

Steering Wheel and Column

Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Intermediate Steering Shaft Lower Bolt	49 N•m	36 lb ft
Intermediate Steering Shaft Upper Bolt	49 N•m	36 lb ft
Steering Column Lower Support Bracket Bolt	22 N•m	16 lb ft
Steering Column Upper Support Bracket Nut	22 N•m	16 lb ft
Steering Wheel Bolt	30 N•m	22 lb ft

Adhesives, Fluids, Lubricants, and Sealers

Application	Type of Material	GM Part Number	
		United States	Canada
Steering Wheel Bolt Thread Locking Adhesive	Medium Strength Threadlocker - Blue Loctite® 242	12345382	10953489

Diagnostic Information and Procedures

Symptoms - Steering Wheel and Column

Review the system description and operation in order to familiarize yourself with the system functions. Refer to *Steering Wheel and Column Description and Operation* on page 15-36.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the steering wheel and column.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Symptoms List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- Noise in Steering Column on page 15-25
- Looseness in Steering Column on page 15-26

Noise in Steering Column

Step	Action	Yes	No
1	Did you review the Steering Wheel and Column Description and Operation and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Steering Wheel and Column on page 15-25
2	Verify that noise is present in the steering column during operation. Is noise present in the steering column during operation?	Go to Step 3	System OK
3	Inspect the steering column mounting features for the following conditions: • The steering column mounting fasteners are loose. • The steering column mounting features are sheared. Are the steering column mounting features loose?	Go to Step 9	Go to Step 4
4	Inspect the SIR/SRS coil for noise. Is the SIR/SRS coil noisy?	Go to Step 10	Go to Step 5
5	If equipped, inspect the lock plate retaining ring for correct installation. Is the lock plate retaining ring installed incorrectly?	Go to Step 11	Go to Step 6

Noise in Steering Column (cont'd)

Step	Action	Yes	No
6	Inspect the steering column upper and lower bearings for the following conditions: • Damage • Lubrication • Wear • Proper seating Are the bearings in need of repair or replacement?	Go to Step 12	Go to Step 7
7	Does the tilt joint need to be lubricated?	Go to Step 13	Go to Step 8
8	Note: Inspect the intermediate shaft for noise while driving the vehicle, turning the steering wheel, and applying the brakes. Inspect the intermediate shaft for noise. Is the intermediate shaft noisy?	Go to Step 14	Go to Step 15
9	Note: If the steering column mounting feature is damaged or sheared, replace the steering column. Refer to <i>Steering Column Replacement</i> on page 15-33. Tighten the steering column mounting fastener to specifications. Refer to <i>Fastener Tightening Specifications</i> on page 15-25. Did you complete the repair?	Go to Step 15	—
10	Replace the SIR/SRS coil. Refer to <i>Steering Wheel Airbag Coil Replacement</i> on page 13-119. Did you complete the repair?	Go to Step 15	—
11	Install the lock plate retaining ring correctly. Did you complete the repair?	Go to Step 15	—
12	Note: If the steering column upper and/or lower bearings are not serviceable, replace the steering column. Refer to <i>Steering Column Replacement</i> on page 15-33. Replace the upper and/or lower bearings, if serviceable. Did you complete the replacement?	Go to Step 15	—
13	Lubricate the tilt joint. Did you complete the repair?	Go to Step 15	—
14	Replace the appropriate steering intermediate shaft component. Did you complete the repair?	Go to Step 15	—
15	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

Looseness in Steering Column

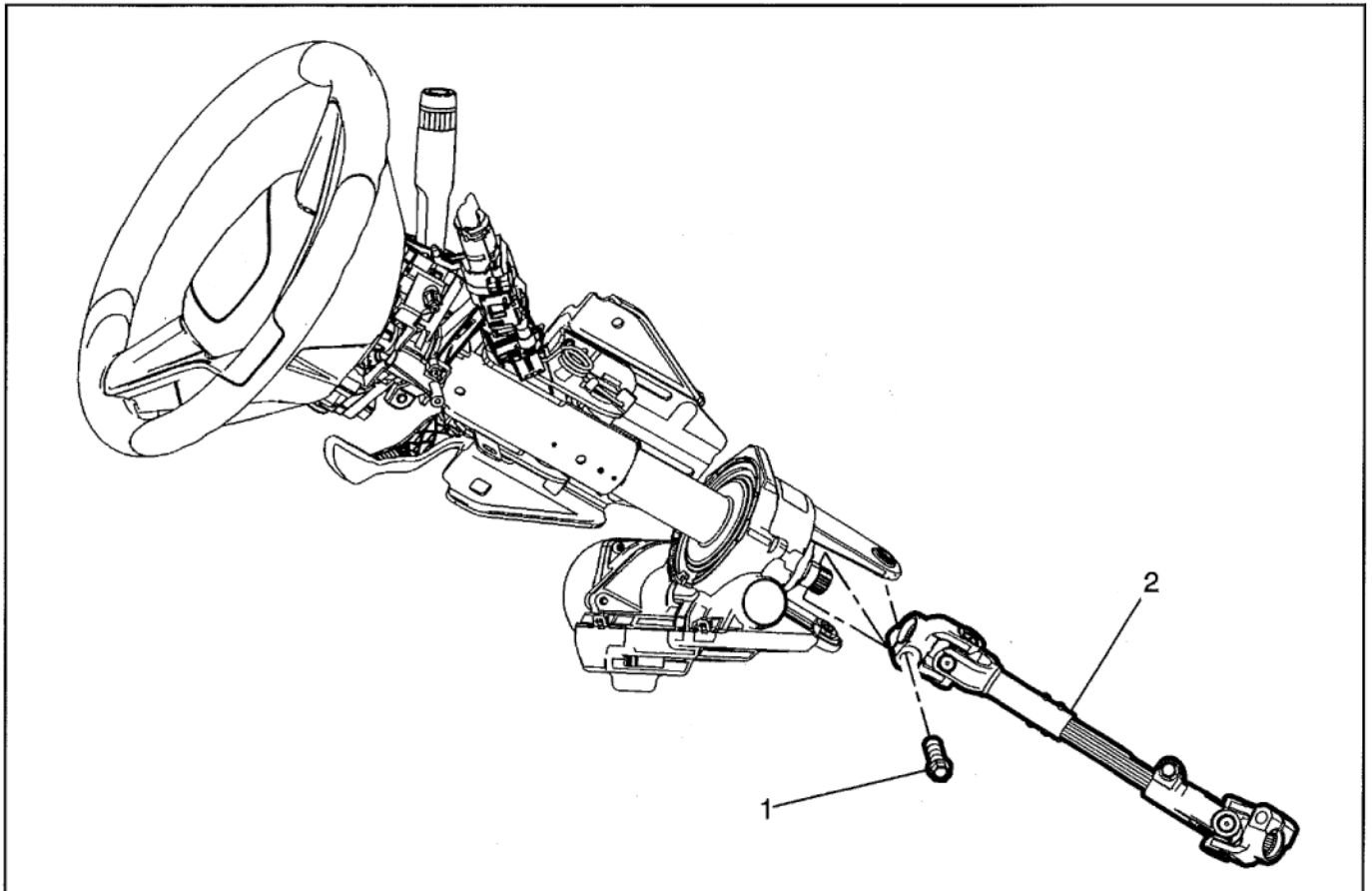
Step	Action	Yes	No
1	Did you review the Steering Wheel and Column Description and Operation and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Steering Wheel and Column on page 15-25
2	Verify that the steering column is loose. Is the steering column loose?	Go to Step 3	System OK
3	Inspect the steering column mounting features for the following conditions. • The steering column mounting fasteners are loose. • The steering column mounting features are sheared. Are the steering column mounting features loose?	Go to Step 5	Go to Step 4
4	Inspect the upper and/or lower bearings for looseness. Are any of the bearings worn or loose?	Go to Step 6	Go to Step 7

Looseness in Steering Column (cont'd)

Step	Action	Yes	No
5	Note: If the steering column mounting feature is damaged or sheared, replace the steering column. Refer to <i>Steering Column Replacement</i> on page 15-33. Tighten the steering column mounting fastener to specifications. Refer to <i>Fastener Tightening Specifications</i> on page 15-25. Did you complete the repair?	Go to Step 7	—
6	Note: If the steering column upper and/or lower bearings are not serviceable, replace the steering column. Refer to <i>Steering Column Replacement</i> on page 15-33. Replace the upper and/or lower bearings, if serviceable. Did you complete the repair?	Go to Step 7	—
7	Operate the steering column in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

Repair Instructions

Intermediate Steering Shaft Replacement

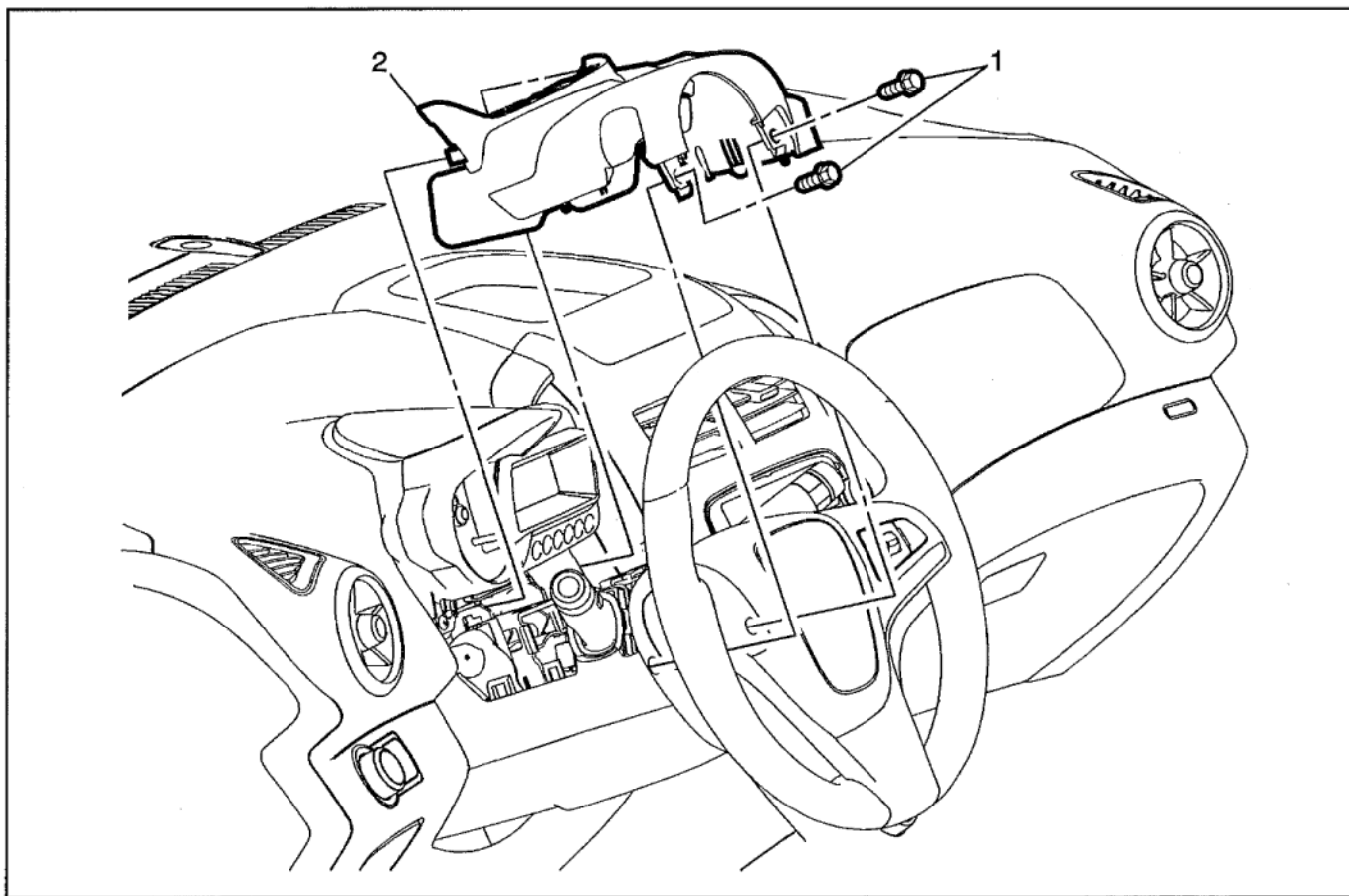


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Intermediate Steering Shaft Replacement

Callout	Component Name
Preliminary Procedure Remove the steering column and the intermediate steering shaft as an assembly. Refer to <i>Steering Column Replacement</i> on page 15-33.	
1	Intermediate Steering Shaft Upper Bolt Caution: Refer to <i>Fastener Caution</i> on page 0-8. Tighten 49 N•m (36 lb ft)
2	Intermediate Steering Shaft Procedure 1. Place match marks on the intermediate steering shaft and the steering column shaft. 2. If replacing the intermediate steering shaft or the steering column, copy the match marks from the old parts to the new parts. 3. Align the match marks when installing the intermediate steering shaft to the steering column shaft. 4. Set up the power steering control module. Refer to <i>Power Steering Control Module Programming and Setup</i> on page 6-12. 5. Center the steering angle sensor. Refer to <i>Steering Angle Sensor Centering</i> on page 5-39.

Steering Column Upper Trim Cover Replacement



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Steering Column Upper Trim Cover Replacement

Callout	Component Name
1	Instrument Panel Steering Column Upper Trim Cover Fasteners (Qty: 2) Caution: Refer to <i>Fastener Caution</i> on page 0-8. Procedure Turn the steering wheel to the right and to the left in order to gain access to the fasteners.
2	Instrument Panel Steering Column Upper Trim Cover Assembly Procedures 1. Use a flat bladed plastic trim tool along the right and left sides of the trim panel in order to release the retainers securing the upper trim cover to the lower trim cover. 2. Lift the upper trim cover upward and rearward in order to release the retainers along the front forward edge of the upper trim cover.

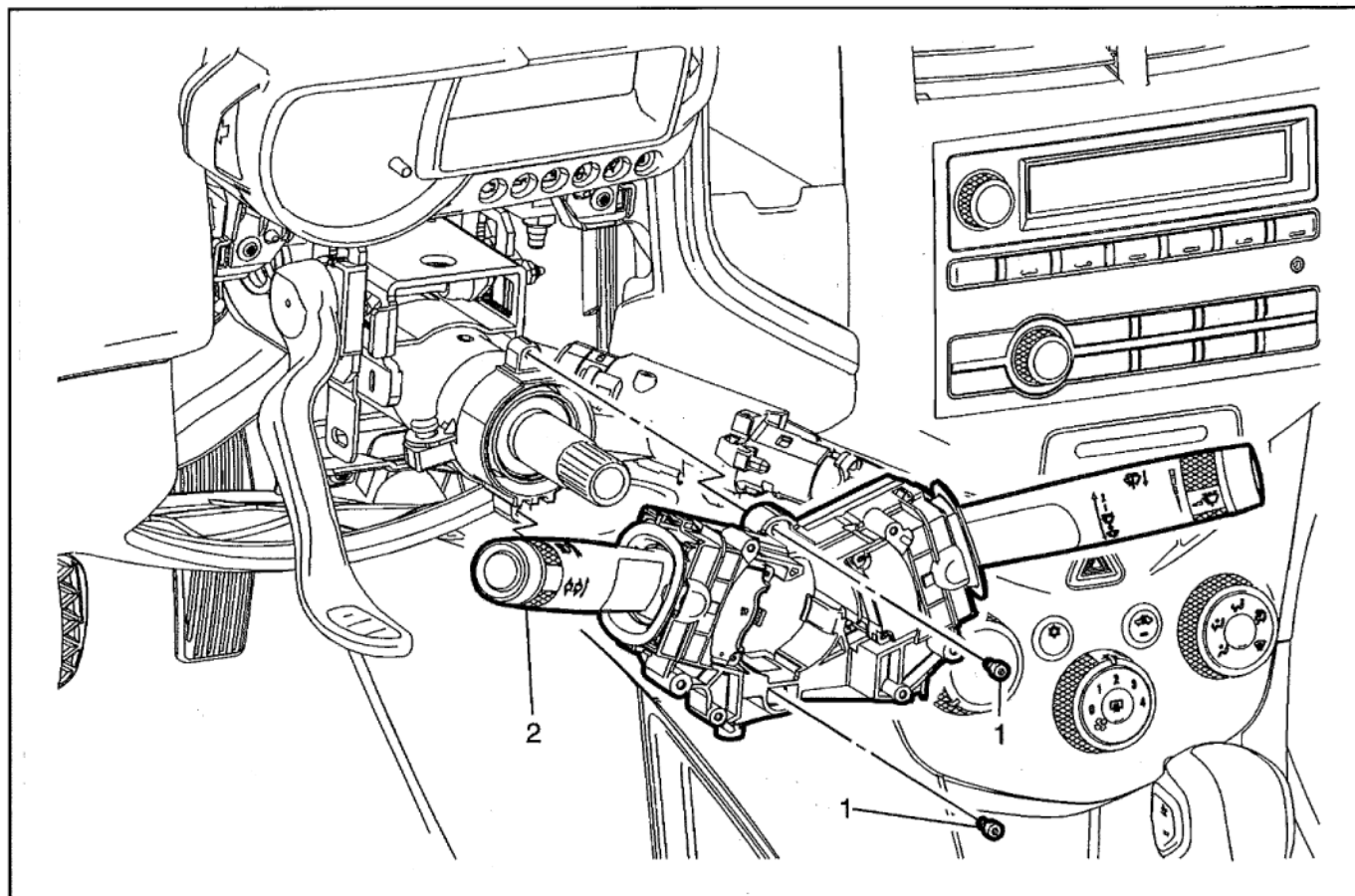
Steering Column Lower Trim Cover Replacement



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Steering Column Lower Trim Cover Replacement

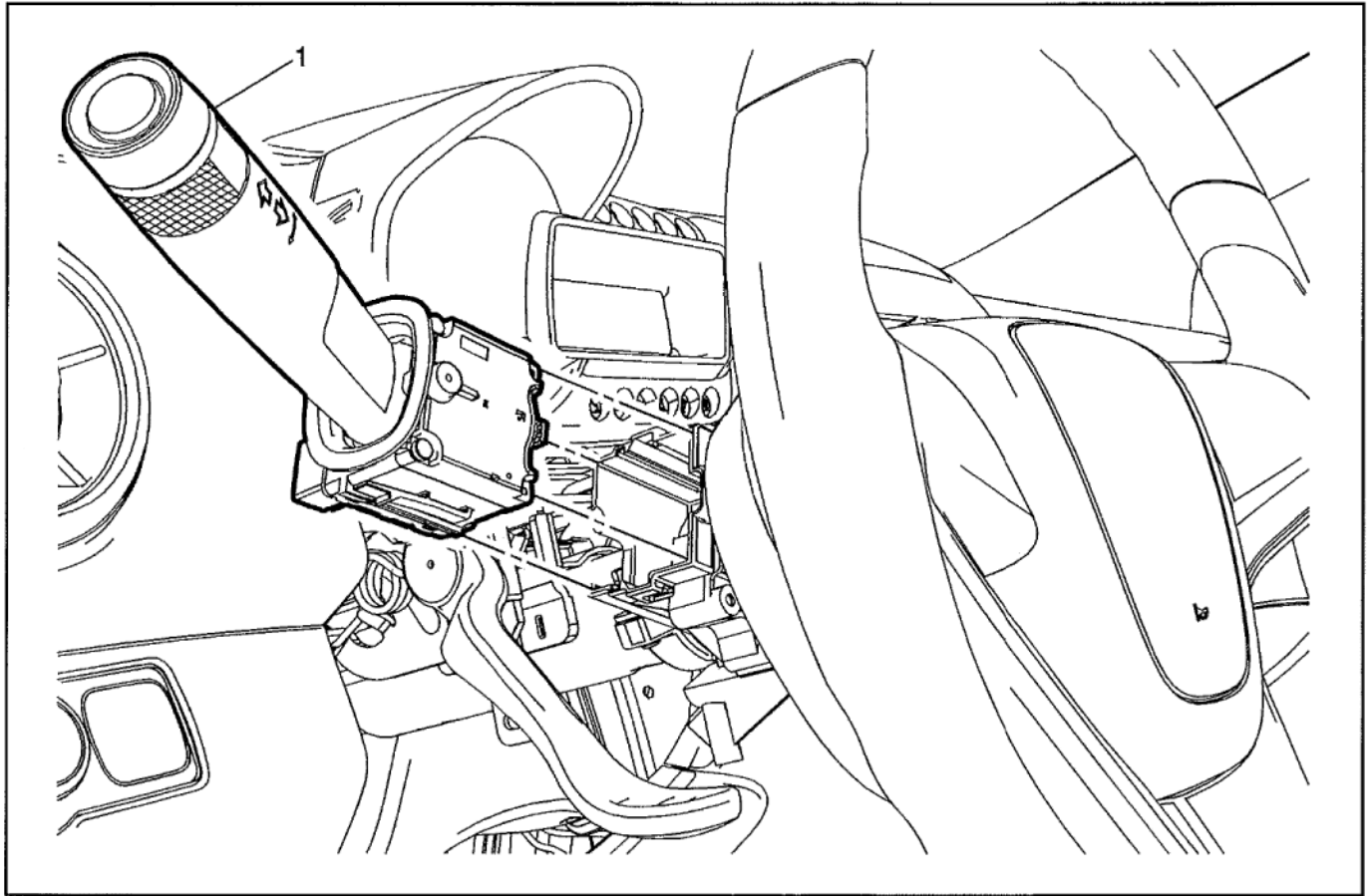
Callout	Component Name
Preliminary Procedure Remove the instrument panel steering column upper trim cover. Refer to <i>Steering Column Upper Trim Cover Replacement</i> on page 15-28.	
1	Instrument Panel Steering Column Lower Trim Cover Fastener Caution: Refer to <i>Fastener Caution</i> on page 0-8.
2	Instrument Panel Steering Column Lower Trim Cover Assembly



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Callout	Component Name
Preliminary Procedure Remove the inflatable restraint steering wheel module coil. Refer to <i>Steering Wheel Airbag Coil Replacement</i> on page 13-119.	
1	Turn Signal Switch Bracket Fastener (Qty: 2) Caution: Refer to <i>Fastener Caution</i> on page 0-8.
2	Turn Signal Switch Bracket Procedure 1. Disconnect any electrical connectors as necessary. 2. Release the locking tab in order to disconnect the turn signal switch bracket from the steering column. 3. Transfer components as necessary.

Turn Signal Multifunction Switch Replacement

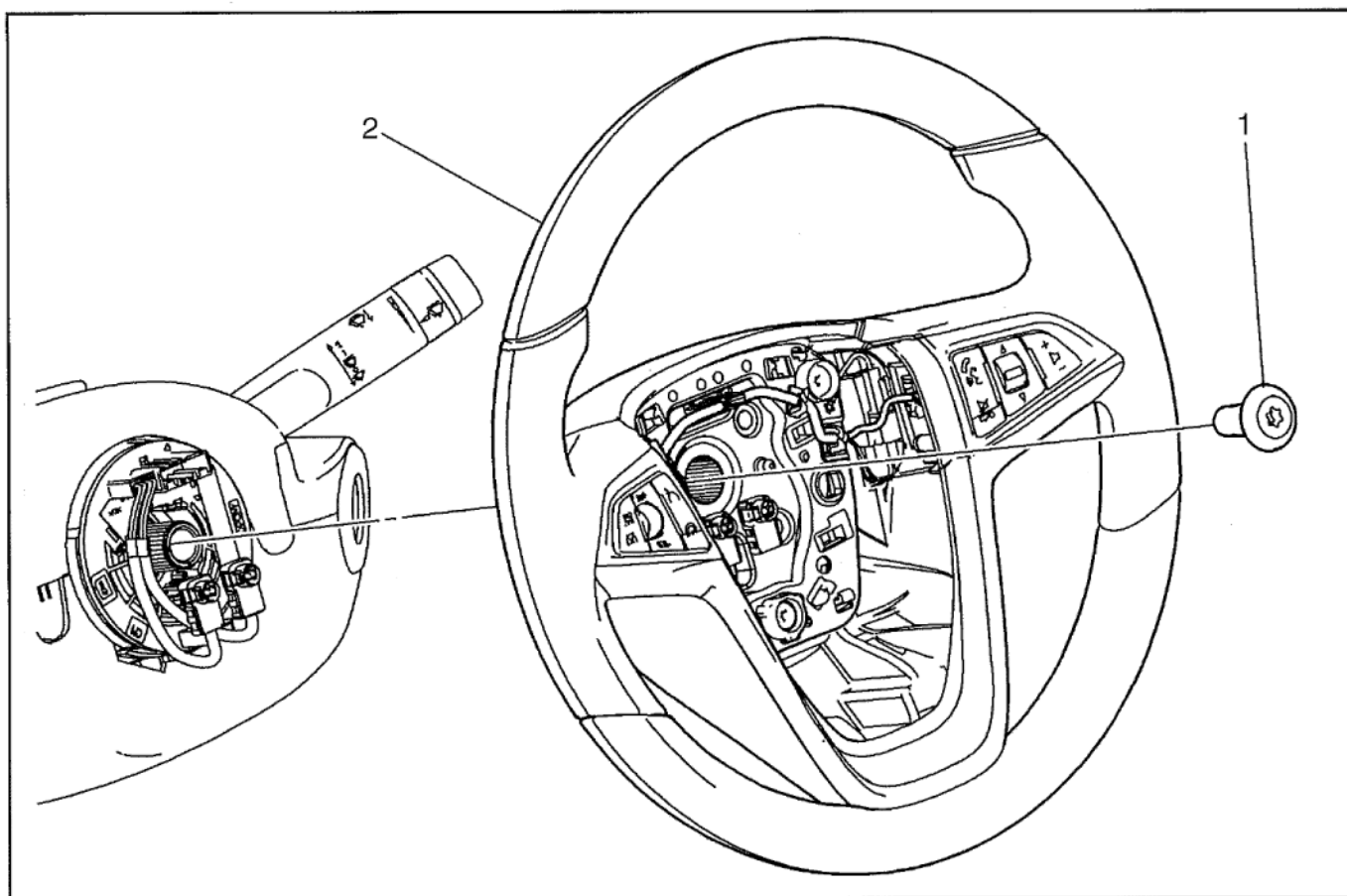


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Turn Signal Multifunction Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the upper trim cover and the lower trim cover from the steering column. Refer to <i>Steering Column Lower Trim Cover Replacement</i> on page 15-29.	
1	Turn Signal Switch Procedure 1. Disconnect any electrical connectors as necessary. 2. Release the plastic retaining tabs and remove the turn signal multifunction switch from the turn signal switch bracket.

Steering Wheel Replacement



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Steering Wheel Replacement

Callout	Component Name
Preliminary Procedure 1. Remove the inflatable restraint steering wheel module. Refer to <i>Airbag Steering Wheel Module Replacement</i> on page 13-118. 2. Use paint in order to place match marks on the steering wheel and on the steering column shaft.	
1	Steering Wheel Bolt Caution: Refer to <i>Fastener Caution</i> on page 0-8. Procedure 1. Clean thread of the bolt. 2. Apply NEW locking compound to the thread. Refer to <i>Adhesives, Fluids, Lubricants, and Sealers</i> on page 15-25. Tighten 30 N•m (22 lb ft)
2	Steering Wheel Procedure 1. Disconnect all electrical connectors as necessary. 2. Loosen the steering wheel bolt until 2 to 3 threads are left engaged. 3. Wiggle the steering wheel until the steering wheel disengages completely. 4. Remove the steering wheel bolt. 5. Remove the steering wheel. 6. Copy the match marks from the old steering wheel to the new steering wheel. 7. Transfer any parts as necessary.

Steering Column Replacement

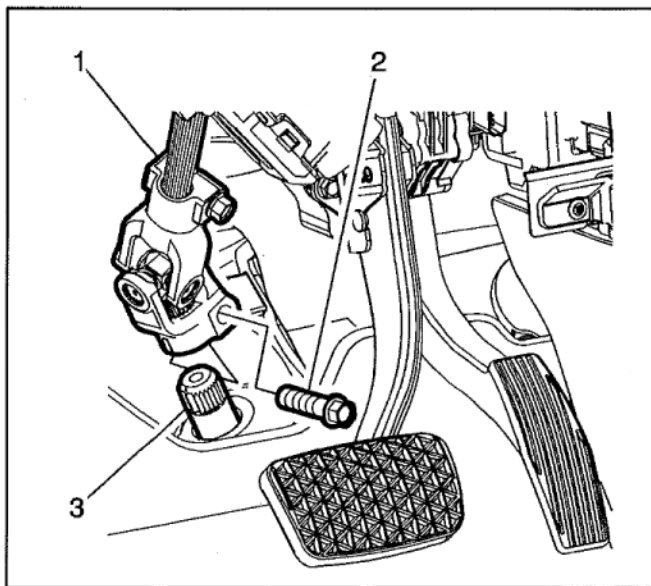
Removal Procedure

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. With the steering wheel in the straight ahead position, LOCK the steering column.
2. Remove the upper trim cover and the lower trim cover from the steering column. Refer to *Steering Column Lower Trim Cover Replacement* on page 15-29.
3. Remove the instrument panel lower trim pad cover. Refer to *Instrument Panel Lower Trim Pad Cover Replacement (Without AAL)* on page 2-40 or *Instrument Panel Lower Trim Pad Cover Replacement (With AAL)* on page 2-41.
4. Remove the left side floor air outlet duct. Refer to *Floor Air Outlet Duct Replacement - Left Side (LHD)* on page 10-56.
5. Disconnect any electrical connectors as necessary.



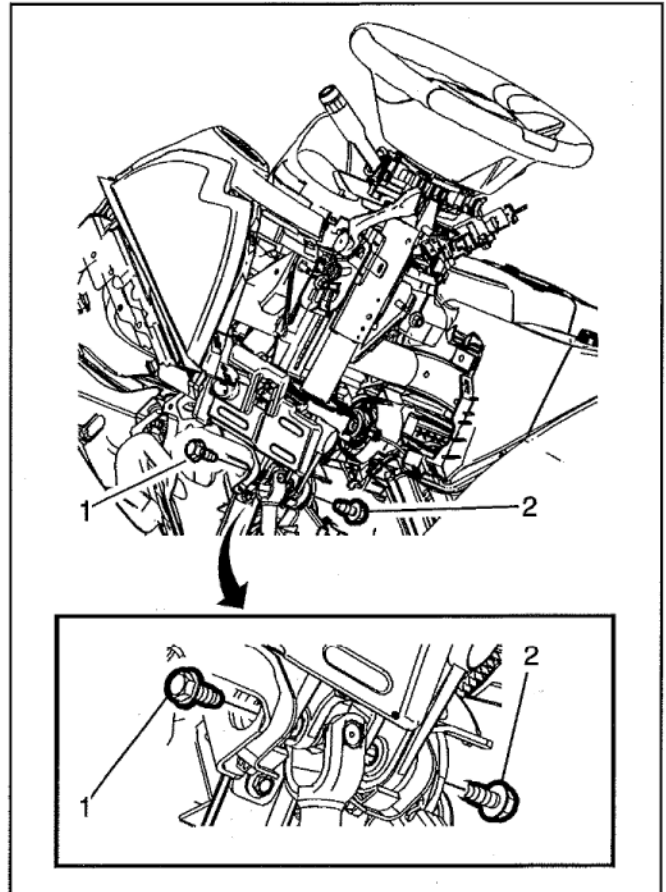
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6. Use paint in order to place match marks on the intermediate steering shaft (1) and on the steering gear pinion shaft (3).

7. Remove the intermediate steering shaft lower bolt (2).
8. Disconnect the intermediate steering shaft from the steering gear pinion shaft.

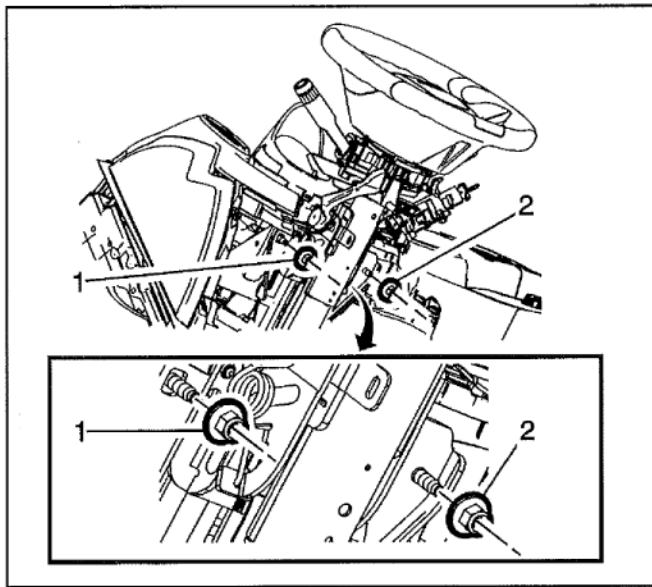
Caution: Do not support the steering column by only the lower or upper support bracket. Damage to the column lower bearing adapter could result.

9. Support the steering column.



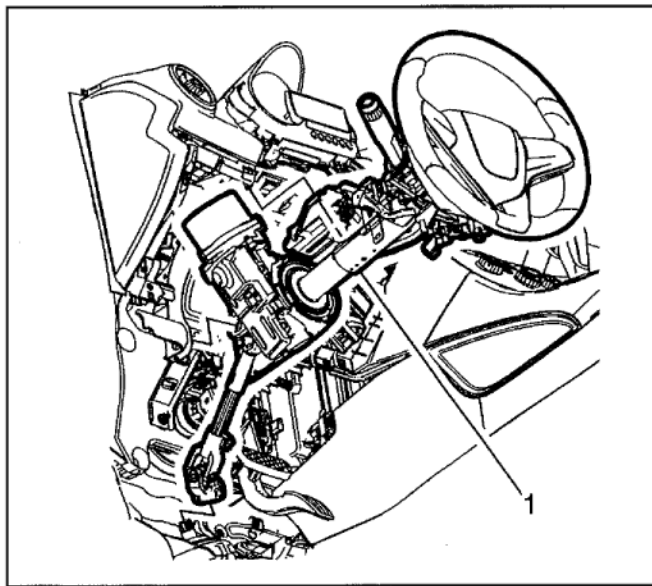
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10. Remove the 2 steering column lower support bracket bolts (1, 2).



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11. Remove the 2 steering column upper support bracket nuts (1, 2).



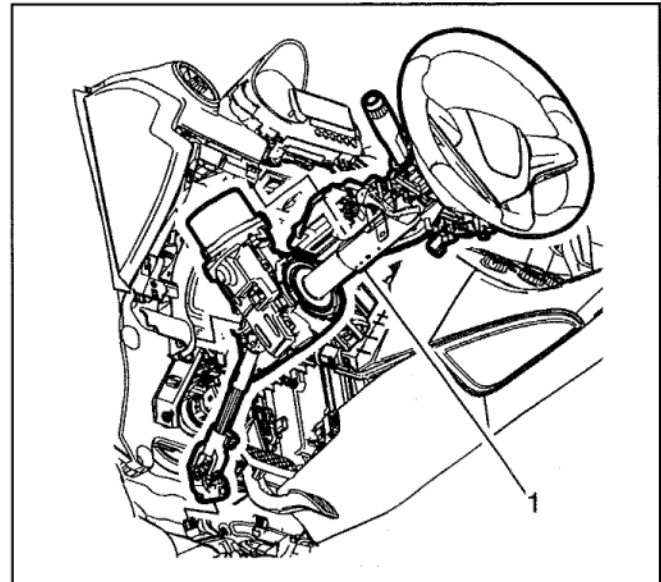
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Caution: Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on the end could collapse the steering shaft or loosen the plastic injections, which maintain column rigidity. 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.

12. Remove the steering column assembly (1) from the vehicle.
13. Transfer components as necessary.

Installation Procedure

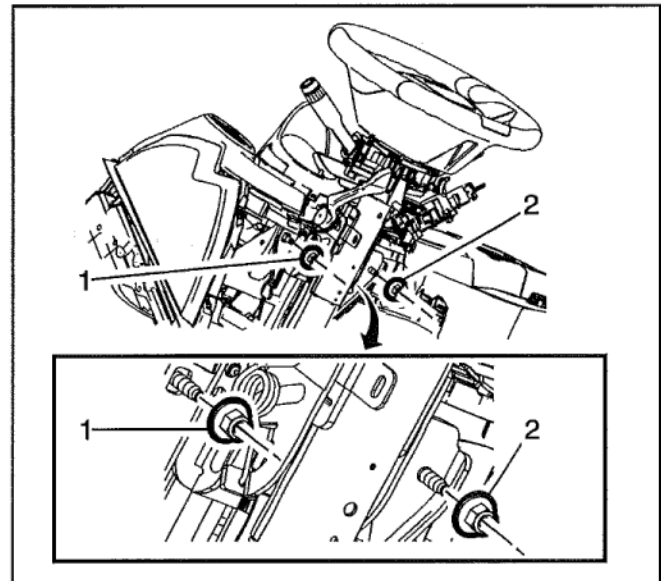
1. If you are replacing the steering column or the intermediate steering shaft, copy the match marks from the old parts to the new parts.



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Caution: Do NOT allow the wiring harness to be pinched between the motor/module assembly and the steering column during installation. A pinched harness will cause diagnostic trouble codes to be set and may require replacement of the steering column.

2. Position the steering column assembly (1) in the vehicle.
3. Align the match marks and connect the intermediate steering shaft to the steering gear pinion shaft.



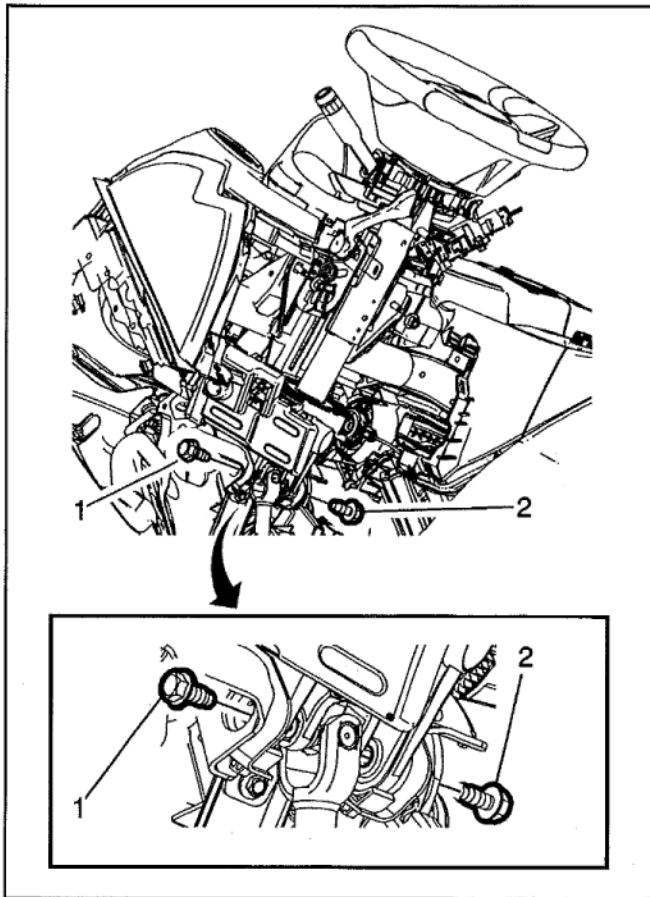
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Warning: In order to ensure the intended function of the steering column in a vehicle during a crash and in order to avoid personal injury to the driver, perform the following:

- 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.

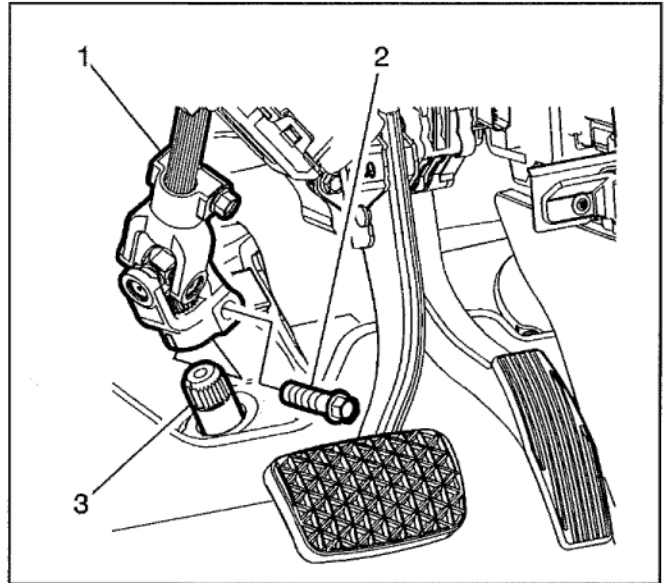
Caution: Ensure all fasteners are securely seated before applying needed torque. Failure to do so may result in component damage or malfunctioning of steering column.

4. Install, but do not tighten, the 2 steering column upper support bracket nuts (1, 2).



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5. Install, but do not tighten, the 2 steering column lower support bracket bolts (1, 2).

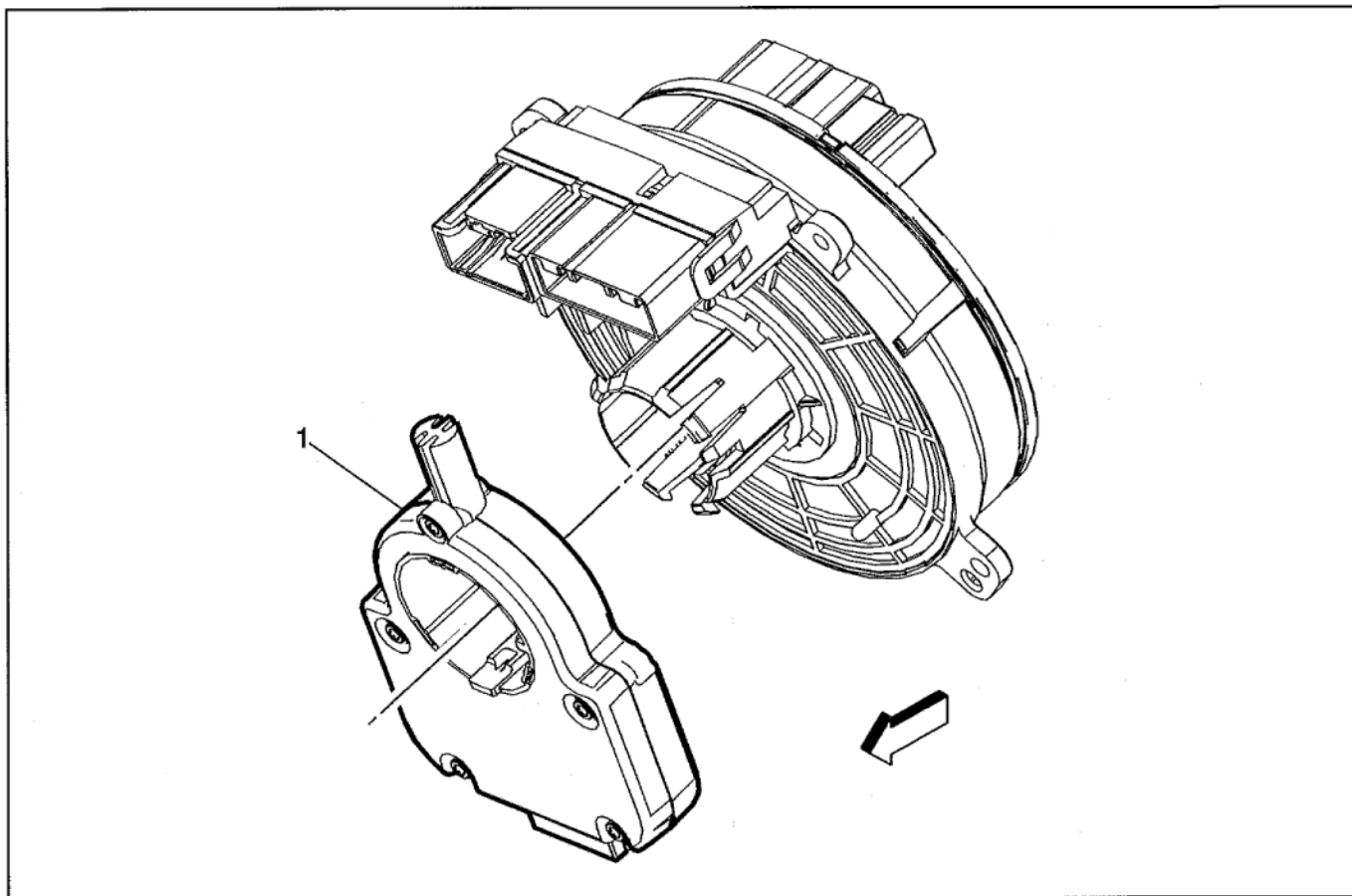


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Caution: Refer to *Fastener Caution* on page 0-8.

6. Install the intermediate steering shaft lower bolt (2) and tighten to **49 N•m (36 lb ft)**.
7. Tighten the 2 steering column lower support bracket bolts to **22 N•m (16 lb ft)**.
8. Tighten the 2 steering column upper support bracket nuts to **22 N•m (16 lb ft)**.
9. Connect any electrical connectors as necessary.
10. Install the left side floor air outlet duct. Refer to *Floor Air Outlet Duct Replacement - Left Side (LHD)* on page 10-56.
11. Install the instrument panel lower trim pad cover. Refer to *Instrument Panel Lower Trim Pad Cover Replacement (Without AAL)* on page 2-40 or *Instrument Panel Lower Trim Pad Cover Replacement (With AAL)* on page 2-41.
12. Install the upper trim cover and the lower trim cover to the steering column. Refer to *Steering Column Lower Trim Cover Replacement* on page 15-29.
13. Setup the power steering control module. Refer to *Power Steering Control Module Programming and Setup* on page 6-12.
14. Center the steering angle sensor. Refer to *Steering Angle Sensor Centering* on page 5-39.

Steering Angle Sensor Replacement



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Steering Angle Sensor Replacement

Callout	Component Name
Preliminary Procedure Remove the steering wheel airbag coil. Refer to <i>Steering Wheel Airbag Coil Replacement</i> on page 13-119.	
1	Steering Angle Sensor Procedure 1. Press in the clip on the steering wheel airbag coil in order to remove the steering angle sensor. 2. After the installation is complete, center the steering angle sensor. Refer to <i>Steering Angle Sensor Centering</i> on page 5-39.

Description and Operation

Steering Wheel and Column Description and Operation

The steering wheel and column have the following 4 primary functions:

- Vehicle steering
- Vehicle security
- Driver convenience
- Driver safety

Vehicle Steering

The steering wheel is the first link between the driver and the vehicle. The steering wheel is fastened to a steering shaft within the steering column. At the lower end of the steering column, the intermediate steering shaft connects the steering column to the steering gear.

Vehicle Security

The steering wheel and column may have theft deterrent components mounted and designed into the steering column.

Driver Convenience

The steering wheel and column may have driver controls attached for convenience and comfort.

Driver Safety

The steering column has safety features to protect the driver.

Energy-Absorbing Steering Column: The energy-absorbing steering column compresses in the event of a front-end collision, which reduces the chance

of injury to the driver. The energy-absorbing feature, collapsible steering shaft, and break away mounting features help reduce the injury in the event of an accident.