

2013 STEERING

Steering Wheel and Column - Malibu

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Intermediate Steering Shaft Lower Bolt		
• First Pass	25 N.m	18 lb ft
• Final Pass	185 degrees	
Intermediate Steering Shaft Upper Bolt		
• First Pass	25 N.m	18 lb ft
• Final Pass	185 degrees	
Steering Column Nut	22 N.m	16 lb ft
Steering Wheel Bolt	30 N.m	22 lb ft

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](#).

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:

- [Steering Column Tilt Function Inoperative](#)
- [High Telescoping Effort](#)
- [Noise While Driver Adjusting Column](#)
- [Noise in Steering Column](#)
- [Looseness in Steering Column](#)

STEERING COLUMN TILT FUNCTION INOPERATIVE

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
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	If equipped, verify that the following components are not seized or corroded: • Tilt pivot pins • Tilt head lock shoes Are the components seized or corroded?	Go to Step 7	Go to Step 4
4	Inspect the tilt pivot pins for binding. Are the tilt pivot pins binding?	Go to Step 8	Go to Step 5
5	Inspect for a weak or broken steering column tilt spring. Is the steering column tilt spring weak or broken?	Go to Step 9	Go to Step 6
6	Inspect the steering column wiring harness routing for tightness. Was the steering column wiring harness routed correctly?	Go to Step 11	Go to Step 10
7	Replace the steering column. Refer to Steering Column Replacement . Did you complete the repair?	Go to Step 11	-
8	If serviceable, replace the pivot pins. If not serviceable replace the steering column. Refer to Steering Column Replacement . Did you complete the repair?	Go to Step 11	-
9	If serviceable, replace the tilt spring. Did you complete the repair?	Go to Step 11	-
10	Route the steering column wiring harness to the correct location. Did you correctly route the wiring harness?	Go to Step 11	-
11	Operate the steering column tilt function in order to verify the repair. Did you correct the condition?	System OK	Go to Step 3

HIGH TELESCOPING EFFORT

High Telescoping Effort

Checks	Action
The steering shaft assembly is bent or damaged.	If necessary, replace the steering column. Refer to <u>Steering Column Replacement</u> .

NOISE WHILE DRIVER ADJUSTING COLUMN

Noise While Driver Adjusting Column

Checks	Action
Interference occurs in the column assembly pivot path.	Inspect the column jacket for wear patterns. Ensure that the mounting and the pivot bolts are properly installed and that the column is properly aligned in the vehicle.

NOISE IN STEERING COLUMN

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 <u>Symptoms - Steering Wheel and Column</u>
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
	Inspect the steering column upper and lower		

6	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 <u>Steering Column Replacement</u> . Tighten the steering column mounting fastener to specifications. Refer to <u>Fastener Tightening Specifications</u> . Did you complete the repair?	Go to Step 15	-
10	Replace the SIR/SRS coil. Refer to <u>Steering Wheel Airbag Coil Replacement</u> . 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 <u>Steering Column Replacement</u> . 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	-
	Replace the appropriate steering intermediate		

14	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

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
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
5	NOTE: If the steering column mounting feature is damaged or sheared, replace the steering column. Refer to Steering Column Replacement . Tighten the steering column mounting fastener to specifications. Refer to Fastener Tightening Specifications . 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 Steering Column Replacement . 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

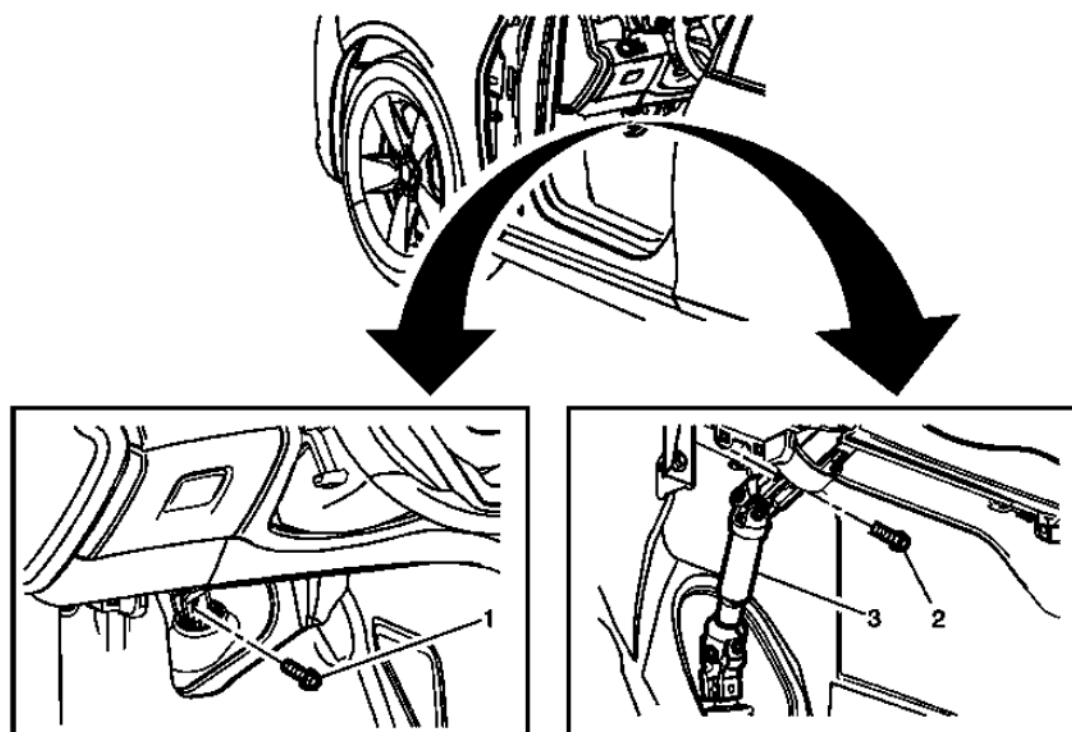


Fig. 1: Intermediate Steering Shaft & Bolts
Courtesy of GENERAL MOTORS COMPANY

Intermediate Steering Shaft Replacement

Callout	Component Name
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.

Preliminary Procedures

1. With the wheels of the vehicle in the straight ahead position, LOCK the steering column.
2. Remove the instrument panel insulator. Refer to **Instrument Panel Insulator Replacement**.
3. Place match marks on the steering gear pinion shaft and the intermediate steering shaft.
4. Place match marks on the steering column shaft and the intermediate steering shaft.

1	Intermediate Steering Shaft Lower Bolt CAUTION: Refer to <u>Fastener Caution</u>. Procedure Apply thread locking adhesive to the bolt. Tighten 1. 25 N.m (18 lb ft) 2. 185 degrees
2	Intermediate Steering Shaft Upper Bolt Procedure Apply thread locking adhesive to the bolt. Tighten 1. 25 N.m (18 lb ft) 2. 185 degrees
3	Intermediate Steering Shaft Procedure If replacing the intermediate steering shaft, copy the match marks from the old intermediate steering shaft to the new intermediate steering shaft. NOTE: Ensure the steering column dash inner and outer seals are positioned properly on the dash panel.

STEERING COLUMN UPPER TRIM COVER REPLACEMENT

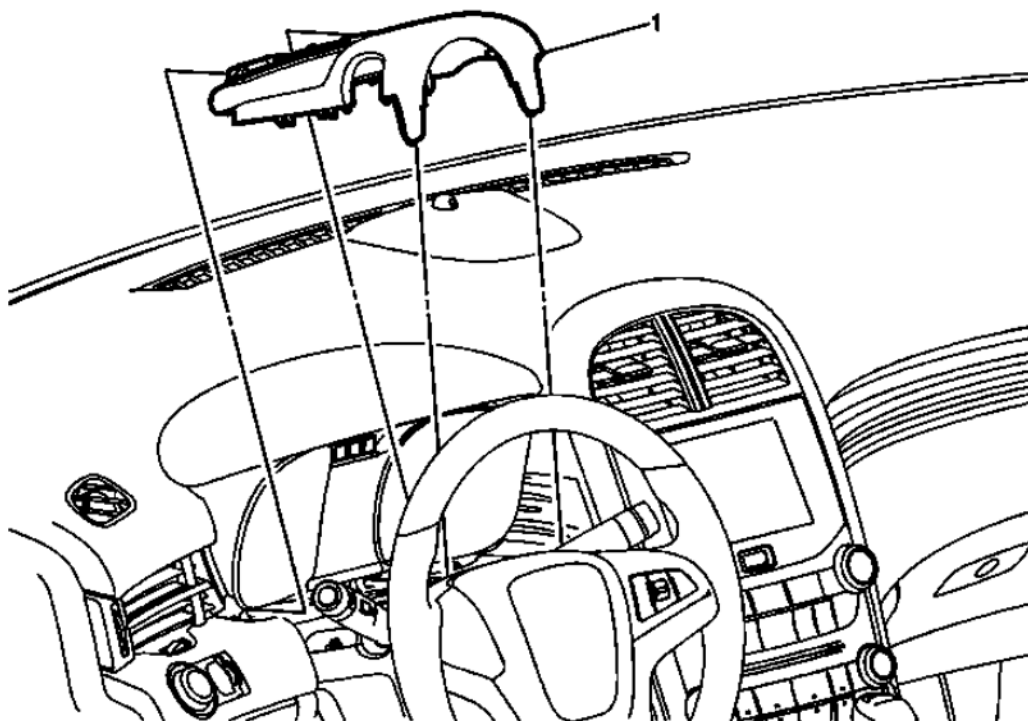


Fig. 2: Steering Column Upper Trim Cover
 Courtesy of GENERAL MOTORS COMPANY

Steering Column Upper Trim Cover Replacement

Callout	Component Name
1	Steering Column Upper Trim Cover Assembly Procedures 1. Turn the steering wheel to the right in order to release the left tab securing the upper trim cover to the lower trim cover. 2. Release the retainers along the left side of the upper trim cover securing it to the lower trim cover. 3. While holding the left side of the trim cover up, turn the steering wheel enough to release the right retainer tab securing the right side of the upper trim cover to the lower trim cover. 4. Release the retainers along the right side of the upper trim cover securing it to the lower trim cover. 5. Grasp the steering column upper trim cover assembly and pull rearward releasing the clips securing the assembly to the instrument cluster.

STEERING COLUMN LOWER TRIM COVER REPLACEMENT

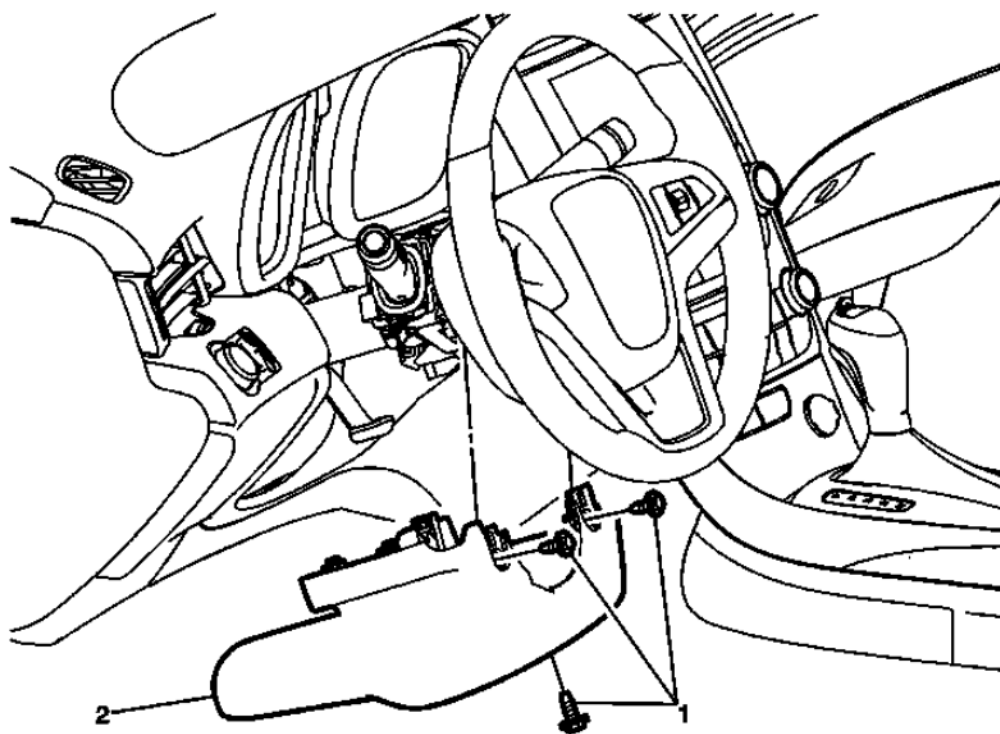


Fig. 3: Steering Column Lower Trim Cover
 Courtesy of GENERAL MOTORS COMPANY

Steering Column Lower Trim Cover Replacement

Callout	Component Name
Preliminary Procedure Remove the steering column upper trim cover assembly. Refer to <u>Steering Column Upper Trim Cover Replacement</u> .	
1	Steering Column Lower Trim Cover Fastener (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Procedure Turn the steering wheel right or left enough to access the fasteners.
2	Steering Column Lower Trim Cover

IGNITION LOCK CYLINDER BEZEL REPLACEMENT (WITHOUT BTM)

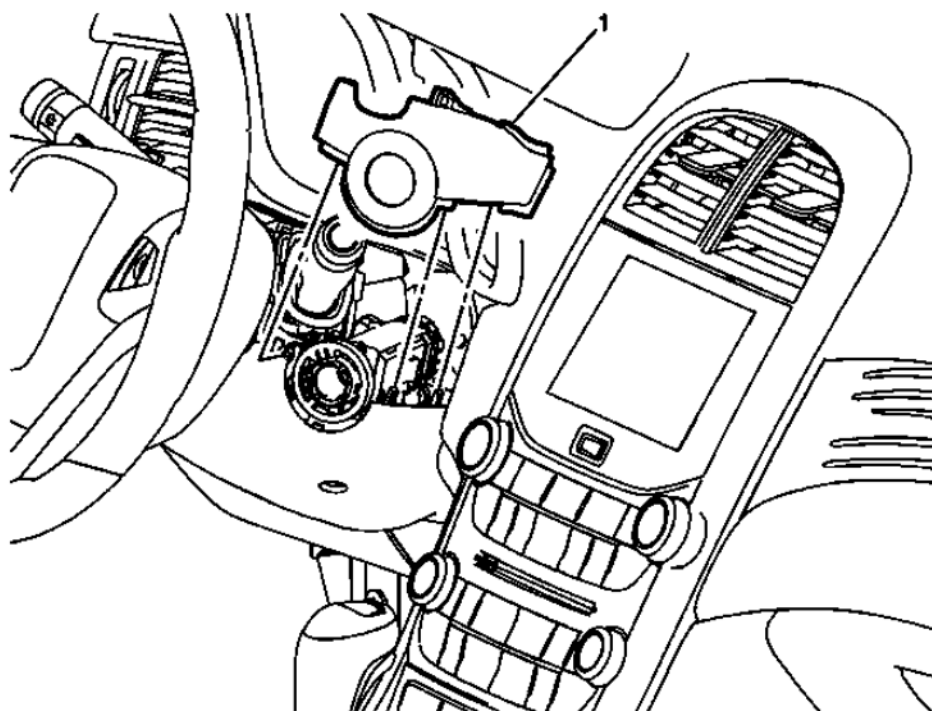


Fig. 4: Ignition Lock Cylinder Bezel (Without BTM)

Courtesy of GENERAL MOTORS COMPANY

Ignition Lock Cylinder Bezel Replacement (Without BTM)

Callout	Component Name
Preliminary Procedure Remove the steering column upper trim cover assembly. Refer to <u>Steering Column Upper Trim Cover Replacement</u> .	
1	Ignition Lock Cylinder Bezel Procedure Use a flat bladed plastic trim tool in order to release the retainer tabs securing the lock bezel to the lower steering column cover.

TURN SIGNAL SWITCH BRACKET REPLACEMENT (WITH BTM)

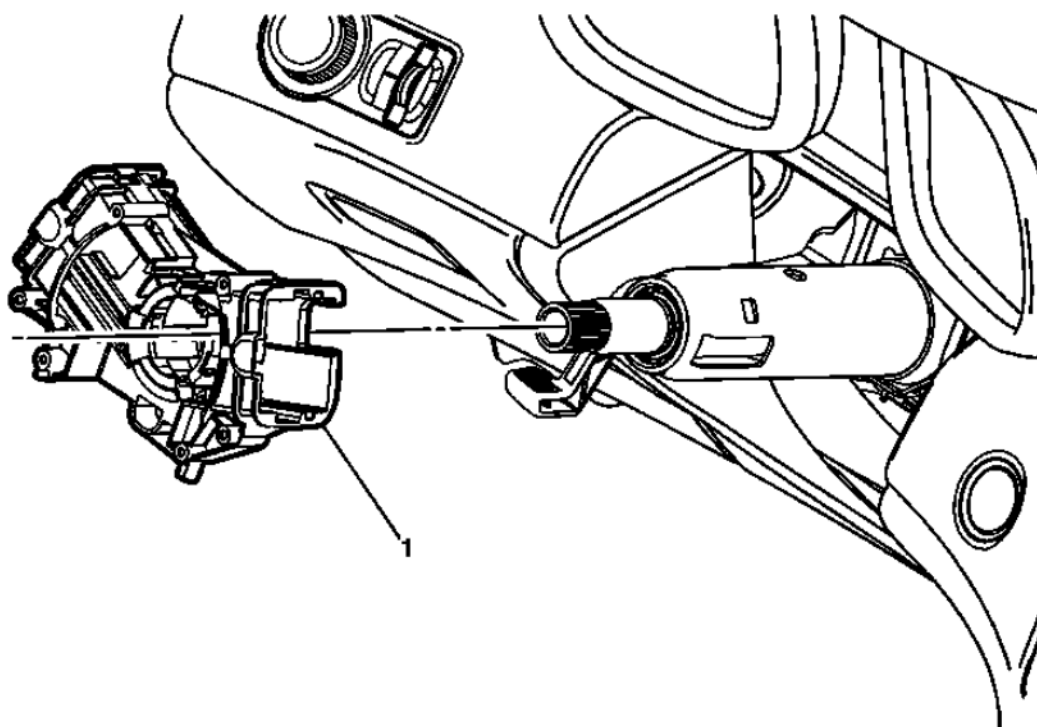


Fig. 5: Turn Signal Switch Bracket (With BTM)
 Courtesy of GENERAL MOTORS COMPANY

Turn Signal Switch Bracket Replacement (With BTM)

Callout	Component Name
Preliminary Procedure	
1. Remove the turn signal multifunction switch. Refer to <u>Turn Signal Multifunction Switch Replacement</u> . 2. Remove the windshield wiper and washer switch. Refer to <u>Windshield Wiper and Washer Switch Replacement</u> . 3. Remove the steering wheel airbag coil. Refer to <u>Steering Wheel Airbag Coil Replacement</u> .	
1	Turn Signal Switch Bracket Procedure Release the plastic retaining tabs to release the turn signal switch bracket from the steering column.

TURN SIGNAL SWITCH BRACKET REPLACEMENT (WITHOUT BTM)

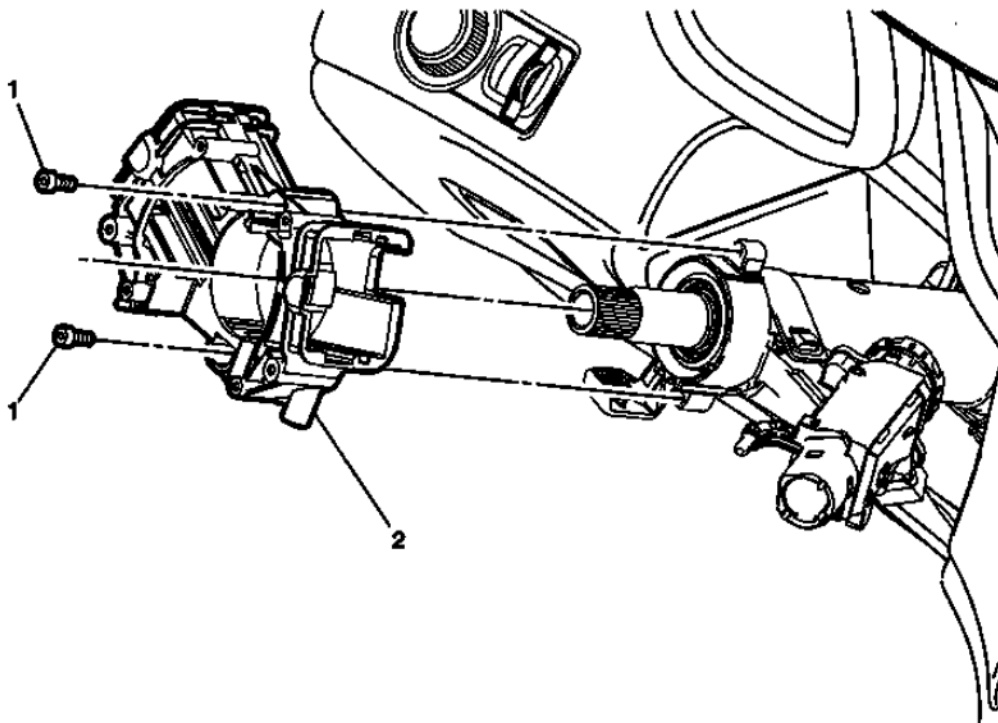


Fig. 6: Turn Signal Switch Bracket (Without BTM)

Courtesy of GENERAL MOTORS COMPANY

Turn Signal Switch Bracket Replacement (Without BTM)

Callout	Component Name
Preliminary Procedure	
1. Remove the turn signal multifunction switch. Refer to <u>Turn Signal Multifunction Switch Replacement</u> .	
2. Remove the windshield wiper and washer switch. Refer to <u>Windshield Wiper and Washer Switch Replacement</u> .	
3. Remove the steering wheel airbag coil. Refer to <u>Steering Wheel Airbag Coil Replacement</u> .	
1	Turn Signal Switch Bracket Fastener (Qty: 2)
2	Turn Signal Switch Bracket

TURN SIGNAL MULTIFUNCTION SWITCH REPLACEMENT

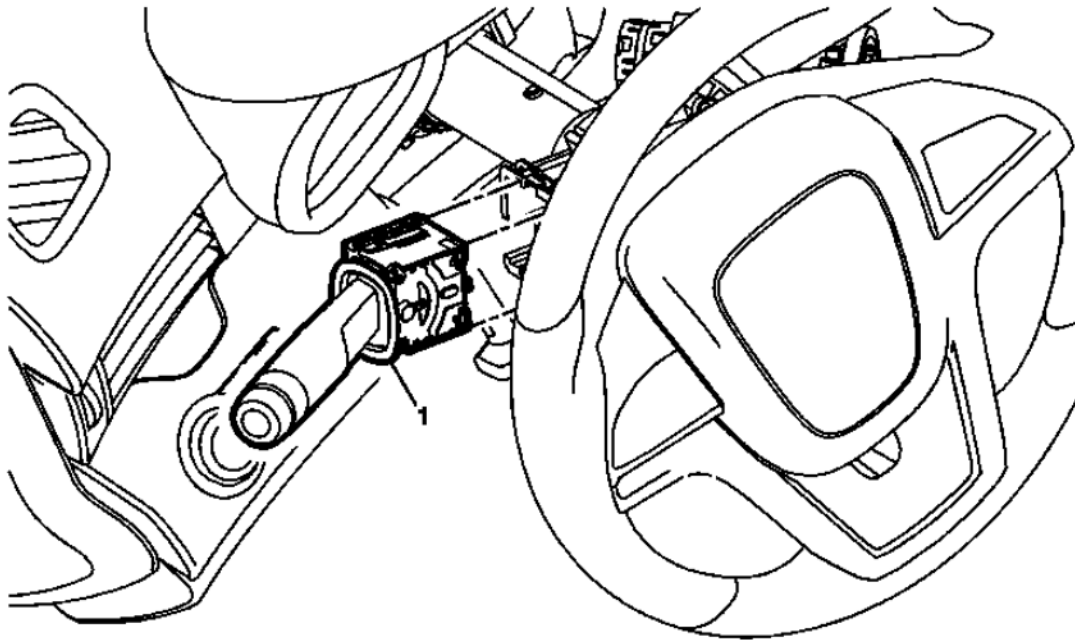


Fig. 7: Turn Signal Multifunction Switch
 Courtesy of GENERAL MOTORS COMPANY

Turn Signal Multifunction Switch Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the steering column upper trim cover. Refer to <u>Steering Column Upper Trim Cover Replacement</u>. 2. If equipped with BTM, remove the steering column lower trim cover. Refer to <u>Steering Column Lower Trim Cover Replacement</u>. 3. If not equipped with BTM, remove the ignition lock cylinder bezel. Refer to <u>Ignition Lock Cylinder Bezel Replacement (Without BTM)</u>.	
1	Turn Signal Multifunction Switch Procedure 1. Disconnect electrical connectors. 2. Release the retaining tabs and remove the turn signal multifunction switch from the turn signal switch bracket.

STEERING WHEEL REPLACEMENT

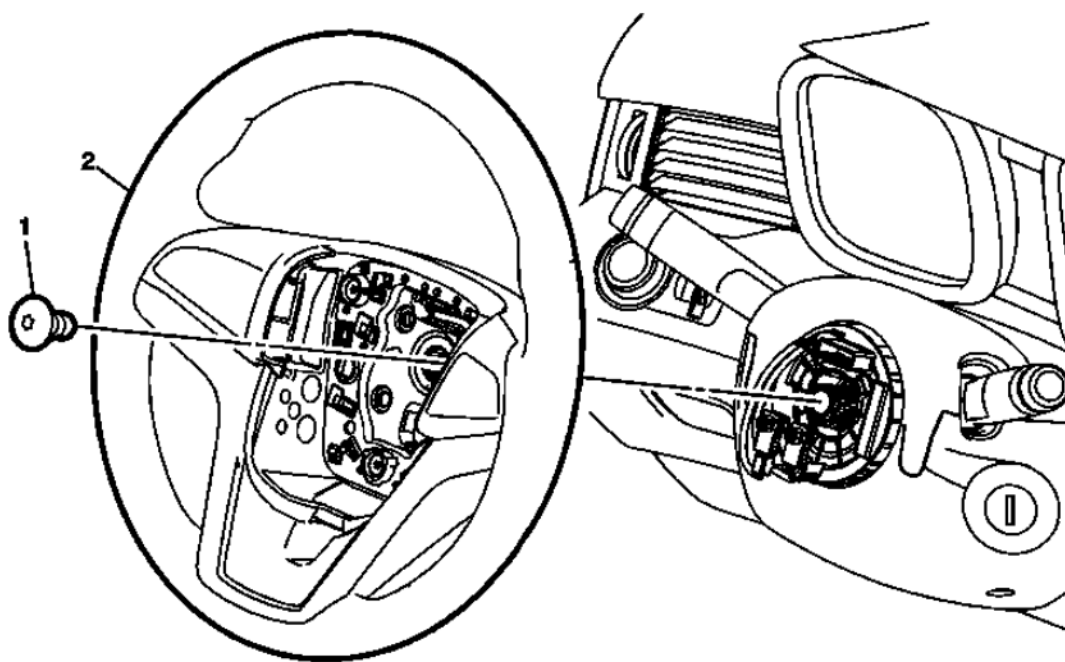


Fig. 8: Steering Wheel

Courtesy of GENERAL MOTORS COMPANY

Steering Wheel Replacement

Callout	Component Name
Preliminary Procedure Remove the steering wheel airbag. Refer to Steering Wheel Airbag Replacement .	
1	Steering Wheel Bolt CAUTION: Refer to Fastener Caution . Procedure Clean the bolt threads and apply new locking agent. Tighten 30 N.m (22 lb ft)
2	Steering Wheel Procedure 1. Disconnect electrical connectors. 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.
5. Transfer any parts as needed.

STEERING WHEEL SPOKE LOWER COVER REPLACEMENT

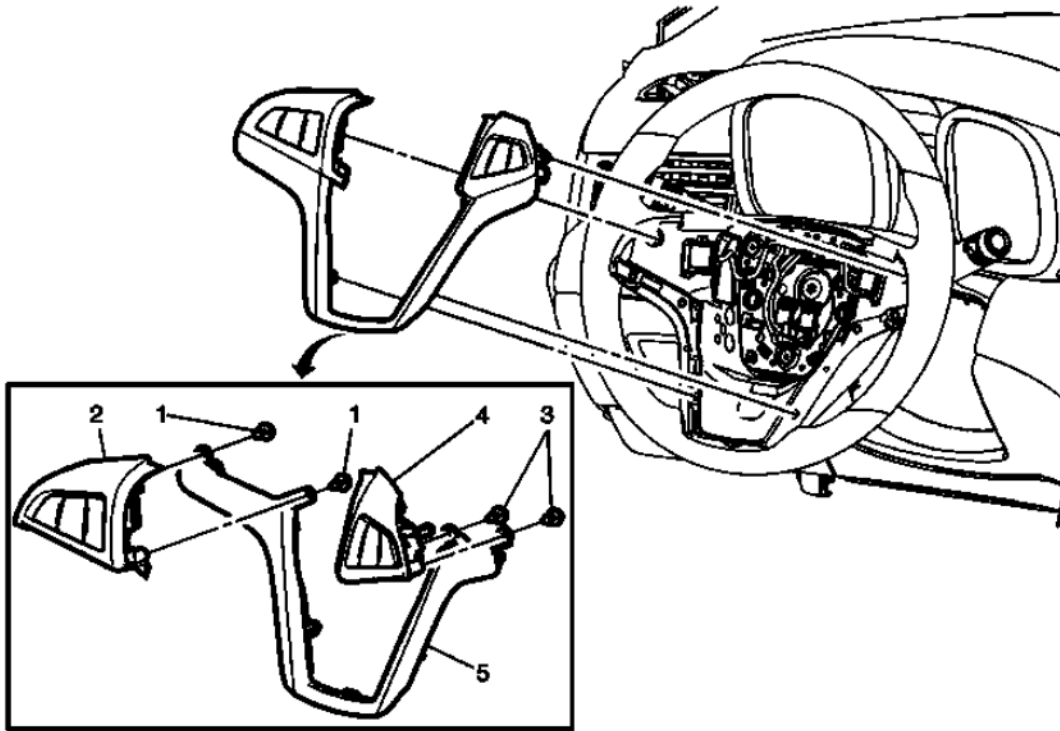


Fig. 9: Steering Wheel Spoke Lower Cover
Courtesy of GENERAL MOTORS COMPANY

Steering Wheel Spoke Lower Cover Replacement

Callout	Component Name
Preliminary Procedure 1. Remove the steering wheel airbag. Refer to <u>Steering Wheel Airbag Replacement</u>. 2. Use a flat bladed plastic trim tool in order to remove the steering wheel lower cover assembly from the steering wheel. 3. Disconnect the electrical connections.	
1	Steering Wheel Spoke Lower Cover Screws (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> .
	Cruise Control Switch

2	If equipped with RPO K34, remove the cruise control switch. Refer to <u>Cruise Control Switch Replacement</u> . If the vehicle is not equipped with RPO K34, remove the left spoke cover.
3	Steering Wheel Spoke Lower Cover Screws (Qty: 2)
4	Radio and Telephone Control Switch If equipped with RPO W1Y, remove the radio and telephone control switch. Refer to <u>Radio and Telephone Control Switch Replacement</u> . If the vehicle is not equipped with RPO W1Y, remove the right spoke cover.
5	Steering Wheel Spoke Lower Cover

STEERING COLUMN REPLACEMENT

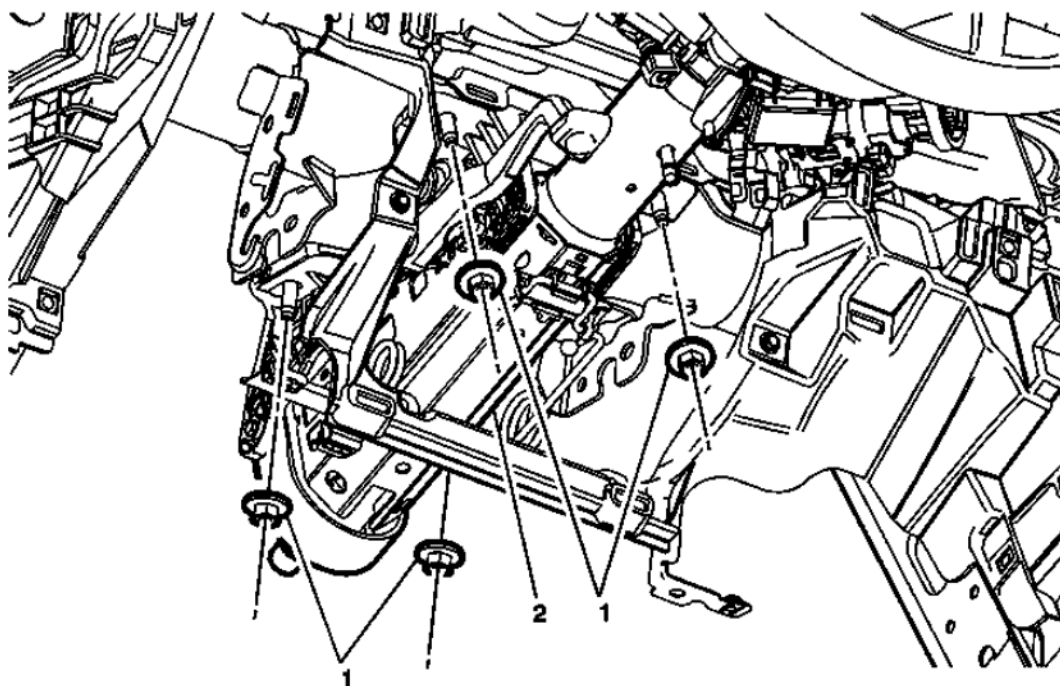


Fig. 10: Steering Column

Courtesy of GENERAL MOTORS COMPANY

Steering Column Replacement

Callout	Component Name
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 steering shaft coupling
- The intermediate shaft(s)

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.

Preliminary Procedures

1. LOCK the steering column and verify the front wheels are in the straight ahead position.
2. Remove the steering column opening lower filler. Refer to **Steering Column Opening Lower Filler Replacement** .
3. If the vehicle is not equipped with BTM, remove the ignition lock cylinder bezel. Refer to **Ignition Lock Cylinder Bezel Replacement (Without BTM)**.
4. Remove the steering column upper trim cover and the steering column lower trim cover. Refer to **Steering Column Lower Trim Cover Replacement**.
5. Place match marks on the steering column shaft and the intermediate steering shaft.
6. Disconnect the intermediate steering shaft from the steering column. Refer to **Intermediate Steering Shaft Replacement**.

1	Steering Column Nut (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 22 N.m (16 lb ft)
2	Steering Column 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. Procedure 1. Disconnect any electrical connectors as needed.

2. If replacing the steering column, copy the match marks from the old steering column to the new steering column.
3. Transfer any parts as necessary.
4. After installation, center the steering angle sensor. Refer to **Steering Angle Sensor Centering** .

STEERING ANGLE SENSOR REPLACEMENT

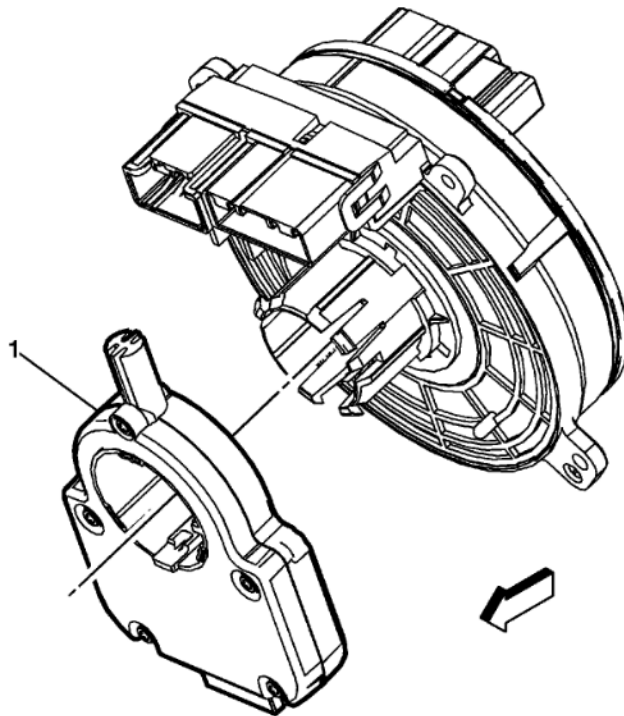


Fig. 11: View Of Steering Angle Sensor
Courtesy of GENERAL MOTORS COMPANY

Steering Angle Sensor Replacement

Callout	Component Name
Preliminary Procedure Remove the steering wheel airbag coil. Refer to <u>Steering Wheel Airbag Coil Replacement</u> .	
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 <u>Steering Angle Sensor Centering</u> .

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.

The steering column can be adjusted vertically and longitudinally.

Vehicle Security

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
- The theft deterrent immobilizer module, if equipped

Steering Column Lock

The Steering Column Lock Module (SCLM) controls the steering wheel theft deterrent lock function, which allows the column to be electronically locked. When a valid key is used to start the vehicle, the BCM recognizes this and will send the encrypted password to the SCLM. The SCLM will compare its own stored password to the encrypted password sent by the BCM. If the data matches, the steering column will be unlocked.

In order for the steering column to be locked the SCLM has to see 3 inputs.

1. The BCM power mode is OFF.
2. The vehicle is stationary based on zero speed reported from all ABS wheel speed sensors.
3. The driver or passenger door is opened reported by the PEPS module.

When the SCLM receives these inputs, the steering column will be locked.

The SCLM monitors the column lock system and will set DTC codes when the module detects malfunctions within the system. When a malfunction occurs the driver information center (DIC) will display the Service Column Lock Now message indicating DTC codes are set within the SCLM.

Driver Convenience

The steering wheel and column may also have driver controls attached for convenience and comfort. The following controls may be mounted on the steering wheel or column.

- The turn signal switch
- The headlamp dimmer switch
- The wiper/washer switch
- The horn pad
- The redundant radio/entertainment system controls
- The tilt functions
- The telephone system controls
- The driver information center controls
- The cruise control functions
- The automatic transmission manual setting function

Driver Safety

The steering wheel and column has safety features to protect the driver. The following components may be mounted on or near the steering column:

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.

SIR Coil and Module

For additional information on the operation of the SIR coil and module, refer to **Supplemental Inflatable Restraint System Description and Operation** .

Electronic Park Lock/Ignition Lock Cylinder Control Actuator

If the vehicle is equipped with automatic transmission and a floor mounted console gear shift, it has an ignition lock cylinder control actuator system in the steering column. The ignition lock cylinder control actuator purpose is to prevent the ignition key from being turned to the OFF position when the transmission is in any position other than PARK and the vehicle may still be moving. The column ignition lock system consists of an ignition lock cylinder control actuator, and a park position switch that is located in the automatic transmission shift lock control switch. The ignition lock cylinder control actuator contains a pin that is spring loaded to mechanically prevent the ignition key cylinder from being turned to the lock position when the vehicle transmission is not in

the PARK position. If vehicle power is lost, and/or the transmission is not in the PARK position the operator will not be able to turn the ignition key to the lock position and will not be able to remove the ignition key from the column. Depending on the implementation, logic might be inverted: Key can be removed by power off.

Steering Wheel Angle Sensor

The steering wheel angle sensor is located somewhere along the steering shaft assembly. The sensor measures the position of the steering wheel and the speed at which it is rotated. A signal representing this measurement is provided to the vehicle stability enhancement system in the ABS module and to the variable effort steering system.

The Theft Deterrent Immobilizer Module

The immobilizer module is mounted in the steering column lock on cars without Passive Entry Passive Start system. Refer to .