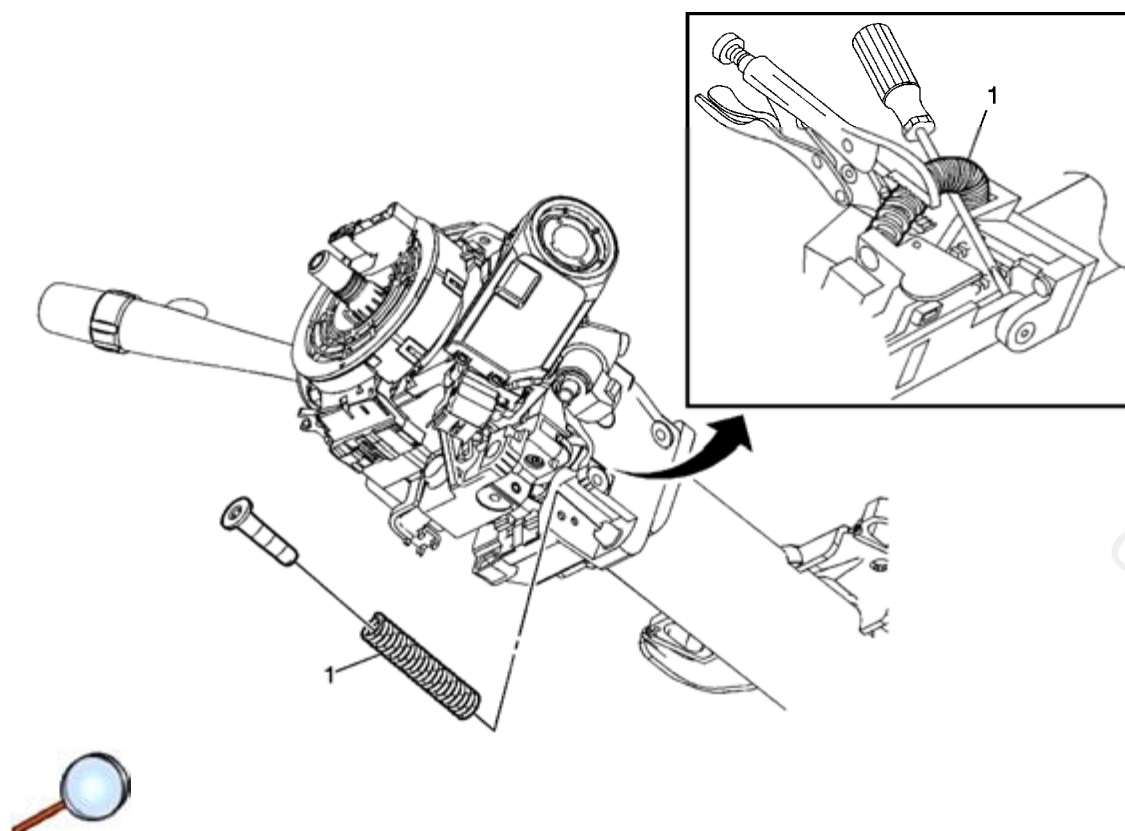
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Special Tools

- [J 1859-A](#) Steering Wheel Puller
- [J 36541-A](#) Steering Wheel Puller Legs
- [J 42578](#) Steering Wheel Puller Legs

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Steering Column Tilt Spring Replacement



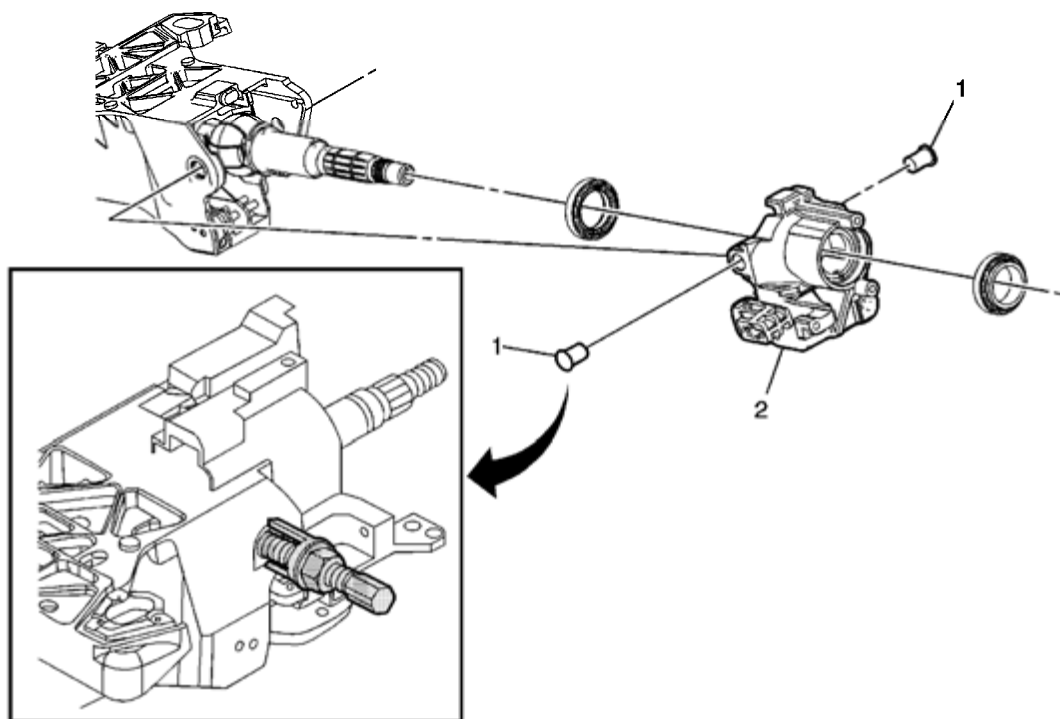
Callout	Component Name
Preliminary Procedure	
Remove the steering column trim covers. Refer to Steering Column Trim Covers Replacement .	
1	Steering Column Tilt Spring Warning: The tilt spring and the spring guide are under pressure. The tilt spring and the spring guide may become a projectile. Secure the spring with locking pliers during removal. Secure the spring with locking pliers during installation. Bodily injury may result during removal and installation of the tilt spring and the spring guide. Always use caution during removal and installation of the tilt spring and the spring guide. Procedure 1. Pry up the steering column tilt spring until a bulge occurs and most of the tension is removed. 2. Secure the steering column tilt spring with locking pliers 3. Continue prying up the steering column tilt spring until it disengages from the posts on the steering column and the steering column tilt head.

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	4. Transfer the steering column tilt guide if needed.
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Steering Column Tilt Head Housing Replacement



Callout	Component Name
Preliminary Procedures	
1. Remove the steering column tilt spring. Refer to Steering Column Tilt Spring Replacement. 2. Remove the ignition lock cylinder case. Refer to Ignition Lock Cylinder Case Replacement.	
1	Steering Column Pivot Pin (Qty: 2)
	Procedure
	1. Use remover J 21854-01 to remove the steering column pivot pins. 2. Before installing, lubricate the steering column pivot pins with the GM recommended lubricant. 3. Once installed, stake the steering column in 3 locations around each steering column pivot pin.
	Special Tools
J 21854-01 Pivot Pin Remover	

Steering Column Tilt Head

2

Procedure

Transfer the turn signal switch bracket if needed.

Tip

Do not allow any debris into the steering column tilt head.

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Steering Column Replacement

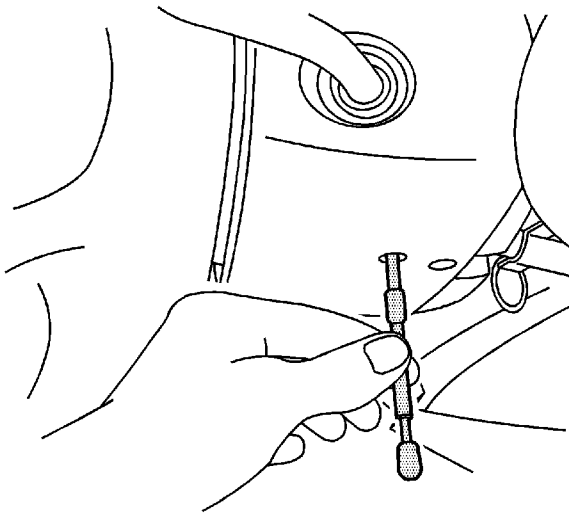
Special Tools

[J 42640](#) Steering Column Anti-Rotation Pin

Removal Procedure

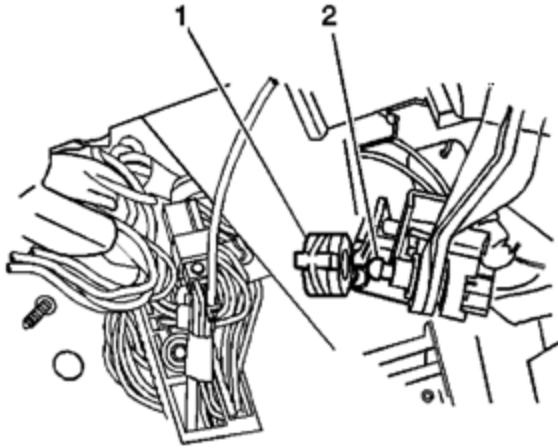
Warning: Refer to [SIR Warning](#) in the Preface section.

1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#).
2. Remove the knee bolster. Refer to [Driver Knee Bolster Bracket Replacement](#).

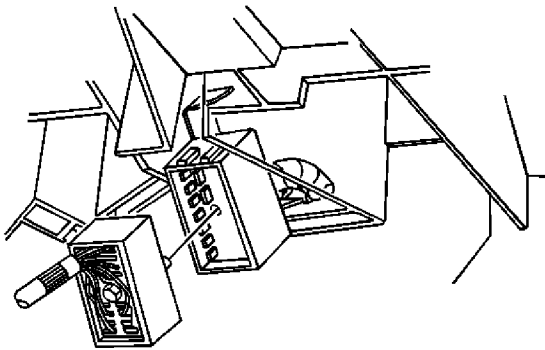


Caution: The front wheels of the vehicle must be maintained in the straight ahead position and the steering column must be in the LOCK position before disconnecting the steering column or intermediate shaft. Failure to follow these procedures will cause improper alignment of some components during installation and result in damage to the SIR coil assembly.

3. Lock the steering column through the access hole in the lower steering column trim cover using the [J 42640](#).



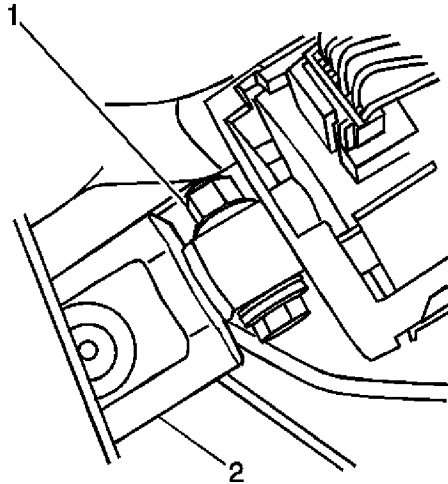
4. Disconnect the transmission shift cable (1) from the column.



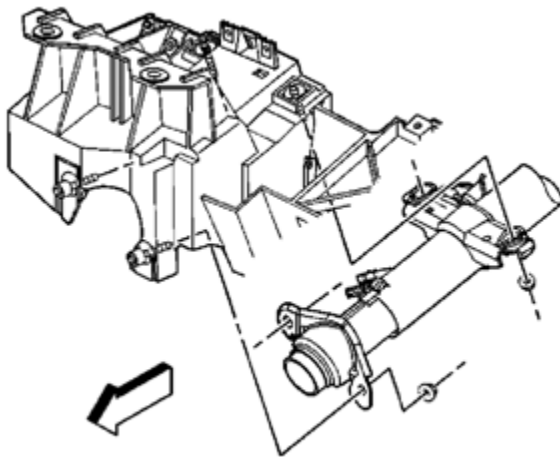
5. Disconnect the steering column electrical connector.
6. Disconnect the steering wheel position sensor electrical connector, if equipped.

Caution: During removal of the steering column the wire harness retaining clip must be removed and reinstalled after installing the steering column or damage may occur to the wire harness.

7. Remove the wiring harness retaining pin from the bottom of the column.



8. Remove the upper intermediate shaft pinch bolt (1) from the steering column and remove the shaft from the steering column.



9. Remove the steering column brackets retaining nuts.

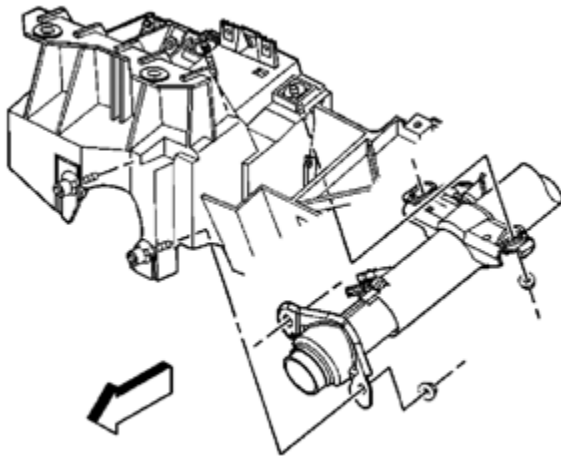
Caution: Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the columns collapsible design. Do NOT hammer on the end of the shaft, because hammering could loosen the plastic injections, which maintain column rigidity. If you need to remove the steering wheel, refer to the Steering Wheel Replacement procedure in this section.

10. Remove the steering column from the vehicle.

Installation Procedure

Warning: In order to ensure the intended function of the steering column in a vehicle during a crash and in order to avoid personal injury to the driver, perform the following:

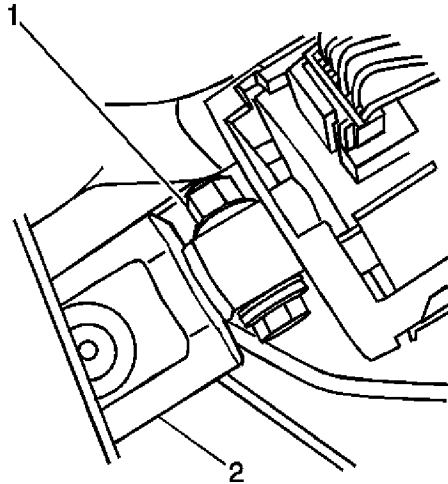
- Tighten the steering column lower fasteners before you tighten the steering column upper fasteners. Failure to do this can damage the steering column.
- Tighten the steering column fasteners to the specified torque. Overtightening the upper steering column fasteners could affect the steering column collapse.



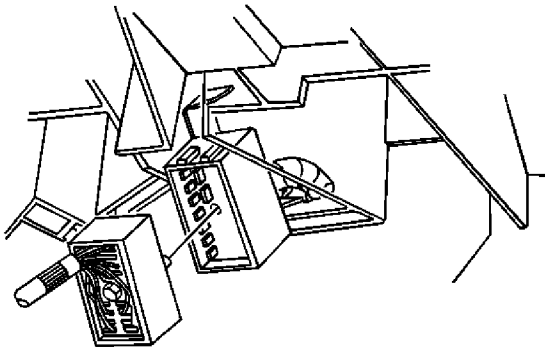
1. Install the steering column to the vehicle.

Caution: Refer to [Fastener Caution](#) in the Preface section.

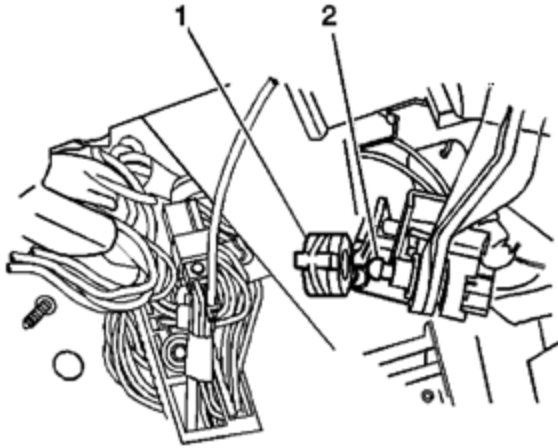
2. Install the steering column brackets retaining nuts and tighten to **30 N·m (22 lb ft)**.



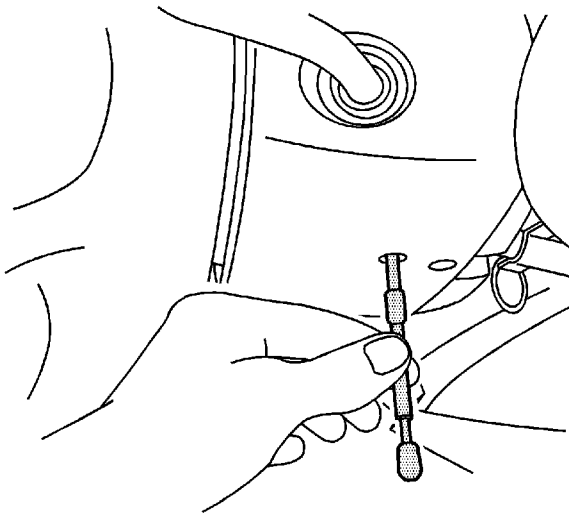
3. Install the upper intermediate shaft and connect the upper intermediate shaft to the steering column.
4. Install the upper intermediate shaft (2) to steering column retaining nut and bolt (1). Tighten the nuts to **62 N·m (46 lb in)**.



5. Install the wiring harness retaining pin to the bottom of the column.
6. Connect the steering wheel position sensor electrical connector, if equipped.
7. Connect the steering column electrical connector to the vehicle wiring harness and tighten to **6 N·m (53 lb in)**.

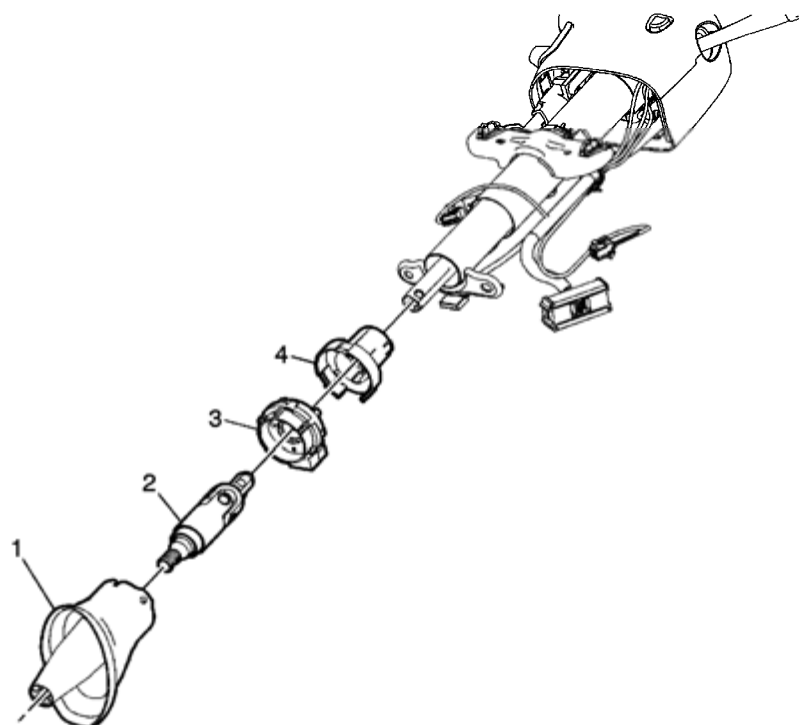


8. Connect the transmission shift cable (1) to the steering column.
9. Install the knee bolster. Refer to [Driver Knee Bolster Bracket Replacement](#).
10. Enable the SIR system. Refer to [SIR Disabling and Enabling](#).



11. Remove [J 42640](#) from the steering column.

Steering Wheel Position Sensor or Steering Shaft Lower Bearing Replacement



Callout	Component Name
Preliminary Procedure	
Remove the steering column. Refer to Steering Column Replacement .	
1	Intermediate Steering Shaft Upper Seal
2	Upper Intermediate Steering Shaft Caution: Refer to Fastener Caution in the Preface section. Tighten 62 N·m (46 lb ft)
	Steering Wheel Position Sensor Procedure 1. Disconnect any electrical connectors as needed. 2. Transfer the steering angle sensor adapter, as needed.

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3	Tip • When reusing a steering wheel position sensor, you must install a pin into the sensor before removal or the sensor will lose its centered position and must be discarded. The pin diameter must be in the range of 1-2 mm. • A new steering wheel position sensor will come with a pin installed in the sensor. The steering wheel position sensor will already come centered, DO NOT remove the pin until the steering wheel position sensor is properly seated. • During installation the steering wheel position sensor must be set with approximately 3 mm gap between it and the bearing adapter.
4	Steering Shaft Lower Bearing Tip Vehicles not equipped with JL4 Active Brake Control will not have a steering wheel position sensor.

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