

# **Component Procedures: Steering Wheel**

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# Component Procedures: Steering Wheel

## Parts and Labor (itype\_189)

### Parts

Qualifier	Part #	Name	Price	Note
Steering Wheel > Without Red?	22896546	5 - Steering Wheel	445.02	Includes: Rear Cover.
Steering Wheel > Without Red?	22790898	5 - Steering Wheel	310.22	Includes: Rear Cover.
Steering Wheel > Without Red?	22790899	5 - Steering Wheel	287.28	Includes: Rear Cover.
Steering Wheel > With Redund?	22790894	5 - Steering Wheel	355.52	Includes: Rear Cover.
Steering Wheel > With Redund?	22790895	5 - Steering Wheel	375.54	Includes: Rear Cover.
Steering Wheel > With Redund?	22850115	5 - Steering Wheel	324.58	Includes: Rear Cover.
Steering Wheel > With Redund?	22790891	5 - Steering Wheel	343.82	Includes: Rear Cover.
Steering Wheel > With Redund?	22790891	5 - Steering Wheel	343.82	Includes: Rear Cover.
Steering Wheel > With Redund?	22790892	5 - Steering Wheel	364.13	Includes: Rear Cover.
Steering Wheel > With Redund?	22850115	5 - Steering Wheel	324.58	Includes: Rear Cover.

### Labor

Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Replace	Steering Wheel > Steering Wheel, R&R	B	0.5	0.3

## Steering Wheel and Column (Article 13486)

The steering wheel and column has 4 primary functions:

- Heated Steering Wheel
- Vehicle steering
- Vehicle security
- Driver convenience
- Driver safety

#### Heated Steering Wheel

The heated steering wheel control module controls the heated steering wheel and the heated steering wheel ON indicator based on an input from the heated steering wheel switch. When the heated steering wheel switch is pressed, the switch signal circuit is pulled to ground. This indicates to the heating steering wheel control module that steering wheel heat is requested. When the request is seen, the heated steering wheel control module supplies ground to the indicator lamp and supplies voltage to the heating elements, which are internal to the steering wheel. The heated steering wheel temperature is monitored through an internal temperature sensor. When the steering wheel reaches operating temperature the module will cycle the voltage on and off to maintain the operating temperature.

#### 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, Found on 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—location varies
- The steering column lock —content varies
- The ignition cylinder—location varies
- The theft deterrent module—location varies

#### 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 redundant radio/entertainment system controls
- The manual/power tilt or tilt/telescoping functions

- The power pedal adjustment control switch
- The navigation/OnStar® features
- The HVAC controls

#### 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:

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. In addition to these features, the following driver safety features may be on the steering column. To inspect the steering column for damage, refer to Steering Column Accident Damage Inspection .

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.

If the vehicle is equipped with a column mounted gear shift, it has a linear shift assembly on the steering column. The linear shift assembly has a cable that runs from the linear shift assembly to the ignition lock cylinder case. The purpose of this cable is to prevent the ignition key from being turned to the OFF position when the transmission is in gear and the vehicle may still be moving. The linear shift assembly cable 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.

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

The automatic transmission shift lock control system is a safety device that prevents an inadvertent shift out of PARK when the engine is running. The driver must press the brake pedal before moving the shift lever out of the PARK position. The system consists of the following components: the automatic transmission shift lock control solenoid, the automatic transmission shift lock control switch, the body control module (BCM), the powertrain control module (PCM)/engine control module (ECM). With the ignition in the ON position, voltage is supplied to automatic transmission shift lock control switch. Voltage flows through the normally closed contacts of the automatic transmission shift lock control switch to the automatic transmission shift lock control solenoid. When the BCM receives a class 2 message from the PCM/ECM indicating the transmission is in the park position the BCM then grounds the automatic transmission shift lock solenoid control circuit . This energizes the automatic transmission shift lock control solenoid causing the transmission shift lever to be physically locked in the PARK position. When the brake pedal is pressed the contacts in the automatic transmission shift lock control switch open, de-energizing the automatic transmission shift lock control solenoid. This allows the shift lever to be move out of the PARK position.

The steering wheel position 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 (VSES) module. The VSES module uses this signal, along with several others representing different vehicle conditions, to monitor the driving behavior of the vehicle and ensure that it stays in control. If the VSES module determines that the vehicle is out of control it provides signals to the powertrain control module (PCM) and the ABS module. These output signals are used to modulate the transmission torque and brake pressure of each of the vehicles wheels in order to regain control of the vehicle.

## Steering Wheel Replacement (Article 13498)

Callout Component Name

Preliminary Procedure Steering Wheel Airbag Replacement .

Preliminary Procedure

- Steering Wheel Airbag Replacement .

1 Steering Wheel Bolt Procedure Prepare the steering wheel bolt for installation as follows: Remove all traces of the adhesive patch from the steering wheel bolt. Clean the threads of the bolt with denatured alcohol.

Apply thread locking adhesive to the steering wheel bolt. Adhesives, Fluids, Lubricants, and Sealers Ensure there are no gaps in the thread locking adhesive along the length of the filled area of the threads on the bolt shaft. Caution: Fastener Caution . Note: The ONLY acceptable bit for removing and installing the steering wheel bolt is a T50 bit. Do NOT use any other size bit or a worn T50 bit or the bolt recess MAY strip and the bolt may NOT be removable. If a power tool is used to remove the steering wheel bolt, the tool must have a torque rating greater than 75 Nm (55 lb ft) and both the power tool and the T50 bit MUST be positioned perpendicular to the bolt recess. Tighten 30 Nm (22 lb ft)

Procedure

- Prepare the steering wheel bolt for installation as follows:
- Remove all traces of the adhesive patch from the steering wheel bolt.
- Clean the threads of the bolt with denatured alcohol.
- Apply thread locking adhesive to the steering wheel bolt. Adhesives, Fluids, Lubricants, and Sealers
- Ensure there are no gaps in the thread locking adhesive along the length of the filled area of the threads on the bolt shaft.
- The ONLY acceptable bit for removing and installing the steering wheel bolt is a T50 bit. Do NOT use any other size bit or a worn T50 bit or the bolt recess MAY strip and the bolt may NOT be removable.
- If a power tool is used to remove the steering wheel bolt, the tool must have a torque rating greater than 75 Nm (55 lb ft) and both the power tool and the T50 bit MUST be positioned perpendicular to the bolt recess.

Tighten

30 Nm (22 lb ft)

2 Steering Wheel Procedure Disconnect the electrical connectors. Install the steering wheel bolt until 2 to 3 threads are engaged. Wiggle the steering wheel until the wheel disengages completely. Remove the steering wheel bolt. Transfer components as necessary.

- Disconnect the electrical connectors.
- Install the steering wheel bolt until 2 to 3 threads are engaged.
- Wiggle the steering wheel until the wheel disengages completely.
- Remove the steering wheel bolt.
- Transfer components as necessary.

## **Steering Wheel Spoke Cover Replacement (w/o ZL1) (Article 13500)**

Callout Component Name

Preliminary Procedure Remove the inflatable restraint steering wheel module. Refer to Steering Wheel Airbag Replacement .

Preliminary Procedure

Remove the inflatable restraint steering wheel module. Refer to Steering Wheel Airbag Replacement .

1 Steering Wheel Spoke Control Switch Bezel Procedure Using the appropriate tool, release the retainers to remove the bezel.

Procedure

Using the appropriate tool, release the retainers to remove the bezel.