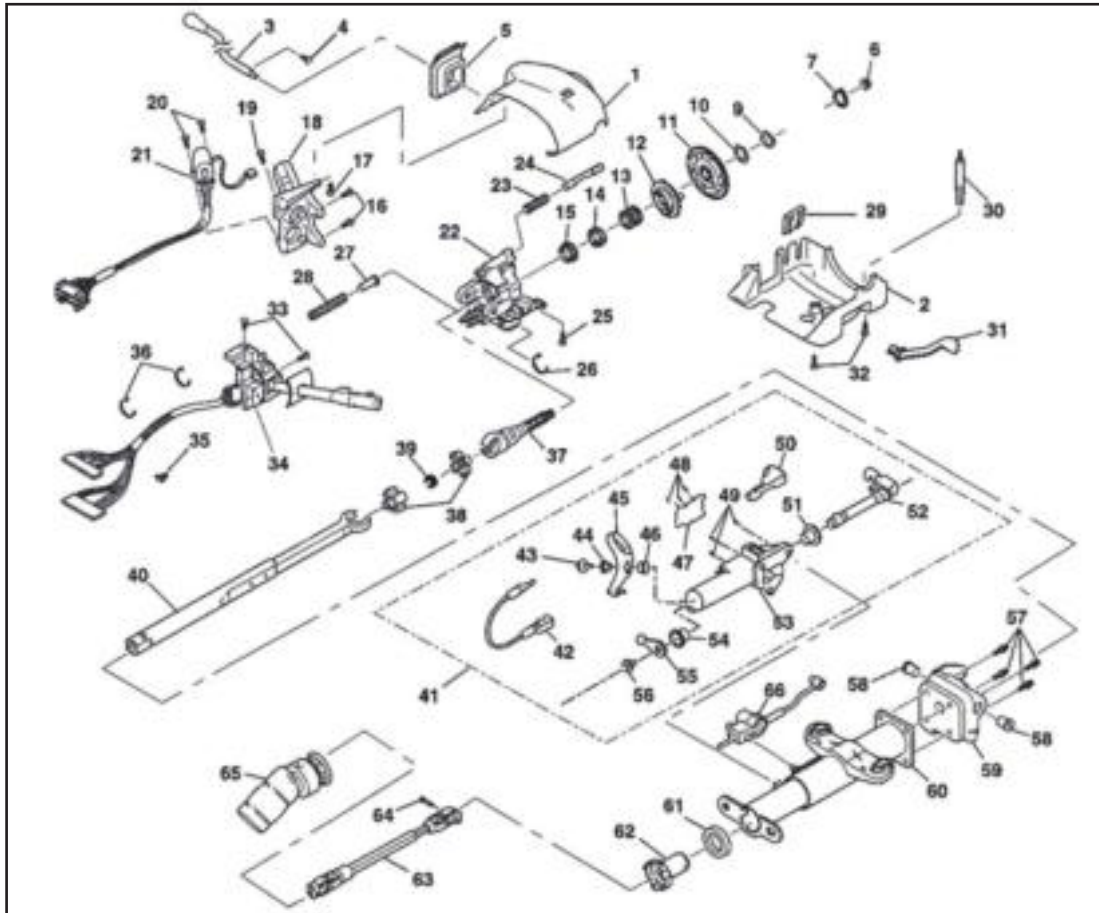


SECTION 2

STEERING WHEEL AND COLUMN

Application	Specification	
	English	Metric
Gear Shift Lever Retaining Screw	14 lb ft	18 N-m
Ignition Switch Assembly	13 lb in	1.5 N-m
Intermediate Shaft Cover Retaining Screws	18 lb in	2 N-m
Intermediate Shaft to the steering Column Pinch Bolt	35 lb ft	47 N-m
Linear Shift Assembly to Steering Column Mtg. Screws	89 lb in	10 N-m
Assembly Screws	62 lb in	7 N-m
Steering Column Trim Cover Screws	31 lb in	3.5 N-m
Multifunction Switch - Lower	53 lb in	6 N-m
Steering Column Bulkhead Connector Screw	53 lb in	6 N-m
Steering Column Support Screws	13 lb ft	17 N-m
Steering Column Support Bracket Nut	18 lb ft	25 N-m
Horn Contact Plate Screws	50 lb in	5.5 N-m
Steering Wheel Nut	30 lb ft	41 N-m
Steering Column Trim Cover Screw - Upper	13 lb in	1.5 N-m

Tilt Steering Column

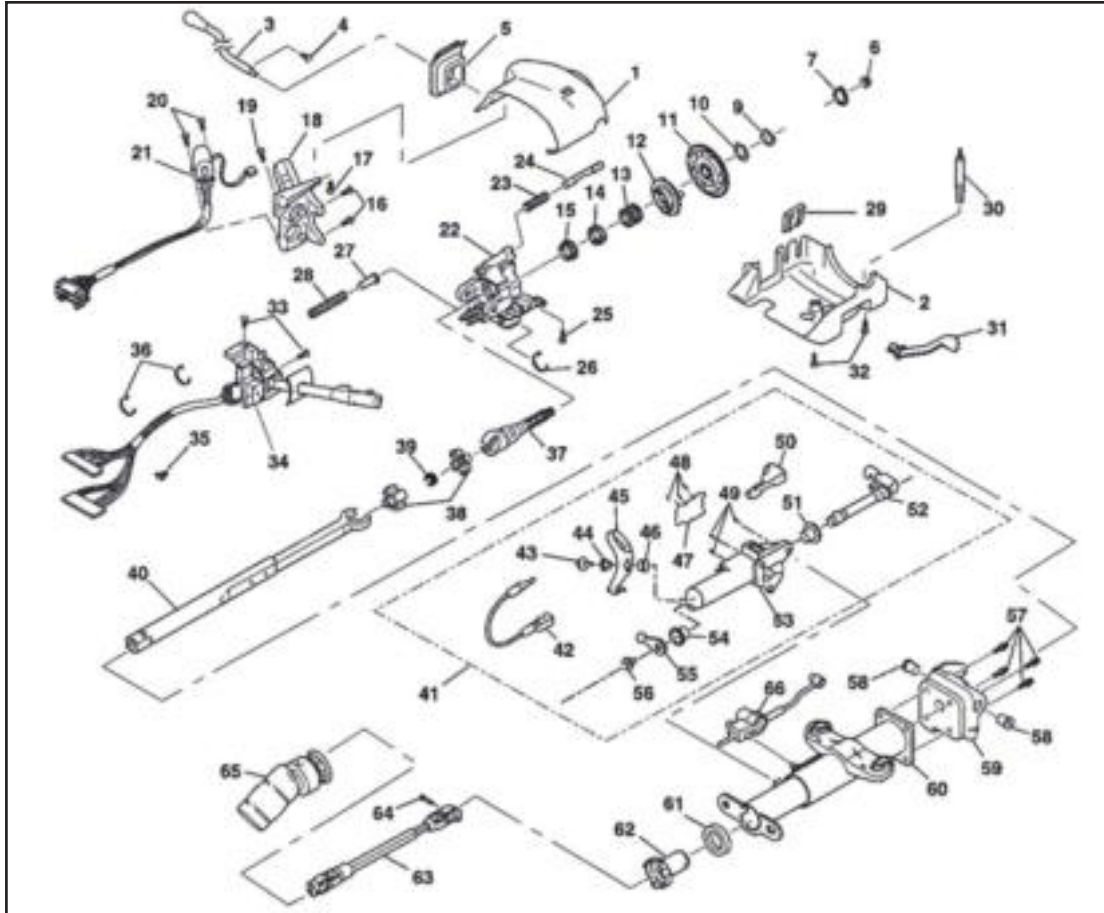


- | | |
|--|---|
| 1. Upper Trim Cover | 21. Ignition Switch Assembly |
| 2. Lower Trim Cover | 22. Steering Column Tilt Head Assembly |
| 3. Shift Lever Assembly | 23. Lock Bolt Spring |
| 4. Shift Lever Screw | 24. Lock Bolt Assembly |
| 5. Shift Lever Seal | 25. Pan Head Tapping Screws |
| 6. Flanged Nut | 26. Wire Harness Strap |
| 7. Retaining Ring | 27. Spring Guide |
| 8. N/A | 28. Tilt Spring |
| 9. Wave Washer (Some applications) | 29. Trim Cover Protector |
| 10. Bearing Retainer | 30. Trim Cover Mounting Stud |
| 11. Shaft Lock Shield Assembly | 31. Tilt Lever Assembly |
| 12. Turn Signal Cancel Cam | 32. Pan Head Tapping Screws |
| 13. Upper Bearing Spring | 33. Pan Head Tapping Screws |
| 14. Upper Bearing Inner Race Seat | 34. Turn Signal / Multifunction Switch Assembly |
| 15. Inner Race | 35. Axial Position Assurance Connector |
| 16. Pan Head Tapping Screws | 36. Wire Harness Straps |
| 17. TORX® Head Screws | 37. Race and Upper Shaft Assembly |
| 18. Ignition Lock Cylinder Case Assembly | 38. Centering Sphere |
| 19. Pan Head Tapping Screws | 39. Joint Preload Spring |
| 20. Tapping Screws | 40. Lower Steering Shaft Assembly |

Tilt Column, (cont'd)

- | | |
|---|---|
| 41. Linear Shaft Assembly | 54. Actuator Assembly |
| 42. Park Lock Cable Assembly | 55. Ball and Actuator Assembly |
| 43. Hexagon Flange Head Bolt | 56. Hexagon Flange Head Bolt |
| 44. Cam Bushing | 57. TORX® Head Screws |
| 45. Cable Shift Cam Assembly | 58. Pivot Pins |
| 46. Cam Assembly | 59. Steering Column Support Arm |
| 47. Shift Lever Gate | 60. Steering Column Jacket Assembly |
| 48. Oval Head Soc Tap Screws | 61. Inner Boot Seal |
| 49. Flat Head 6-Lobed Soc Tap Screws | 62. Adapter and Bearing Assembly |
| 50. Park Lock Position Switch Assembly | 63. Intermediate Steering Shaft Assembly |
| 51. Actuator Bushing | 64. Bolt and Retainer Assembly |
| 52. Shift Actuator Shaft | 65. Boot Seal |
| 53. Gear Shift Assembly Support Bracket | 66. Automatic Transmission Shift Lock Control |

Standard Column Assembly



- | | |
|--|---|
| 1. Upper Trim Cover | 30. Pan Head Tapping Screws |
| 2. Lower Trim Cover | 31. Turn Signal and Multifunction Switch Assembly |
| 3. Shift Lever Assembly | 32. Axial Position Assurance Connector |
| 4. Shift Lever Screw | 33. Wire Harness Straps |
| 5. Shift Lever Seal | 34. Linear Shift Assembly |
| 6. Flanged Nut | 35. Park Lock Cable System |
| 7. Retaining Ring | 36. Hexagon Flange Head Bolt |
| 8. N/A | 37. Cam Bushing |
| 9. Wave Washer (Some applications) | 38. Cable Shift Cam Assembly |
| 10. Bearing Retainer | 39. Cam Bushing |
| 11. Shaft Lock Shield Assembly | 40. Shift Lever Gate |
| 12. Turn Signal Cancel Cam | 41. Oval Head Soc Tap Screws |
| 13. Upper Bearing Spring | 42. Flat Head 6-Lobed Soc Tap Screws |
| 14. Thrust Washer | 43. Park Lock Position Switch Assembly |
| 15. Pan Head Tapping Screws | 44. Actuator Bushing |
| 16. TORX Head Screws | 45. Shift Actuator Shaft |
| 17. Ignition Lock Cylinder Case Assembly | 46. Gear Shift Lever Assembly Support Bracket |
| 18. Pan Head Tapping Screw | 47. Actuator Bushing |
| 19. Tapping Screws | 48. Ball and Actuator Assembly |
| 20. Ignition Switch Assembly | 49. Hexagon Flange Head Bolt |
| 21. TORX® Head Screws | 50. Bearing Retainer |
| 22. Lock Bolt Spring | 51. Steering Shaft Assembly |
| 23. Lock Bolt Assembly | 52. Steering Column Jacket Assembly |
| 24. Steering Column Housing Assembly | 53. Inner Boot Seal |
| 25. TORX® Head Screw | 54. Adapter and Bearing Assembly |
| 26. Wire Harness Strap | 55. Intermediate Steering Shaft Assembly |
| 27. Pan Head Tapping Screws | 56. Bolt and Retainer Assembly |
| 28. Trim Cover Mounting Stud | 57. Insulator Boot |
| 29. Trim Cover Protector | 58. Automatic Transmission Shift Lock Control |

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 2-63.

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

- Lock System Does Not Unlock on page 2-6
- Lock System Does Not Lock on page 2-6
- Lock System Sticks in Start on page 2-7
- Key Cannot Be Removed in the Off Lock Position on page 2-7
- High Lock Effort on page 2-8
- Noise in Steering Column on page 2-8
- High Shift Effort on page 2-9
- Looseness in Steering Column on page 2-10
- Steering Column Tilt Function Inoperative on page 2-10 diagnostic procedure from the following list in order to diagnose the symptom:

Lock System Does Not Unlock

Step	Action	Yes	No
DEFINITION: The lock system does not allow the key to rotate out of the OFF position.			
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 2-6
2	Verify that the lock system does not unlock. Does the lock system operate normally?	System OK	Go to Step 3
3	Inspect for an incorrect, worn, or damaged key. Is the key incorrect, worn, or damaged?	Go to Step 7	Go to Step 4
4	Inspect for a faulty lock cylinder. Is the lock cylinder damaged?	Go to Step 8	Go to Step 5
5	Inspect the ignition lock cylinder case assembly for looseness. Is the ignition lock cylinder case assembly loose?	Go to Step 9	Go to Step 6
6	Inspect the ignition switch assembly for damage. Is the ignition switch assembly damaged?	Go to Step 10	Go to Step 3
7	Replace the key. Refer to <i>Key and Lock Cylinder Coding</i> on page 0-70 in General Information. Did you complete the repair?	Go to Step 11	—
8	Replace the lock cylinder. Refer to <i>Ignition Lock Cylinder Replacement</i> on page 2-22. Did you complete the repair?	Go to Step 11	—
9	Tighten the ignition lock cylinder case assembly. Refer to <i>Fastener Tightening Specifications</i> on page 2-1. Did you complete the repair?	Go to Step 11	—
10	Replace the ignition switch. Refer to <i>Ignition Switch Replacement</i> on page 2-19. Did you complete the repair?	Go to Step 11	—
11	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

Lock System Does Not Lock

Step	Action	Yes	No
DEFINITION: The lock system will not allow the key to be turned to the OFF lock position.			
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 2-6
2	Verify that the lock system does not lock. Does the lock system operate normally?	System OK	Go to Step 3
3	Inspect for a faulty lock cylinder or release button. Is the lock cylinder or release button damaged?	Go to Step 6	Go to Step 4
4	Inspect the shift linkage adjustment. Is the shift linkage adjusted incorrectly?	Go to Step 7	Go to Step 5
5	Inspect the ignition switch for damage. Is the ignition switch damaged?	Go to Step 8	Go to Step 6
6	Replace the lock cylinder. Refer to <i>Ignition Lock Cylinder Replacement</i> on page 2-22. Did you complete the repair?	Go to Step 9	—
7	Adjust the shift linkage. Did you complete the repair?	Go to Step 9	—
8	Replace the ignition switch. Refer to <i>Ignition Switch Replacement</i> on page 2-19. Did you complete the repair?	Go to Step 9	—
9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

Lock System Sticks in Start

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 2-6
2	Verify that the lock system sticks in the START position. Does the lock system operate normally?	System OK	Go to Step 3
3	Inspect the ignition lock cylinder case assembly for damage. Is the ignition lock cylinder case assembly damaged?	Go to Step 6	Go to Step 4
4	Inspect the lock cylinder for damage. Is the lock cylinder damaged?	Go to Step 7	Go to Step 5
5	Inspect the ignition switch for damage. Is the ignition switch damaged?	Go to Step 8	Go to Step 3
6	Tighten the ignition lock cylinder case assembly mounting bolts. Refer to <i>Fastener Tightening Specifications</i> on page 2-1. Did you complete the repair?	Go to Step 9	—
7	Replace the lock cylinder. Refer to <i>Ignition Lock Cylinder Replacement</i> on page 2-22. Did you complete the repair?	Go to Step 9	—
8	Replace the ignition switch. Refer to <i>Ignition Switch Replacement</i> on page 2-19. Did you complete the repair?	Go to Step 9	—
9	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

Key Cannot Be Removed In Off Lock Position

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 2-6
2	Verify that the key cannot be removed from the lock cylinder in the OFF position. Does the lock system operate normally?	System OK	Go to Step 3
3	Inspect for incorrect, worn, or damaged key. Is the key incorrect, worn, or damaged?	Go to Step 5	Go to Step 4
4	Inspect for a faulty lock cylinder or release button. Is the lock cylinder or release button damaged?	Go to Step 6	Go to Step 3
5	Replace the key. Refer to <i>Key and Lock Cylinder Coding</i> on page 0-70 in General Information. Did you complete the repair?	Go to Step 7	—
6	Replace the lock cylinder. Refer to <i>Ignition Lock Cylinder Replacement</i> on page 2-22. Did you complete the repair?	Go to Step 7	—
7	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

High Lock Effort

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 2-6
2	Verify that the lock system has a high lock effort. Does the lock system operate normally?	System OK	Go to Step 3
3	Inspect for an incorrect, worn, or damaged key. Is the key incorrect, worn, or damaged?	Go to Step 7	Go to Step 4
4	Inspect for a faulty lock cylinder. Is the lock cylinder damaged?	Go to Step 8	Go to Step 5
5	Inspect the ignition lock cylinder case assembly for damage. Is the ignition lock cylinder case assembly damaged?	Go to Step 9	Go to Step 6
6	Inspect the ignition switch assembly for damage. Is the ignition switch assembly damaged?	Go to Step 10	Go to Step 7
7	Replace the key. Refer to <i>Key and Lock Cylinder Coding</i> on page 0-70 in General Information. Did you complete the repair?	Go to Step 11	—
8	Replace the lock cylinder. Refer to <i>Ignition Lock Cylinder Replacement</i> on page 2-22. Did you complete the repair?	Go to Step 11	—
9	Tighten the ignition lock cylinder case assembly. Refer to <i>Fastener Tightening Specifications</i> on page 2-1. Did you complete the repair?	Go to Step 11	—
10	Replace the ignition switch. Refer to <i>Ignition Switch Replacement</i> on page 2-19. Did you complete the repair?	Go to Step 11	—
11	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

Noise in Steering Column

Step	Action	Yes	No
1	Did you review the Steering Wheel and Column Description and perform the necessary inspections?	Go to Step 2	Go to Symptoms - Steering Wheel and Column on page 2-6
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 components for looseness. Is the steering column components loose?	Go to Step 10	Go to Step 4
4	Inspect the SIR coil for noise. Is the SIR coil noisy?	Go to Step 11	Go to Step 5
5	Inspect the horn contact ring for lubrication. Is the horn contact ring lubricated?	Go to Step 12	Go to Step 6
6	Inspect the lock plate retaining ring for the correct installation. Is the lock plate retaining ring installed properly?	Go to Step 13	Go to Step 7
7	Inspect the shaft bearing for the following conditions: <ul style="list-style-type: none"> • Damage • Lubrication • Wear • Proper seating Are the bearings in need of repair or replacement?	Go to Step 14	Go to Step 8
8	Inspect the spherical joint for lubrication. Is the spherical joint lubricated?	Go to Step 15	Go to Step 9
9	Inspect the steering column coupling for looseness. Is the steering column coupling loose?	Go to Step 16	Go to Step 3
10	Tighten the steering column components to specifications. Refer to <i>Fastener Tightening Specifications on page 2-1</i> . Did you complete the repair?	Go to Step 17	—
11	Replace the SIR coil. Refer to <i>Inflatable Restraint Steering Wheel Module Coil Replacement on page 9-45</i> in SIR. Did you complete the repair?	Go to Step 17	—
12	Lubricate the horn contact ring. Did you complete the repair?	Go to Step 17	—
13	Install the lock plate retaining ring properly. Did you complete the repair?	Go to Step 17	—
14	Repair the shaft bearings as necessary. Refer to <i>Turn Signal Cancel Cam and Upper Bearing Inner Race Replacement on page 2-40</i> and to <i>Steering Shaft, Lower Bearing, and Jacket Replacement (Tilt Column) on page 2-48</i> or <i>Steering Shaft, Lower Bearing, and Jacket Replacement (Standard Column) on page 2-56</i> . Did you complete the repair?	Go to Step 17	—
15	Lubricate the spherical joints. Did you complete the repair?	Go to Step 17	—
16	Tighten the steering column coupling to specifications. Refer to <i>Fastener Tightening Specifications on page 2-1</i> . Did you complete the repair?	Go to Step 17	—
17	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

High Shift Effort

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 2-6
2	Verify that a high shift effort is required in order to shift out of the PARK position. Does the shifter operate normally?	System OK	Go to Step 3
3	Inspect for worn or damaged shift linkage components. Are the shift linkage components worn or damaged?	Go to Step 5	Go to Step 4
4	Inspect the shift cable for binding or misadjustment. Is the shift cable binding or misadjusted?	Go to Step 6	Go to Step 7
5	Replace the shift linkage. Did you complete the repair?	Go to Step 7	—
6	Adjust the shift cable. Did you complete the repair?	Go to Step 7	—
7	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 2

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 2-6
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 brackets for looseness. Are the steering column mounting brackets loose?	Go to Step 7	Go to Step 4
4	Verify that the steering column bracket capsule is not sheared. Is the steering column bracket capsule sheared?	Go to Step 8	Go to Step 5
5	Inspect the upper and lower tilthead screws for looseness. Are the support screws loose?	Go to Step 9	Go to Step 6
6	Inspect the intermediate shaft for worn joints or looseness. Is the intermediate joint worn or loose?	Go to Step 10	Go to Step 2
7	Tighten the brackets to specifications. Refer to <i>Fastener Tightening Specifications</i> on page 2-1. Did you complete the repair?	Go to Step 11	—
8	Replace the jacket assembly. Refer to <i>Steering Shaft, Lower Bearing, and Jacket Replacement (Tilt Column)</i> on page 2-48 or <i>Steering Shaft, Lower Bearing, and Jacket Replacement (Standard Column)</i> on page 2-56. Did you complete the replacement?	Go to Step 11	—
9	Tighten the upper and lower tilthead screws to specifications. Refer to <i>Fastener Tightening Specifications</i> on page 2-1. Did you complete the repair?	Go to Step 11	—
10	Tighten or replace the intermediate shaft as needed. Refer to <i>Intermediate Steering Shaft Replacement</i> on page 2-12. Did you complete the repair?	Go to Step 11	—
11	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

Steering Column Tilt Function Inoperative

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 2-6
2	Verify that the steering column tilt function is inoperative. Does the steering column tilt function operate normally?	System OK	Go to Step 3
3	Verify that the shoe is not seized on the pivot pin. Is the shoe seized on the pivot pin?	Go to Step 9	Go to Step 4
4	Inspect the shoe grooves for dirt, burrs, or rust. Are the shoe grooves free of dirt, burrs, and rust?	Go to Step 9	Go to Step 5
5	Inspect weak or broken shoe lock spring. Is the shoe lock spring weak or broken?	Go to Step 9	Go to Step 6
6	Inspect the pivot pins for binding. Are the pivot pins binding?	Go to Step 10	Go to Step 7
7	Inspect for a weak or broken wheel tilt spring. Is the wheel tilt spring weak or broken?	Go to Step 11	Go to Step 8
8	Inspect the steering column wiring harness for tightness. Is the steering column wiring harness too tight?	Go to Step 12	Go to Step 3
9	Replace the tilt head. Refer to <i>Steering Shaft, Lower Bearing, and Jacket Replacement (Tilt Column)</i> on page 2-48 or <i>Steering Shaft, Lower Bearing, and Jacket Replacement (Standard Column)</i> on page 2-56. Is the repair complete?	Go to Step 13	—
10	Replace the pivot pins. Refer to <i>Steering Shaft, Lower Bearing, and Jacket Replacement (Tilt Column)</i> on page 2-48 or <i>Steering Shaft, Lower Bearing, and Jacket Replacement (Standard Column)</i> on page 2-56. Is the repair complete?	Go to Step 13	—
11	Replace the tilt spring. Refer to <i>Tilt Spring Replacement</i> on page 2-37. Is the repair complete?	Go to Step 13	—
12	Reroute the steering column wiring harness to the correct location. Is the steering column wiring harness routed properly?	Go to Step 13	—
13	Operate the steering column tilt function in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

Repair Instructions

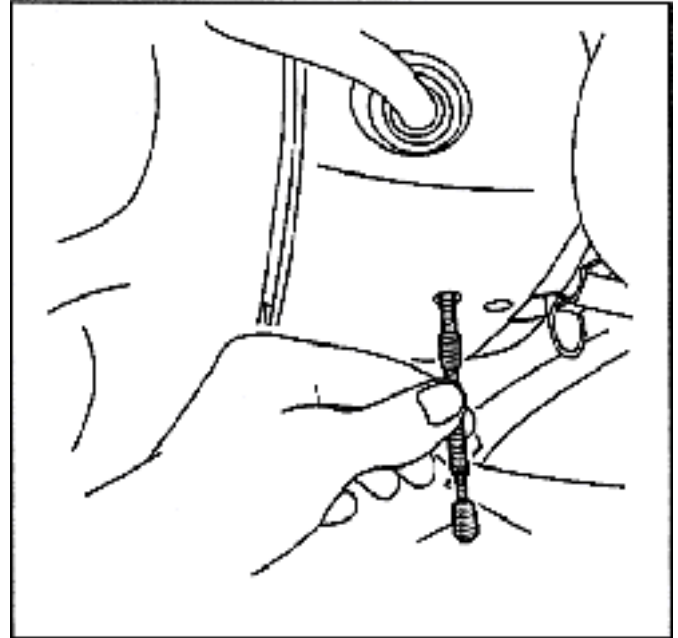
Intermediate Steering Shaft Replacement

Tools Required

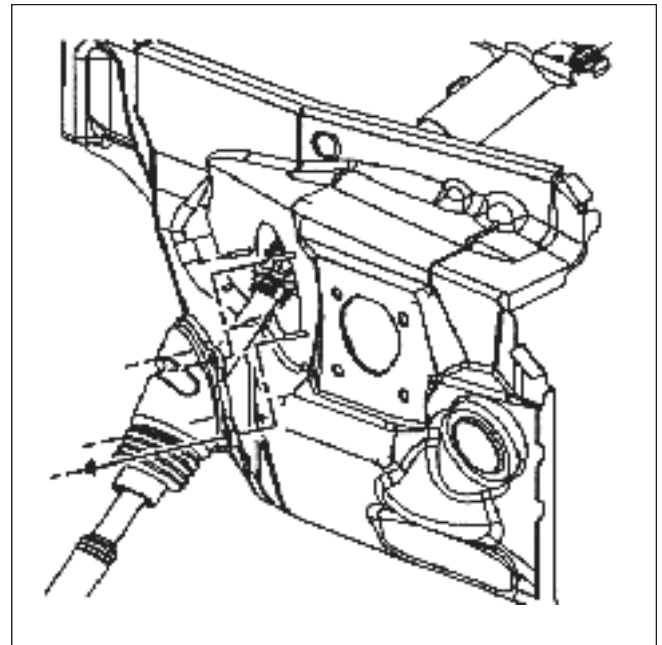
J 42640 Steering Column Pin

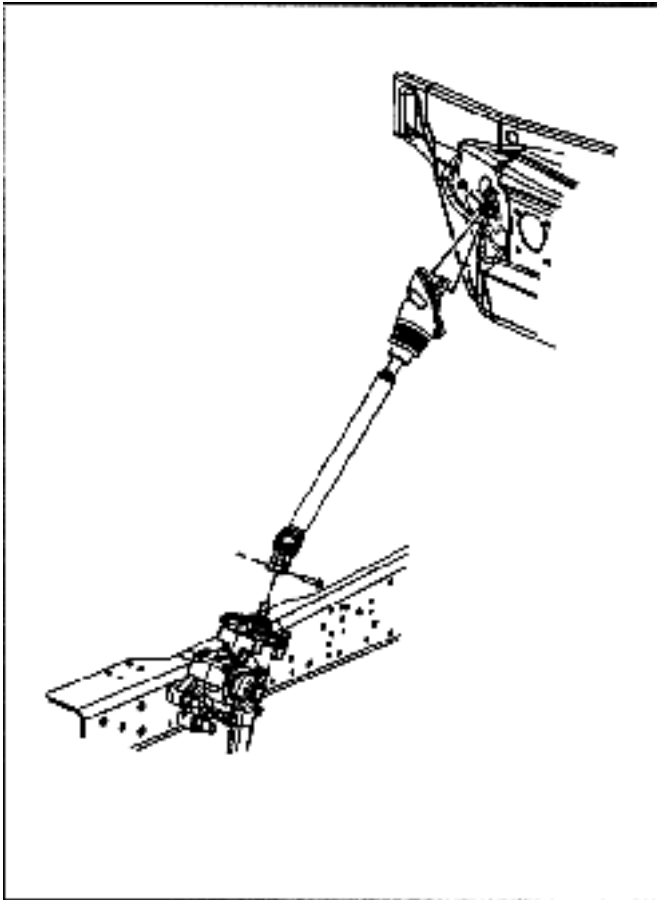
Removal Procedure

1. Install the J 42640 in the steering column lower access hole.



2. Remove the protective cover from the steering column under the instrument panel to gain access to the bolt.
3. Remove the bolt retaining the intermediate shaft to the steering column.





4. Mark the intermediate shaft to/Steering gear alignment before removal.
5. Position the intermediate shaft for access to the lower shaft pinch bolt. Turn the steering wheel to allow access to the pinch bolt.

Important: The intermediate shaft bolt contains an epoxy patch. When the intermediate shaft retaining bolt is removed it must be replaced Apply Loctite 272) N 12345493 or equivalent to the threads of the bolts.

6. Remove the intermediate shaft retaining bolt from the steering gear stub shaft.
7. Remove the intermediate shaft from the vehicle.

Installation Procedure

1. Make sure to align the marks made at removal.
2. Install the intermediate shaft to the steering gear stub shaft.

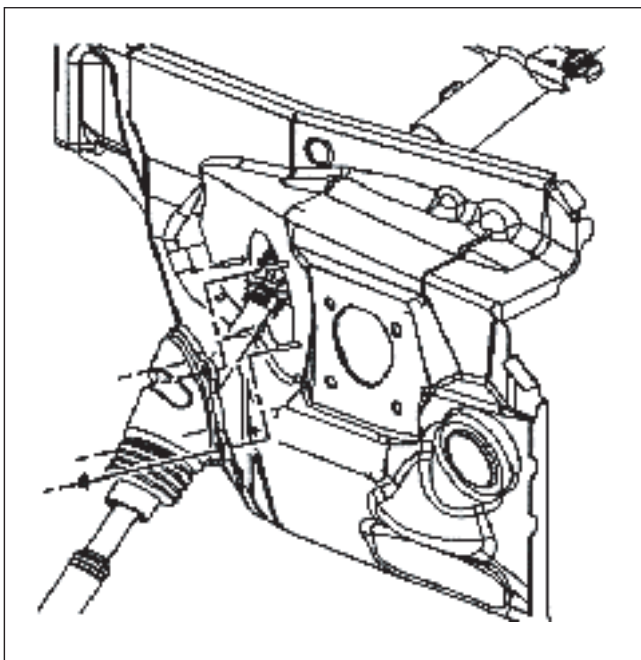
Important: The intermediate shaft removing bolt contains an epoxy patch. When the intermediate shaft retaining bolt is removed it must be replaced or – 5 Apply Loctite 272),~PN 12345493 or equivalent to the threads of the bolt

Notice: Refer to Fastener Notice on page P-6 in Cautions and Notices. Install the intermediate shaft retaining bolt to the steering gear stub shaft.

Tighten

Tighten the intermediate shaft retaining bolt to the steering gear stub shaft to 61 N·m (45 lb ft).

3. Install the intermediate shaft (2) to the steering column (1).

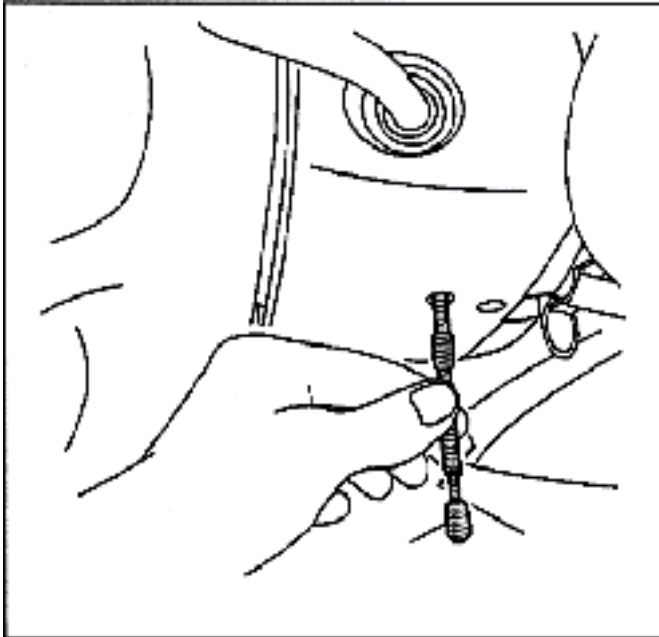


Important: Make sure the upper cover to the steering column is inside the intermediate shaft cover.

4. Install the intermediate shaft retaining bolt (3) to the steering column (1).

Tighten

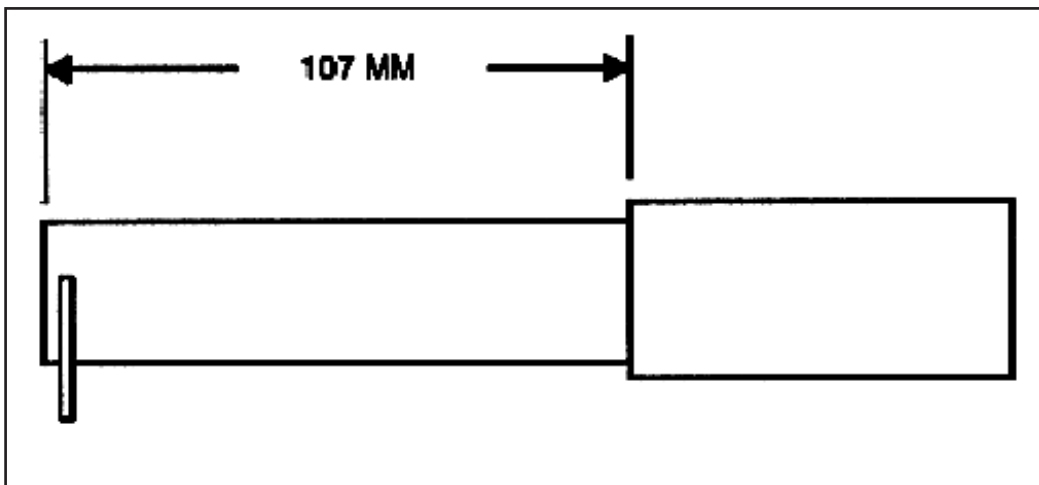
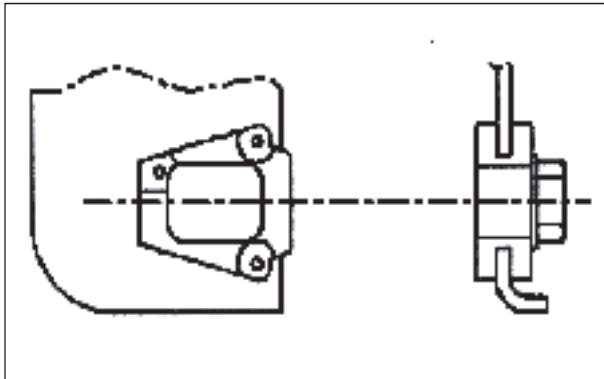
Tighten the intermediate shaft bolt to the steering column to 47 N·m (35 lb ft).

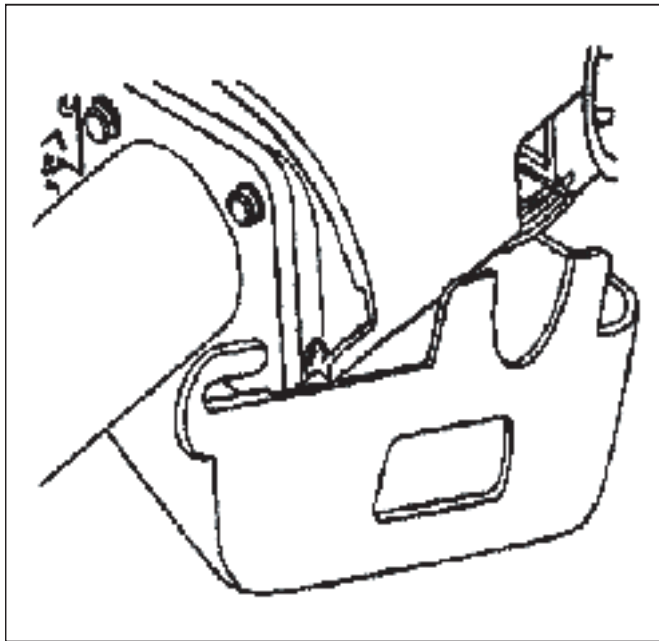
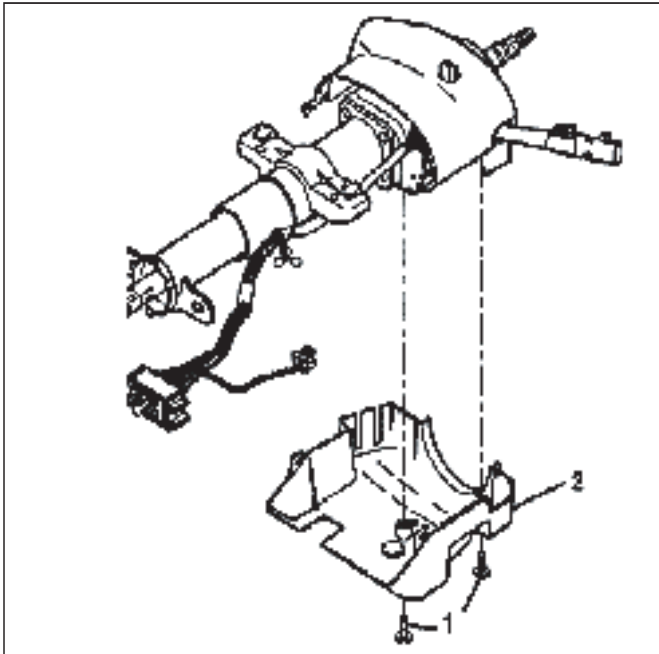


5. Remove the J 42640 from the steering column lower access hole.

Steering Column Accident Damage Inspection

- Vehicles involved in accidents resulting in frame damage, major body or sheet metal damage or where the steering column has been impacted may also have a damaged or misaligned steering column.
- Check the capsules on the steering column bracket assembly: all must be securely seated in the bracket slots and checked for any loose conditions when pushed or pulled by hand. If not, the bracket should be replaced if bolted to the jacket assembly. If the bracket is welded to the jacket assembly replace the jacket assembly.
- Check for jacket assembly collapse by measuring the distance from the lower edge of the upper jacket to a defined point on the lower jacket. If measured dimensions are not within specifications, a new jacket must be installed.
- Visually inspect steering shaft for sheared injected plastic (1). If steering shaft shows sheared plastic, a new steering shaft must be installed.
- Any frame damage that could cause a bent steering shaft must have the steering shaft runout checked in the following manner. Using a dial indicator at the lower end of the steering shaft, have the steering wheel rotated. Runout must not exceed 1.60 mm (0.625 in).





Steering Column Trim Covers Replacement

Removal Procedure

1. Remove the steering wheel. Refer to Steering Wheel Replacement in this section.
2. Remove the tilt lever. Refer to Tilt Lever Replacement in this section.
3. Remove the 2 pan head tapping screws (1) from the lower shroud (2).
4. Tilt the lower shroud down.
5. Slide the lower shroud backward in order to disengage the locking tabs.
6. Remove the lower shroud from the upper shroud.
7. Remove the shroud protector (1) from the lower shroud (2).
8. Remove the 2 TORX® head screws (1) from the upper shroud (2).
9. Remove the ignition lock cylinder. Refer to Ignition Lock Cylinder Replacement in this section.
10. Remove the upper shroud (2) from the steering column.

Installation Procedure

1. Install the upper shroud (2) onto the steering column.
2. Install the ignition lock cylinder. Refer to Ignition Lock Cylinder Replacement on page 2-22.

Notice: Refer to Fastener Notice on page P-6 in Cautions and Notices.

3. Screw the 2 TORX® head screws (1) into the upper shroud (2).

Tighten

Tighten the 2 TORX® head screws to 1.5 N•m (13 lb in).

4. Install the shroud protector (1) onto the lower shroud (2).

Important: The shift lever seal must be seated in the shrouds.

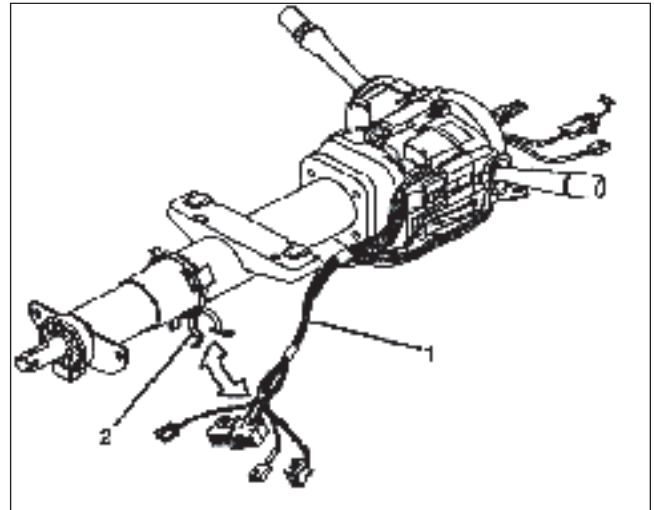
5. Install the lower shroud onto the upper shroud.
6. Match the tab slots on the lower shroud with the locking tabs on the upper shroud.
7. Tilt the lower shroud up.

8. Slide the lower shroud forward until the locking tabs snap into the tab slots.
9. Screw the 2 pan head tapping screws (1) into the lower shroud (2).

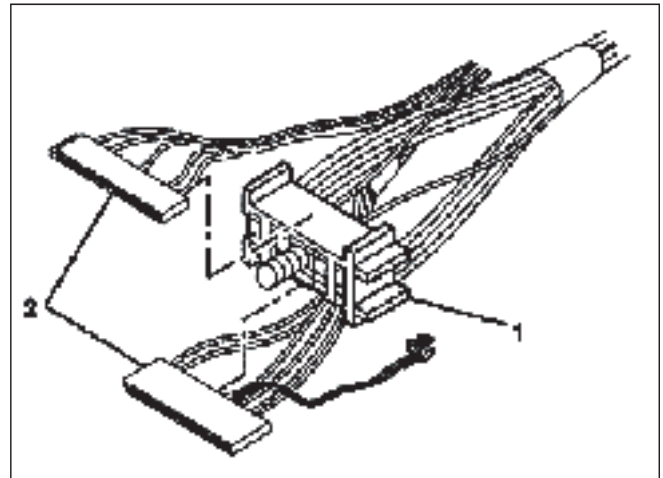
Tighten

Tighten the 2 pan head tapping screws to 3.5 N·m (31 lb in).

10. Install the tilt lever. Refer to Tilt Lever Replacement in this section.
11. Install the steering wheel. Refer to Steering Wheel Replacement in this section.

**IGNITION SWITCH REPLACEMENT****Removal Procedure**

1. Remove the tilt lever. Refer to Tilt Lever Replacement in this section.
2. Remove the trim covers from the column. Refer to Steering Column Trim Covers Replacement in this section.
3. Remove the knee bolster, if equipped.
4. Disconnect the steering column electrical connectors.
5. Remove the wire harness assembly (1) from the wire harness strap (2).
6. Remove and dispose of the smaller wire harness straps.
7. Slide the 2 connectors of the turn signal and multi-function switch assembly out of the harness connector.
8. Remove the key alarm connector (1) from the ignition lock cylinder case assembly (2).
 - 8.1. Rotate the key alarm connector (1) 90 degrees.
 - 8.2. Pull the key alarm connector (1) out of the ignition lock cylinder case assembly (2).
9. Remove the 2 tapping screws (2) from the ignition and key alarm switch assembly (1).
10. Remove the ignition switch assembly (1) from the ignition lock cylinder case assembly.

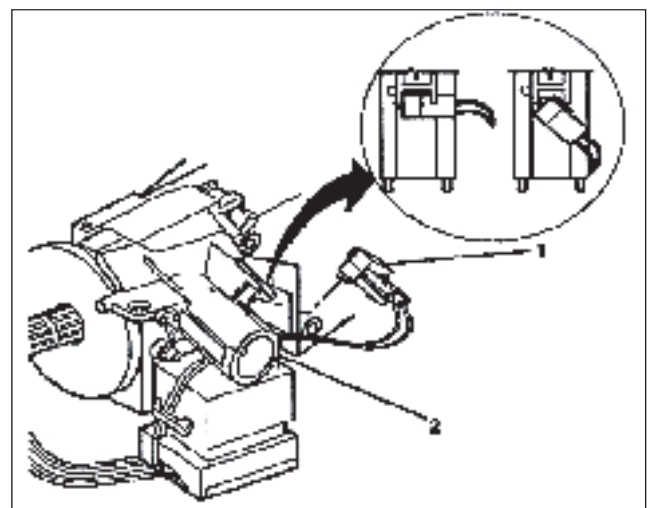
**Installation Procedure**

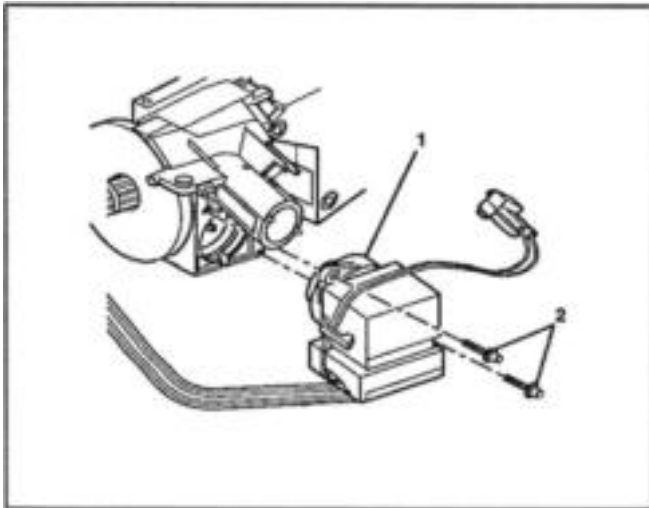
1. Install the ignition switch assembly (1) onto the ignition lock cylinder case assembly.
2. Screw the 2 tapping screws into the ignition switch assembly.

Tighten

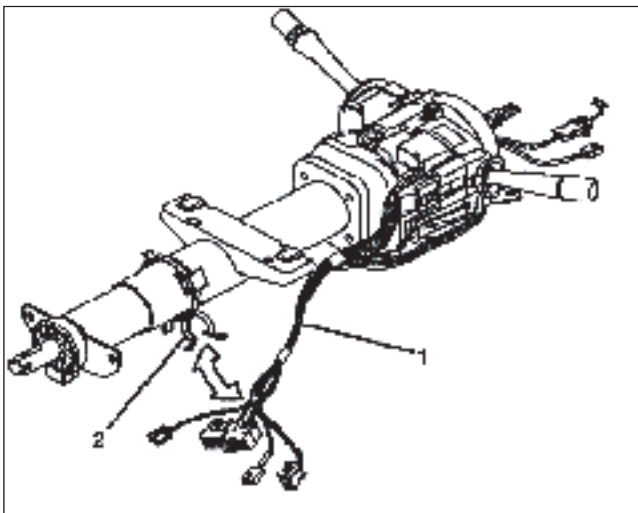
Tighten the 2 tapping screws to 3.5 N·m (13 lb in).

3. Install the key alarm connector (1) into the ignition lock cylinder case assembly (2).
 - 3.1. Push the key alarm connector (1) into the ignition lock cylinder case assembly (2).
 - 3.2. Rotate the key alarm connector (1) 90 degrees so that the key alarm connector (1) locks into place

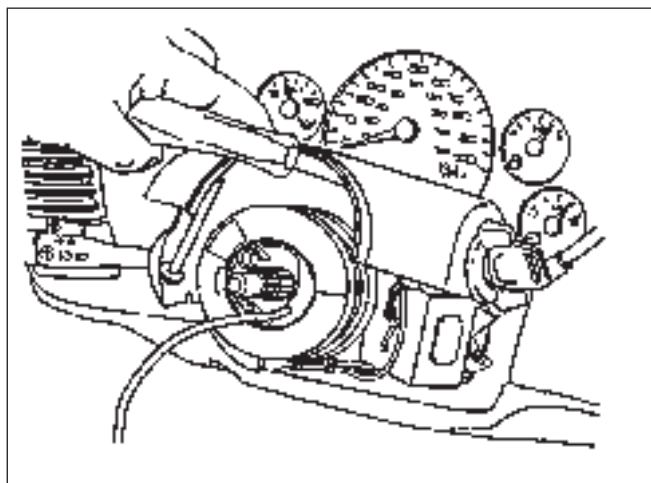




4. Connect the 2 connectors of the turn signal and multifunction switch assembly into the harness connector.
5. Connect the steering column electrical connectors.



6. Attach new wire harness straps to the wire harness assembly.
7. Attach the wire harness assembly (1) to the wire harness strap (2).
8. Install the trim covers to the column.
9. Install the tilt lever. Refer to Tilt Lever Replacement in this section.
10. Connect the steering column electrical connectors

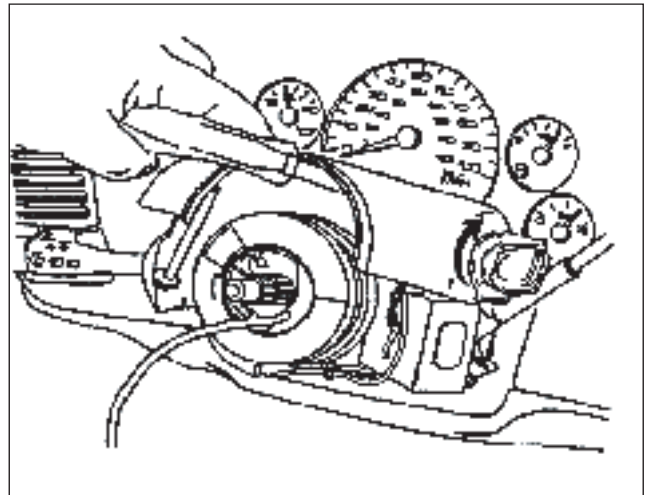


IGNITION LOCK CYLINDER REPLACEMENT

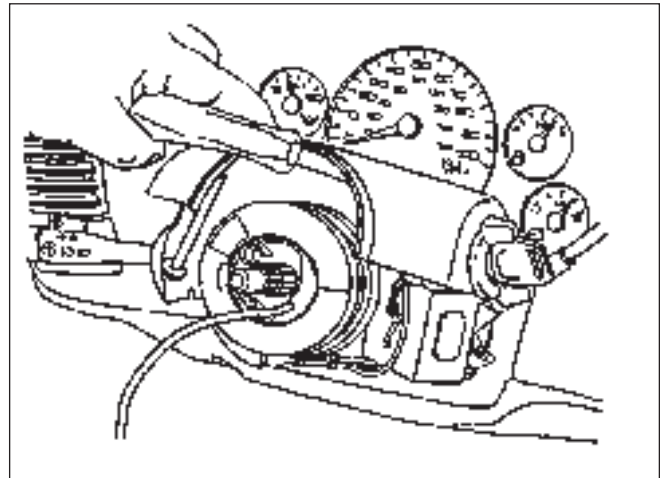
Removal Procedure

1. Position the steering wheel half way between the upper and lower tilt stops.
2. Remove the steering wheel. Refer to Steering Wheel Replacement in this section.
3. Roll back the shift lever seal from the upper and the lower shrouds.
4. Remove the tilt wheel lever. Refer to Tilt Lever Replacement in this section.
5. Remove the steering column trim covers.
6. Lift the upper steering column shroud to gain access to the lock cylinder access hole.
7. Using a bent tip awl, insert the tip into the ignition lock cylinder access hole.

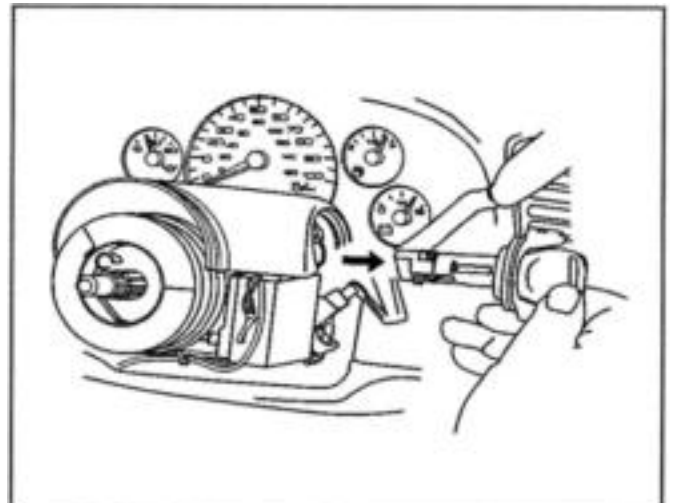
8. Turn the ignition lock cylinder to the START position.
9. Using the bent tip awl, push down on the ignition lock cylinder retaining pin.

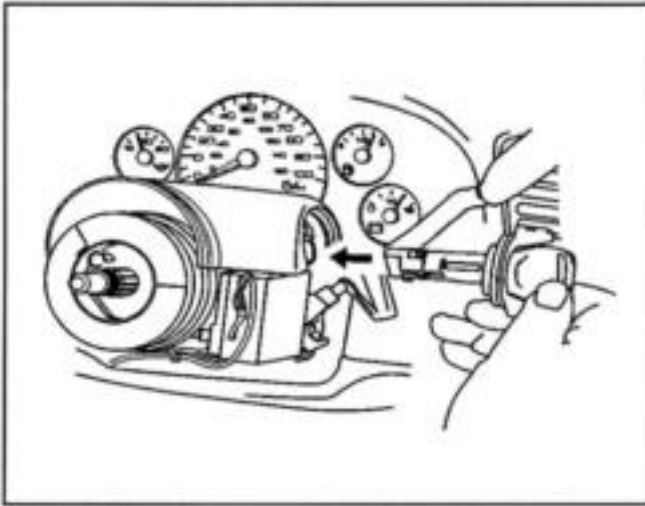


10. Release the ignition lock cylinder to the RUN position.



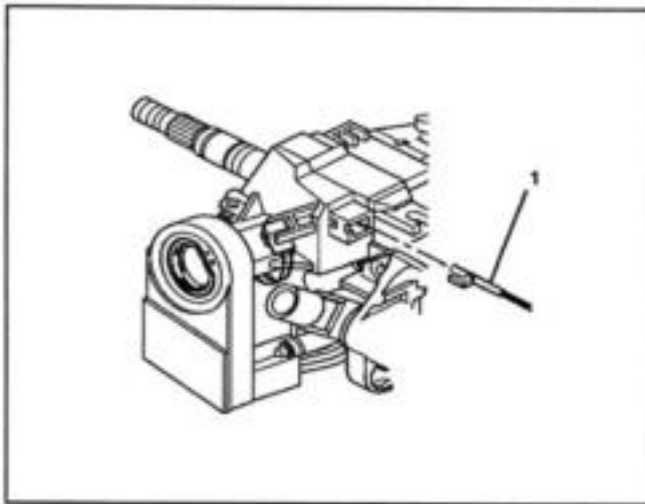
11. Remove the ignition lock cylinder from the ignition lock cylinder case assembly by pulling the ignition lock cylinder away from the steering column.





Installation Procedure

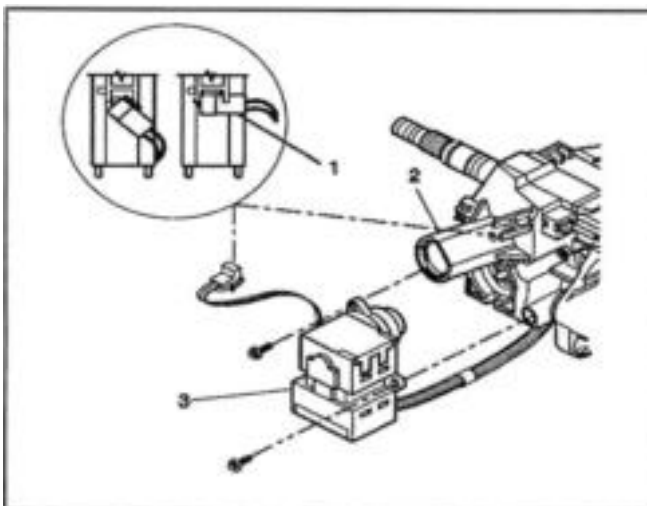
1. Insert the ignition lock cylinder through the upper shroud.
2. Install the ignition lock cylinder to the ignition lock cylinder case assembly by doing the following procedures:
 - 2.1. Align the positioning slot and locking tab slot on the ignition lock cylinder case assembly to the positioning tab and locking tab on the ignition lock cylinder.
 - 2.2. Push the ignition lock cylinder into the ignition lock cylinder case assembly until the locking tab locks against the locking tab.
3. Install the steering column trim covers. Refer to Steering Column Trim Covers Replacement in this section.
4. Install the shift lever seal to the upper and the lower shrouds.
5. Install the steering wheel. Refer to Steering Wheel Replacement in this section.
6. Install the tilt wheel lever. Refer to Tilt Lever Replacement in this section.



Ignition Lock Cylinder Case Replacement

Removal Procedure

1. Remove the steering wheel. Refer to Steering Wheel Replacement on page 2-36.
2. Remove the shift lever. Refer to Shift Lever Replacement on page 2-28.
3. Remove the ignition lock cylinder. Refer to Ignition Lock Cylinder Replacement in this section.
4. If tilt column, remove the steering column tilt head components.
5. If standard column, remove the steering column components..
6. If necessary, remove the park lock cable assembly (1) from the ignition lock cylinder case assembly.
 - 6.1. Place the lock cylinder in the OFF-LOCK position.
 - 6.2. Place the shift lever into the PARK position.
 - 6.3. Insert a small screwdriver into the slot on the ignition lock cylinder case assembly. Push against the locking tab on the end of the park lock cable assembly (1).
 - 6.4. Disconnect the park lock cable assembly (1) from the ignition lock cylinder case assembly.
7. Rotate the key alarm connector (1) 90 degrees.
8. Pull the key alarm connector (1) out of the ignition lock cylinder case assembly (2).
9. Remove the 2 tapping screws from the ignition switch (3).
10. Remove the ignition switch (3) from the ignition lock cylinder case assembly (2).
11. Let the ignition switch (3) hang freely.



12. Remove the 3 pan head tapping screws (2) from the ignition lock cylinder case assembly (1).
13. Remove the ignition lock cylinder case assembly (1) from the steering column tilt head assembly

Installation Procedure

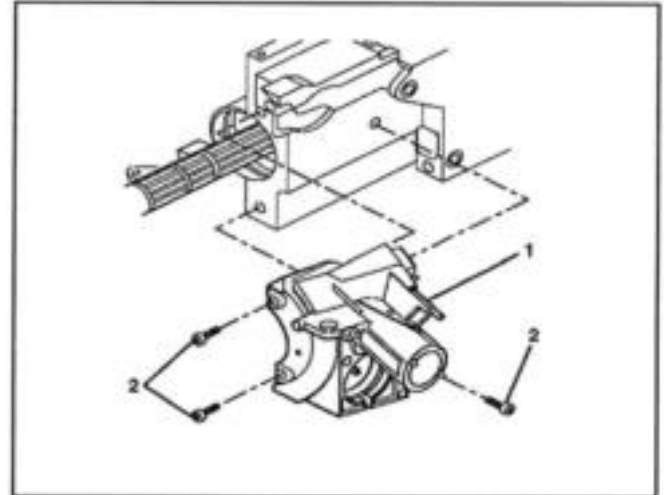
1. Install the ignition lock cylinder case assembly (1) onto the steering column tilt head assembly.

Notice: Refer to Fastener Notice on page P-6 in Cautions and Notices.

2. Screw the 3 pan head tapping screws
3. Install the ignition switch assembly (1) onto the ignition lock cylinder case assembly (2).
4. Screw the 2 tapping screws into the ignition switch (1).

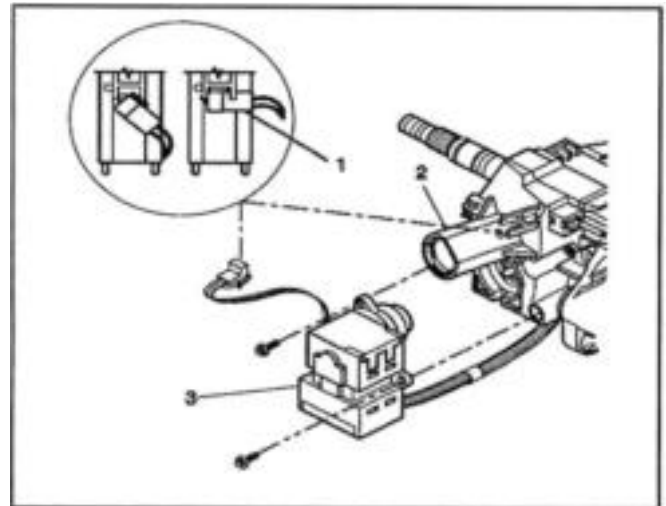
Tighten

Tighten the tapping screws to 1.5 N.m (13 lb in).



5. Install the key alarm connector (3) onto the ignition lock cylinder case assembly (2) by doing the following:

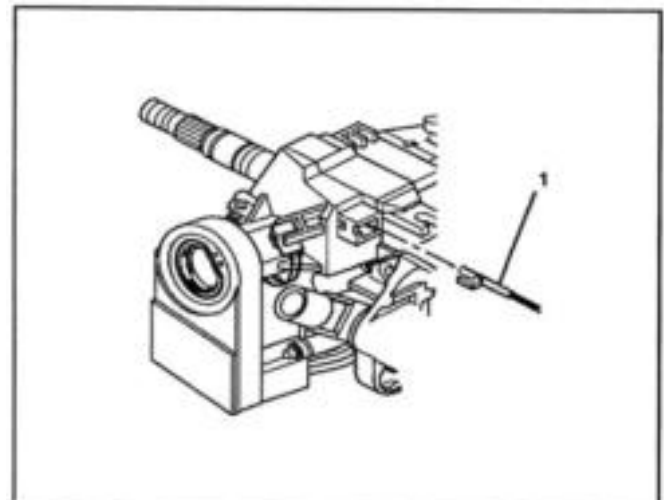
- 5.1. Push the key alarm connector (1) into the ignition lock cylinder case assembly (2).
- 5.2. Rotate the key alarm connector 90 degrees so that the key alarm connector locks into place.

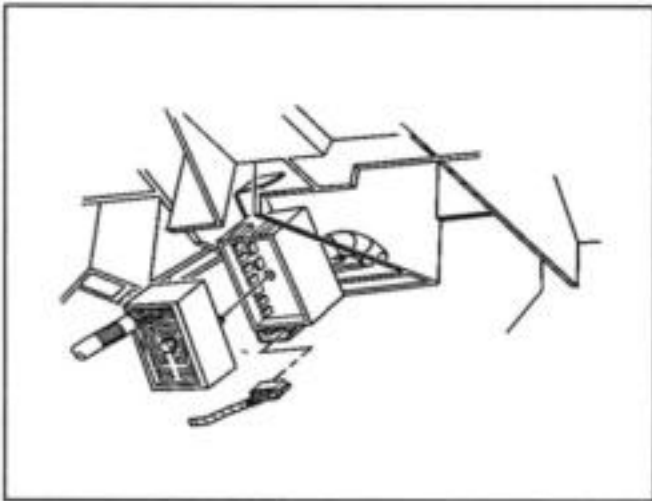


6. If necessary, connect the park lock cable assembly (1):

- 6.1. Place the lock cylinder in the ACCESSORY position.
- 6.2. Place the gear shift lever into the PARK position.
- 6.3. Press the locking tab on the end of the park lock cable assembly (1) into the slot in the ignition lock cylinder case assembly.

7. If standard column, install the steering column components.
8. If tilt column, install the steering column tilt head components.
9. Install the ignition lock cylinder. Refer to Ignition Lock Cylinder Replacement in this section.
10. Install the shift lever.
11. Install the steering wheel. Refer to Steering Wheel Replacement in this section.

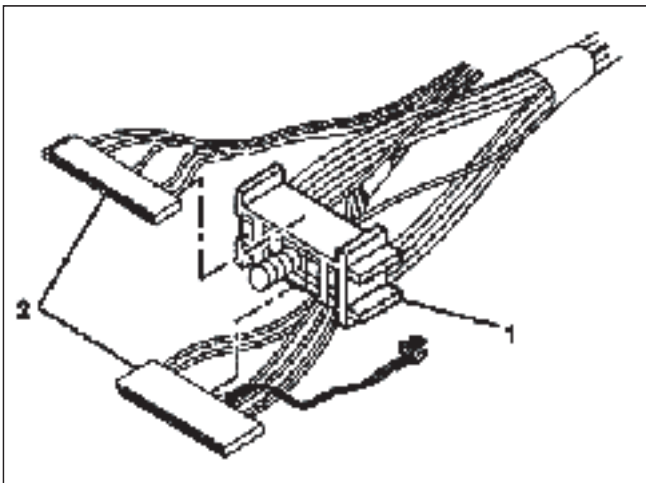




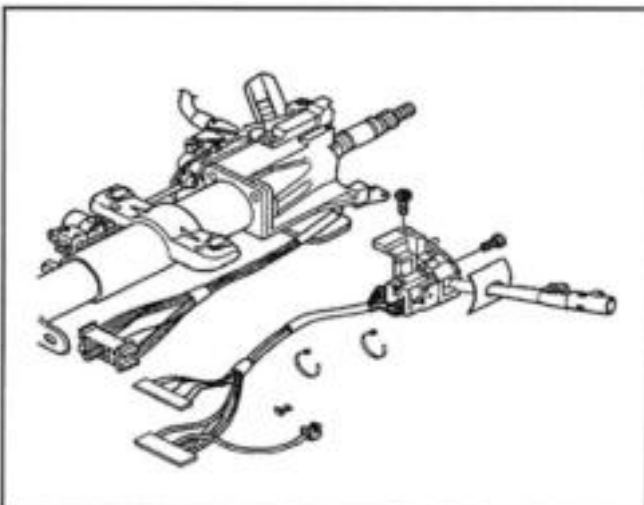
Multifunction, Turn Signal Switch Replacement

Removal Procedure

1. Loosen the steering column bracket nuts.
2. Remove the steering column trim covers.
3. Disconnect the steering column bulkhead connector from the vehicle harness.



4. Disconnect the gray and black connectors (2) of the switch from the column bulkhead connector.



5. Remove the retaining screws from the switch.
6. Remove the multifunction turn signal/hazard switch from the vehicle.

Installation Procedure

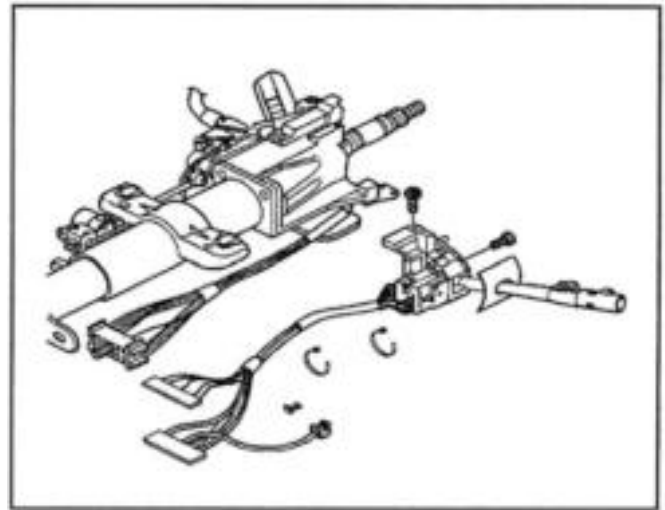
1. Install the multifunction switch to the steering column.

Notice: Refer to Fastener Notice in Cautions and Notices.

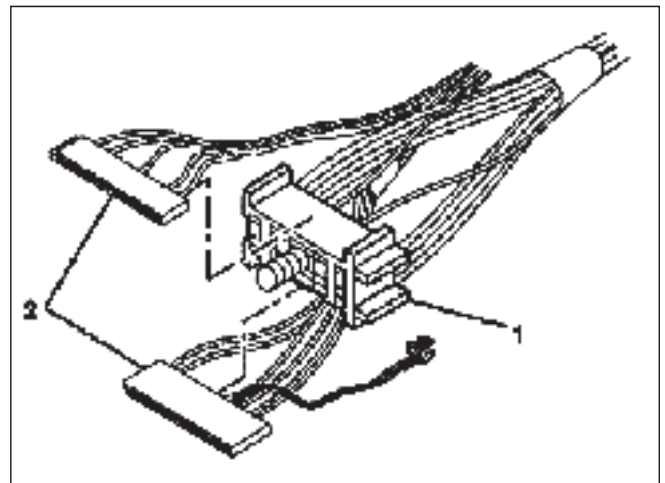
2. Install the screws that retain the multifunction switch to the steering column.

Tighten

Tighten the screws to 6 N·m (53 lb in).



3. Install the gray and black wiring harness connectors (2) to the steering column bulkhead connector.



4. Install the steering column bulkhead connector to the vehicle wire harness.

Tighten

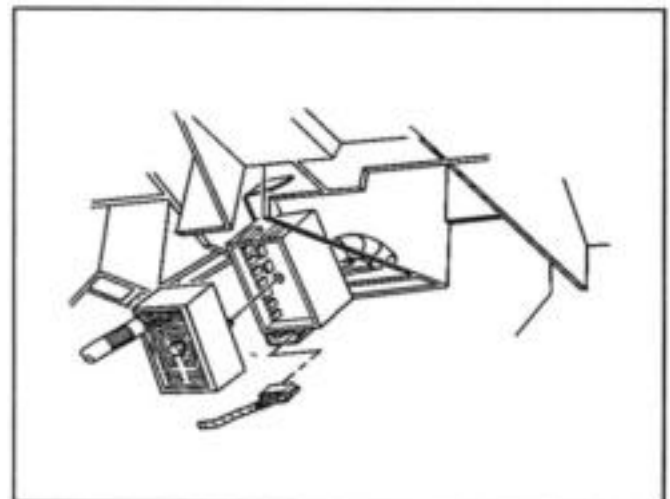
Tighten the center screw to 6 N·m (53 lb in).

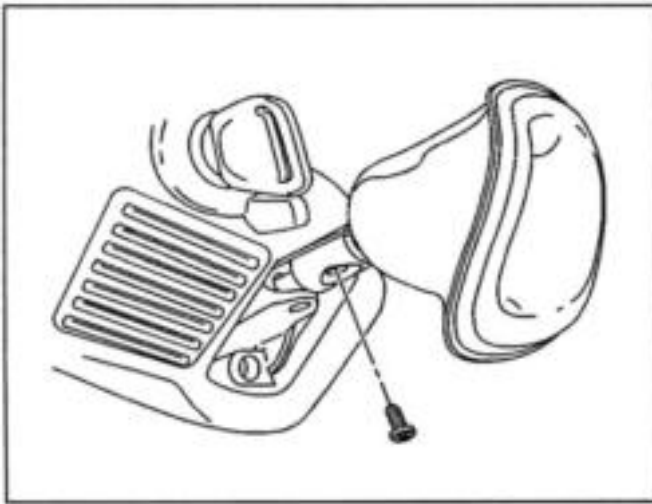
5. Install the electrical connector to the ATSLC.
6. Install the straps that secure the steering column wiring harness.
7. Install the steering column trim covers. Refer to Steering Column Trim Covers Replacement on page 2-16.
8. Install the steering column bracket nuts.

Tighten

Tighten the nuts to 30 N·m (22 lb ft).

9. Place the lever in the center or the OFF position.





Shift Lever Replacement

Removal Procedure

1. Roll the shift lever boot back until the TORX® head screw is exposed.
2. Remove the TORX® head screw.
3. Remove the shift lever.

Installation Procedure

1. Install the shift lever.

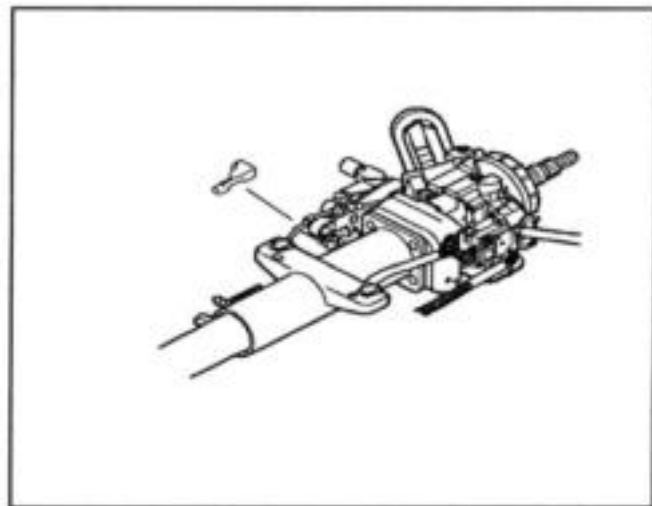
Notice: Refer to Fastener Notice in Cautions and Notices.

2. Install the TORX® head screw.

Tighten

Tighten the TORX® head screw to 18 N·m (14 lb in).

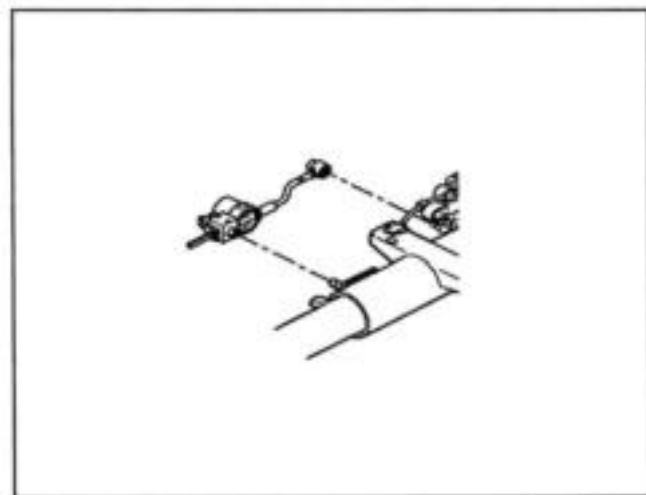
3. Roll the shift lever boot over the TORX® head screw.



Linear Shift Assembly

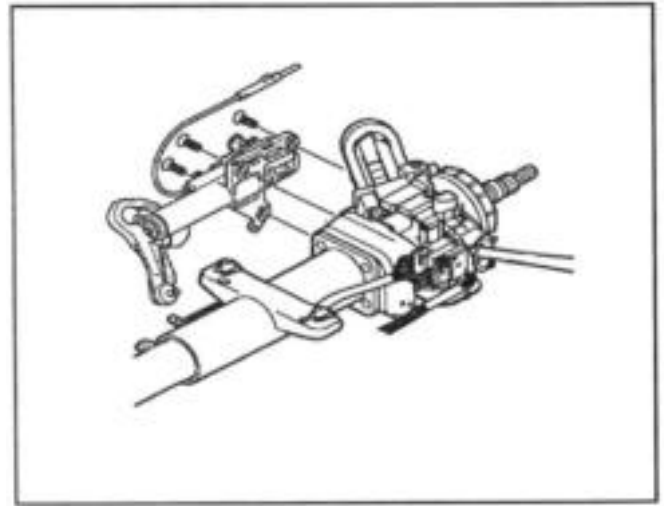
Removal Procedure

1. Remove the shift lever. Refer to Shift Lever Replacement on page 2-28
2. The steering column lock cylinder set should be in the OFF-LOCK position.
3. Insert a small screwdriver into the slot on the ignition lock cylinder case assembly and push against the locking tab to remove the park lock cable assembly (1).

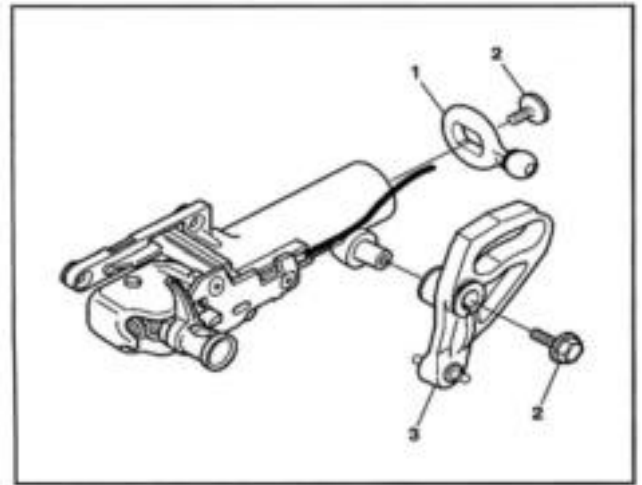


4. Disconnect the PVT shift lock control connector from the park position switch assembly.
5. Slide the park position switch assembly off of the linear shift assembly.
6. Use a small screwdriver to gently pry the A/T shift lock control from the steering column jacket assembly.

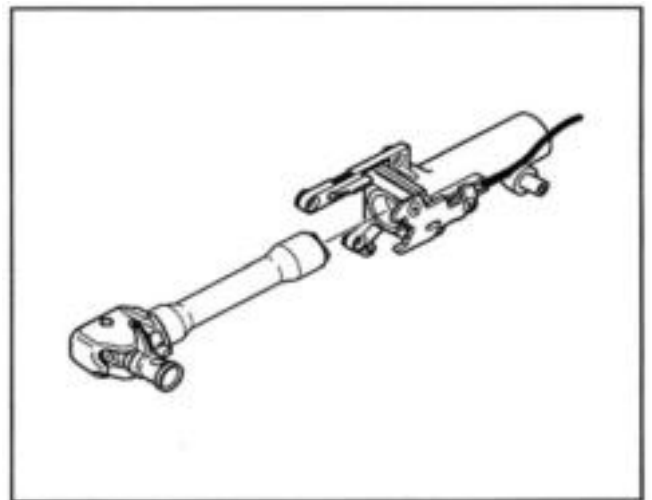
7. Remove the 3 TORX® screws from the linear shift assembly.
8. Remove the linear shift assembly from the steering column support assembly.

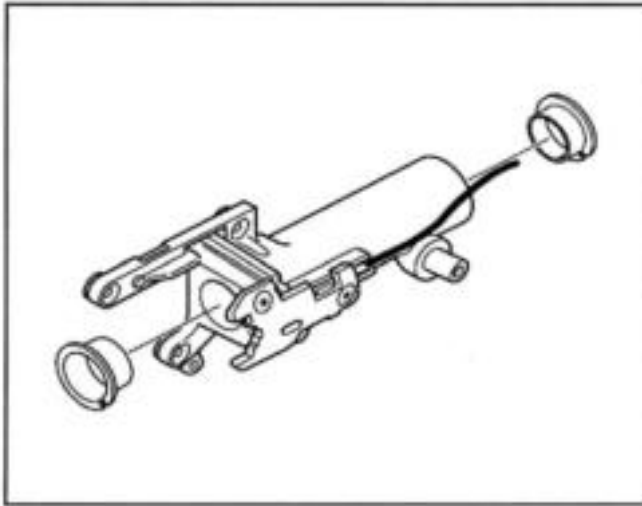


9. To disassemble the linear shift assembly, remove the 2 hexagon flange head bolts (2).
10. Remove the ball and actuator assembly (1).
11. Remove the cable shift cam assembly (3).

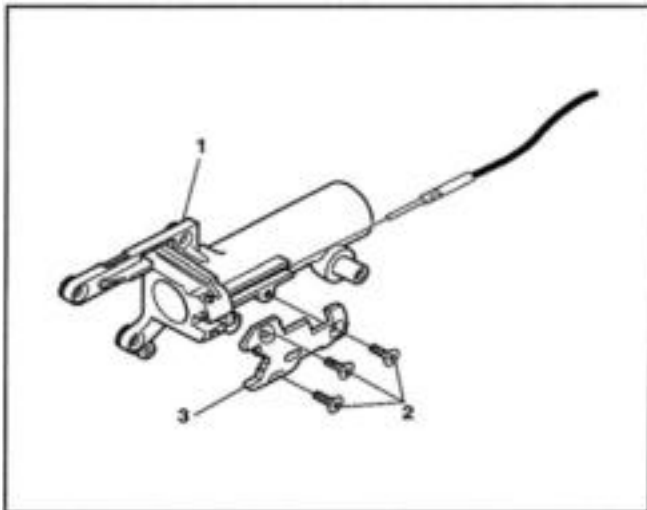


12. Remove the shift lever shaft.



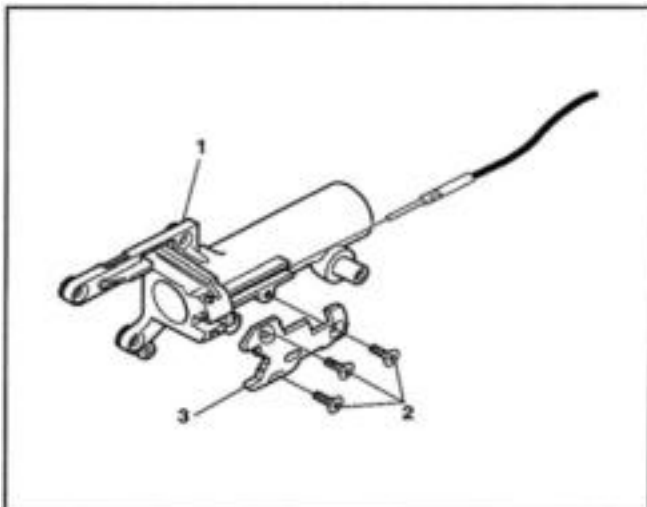


13. Remove the 2 actuator bushings.



14. Remove the 3 oval head screws (2) from the shift lever gate (3).

15. Remove the shift lever gate (3) from the support bracket (1) on the gear shift lever assembly.



Installation Procedure

If installing the linear shift assembly as an assembly, proceed to step 11.

1. Install the shift lever gate (3) onto the gear shift lever assembly support bracket (1).

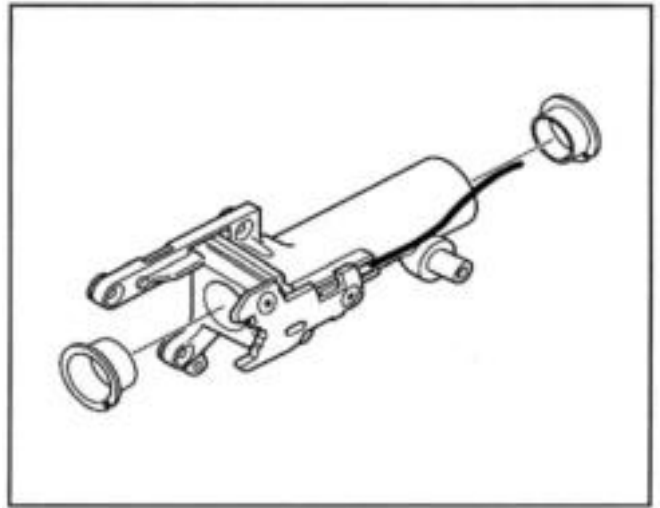
Notice: Refer to Fastener Notice in Cautions and Notices.

2. Install the 3 oval head screws (2) onto the shift lever gate (3).

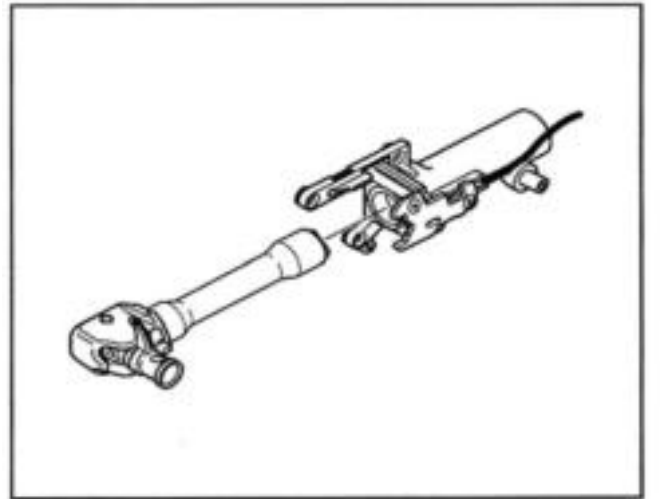
Tighten

Tighten the screws to 7 N·m (62 lb in).

3. Install the 2 actuator bushings.



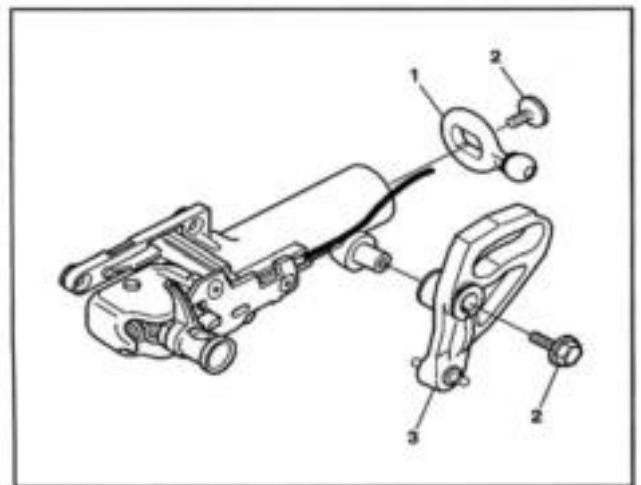
4. Install the shift actuator shaft.

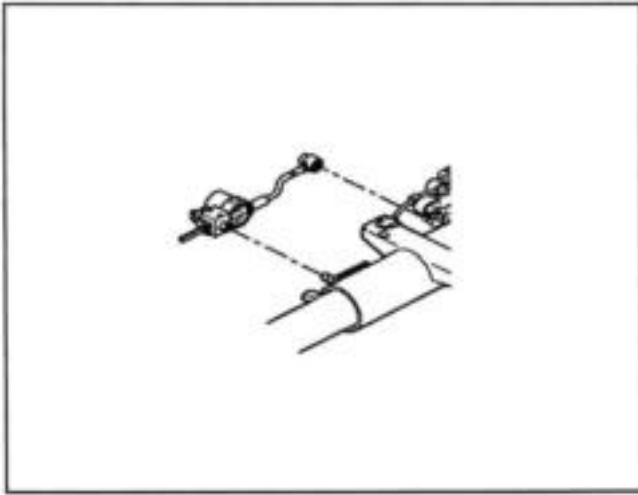


5. Install the cable shift cam assembly (3).
6. Install the ball and actuator assembly (1).
7. Install the 2 hexagon flange head bolts (2).

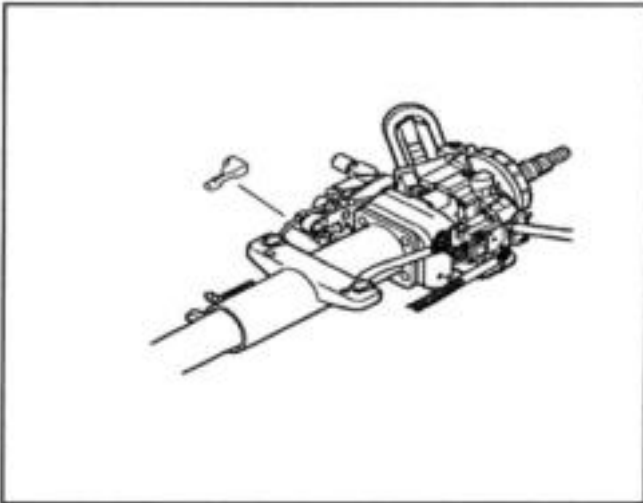
Tighten

Tighten the bolts to 18 N·m (13 lb ft).

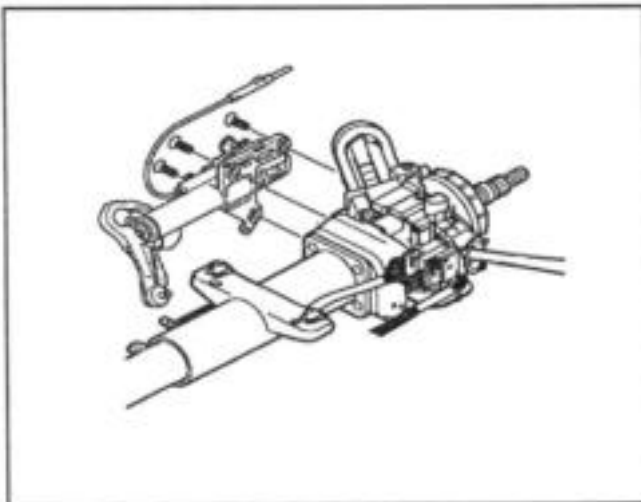




8. Install the A/T shift lock control. Install the shift lever clevis and put the column in the neutral position, which is 2 positions from the park position.



9. Slide the park position switch assembly onto the linear shift assembly.
10. Connect the A/T shift lock control connector onto the park position switch assembly.



11. Install the linear shift assembly onto the steering column support assembly.
12. Secure the linear shift assembly to the steering column with 3 flat head tapping screws. Move the linear shift assembly out of the PARK position to install the lower socket tapping screw.

Tighten

Tighten the bolts to 10 N·m (89 lb in).

13. Connect the park lock cable assembly (1) to the lock module assembly using the following procedure:
- Place the steering column lock cylinder set into the OFF position.
 - Place the shift lever clevis into the PARK position.
 - Press the locking tab on the end of the park lock cable assembly (1) into the slot in the lock module assembly.

14. Install the shift lever.

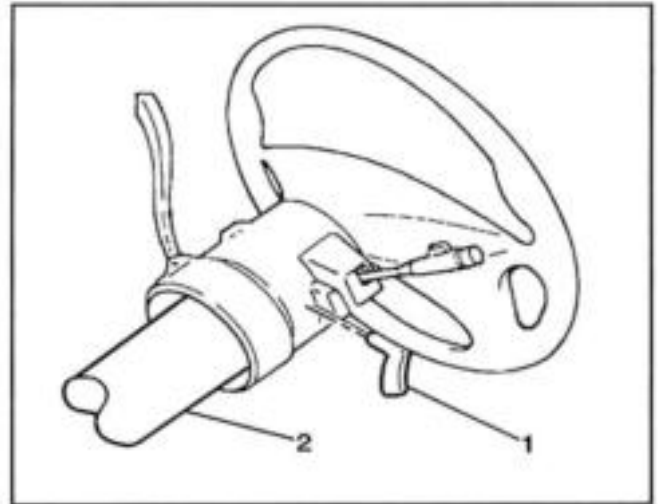
Tilt Lever Replacement

Removal Procedure

Pull the tilt steering column lever (1) out from the steering column (2).

Installation Procedure

Align the tilt steering column lever (1) and push the lever into the steering column (2).



Steering Wheel Replacement

Tools Required

- J 1859-A Steering Wheel Puller

Removal Procedure

1. Mark the relationship of the steering wheel (1) to the column.
2. Remove the steering wheel and the nut (2).
3. Use the J 1859-A in order to remove the steering wheel from the column.

Installation Procedure

1. With the marked relationship references in line, install the steering wheel (1) onto the column.

Notice: Refer to Fastener Notice in Cautions and Notices.

2. Install the steering wheel nut (2).

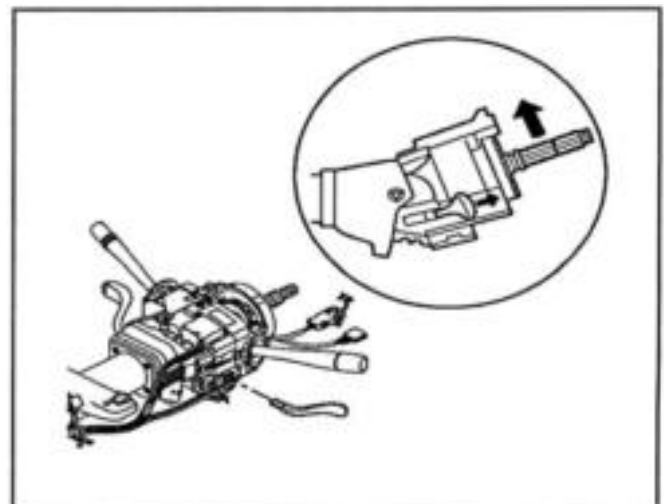
Tighten

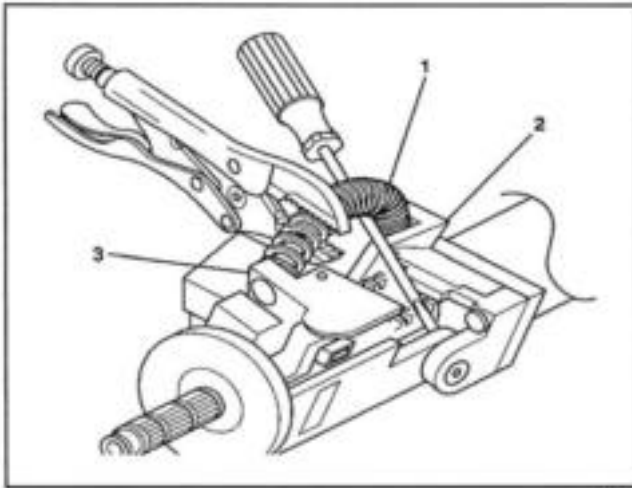
Tighten the bolts to 41 N·m (30 lb ft).

Tilt Spring Replacement

Removal Procedure

1. Remove the upper and lower trim covers.
2. Install the tilt lever onto the steering column tilt head assembly.
3. Use the tilt lever to tilt the column to the UP position.



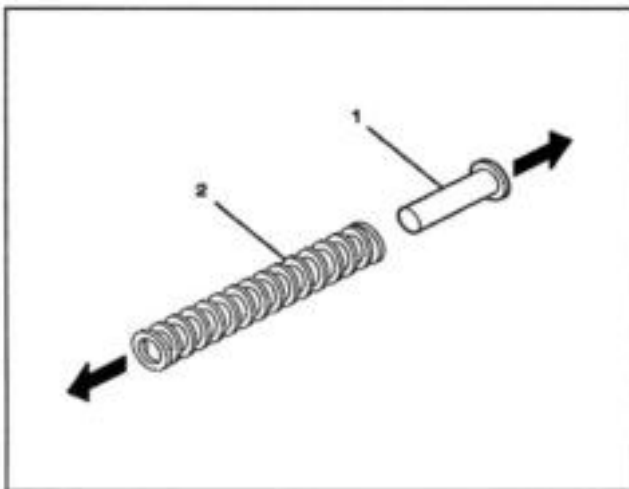


Caution: The tilt spring and the spring guide are under pressure. The tilt spring and the spring guide may become a projectile. Secure the spring with locking pliers during removal. Secure the spring with locking pliers during installation. Bodily injury may result during removal and installation of the tilt spring and the spring guide. Always use caution during removal and installation of the tilt spring and the spring guide.

4. Remove the tilt spring (1) from the steering column support assembly (2) and from the steering column tilt head assembly (3) by using the following procedure:

- 4.1. Pry up the tilt spring (1) until a bulge occurs and most of the tilt spring tension is removed.
- 4.2. Secure the tilt spring (1) with locking pliers.
- 4.3. Continue prying up the tilt spring (1) until the tilt spring disengages from the post on the steering column support assembly (2) and from the steering column tilt head assembly (3).

5. Remove the spring guide (1) from the tilt spring (2).



Installation Procedure

1. Use the tilt lever to tilt the column to the UP position.
2. Install the spring guide into the tilt spring.

Caution: 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.

3. Install the tilt spring (1) onto the steering column support assembly (2) and onto the steering column tilt head assembly by using the following procedure:
 - 3.1. Install the tilt spring (1) onto the steering column tilt head assembly.
 - 3.2. Install the tilt spring (1) onto the post on the steering column support assembly (2).
4. Install the upper and lower trim covers.

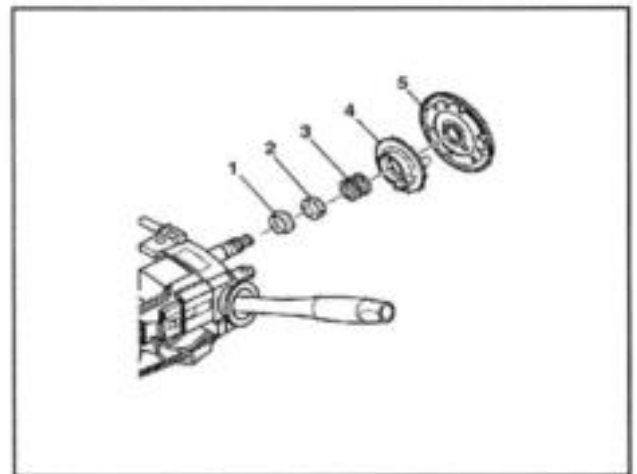
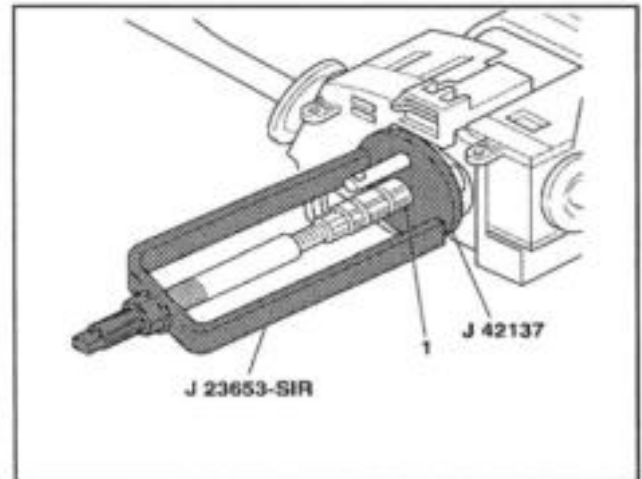
Turn Signal Cancel Cam and Upper Bearing Inner Race Replacement

Tools Required

- J 23653-SIR Lock Plate Compressor
- J 42137 Cam Orientation Plate Adapter

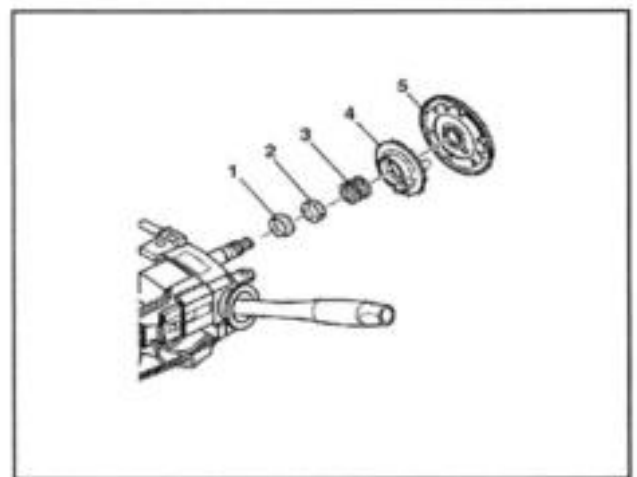
Removal Procedure

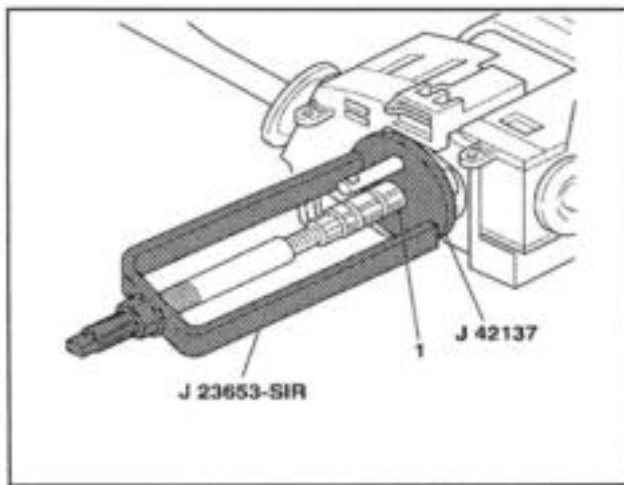
1. Compress the shaft lock shield assembly using J 23653-SIR and J 42137.
2. Remove the bearing retainer (1) from the steering shaft assembly.
3. Discard the bearing retainer.
4. Remove J 23653-SIR and J 42137 from the steering shaft assembly.
5. Remove the following parts from the steering shaft assembly:
 - 5.1. The shaft lock shield assembly (5)
 - 5.2. The turn signal cancel cam assembly (4)
 - 5.3. The upper bearing spring (3)
 - 5.4. The upper bearing inner race seat (2)
 - 5.5. The inner race (1)



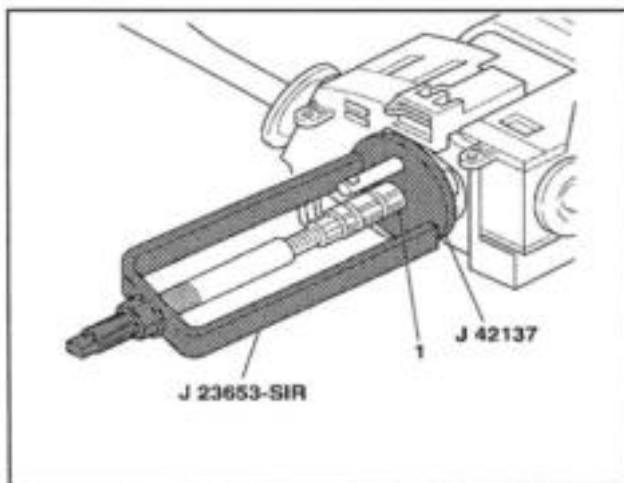
Installation Procedure

1. Lubricate the lower brass surface of the turn signal cancel cam assembly (4) with GM P/N 12377900 (Canadian P/N 10953529).
2. Lubricate the inner race with GM P/N 12345718 (Canadian P/N 10953516)
3. Install the following parts onto the steering shaft assembly:
 - 3.1. The inner race (1)
 - 3.2. The upper bearing inner race seat (2)
 - 3.3. The upper bearing spring (3)
 - 3.4. The turn signal cancel cam assembly (4)
 - 3.5. The shaft lock shield assembly (5)





4. Compress the shaft lock shield assembly using J 23653-SIR and J 42137.
5. Install the new bearing retainer (1) onto the steering shaft assembly.
6. Firmly seat the bearing retainer (1) into the groove on the steering shaft assembly.
7. Remove J 23653-SIR and J 42137 from the steering shaft assembly.



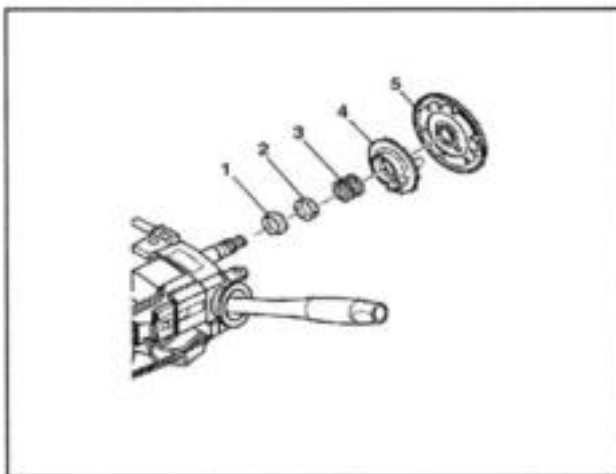
Turn Signal Cancel Cam and Upper Bearing Thrust Washer

Tools Required

- J23653-SIR Steering Column Lock Plate Compressor
- J 42137 Cam Orientation Plate

Removal Procedure

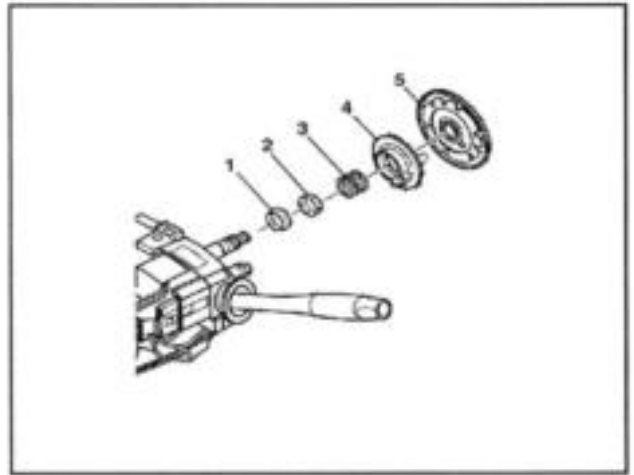
1. Compress the shaft lock shield assembly using J 23653-SIR and J 42137.
2. Remove the bearing retainer (1) from the steering shaft assembly.
3. Discard the bearing retainer.
3. Remove J23653-SIR and J 42137 from the steering shaft assembly.
4. Remove the following parts from the steering shaft assembly:
 - 4.1. The shaft lock shield assembly (4)
 - 4.2. The turn signal cancel cam assembly (3) 7.3.
 - The upper bearing spring (2)
 - 4.4. The thrust washer (1)



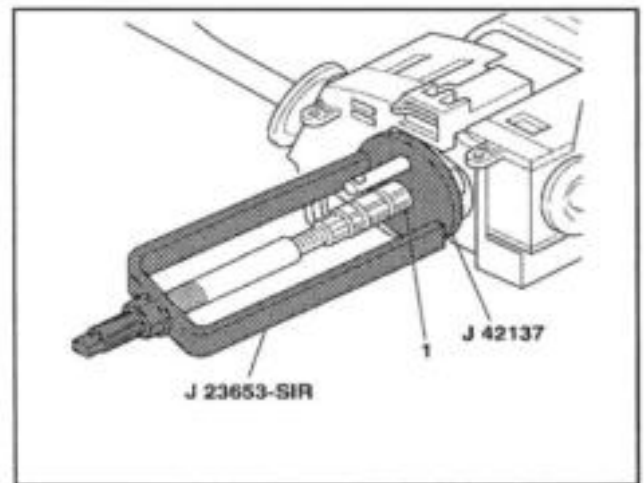
Installation Procedure

1. Install the following parts onto the steering shaft assembly:

- 1.1. The thrust washer (1)
- 1.2. The upper bearing spring (2)
- 1.3. Lubricate the turn signal cancel ca assembly with GM P/N 2377900:2. Compress the shaft lock shield assembly using J 23653-SIR and J 42137.



2. Compress the shaft lock shield using J23653-SIR and J 42137. Install the new bearing retainer (1) onto the steering shaft assembly.
3. Firmly seat the bearing retainer (1) into the groove on the steering shaft assembly.
3. Remove J 23653-SIR and J 42137 from the steering shaft assembly.



Steering Column Replacement

Tools Required

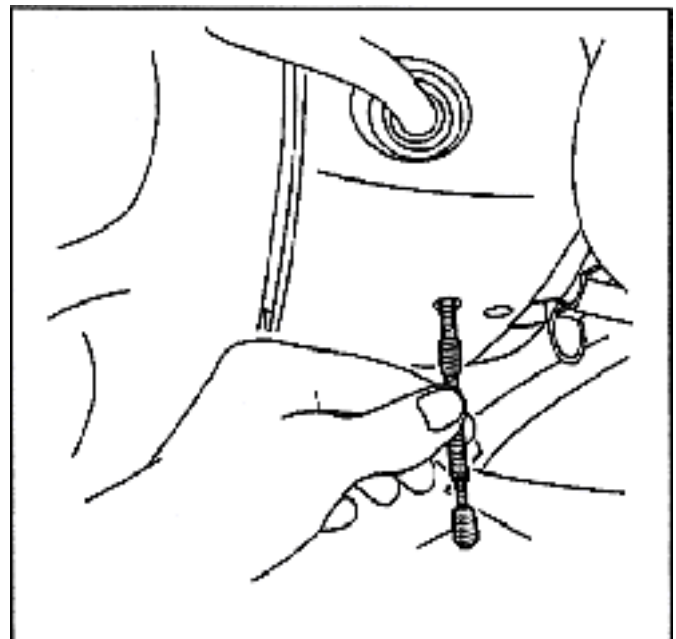
- J 42640 Steering Column Pin

Removal Procedure

Important: Position the wheels straight ahead, and lock the steering column.

1. Remove the left knee bolster trim panel, if equipped.

Notice: 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.

2. Remove the shift cable (1) from the steering column. & (Canadian P/N 10953529)
3. Install the J 42640 in the lower steering column shroud access hole.
4. Remove the Intermediate shaft from the steering gear..
5. Remove the steering column electrical connectors.
6. Remove the nuts retaining the column to the IP
7. Remove the column from the vehicle.

Installation Procedure

Caution: *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 column to the vehicle.

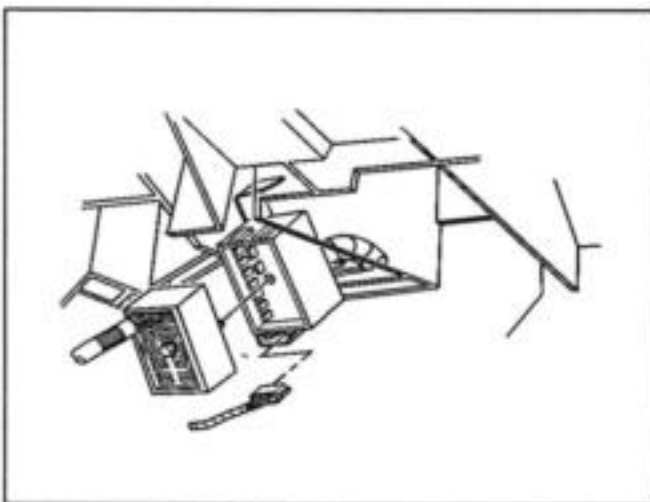
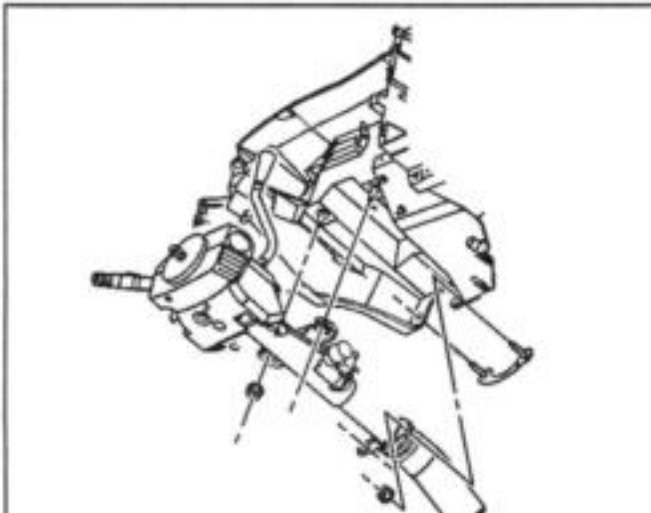
Notice: **Refer to Fastener Notice in Cautions and Notices.**

2. Install the nuts retaining the column to the IP.

Tighten

Tighten the support bolts and the nut to 25 N-m (18 lb ft).

3. Install the steering column electrical connectors.
4. Install the steering column to the intermediate shaft. Refer to Intermediate Steering Shaft Replacement in this section.
5. Remove the J 42640 from the lower steering column shroud access hole.



DESCRIPTION AND OPERATION

Steering Wheel and Column Description and Operation

The steering wheel and column has 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 column. At the lower end of the column, the intermediate shaft connects the column to the steering gear.

Vehicle Security-Some Vehicle Models

Theft deterrent components are mounted and designed into the steering column. The following components allow the column to be locked in order to minimize theft:

- The ignition switch
- The steering column lock
- The ignition cylinder

Driver Convenience

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

The following controls may be mounted on or near the steering wheel or column.

- The turn signal switch
- The hazard switch
- The headlamp dimmer switch
- The wiper/washer switch
- The horn pad/cruise control switch
- The tilt or tilt/telescoping functions

Driver Safety

The energy-absorbing steering column compresses in the event of a front-end collision, which reduces the chance of injury to the driver. The mounting capsules break away from the mounting bracket in the event of an accident.