

STEERING SYSTEM

SR08F-03

PRECAUTION

- Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.
- The MR2 is equipped with SRS (Supplemental Restraint System) such as the driver airbag and passenger airbag. Failure to carry out service operation in the 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 notices in the RS section.

TROUBLESHOOTING

SR08G-04

PROBLEM SYMPTOMS TABLE

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

Symptom	Suspect Area	See page
Hard steering	9. Tires (Improperly inflated)	SA-2
	10. Power steering fluid level (Low)	SR-4
	11. Front wheel alignment (Incorrect)	SA-4
	12. Steering system joints (Worn)	–
	13. Suspension arm ball joints (Worn)	SA-25
	14. Steering column (Binding)	–
Poor return	15. Power steering vane pump	SR-22
	16. Power steering gear	SR-32
	1. Tires (Improperly inflated)	SA-2
	2. Front wheel alignment (Incorrect)	SA-4
Excessive play	3. Steering column (Binding)	–
	4. Power steering gear	SR-32
	1. Steering system joints (Worn)	–
	2. Suspension arm ball joints (Worn)	SA-25
	3. Intermediate shaft, Sliding yoke (Worn)	–
Abnormal noise	4. Front wheel bearing (Worn)	SA-9
	5. Power steering gear	SR-32
	1. Power steering fluid level (Low)	SR-4
	2. Steering system joints (Worn)	–
	3. Power steering vane pump	SR-22
	4. Power steering gear	SR-32

HINT:

When the problem occurs on the Electro-Hydraulic Power Steering system, refer to the DI section (See page [DI-200](#)).

POWER STEERING FLUID BLEEDING

SR08I-04

1. **CHECK FLUID LEVEL** (See page [SR-4](#))
2. **JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS**

3. **TURN STEERING WHEEL**

With the engine stopped, turn the steering wheel slowly from lock to lock several times.

4. **LOWER VEHICLE**

5. **START ENGINE**

Run the engine at idle for a few minutes.

6. **TURN STEERING WHEEL**

- (a) With the engine idling, turn the steering wheel to left or right full lock position and keep it there for 2-3 seconds, then turn the steering wheel to the opposite full lock position and keep it there for 2-3 seconds.

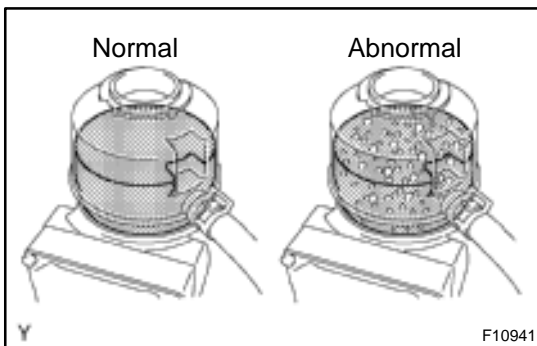
- (b) Repeat (a) several times.

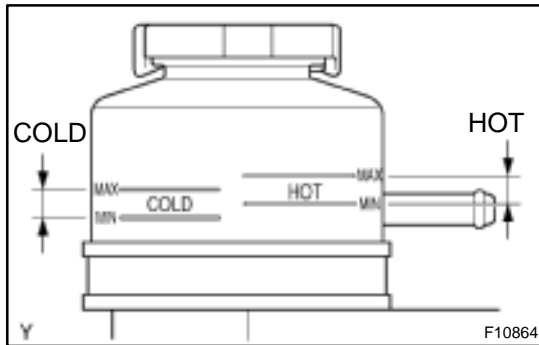
7. **STOP ENGINE**

8. **CHECK FOR FOAMING OR EMULSIFICATION**

If the system has to be bled twice specifically because of foaming or emulsification, check for fluid leaks in the system.

9. **CHECK FLUID LEVEL** (See page [SR-4](#))





INSPECTION

1. CHECK FLUID LEVEL

- (a) Keep the vehicle level.
- (b) With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

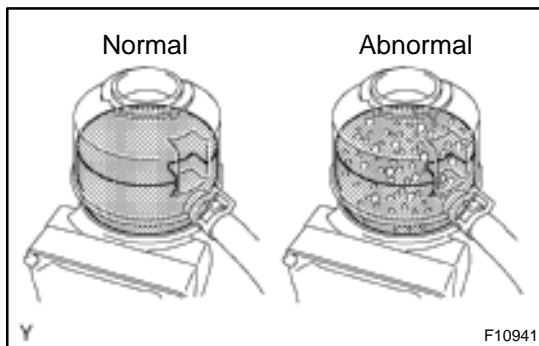
Fluid: TOYOTA POWER STEERING FLUID EH (Part No. 08886-01206) or equivalent

HINT:

Check that the fluid level is within the HOT LEVEL range on the reservoir. If the fluid is cold, check that it is within the COLD LEVEL range.

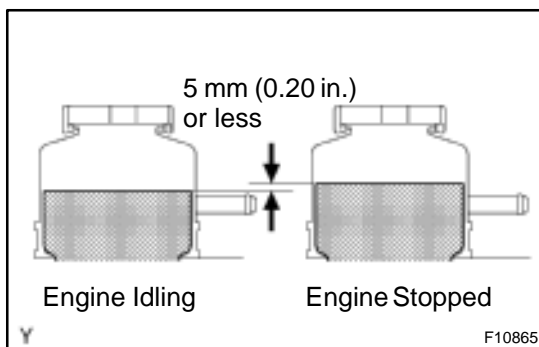
- (c) Start the engine and run it at idle.
- (d) Turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature: 50°C (122°F)



- (e) Check for foaming or emulsification.

If there is foaming or emulsification, bleed power steering system (See page [SR-3](#)).



- (f) With the engine idling, measure the fluid level in the oil reservoir.

- (g) Stop the engine.

- (h) Wait a few minutes and remeasure the fluid level in the oil reservoir.

Maximum fluid level rise: 5 mm (0.20 in.)

If a problem is found, bleed power steering system (See page [SR-3](#)).

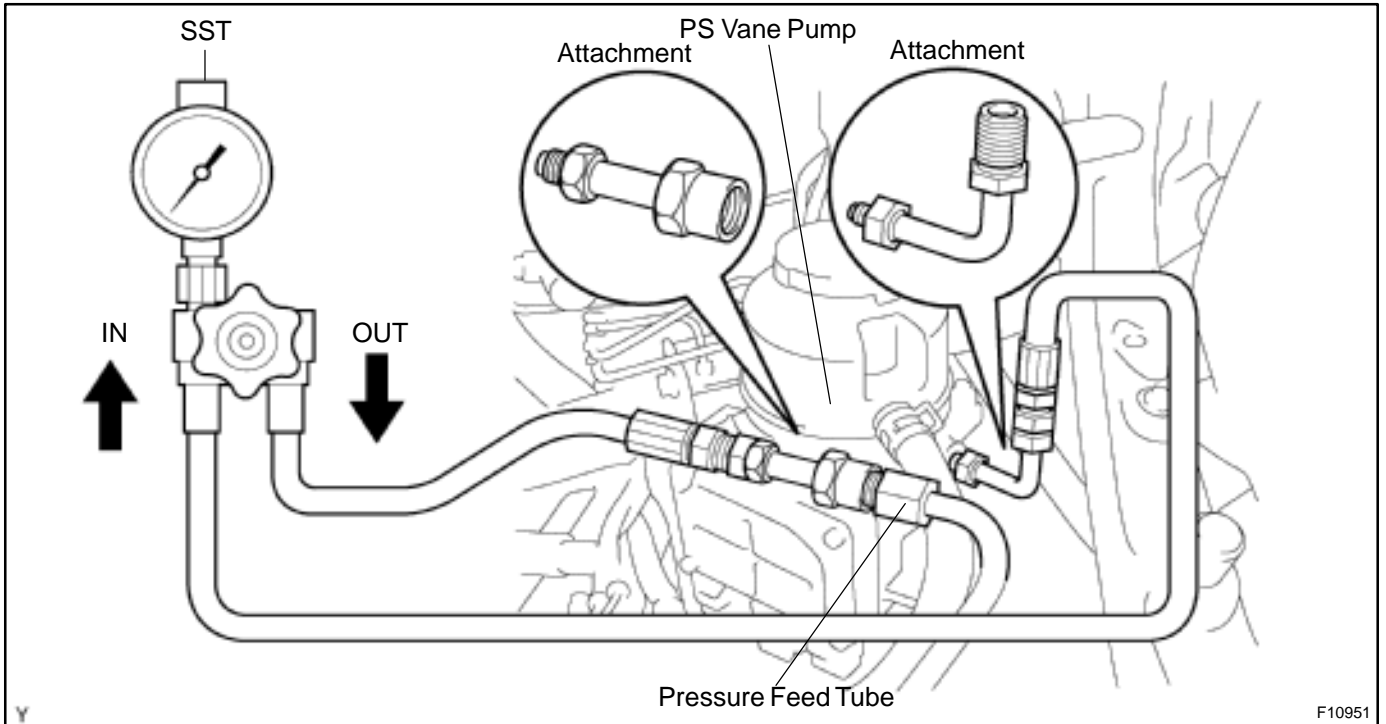
- (i) Check the fluid level.

2. CHECK STEERING FLUID PRESSURE

- (a) Disconnect the pressure feed tube from the PS vane pump (See page SR-24).
- (b) Connect SST, as shown in the illustration below.
SST 09640-10010 (09641-01010, 09641-01020, 09641-01030)

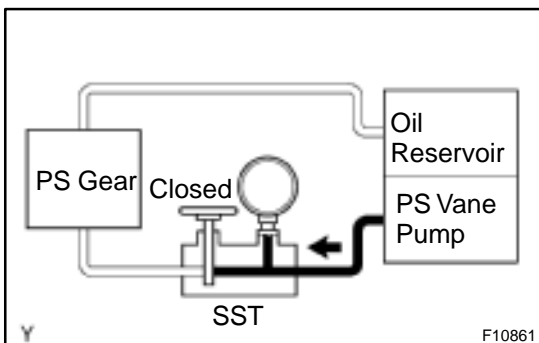
NOTICE:

Check that the valve of the SST is in the open position.



- (c) Bleed the power steering system (See page SR-3).
- (d) Start the engine and run it at idle.
- (e) Turn the steering wheel from lock to lock several times to boost fluid temperature.

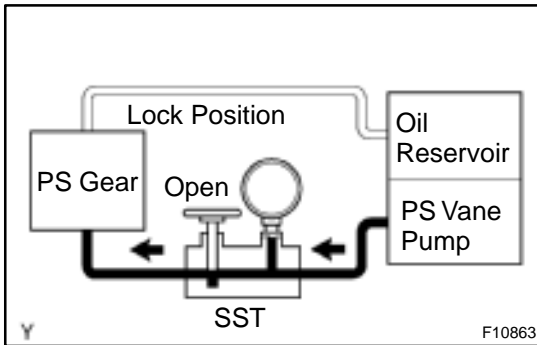
Fluid temperature: 50°C (122°F)



- (f) With the engine idling, close the valve of the SST and observe the reading on the SST.
Minimum fluid pressure: 4,900 kPa (50 kgf/cm², 711 psi)

NOTICE:

- **Do not keep the valve closed for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**



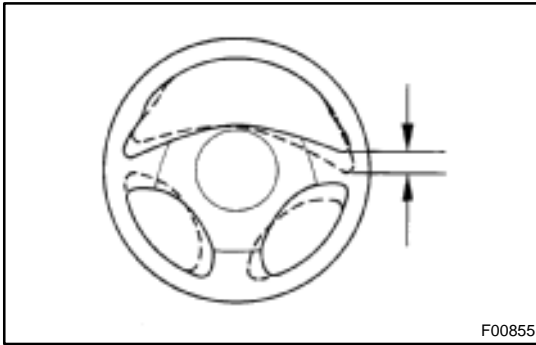
- (g) With the engine idling and valve fully opened, turn the steering wheel to full lock.

Minimum fluid pressure:

4,900 kPa (50 kgf/cm², 711 psi)

NOTICE:

- **Do not maintain lock position for more than 10 seconds.**
 - **Do not let the fluid temperature become too high.**
- (h) Disconnect the SST.
SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)
- (i) Connect the pressure feed tube to the PS vane pump (See page [SR-31](#)).
- (j) Bleed the power steering system (See page [SR-3](#)).



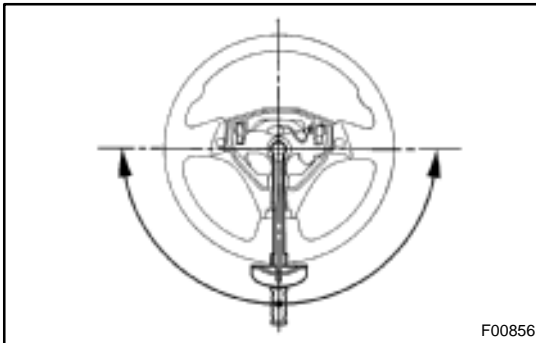
STEERING WHEEL INSPECTION

SR08K-04

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 a finger lightly, check the steering wheel freeplay.

Maximum free play: 30 mm (1.18 in.)



2. CHECK STEERING EFFORT

- (a) Center the steering wheel.
- (b) Remove the steering wheel pad (See page [SR-10](#)).
- (c) Start the engine and run it at idle.
- (d) Measure the steering effort in both directions.

Steering effort (Reference):

6.5 N·m (65 kgf·cm, 58 in.-lbf)

HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

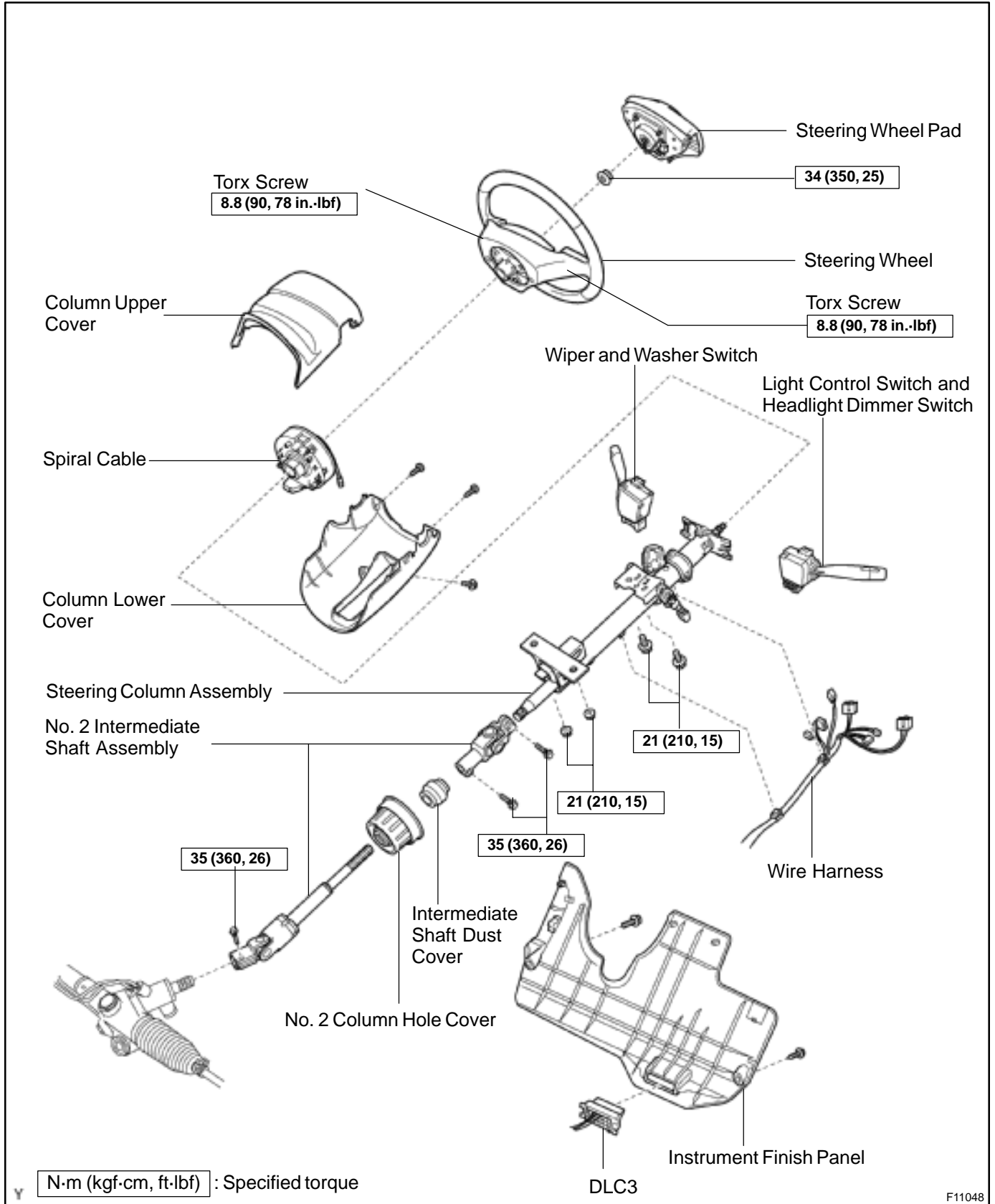
- (e) Install the steering wheel set nut.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

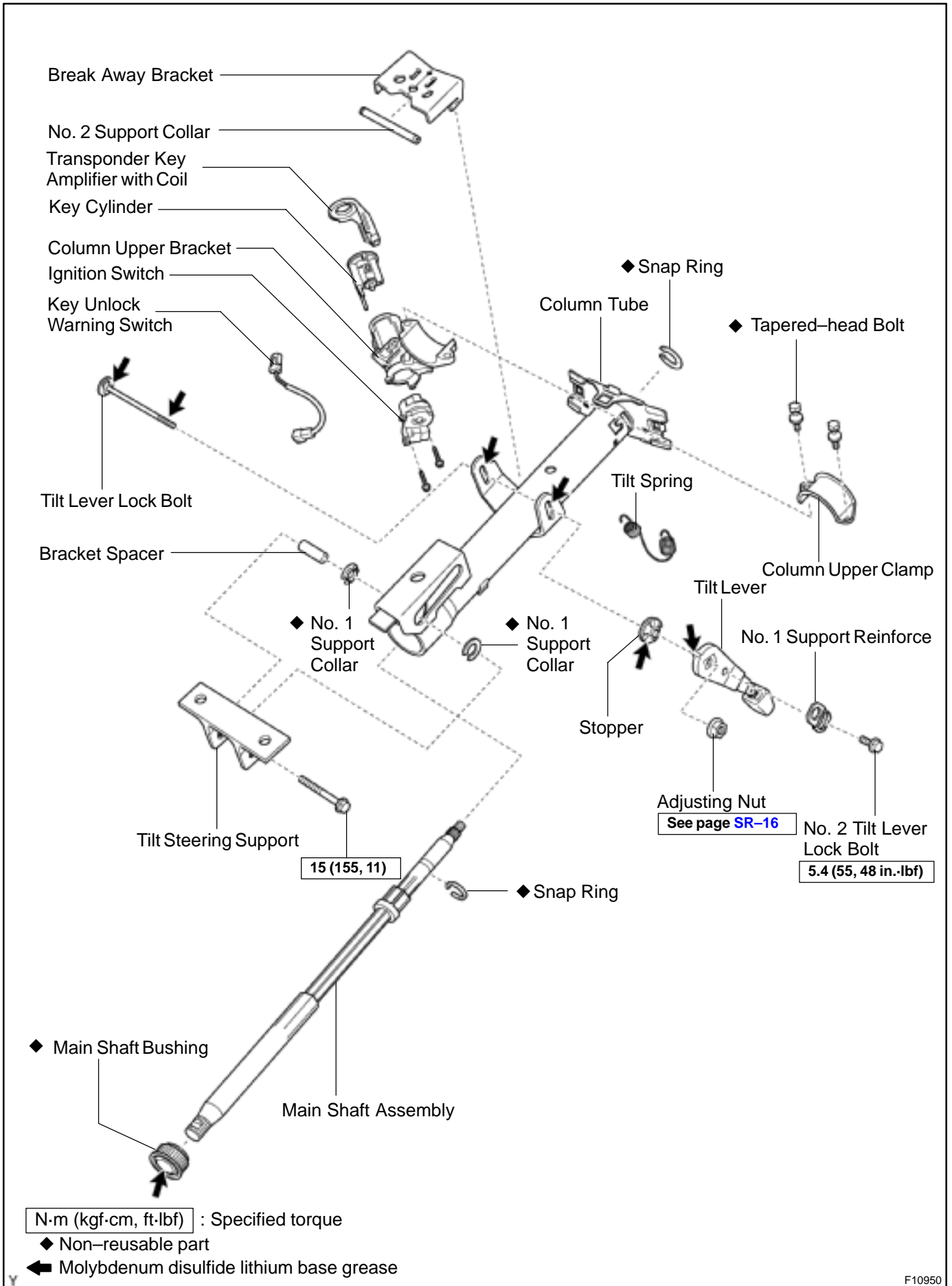
- (f) Install the steering wheel pad (See page [SR-19](#)).

TILT STEERING COLUMN COMPONENTS

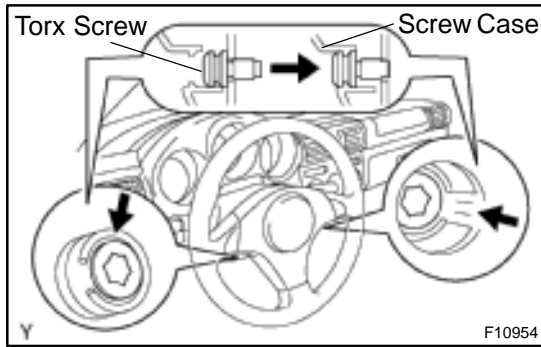
SR0YK-03



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REMOVAL

1. REMOVE STEERING WHEEL PAD

NOTICE:

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

- Place the front wheels facing straight ahead.
- Using a torx socket wrench (T30), loosen the 2 torx screws until the groove along the screw circumference catches on the screw case.

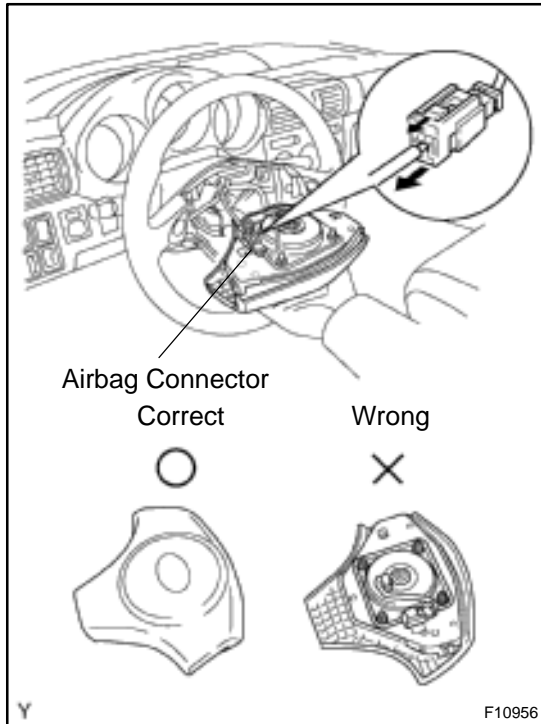
- Pull out the wheel pad from the steering wheel and disconnect the airbag connector.

CAUTION:

- When storing the wheel pad, keep the upper surface of the pad facing upward.
- Never disassemble the wheel pad.

NOTICE:

When removing the wheel pad, take care not to pull the airbag wire harness.



2. REMOVE STEERING WHEEL

- Disconnect the connector.
- Remove the steering wheel set nut.
- Place matchmarks on the steering wheel and main shaft assembly.
- Using SST, remove the steering wheel.
SST 09950-50012 (09951-05010, 09952-05010, 09953-05020, 09954-05020)

3. REMOVE INSTRUMENT FINISH PANEL

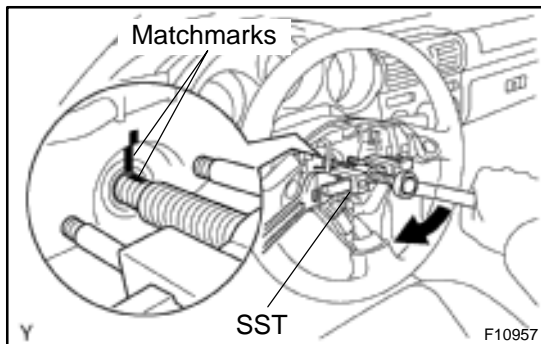
- Remove the bolt, screw and lower No. 1 instrument finish panel.
- Disconnect the DLC3.

4. REMOVE COLUMN LOWER COVER

Remove the 3 screws and column lower cover.

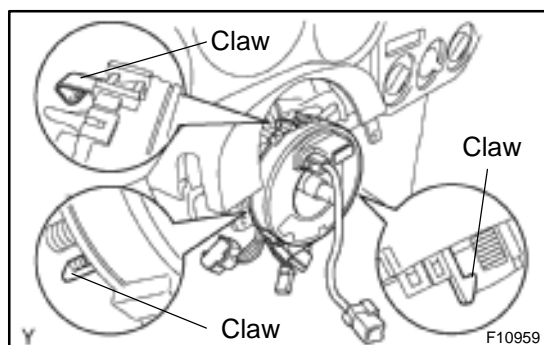
5. DISCONNECT COLUMN UPPER COVER

Disconnect the column upper cover from the column tube.



6. REMOVE SPIRAL CABLE, LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH AND WIPER AND WASHER SWITCH

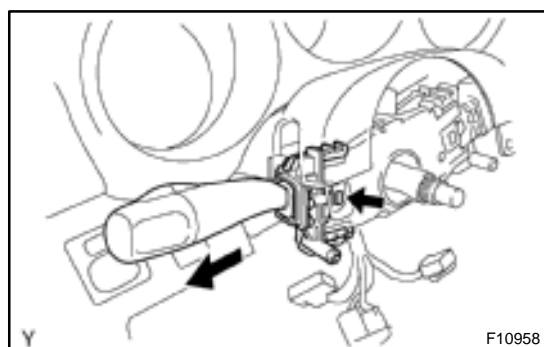
- (a) Disconnect the 3 connectors from the spiral cable, light control switch and headlight dimmer switch and wiper and washer switch.
- (b) Disconnect the airbag connector from the spiral cable.



- (c) Release the 3 claws and remove the spiral cable.

NOTICE:

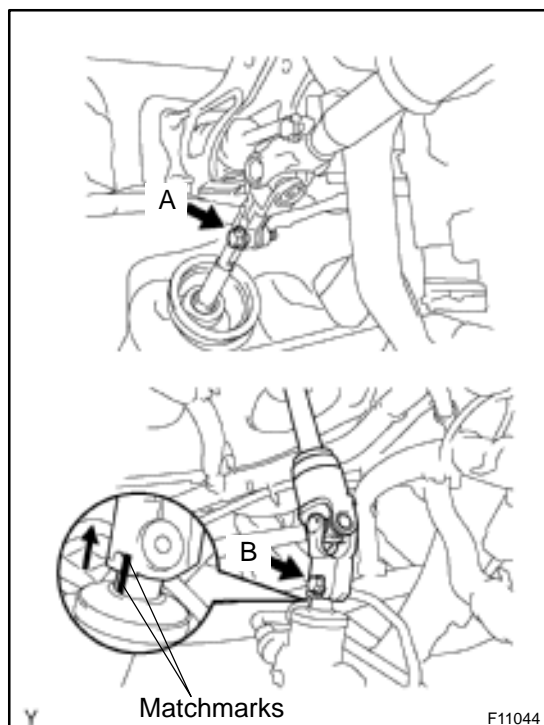
Do not disassemble the spiral cable or apply oil to it.



- (d) Push the claw and pull out the light control switch and headlight dimmer switch.
- (e) Employ the same manner described above to the wiper and washer switch.

7. DISCONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY

- (a) Loosen the clamp and disconnect the No. 2 column hole cover.

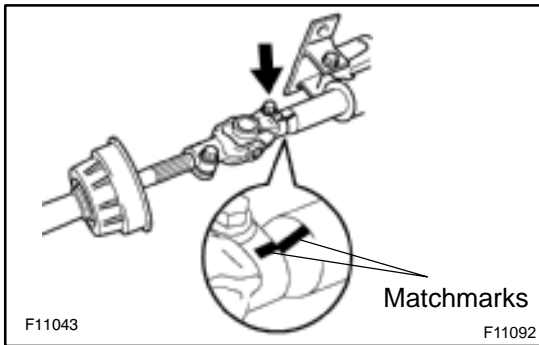


- (b) Place matchmarks on the No. 2 intermediate shaft assembly and control valve shaft.
- (c) Loosen the bolt A and remove the bolt B, then disconnect the No. 2 intermediate shaft assembly.

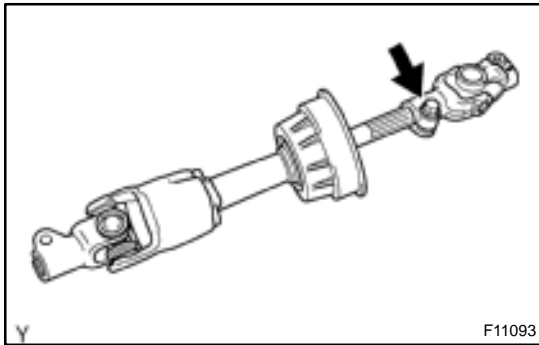
8. REMOVE STEERING COLUMN ASSEMBLY

- (a) Disconnect the 3 connectors and 2 wire harness clamps.
- (b) Remove the 2 bolts, nuts and steering column assembly.

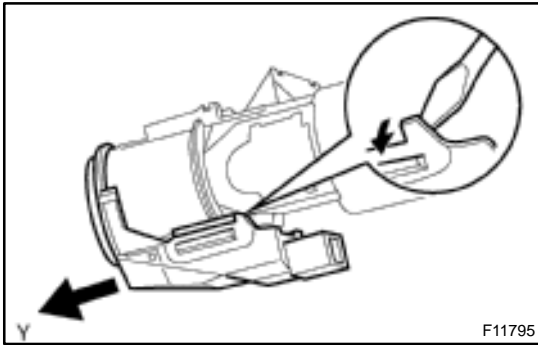
9. REMOVE COLUMN UPPER COVER



- 10. REMOVE NO. 2 INTERMEDIATE SHAFT ASSEMBLY**
- (a) Place matchmarks on the sliding yoke and main shaft assembly.
 - (b) Remove the bolt and No. 2 intermediate shaft assembly.



- 11. REMOVE SLIDING YOKE AND NO. 2 COLUMN HOLE COVER**
- Remove the bolt, sliding yoke, intermediate shaft dust cover and No. 2 column hole cover.



DISASSEMBLY

NOTICE:

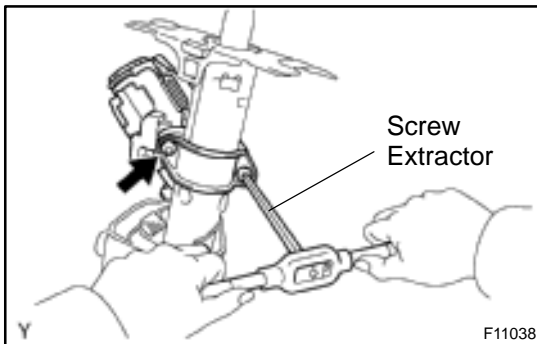
When using a vise, do not overtighten it.

1. REMOVE TRANSPONDER KEY AMPLIFIER WITH COIL

- (a) Widen the claw hung on 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.

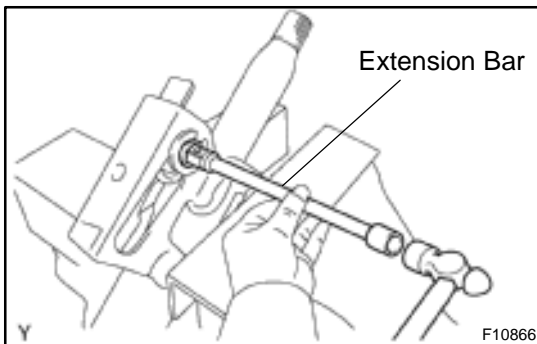


2. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

- (a) Using a centering punch, mark the center of the 2 tapered-head bolts.
- (b) Using a 3 – 4 mm (0.12 – 0.16 in.) drill, drill into the 2 bolts.
- (c) Using a screw extractor, remove the 2 bolts, column upper clamp and column upper bracket.

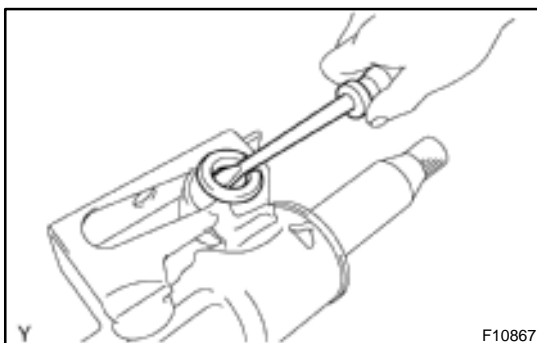
3. REMOVE TILT STEERING SUPPORT

Remove the bolt and tilt steering support.



4. REMOVE BRACKET SPACER AND NO. 1 SUPPORT COLLARS

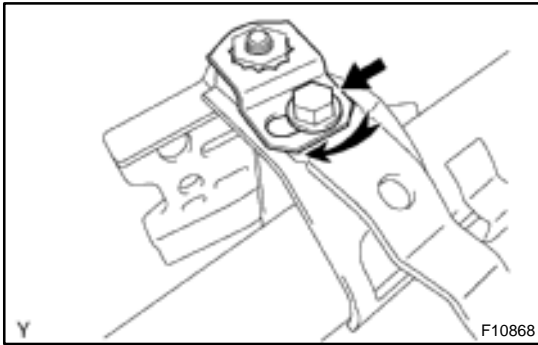
- (a) Using an extension bar and a hammer, tap out the bracket spacer.



- (b) Using a screwdriver, remove the 2 No. 1 support collars.

5. REMOVE TILT LEVER AND BREAK AWAY BRACKET

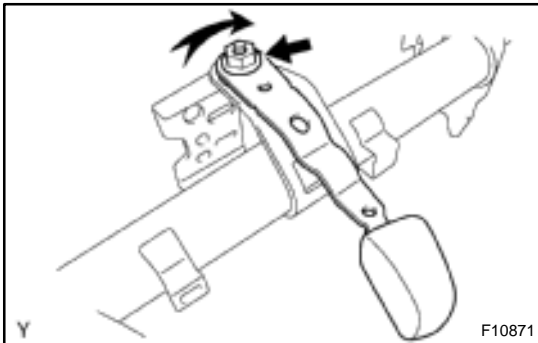
- (a) Remove the tilt spring.



- (b) Remove the No. 2 tilt lever lock bolt and No. 1 support reinforce.

HINT:

This bolt is left-handed one.

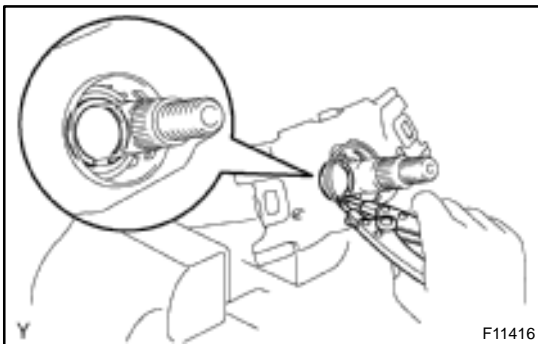


- (c) Remove the adjusting nut, tilt lever, stopper, tilt lever lock bolt and break away bracket.

HINT:

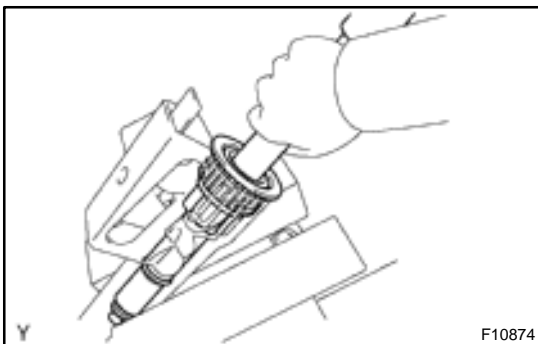
This nut is left-handed one.

- (d) Remove the No. 2 support collar from the break away bracket.

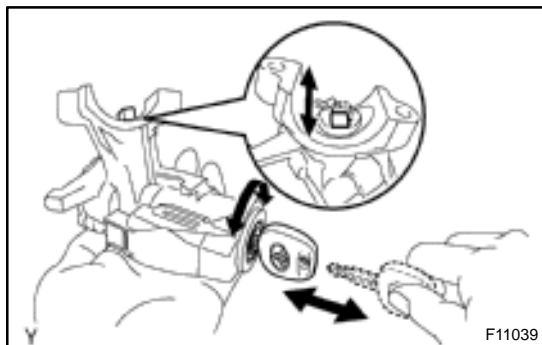


6. REMOVE MAIN SHAFT ASSEMBLY AND MAIN SHAFT BUSHING

- (a) Using a snap ring expander, remove the snap ring on the upper side.



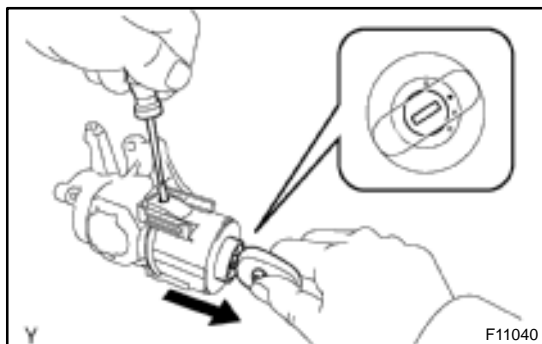
- (b) Pull out the main shaft assembly and main shaft bushing.
 (c) Using a snap ring expander, remove the snap ring on the lower side.



INSPECTION

1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



2. IF NECESSARY, REPLACE KEY CYLINDER

- (a) Place the ignition key at the ACC position.
- (b) Push down the stop pin with a screwdriver, and pull out the cylinder.
- (c) Install a new cylinder.

HINT:

Make sure the key is at the ACC position.

3. INSPECT IGNITION SWITCH (See page BE-16)

4. IF NECESSARY, REPLACE IGNITION SWITCH

- (a) Remove the 2 screws and ignition switch from the column upper bracket.
- (b) Install a new ignition switch with the 2 screws.

5. INSPECT KEY UNLOCK WARNING SWITCH (See page BE-16)

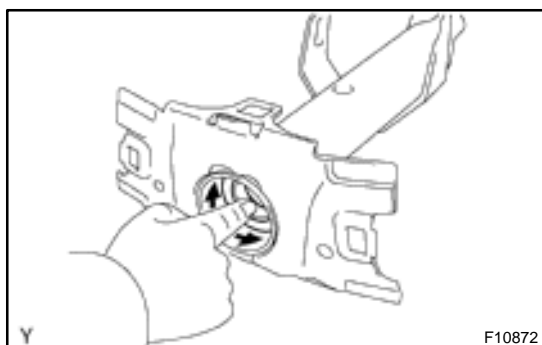
6. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH

- (a) Slide the key unlock warning switch out of the column upper bracket.
- (b) Slide a new key unlock warning switch in the column upper bracket.

7. INSPECT BEARING

Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the column tube.

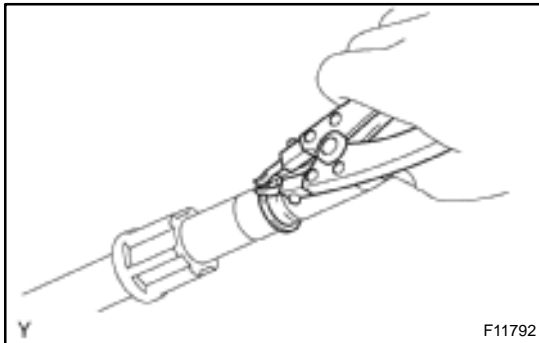


REASSEMBLY

NOTICE:

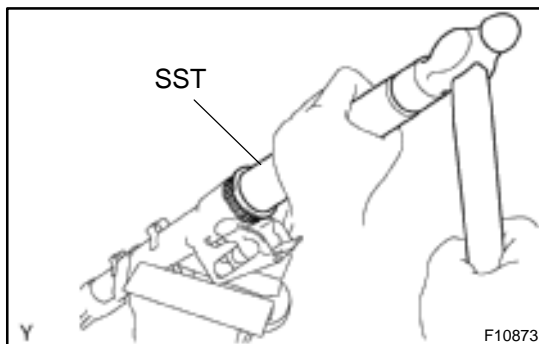
When using a vise, do not overtighten it.

1. **COAT PARTS INDICATED BY ARROWS WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page SR-8)**



2. **INSTALL MAIN SHAFT ASSEMBLY**

- (a) Using a snap ring expander, install a new snap ring on the lower side.
- (b) Install the main shaft assembly.
- (c) Using a snap ring expander, install a new snap ring on the upper side.



3. **INSTALL MAIN SHAFT BUSHING**

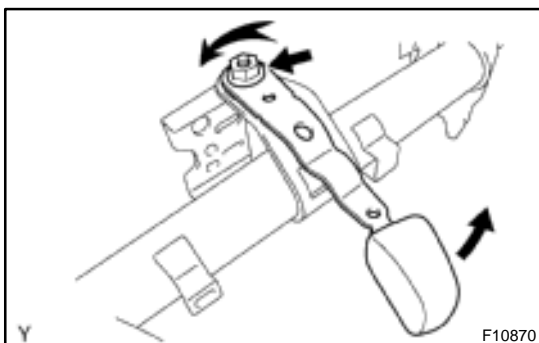
- (a) Coat a new bushing with molybdenum disulfide lithium base grease.
- (b) Using SST and a hammer, tap in the main shaft bushing. SST 09608-04031

4. **INSTALL BREAK AWAY BRACKET AND TILT LEVER**

- (a) Install the No. 2 support collar to the break away bracket.
- (b) Install the break away bracket, tilt lever lock bolt, stopper and tilt lever.

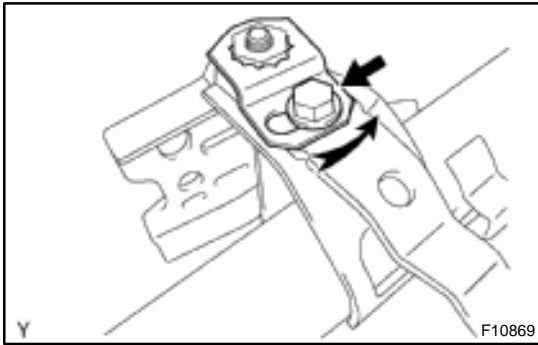
HINT:

Align the holes in the column tube with the projections of the tilt lever lock bolt and stopper.



- (c) Install the adjusting nut by rotating it counterclockwise in the specified torque so that the locking load (load applied to when a knob is operated) of the tilt lever will be 38 – 82 N (3.9 – 8.4 kgf, 8.5 – 18.4 lbf).

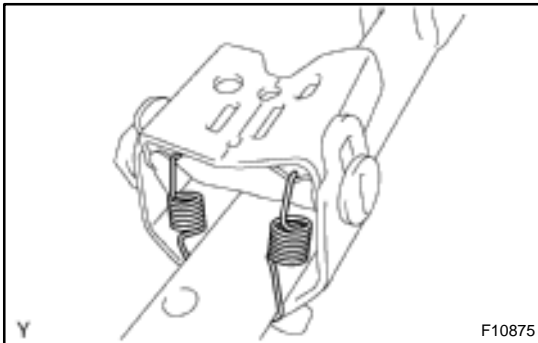
Torque: 9 N·m – 14 N·m (90 kgf·cm – 145 kgf·cm, 80 in·lbf – 10 ft·lbf)



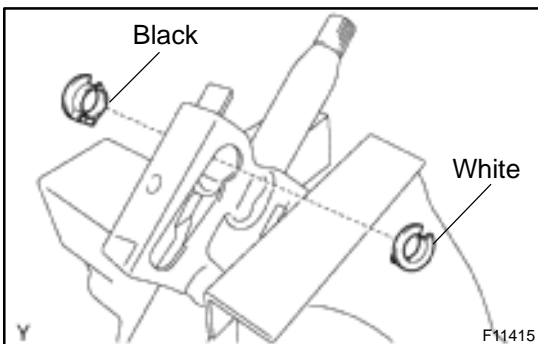
- (d) Install the No. 1 support reinforce with the No. 2 tilt lever lock bolt by turning it counterclockwise.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

HINT:

Align the No. 1 support reinforce with the nut to eliminate looseness by turning the No. 1 support reinforce counterclockwise a little, then torque the No. 2 tilt lever lock bolt.



- (e) Install the tilt spring.

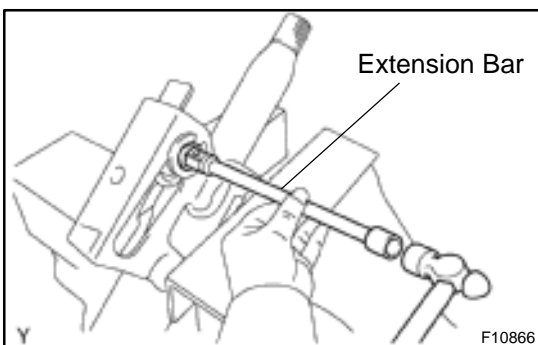


5. INSTALL NO. 1 SUPPORT COLLARS AND BRACKET SPACER

- (a) Install 2 new No. 1 support collars.

NOTICE:

Install the white support collar to the RH side, black support collar to the LH side.



- (b) Using an extension bar and a hammer, drive in the bracket spacer.

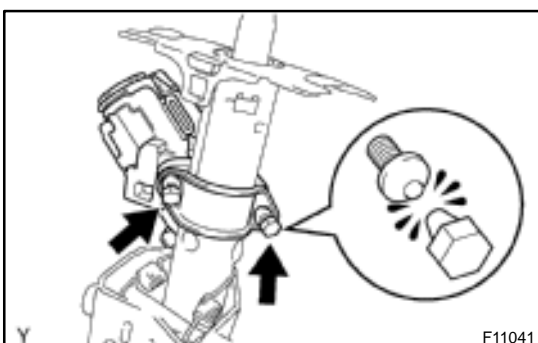
6. INSTALL TILT STEERING SUPPORT

Install the tilt steering support with the bolt.

Torque: 15 N·m (155 kgf·cm, 11 ft-lbf)

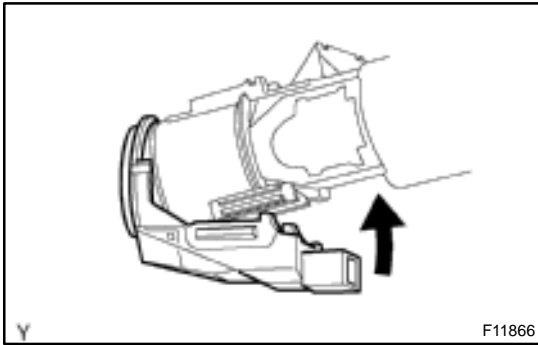
NOTICE:

Make sure that the tilt steering support is installed facing in the correct direction.



7. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

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

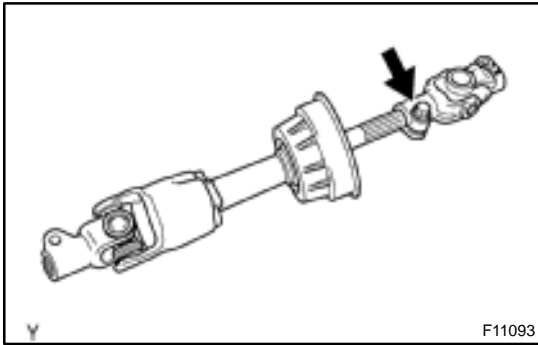


8. INSTALL TRANSPONDER KEY AMPLIFIER WITH COIL

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

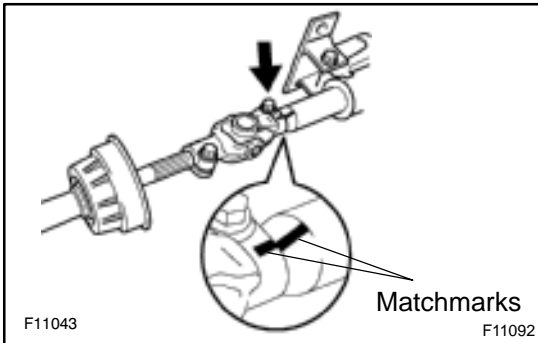
NOTICE:

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

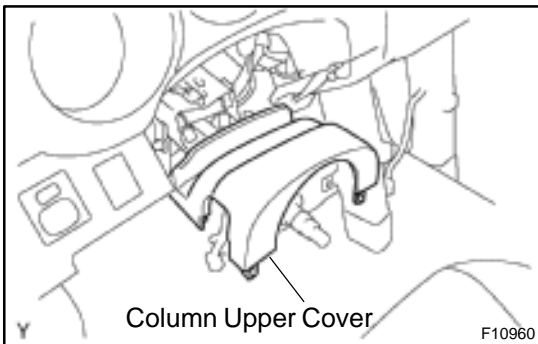


INSTALLATION

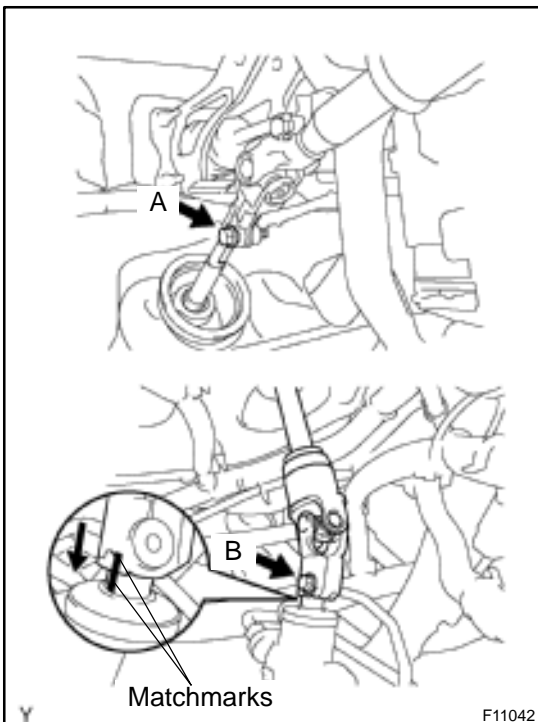
1. **INSTALL SLIDING YOKE AND NO. 2 COLUMN HOLE COVER TO NO. 2 INTERMEDIATE SHAFT**
 - (a) Install the No. 2 column hole cover and intermediate shaft dust cover
 - (b) Temporarily install the sliding yoke with the bolt.



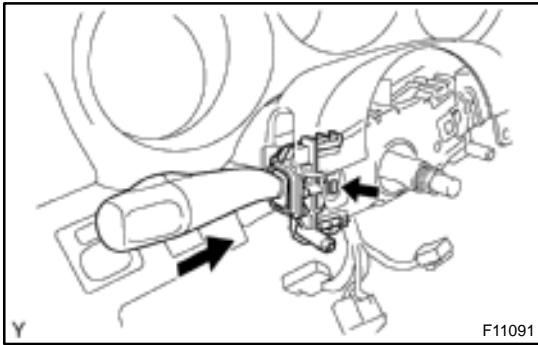
2. **INSTALL NO. 2 INTERMEDIATE SHAFT ASSEMBLY**
 - (a) Align the matchmarks on the sliding yoke and main shaft assembly.
 - (b) Install the No. 2 intermediate shaft assembly with the bolt. **Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)**



3. **PLACE COLUMN UPPER COVER TO STEERING COLUMN ASSEMBLY**
4. **INSTALL STEERING COLUMN ASSEMBLY**
 - (a) Install the steering column assembly with the 2 bolts and nuts. **Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)**
 - (b) Connect the 3 connectors and 2 wire harness clamps.



5. **CONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY**
 - (a) Align the matchmarks on the No. 2 intermediate shaft assembly and control valve shaft.
 - (b) Install the bolt B. **Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)**
 - (c) Torque the bolt A. **Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)**
 - (d) Connect the No. 2 column hole cover and tighten the clamp.



6. INSTALL LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH, WIPER AND WASHER SWITCH AND SPIRAL CABLE

- (a) Push into the light control switch and headlight dimmer switch until the claw is latched.
- (b) Employ the same manner described above to the wiper and washer switch.
- (c) Install the spiral cable.
- (d) Connect the airbag connector to the spiral cable.
- (e) Connect the 3 connectors to the spiral cable, light control switch and headlight dimmer switch and wiper and washer switch.

7. INSTALL COLUMN UPPER AND LOWER COVERS

Install the column upper and lower covers with the 3 screws.

8. INSTALL INSTRUMENT FINISH PANEL

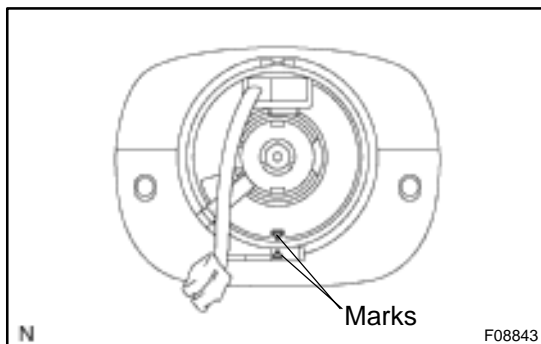
- (a) Connect the DLC3.
- (b) Install the lower No. 1 instrument finish panel with the bolt and screw.
- (c) Connect the hood lock release lever and install the 2 screws.

9. CENTER SPIRAL CABLE

- (a) Check that the front wheels are facing straight ahead.
- (b) Turn the cable counterclockwise by hand until it becomes harder to turn.
- (c) Then rotate the cable clockwise about 2.5 turns to align the marks.

HINT:

The cable will rotate about 2.5 turns to either left or right of the center.



10. INSTALL STEERING WHEEL

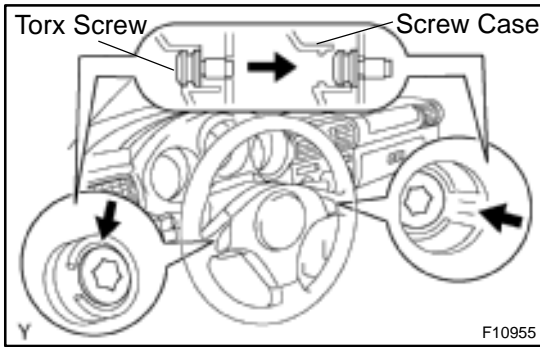
- (a) Align the matchmarks on the steering wheel and main shaft assembly.
- (b) Install the steering wheel set nut.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)
- (c) Connect the connector.

11. INSTALL STEERING WHEEL PAD

NOTICE:

- **Never use airbag parts 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 in the case or connector, replace the wheel pad with a new one.**
- **When installing the wheel pad, take care that the wirings do not interfere with other parts and that they are not pinched between other parts.**

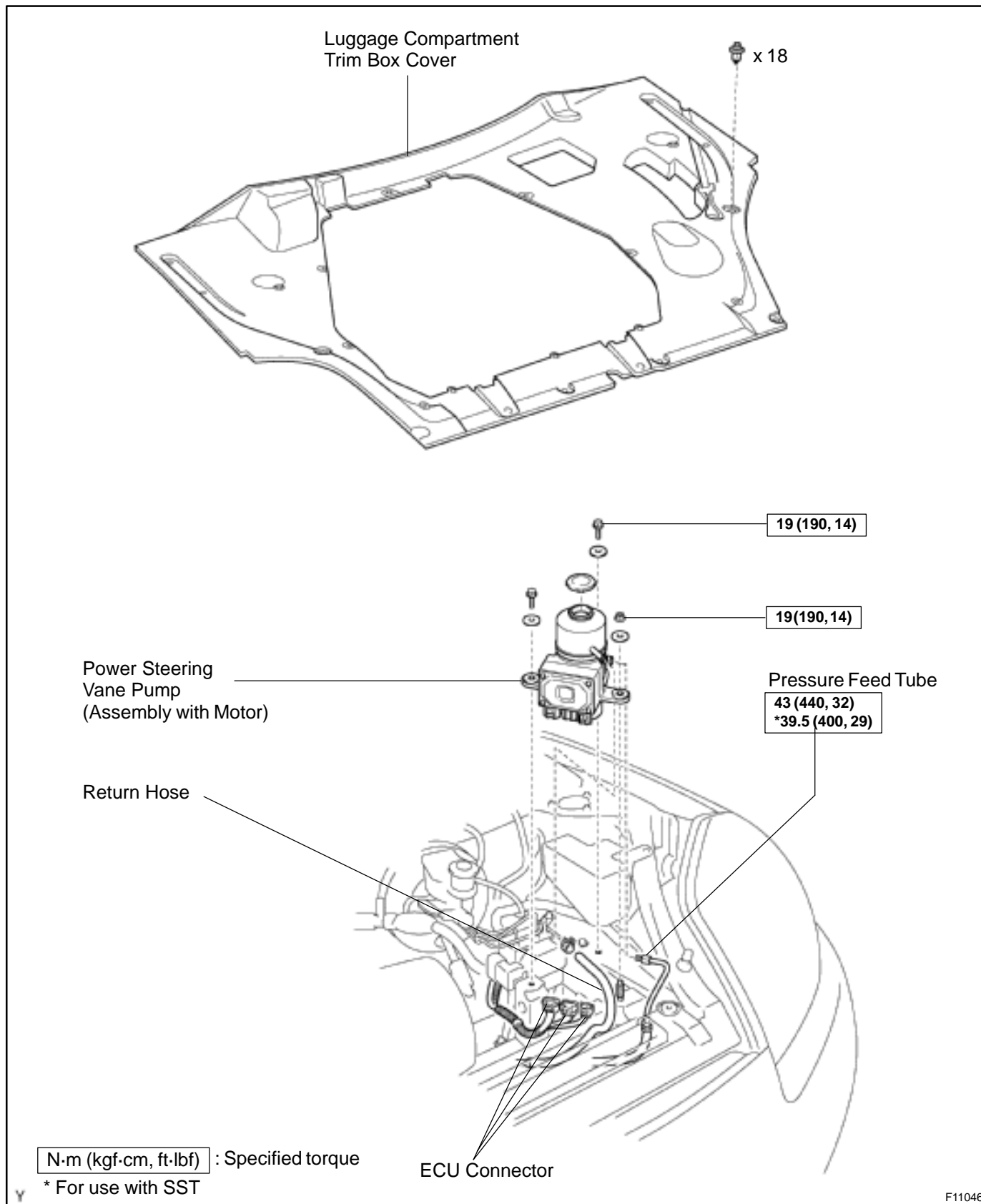
- (a) Connect the airbag connector.

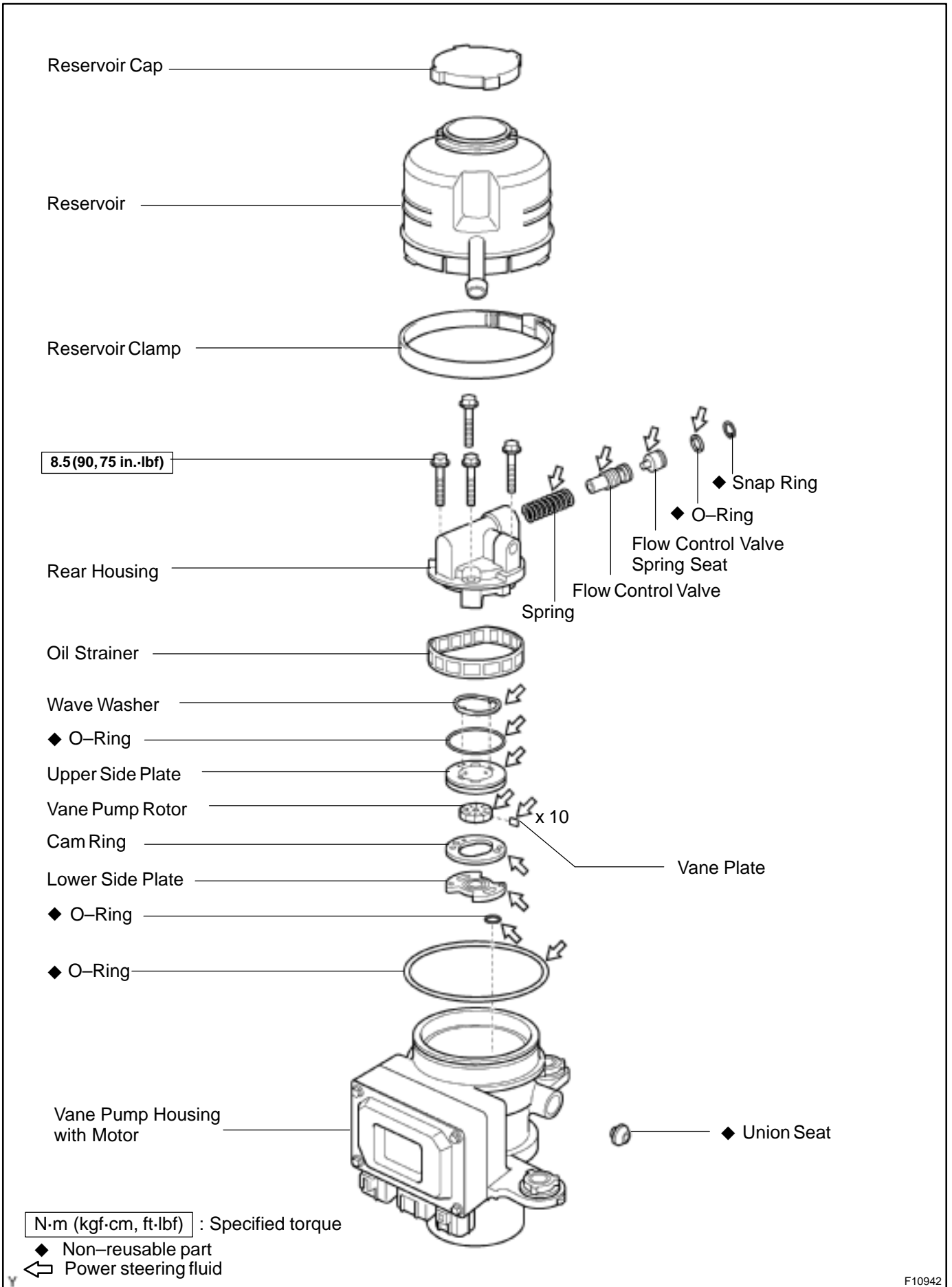


- (b) Install the steering wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.
- (c) Using a torx socket wrench (T30), torque the 2 screws.
Torque: 8.8 N·m (90 kgf·cm, 78 in.-lbf)
- 12. CHECK STEERING WHEEL CENTER POINT**

POWER STEERING VANE PUMP COMPONENTS

SR0YO-03



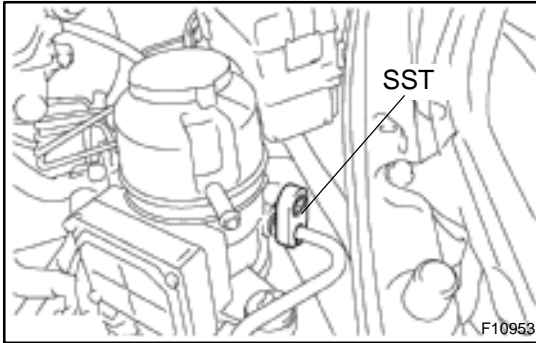


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REMOVAL

1. **REMOVE LUGGAGE COMPARTMENT TRIM BOX COVER**
2. **DISCONNECT ECU CONNECTORS**
3. **DISCONNECT RETURN HOSE**

Remove the clip and disconnect the return hose.



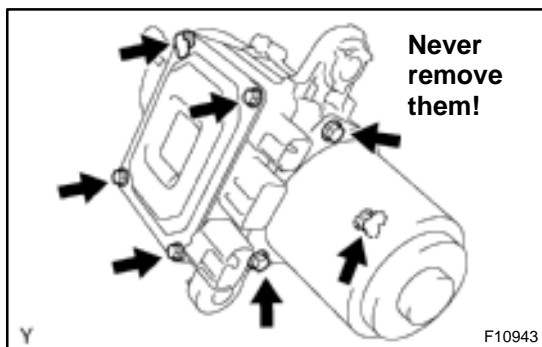
4. **DISCONNECT PRESSURE FEED TUBE**

Using SST, disconnect the pressure feed tube.

SST 09023-12700

5. **REMOVE POWER STEERING VANE PUMP**

Remove the 2 bolts, nut, 3 washers and power steering vane pump.



DISASSEMBLY

NOTICE:

Never remove the mounting bolts (partly resin coated) of the power steering ECU and motor. (The power steering ECU and motor should not be disassembly.)

1. REMOVE RESERVOIR CAP

2. REMOVE RESERVOIR

- Loosen the clamp and remove the reservoir.
- Remove the O-ring from the power steering vane pump housing.

3. REMOVE REAR HOUSING AND OIL STRAINER

- Remove the 4 bolts, rear housing and oil strainer.
- Remove the O-ring from the power steering vane pump housing.

4. REMOVE CAM RING, VANE PLATES, VANE PUMP ROTOR AND LOWER SIDE PLATE

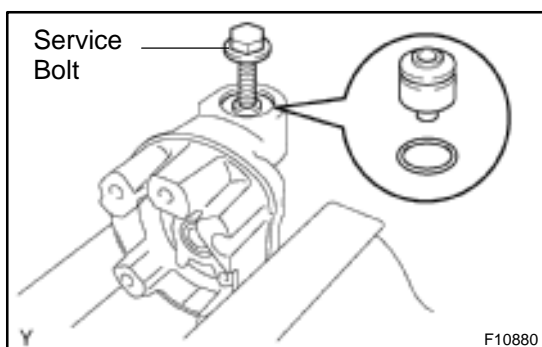
- Remove the cam ring, vane pump rotor and 10 vane plates.
- Remove the lower side plate.

NOTICE:

Take care not to drop the vane plate.

5. REMOVE FLOW CONTROL VALVE SPRING SEAT AND FLOW CONTROL VALVE

- Using snap ring pliers, remove the snap ring.

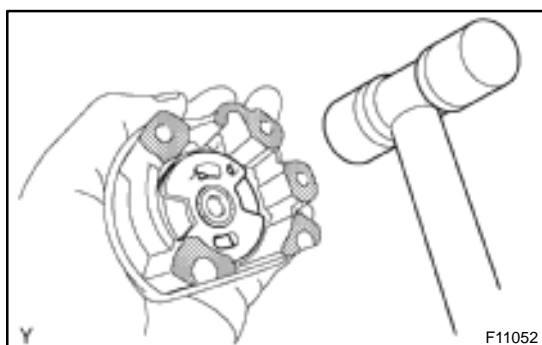


- Using a service bolt, pull it out together with the spring seat.

Recommended service bolt:

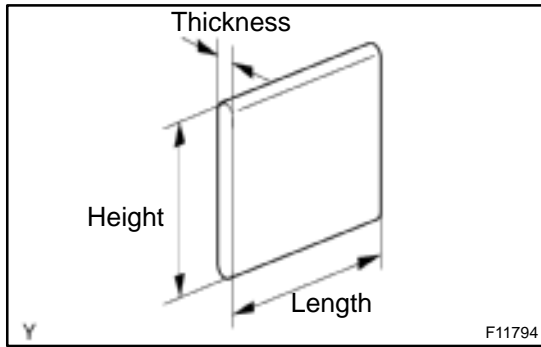
Thread diameter	6 mm
Thread pitch	1.0 mm

- Remove the O-ring from the spring seat.
- Remove the flow control valve and spring.



6. REMOVE UPPER SIDE PLATE

- Using a plastic-faced hammer, tap out the side plate and wave washer.
- Remove the O-ring from the side plate.



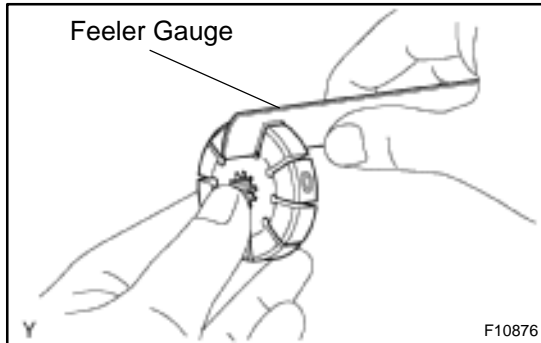
INSPECTION

1. **INSPECT VANE PUMP ROTOR AND VANE PLATES**
 - (a) Using a micrometer, measure the height, thickness and length of the 10 vane plates.

Minimum height: 5.4 mm (0.213 in.)

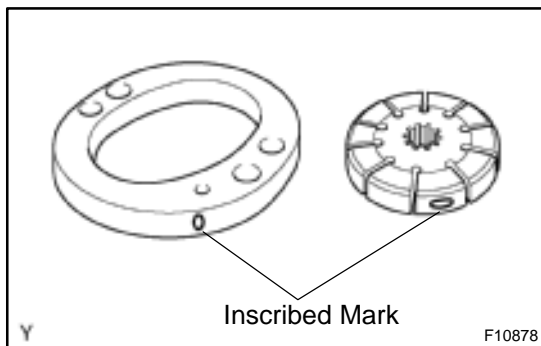
Minimum thickness: 0.882 mm (0.0347 in.)

Minimum length: 4.596 mm (0.1809 in.)



- (b) Using a feeler gauge, measure the clearance between the vane pump rotor groove and vane plate.

Maximum clearance: 0.023 mm (0.0009 in.)



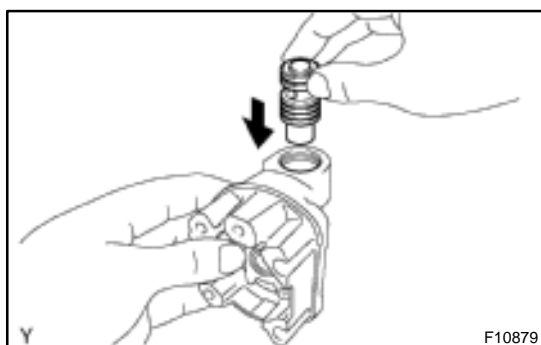
If it is more than the maximum, replace the vane plate and/or vane pump rotor with the one having the same mark stamped on the cam ring.

Inscribed mark: 0, 1, 2, 3, or 4

HINT:

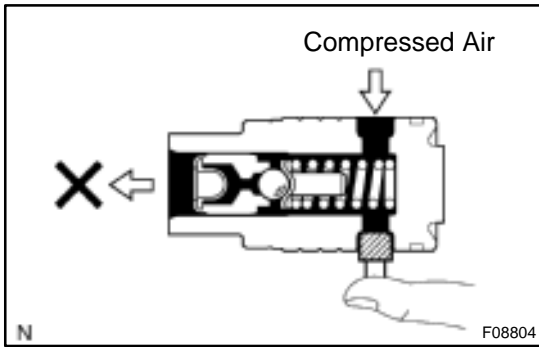
There are 5 vane plate heights corresponding to the following vane pump rotor and cam ring marks:

Vane pump rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
0	44345-17060	4.604-4.606 (0.18126-0.18134)
1	44345-17070	4.602-4.604 (0.18118-0.18126)
2	44345-17080	4.600-4.602 (0.18110-0.18118)
3	44345-17090	4.598-4.600 (0.18102-0.18110)
4	44345-17100	4.596-4.598 (0.18094-0.18102)

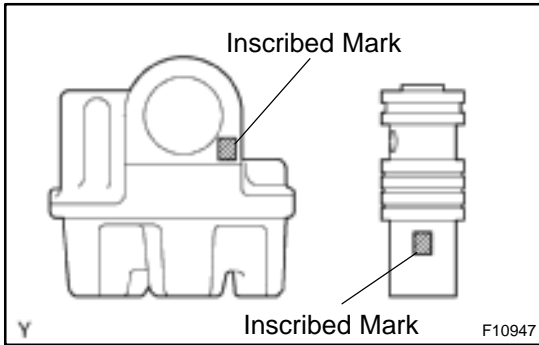


2. INSPECT FLOW CONTROL VALVE

- (a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the valve hole of the rear housing by its own weight.

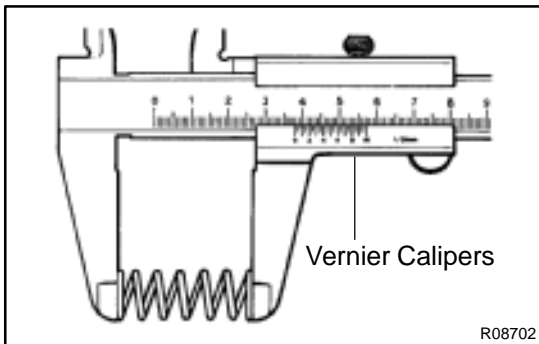


(b) Check the flow control valve for leakage. Close one of the holes and apply compressed air of 392 – 490 kPa (4 – 5 kgf/cm², 57 – 71 psi) into the opposite side hole, and confirm that air does not come out from the end hole.



If necessary, replace the flow control valve with the one having the same letter as inscribed on the rear housing.

Inscribed mark: A, B, C, D, E or F

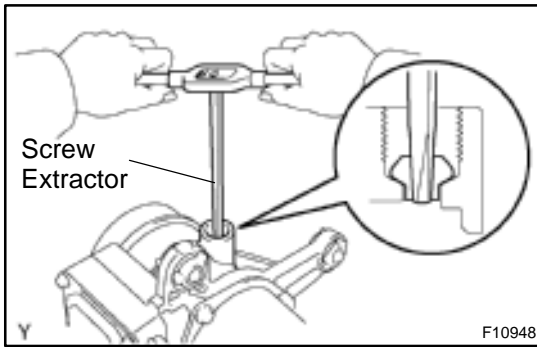


3. INSPECT SPRING

Using vernier calipers, measure the free length of the spring.

Minimum free length: 28.7 mm (1.130 in.)

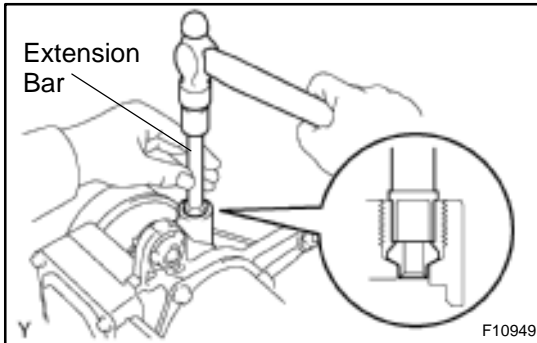
If it is not within the specification, replace the spring.



REPLACEMENT

REPLACE UNION SEAT

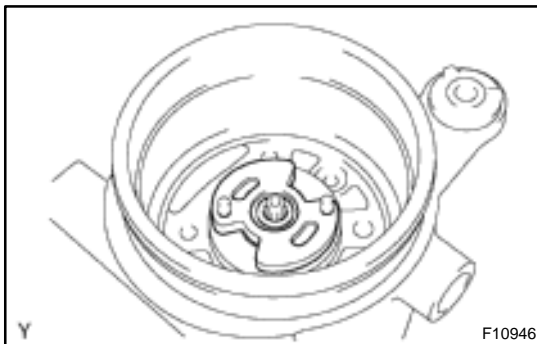
- (a) Using a screw extractor, remove the union seat from the power steering vane pump housing.



- (b) Using a hammer and an extension bar, lightly tap in a new union seat.

REASSEMBLY

1. **COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID (See page SR-22)**
2. **INSTALL FLOW CONTROL VALVE AND FLOW CONTROL VALVE SPRING SEAT**
 - (a) Install the spring.
 - (b) Install the flow control valve facing in the correct direction (See page SR-22).
 - (c) Coat a new O-ring with power steering fluid, and install it to the spring seat.
 - (d) Install the the spring seat with the bolt hole facing outward to the rear housing.
 - (e) Using snap ring pliers, install a new snap ring.

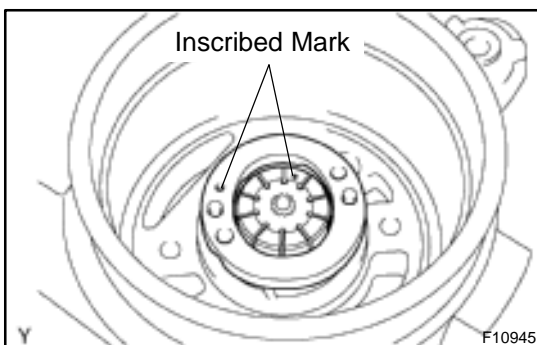


3. INSTALL LOWER SIDE PLATE

Align the holes of the side plate with the 2 straight pins, and install the lower side plate.

NOTICE:

Make sure that the side plate is installed facing in the correct direction.



4. INSTALL CAM RING

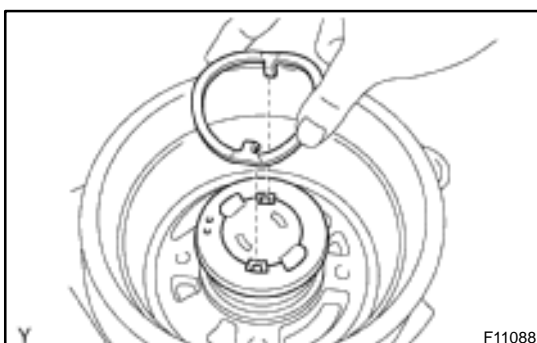
Align the holes of the cam ring with the 2 straight pins, and install the cam ring with the inscribed mark facing upward.

5. INSTALL VANE PUMP ROTOR

Install the vane pump rotor with the inscribed mark facing upward.

6. INSTALL VANE PLATES

Install the 10 vane plates.

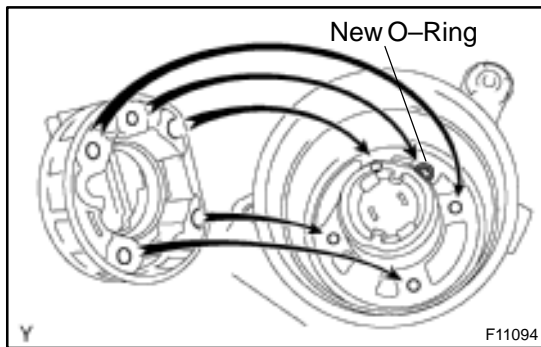


7. INSTALL UPPER SIDE PLATE

- (a) Coat a new O-ring with power steering fluid, and install it to the upper side plate.
- (b) Align the holes of the side plate with the 2 straight pins, and install the upper side plate.

8. INSTALL WAVE WASHER

Install the wave washer so that its protrusions fit into the slots in the upper side plate.

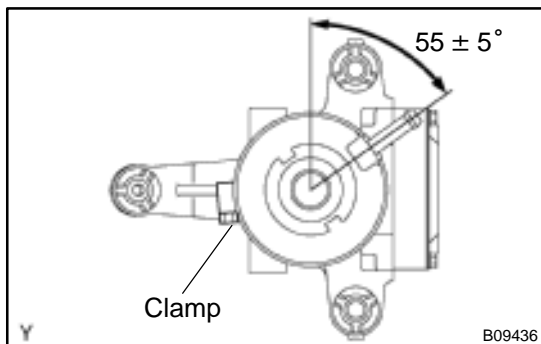
**9. INSTALL OIL STRAINER AND REAR HOUSING**

- (a) Coat a new O-ring with power steering fluid, and install it to the vane pump housing.
- (b) Install the oil strainer to the rear housing.
- (c) Align the O-ring with the oil hole of the rear housing.
- (d) Align the bolt set holes of the power steering vane pump housing with the bolt set holes of the rear housing, and install the rear housing with the 4 bolts.

Torque: 8.5 N·m (90 kgf·cm, 75 in.-lbf)

10. INSTALL RESERVOIR

- (a) Coat a new O-ring with power steering fluid, and install it to the power steering vane pump housing.



- (b) Install the reservoir with the clamp to the position shown in the illustration.

Torque: 7.0 N·m (70 kgf·cm, 61 in.-lbf)

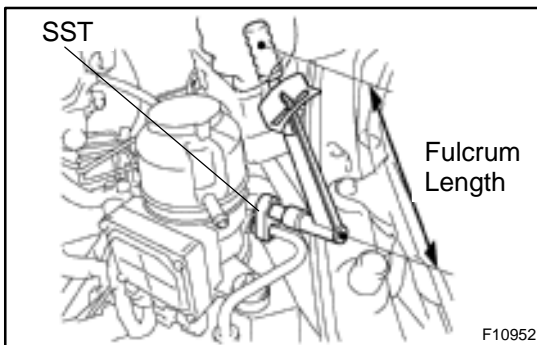
11. INSTALL RESERVOIR CAP

INSTALLATION

1. INSTALL POWER STEERING VANE PUMP

Install the power steering vane pump with the 2 bolts, nut and 3 washers.

Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)



2. CONNECT PRESSURE FEED TUBE

Using SST, connect the pressure feed tube.

SST 09023-12700

Torque: 39.5 N·m (400 kgf·cm, 29 ft·lbf)

HINT:

Use a torque wrench with a fulcrum length of 345 mm (11.81 in).

3. CONNECT RETURN HOSE

Connect the return hose with the clip.

4. CONNECT ECU CONNECTORS

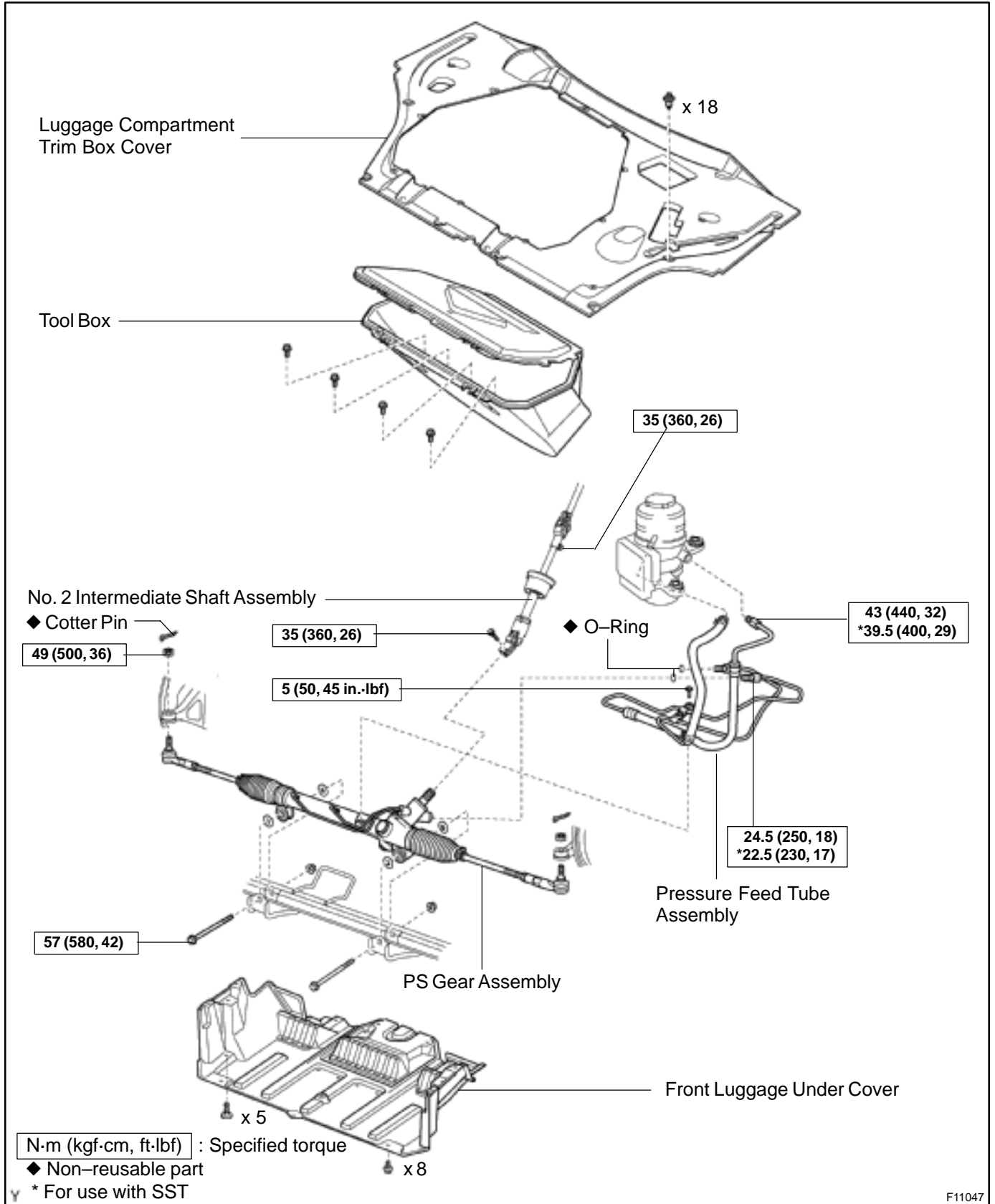
5. BLEED POWER STEERING SYSTEM

(See page [SR-3](#))

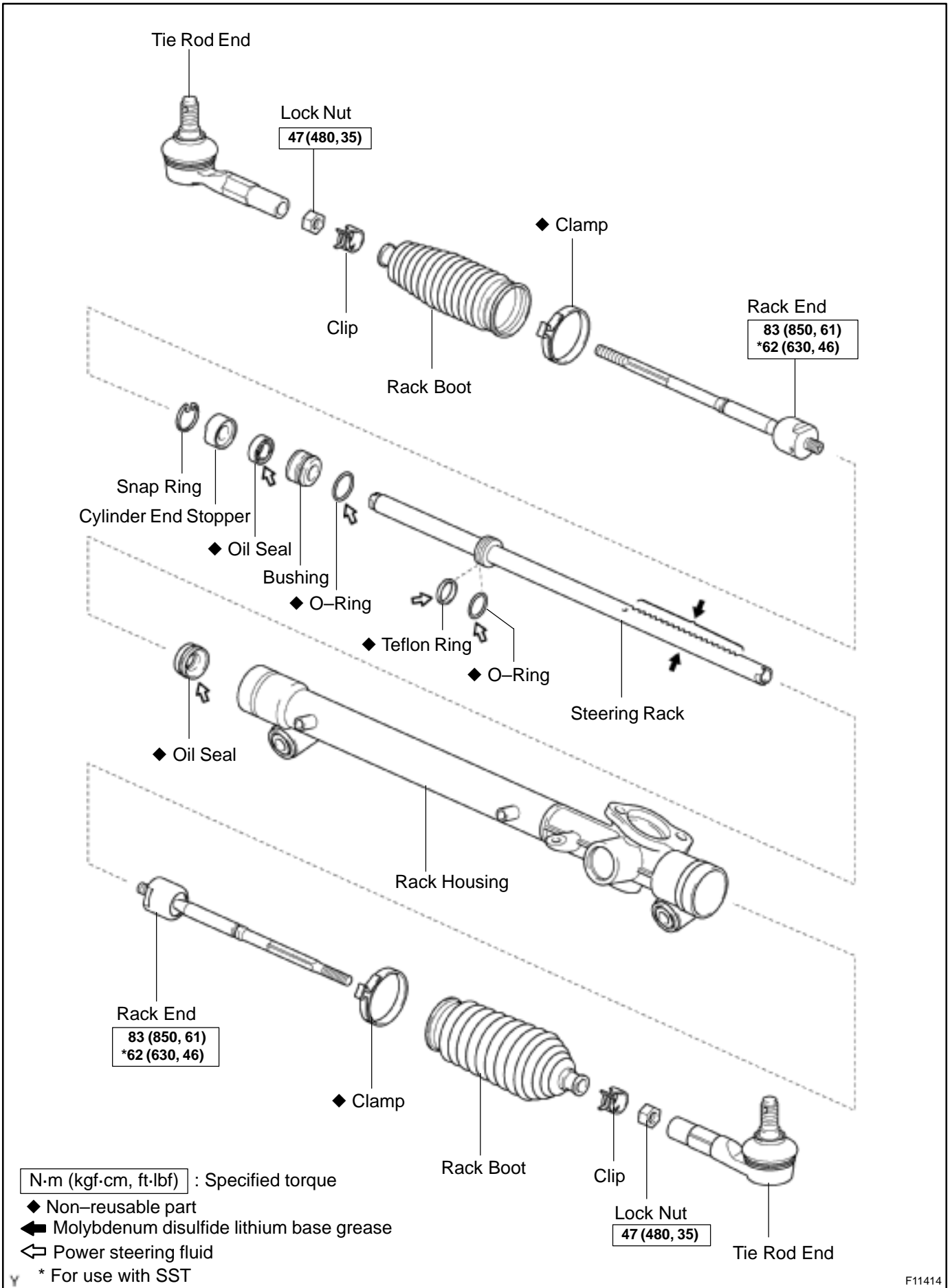
6. INSTALL LUGGAGE COMPARTMENT TRIM BOX COVER

POWER STEERING GEAR COMPONENTS

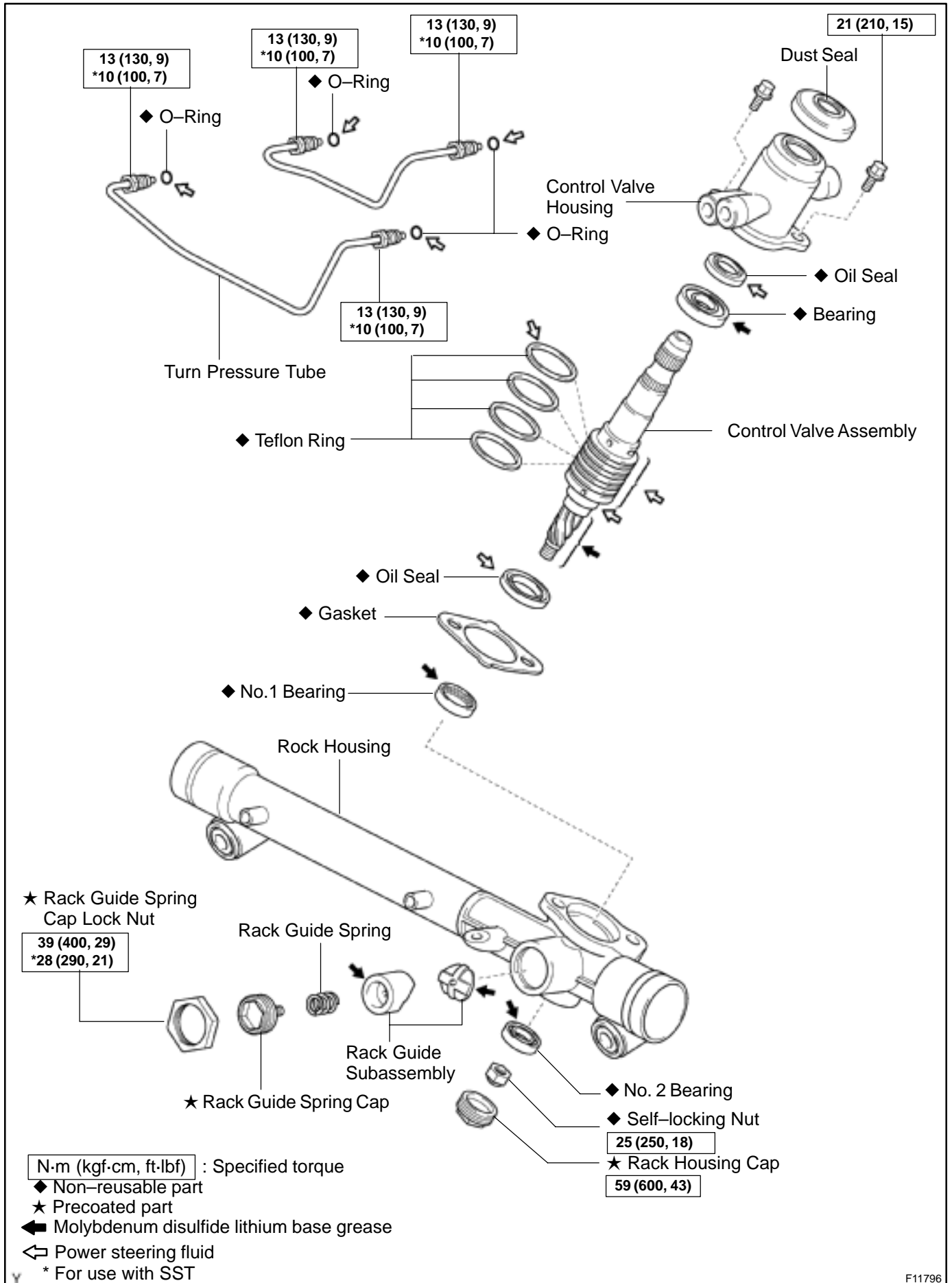
SR13A-02



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REMOVAL

NOTICE:

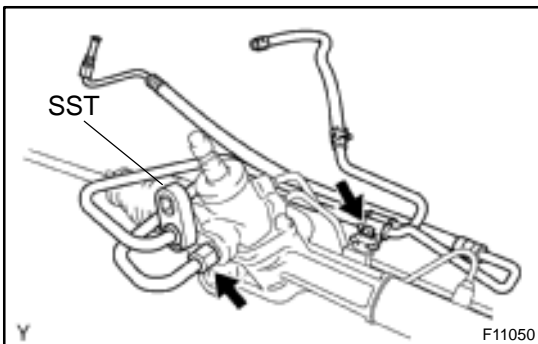
Remove the steering wheel assembly before the steering gear removal, because there is possibility of breaking of the spiral cable.

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
2. REMOVE STEERING WHEEL PAD (See page [SR-10](#))
3. REMOVE STEERING WHEEL (See page [SR-10](#))
4. REMOVE LUGGAGE COMPARTMENT TRIM BOX COVER
5. REMOVE TOOL BOX
6. DISCONNECT PRESSURE FEED TUBE AND RETURN HOSE FROM POWER STEERING VANE PUMP (See page [SR-24](#))
7. REMOVE FRONT LUGGAGE UNDER COVER
8. DISCONNECT RH AND LH TIE ROD ENDS (See page [SA-9](#))
9. DISCONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY (See page [SR-10](#))



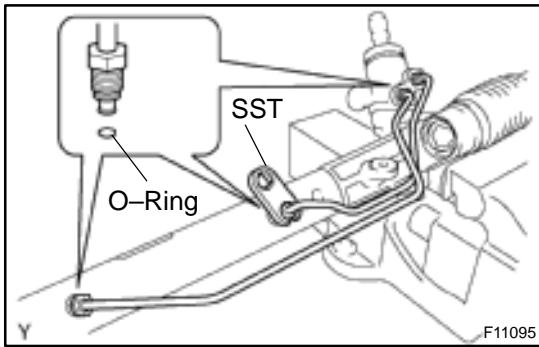
10. REMOVE PS GEAR ASSEMBLY

Remove the 2 bolts, 2 nuts, 4 plate washers and PS gear assembly from the steering gear support member.



11. REMOVE PRESSURE FEED TUBE ASSEMBLY

- (a) Using SST, disconnect the pressure feed and return tubes.
SST 09023-12700
- (b) Remove the 2 O-rings from the feed and return tubes.
- (c) Remove the bolt and pressure feed tube assembly.



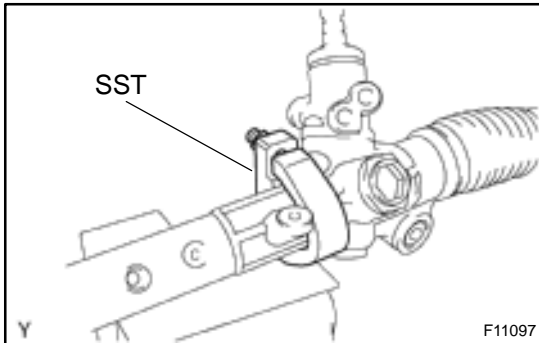
DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. REMOVE TURN PRESSURE TUBES

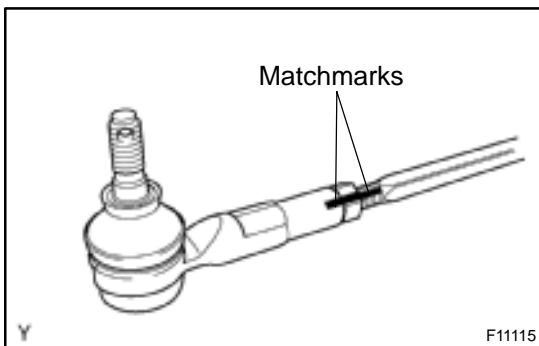
- (a) Using SST, remove the 2 turn pressure tubes.
SST 09023-38200
- (b) Remove the 4 O-rings from the 2 turn pressure tubes.



2. SECURE PS GEAR ASSEMBLY IN VISE

Using SST, secure the PS gear assembly in a vise.

SST 09612-00012



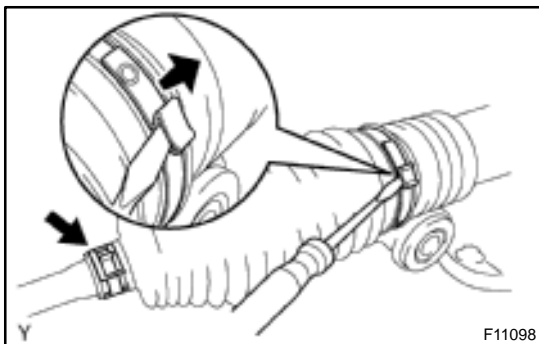
3. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

- (a) Place matchmarks on the tie rod end and rack end.
- (b) Loosen the lock nut, and remove the tie rod end and lock nut.

HINT:

Mark the RH and LH tie rod ends and lock nuts.

- (c) Employ the same manner described above to the other side.



4. REMOVE RH AND LH CLIPS, CLAMPS AND RACK BOOTS

- (a) Using a screwdriver, loosen the clamp.
- (b) Remove the clip, clamp and rack boot.

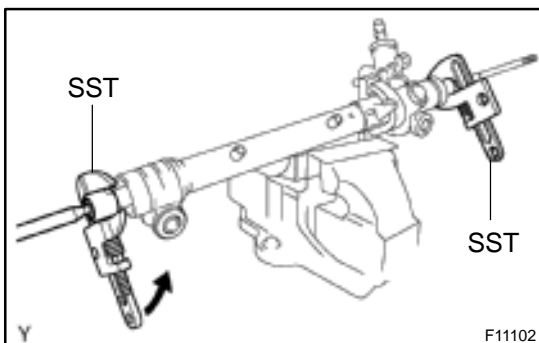
NOTICE:

Be careful not to damage the boot.

HINT:

Mark the RH and LH rack boots.

- (c) Employ the same manner described above to the other side.



5. REMOVE RH AND LH RACK ENDS

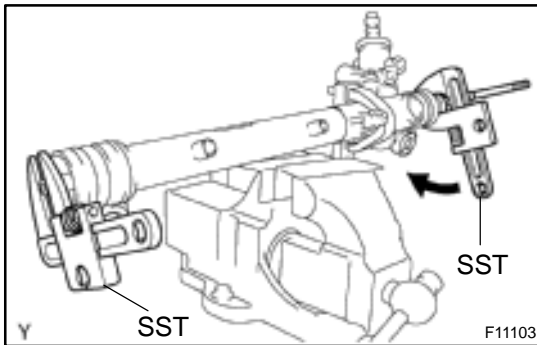
- (a) Using SST, hold the LH rack end steadily and using another SST, remove the RH rack end.
SST 09922-10010

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Mark the RH and LH rack ends.



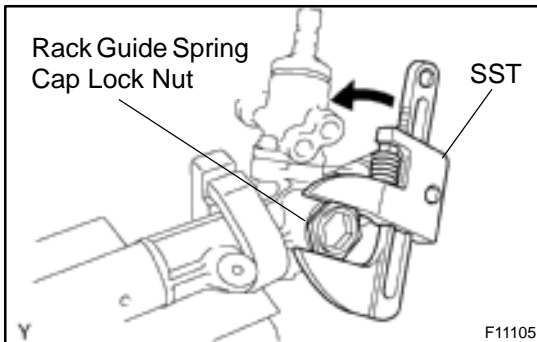
- (b) Using SST, hold the steering rack RH side steadily and using another SST, remove the LH rack end.
SST 09922-10010

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Mark the RH and LH rack ends.

**6. REMOVE RACK GUIDE SPRING CAP LOCK NUT**

Using SST, remove the rack guide spring cap lock nut.

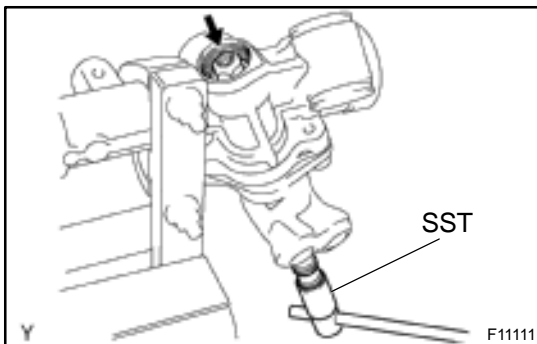
SST 09922-10010

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

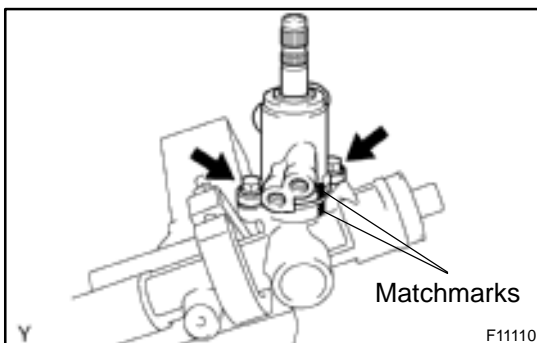
7. REMOVE RACK GUIDE SPRING CAP, RACK GUIDE SPRING AND RACK GUIDE SUBASSEMBLY

- (a) Using a hexagon wrench (19 mm), remove the rack guide spring cap.
- (b) Remove the rack guide spring and rack guide subassembly.

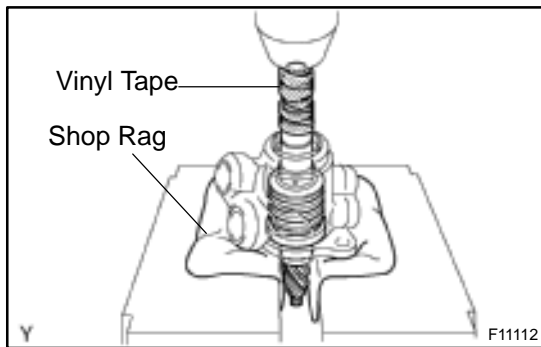
8. REMOVE RACK HOUSING CAP**9. REMOVE SELF-LOCKING NUT**

Using SST, stop the control valve shaft rotating and remove the self-locking nut.

SST 09616-00011

**10. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY**

- (a) Remove the dust seal.
- (b) Place matchmarks on the control valve housing and rack housing.
- (c) Remove the 2 bolts.
- (d) Pull out the control valve housing with control valve assembly.
- (e) Remove the gasket.

**11. REMOVE CONTROL VALVE ASSEMBLY**

- (a) Wind vinyl tape on the control valve shaft.
- (b) Press out the control valve assembly.

NOTICE:

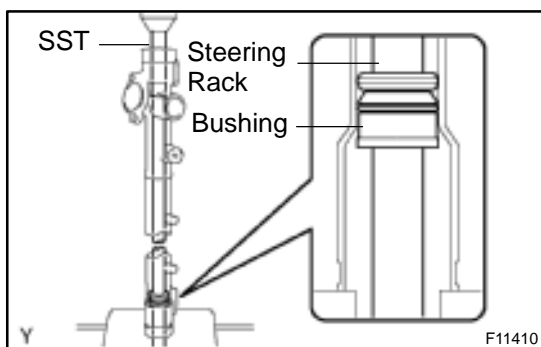
- **Be careful not to damage the oil seal lip.**
- **Place a shop rag between the valve housing and the blocks.**
- **Be careful not to drop the valve assembly.**

12. REMOVE OIL SEAL OF CONTROL VALVE ASSEMBLY

Remove the oil seal from the control valve assembly.

13. REMOVE CYLINDER END STOPPER

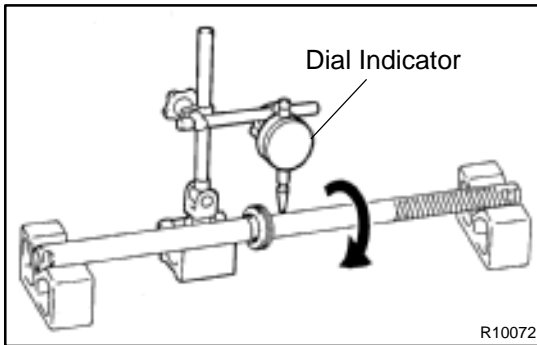
- (a) Using needle nose pliers, remove the snap ring.
- (b) Pull out the cylinder end stopper.

**14. REMOVE STEERING RACK WITH BUSHING**

- (a) Using SST, press out the steering rack with the bushing.
SST 09950-70010 (09951-07200)

NOTICE:

- Take care not to drop the steering rack.**
- (b) Remove the O-ring from the bushing.



INSPECTION

NOTICE:

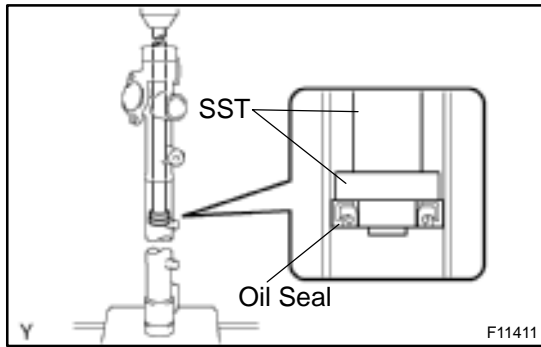
When using a vise, do not overtighten it.

INSPECT STEERING RACK

- (a) Using a dial indicator, check the rack for runout, teeth wear and damage.

Maximum runout: 0.1 mm (0.004 in.)

- (b) Check the back surface for wear and damage.



REPLACEMENT

NOTICE:

When using a vise, do not overtighten it.

1. REPLACE OIL SEAL OF RACK HOUSING

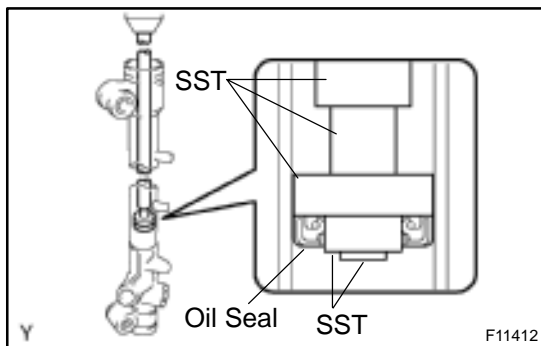
(a) Using SST, press out the oil seal.

SST 09950-60010 (09951-00210, 09951-00240,
09952-06010) 09950-70010 (09951-07360)

NOTICE:

Do not damage the rack housing.

(b) Coat a new oil seal lip with power steering fluid.

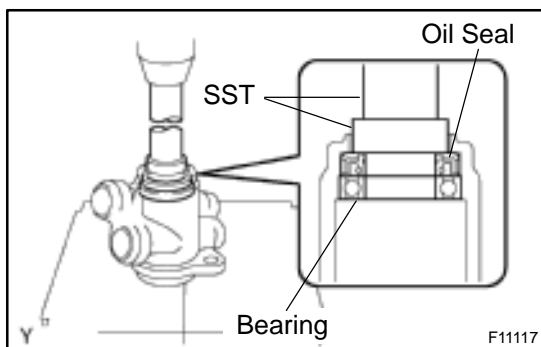


(c) Install the oil seal to SST, and press them into the rack housing.

SST 09950-60010 (09951-00210, 09951-00380,
09952-06010), 09950-70010 (09951-07360)

NOTICE:

- Make sure that the oil seal is installed facing in the correct direction.
- Take care that the oil seal does not get reversed as you install it.

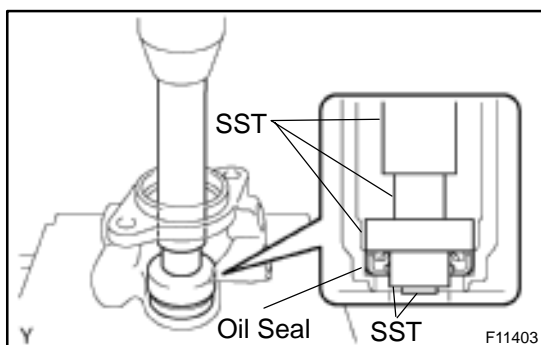


2. REPLACE OIL SEAL AND BEARING OF CONTROL VALVE HOUSING

(a) Using SST, press out the bearing and oil seal from the control valve housing.

SST 09950-60010 (09951-00260), 09950-70010
(09951-07100)

(b) Coat a new oil seal lip with power steering fluid.



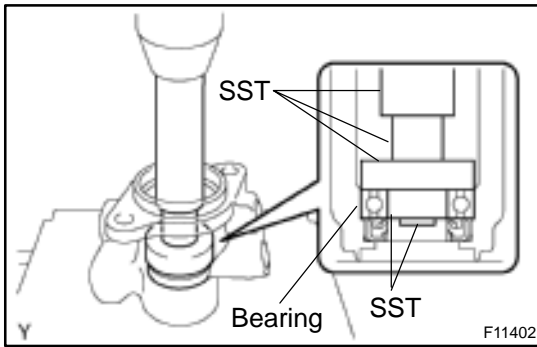
(c) Using SST, press in the oil seal.

SST 09950-60010 (09951-00180, 09951-00330,
09952-06010), 09950-70010 (09951-07100)

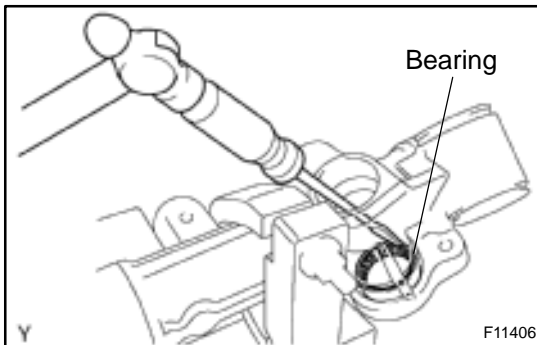
NOTICE:

Make sure that the oil seal is installed facing in the correct direction.

(d) Coat a new bearing with molybdenum disulfide lithium base grease.

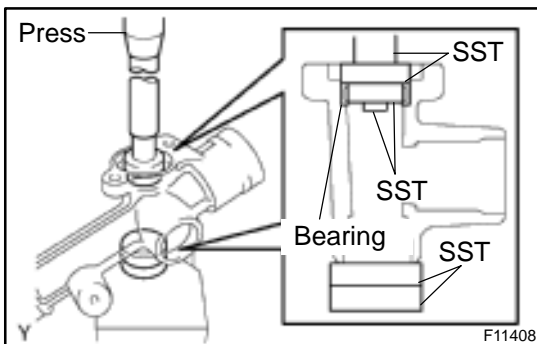


- (e) Using SST, press in the bearing.
 SST 09950-60010 (09551-00190, 09951-00340,
 09952-06010), 09950-70010 (09951-07100)

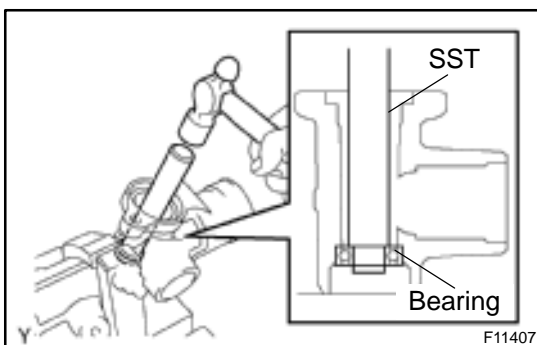


3. REPLACE NO.1 BEARING OF RACK HOUSING

- (a) Using a screwdriver and hammer, tap out the No. 1 bearing from the rack housing.
 (b) Coat a new bearing with molybdenum disulfide lithium base grease.

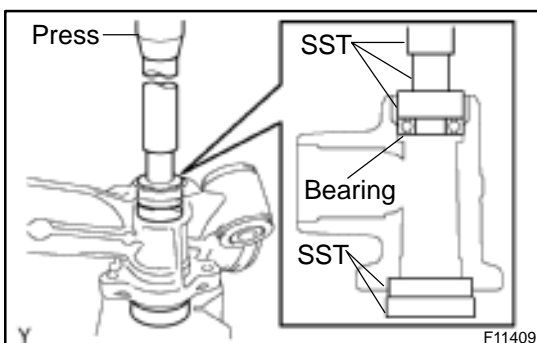


- (c) Using SST, press in the No.1 bearing.
 SST 09950-60010 (09951-00220, 09951-00320,
 09951-00420, 09951-00430, 09952-06010),
 09950-70010 (09951-07100)

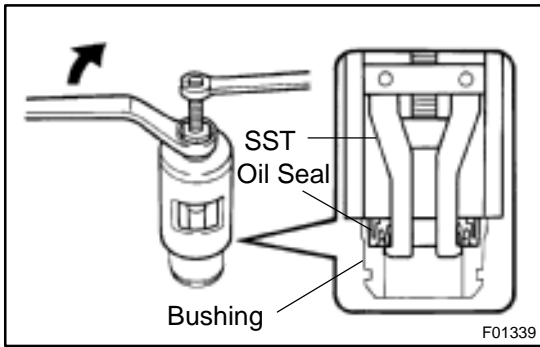


4. REPLACE NO. 2 BEARING OF RACK HOUSING

- (a) Using SST and a hammer, tap out the No. 2 bearing from the rack housing.
 SST 09950-70010 (09951-07100)
 (b) Coat a new bearing with molybdenum disulfide lithium base grease.



- (c) Using SST, press in the No. 2 bearing.
 SST 09950-60010 (09951-00280, 09951-00420,
 09951-00430, 09952-06010), 09950-70010
 (09951-07100)



5. REPLACE OIL SEAL OF STALING RACK BUSHING

- (a) Using SST, remove the oil seal from the bushing.
SST 09612-24014 (09613-22011)

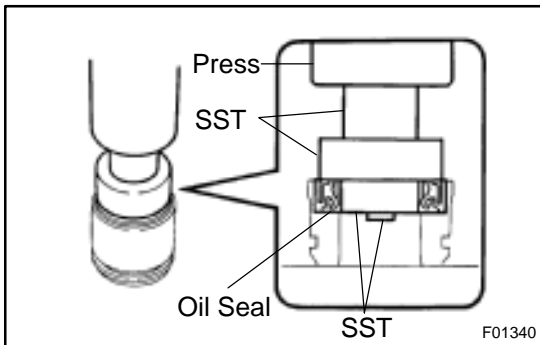
NOTICE:

Be careful not to damage the bushing.

HINT:

As shown in the illustration, from the opposite side of SST confirm that its claws are firmly caught on the oil seal.

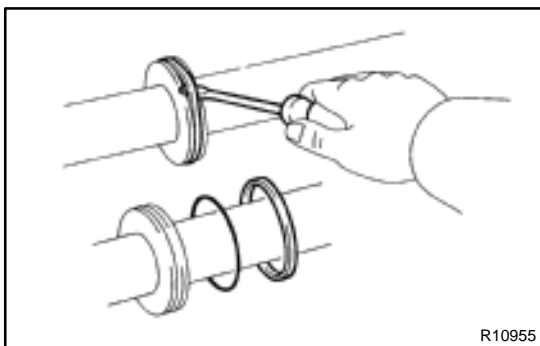
- (b) Coat a new oil seal lip with power steering fluid.



- (c) Using SST, press in the oil seal.
SST 09950-60010 (09951-00210, 09951-00350, 09952-06010)

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.



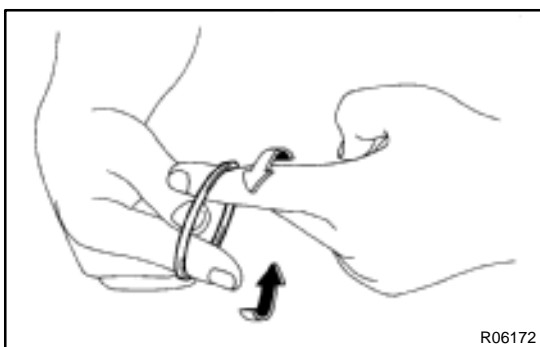
6. REPLACE TEFLON RING AND O-RING OF STEERING RACK

- (a) Using a screwdriver, remove the teflon ring and O-ring from the steering rack.

NOTICE:

Be careful not to damage the groove for the teflon ring.

- (b) Coat a new O-ring with power steering fluid and install it to the steering rack.

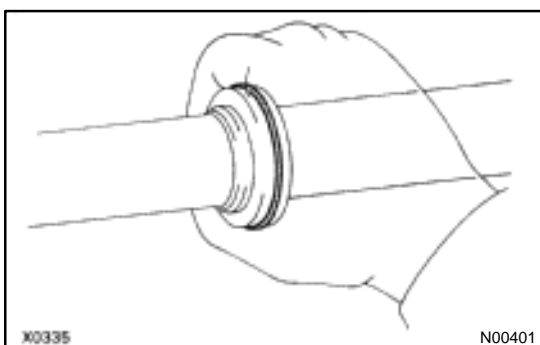


- (c) Expand a new teflon ring with your fingers.

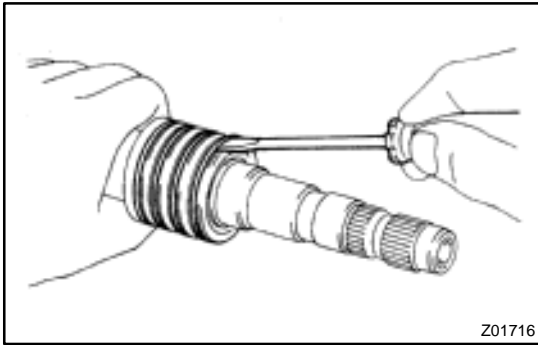
NOTICE:

Be careful not to overexpand the teflon ring.

- (d) Coat the teflon ring with power steering fluid.



- (e) Install the teflon ring to the steering rack and settle it down with your fingers.



7. REPLACE TEFLON RINGS OF CONTROL VALVE ASSEMBLY

- (a) Using a screwdriver, remove the 4 teflon rings from the control valve assembly.

NOTICE:

Be careful not to damage the grooves for the teflon rings.

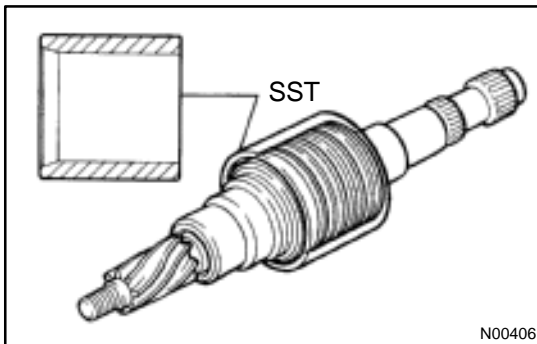
- (b) Expand 4 new teflon rings with your fingers.

NOTICE:

Be careful not to overexpand the teflon ring.

- (c) Coat the teflon rings with power steering fluid.

- (d) Install the teflon rings to the control valve assembly and settle them down with your fingers.



- (e) Carefully slide the tapered end of SST over the teflon rings until they fit to the control valve assembly.

SST 09631-20081

NOTICE:

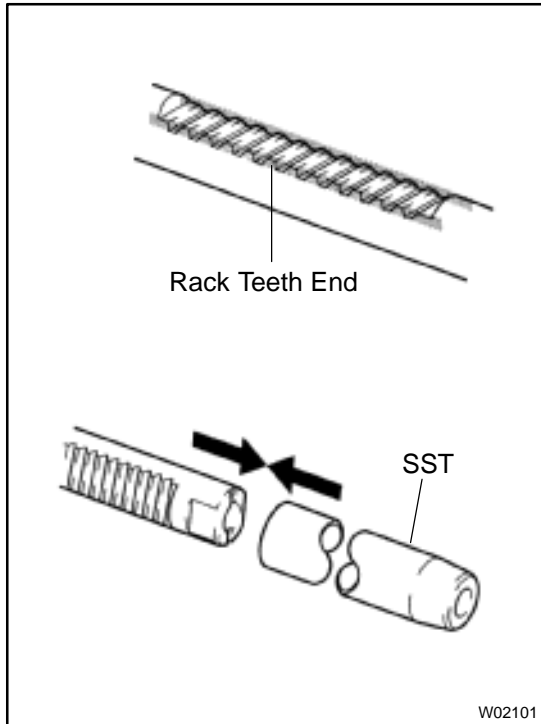
Be careful not to damage the teflon rings.

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. **COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page SR-32)**



2. INSTALL STEERING RACK

- (a) Install SST to the rack.
SST 09631-10041

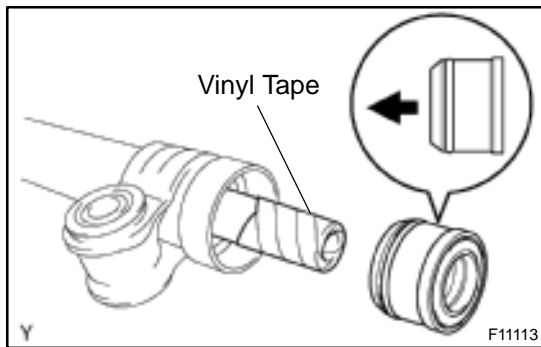
HINT:

If necessary, scrape the burrs off the rack teeth end and bur-nish.

- (b) Coat SST with power steering fluid.
- (c) Install the steering rack into the rack housing.
- (d) Remove the SST.
SST 09631-10041

3. INSTALL STEERING RACK BUSHING

- (a) Coat a new O-ring with power steering fluid and install it to the bushing.



- (b) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
- (c) Install the bushing into the rack housing.

NOTICE:

- **Make sure that the bushing is installed facing in the correct direction.**
- **Be careful not to damage the oil seal lip.**

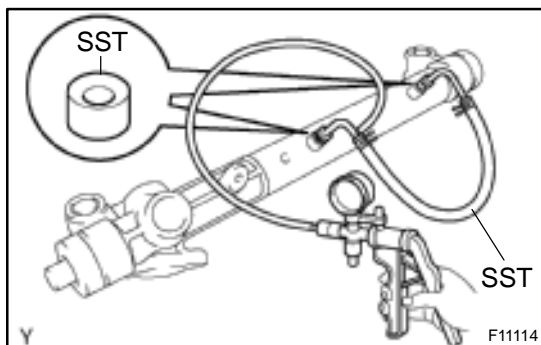
4. INSTALL CYLINDER END STOPPER

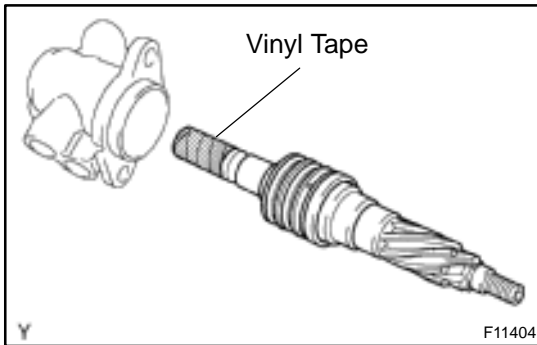
- (a) Push into the cylinder end stopper.
- (b) Using needle nose pliers, install the snap ring.

5. AIR TIGHTNESS TEST

- (a) Install SST to the rack housing.
SST 09631-12071 (09633-00010)
- (b) Apply 53 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.
- (c) Check that there is no change in the vacuum.

If there is a change in the vacuum, check the installation of the oil seals.



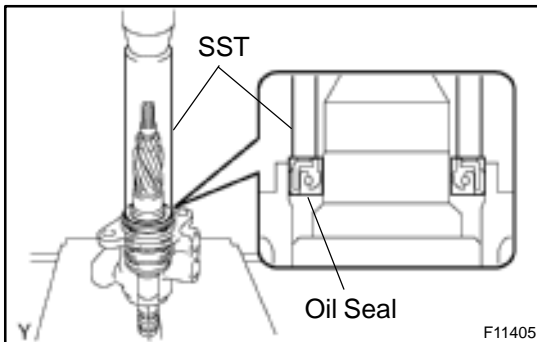


6. INSTALL CONTROL VALVE ASSEMBLY

- To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.
- Coat the teflon rings with power steering fluid.
- Install the control valve assembly into the control valve housing.

NOTICE:

Be careful not to damage the teflon rings and oil seal lips.

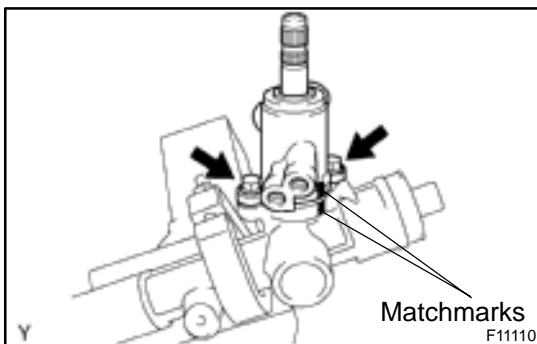


7. INSTALL OIL SEAL OF CONTROL VALVE ASSEMBLY

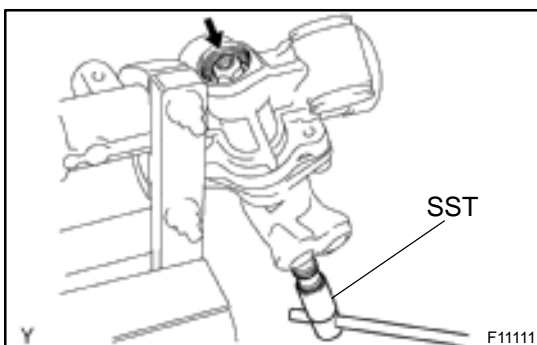
- Coat a new oil seal lip with power steering fluid.
- Using SST, press in the oil seal.
SST 09612-22011

8. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

- Install a new gasket.



- Align the matchmarks on the control valve housing and rack housing.
- Push into the control valve housing with control valve assembly.
- Install the 2 bolts.
Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)
- Install the dust seal.



9. INSTALL SELF-LOCKING NUT

Using SST, stop the control valve shaft rotating and install a new self-locking nut.

SST 09616-00010

Torque: 24.5 N·m (250 kgf-cm, 18 ft-lbf)

10. INSTALL RACK HOUSING CAP

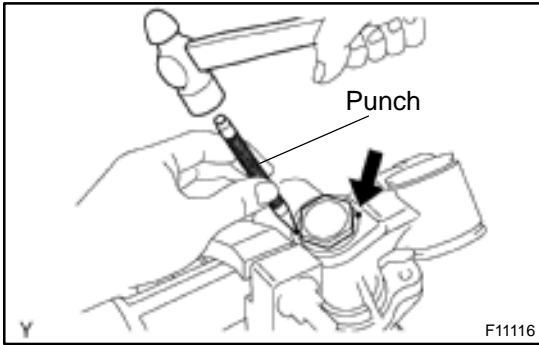
- Apply sealant to 2 or 3 threads of the rack housing cap.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- Install the rack housing cap.

Torque: 59 N·m (600 kgf-cm, 43 ft-lbf)



- (c) Using a punch and a hammer, stake the 2 parts of the rack housing cap.

11. INSTALL RACK GUIDE SUB-ASSEMBLY, RACK GUIDE SPRING AND RACK GUIDE SPRING CAP

- (a) Install the rack guide sub-assembly and rack guide spring.
- (b) Apply sealant to 2 or 3 threads of the rack guide spring cap.

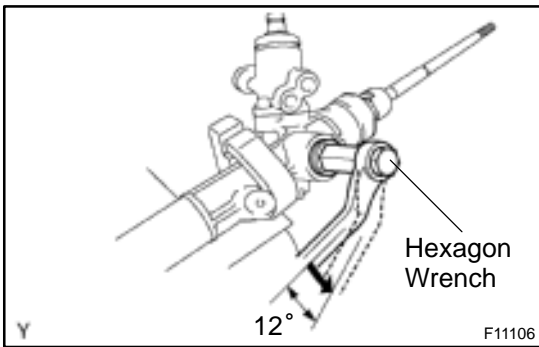
Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (c) Temporarily install the rack guide spring cap.

12. ADJUST TOTAL PRELOAD

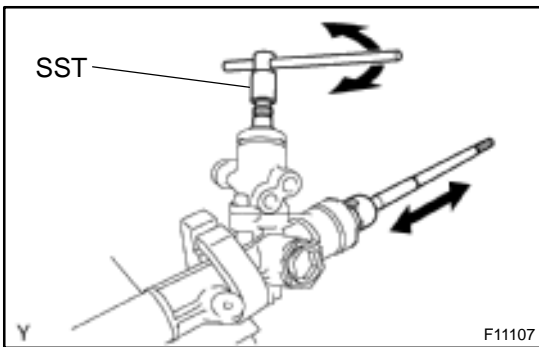
- (a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.



- (b) Using a hexagon wrench (19 mm), torque the rack guide spring cap.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

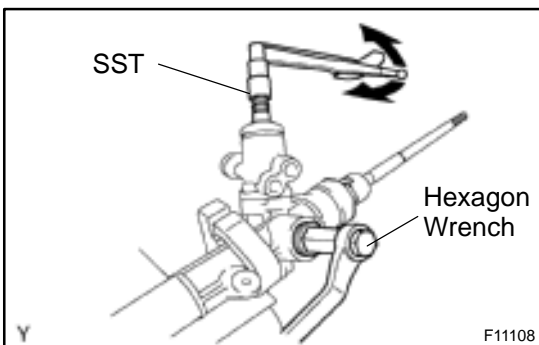
- (c) Using a hexagon wrench (19 mm), return the rack guide spring cap 12°.



- (d) Using SST, turn the control valve shaft right and left 1 or 2 times.

SST 09616-00011

- (e) Using a hexagon wrench (19 mm), loosen the rack guide spring cap until the rack guide spring is not functioning.



- (f) Using SST, a torque wrench and hexagon wrench (19 mm), tighten the rack guide spring cap until the preload is within the specification.

SST 09616-00010

Preload (turning):

0.8 – 1.3 N·m (8 – 13 kgf·cm, 6.9 – 11.3 in.-lbf)

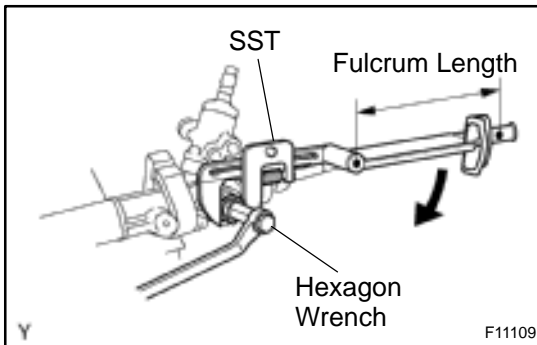
13. INSTALL RACK GUIDE SPRING CAP LOCK NUT

- (a) Apply sealant to 2 or 3 threads of the rack guide spring cap lock nut.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Temporarily install the rack guide spring cap lock nut.



- (c) Using a hexagon wrench (19 mm), hold the rack guide spring cap and using SST, torque the rack guide spring cap lock nut.

SST 09922-10010

Torque: 28 N·m (290 kgf-cm, 21 ft-lbf)

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

- (d) Recheck the total preload.

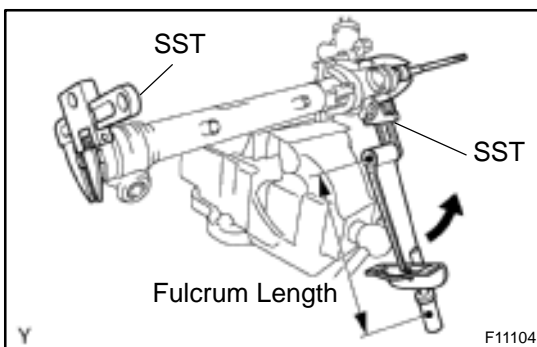
Preload (turning):

0.8 – 1.3 N·m (8 – 13 kgf-cm, 6.9 – 11.3 in.-lbf)

- (e) Remove the RH and LH rack ends.

14. INSTALL RH AND LH RACK ENDS

- (a) Temporarily install the LH rack end.



- (b) Using SST, hold the steering rack RH side steadily and using another SST, torque the LH rack end.

SST 09922-10010

Torque: 62 N·m (630 kgf-cm, 46 ft-lbf)

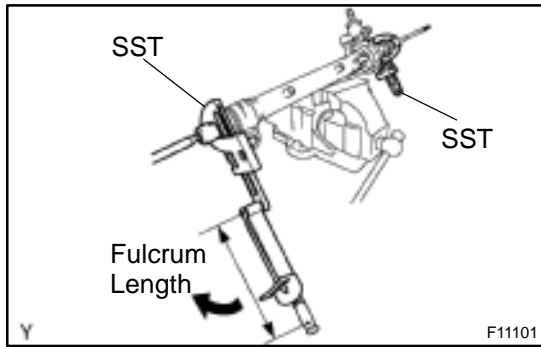
NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 380 mm (14.96 in.).

- (c) Temporarily install the RH rack end.



- (d) Using SST, hold the LH rack end steadily and using another SST, torque the RH rack end.
 SST 09922-10010
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 380 mm (14.96 in.).

15. INSTALL RH AND LH RACK BOOTS, CLAMPS AND CLIPS

- (a) Ensure that the steering rack end hole is not clogged with grease.

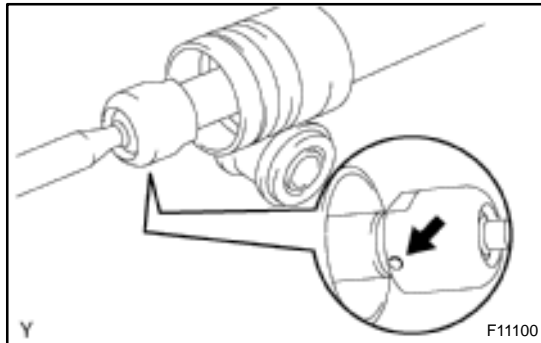
HINT:

If the hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.

- (b) Install the boot, clip and a new clamp.

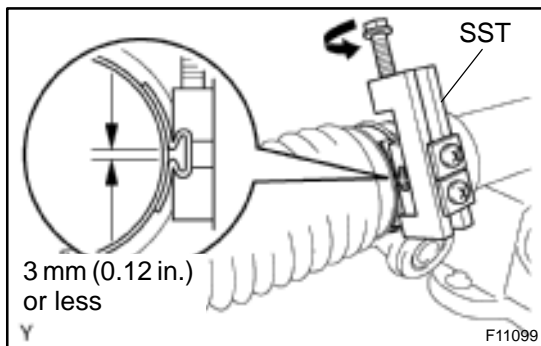
NOTICE:

Be careful not to damage or twist the boot.



- (c) Using SST, tighten the clamp as shown in the illustration.
 SST 09521-24010

- (d) Employ the same manner described above to the other side.



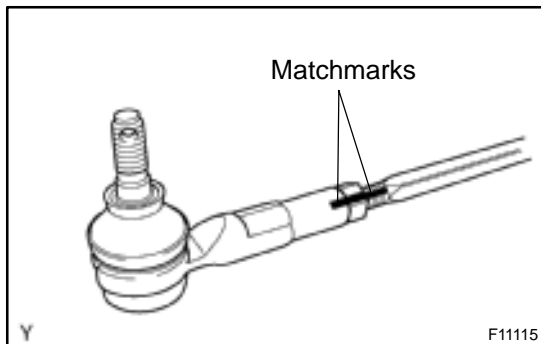
16. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS

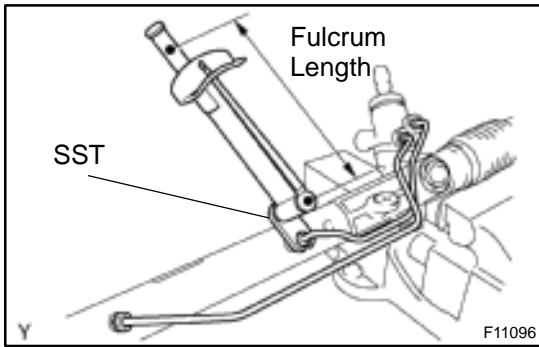
- (a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.
- (b) Employ the same manner described above to the other side.
- (c) After adjusting toe-in, torque the nut (See page SA-4).

Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)

17. INSTALL TURN PRESSURE TUBES

- (a) Coat 4 new O-rings with power steering fluid and install them to the 2 turn pressure tubes.

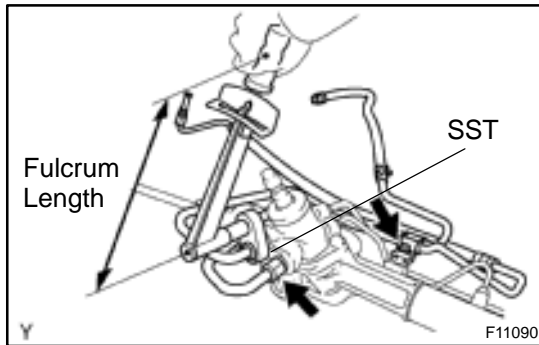




- (b) Using SST, install the 2 turn pressure tubes.
SST 09023-38200
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

HINT:

Use a torque wrench with a fulcrum length of 250 mm (9.84 in.).



INSTALLATION

1. INSTALL PRESSURE FEED TUBE ASSEMBLY

- (a) Install the pressure feed tube assembly with the bolt.
Torque: 5.0 N·m (50 kgf·cm, 45 in.-lbf)
- (b) Coat 2 new O-rings with power steering fluid and install them the pressure feed and return tubes.
- (c) Using SST, connect the pressure feed and return tubes.
SST 09023-12700
Torque: 22.5 N·m (230 kgf·cm, 17 ft·lbf)

HINT:

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).



2. INSTALL PS GEAR ASSEMBLY

Install the PS gear assembly with the 2 bolts, 2 nuts and 4 plate washers to the steering gear support member.

Torque: 57 N·m (580 kgf·cm, 42 ft·lbf)

3. CONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY (See page [SR-19](#))

4. CONNECT RH AND LH TIE ROD ENDS (See page [SA-13](#))

5. INSTALL FRONT LUGGAGE UNDER COVER

6. CONNECT PRESSURE FEED TUBE AND RETURN HOSE TO POWER STEERING VANE PUMP (See page [SR-31](#))

7. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

8. CENTER SPIRAL CABLE (See page [SR-19](#))

9. INSTALL STEERING WHEEL

- (a) Align the matchmarks on the steering wheel and steering column main shaft.
- (b) Temporarily tighten the steering wheel set nut.

10. BLEED POWER STEERING SYSTEM (See page [SR-3](#))

11. CHECK STEERING WHEEL CENTER POINT

12. TORQUE STEERING WHEEL SET NUT

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

13. INSTALL STEERING WHEEL PAD (See page [SR-19](#))

14. INSTALL TOOL BOX

15. INSTALL LUGGAGE COMPARTMENT TRIM BOX COVER

16. CHECK FRONT WHEEL ALIGNMENT
(See page [SA-4](#))