

STEERING

50095-01

PRECAUTION

1. HANDLING PRECAUTIONS FOR SRS AIRBAG SYSTEM (SEE PAGE 60-1)

2. HANDLING PRECAUTIONS FOR STEERING COLUMN

- (a) When handling the steering column assy:
 - (1) Avoid any impact to the steering column assy, especially to the motor or the torque sensor. Replace with a new one if dropped or subjected to a severe blow.
 - (2) Do not pull on the wire harness when moving the steering column assy.
 - (3) When the steering column assy or other steering-related parts have been removed and either reinstalled or replaced, perform steering center point adjustment (zero point calibration) (see page 05-1211).
- (b) When disconnecting and reconnecting the connectors:
 - (1) When disconnecting the connector related to the electronic motor power steering system, turn the power switch on (IG), center the steering wheel, turn the power switch off, and then disconnect the connector.
 - (2) When reconnecting the connector related to the electronic motor power steering system, reconnect it after making sure that the power switch is off, center the steering wheel, and then turn the power switch on (IG).

NOTICE:

Do not turn the power switch on (IG) when the steering wheel is not centered.

- (3) If the above operations are not carried out properly, the steering center point (zero point) will deviate, which will lead to a difference in steering effort between right and left. If there is a difference in the steering effort between right and left, perform steering center point adjustment (zero point calibration) (see page 05-1211).

NOTICE FOR INITIALIZATION:

When disconnecting the negative (-) battery terminal, initialize the following systems after the terminal is reconnected.

System Name	See Page
Power Window Control System	01-28

NOTICES FOR HYBRID SYSTEM ACTIVATION:

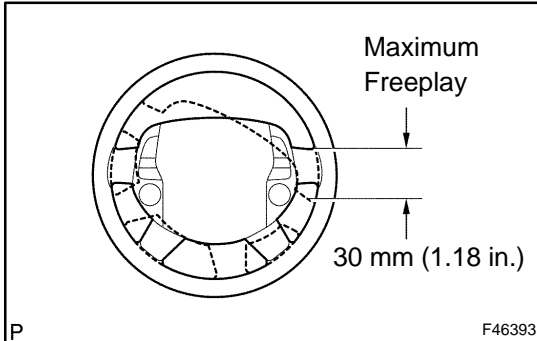
- **When the warning lamp is illuminated or the battery has been disconnected and reconnected, pressing the power switch may not start the system on the first try. If so, press the power switch again.**
- **With the power switch's power mode changed to ON (IG), disconnect the battery. If the key is not in the key slot during reconnection, DTC B2799 may be output.**

PROBLEM SYMPTOMS TABLE

Use the table below to help determine the cause of the problem. The numbers indicate the priority of the likely causes of the problem. Check each part in order. If necessary, repair or replace these parts.

Symptom	Inspection Area	See page
Hard steering	6. Front tires (improperly inflated, unevenly worn)	28-1
	7. Front wheel alignment (Incorrect)	26-6
	8. Front suspension (Lower ball joint)	-
	9. Steering intermediate shaft	-
	10. Steering column assy	50-8
	11. Steering gear assy	51-6
Poor return	12. Power steering ECU	50-16
	1. Front tires (improperly inflated, unevenly worn)	28-1
	2. Front wheel alignment (Incorrect)	26-6
	3. Steering column assy	50-8
	4. Steering gear assy	51-6
No free play or excessive play	5. Power steering ECU	50-16
	1. Steering intermediate shaft	-
Knocking (or clunking) sound occurs when turning steering wheel back and forth while power steering is in operation.	2. Steering gear assy	51-6
	1. Steering intermediate shaft	-
	2. Front suspension (Lower ball joint)	26-22
	3. Front axle hub (Hub bearing)	30-21
Friction sound occurs when turning steering wheel during low speed driving.	4. Steering gear assy	51-6
	1. Power steering motor	50-8
High-pitched sound (squeaking sound) occurs when turning steering wheel slowly with vehicle stopped.	2. Steering column assy	50-8
	1. Power steering motor	50-8
Steering wheel vibrates and noise occurs when turning steering wheel from lock to lock.	1. Power steering motor	50-8
	2. Steering column assy	50-8

ON-VEHICLE INSPECTION



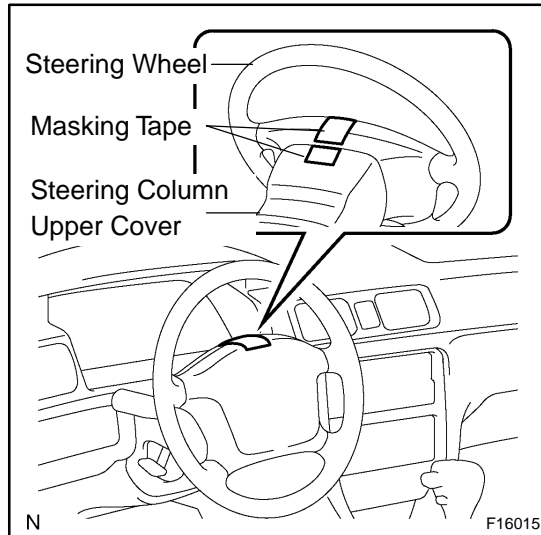
1. CHECK STEERING WHEEL FREE PLAY

- (a) Stop the vehicle and align the tires straight ahead.
- (b) Turn the steering wheel gently right and left, and check the steering wheel free play.

Maximum Free Play: 30 mm (1.18 in.)

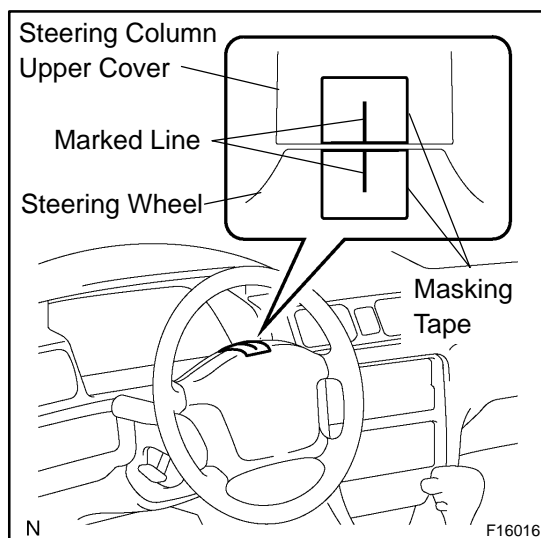
If the free play exceeds the maximum, replace the steering intermediate shaft sub-assy or steering gear.

REPAIR

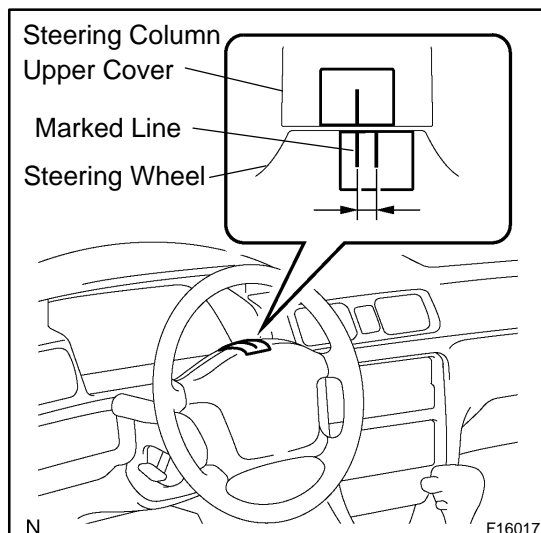


1. STEERING OFF CENTER REPAIR PROCEDURE

- (a) Inspect steering wheel off center.
- (1) Apply masking tape on 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 the center position.

HINT:

Look at the upper surface of the steering wheel, steering spoke and SRS airbag line to find the center position.

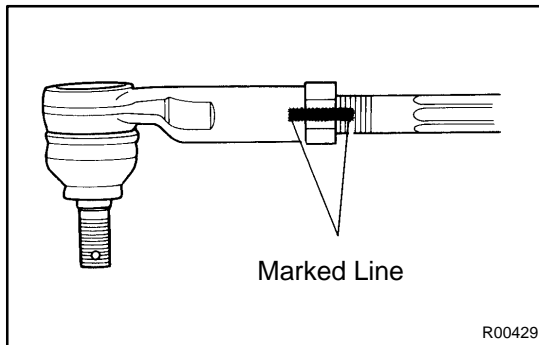
- (5) Draw a new line on the masking tape on the steering wheel as shown in the illustration.
- (6) Measure the distance between the 2 lines on the masking tape on the steering wheel.

- (7) Convert the measured distance to steering angle.
Measured distance 1 mm (0.04 in.) = Steering angle of approximately 1 degree.

HINT:

Make a note of the steering angle.

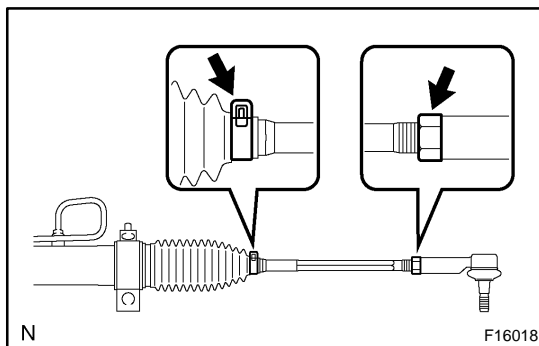
- (b) Adjust steering angle.



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

HINT:

- Measure both the RH and LH sides.
- 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 ends by the same amount (but in different directions) according to the steering angle.

One 360 degree turn of rack end (1.5 mm (0.059 in.) horizontal movement) equals to 12 degrees of steering angle.

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

Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

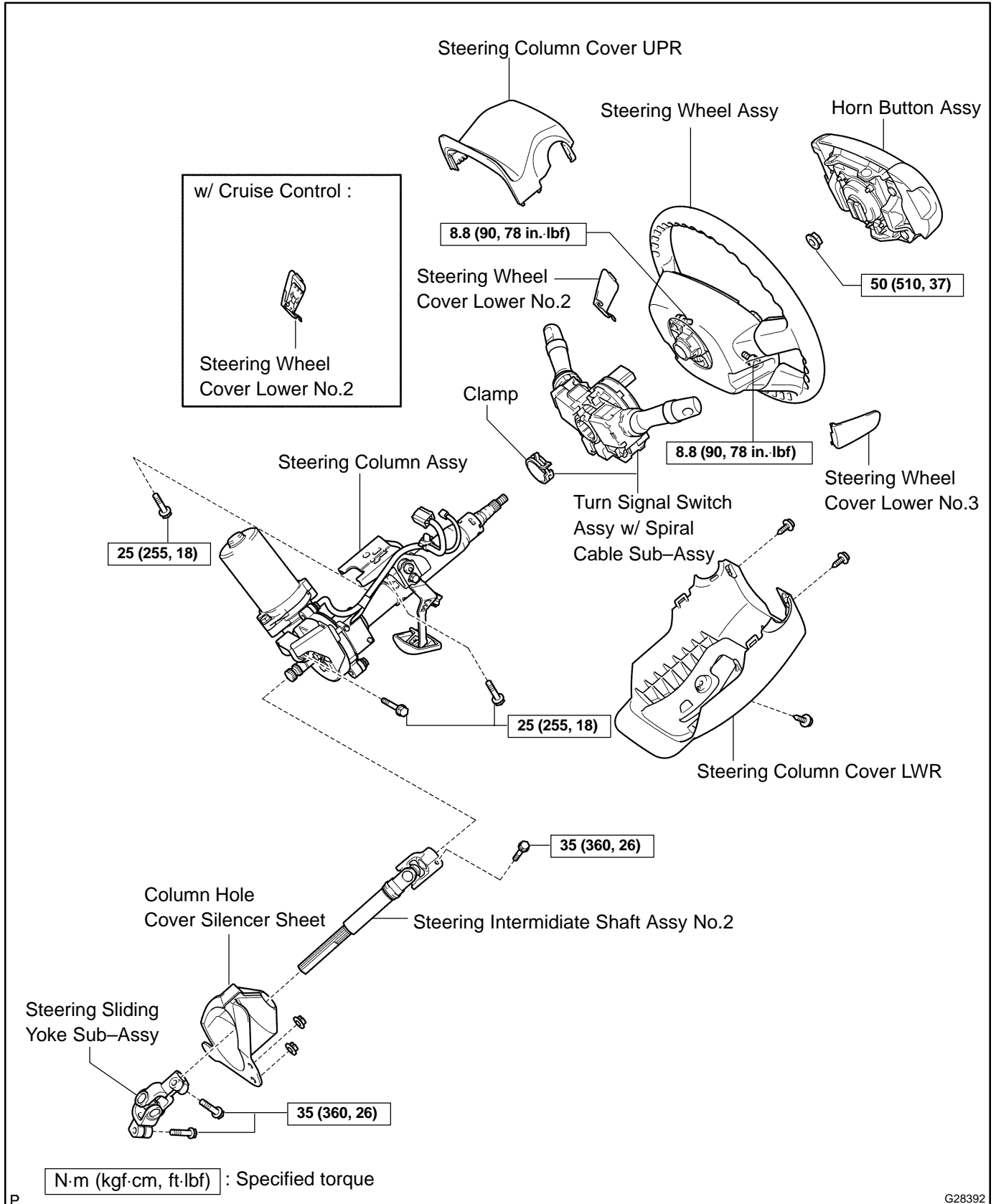
NOTICE:

Make sure that the difference in length between the 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.
 (8) Perform steering angle sensor zero point calibration (see page 05-1211).

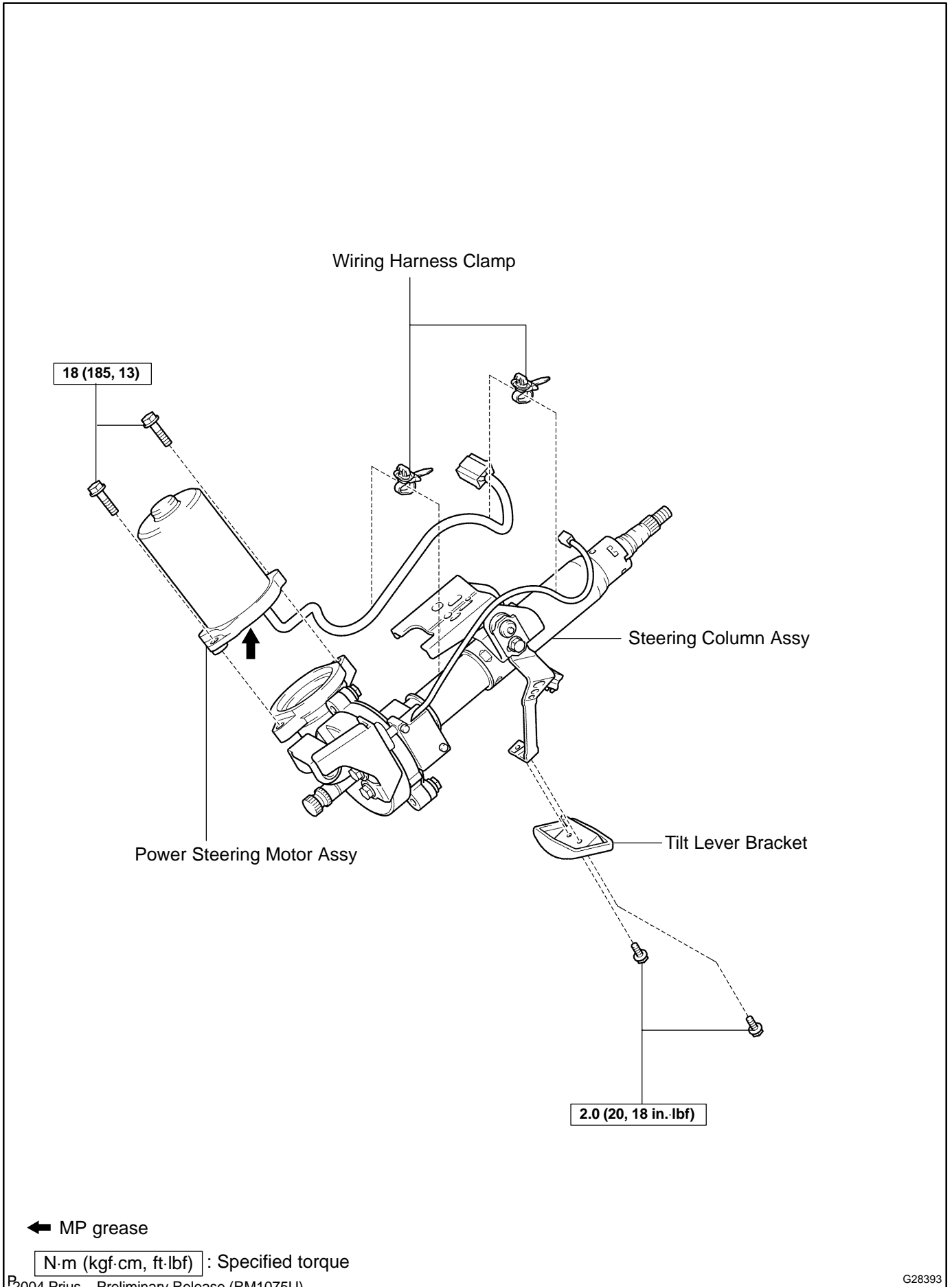
STEERING COLUMN ASSY COMPONENTS

50099-01



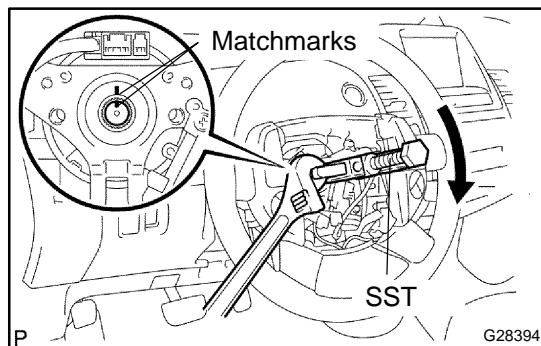
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OVERHAUL

1. PRECAUTION (SEE PAGE 60-1)
2. REMOVE REAR FLOOR BOARD NO.2 (SEE PAGE 21-116)
3. REMOVE DECK FLOOR BOX REAR (SEE PAGE 21-116)
4. REMOVE REAR FLOOR BOARD NO.3 (SEE PAGE 21-116)
5. DISCONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)
6. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
7. REMOVE STEERING WHEEL COVER LOWER NO.2 (SEE PAGE 60-20)
8. REMOVE STEERING WHEEL COVER LOWER NO.3 (SEE PAGE 60-20)
9. REMOVE HORN BUTTON ASSY (SEE PAGE 60-20)



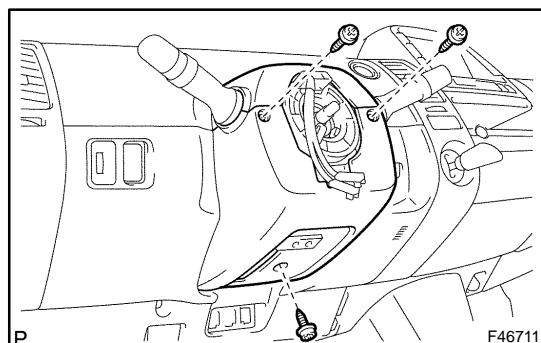
10. REMOVE STEERING WHEEL ASSY

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



11. REMOVE TILT LEVER BRACKET

- (a) Remove the 2 screws and the tilt lever bracket.



12. REMOVE STEERING COLUMN COVER

- (a) Disengage the 4 claws, remove the 3 screws, and then remove the steering column cover LWR and the steering column cover UPR.

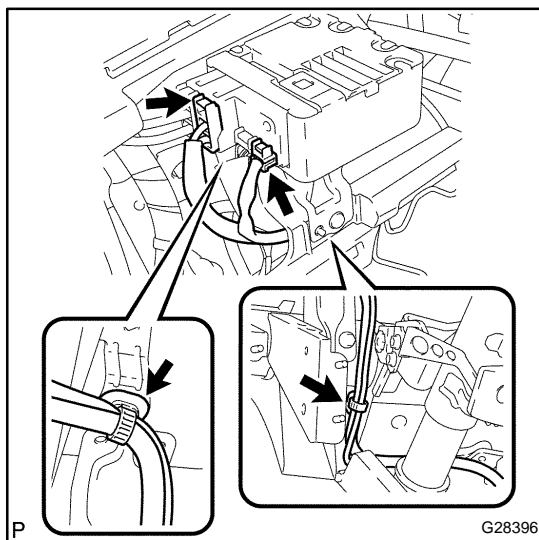
13. REMOVE TURN SIGNAL SWITCH ASSY W/SPIRAL CABLE SUB-ASSY

- (a) Remove the clamp and remove the turn signal switch assy w/ spiral cable sub-assy from the steering column assy.

14. REMOVE FRONT DOOR SCUFF PLATE LH (SEE PAGE 76-28)

15. REMOVE FRONT DOOR SCUFF PLATE RH (SEE PAGE 76-28)

16. REMOVE COWL SIDE TRIM BOARD LH (SEE PAGE 76-28)
17. REMOVE COWL SIDE TRIM BOARD RH (SEE PAGE 76-28)
18. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.1 (SEE PAGE 71-7)
19. REMOVE INSTRUMENT PANEL FINISH PANEL SUB-ASSY LOWER (SEE PAGE 71-7)
20. REMOVE INSTRUMENT PANEL FINISH PANEL SUB-ASSY UPPER (SEE PAGE 71-7)
21. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.3 (SEE PAGE 71-7)
22. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.4 (SEE PAGE 71-7)
23. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.2 (SEE PAGE 71-7)
24. REMOVE MULTI-DISPLAY ASSY (SEE PAGE 71-7)
25. REMOVE GLOVE COMPARTMENT DOOR STOPPER SUB-ASSY (SEE PAGE 71-7)
26. REMOVE GLOVE COMPARTMENT DOOR ASSY (SEE PAGE 71-7)
27. REMOVE GLOVE COMPARTMENT DOOR (SEE PAGE 71-7)
28. REMOVE INSTR PANEL SPEAKER PANEL SUB-ASSY NO.1 W/CTR SPEAKER (SEE PAGE 71-7)
29. REMOVE FRONT PILLAR GARNISH CORNER PIECE LH (SEE PAGE 71-7)
30. REMOVE FRONT PILLAR GARNISH CORNER PIECE RH (SEE PAGE 71-7)
31. REMOVE FRONT PILLAR GARNISH LH (SEE PAGE 71-7)
32. REMOVE FRONT PILLAR GARNISH RH (SEE PAGE 71-7)
33. DISCONNECT PASSENGER AIRBAG CONNECTOR (SEE PAGE 71-7)
34. REMOVE INSTRUMENT PANEL SUB-ASSY W/PASSENGER AIRBAG ASSY (SEE PAGE 71-7)

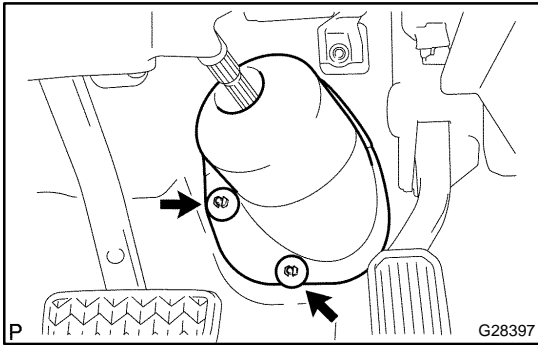


35. DISCONNECT POWER STEERING ECU ASSY

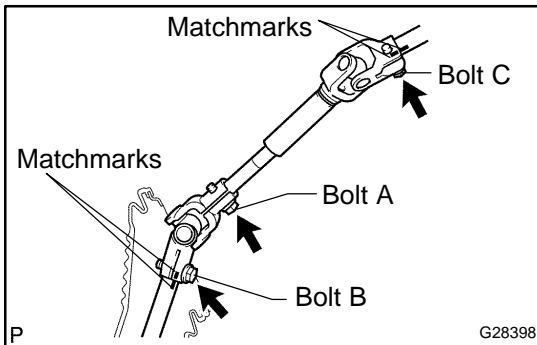
- (a) Separate the torque sensor wire harness clamp from the bottom surface of the power steering ECU assy.
- (b) Separate the torque sensor wire harness clamp from the instrument panel reinforcement.
- (c) Disconnect the 2 steering column assy connectors from the power steering ECU assy.

36. REMOVE FRONT FLOOR FOOTREST

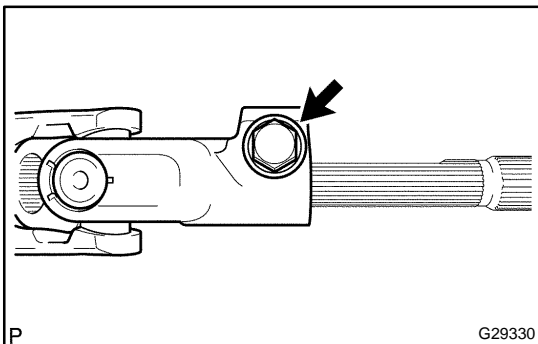
- (a) Using a flathead screwdriver, pull the front floor footrest forward, disengage the 2 clips, and remove the front floor footrest.

**37. REMOVE COLUMN HOLE COVER SILENCER SHEET**

- (a) Turn back the floor carpet and remove the 2 clips and the column hole cover silencer sheet.

**38. REMOVE STEERING INTERMEDIATE SHAFT ASSY NO.2**

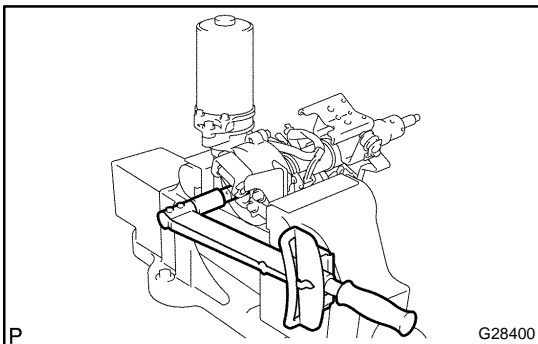
- (a) Loosen bolt A on the steering sliding yoke sub-assy.
 (b) Put matchmarks on the steering intermediate shaft assy and the steering intermediate shaft.
 (c) Remove bolt B and separate the steering intermediate shaft assy from the steering intermediate shaft.
 (d) Put matchmarks on the steering intermediate shaft assy and the steering column assy.
 (e) Remove bolt C and separate the steering intermediate shaft assy from the steering column assy.

**39. REMOVE STEERING SLIDING YOKE SUB-ASSY**

- (a) Remove the bolt and remove the steering sliding yoke sub-assy from the steering intermediate shaft assy.

**40. REMOVE STEERING COLUMN ASSY**

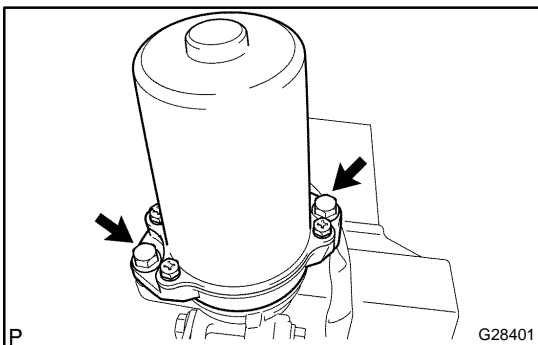
- (a) Disconnect the connectors and the wire harness clamps from the steering column assy.
- (b) Remove the 3 bolts and the steering column assy.

**41. INSPECT STEERING COLUMN ASSY**

- (a) Using SST and a torque wrench, measure the main shaft turning torque.
SST 09616-00011
Standard turning torque: 0.4 to 1.1 N·m (4 to 11 kgf·cm) (2 sec./turn)
- (b) If turning torque is out of specification, remove the motor and remeasure.
Reference turning torque: 0.1 to 0.6 N·m (1 to 6 kgf·cm) (2 sec./turn) (motorless)

If turning torque is within specification, replace the motor with a new one.

If turning torque is out of specification, replace the steering column assy with a new one.

**42. REMOVE POWER STEERING MOTOR ASSY**

- (a) Remove the 2 clamps from the power steering motor and the torque sensor wire harnesses.

NOTICE:

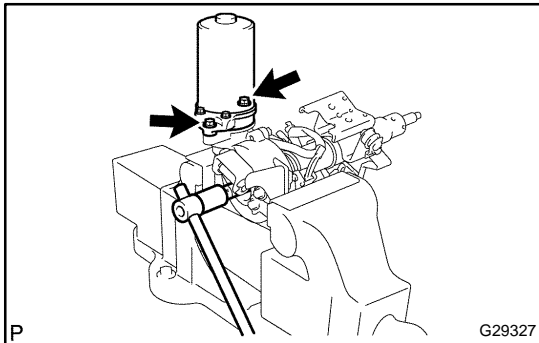
Do not damage the clamps.

- (b) Remove the 2 bolts and the power steering motor assy.

43. INSTALL POWER STEERING MOTOR ASSY

- (a) Secure the steering column assy in a vise so that the motor installation part is horizontal.
- (b) Apply MP grease to the serrated part of the motor and install it to the steering column.

Reference amount: 0.3 g



- (c) Using SST, turn the steering main shaft 2 or 3 turns at a rate of one turn per second to seat the motor, and temporarily tighten the 2 bolts.

NOTICE:

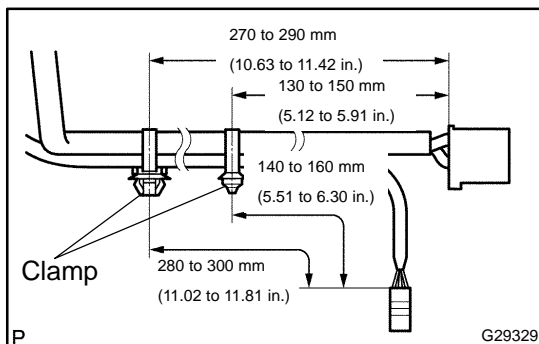
- **Make sure that the motor is installed vertically and sits under its own weight.**
- **Temporarily tighten the bolts with the motor properly seated.**

- (d) Fully tighten the 2 bolts.

Torque: 18N·m (185 kgf·cm, 13 ft·lbf)

NOTICE:

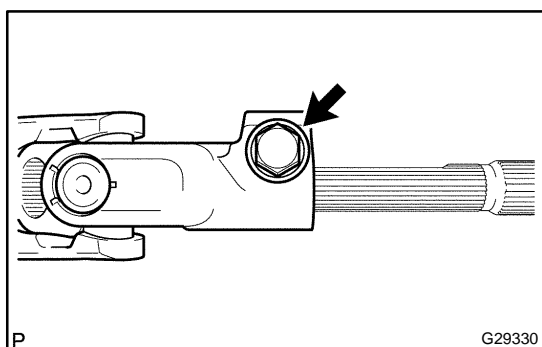
Do not apply force to the motor in the horizontal direction when tightening the bolts.



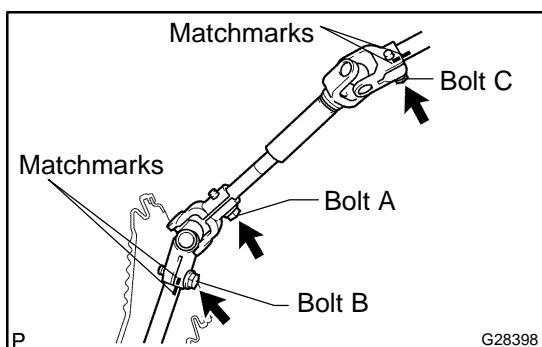
- (e) Hold the wire harness for the power steering motor and the torque sensor wire harness with the 2 clamps and vinyl tape as shown in the illustration.

**44. 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 and the wire harness clamps to the steering column assy.

**45. INSTALL STEERING SLIDING YOKE SUB-ASSY**

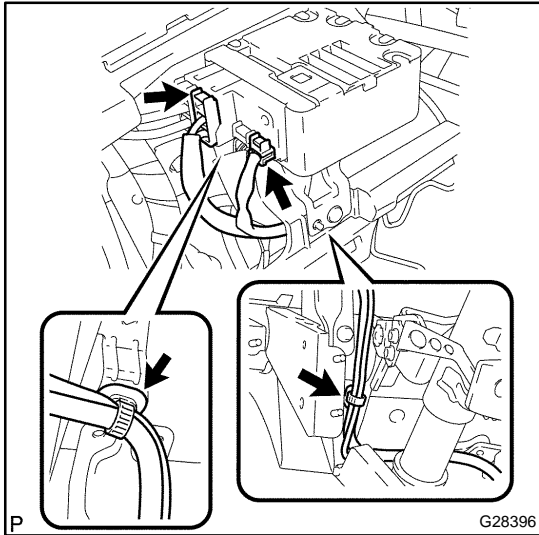
- (a) Temporarily install the steering sliding yoke sub-assy to the steering intermediate shaft assy with the bolt.

**46. INSTALL STEERING INTERMEDIATE SHAFT ASSY NO.2**

- (a) Align the matchmarks on the steering intermediate shaft assy and the steering column assy and install them with bolt C.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)
- (b) Align the matchmarks on the steering intermediate shaft assy and the steering intermediate shaft and install them with bolt B.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)
- (c) Tighten bolt A on the steering sliding yoke sub-assy.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

47. INSTALL COLUMN HOLE COVER SILENCER SHEET**48. INSTALL FRONT FLOOR FOOTREST**

- (a) Engage the 2 clips to install the front floor footrest.

**49. CONNECT POWER STEERING ECU ASSY**

- (a) Connect the 2 steering column assy connectors to the power steering ECU assy.
- (b) Install the clamp holding the power steering motor and the torque sensor wire harnesses on the bottom surface of the power steering ECU assy.
- (c) Install the torque sensor wire harness clamp to the instrument panel reinforcement.
- (d) Make sure that the power steering motor and the torque sensor wire harnesses do not interfere with other parts while by tilting up and down the steering column assy.

50. INSTALL INSTRUMENT PANEL SUB-ASSY W/PASSENGER AIRBAG ASSY (SEE PAGE 71-7)**51. INSTALL TURN SIGNAL SWITCH ASSY W/SPIRAL CABLE SUB-ASSY**

- (a) Install the turn signal switch assy w/ spiral cable sub-assy to the steering column assy with the clamp.

52. ADJUST SPIRAL CABLE SUB-ASSY (SEE PAGE 60-29)**53. INSTALL STEERING COLUMN COVER**

- (a) Engage the 4 claws to install the steering column cover UPR and the steering column cover LWR.

HINT:

Fully tilt down the steering column assy when installing the steering column cover UPR and fully tilt it up when installing the steering column cover LWR.

54. INSTALL TILT LEVER BRACKET

- (a) Install the tilt lever bracket with the 2 screws.

Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)

55. INSPECT STEERING WHEEL CENTER POINT

HINT:

When the steering wheel is not properly centered, remove and refit to center.

56. INSTALL STEERING WHEEL ASSY

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

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

57. INSPECT HORN BUTTON ASSY (SEE PAGE 60-20)**58. INSTALL HORN BUTTON ASSY (SEE PAGE 60-20)****59. CONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 19-2)****60. INSTALL REAR FLOOR BOARD NO.3****61. INSTALL DECK FLOOR BOX REAR****62. INSTALL REAR FLOOR BOARD NO.2****63. INSPECT SRS WARNING LIGHT (SEE PAGE 05-1397)****64. PERFORM CALIBRATION OF TORQUE SENSOR ZERO POINT (SEE PAGE 05-1211)**

65. PERFORM INITIALIZATION (SEE PAGE 01-28)**HINT:**

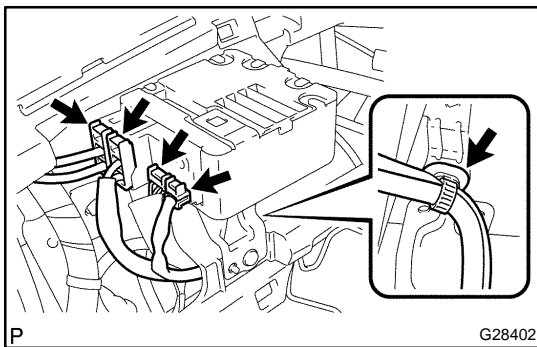
When disconnecting the negative battery terminal, it is necessary to initialize other systems.

POWER STEERING ECU ASSY

5009B-01

REPLACEMENT

1. PRECAUTION (SEE PAGE 60-1)
2. REMOVE REAR FLOOR BOARD NO.2 (SEE PAGE 21-116)
3. REMOVE DECK FLOOR BOX REAR (SEE PAGE 21-116)
4. REMOVE REAR FLOOR BOARD NO.3 (SEE PAGE 21-116)
5. DISCONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 60-1)
6. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.1 (SEE PAGE 71-7)
7. REMOVE INSTRUMENT PANEL FINISH PANEL SUB-ASSY LOWER (SEE PAGE 71-7)
8. REMOVE INSTRUMENT PANEL FINISH PANEL SUB-ASSY UPPER (SEE PAGE 71-7)
9. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.3 (SEE PAGE 71-7)
10. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.4 (SEE PAGE 71-7)
11. REMOVE INSTRUMENT PANEL REGISTER ASSY NO.2 (SEE PAGE 71-7)
12. REMOVE MULTI-DISPLAY ASSY (SEE PAGE 71-7)
13. REMOVE GLOVE COMPARTMENT DOOR STOPPER SUB-ASSY (SEE PAGE 71-7)
14. REMOVE GLOVE COMPARTMENT DOOR ASSY (SEE PAGE 71-7)
15. REMOVE GLOVE COMPARTMENT DOOR (SEE PAGE 71-7)
16. REMOVE INSTR PANEL SPEAKER PANEL SUB-ASSY NO.1 W/CTR SPEAKER (W PREMIUM SOUND SYSTEM) (SEE PAGE 71-7)
17. REMOVE FRONT PILLAR GARNISH CORNER PIECE LH (SEE PAGE 71-7)
18. REMOVE FRONT PILLAR GARNISH CORNER PIECE RH (SEE PAGE 71-7)
19. REMOVE FRONT PILLAR GARNISH LH (SEE PAGE 71-7)
20. REMOVE FRONT PILLAR GARNISH RH (SEE PAGE 71-7)
21. DISCONNECT PASSENGER AIRBAG CONNECTOR (SEE PAGE 71-7)
22. REMOVE INSTRUMENT PANEL SUB-ASSY W/PASSENGER AIRBAG ASSY (SEE PAGE 71-7)



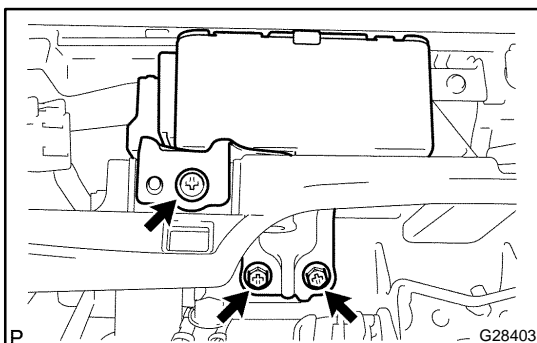
23. REMOVE POWER STEERING ECU ASSY

- (a) Separate the torque sensor wire harness clamp from the power steering ECU.

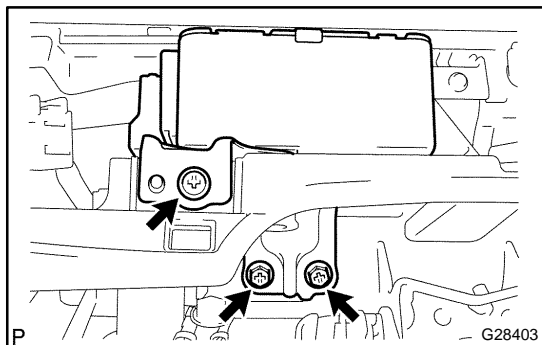
NOTICE:

Be careful not to damage the torque sensor wire harness clamp.

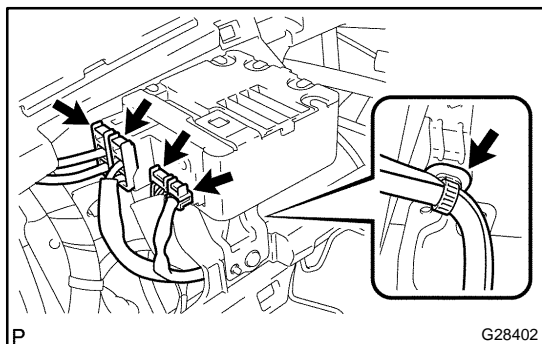
- (b) Disconnect the 4 connectors.



- (c) Remove the 3 screws and the power steering ECU assy.

**24. INSTALL POWER STEERING ECU ASSY**

- (a) Install the power steering ECU assy with the 3 screws.
Torque: 5.0 N·m (50 kgf·cm, 44 in·lbf)



- (b) Connect the 4 connectors.
 (c) Install the torque sensor wire harness clamp to the power steering ECU.

25. INSTALL INSTRUMENT PANEL SUB-ASSY W/PASSENGER AIRBAG ASSY (SEE PAGE 71-7)**26. CONNECT BATTERY NEGATIVE TERMINAL (SEE PAGE 19-2)****27. INSTALL REAR FLOOR BOARD NO.3****28. INSTALL DECK FLOOR BOX REAR****29. INSTALL REAR FLOOR BOARD NO.2****30. INSPECT SRS WARNING LIGHT (SEE PAGE 05-1397)****31. PERFORM CALIBRATION OF TORQUE SENSOR ZERO POINT (SEE PAGE 05-1211)****32. PERFORM INITIALIZATION (SEE PAGE 01-28)****HINT:**

When disconnecting the negative battery terminal, it is necessary to initialize other systems.