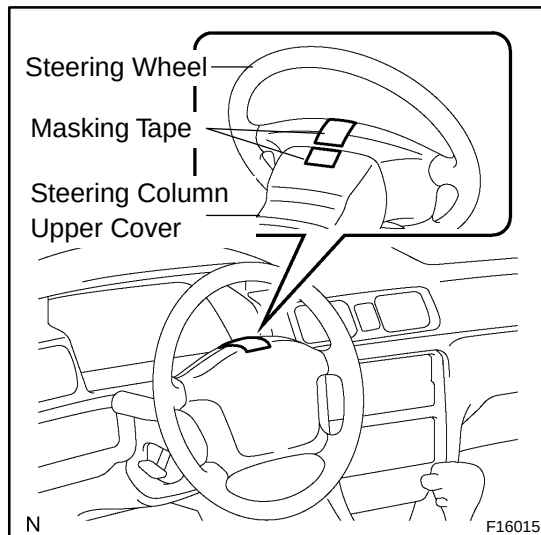
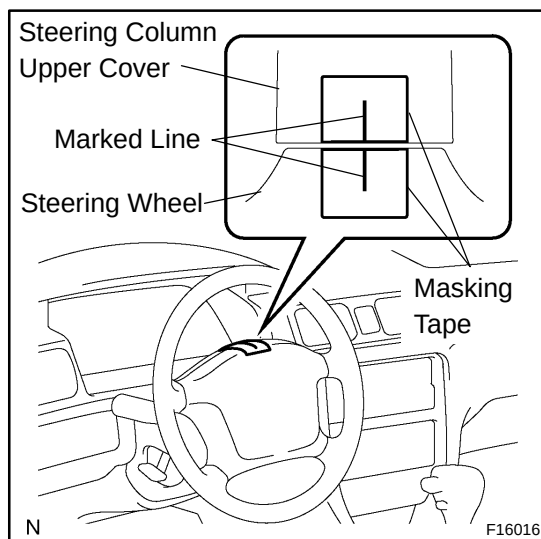




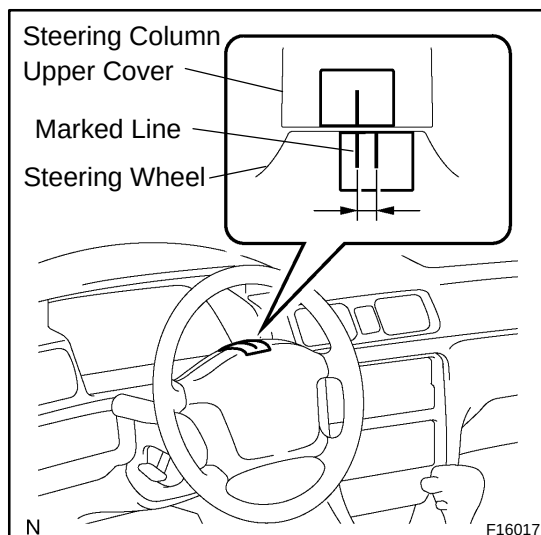
REPAIR

1. STEERING OFF CENTER REPAIR PROCEDURE

- (a) Inspect steering wheel off center.
 - (1) Apply masking tape to the top center of the steering wheel and steering column upper cover.
 - (2) Drive the vehicle in a straight line for 100 meters at a constant speed of 35 mph (56 km/h), and hold the steering wheel to maintain the course.



- (3) Draw a line on the masking tape as shown in the illustration.



- (4) Turn the steering wheel to its straight position.

HINT:

Refer to the upper surface of the steering wheel, steering spoke and SRS airbag line for the straight position.

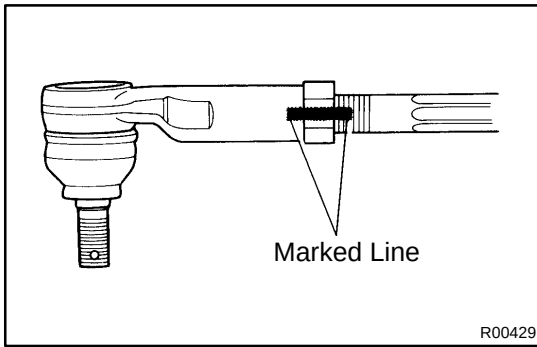
- (5) Draw a new line on the masking tape or the steering wheel as shown in the illustration.
- (6) Measure the distance between the 2 lines on the masking tape of the steering wheel.
- (7) Convert the measured distance to steering angle.

Measured distance 1 mm (0.04 in.) = Steering angle approximately 1 deg.

HINT:

Make a note of the steering angle.

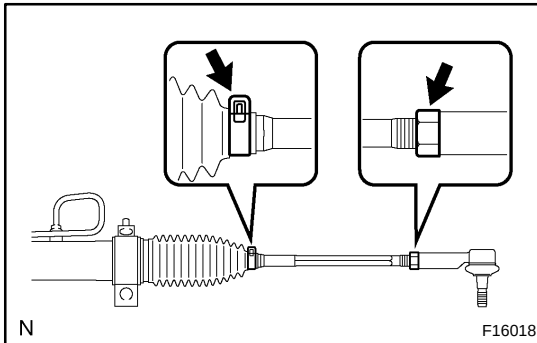
- (b) Adjust the steering angle.



- (1) Draw a line on the RH and LH tie rod and on the RH and LH rack end, which can easily be seen.
- (2) Using a paper gauge, measure the distance from the RH and LH tie rod ends to the rack end screws.

HINT:

- Measure the RH side and LH side.
- Make a note of the measured values.



- (3) Remove the RH and LH boot clips from the rack boots.
- (4) Loosen the RH and LH lock nuts.
- (5) Turn the RH and LH rack end by the same amount (but in different directions) according to the steering angle.

1 turn 360 deg. of rack end (1.5 mm (0.059 in.) horizontal movement) - 12 deg. of steering angle.

- (6) Tighten the RH and LH lock nuts.

Torque: 74 N·m (755 kgf·cm, 55 ft·lbf)

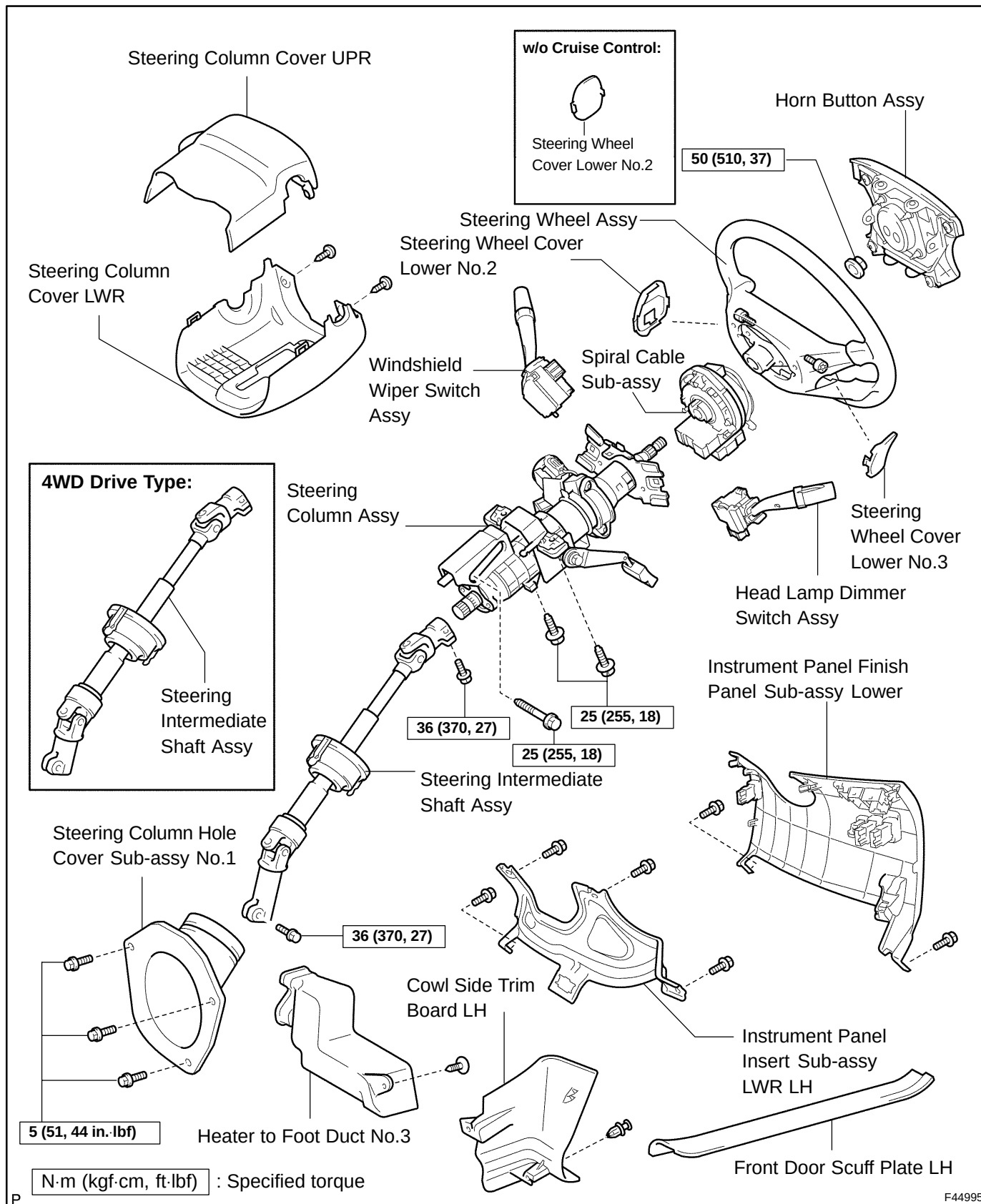
NOTICE:

Make sure that the difference in length between RH and LH tie rod ends and rack end screws are within 1.5 mm (0.059 in.).

- (7) Install the RH and LH boot clips.

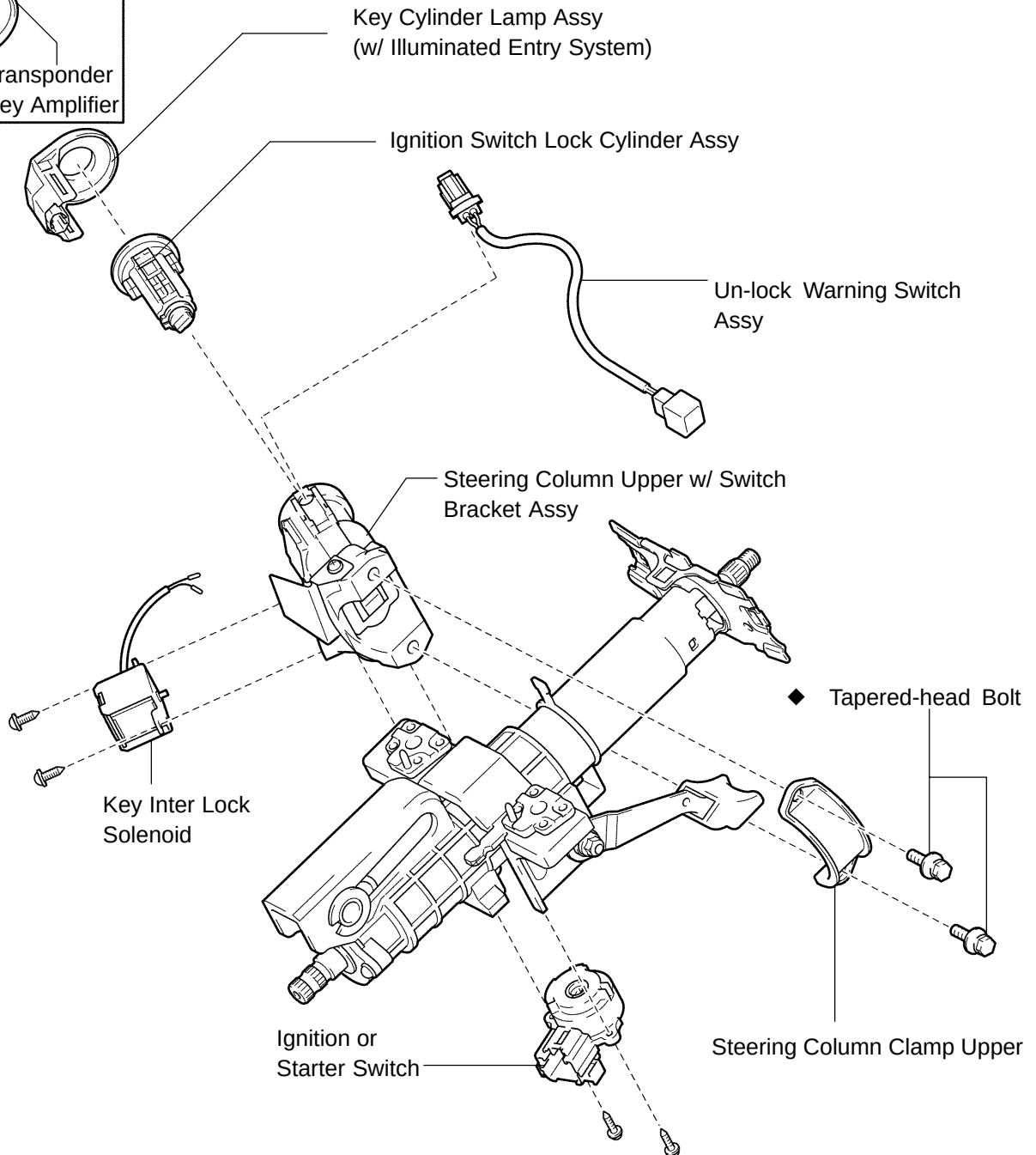
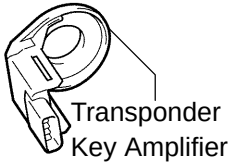
STEERING COLUMN ASSY COMPONENTS

500B8-01



F44995

w/ Engine Immobiliser System:

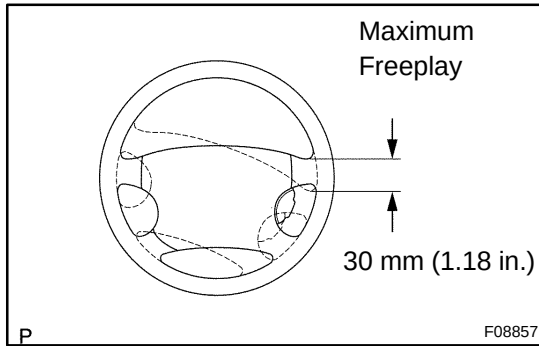


◆ Non-reusable part

P

F44996

ON-VEHICLE INSPECTION



1. CHECK STEERING WHEEL FREEPLAY

- (a) Stop the vehicle and face the tires straight ahead.
- (b) Rock the steering wheel gently up and down with your hand, check the steering wheel freeplay.

Maximum freeplay: 30 mm (1.18 in.)

STEERING

5006L-02

PRECAUTION

1. HANDLING PRECAUTIONS ON STEERING SYSTEM

- (a) Be careful to replace the parts properly because they could affect the performance of the steering system and result in a driving hazard.

2. HANDLING PRECAUTIONS ON SRS AIRBAG SYSTEM

- (a) The SIENNA is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notice for the supplemental restraint system (See page [60-1](#)).

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the likelihood of the cause in the descending order. Check each part in the order shown. Replace these parts as necessary.

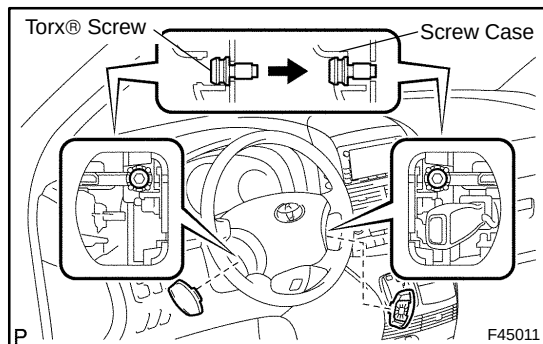
Symptom	Suspect Area	See page
Hard steering	1. Tires (Improperly inflated) 2. Power steering fluid level (Low) 3. Drive belt (Loose) 4. Front wheel alignment (Incorrect) 5. Steering system joints (Worn) 6. Suspension arm ball joints (Worn) 7. Steering column (Binding) 8. Power steering vane pump 9. Power steering gear	28-1 51-3 51-3 26-7 - 26-19 - 51-8 51-19
Poor return	1. Tires (Improperly inflated) 2. Front wheel alignment (Incorrect) 3. Steering column (Binding) 4. Power steering gear	28-1 26-7 - 51-19
Excessive play	1. Steering system joints (Worn) 2. Suspension arm ball joints (Worn) 3. Intermediate shaft, Sliding yoke (Worn) 4. Front wheel bearing (Worn) 5. Power steering gear	- 26-19 - 30-39 51-19
Abnormal noise	1. Power steering fluid level (Low) 2. Steering system joints (Worn) 3. Power steering vane pump 4. Power steering gear	51-3 - 51-8 51-19

OVERHAUL

1. **PRECAUTION** (See page 60-1)
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**

Wait for 90 seconds after disconnecting the battery terminal to prevent the airbag working.

3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**

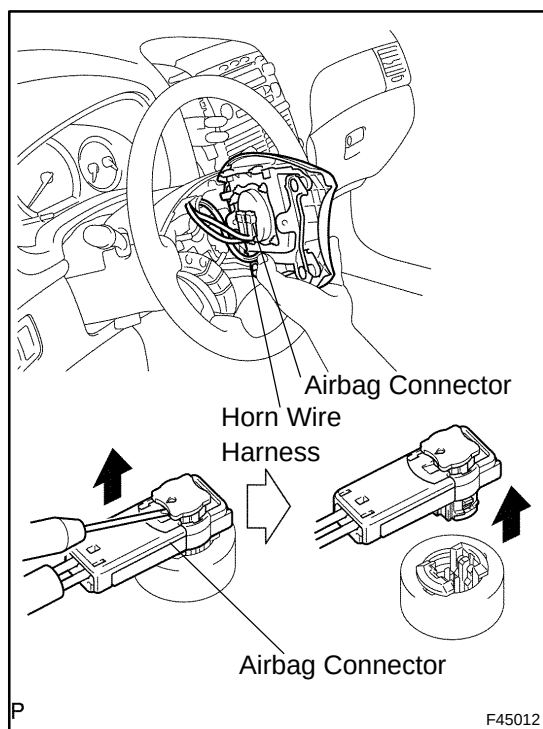


4. **REMOVE STEERING WHEEL COVER LOWER NO.2**
5. **REMOVE STEERING WHEEL COVER LOWER NO.3**
6. **REMOVE HORN BUTTON ASSY**

NOTICE:

If the airbag connector is disconnected with the ignition switch in the ON position, DTCs will be recorded.

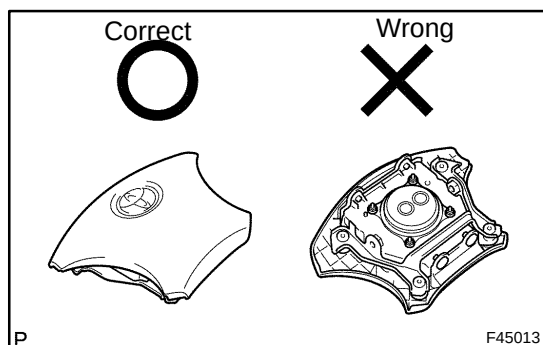
- (a) Using a torx® socket wrench, loosen the 2 torx® screws until the grooves along the screw circumference are caught on the screw case.



- (b) Pull out the horn button assy from the steering wheel and disconnect the airbag connector.
- (c) Disconnect the horn wire harness.

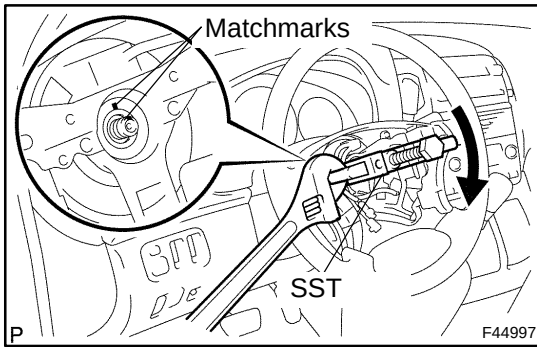
NOTICE:

When removing the horn button assy, take care not to pull on the airbag wire harness or horn wire harness.



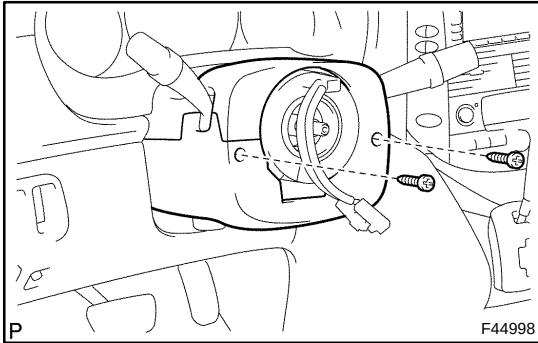
CAUTION:

- When storing the horn button assy, keep the upper surface of the horn button assy facing upward.
- Never disassemble the horn button assy.



7. REMOVE STEERING WHEEL ASSY

- (a) Remove the steering wheel assy set nut.
- (b) Put matchmarks on the steering wheel assy and main shaft assy.
- (c) Using SST, remove the steering wheel assy.
SST 09950- 50013 (09951- 05010, 09952- 05010, 09953-05020, 09954-05021)



8. REMOVE STEERING COLUMN COVER

- (a) Remove the 2 screws and steering column cover.

9. REMOVE SPIRAL CABLE SUB-ASSY (See page 60-28)

10. REMOVE HEADLAMP DIMMER SWITCH ASSY (See page 65-24)

11. REMOVE WINDSHIELD WIPER SWITCH ASSY (See page 66-15)

12. REMOVE FRONT DOOR SCUFF PLATE LH (See page 71-10)

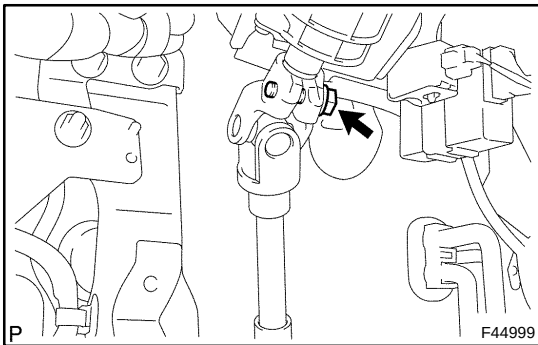
13. REMOVE COWL SIDE TRIM BOARD LH (See page 71-10)

14. REMOVE INSTRUMENT PANEL FINISH PANEL SUB-ASSY LOWER LH (See page 71-10)

15. REMOVE INSTRUMENT PANEL SAFETY PAD INSERT SUB-ASSY NO.1 (See page 71-10)

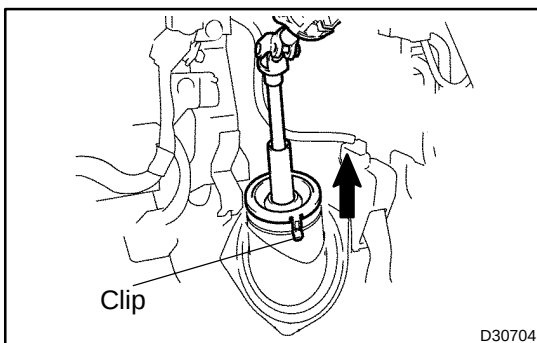
16. REMOVE HEATER TO FOOT DUCT NO.3

- (a) Disengage the 3 claws and remove the air duct No.3.

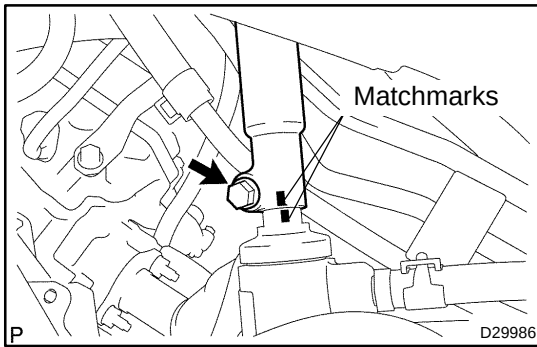


17. SEPARATE STEERING INTERMEDIATE SHAFT ASSY

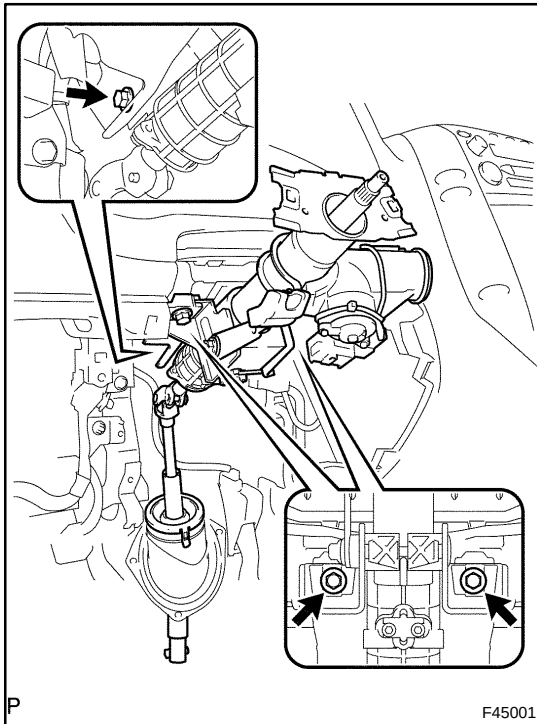
- (a) Loosen the bolt.



- (b) Release the 3 clips and separate the dust cover.

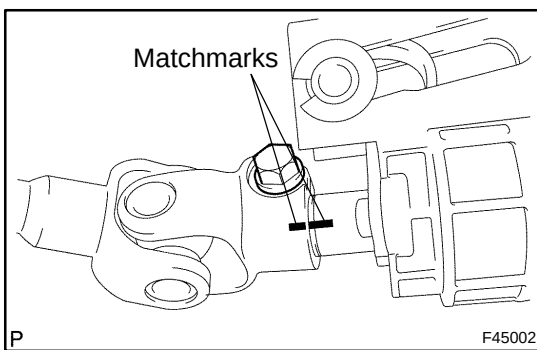


- (c) Align the matchmarks on the steering intermediate shaft assy and steering gear assy.
- (d) Remove the bolt and separate the steering intermediate shaft assy.



18. REMOVE STEERING COLUMN ASSY

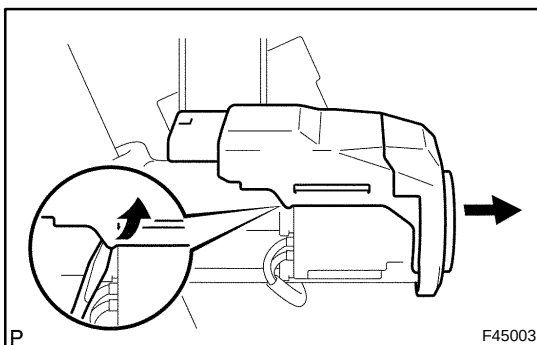
- (a) Disconnect the connectors and wire harness clamps.
- (b) Remove the 3 bolts and steering column assy from the instrument panel reinforcement assy.



19. REMOVE STEERING INTERMEDIATE SHAFT ASSY

- (a) Align the matchmarks on the steering intermediate shaft assy and main shaft.
- (b) Remove the bolt and steering intermediate shaft assy.

20. REMOVE KEY CYLINDER LAMP ASSY (W/O ENGINE IMMOBILISER SYSTEM)

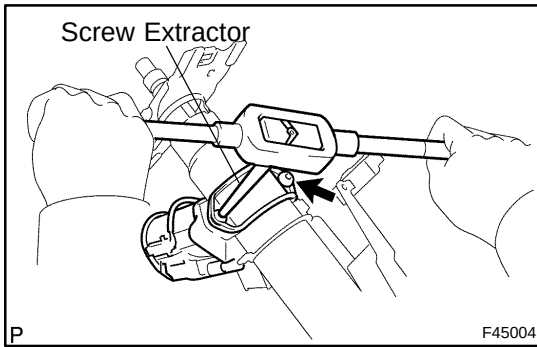


21. REMOVE TRANSPONDER KEY AMPLIFIER (W/ ENGINE IMMOBILISER SYSTEM)

- (a) Widen the claw hanging onto the upper bracket by approx. 1.0 mm (0.039 in.) using a screwdriver.
- (b) Pull the transponder key amplifier toward the rear of the vehicle with the claw open.

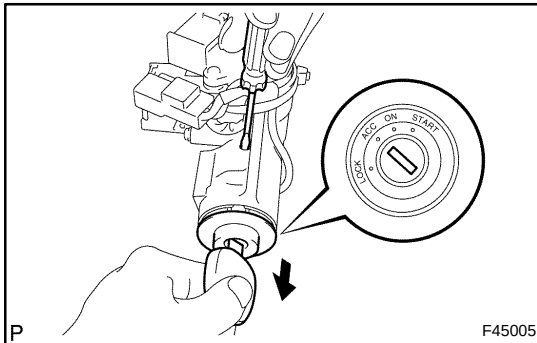
NOTICE:

Take care not to use excessive force to prevent the case from being damaged.



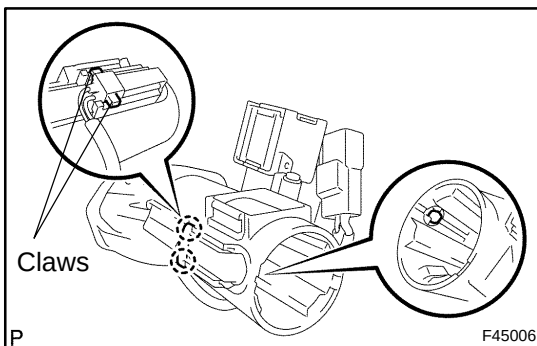
22. REMOVE STEERING COLUMN UPPER W/ SWITCH BRACKET ASSY

- Using a centering punch, mark the center of the 2 tapered-head bolts.
- Using a 3 to 4 mm (0.12 to 0.16 in.) drill, drill a hole into the heads of the 2 bolts.
- Using a screw extractor, remove the 2 bolts and steering column upper w/ switch bracket assy.



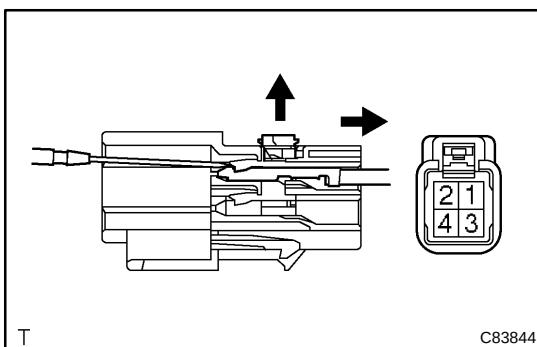
23. REMOVE IGNITION SWITCH LOCK CYLINDER ASSY

- Place the ignition switch lock cylinder assy in the ACC position.
- Push down the stop pin with a screwdriver, and pull out the cylinder assy.



24. REMOVE UN-LOCK WARNING SWITCH ASSY

- Disconnect the un-lock warning switch assy connector from the ignition or starter switch assy.
- Remove the un-lock warning switch assy by pushing up the center part and releasing the 2 claws.



- Disengage the secondary locking device.
- Using a screwdriver, disengage the locking lug of terminals 1 and 2, and pull the terminals out from the rear side of the un-lock warning switch assy.

25. REMOVE KEY INTER LOCK SOLENOID

- Remove the 2 screws and solenoid from the steering column bracket assy.

26. REMOVE IGNITION OR STARTER SWITCH ASSY

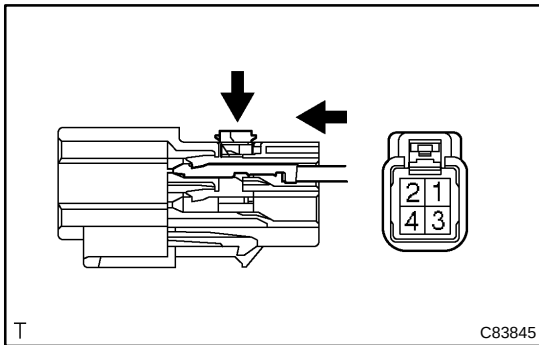
- Remove the 2 screws and ignition or starter switch assy from the steering column bracket assy UPR.

27. INSTALL IGNITION OR STARTER SWITCH ASSY

- Install the ignition or starter switch assy to the steering column bracket assy UPR with the 2 screws.

28. INSTALL KEY INTER LOCK SOLENOID

- Install the solenoid to the steering column bracket assy with the 2 screws.

**29. INSTALL UN-LOCK WARNING SWITCH ASSY**

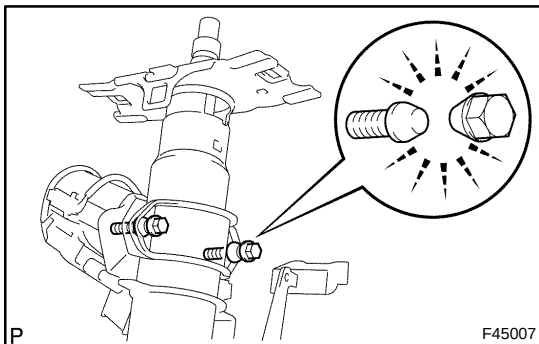
- Install the un-lock warning switch assy.
- Connect terminals 1 and 2 of the un-lock warning switch assy connector.
- Connect the un-lock warning switch assy connector to the ignition or starter switch assy.

30. INSTALL IGNITION SWITCH LOCK CYLINDER ASSY

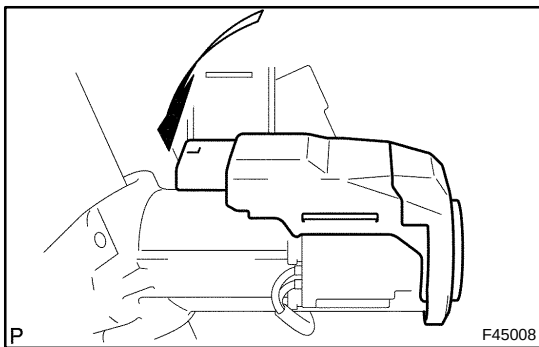
- Make sure that the ignition switch lock cylinder assy is in the ACC position.
- Install the ignition switch lock cylinder assy.

31. INSPECT STEERING LOCK OPERATION

- Check that the steering lock mechanism is activated when removing the key.
- Check that the steering lock mechanism is deactivated when inserting the key and turning it to the ACC position.

**32. INSTALL STEERING COLUMN UPPER W/ SWITCH BRACKET ASSY**

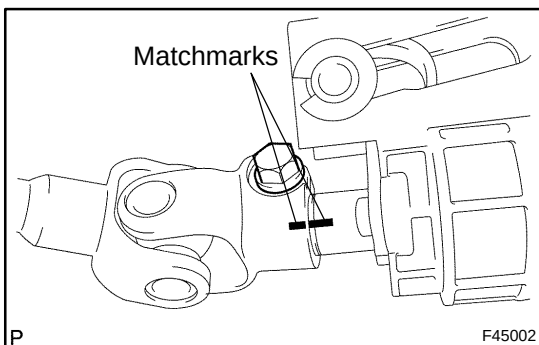
- Temporarily install the steering column upper w/ switch bracket assy and steering column upper clamp with 2 new tapered-head bolts.
- Tighten the 2 tapered-head bolts until the bolt heads break off.

33. INSTALL KEY CYLINDER LAMP ASSY (W/O ENGINE IMMOBILISER SYSTEM)**34. INSTALL TRANSPONDER KEY AMPLIFIER (W/ ENGINE IMMOBILISER SYSTEM)**

- Align the transponder key amplifier with the installation position of the upper bracket with the amplifier inclined.
- Push the transponder key amplifier up and connect it to the upper bracket.

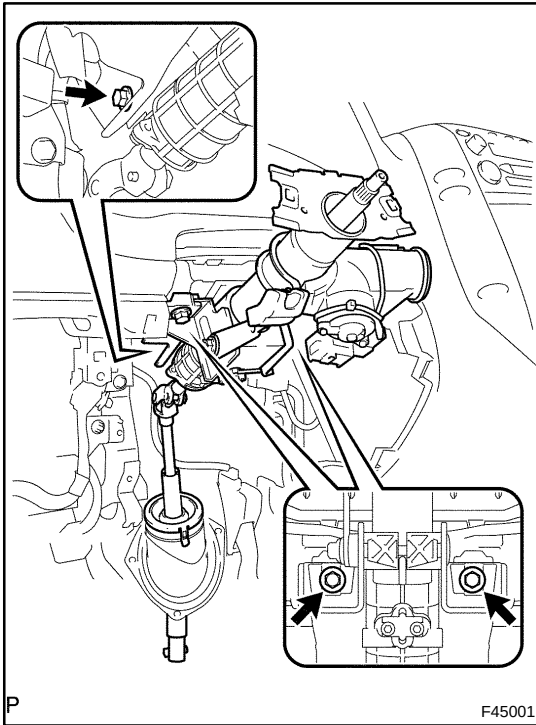
NOTICE:

Take care not to push the amplifier up with excessive force to prevent it from being damaged.

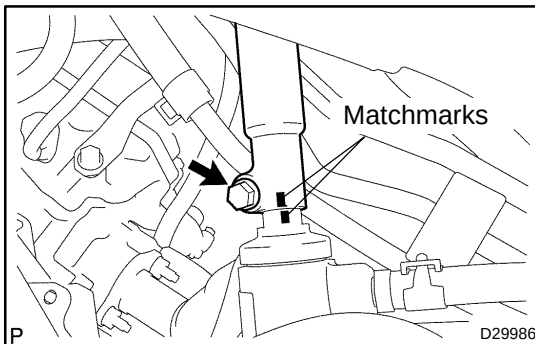
**35. INSTALL STEERING INTERMEDIATE SHAFT ASSY**

- Align the matchmarks on the steering intermediate shaft assy and main shaft.
- Temporarily install the steering intermediate shaft assy with the bolt.

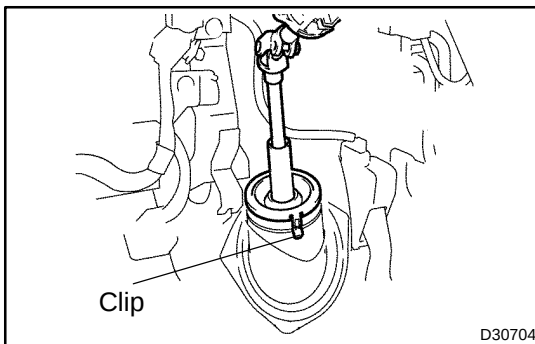
Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

**36. INSTALL STEERING COLUMN ASSY**

- (a) Install the steering column assy with the 3 bolts.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)
- (b) Connect the connectors.
- (c) Connect the wire harness clamps to the steering column tube.

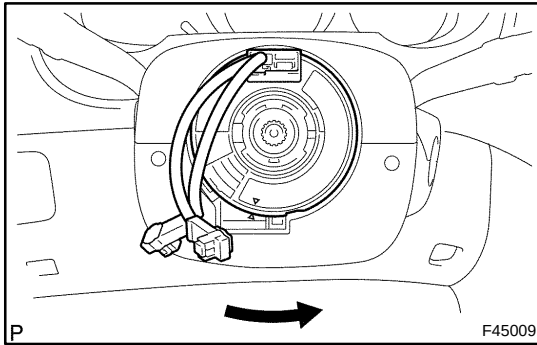
**37. CONNECT STEERING INTERMEDIATE SHAFT ASSY**

- (a) Align the matchmarks on the intermediate shaft assy and steering gear assy.
- (b) Install the steering intermediate shaft assy with the bolt.
Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)



- (c) Install the dust cover to the hole cover. Check that the 3 clips of the dust cover are securely fitted into the groove on the hole cover.

38. PLACE FRONT WHEELS FACING STRAIGHT AHEAD**39. INSTALL SPIRAL CABLE SUB-ASSY (See page 60-28)**

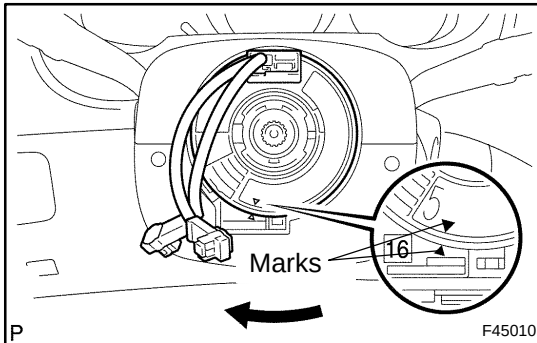
**40. CENTER SPIRAL CABLE**

- (a) Check that the ignition switch is OFF.
- (b) Check that the battery negative terminal is separated.

NOTICE:

After removing the terminal, wait for at least 90 seconds before starting the operation.

- (c) Turn the cable counterclockwise by hand until it feels firm.



- (d) Then rotate the cable clockwise about 2.5 turns to align the marks.

HINT:

The cable will rotate about 2.5 turns to both the left and right from the center.

41. INSTALL STEERING COLUMN COVER**42. INSTALL STEERING WHEEL ASSY**

- (a) Align the matchmarks on the steering wheel assy and steering main shaft assy.
- (b) Install the steering wheel assy set nut.

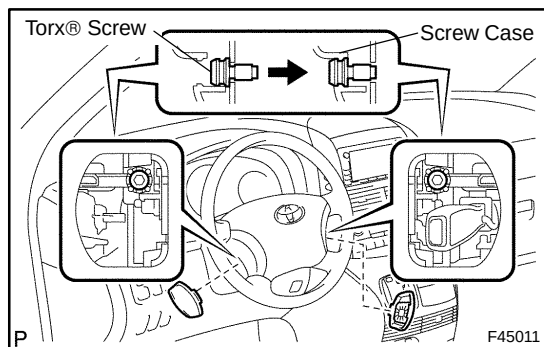
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

- (c) Connect the connector.

43. INSPECT STEERING WHEEL CENTER POINT**44. INSPECT HORN BUTTON ASSY (See page 60-12)****45. INSTALL HORN BUTTON ASSY****NOTICE:**

- Never use airbag parts removed from another vehicle. When replacing parts, replace with new ones.
- Make sure the wheel pad is installed with the specified torque.
- If the wheel pad has been dropped, or there are cracks, dents or other defects on the case or connector, replace the wheel pad with a new one.
- When installing the wheel pad, take care so that the wirings do not interfere with other parts and that they are not pinched between other parts.

- (a) Connect the horn wire harness.
- (b) Connect the airbag connector.



- (c) Install the steering wheel pad after confirming that the circumference groove of the torx® screws is caught on the screw case.
- (d) Using a torx® socket wrench, tighten the 2 screws.
Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

46. INSTALL STEERING WHEEL COVER LOWER NO.3

47. INSTALL STEERING WHEEL COVER LOWER NO.2

48. CONNECT BATTERY NEGATIVE TERMINAL

49. PERFORM INITIALIZATION (See page 01-5)

Some systems need initialization when disconnecting the battery terminal.

50. INSPECT SRS WARNING LIGHT (See page 05-777)