

STEERING SYSTEM

PRECAUTION

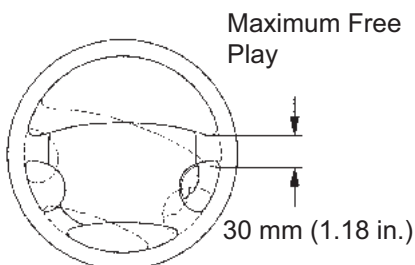
1. **HANDLING PRECAUTIONS ON STEERING SYSTEM**
 - (a) Care must be taken when replacing parts. Incorrect replacement may affect the performance of the steering system and result in driving hazards.
2. **HANDLING PRECAUTIONS ON SRS AIRBAG SYSTEM**
 - (a) The vehicle is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing. This may cause a serious accident. Before servicing (including inspection, replacement, removal and installation of parts), be sure to read the precautionary notices for the supplemental restraint system (see page 60-6).

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problems. The numbers indicate the ranked order of probability of each of the possible causes. Check each part in the order shown. Repair or replace the parts as necessary.

STEERING SYSTEM

Symptom	Suspected area	See page
Hard steering	1. Tires (Improperly inflated)	TW-1
	2. Power steering fluid level (Low)	PS-2
	3. Drive belt (Loose)	PS-2
	4. Front wheel alignment (Incorrect) (2WD)	SP-2
	5. Front wheel alignment (Incorrect) (4WD Pre)	SP-7
	6. Steering system joints (Worn)	-
	7. Suspension arm ball joints (2WD) (Worn)	SP-34
	8. Suspension arm ball joints (4WD Pre) (Worn)	SP-40
	9. Steering column (Binding)	-
	10. Power steering vane pump (2TR)	PS-19
	11. Power steering vane pump (1GR)	PS-9
	12. Power steering gear (2WD)	PS-29
	13. Power steering gear (4WD Pre)	PS-53
Poor return	1. Tires (Improperly inflated)	TW-1
	2. Front wheel alignment (Incorrect) (2WD)	SP-2
	3. Front wheel alignment (Incorrect) (4WD Pre)	SP-7
	4. Steering column (Binding)	-
	5. Power steering gear (2WD)	PS-29
	6. Power steering gear (4WD Pre)	PS-53
Excessive free play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn) (2WD)	SP-34
	3. Suspension arm ball joints (Worn) (4WD Pre)	SP-40
	4. Intermediate shaft, Sliding yoke (Worn)	-
	5. Front wheel bearing (Worn) (2WD)	AH-7
	6. Front wheel bearing (Worn) (4WD pre)	AH-15
	7. Power steering gear (2WD)	PS-29
	8. Power steering gear (4WD Pre)	PS-53
Abnormal noise	1. Power steering fluid level (Low)	PS-2
	2. Steering system joints (Worn)	-
	3. Power steering vane pump (2TR)	PS-19
	4. Power steering vane pump (1GR)	PS-9
	5. Power steering gear (2WD)	PS-29
	6. Power steering gear (4WD Pre)	PS-53



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ON-VEHICLE INSPECTION

1. CHECK STEERING WHEEL FREE PLAY

- Stop the vehicle and align the tires facing straight ahead.
- Gently turn the steering wheel right and left by hand, and check the steering wheel free play.

Maximum free play:

30 mm (1.18 in.)

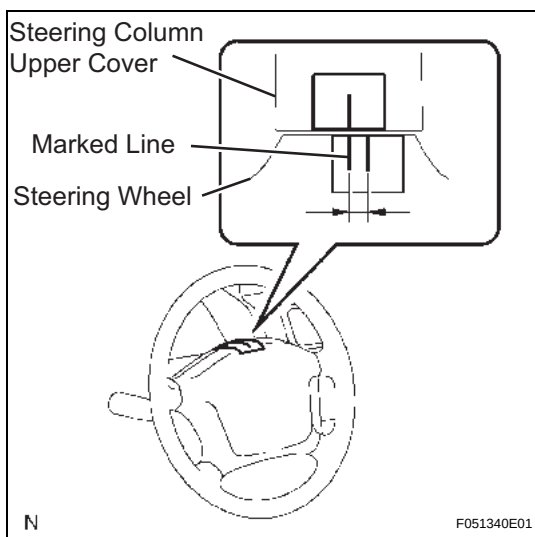
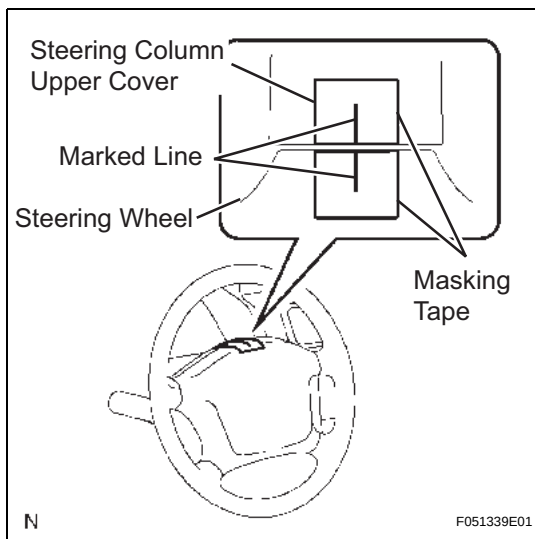
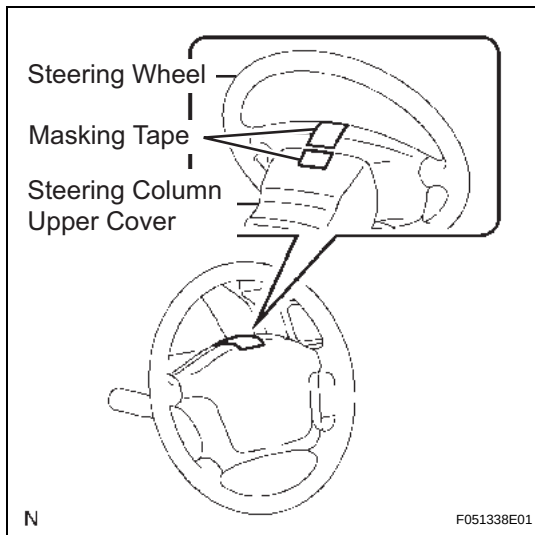
If the free play exceeds the maximum, replace the steering intermediate shaft or steering gear.

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 steering column upper cover and marked line on the steering wheel 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 the steering angle.

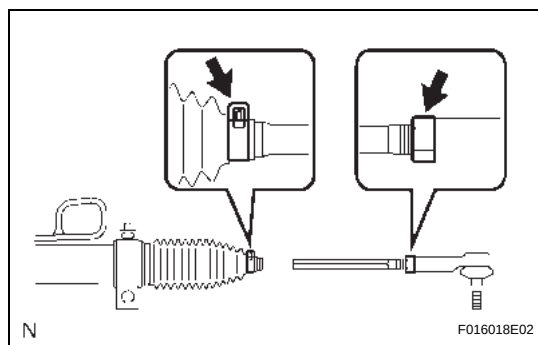
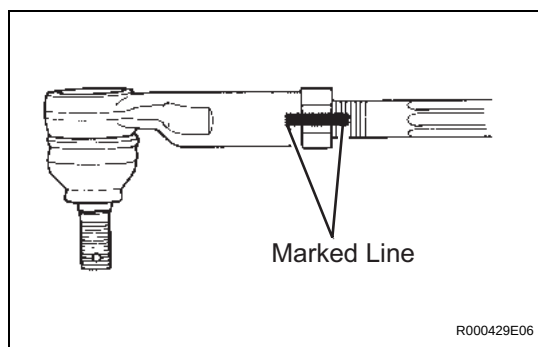
Measured distance 1 mm (0.04 in.):

Steering angle approximately 1 deg.

HINT:

Make a note of the steering angle.

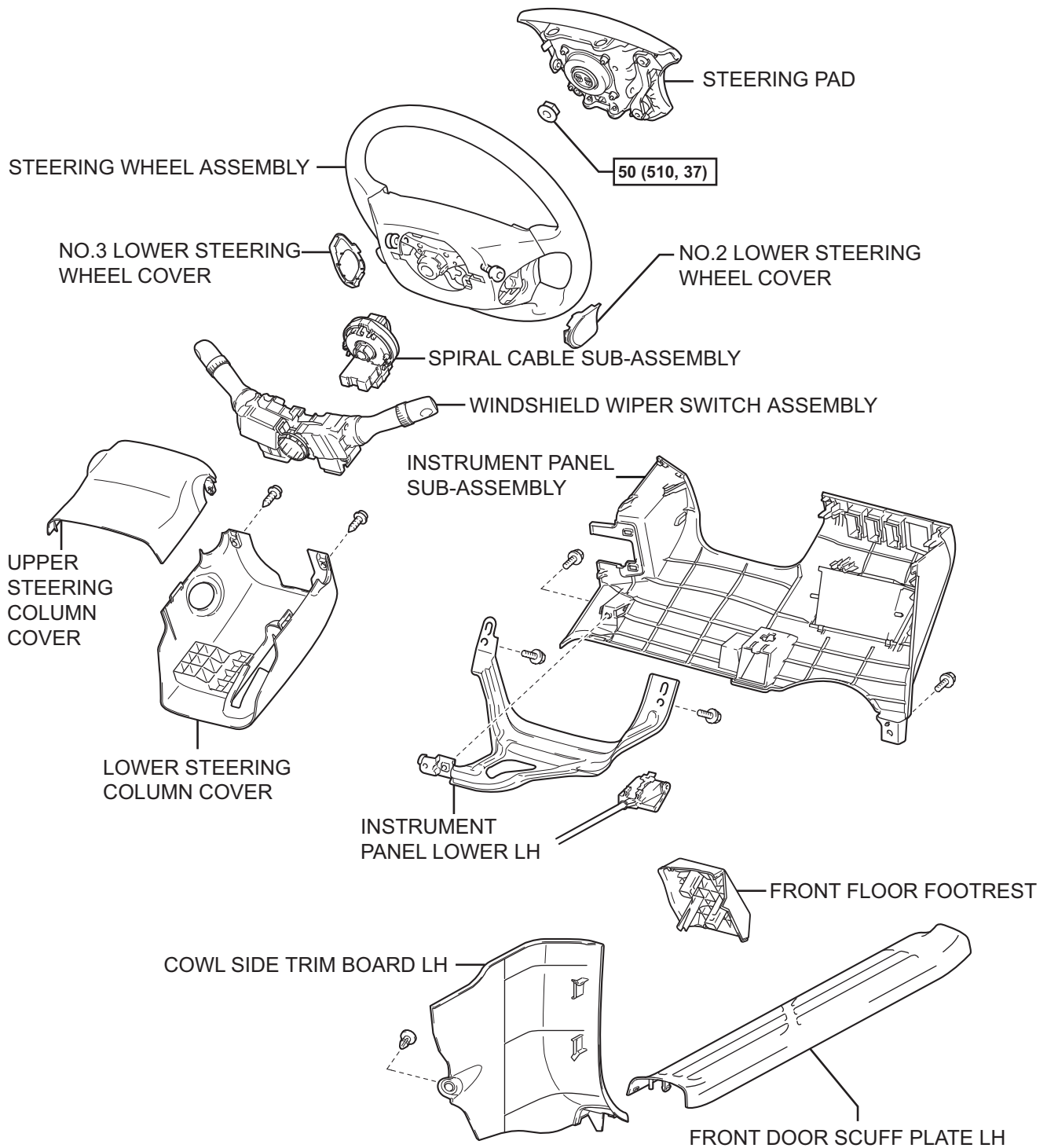
SR



- (b) Adjust the steering angle.
- (1) Draw a line on the RH and LH tie rods and on the RH and LH rack ends which can easily be seen.
 - (2) Using a paper gauge, measure the distance from RH and LH tie rod ends to the rack end screws.
HINT:
 - Measure both the RH 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 ends by the same amount (but in different directions) according to the steering angle.
Amount of turn:
360° turn of rack end (1.5 mm (0.059 in.) horizontal movement) - 12° of steering angle.
 - (6) Tighten the RH and LH lock nuts.
Torque: 55.5 N*m (566 kgf*cm, 41 ft.*lbf)
NOTICE:
Make sure that the difference in length between the RH and LH tie rod ends and rack end screws is less than 1.5 mm (0.059 in.).
 - (7) Install the RH and LH boot clips.

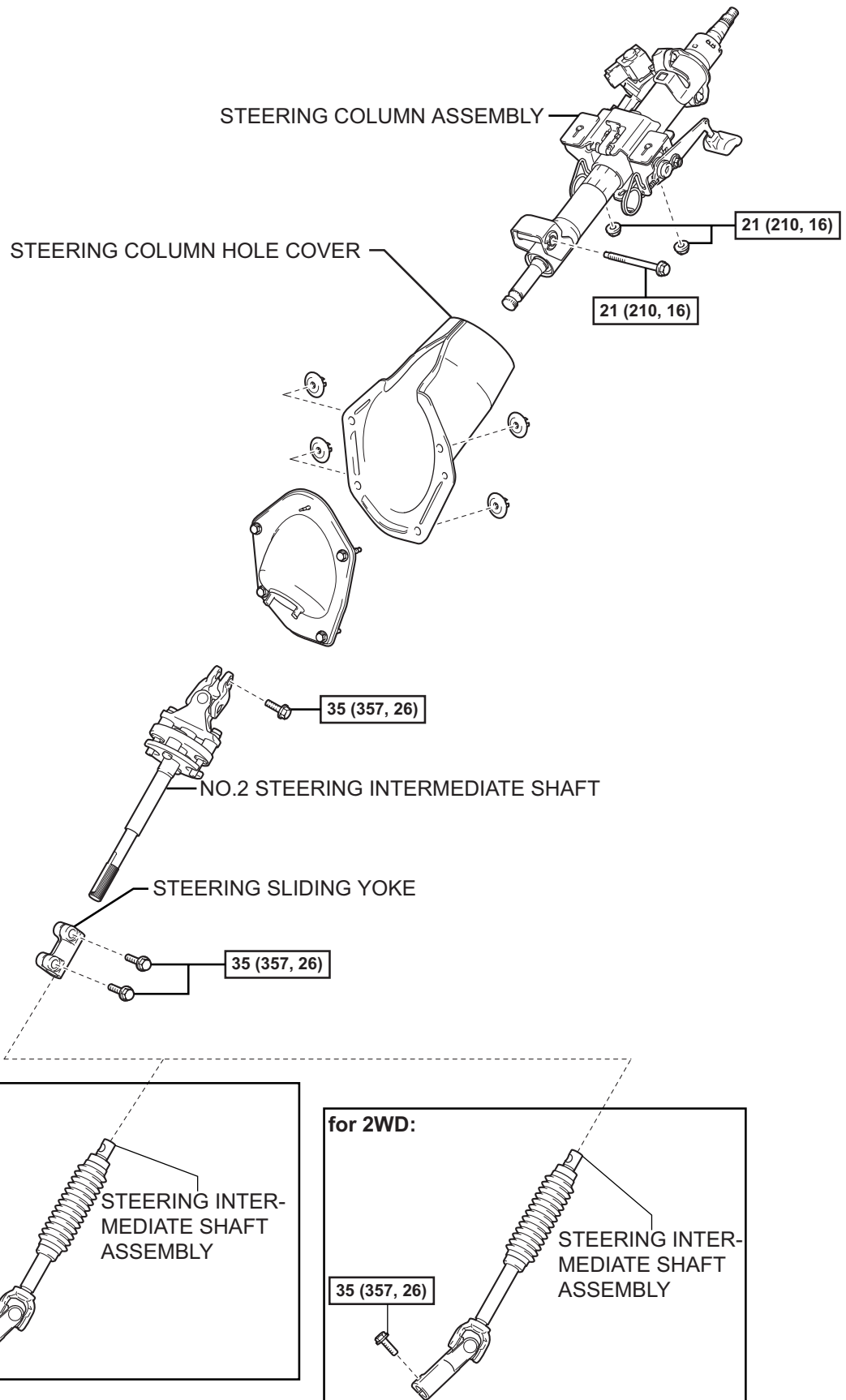
STEERING COLUMN ASSEMBLY

COMPONENTS

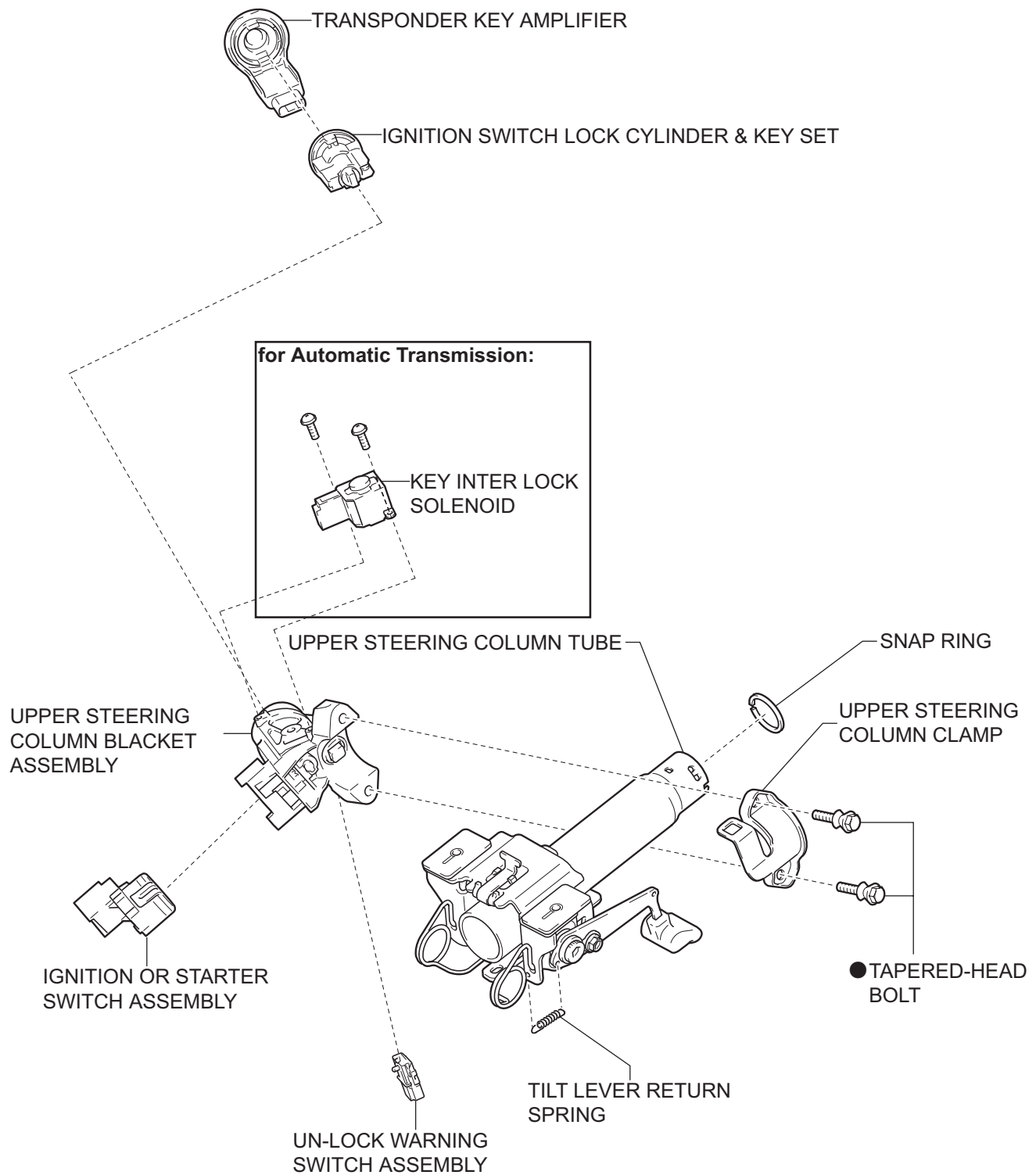


N*m (kgf*cm, ft.*lbf) : Specified torque

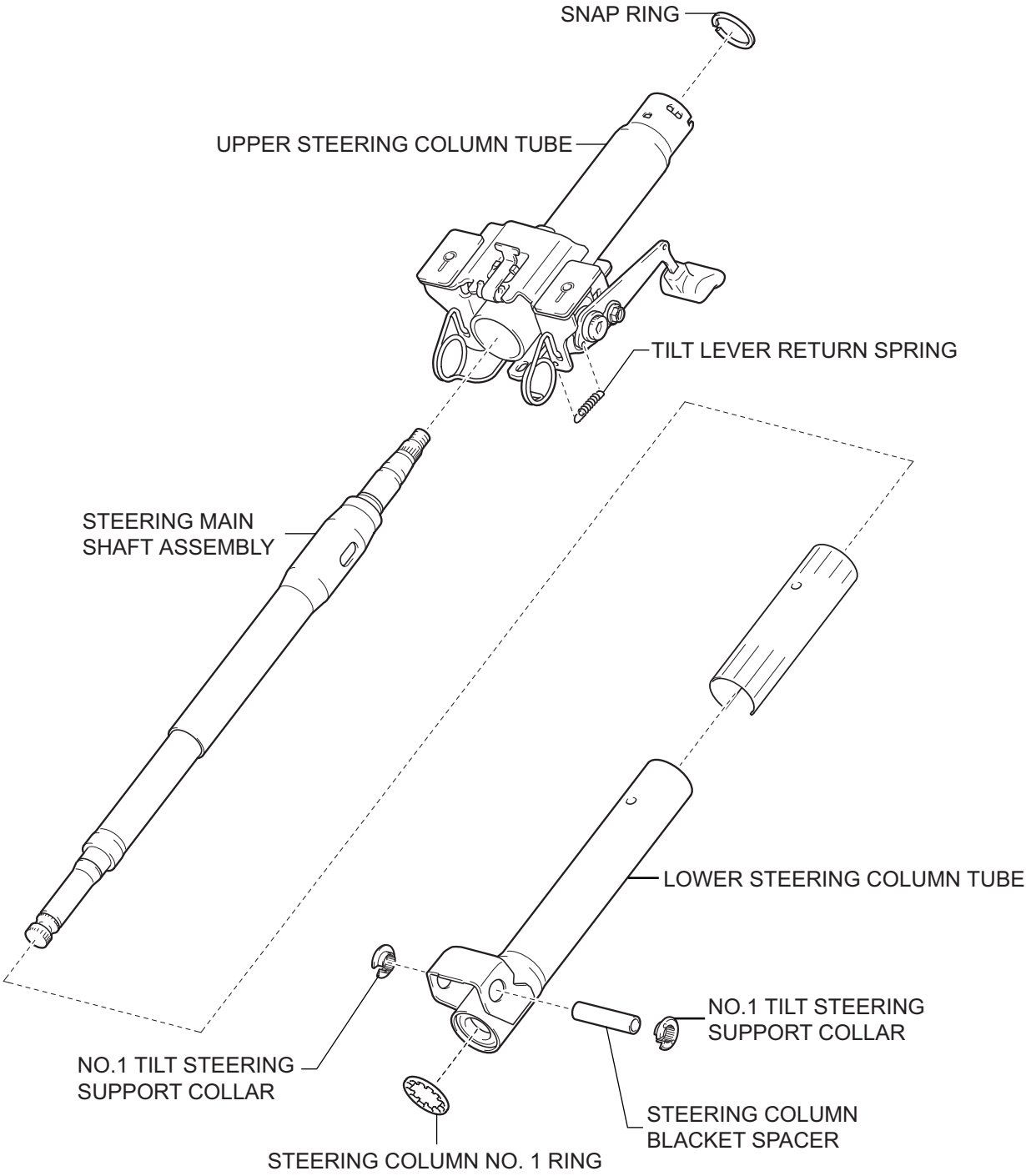
● Non-reusable part



N*m (kgf*cm, ft.*lbf) : Specified torque ● Non-reusable part



● Non-reusable part



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REMOVAL

1. PRECAUTION

(See page [RS-1](#))

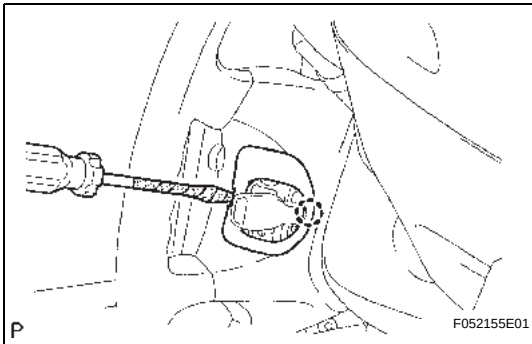
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

Wait for at least 90 seconds after disconnecting the cable to prevent the airbag from working.

3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

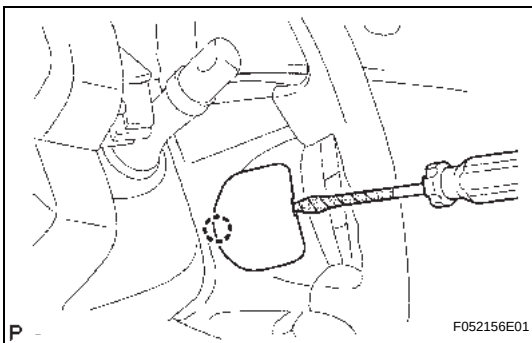
4. REMOVE NO.2 LOWER STEERING WHEEL COVER

- (a) Using a screwdriver with its tip wrapped in protective tape, disengage the claw and remove the steering wheel cover lower No. 2.



5. REMOVE NO.3 LOWER STEERING WHEEL COVER

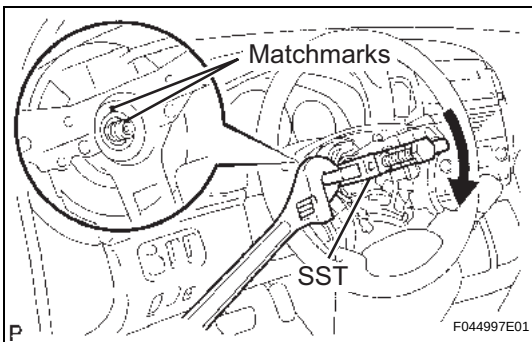
- (a) Using a screwdriver with its tip wrapped in protective tape, disengage the claw and remove the No. 3 lower steering wheel cover.



6. REMOVE STEERING PAD (See page [RS-558](#))

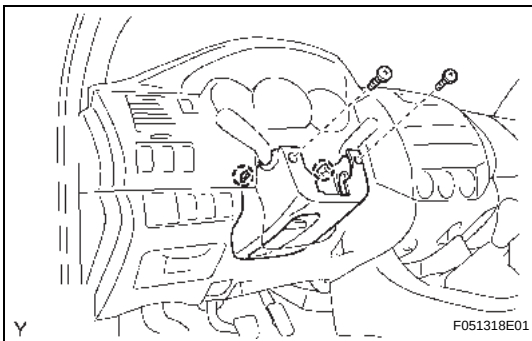
7. REMOVE STEERING WHEEL ASSEMBLY

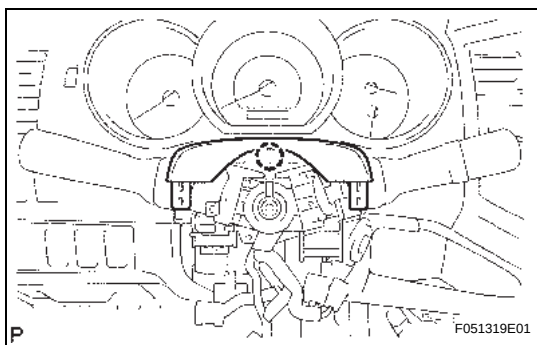
- (a) Remove the steering wheel assembly set nut.
 (b) Place matchmarks on the steering wheel assembly and main shaft assembly.
 (c) Using SST, remove the steering wheel assembly.
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)



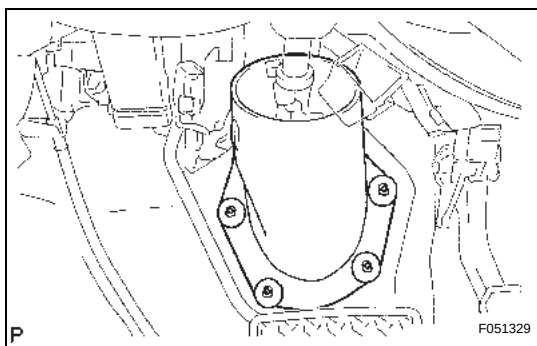
8. REMOVE LOWER STEERING COLUMN COVER

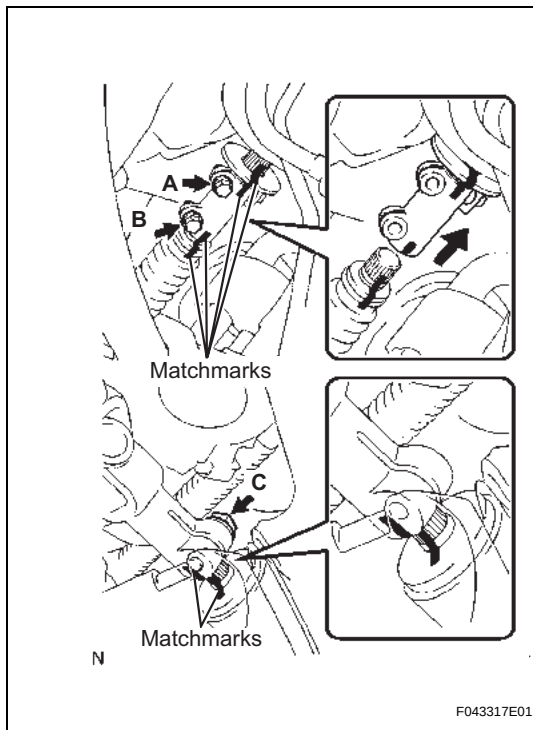
- (a) Remove the 2 screws.
 (b) Disengage the 2 claws to remove the lower steering column cover.





9. **REMOVE UPPER STEERING COLUMN COVER**
 - (a) Disengage the claw and then remove the upper steering column cover.
10. **REMOVE SPIRAL CABLE SUB-ASSEMBLY** (See page [RS-566](#))
11. **REMOVE WINDSHIELD WIPER SWITCH ASSEMBLY** (See page [WW-17](#))
12. **REMOVE FRONT FLOOR FOOTREST** (See page [IR-1](#))
13. **REMOVE FRONT DOOR SCUFF PLATE LH** (for Regular Cab) (See page [IR-40](#))
14. **REMOVE FRONT DOOR SCUFF PLATE LH** (for Access Cab) (See page [IR-61](#))
15. **REMOVE FRONT DOOR SCUFF PLATE LH** (for Double Cab) (See page [IR-12](#))
16. **REMOVE COWL SIDE TRIM BOARD LH** (for Regular Cab) (See page [IR-40](#))
17. **REMOVE COWL SIDE TRIM BOARD LH** (for Access Cab) (See page [IR-61](#))
18. **REMOVE COWL SIDE TRIM BOARD LH** (for Double Cab) (See page [IR-12](#))
19. **REMOVE INSTRUMENT PANEL UNDER TRAY** (for Pedal Type Parking Brake) (See page [IP-9](#))
20. **REMOVE INSTRUMENT PANEL HOLE COVER** (for Lever Type Parking Brake) (See page [IP-9](#))
21. **REMOVE INSTRUMENT PANEL LOWER LH** (See page [IP-14](#))
22. **REMOVE INSTRUMENT PANEL COVER SUB-ASSEMBLY LOWER** (See page [IP-14](#))
23. **REMOVE STEERING COLUMN HOLE COVER**
 - (a) Disengage the 4 clips and remove the steering column hole cover.
24. **REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY**
 - (a) Remove the No. 1 engine under cover sub-assembly with the 4 bolts.

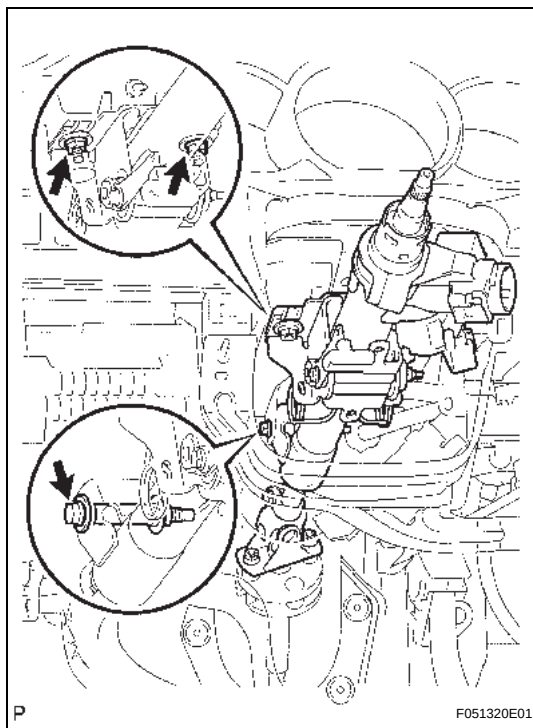


**25. REMOVE NO. 2 STEERING INTERMEDIATE SHAFT**

- (a) Mark matchmarks on the power steering gear assembly and No. 2 steering intermediate shaft.
- (b) Remove bolt C and No. 2 steering intermediate shaft from the power steering gear assembly.

26. REMOVE STEERING SLIDING YOKE

- (a) Mark matchmarks on the steering sliding yoke, steering intermediate shaft sub-assembly No. 2 and steering intermediate shaft assembly.
- (b) Remove bolts A and B from the steering sliding yoke.
- (c) Slide the steering sliding yoke up and separate it from the steering intermediate shaft sub-assembly No. 2.
- (d) Pull down the steering sliding yoke from the steering intermediate shaft assembly to remove.

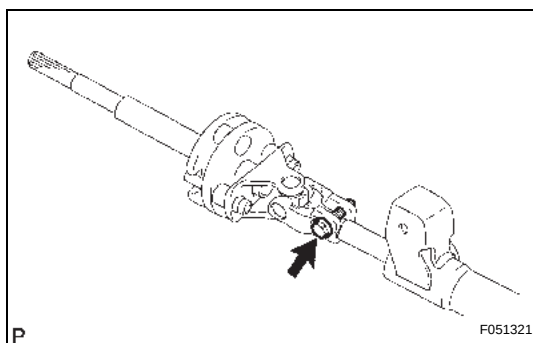
**27. REMOVE STEERING COLUMN ASSEMBLY**

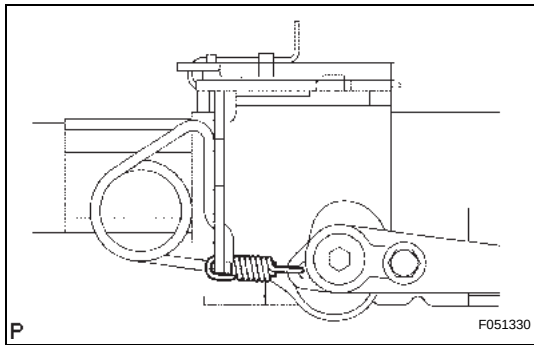
- (a) Disconnect the connectors and wire harness clamps.
- (b) Remove the bolt and 2 nuts, then remove the steering column assembly from the instrument panel reinforcement assembly.

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DISASSEMBLY**1. REMOVE STEERING INTERMEDIATE SHAFT ASSEMBLY**

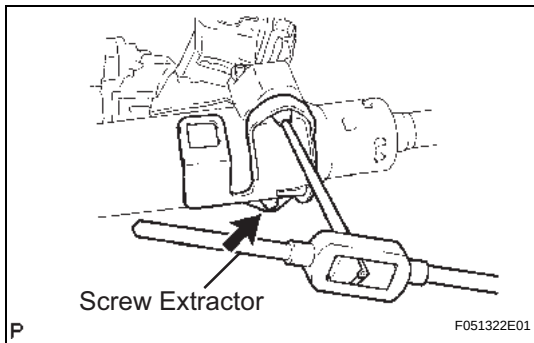
- (a) Place matchmarks on the steering intermediate shaft sub-assembly and steering shaft.
- (b) Remove the bolt and steering intermediate shaft sub-assembly.





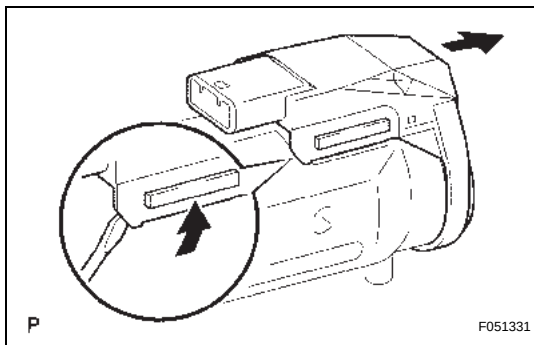
2. REMOVE TILT LEVER RETURN SPRING

- Remove the tilt lever return spring from the steering upper support bracket and steering tilt lever.



3. REMOVE UPPER STEERING COLUMN CLAMP

- Using a centering punch, make the center of the 2 taped- hand bolts.
- Using a drill, make a hole in the 2 steering lock set bolts and set a screw extractor.
- Using the screw extractor, remove the steering column bracket assembly upper and upper steering column clamp from the steering column tube upper.



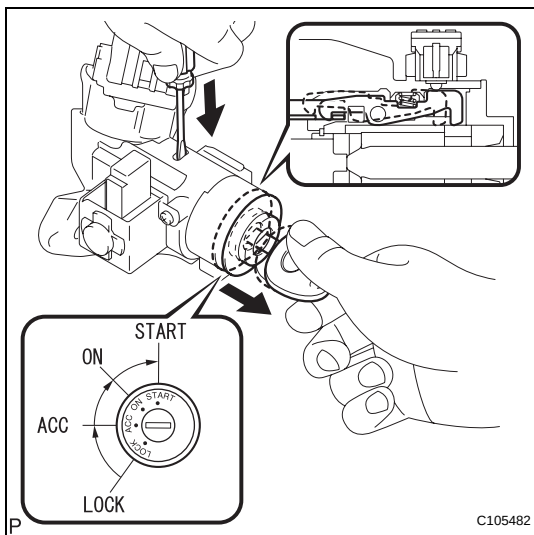
4. REMOVE TRANSPONDER KEY AMPLIFIER

- Widen the claw hung on the upper bracket by approximately 1.0 mm (0.039 in.) using a screwdriver.
- Pull the transponder key amplifier toward the rear of the vehicle with the claw open.

NOTICE:

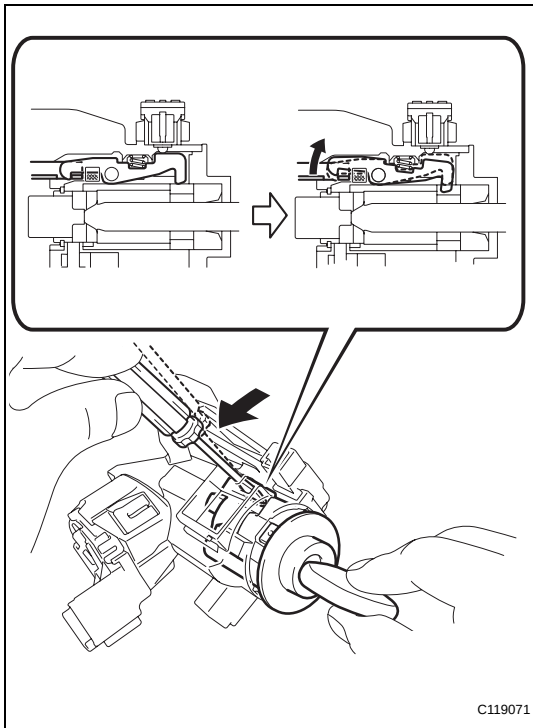
Take care not to apply excessive force to prevent the case from being damaged.

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5. REMOVE IGNITION SWITCH LOCK CYLINDER & KEY SET

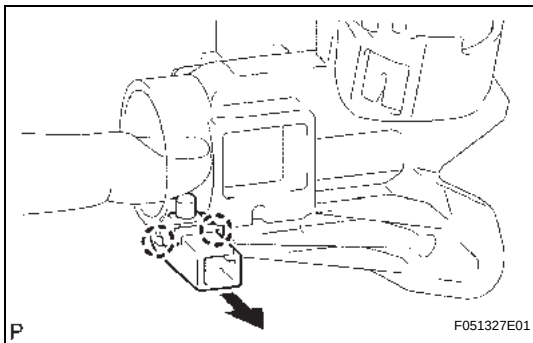
- Place the ignition switch lock cylinder assembly in the accessory position.
- Insert screwdriver in the steering column bracket assembly upper as shown in the illustration. Then slide ignition switch lock cylinder assembly until the claw of the ignition switch lock cylinder assembly comes into contact with the steering column bracket assembly upper stopper.



- (c) Insert a screwdriver into the steering column bracket assembly upper as shown in the illustration. Then tilt the screwdriver as shown in the illustration to disengage the claw of the ignition lock cylinder assembly and remove the cylinder.

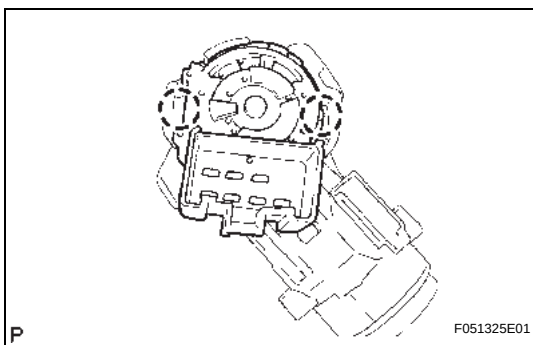
HINT:

When the ignition lock cylinder assembly disengages, a click sound is heard.



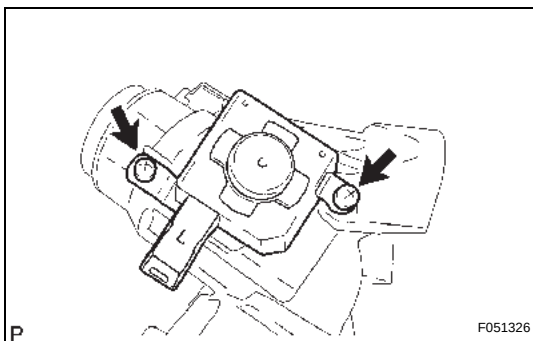
6. REMOVE UN-LOCK WARNING SWITCH ASSEMBLY

- Disconnect the un-lock warning switch assembly connector from the ignition or start switch assembly.
- Remove the un-lock warning switch assembly toward the rear of the vehicle by pushing up the center part.



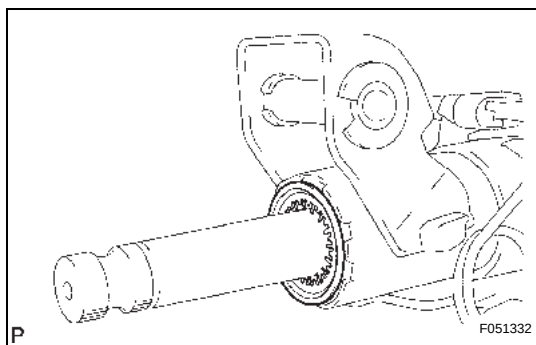
7. REMOVE IGNITION OR STARTER SWITCH ASSEMBLY

- Disengage the 2 claws and ignition or starter switch assembly from the steering column bracket assembly upper.

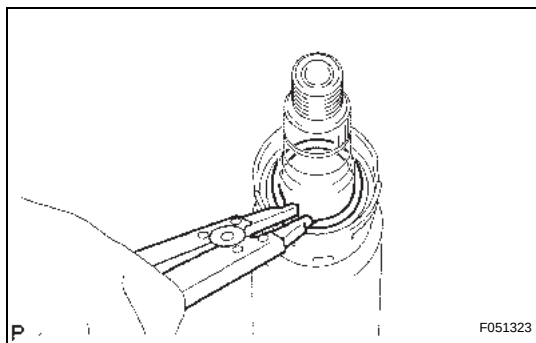


8. REMOVE KEY INTER LOCK SOLENOID (for Automatic Transmission)

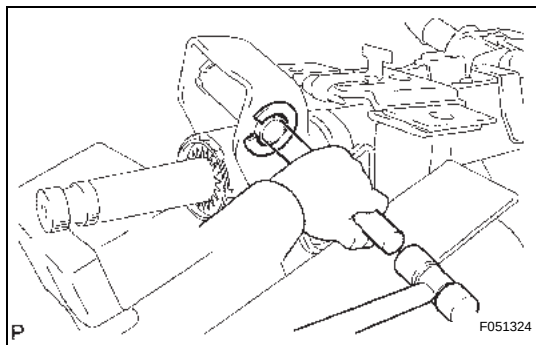
- Remove the 2 screws and key inter lock solenoid from the steering column bracket assembly upper.

**9. REMOVE STEERING MAIN SHAFT ASSEMBLY**

- (a) Using a screwdriver, remove the steering column No. 1 ring from the steering main shaft.



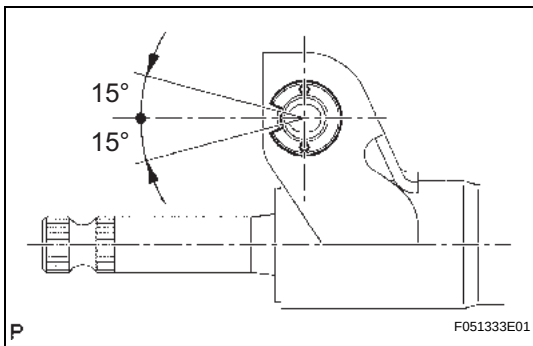
- (b) Using a snap ring expander, remove the snap ring and No. 1 main shaft.
- (c) Remove the compression spring, bearing thrust collar and bearing from the No. 1 main shaft.

**10. REMOVE NO.1 TILT STEERING SUPPORT COLLAR**

- (a) Using a brass bar, hammer and vise, gently strike the central part of the steering column bracket spacer and remove it.
- (b) Remove the No. 1 tilt steering support collar from the steering column tube lower.

REASSEMBLY

1. **INSTALL NO.1 TILT STEERING SUPPORT COLLAR**
 - (a) Install the No. 1 tilt steering support collar from the steering column tube lower.



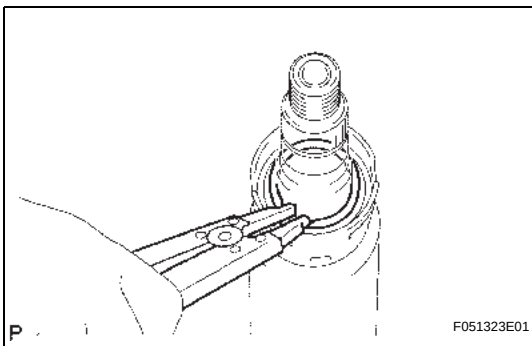
- (b) Using a hammer and vise, install the steering column bracket spacer.

NOTICE:

- The inclination of the steering column bracket spacer should be within $\pm 15^\circ$ when installing, as shown in the illustration.
- The turning angle of the No. 1 tilt steering support collar should be within $\pm 15^\circ$ when installing.

2. **INSTALL STEERING MAIN SHAFT ASSEMBLY**

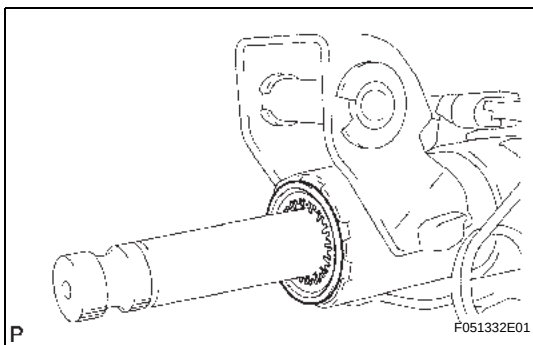
- (a) Install the steering main shaft onto the steering column tube upper and steering column tube lower.
 - (b) Using a snap ring expander, install a new snap ring onto the main shaft.



- (c) Install the steering column No. 1 ring onto the steering main shaft.

3. **INSTALL KEY INTER LOCK SOLENOID (for Automatic Transmission)**

- (a) Install the key inter lock solenoid onto the steering column bracket assembly upper with 2 screws.



4. **INSTALL IGNITION OR STARTER SWITCH ASSEMBLY**

- (a) Engage the ignition starter switch assembly into the steering column bracket assembly upper with the 2 claws.

5. **INSTALL UN-LOCK WARNING SWITCH ASSEMBLY**

- (a) Install the un-lock warning switch assembly onto the steering column bracket assembly upper.
 - (b) Connect the un-lock warning switch assembly connector to the ignition switch assembly.

6. **INSTALL IGNITION SWITCH LOCK CYLINDER & KEY SET**

- (a) Make sure that the ignition switch lock cylinder assembly is in the accessory position.
 - (b) Install the ignition switch lock cylinder assembly.

HINT:

When the ignition lock cylinder assembly engages, a click sound is heard.

7. INSTALL TRANSPONDER KEY AMPLIFIER**NOTICE:**

Take care not to push the amplifier up forcibly to prevent it from being damaged.

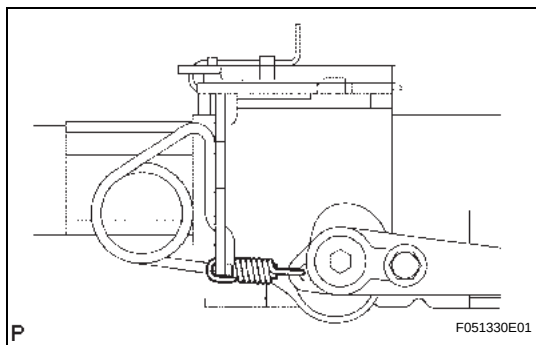
- (a) Align the transponder key amplifier with the installation position of the upper bracket with the amplifier inclined.
- (b) Push up the transponder key amplifier and connect it to the upper bracket.

8. INSPECT STEERING LOCK OPERATION

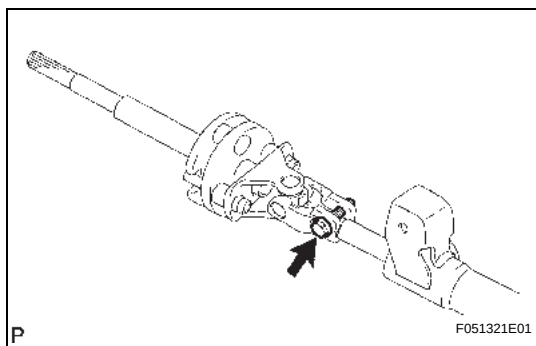
- (a) Check that the steering mechanism is activated when removing the key.
- (b) Check that the steering mechanism is deactivated when inserting the key and turning it to ACC position.

9. INSTALL UPPER STEERING COLUMN CLAMP

- (a) Provisionally install the steering column bracket assembly upper and steering column upper clamp with the 2 new tapered-head bolts.
- (b) Tighten the 2 tapered-head bolts until the bolt heads break off.

**10. INSTALL TILT LEVER RETURN SPRING**

- (a) Install the tilt lever return spring onto the bracket and steering tilt lever.

SR**11. INSTALL STEERING INTERMEDIATE SHAFT ASSEMBLY**

- (a) Align the matchmarks on the steering intermediate shaft sub-assembly and steering main shaft assembly.
- (b) Temporarily install the steering intermediate shaft sub- assembly with the bolt.

Torque: 35 N*m (357 kgf*cm, 26 ft.*lbf)

INSTALLATION

1. INSTALL STEERING COLUMN ASSEMBLY

- (a) Install the steering column assembly with the 2 nuts and bolt.

Torque: 21 N*m (210 kgf*cm, 16 ft.*lbf)

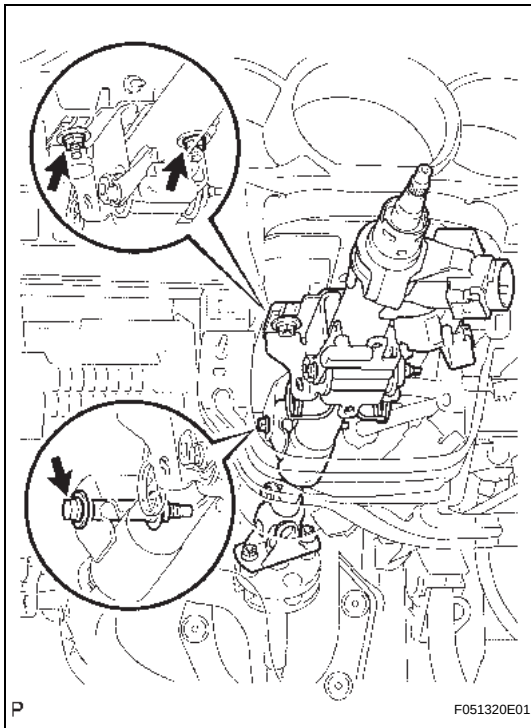
- (b) Connect each of the connectors to the steering column assembly.
(c) Connect the wire harness clamps to the steering column assembly.

CAUTION:

Use a shop rag to wipe any dirt off the installation plane and column body side.

NOTICE:

Be careful not to scratch or soil the installation plane of the steering column.



2. INSTALL NO.2 STEERING INTERMEDIATE SHAFT

- (a) Align the matchmarks on the power steering gear and No. 2 steering intermediate shaft.
(b) Install the No. 2 steering intermediate shaft onto the steering gear box with bolt C.

Torque: 35 N*m (357 kgf*cm, 26 ft.*lbf) for bolt C

3. INSTALL STEERING SLIDING YOKE

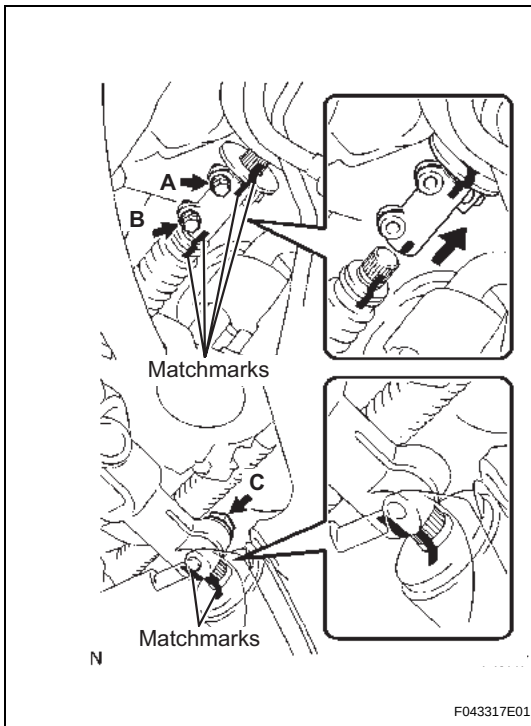
- (a) Align the matchmarks on the steering column and steering sliding yoke.
(b) Install the steering sliding yoke onto the steering column assembly and slide it upward.
(c) Align the matchmarks on the intermediate shaft sub-assembly No. 2 and steering sliding yoke.
(d) Install the sliding yoke onto the intermediate shaft sub-assembly No. 2 with bolts A and B.

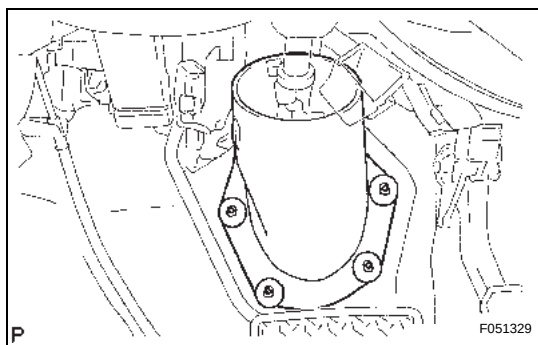
Torque: 35 N*m (357 kgf*cm, 26 ft.*lbf) for bolt A, B

4. INSTALL NO.1 ENGINE UNDER COVER SUB-ASSEMBLY

- (a) Install the No. 1 engine under cover sub-assembly with the 4 bolts.

Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)





5. **INSTALL STEERING COLUMN HOLE COVER**
 - (a) Install the steering column hole cover with the 4 clips.
6. **INSTALL LOWER INSTRUMENT PANEL LH** (See page [IP-20](#))
7. **REMOVE INSTRUMENT PANEL SUB-ASSEMBLY** (See page [IP-22](#))
8. **INSTALL INSTRUMENT PANEL HOLE COVER** (for Lever Type Parking Brake) (See page [IP-25](#))
9. **INSTALL INSTRUMENT PANEL UNDER TRAY** (for Pedal Type Parking Brake) (See page [IP-25](#))
10. **INSTALL COWL SIDE TRIM BOARD LH** (for Regular Cab) (See page [IR-52](#))
11. **INSTALL COWL SIDE TRIM BOARD LH** (for Access Cab) (See page [IR-75](#))
12. **INSTALL COWL SIDE TRIM BOARD LH** (for Double Cab) (See page [IR-29](#))
13. **INSTALL FRONT DOOR SCUFF PLATE LH** (for Regular Cab) (See page [IR-52](#))
14. **INSTALL FRONT DOOR SCUFF PLATE LH** (for Access Cab) (See page [IR-75](#))
15. **INSTALL FRONT DOOR SCUFF PLATE LH** (for Double Cab) (See page [IR-29](#))
16. **INSTALL FRONT FLOOR FOOTREST** (See page [IR-1](#))
17. **INSTALL WINDSHIELD WIPER SWITCH ASSEMBLY** (See page [WW-19](#))
18. **INSTALL SPIRAL CABLE SUB-ASSEMBLY** (See page [RS-567](#))
19. **INSTALL UPPER STEERING COLUMN COVER**
 - (a) Engage the claw and then install the steering column cover upper.
20. **INSTALL LOWER STEERING COLUMN COVER**
 - (a) Engage the 2 claws.
 - (b) Install the steering column cover lower with the 2 screws.
21. **INSTALL STEERING WHEEL ASSEMBLY**
 - (a) Align the matchmarks on the steering wheel assembly and steering main shaft assembly.
 - (b) Install the steering wheel assembly set nut.
Torque: 50 N*m (510 kgf*cm, 37 ft.*lbf)
22. **INSTALL STEERING PAD** (See page [RS-558](#))
23. **INSTALL NO.3 LOWER STEERING WHEEL COVER**
 - (a) Engage the claw and install the No. 3 lower steering wheel cover onto the steering wheel assembly.

- 24. INSTALL NO.2 LOWER STEERING WHEEL COVER**
 - (a) Engage the claw and install the No. 2 lower steering wheel cover onto the steering wheel assembly.
- 25. PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
- 26. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)
- 27. INSPECT SRS WARNING LIGHT**

(See page [RS-28](#))