

STEERING SYSTEM

SR0L4-03

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 LEXUS IS200 is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front 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.

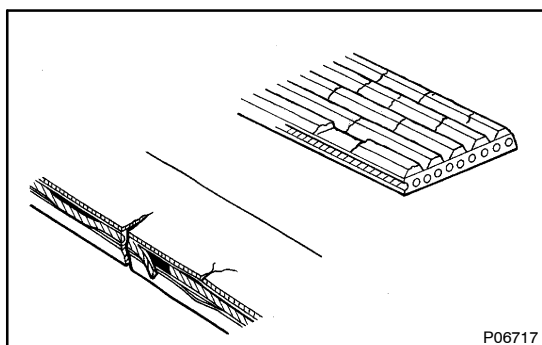
TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

SR0L5-05

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	1. Tires (Improperly inflated) 2. Power steering fluid level (Low) 3. Drive belt (Loose) 4. Front wheel alignment (Incorrect) 5. Steering system joints (Worn) 6. Suspension arm ball joints (Worn) 7. Steering column (Binding) 8. Power steering vane pump 9. Power steering gear Upper Lower	SA-2 SR-6 SR-3 SA-5 – SA-29 SA-39 – SR-25 SR-38
Poor return	1. Tires (Improperly inflated) 2. Front wheel alignment (Incorrect) 3. Steering column (Binding) 4. Power steering gear	SA-2 SA-5 – SR-38
Excessive play	1. Steering system joints (Worn) 2. Suspension arm ball joints (Worn) 3. Intermediate shaft (Worn) 4. Front wheel bearing (Worn) 5. Power steering gear Upper Lower	– SA-29 SA-39 – SA-11 SR-38
Abnormal noise	1. Power steering fluid level (Low) 2. Steering system joints (Worn) 3. Power steering vane pump 4. Power steering gear	SR-6 – SR-25 SR-38



DRIVE BELT INSPECTION

SR00Z-02

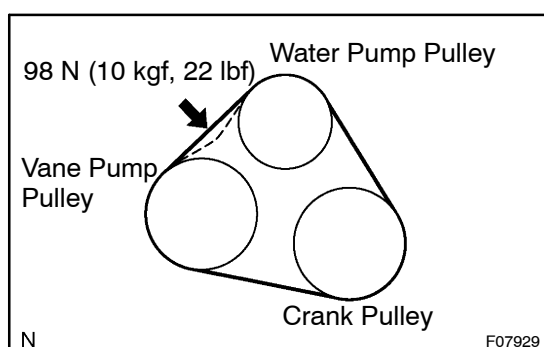
INSPECT DRIVE BELT

- (a) Visually check the belt for excessive wear, frayed cords etc.

If any defect has been found, replace the drive belt.

HINT:

Cracks on the rib side of a belt are considered acceptable. If the missing chunks from the ribs are found on the belt, it should be replaced.



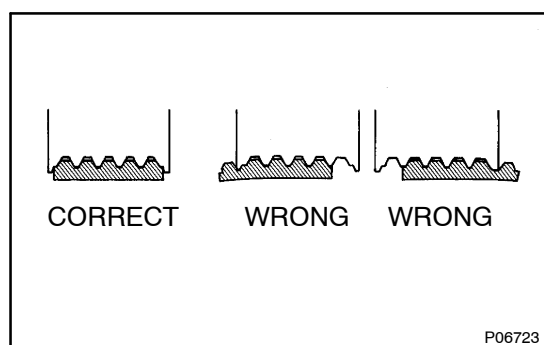
- (b) Measure the drive belt deflection.

Drive belt tension: at 98 N (10 kgf, 22 lbf)

New belt: 5.5 – 7.0 mm (0.217 – 0.276 in.)

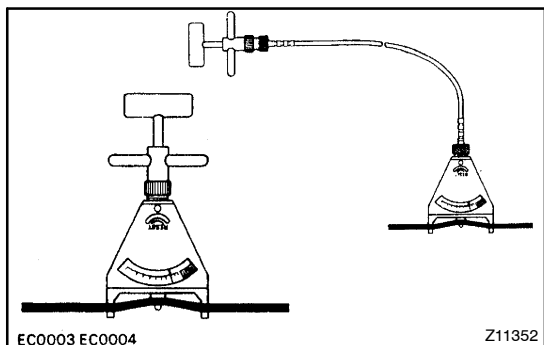
Used belt: 7.0 – 9.0 mm (0.276 – 0.354 in.)

If the belt deflection is not as specified, adjust it.



HINT:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing a belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.
- After installing a new belt, run the engine for about 5 minutes and recheck the belt tension.



(Reference)

- Using a belt tension gauge, measure the drive belt tension.

Drive belt tension:

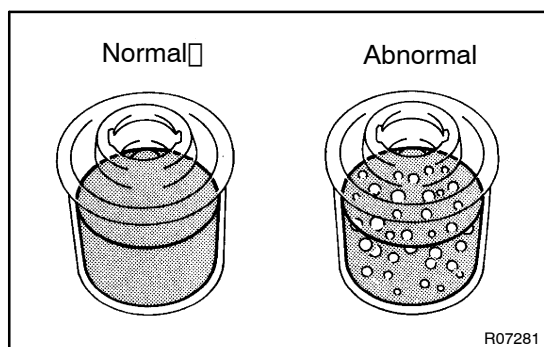
New belt: 441 – 539 N (45 – 55 kgf)

Used belt: 196 – 343 N (20 – 35 kgf)

If the belt tension is not as specified, adjust it.

POWER STEERING FLUID BLEEDING

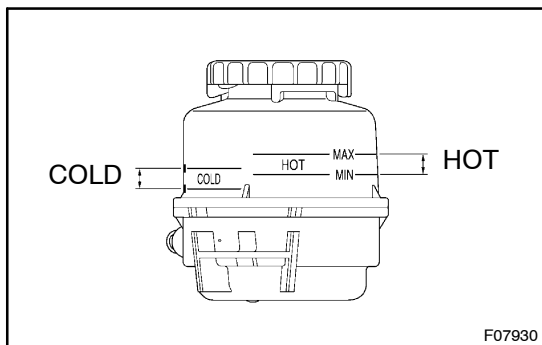
1. **CHECK FLUID LEVEL** (See page SR-6)
2. **JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS**
3. **TURN STEERING WHEEL**
With the engine stopped, turn the wheel slowly from lock to lock several times.
4. **LOWER VEHICLE**
5. **START ENGINE**
Run the engine at idle for a few minutes.
6. **TURN STEERING WHEEL**
 - (a) With the engine idling, turn the wheel to left or right full lock position and keep it there for 2–3 seconds, then turn the 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-6)



INSPECTION

1. CHECK FLUID LEVEL

- Keep the vehicle level.
- With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

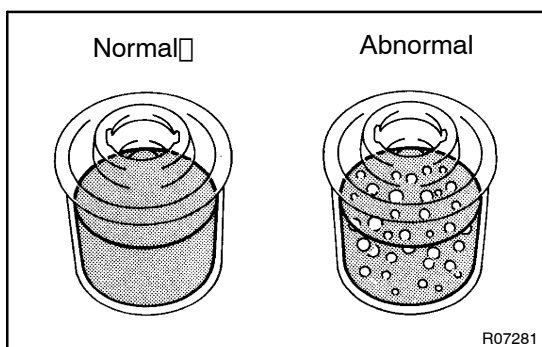
Fluid: ATF DEXRON® II or III

HINT:

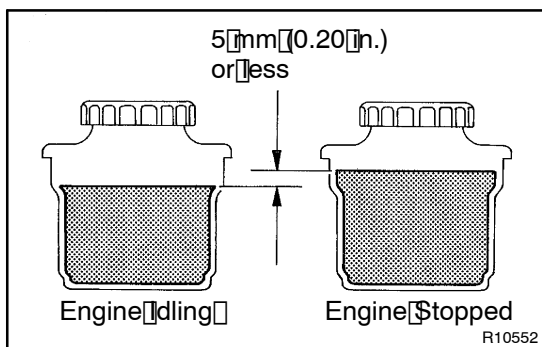
Check that the fluid level is within the HOT LEVEL range on the reservoir. If the fluid is cold, check that it is within the COLD LEVEL range.

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

Fluid temperature: 80°C (176°F)



- Check for foaming or emulsification. If there is foaming or emulsification, bleed power steering system (See page SR-5)



- With the engine idling, measure the fluid level in the oil reservoir.
- Stop the engine.
- 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-5)

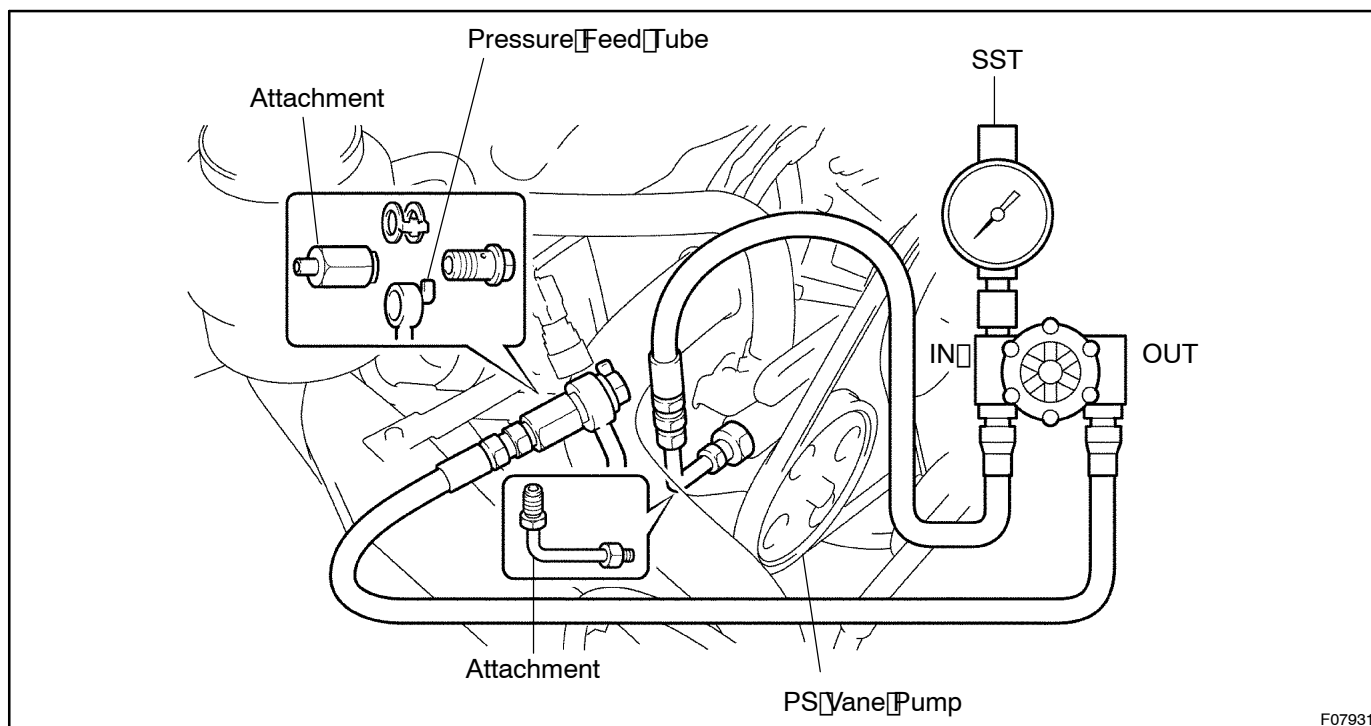
- Check the fluid level.

2. CHECK STEERING FLUID PRESSURE

- (a) Disconnect the pressure feed tube from the PS Vane pump (See page SR-27).
- (b) Connect SST, as shown in the illustration below.
SST 09640-10010, 09641-01010, 09641-01030, 09641-01060

NOTICE:

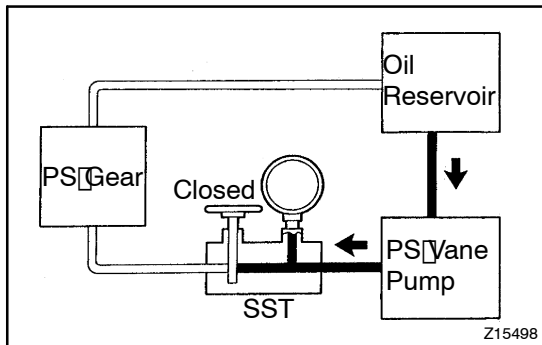
Check that the valve of the SST is in the open position.



F07931

- (c) Bleed the power steering system (See page SR-5).
- (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: 80 °C (176 °F)



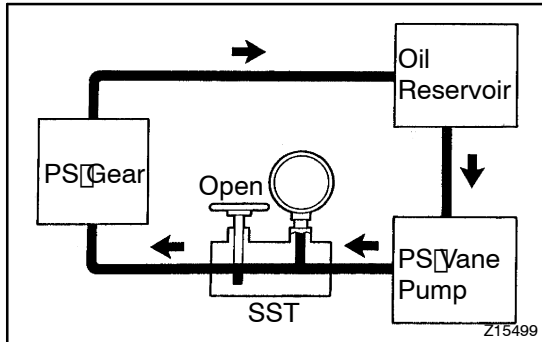
- (f) With the engine idling, close the valve of the SST and observe the reading on the SST.

Minimum fluid pressure:

6,374 kPa (65 kgf/cm², 925 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, open the valve fully.

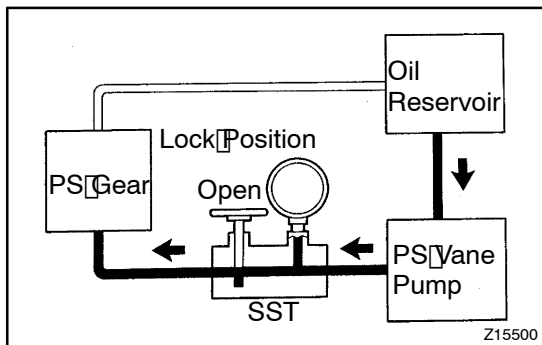
- (h) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.

Difference fluid pressure:

490 kPa (5 kgf/cm², 71 psi) or less

NOTICE:

Do not turn the steering wheel.



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

Minimum fluid pressure:

6,374 kPa (65 kgf/cm², 925 psi)

NOTICE:

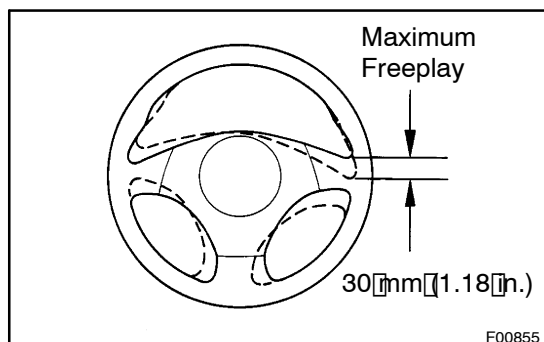
- Do not maintain lock position for more than 10 seconds.
- Do not let the fluid temperature become too high.

- (j) Disconnect the SST.

SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)

- (k) Connect the pressure feed tube to the PS vane pump (See page SR-37).

- (l) Bleed the power steering system (See page SR-5).



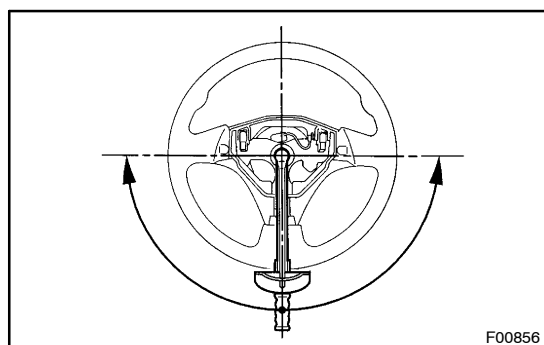
STEERING WHEEL INSPECTION

SR05R-06

1. CHECK STEERING WHEEL FREEPLAY

- Stop the vehicle and face the tires straight ahead.
- Rock the steering wheel gently up and down with a finger lightly, check the steering wheel freeplay.

Maximum freeplay: 30 mm (1.18 in.)



2. CHECK STEERING EFFORT

- Center the steering wheel.
- Remove the steering wheel pad (See page SR-12).
- Start the engine and run it at idle.
- Measure the steering effort in both directions.

Steering effort (Reference):

4.2 - 5.4 N·m (43 - 55 kgf·cm, 37 - 48 in.·lbf)

HINT:

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

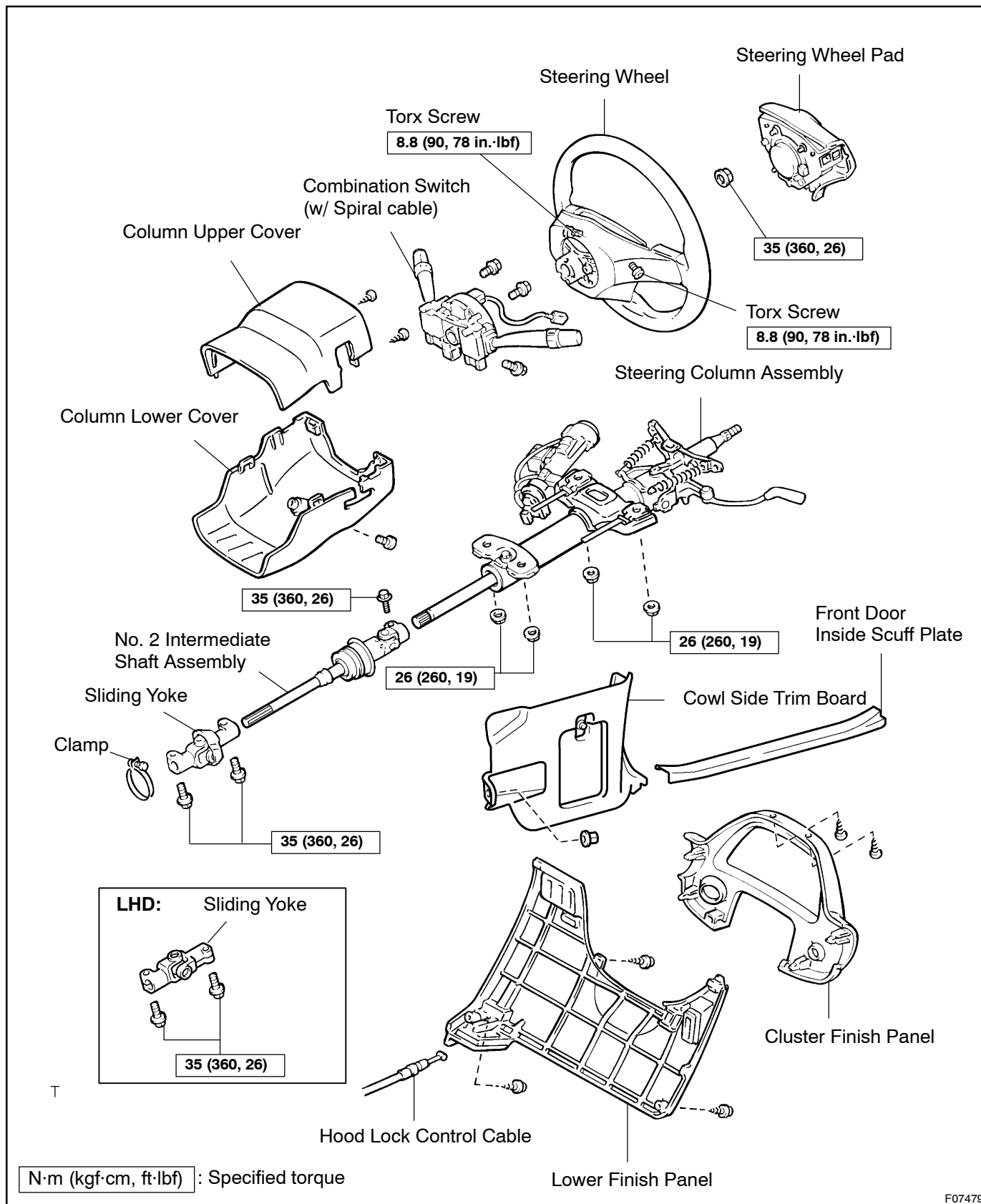
- Torque the steering wheel set nut.

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

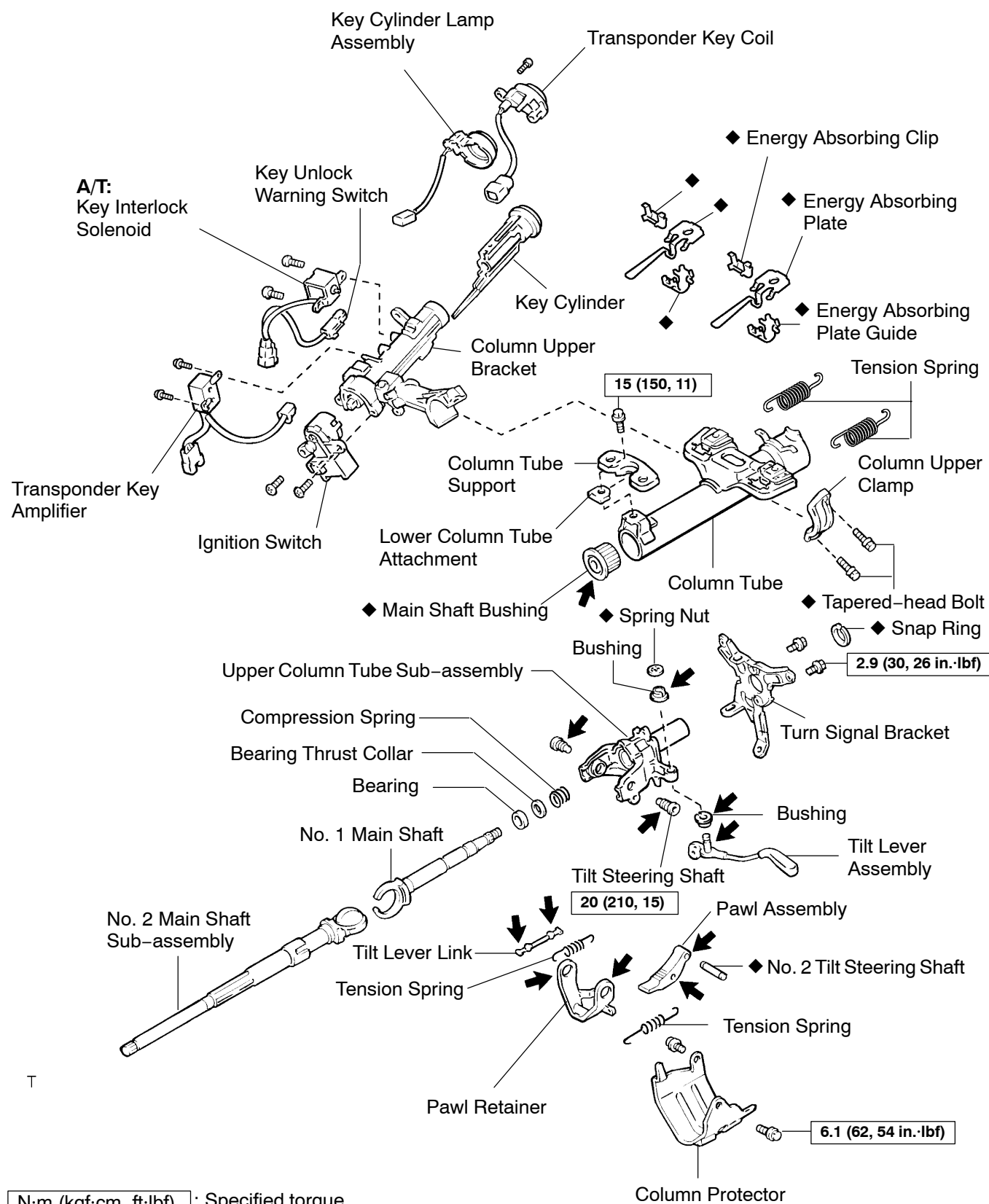
- Install the steering wheel pad (See page SR-23).

TILT STEERING COLUMN COMPONENTS

SR0U6-01



F07479

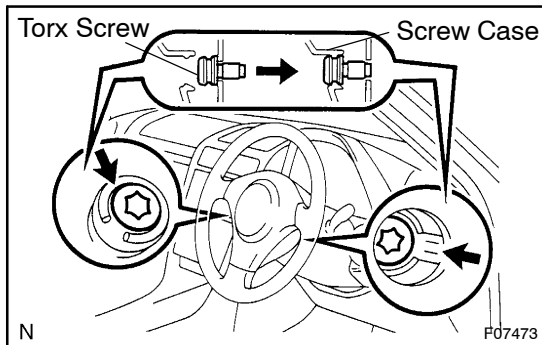


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

◀ Molybdenum disulfide lithium base grease

F07480



REMOVAL

1. REMOVE STEERING WHEEL PAD

NOTICE:

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

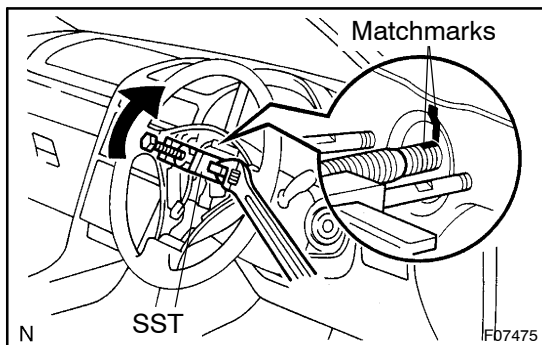
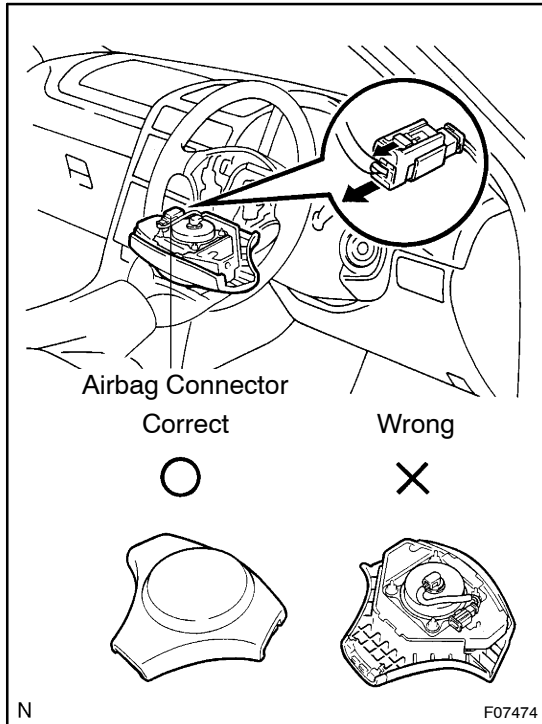
- Place the front wheels facing straight ahead.
- Using a torx socket wrench, loosen the 2 torx screws until the groove along the screw circumference catches on the screw case.
- Pull out the wheel pad from the steering wheel and disconnect the airbag connector.

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 wheel.
SST 09950-50012 (09951-05010, 09952-05010, 09953-05020, 09954-05020)

3. REMOVE FRONT DOOR INSIDE SCUFF PLATE AND COWL SIDE TRIM BOARD

- Remove the front door inside scuff plate.
- Remove the clip and cowl side trim board.

4. REMOVE LOWER FINISH PANEL

- Remove the 3 screws.
- Disconnect the connectors and remove the lower finish panel.
- Disconnect the hood lock control cable.

5. REMOVE CLUSTER FINISH PANEL

- (a) Remove the 2 screws.
- (b) Disconnect the connector and remove the cluster finish panel.

6. REMOVE COLUMN UPPER AND LOWER COVERS

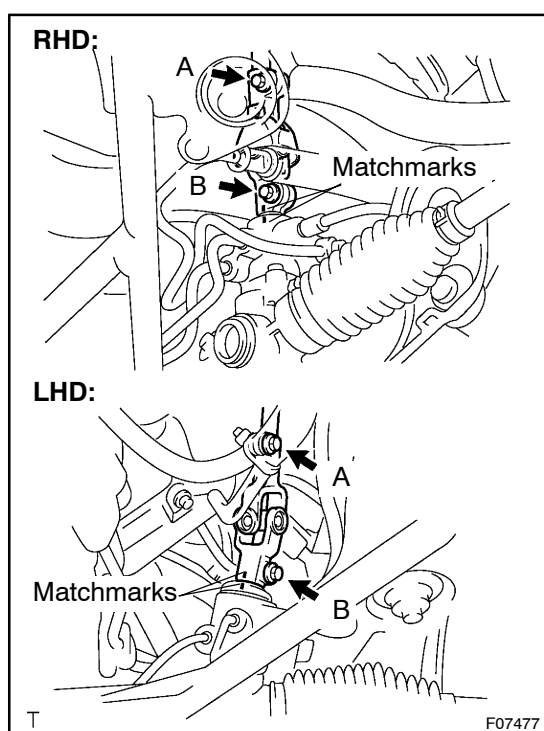
- (a) Remove the 3 screws and column lower cover.
- (b) Remove the column upper cover.

7. REMOVE COMBINATION SWITCH WITH SPIRAL CABLE

- (a) Disconnect the connectors.
- (b) Disconnect the airbag connector.
- (c) Remove the 3 screws and combination switch.

8. REMOVE SPIRAL CABLE (See page BE-26)**NOTICE:**

Do not disassemble the cable or apply oil to it.

**9. DISCONNECT SLIDING YOKE**

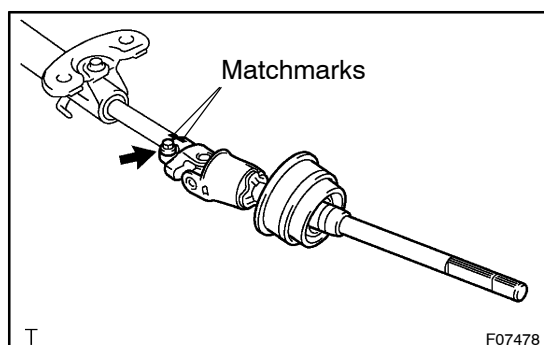
- (a) Place matchmarks on the sliding yoke and control valve shaft.
- (b) Loosen the bolt A and remove the bolt B.

10. REMOVE STEERING COLUMN ASSEMBLY

- (a) Loosen the clamp.
- (b) Disconnect the connectors.
- (c) Remove the 4 nuts and steering column assembly.

11. REMOVE SLIDING YOKE

Remove the bolt A and sliding yoke.

**12. REMOVE NO. 2 INTERMEDIATE SHAFT ASSEMBLY**

- (a) Place matchmarks on the No. 2 intermediate shaft assembly and main shaft.
- (b) Remove the bolt and No. 2 intermediate shaft assembly.

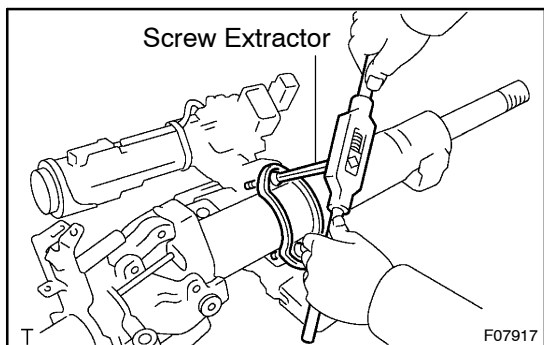
DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. REMOVE TRANSPONDER KEY COIL AND KEY CYLINDER LAMP ASSEMBLY

Remove the screw, transponder key coil and key cylinder lamp assembly.

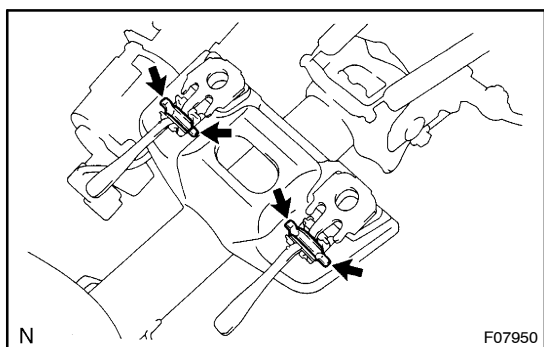


2. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

- (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 bracket and column upper clamp.

3. REMOVE COLUMN TUBE SUPPORT

- (a) Remove the bolt and column tube support with the lower column tube attachment.
- (b) Remove the lower column tube attachment from the column tube support.

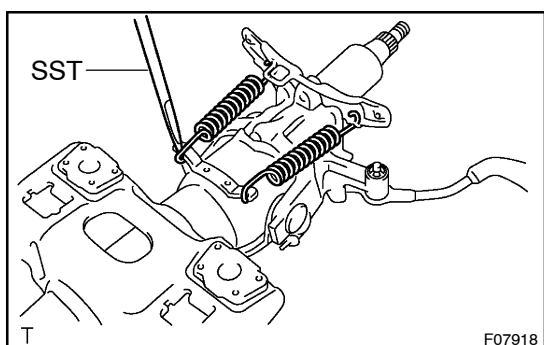


4. REMOVE 2 ENERGY ABSORBING PLATES

- (a) Using pliers, remove the 2 energy absorbing clips.
- (b) Remove the 2 energy absorbing plates and energy absorbing plate guides.

5. REMOVE COLUMN PROTECTOR

Remove the 2 bolts and column protector.



6. REMOVE 2 TENSION SPRINGS

Using SST, remove the 2 tension springs.

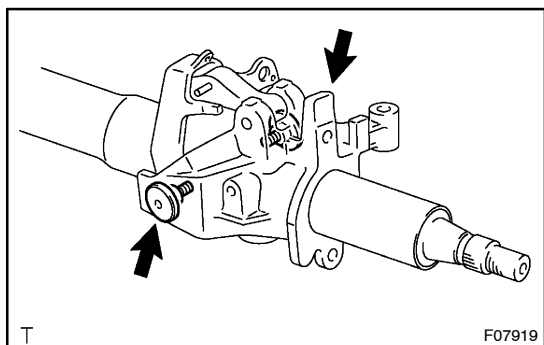
SST 09703-30010

7. REMOVE TURN SIGNAL BRACKET

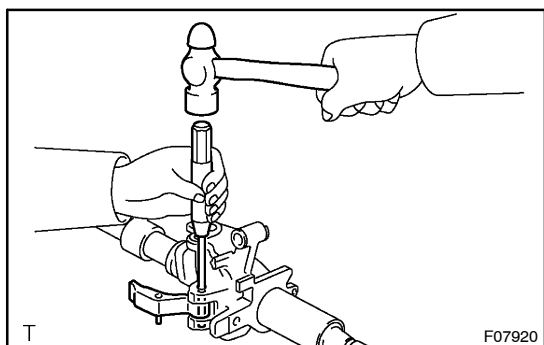
- (a) Using pliers, remove the tension spring.
- (b) Remove the 2 bolts and turn signal bracket.

8. REMOVE TILT LEVER ASSEMBLY

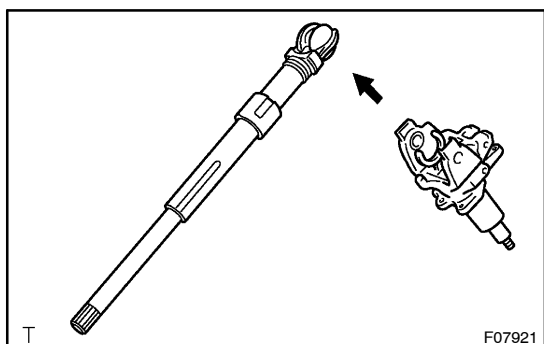
- (a) Remove the tension spring.
- (b) Remove the spring nut, tilt lever assembly and tilt lever link.
- (c) Remove the 2 bushings from the upper column tube sub-assembly.

**9. REMOVE MAIN SHAFT ASSEMBLY WITH UPPER COLUMN TUBE SUB-ASSEMBLY**

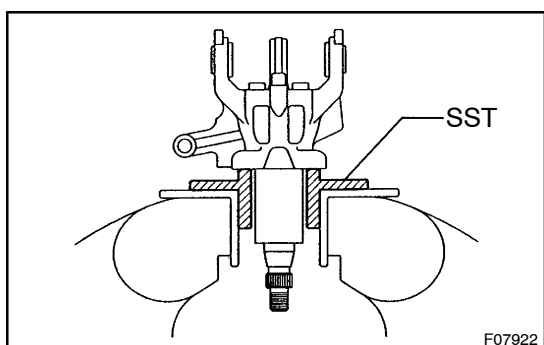
- (a) Using a hexagon wrench (6 mm), remove the 2 tilt steering shafts.
- (b) Remove the pawl retainer and main shaft assembly with the upper column tube sub-assembly.



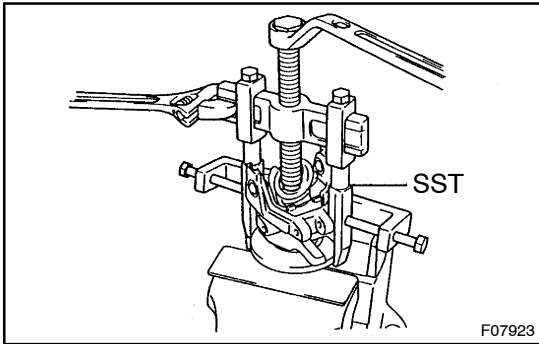
- (c) Using a pin punch (5 mm) and hammer, remove the No. 2 tilt steering shaft and pawl assembly.

**10. REMOVE UPPER COLUMN TUBE SUB-ASSEMBLY FROM MAIN SHAFT ASSEMBLY**

- (a) Bent the joint of the main shaft at right angles, leaving the cross ball in the No. 2 main shaft sub-assembly, separate the main shaft into the No. 1 main shaft with upper column tube sub-assembly and No. 2 main shaft sub-assembly.



- (b) Secure the No. 1 main shaft with upper column tube sub-assembly and SST in a vise.
SST 09316-60011 (09316-00051)



- (c) Using SST, compress the spring of the upper column tube sub-assembly.

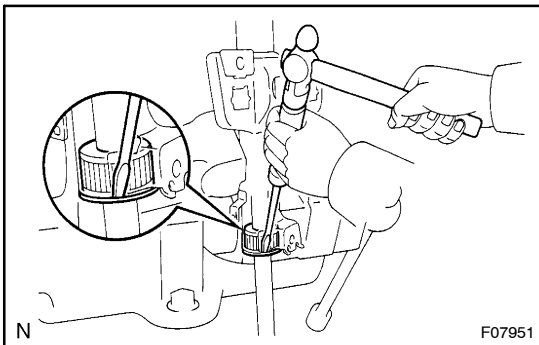
SST 09950-40011 (09951-04010, 09952-04010, 09953-04020, 09954-04010, 09955-04061, 09958-04011)

NOTICE:

Do not overtighten the SST.

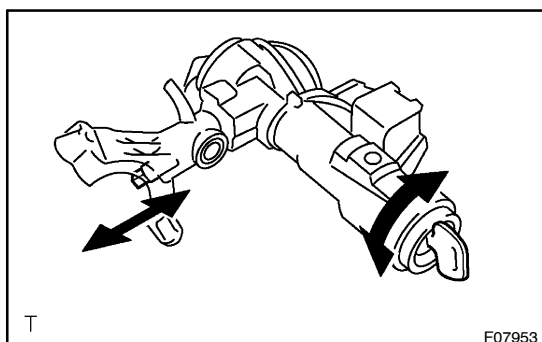
- (d) Using snap ring expander, remove the snap ring and No. 1 main shaft.

11. REMOVE COMPRESSION SPRING, BEARING THRUST COLLAR AND BEARING



12. REMOVE MAIN SHAFT BUSHING

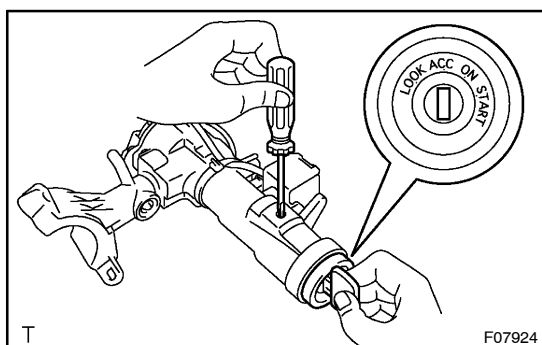
Using a screwdriver, tap out the main shaft bushing.



INSPECTION

1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



2. IF NECESSARY, REPLACE KEY CYLINDER

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

HINT:

Make sure the key is at the ACC position.

3. INSPECT IGNITION SWITCH (See page BE-23)

4. IF NECESSARY, REPLACE IGNITION SWITCH

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

5. INSPECT KEY UNLOCK WARNING SWITCH (See page BE-23)

6. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH

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

7. A/T:

INSPECT KEY INTERLOCK SOLENOID (See page AT-17)

8. A/T:

IF NECESSARY, REPLACE KEY INTERLOCK SOLENOID

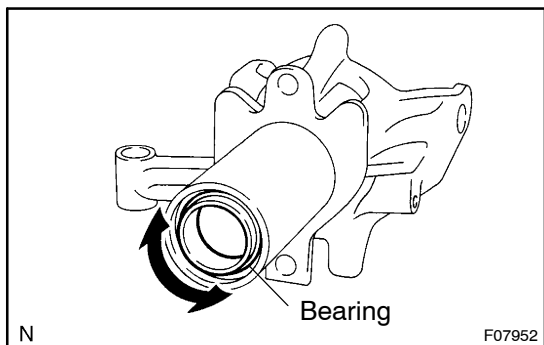
- Remove the 2 screws and key interlock solenoid.
- Install a new key interlock solenoid with the 2 screws.

9. INSPECT TRANSPONDER KEY COIL (See page BE-201)

10. IF NECESSARY, REPLACE TRANSPONDER KEY COIL

11. IF NECESSARY, REPLACE TRANSPONDER KEY AMPLIFIER

- Remove the 2 screws and transponder key amplifier.
- Install a new transponder key amplifier with the 2 screws.

**12. INSPECT BEARING**

Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the upper column tube sub-assembly.

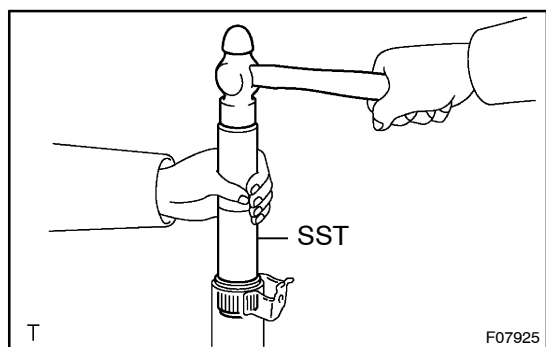
REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE

(See page SR-10)



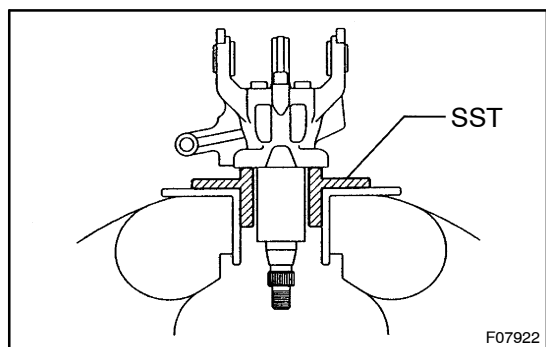
2. INSTALL MAIN SHAFT BUSHING

- (a) Coat a new main shaft bushing with molybdenum disulfide lithium base grease.
- (b) Using SST and a hammer, tap in the main shaft bushing.
SST 09612-22011

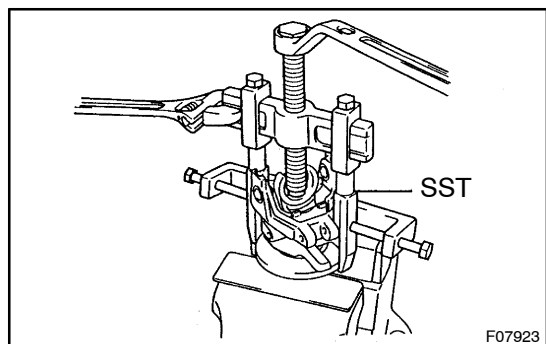
3. INSTALL COMPRESSION SPRING, BEARING THRUST COLLAR AND BEARING

4. INSTALL UPPER COLUMN TUBE SUB-ASSEMBLY TO MAIN SHAFT ASSEMBLY

- (a) Temporarily install the upper column tube sub-assembly to the No. 1 main shaft.



- (b) Secure the No. 1 main shaft with upper column tube sub-assembly and SST in a vise.
SST 09316-60011 (09316-00051)

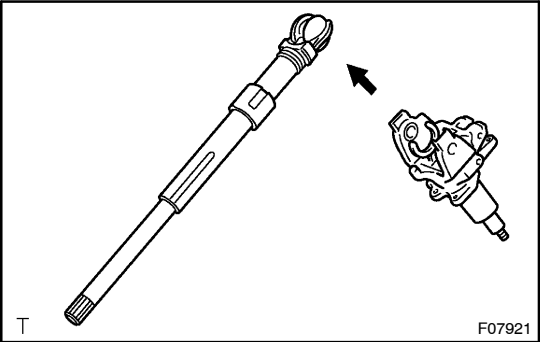


- (c) Using SST, compress the spring of the upper column tube sub-assembly.
SST 09950-40011 (09951-04010, 09952-04010, 09953-04020, 09954-04010, 09955-04061, 09958-04011)

NOTICE:

Do not overtighten the SST.

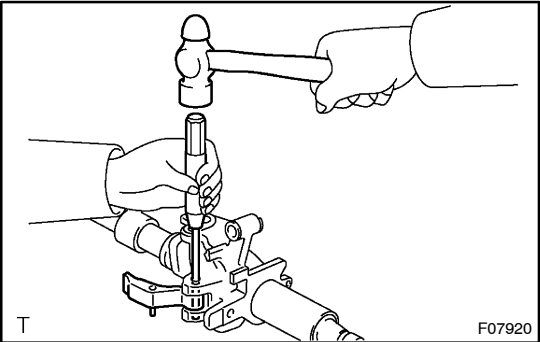
- (d) Using a snap ring expander, install a new snap ring and No. 1 main shaft.



- (e) Assemble the No. 1 main shaft with upper column tube sub-assembly and No. 2 main shaft sub-assembly.

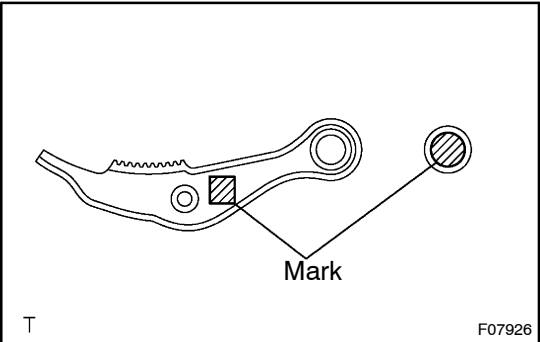
NOTICE:

Do not bend the universal joint of the shaft more than 20°.



5. INSTALL MAIN SHAFT ASSEMBLY WITH UPPER COLUMN TUBE SUB-ASSEMBLY

- (a) Using a pin punch (5 mm) and hammer, install the pawl assembly with a new No. 2 tilt steering shaft.

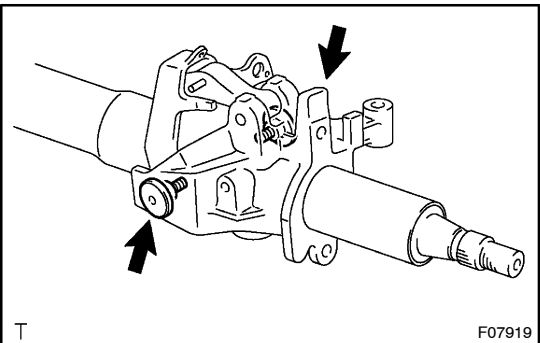


HINT:

Install a new No. 2 tilt steering shaft with the one having the mark corresponding to the mark stamped on the pawl assembly.

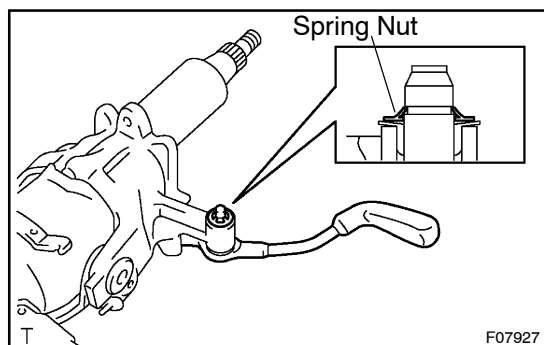
Pawl assembly mark	No. 2 tilt steering shaft color	No. 2 tilt steering shaft part number
1	White	45856-26010
2	Yellow	45856-26020
3	Black	45856-26030

- (b) Install the main shaft assembly with the upper column tube sub-assembly and pawl retainer.



- (c) Using a hexagon wrench (6 mm), install the 2 tilt steering shafts.

Torque: 20 N·m (210 kgf·cm, 15 ft·lbf)



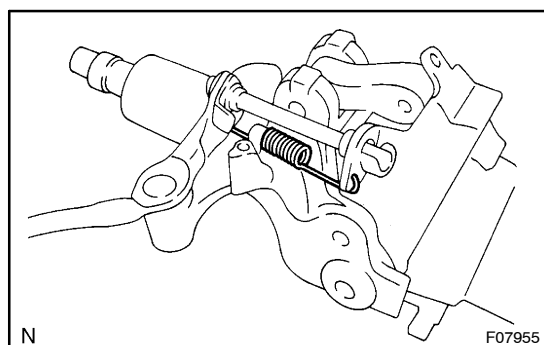
6. INSTALL TILT LEVER ASSEMBLY

- Install the 2 bushings to the upper column tube sub-assembly.
- Install the tilt lever assembly with a new spring nut.

NOTICE:

Make sure that the spring nut is installed facing in the correct direction.

- Install the tilt lever link.



- Install the tension spring.

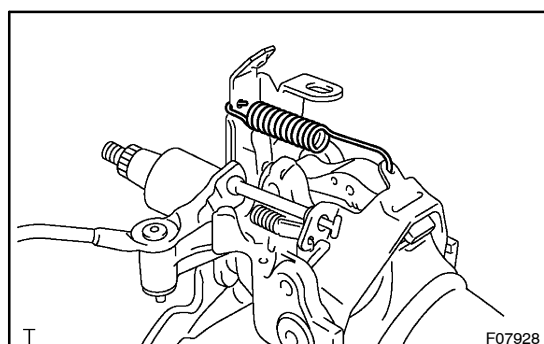
NOTICE:

Make sure that the tension spring is installed facing in the correct direction.

7. INSTALL TURN SIGNAL BRACKET

- Install the turn signal bracket with the 2 bolts.

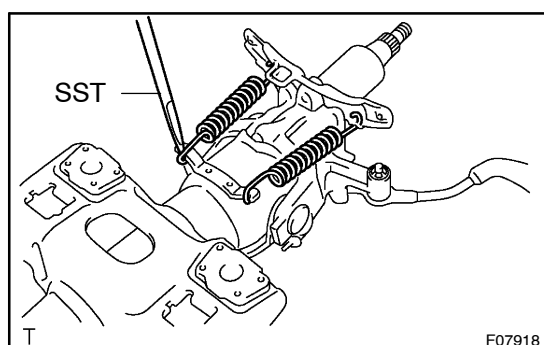
Torque: 2.9 N·m (30 kgf·cm, 26 in·lbf)



- Using pliers, install the tension spring.

NOTICE:

Make sure that the tension spring is installed facing in the correct direction.



8. INSTALL 2 TENSION SPRINGS

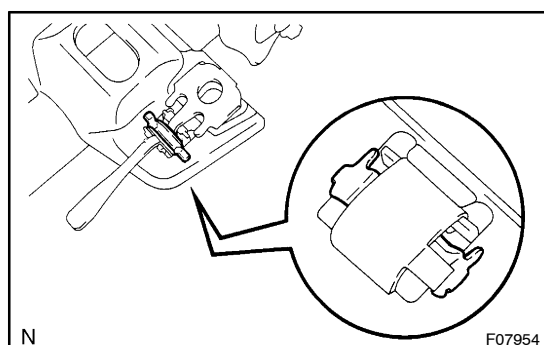
Using SST, install the 2 tension springs.

SST 09703-30010

9. INSTALL COLUMN PROTECTOR

Install the column protector with the 2 bolts.

Torque: 6.1 N·m (62 kgf·cm, 54 in·lbf)



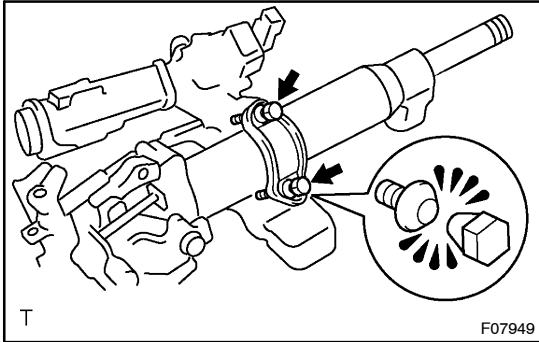
10. INSTALL 2 ENERGY ABSORBING PLATES

- Install the 2 new energy absorbing plate guides and energy absorbing plates.
- Install the 2 new energy absorbing clips.

11. INSTALL COLUMN TUBE SUPPORT

- Install the lower column tube attachment to the column tube support.
- Install the column tube support with the lower column tube attachment with the bolt.

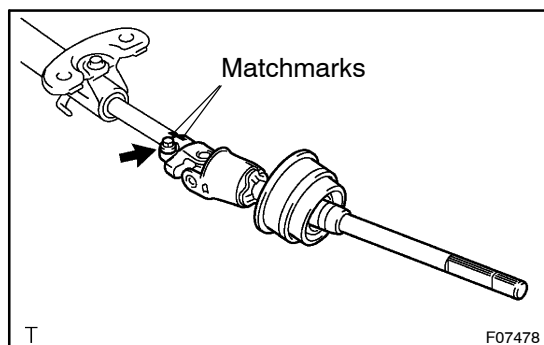
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

**12. 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.

13. INSTALL TRANSPONDER KEY COIL AND KEY CYLINDER LAMP ASSEMBLY

Install the key cylinder lamp assembly and transponder key coil with the screw.



INSTALLATION

1. INSTALL NO. 2 INTERMEDIATE SHAFT ASSEMBLY

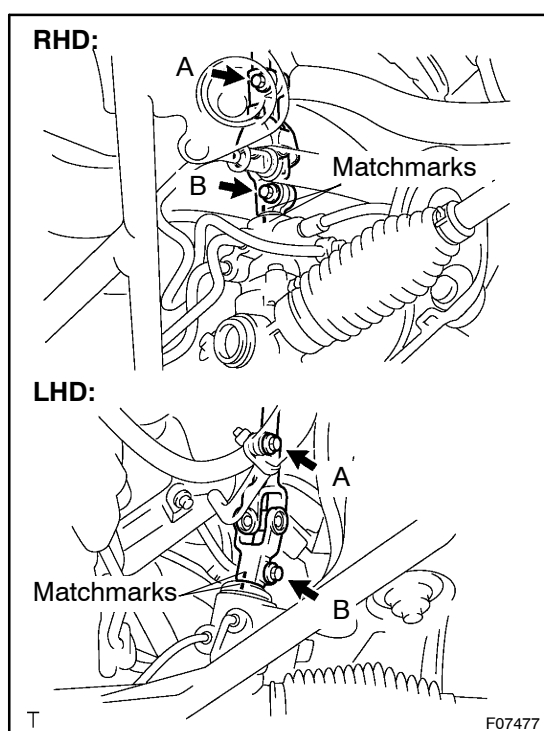
- Align the matchmarks on the No. 2 intermediate shaft assembly and main shaft.
- Install the No. 2 intermediate shaft assembly with the bolt.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

2. INSTALL SLIDING YOKE

Temporarily install the sliding yoke with the bolt A.

3. INSTALL STEERING COLUMN ASSEMBLY

- Install the steering column assembly with the 4 nuts.
Torque: 26 N·m (260 kgf·cm, 19 ft·lbf)
- Connect the connectors.
- Tighten the clamp.



4. CONNECT SLIDING YOKE

- Align the matchmarks on the sliding yoke and control valve shaft.
- Install the bolt B.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)
- Torque the bolt A.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

5. INSTALL SPIRAL CABLE (See page BE-26)

6. INSTALL COMBINATION SWITCH WITH SPIRAL CABLE

- Install the combination switch with the 3 screws.
- Connect the airbag connector.
- Connect the connectors.

7. INSTALL COLUMN UPPER AND LOWER COVERS

- Install the column upper cover.
- Install the column lower cover with the 3 screws.

8. INSTALL CLUSTER FINISH PANEL

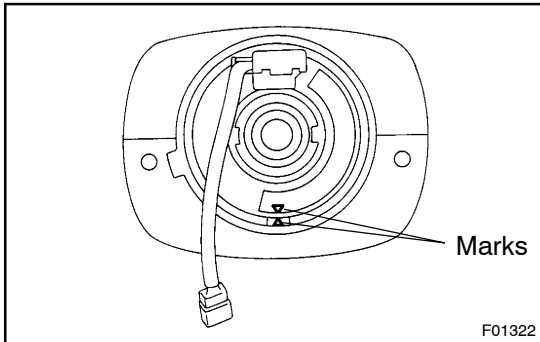
- Connect the connector and install the cluster finish panel.
- Install the 2 screws.

9. INSTALL LOWER FINISH PANEL

- Connect the hood lock control cable to the lower finish panel.
- Connect the connectors and install the lower finish panel.
- Install the 3 screws.

10. INSTALL FRONT DOOR INSIDE SCUFF PLATE AND COWL SIDE TRIM BOARD

- (a) Install the cowl side trim board with the clip.
- (b) Install the front door inside scuff plate.

**11. 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.

12. INSTALL STEERING WHEEL

- (a) Align the matchmarks on the steering wheel and main shaft assembly.

- (b) Install the steering wheel set nut.

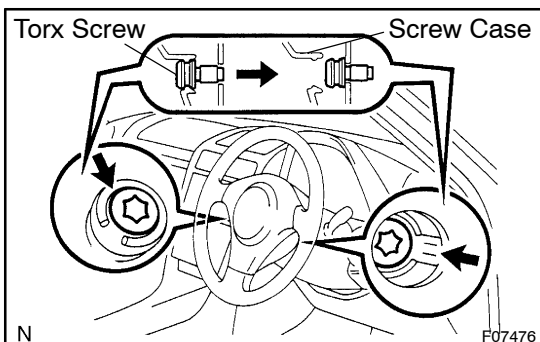
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

- (c) Connect the connector.

13. 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 on 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.

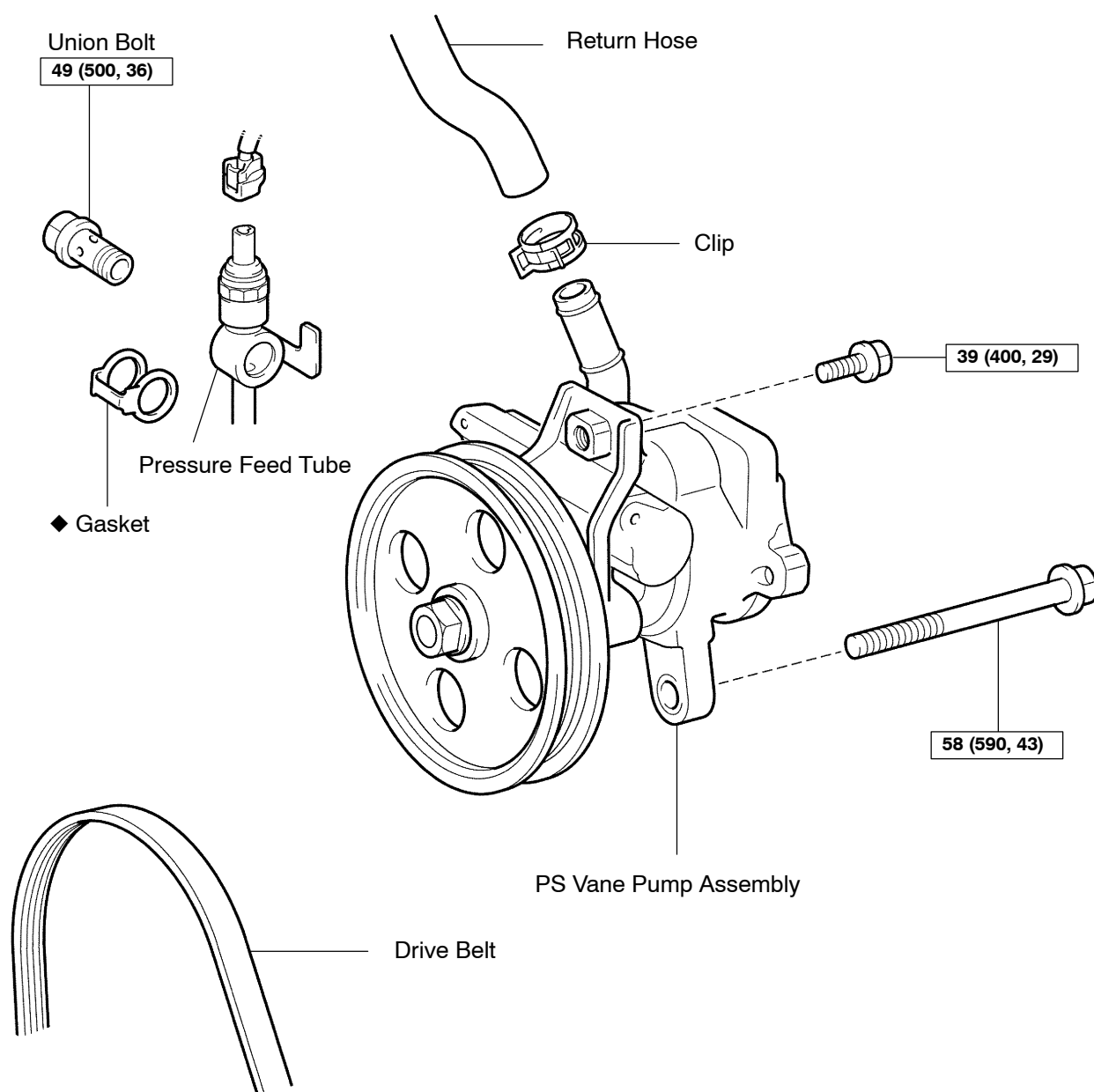
- (c) Using a torx socket wrench, torque the 2 screws.

Torque: 8.8 N·m (90 kgf·cm, 78 in·lbf)

14. CHECK STEERING WHEEL CENTER POINT

POWER STEERING VANE PUMP COMPONENTS

SR0UB-01

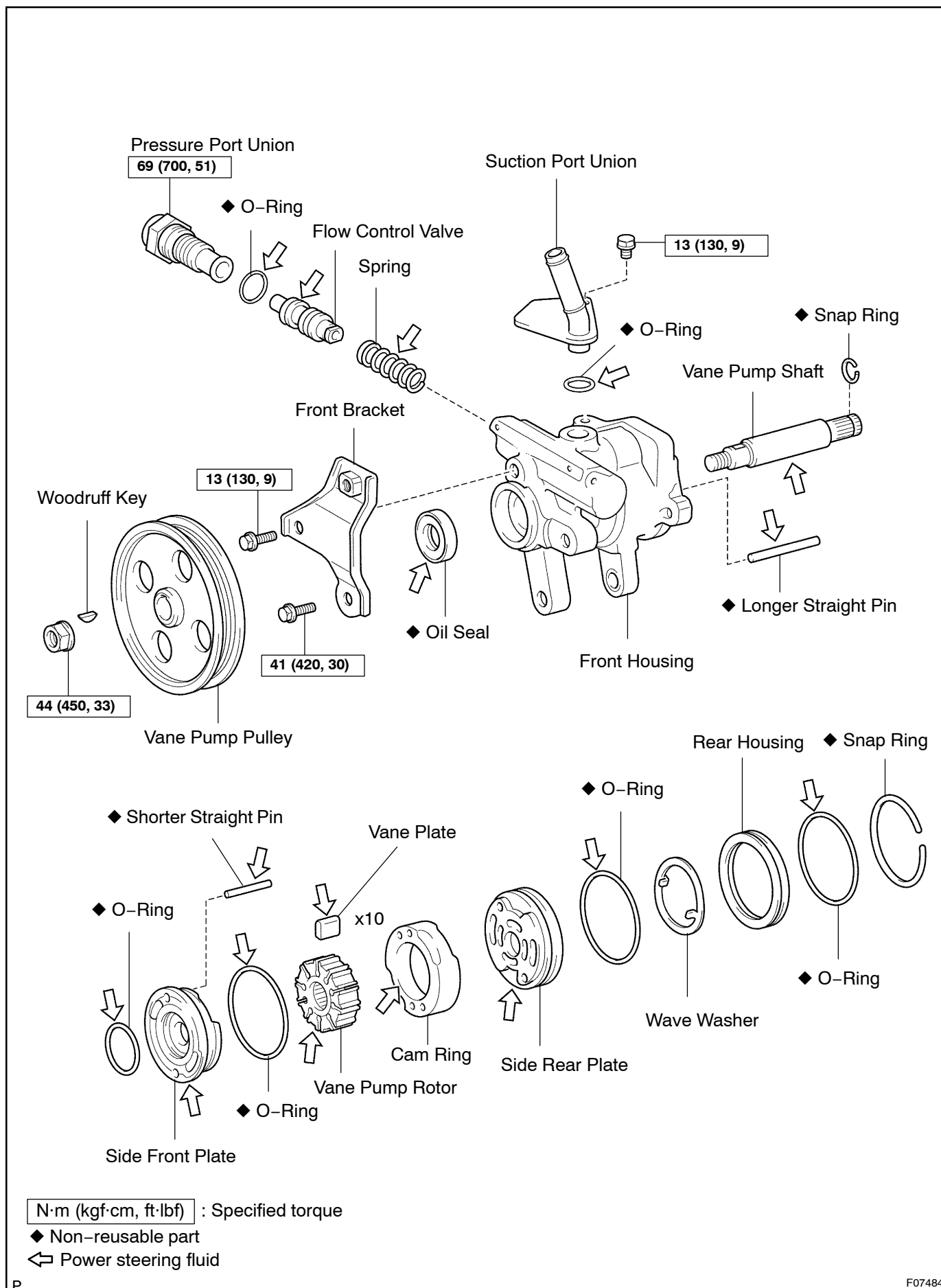


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

P

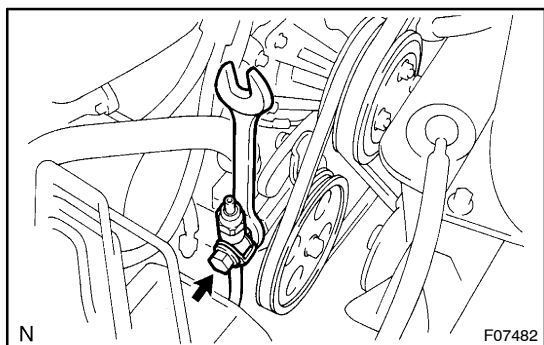
F07483



REMOVAL

1. DISCONNECT RETURN HOSE

Remove the clip and disconnect the return hose.



2. DISCONNECT PRESSURE FEED TUBE

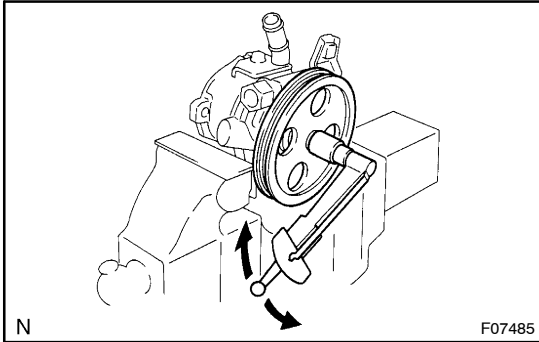
- (a) Disconnect the oil pressure switch connector.
- (b) Using a spanner, hold the pressure port union, then remove the union bolt and gasket, and disconnect the pressure feed tube.

3. REMOVE DRIVE BELT

Loosen the 2 pump assembly set bolts and remove the drive belt.

4. REMOVE PS VANE PUMP ASSEMBLY

Remove the 2 pump assembly set bolts and PS vane pump assembly.



DISASSEMBLY

NOTICE:

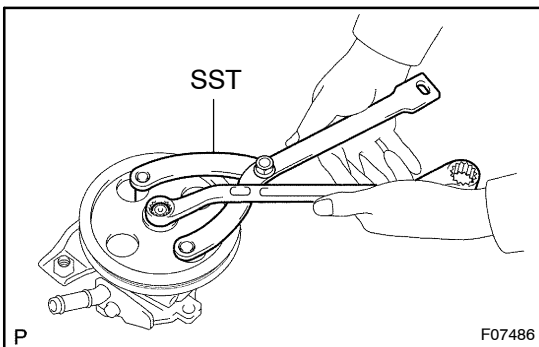
When using a vise, do not overtighten it.

1. MEASURE POWER STEERING VANE PUMP ROTATING TORQUE

- Check that the pump rotates smoothly without abnormal noise.
- Using a torque wrench, check the pump rotating torque.

Rotating torque :

0.2 N·m (2.5 kgf·cm, 2.2 in.·lbf) or less



2. REMOVE VANE PUMP PULLEY

- Using SST, stop the pulley rotating and loosen the nut. SST 09960-10010 (09962-01000, 09963-01000)
- Remove the nut and vane pump pulley from the vane pump shaft.
- Remove the woodruff key from the vane pump shaft.

3. REMOVE FRONT BRACKET

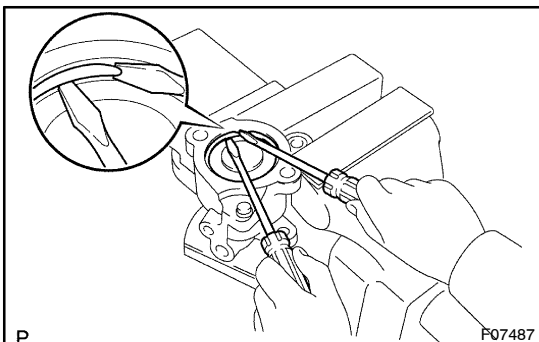
Remove the 2 bolts and front bracket.

4. REMOVE SUCTION PORT UNION

- Remove the bolt and suction port union.
- Remove the O-ring from the suction port union.

5. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

- Remove the pressure port union, flow control valve and spring.
- Remove the O-ring from the pressure port union.

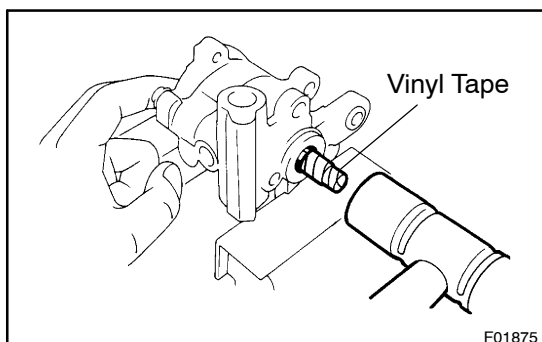


6. REMOVE REAR HOUSING, WAVE WASHER AND SIDE REAR PLATE

- Using 2 screwdrivers, remove the snap ring.

NOTICE:

Take care not to damage the housing.



- (b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the vane pump shaft.
- (c) Using a plastic hammer, tap the vane pump shaft to remove the rear housing, wave washer and side rear plate.
- (d) Remove the O-ring from the rear housing.
- (e) Remove the O-ring from the side rear plate.

7. REMOVE CAM RING AND 10 VANE PLATES

NOTICE:

Be careful not to drop the plate.

8. REMOVE VANE PUMP SHAFT WITH VANE PUMP ROTOR AND SIDE FRONT PLATE

9. REMOVE VANE PUMP ROTOR AND SIDE FRONT PLATE

- (a) Using a screwdriver, remove the snap ring from the vane pump shaft.
- (b) Remove the vane pump rotor and side front plate.
- (c) Remove the 2 O-rings from the side front plate.

10. REMOVE SHORTER STRAIGHT PIN

Using pliers, remove the shorter straight pin from the side front plate.

HINT:

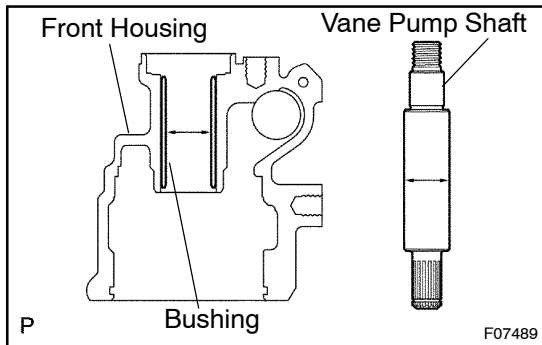
Place a shop rag over the pin to prevent damaging it.

11. REMOVE LONGER STRAIGHT PIN

Using pliers, remove the longer straight pin from the front housing.

HINT:

Place a shop rag over the pin to prevent damaging it.



INSPECTION

1. MEASURE OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

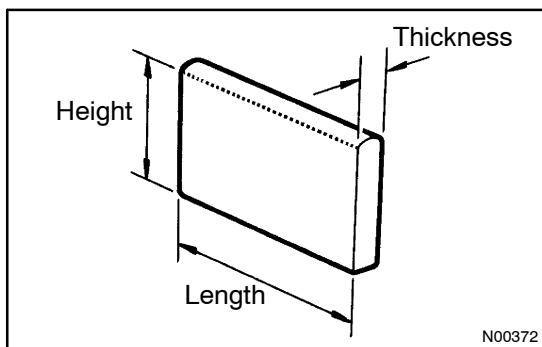
Using a micrometer and a caliper gauge, measure the oil clearance.

Standard clearance:

0.01 – 0.03 mm (0.0004 – 0.0012 in.)

Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the front housing and vane pump shaft.



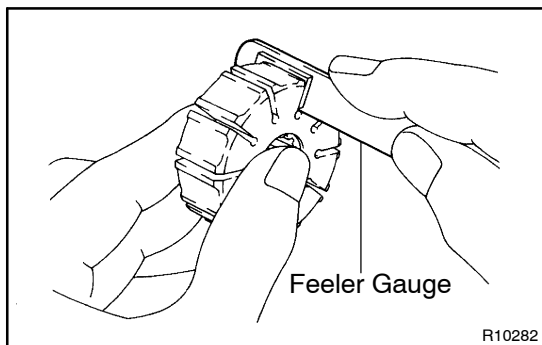
2. INSPECT VANE PUMP ROTOR AND VANE PLATES

- (a) Using a micrometer, measure the height, thickness and length of the 10 vane plates.

Minimum height: 8.1 mm (0.319 in.)

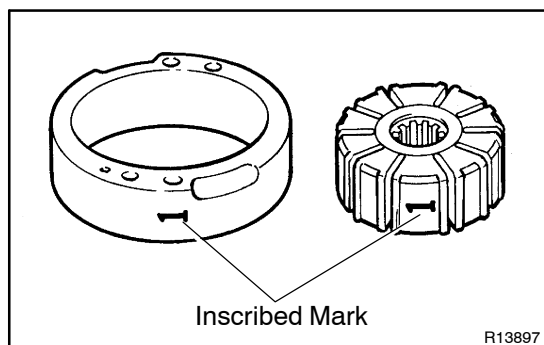
Minimum thickness: 1.797 mm (0.0707 in.)

Minimum length: 14.988 mm (0.5901 in.)



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

Maximum clearance: 0.03 mm (0.0012 in.)



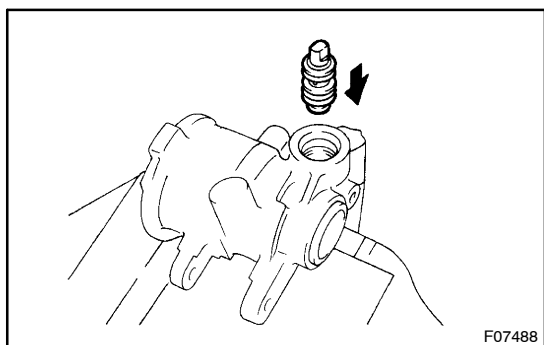
If it is more than the maximum, replace the vane plate and/or vane pump rotor with the one having the same mark stamped on the cam ring.

Inscribed mark: 1, 2, 3, 4 or None

HINT:

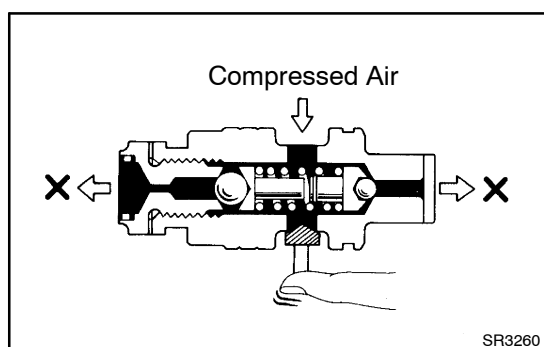
There are 5 vane plate lengths with the following vane pump rotor and cam ring marks:

Vane pump rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
None	44345-12010	14.996 – 14.998 (0.59039 – 0.59047)
1	44345-12020	14.994 – 14.996 (0.59032 – 0.59039)
2	44345-12030	14.992 – 14.994 (0.59024 – 0.59032)
3	44345-12040	14.990 – 14.992 (0.59016 – 0.59024)
4	44345-12050	14.988 – 14.990 (0.59008 – 0.59016)

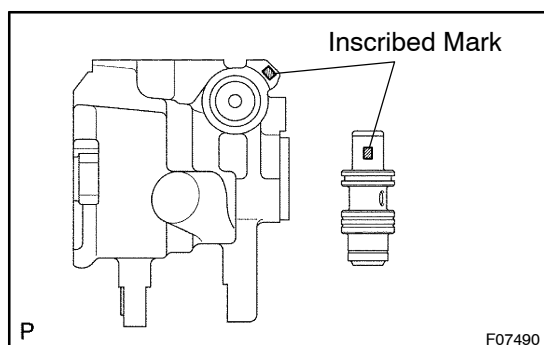


3. INSPECT FLOW CONTROL VALVE

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

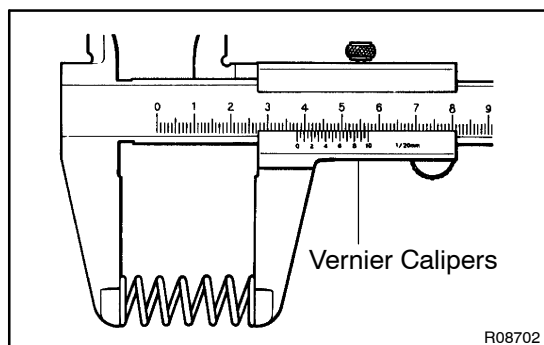


- (b) Check the flow control valve for leakage. Close one of the holes and apply compressed air 392 – 490 kPa (4 – 5 kgf/cm², 57 – 71 psi) into the opposite side hole, and confirm that air does not come out from the end hole.



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

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

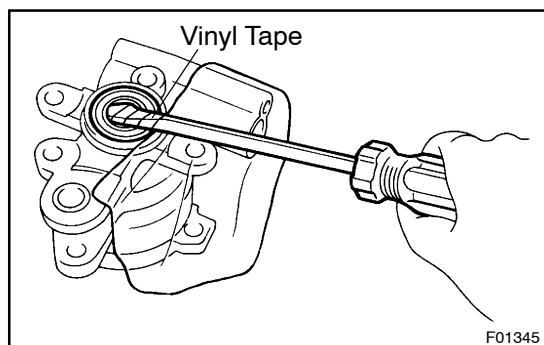


4. INSPECT SPRING

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

Minimum free length: 36.0 mm (1.417 in.)

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



REPLACEMENT

NOTICE:

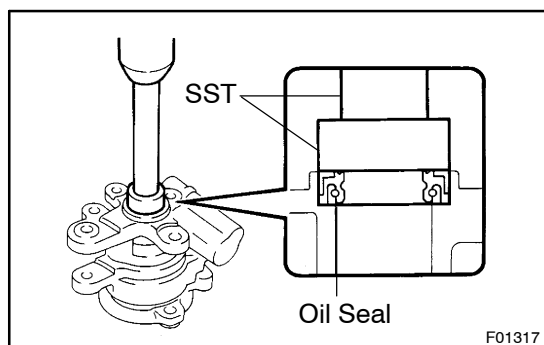
When using a vise, do not overtighten it.

IF NECESSARY, REPLACE OIL SEAL

- (a) Using a screwdriver with vinyl tape wound around its tip, remove the oil seal.

NOTICE:

Be careful not to damage the bushing of the front housing.



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

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

SST 09950-60010 (09951-00320),
09950-70010 (09951-07100)

NOTICE:

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

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID (See page SR-25)

2. INSTALL LONGER STRAIGHT PIN

Using a plastic hammer, tap in a new longer straight pin to the front housing.

NOTICE:

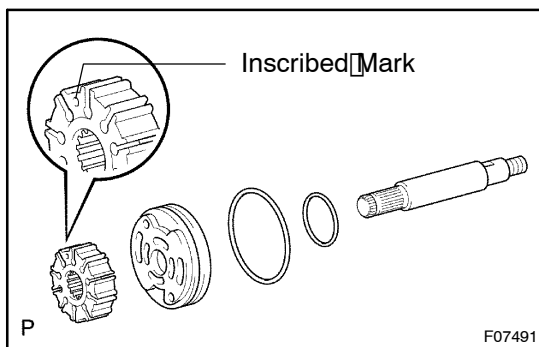
Be careful not to damage the pin.

3. INSTALL SHORTER STRAIGHT PIN

Install a new shorter straight pin to the side front plate.

NOTICE:

Be careful not to damage the pin.



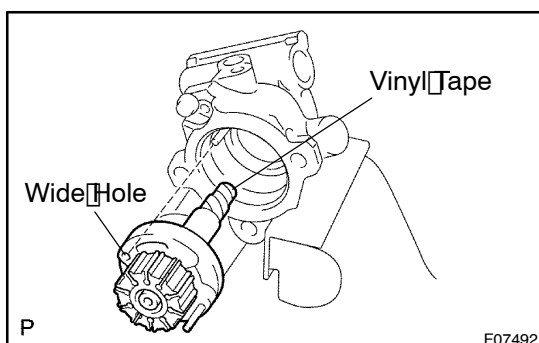
4. INSTALL SIDE FRONT PLATE AND VANE PUMP ROTOR

- (a) Coat 2 new O-rings with power steering fluid and install them to the side front plate.
- (b) Install the side front plate to the vane pump shaft.
- (c) Install the vane pump rotor to the vane pump shaft with the inscribed mark facing outward.

NOTICE:

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

- (d) Using snap ring pliers, install a new snap ring to the vane pump shaft.

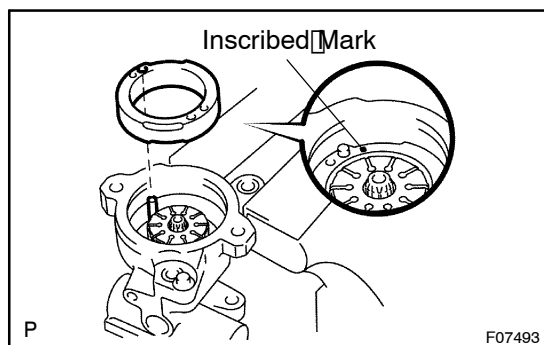


5. INSTALL VANE PUMP SHAFT WITH VANE PUMP ROTOR AND SIDE FRONT PLATE

- (a) Wind vinyl tape to the control valve shaft.
- (b) Align the wide hole of the side front plate and longer straight pin, and tap in the vane pump shaft with a plastic hammer.

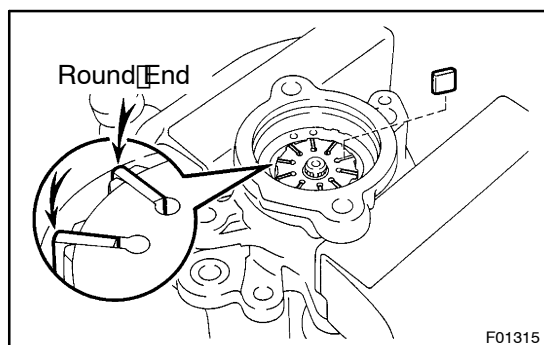
NOTICE:

Be careful not to damage the oil seal and O-rings.



6. INSTALL CAM RING

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

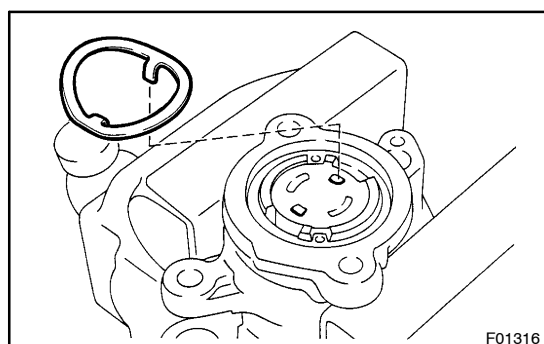


7. INSTALL 10 VANE PLATES

Install the 10 vane plates with the round end facing outward.

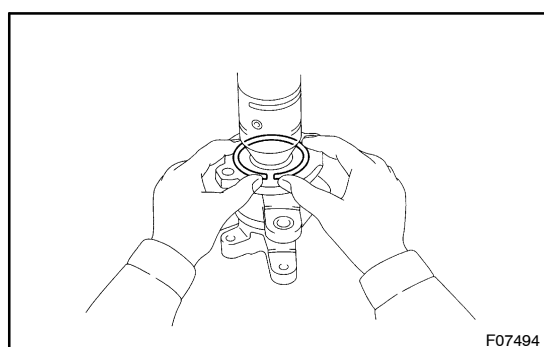
8. INSTALL SIDE REAR PLATE

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



9. INSTALL WAVE WASHER

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



10. INSTALL REAR HOUSING

- Coat a new O-ring with power steering fluid and install it to the rear housing.
- Apply just enough pressure to compress the wave washer, and install a new snap ring to the front housing.

11. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

- Install the spring.
- Install the flow control valve facing in the correct direction (See page SR-25).

- Coat a new O-ring with power steering fluid and install it to the pressure port union.
- Install the pressure port union.

Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

12. INSTALL SUCTION PORT UNION

- Coat a new O-ring with power steering fluid and install it to the suction port union.
- Install the suction port union with the bolt.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

13. INSTALL FRONT BRACKET

Install the front bracket with the 2 bolt.

Torque:

Upper side: 13 N·m (130 kgf·cm, 9 ft·lbf)

Lower side: 41 N·m (420 kgf·cm, 30 ft·lbf)

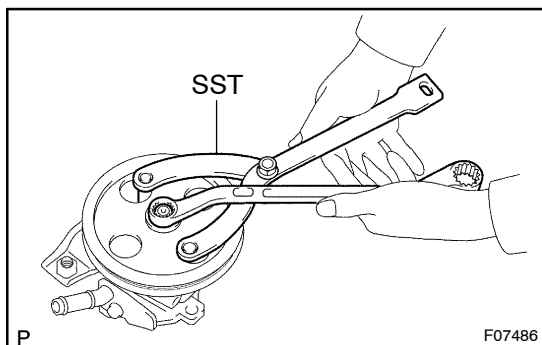
14. INSTALL VANE PUMP PULLEY

(a) Install the woodruff key to the vane pump shaft.

(b) Install the vane pump pulley and nut to the vane pump shaft.

(c) Using SST, stop the pulley rotating and torque the nut.
SST 09960-10010 (09962-01000, 09963-01000)

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

15. MEASURE PS VANE PUMP ROTATING TORQUE
(See page SR-28)

INSTALLATION

1. INSTALL PS VANE PUMP ASSEMBLY

Temporarily install the PS Vane pump assembly with the 2 pump assembly set bolts.

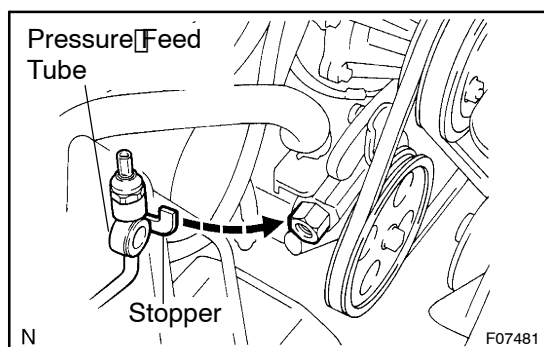
2. INSTALL DRIVE BELT

- (a) Install the drive belt and adjust the drive belt tension (See page SR-3).
- (b) Torque the 2 pump assembly set bolts.

Torque:

Upper side: 39 N·m (400 kgf·cm, 29 ft·lbf)

Lower side: 58 N·m (590 kgf·cm, 43 ft·lbf)



3. CONNECT PRESSURE FEED TUBE

- (a) Install a new gasket, then connect pressure feed tube with the union bolt.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

HINT:

Make sure that the stopper of the pressure feed tube touches the pressure port union as shown in the illustration, then torque the union bolt.

- (b) Connect the oil pressure switch connector.

4. CONNECT RETURN HOSE

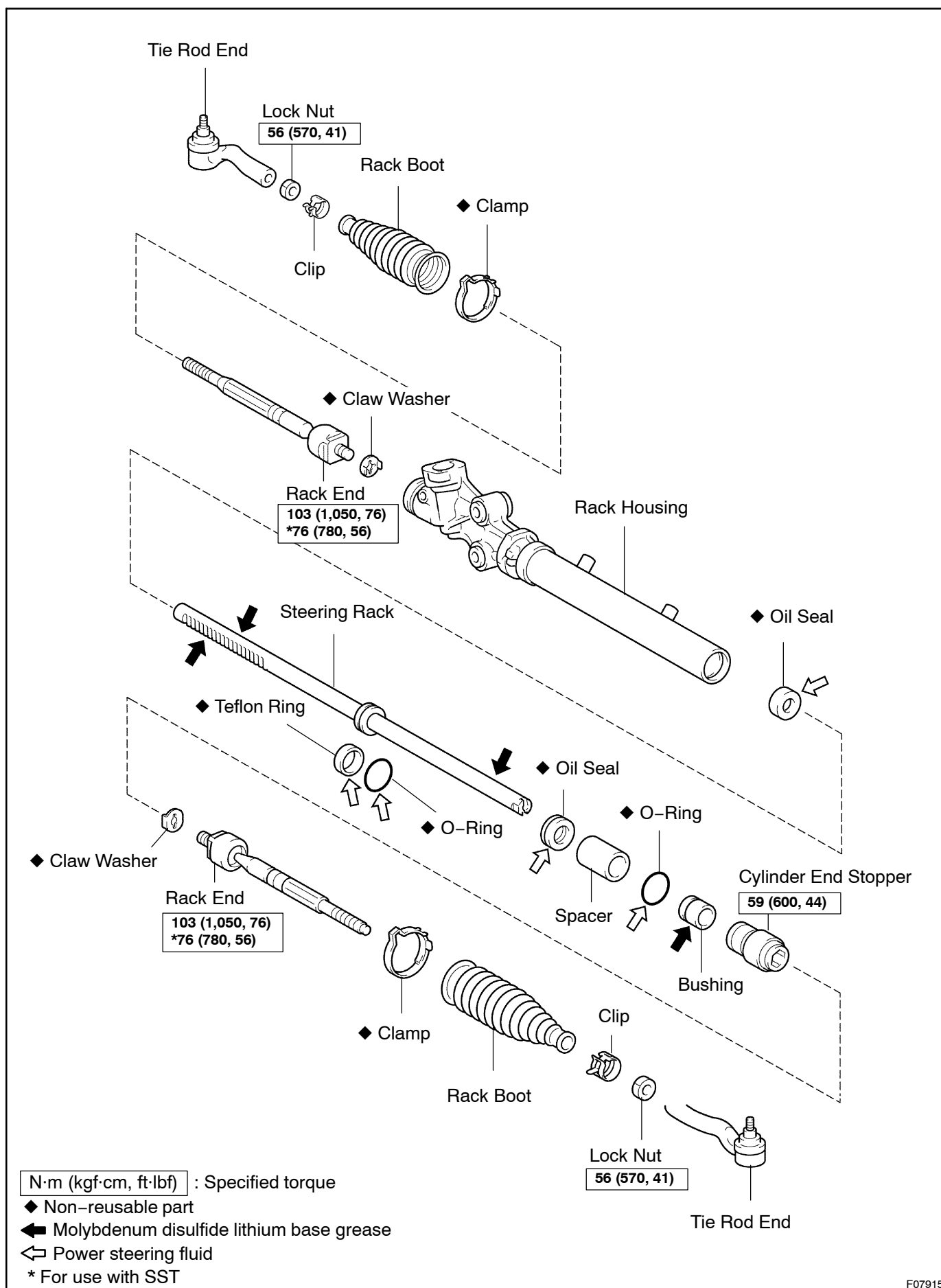
Connect the return hose with the clip.

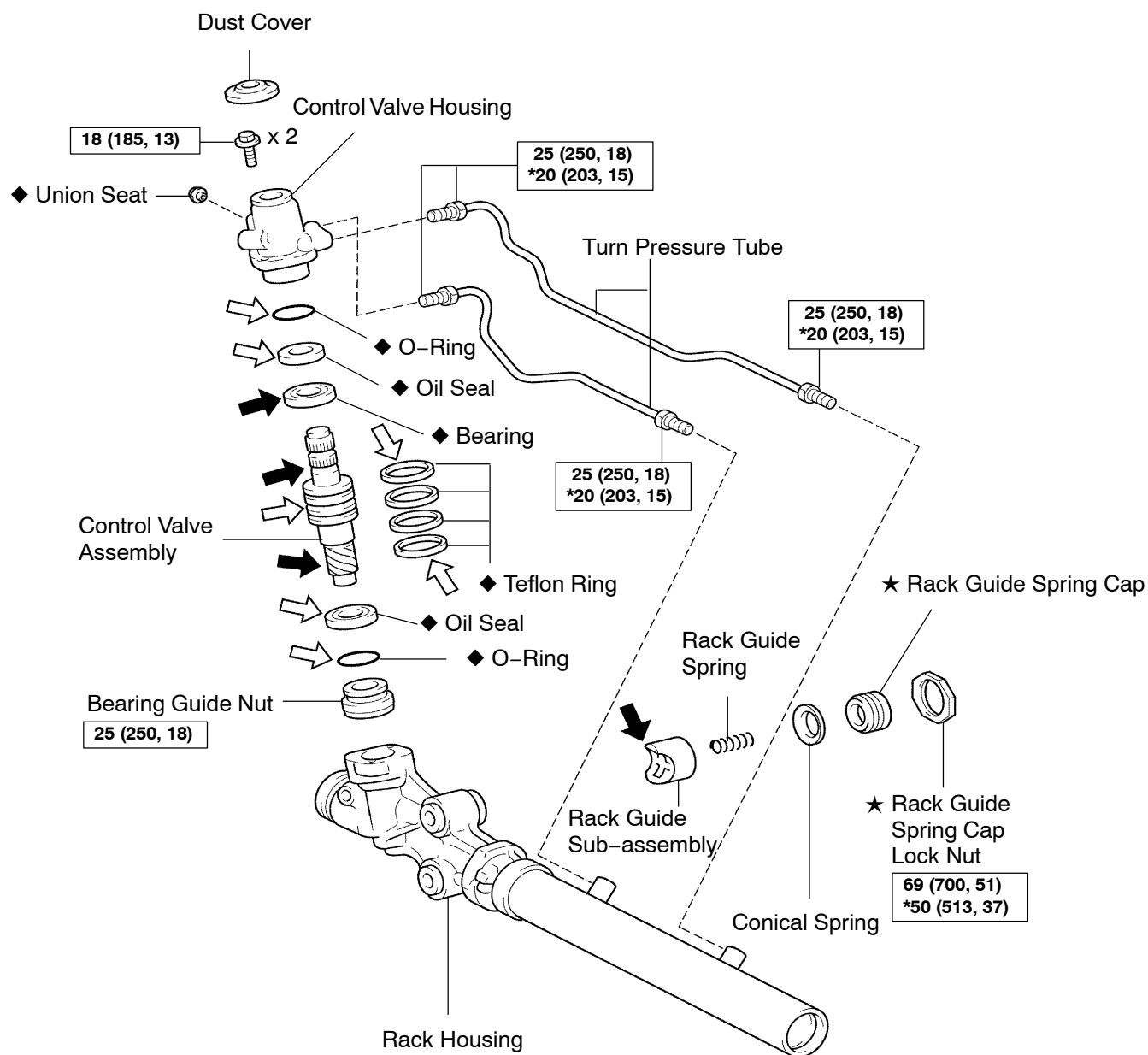
5. BLEED POWER STEERING SYSTEM

(See page SR-5)

SR03V-03







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

◆ Non-reusable part

★ Precoated part

◀ Molybdenum disulfide lithium base grease

⇌ Power steering fluid

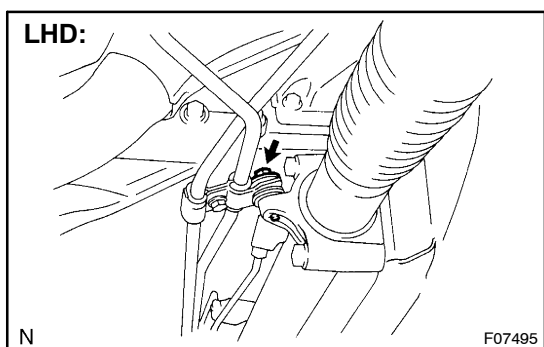
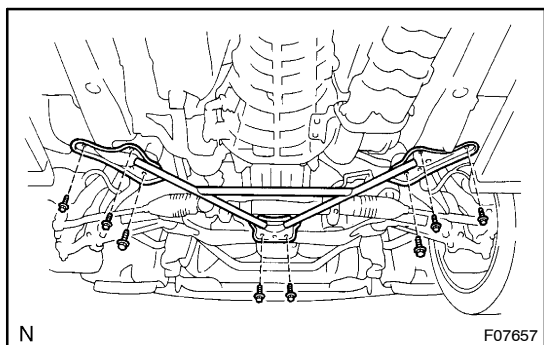
* For use with SST

REMOVAL

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
2. REMOVE STEERING WHEEL PAD (See page SR-12)
3. REMOVE STEERING WHEEL (See page SR-12)
4. REMOVE RH AND LH FRONT BRAKE CALPERS (See page BR-26)
5. DISCONNECT RH AND LH TIE ROD ENDS (See page SA-32)
6. DISCONNECT SLIDING YOKE (See page SR-12)

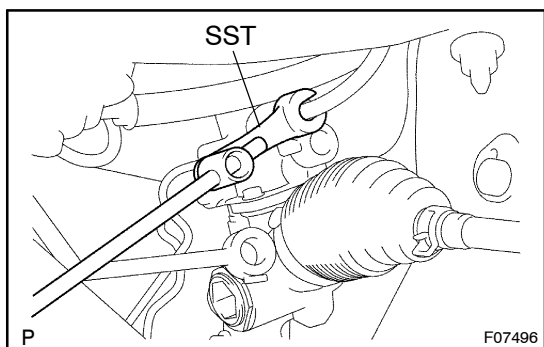
7. REMOVE FRONT SUSPENSION MEMBER BRACE

Remove the 7 bolts and front suspension member brace.



8. DISCONNECT PRESSURE FEED TUBE

- (a) LHD:
Remove the bolt and disconnect the pressure feed tube clamp.
- (b) Remove the union bolt and gasket, and disconnect the pressure feed tube.



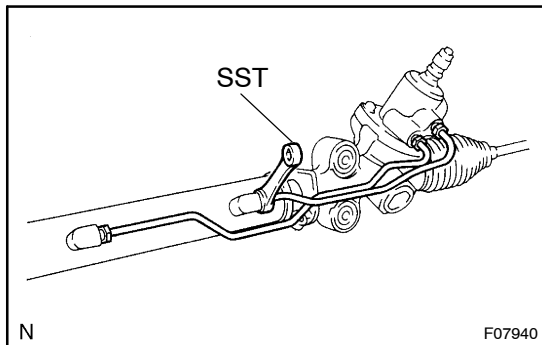
9. DISCONNECT RETURN TUBE

Using SST, disconnect the rerurn tube.

SST 09631-22020

10. REMOVE PS GEAR ASSEMBLY, BRACKET AND GROMMET

Remove the 4 bolts, PS gear assembly, bracket and grommet.



DISASSEMBLY

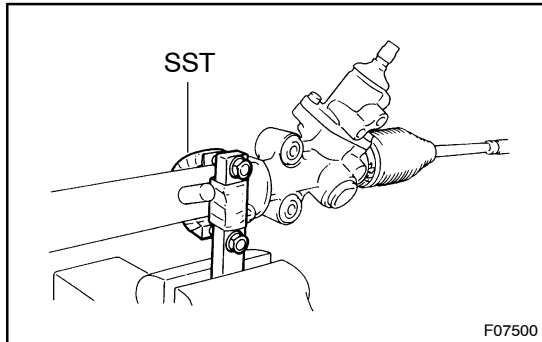
NOTICE:

When using a vise, do not overtighten it.

1. REMOVE 2 TURN PRESSURE TUBES

Using SST, remove the 2 turn pressure tubes.

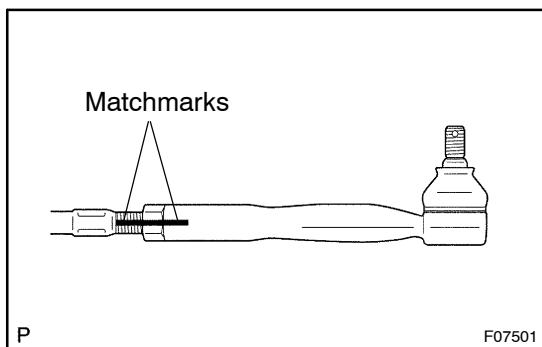
SST 09633-00020



2. SECURE PS GEAR ASSEMBLY IN VISE

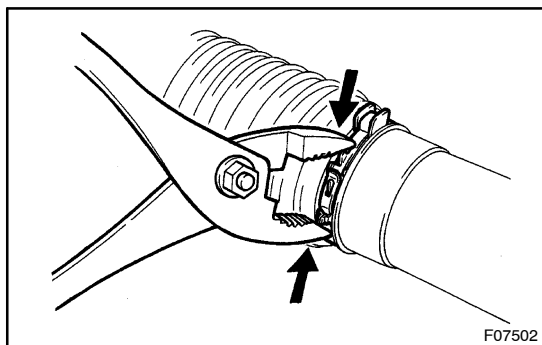
Using SST, secure the PS gear assembly in a vise.

SST 09612-00012



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

- Place matchmarks on the tie rod end and rack end.
- Loosen the lock nut, and remove the tie rod end and lock nut.
- Employ the same manner described above to the other side.



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

- Using pliers, loosen the clamp as shown in the illustration.
- Remove the clamp, clip and rack boot.

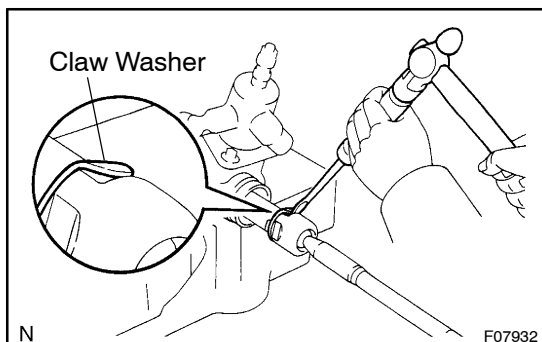
NOTICE:

Be careful not to damage the boot.

HINT:

Mark the RH and LH rack boots.

- Employ the same manner described above to the other side.

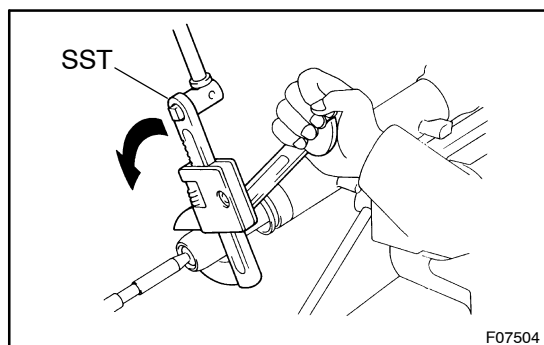


5. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

- Using a screwdriver and a hammer, unstake the washer.

NOTICE:

Avoid any impact on the steering rack.



- (b) Using a spanner, hold the steering rack steadily and using SST, remove the rack end.
SST 09922-10010

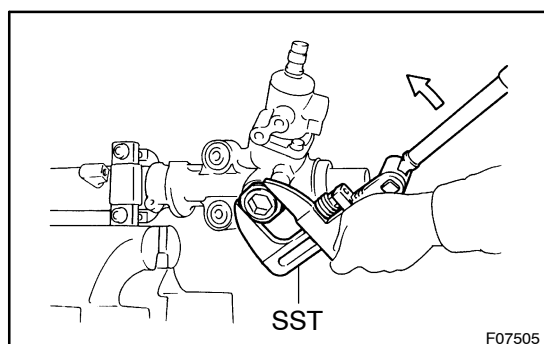
NOTICE:

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

HINT:

Mark the RH and LH rack ends.

- (c) Remove the claw washer.
(d) Employ the same manner described above to the other side.

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

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

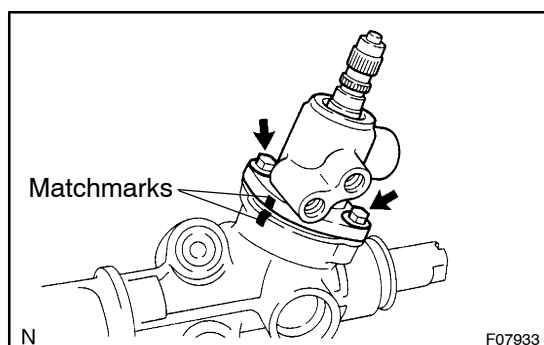
SST 09922-10010

NOTICE:

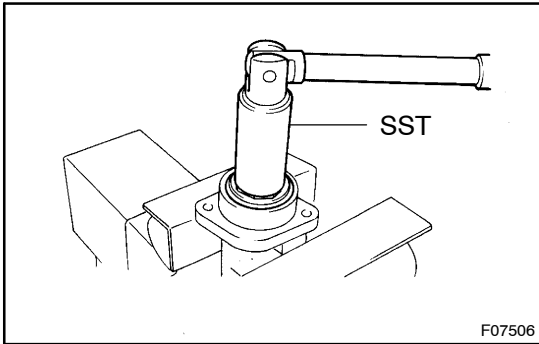
Use SST 09922-10010 in the direction shown in the illustration.

7. REMOVE RACK GUIDE SPRING CAP, CONICAL SPRING, RACK GUIDE SPRING AND RACK GUIDE SUB-ASSEMBLY

- (a) Using a hexagon wrench (24 mm), remove the rack guide spring cap.
(b) Remove the conical spring, rack guide spring and rack guide sub-assembly.

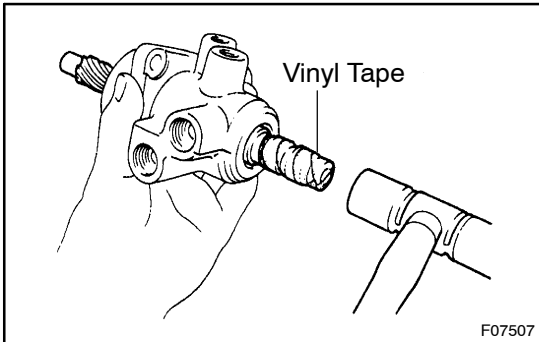
8. REMOVE DUST COVER**9. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY**

- (a) Place matchmarks on the control valve housing and rack housing.
(b) Remove the 2 bolts and pull out the control valve housing with control valve assembly.
(c) Remove the O-ring from the control valve housing.



10. REMOVE BEARING GUIDE NUT AND CONTROL VALVE ASSEMBLY

- (a) Using SST, loosen the bearing guide nut.
SST 09631-20060

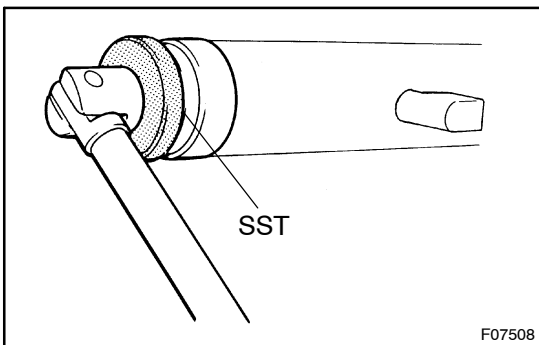


- (b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.
- (c) Using a plastic hammer, tap out the control valve assembly with the bearing guide nut from the control valve housing.

NOTICE:

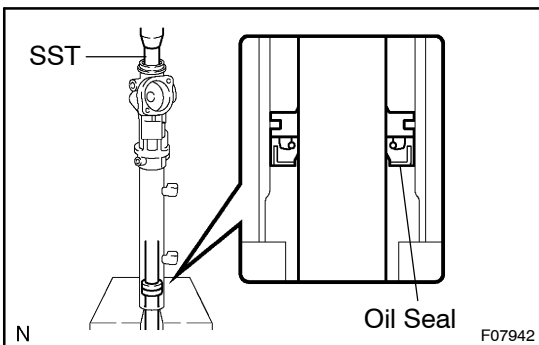
Be careful not to damage the oil seal lip

- (d) Remove the bearing guide nut from the control valve assembly.
- (e) Remove the O-ring from the bearing guide nut.



11. REMOVE CYLINDER END STOPPER AND SPACER

- (a) Using SST, remove the cylinder end stopper.
SST 09631-20090
- (b) Remove the O-ring from the cylinder end stopper.
- (c) Remove the spacer.



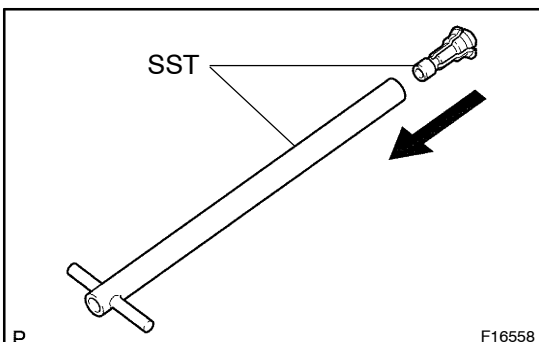
12. REMOVE STEERING RACK WITH OIL SEAL

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

NOTICE:

Take care not to drop the steering rack.

- (b) Remove the oil seal from the steering rack.

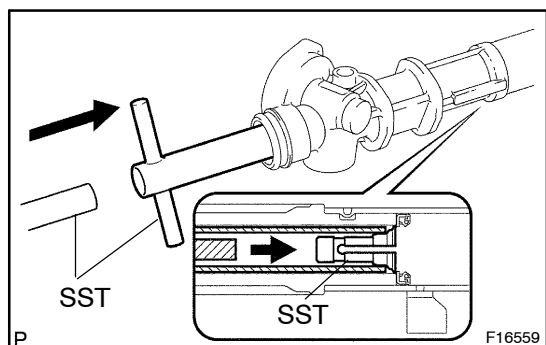


13. REMOVE OIL SEAL

- (a) Install SST (09612-07130) on SST (09612-07210).
SST 09612-70100 (09612-07130, 09612-07210)

NOTICE:

- Before using them, apply a small dab of grease to the inside wall of SST (09612-07210, 09612-07130).
- To prevent the inside of the housing from being damaged securely install SST 09612-07130 on SST (09612-07210).

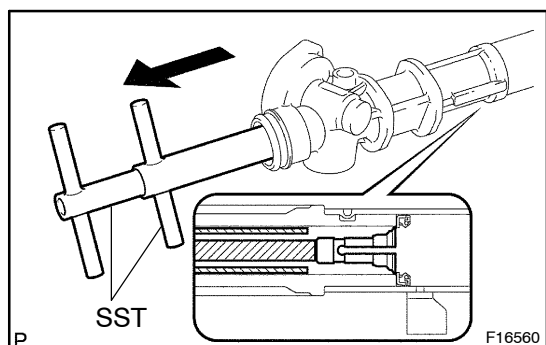


- (b) Diagonally insert SST (09612-07210) into the housing until it contacts with the oil seal, and then insert the SST (09612-07220) until the tip of SST (09612-07220) contacts with SST (09612-07130).

SST 09612-70100 (09612-07130, 09612-07210, 09612-07220)

NOTICE:

Do not damage the inside of the housing.



- (c) Secure SST (09612-07220), and pull SST (09612-07210) to place SST (09612-07130) in the housing.

SST 09612-70100 (09612-07130, 09612-07210, 09612-07220)

HINT:

Place SST on the chamfering position between the oil seal and rack housing.

- (d) Remove the SST (09612-07210, 09612-07220).

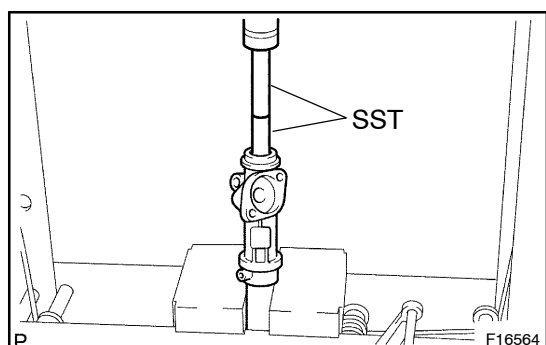
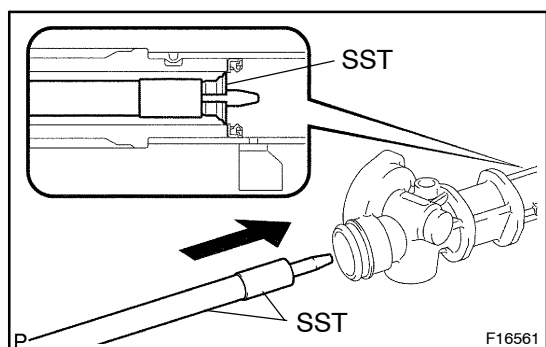
SST 09612-70100 (09612-07210, 09612-07220)

- (e) After installing SST (09612-07240) on SST (09612-07210), insert the tip of SST (09612-07230) in the service hole of SST (09612-07130).

SST 09612-70100 (09612-07130, 09612-07230, 09612-07240)

NOTICE:

- Before using them, apply a small dab of grease to the tip of SST (09612-07230).
- To prevent SST (09612-07130) from being damaged, be sure to install SST (09612-07240).
- Do not damage the inside of the rack housing.



- (f) Install SST (09951-07100) on SST (09612-07230) and remove the oil seal using a press.

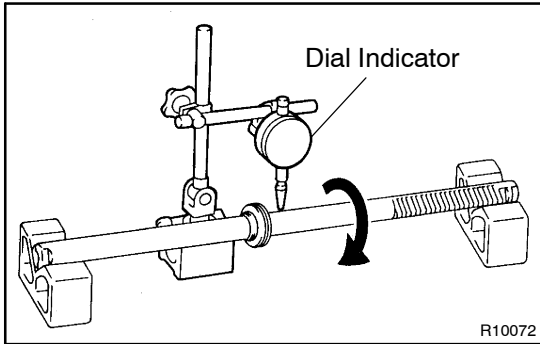
SST 09612-70100 (09612-07130, 09612-07230, 09612-07240), 09950-70010 (09951-07100)

NOTICE:

Do not damage the rack housing.

HINT:

Replace SST (09951-07100) with SST that is different in length in the set, if necessary.



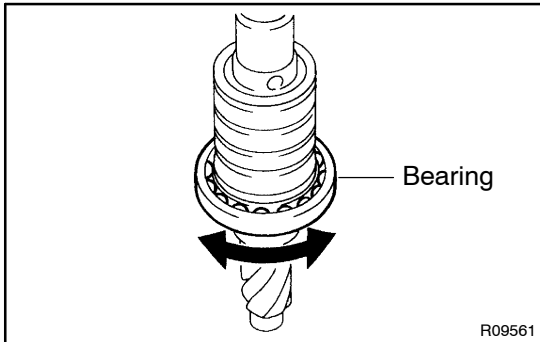
INSPECTION

1. INSPECT STEERING RACK

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

Maximum runout: 0.15 mm (0.0059 in.)

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

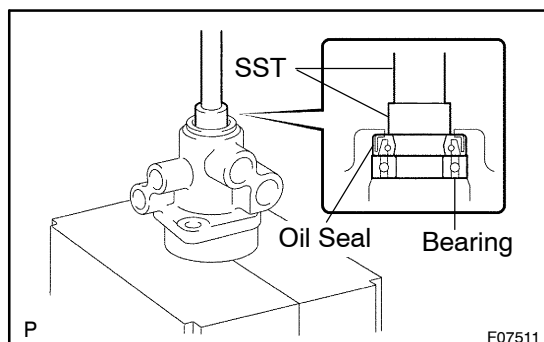


2. INSPECT BEARING

- (a) Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the control valve assembly.

- (b) Coat the bearing with molybdenum disulfide lithium base grease.



REPLACEMENT

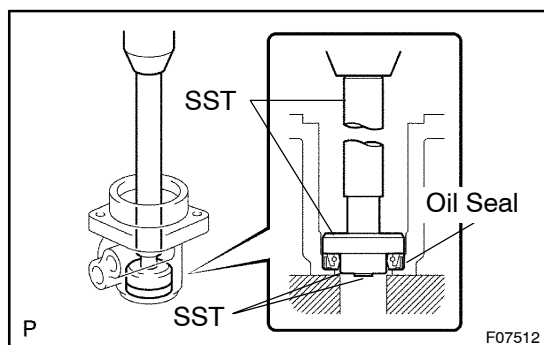
NOTICE:

When using a vise, do not overtighten it.

1. IF NECESSARY, REPLACE OIL SEAL AND BEARING

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

SST 09950-60010 (09951-00240),
09950-70010 (09951-07100)



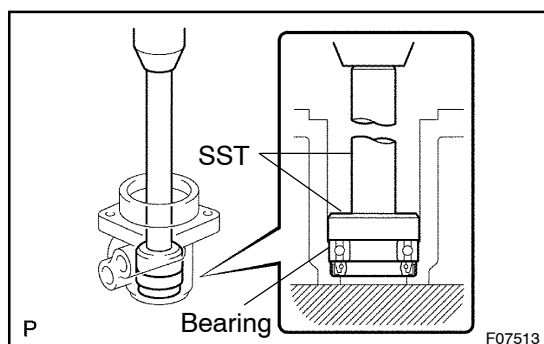
- (b) Coat a new oil seal lip with power steering fluid.

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

SST 09950-60010 (09951-00180, 09951-00320,
09952-06010), 09950-70010 (09951-07150)

NOTICE:

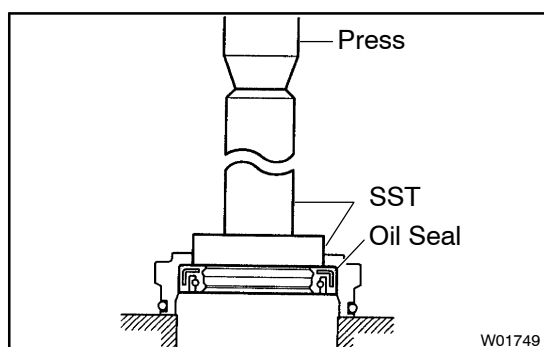
Make sure that the oil seal is installed facing in the correct direction.



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

- (e) Using SST, press in the bearing.

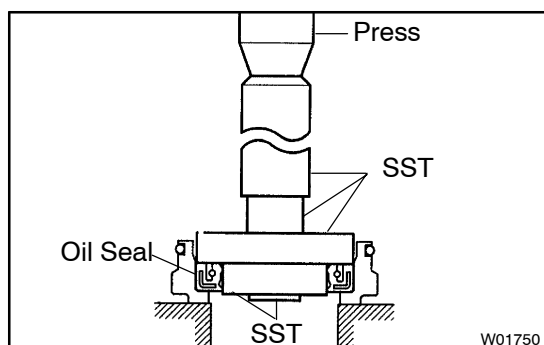
SST 09950-60010 (09951-00340),
09950-70010 (09951-07150)



2. IF NECESSARY, REPLACE OIL SEAL

- (a) Using SST, press out the oil seal from the bearing guide nut.

SST 09950-60010 (09951-00310),
09950-70010 (09951-07100)



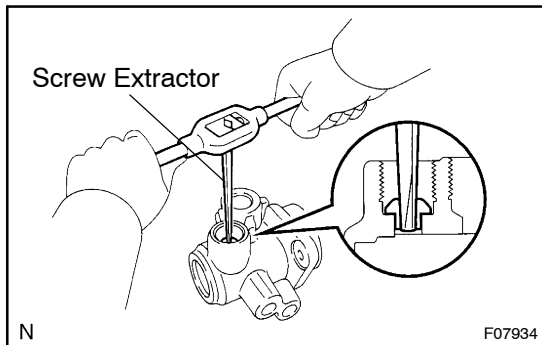
- (b) Coat a new oil seal lip with power steering fluid.

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

SST 09950-60010 (09951-00250, 09951-00360,
09952-06010), 09950-70010 (09951-07100)

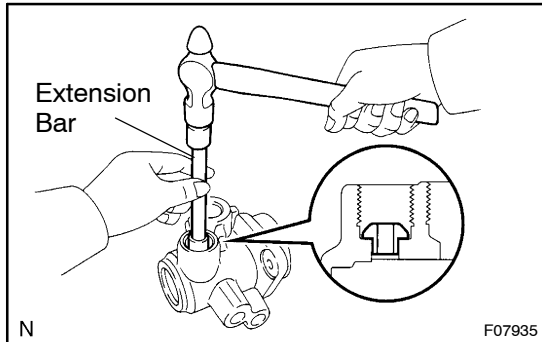
NOTICE:

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

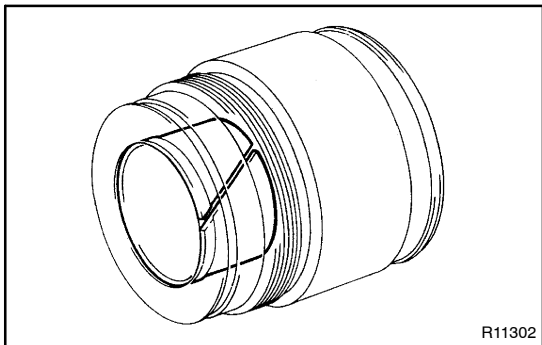


3. IF NECESSARY, REPLACE UNION SEAT

- (a) Using a screw extractor, remove the union seat from the control valve housing.

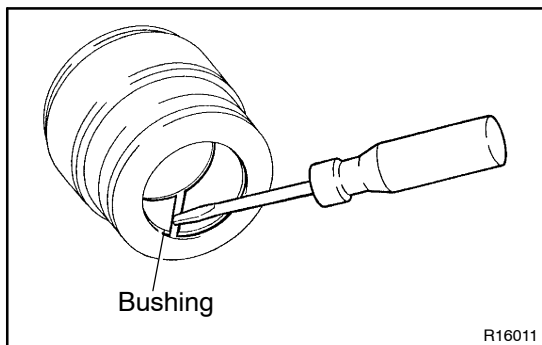


- (b) Using a plastic hammer and extension bar, lightly tap in a new union seat.



4. INSPECT BUSHING

- (a) Check the inside of the bushing of the cylinder end stopper for cracks. If faulty, replace the bushing.
- (b) Apply molybdenum disulfide lithium base grease to the inside of the bushing.



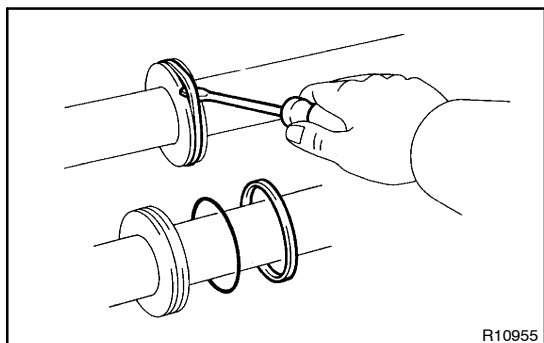
5. IF NECESSARY, REPLACE BUSHING

- (a) Using a screwdriver, remove the bushing from the cylinder end stopper.

NOTICE:

Be careful not to damage the cylinder end stopper.

- (b) Coat the inside of a new bushing with molybdenum disulfide lithium base grease.
- (c) Install the bushing.



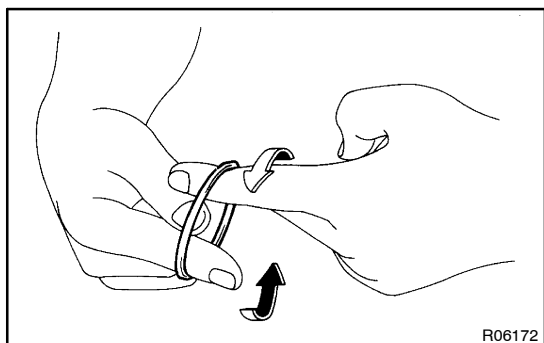
6. IF NECESSARY, REPLACE TEFLON RING AND O-RING

- (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.

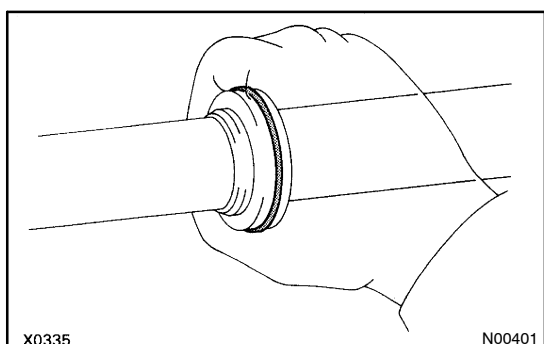
- (b) Coat a new O-ring with power steering fluid and install it to the steering rack.



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

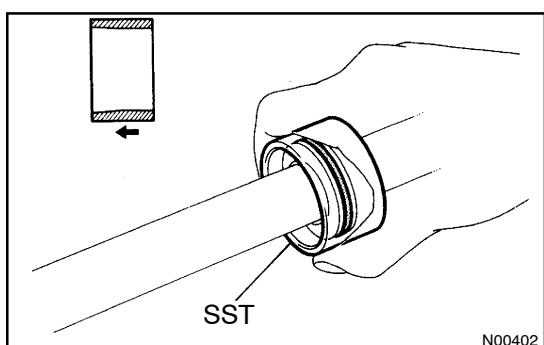
NOTICE:

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.

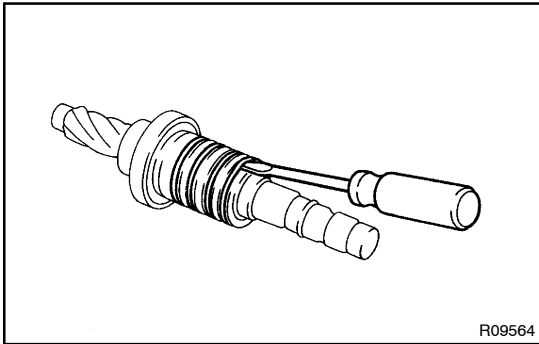


- (f) Carefully slide the tapered end of SST over the teflon ring until it fits to the steering rack.

SST 09630-24014 (09620-24051)

NOTICE:

Be careful not to damage the teflon ring.

**7. IF NECESSARY, REPLACE 4 TEFLON RINGS**

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

NOTICE:

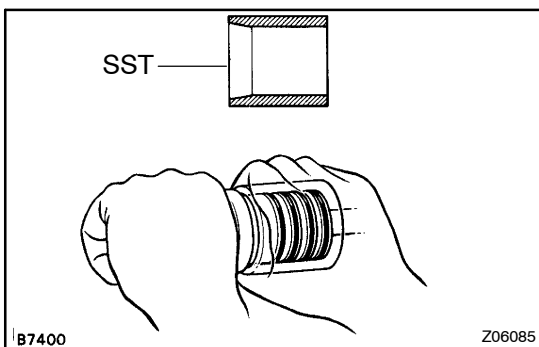
Be careful not to damage the grooves for the teflon ring.

- (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:

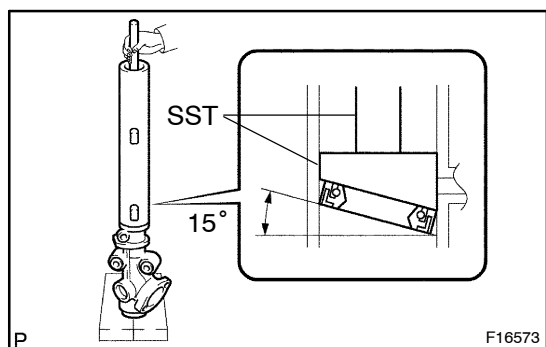
Be careful not to damage the teflon rings.

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-38)



2. INSTALL OIL SEAL

- (a) Apply power steering fluid to a new oil seal, and install the oil seal on the rack housing at an angle.

NOTICE:

Install the oil seal in the correct direction.

HINT:

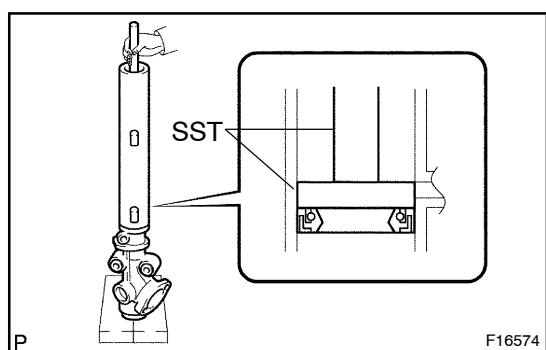
Install the oil seal so that the port faces downward with approx. 15 degrees.

- (b) Using SST, push in the oil seal by hand until it passes through the 2 ports.

SST 09631-00180, 09950-70010 (09951-07360)

NOTICE:

Do not turn SST when inserting the oil seal.

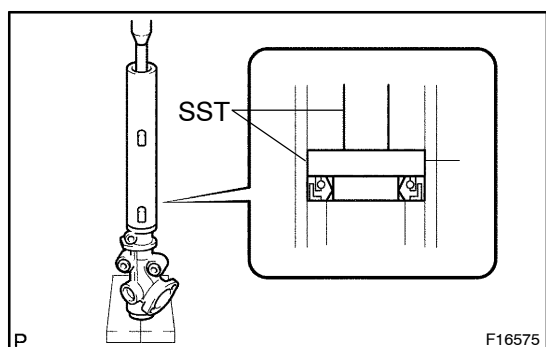


- (c) After the oil seal has passed through the ports, push in the oil seal by hand until it becomes level, using SST.

SST 09950-60010 (09951-00430), 09950-70010 (09951-07360)

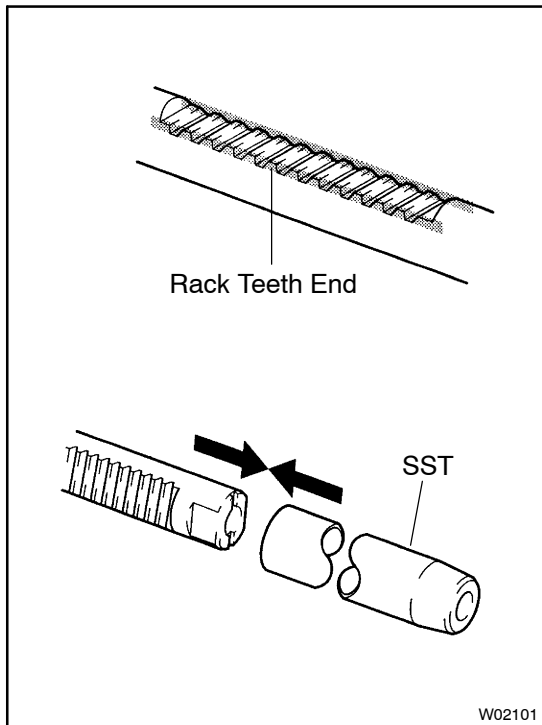
NOTICE:

When SST is set, do not damage the inside surface of the rack housing.



- (d) After the oil seal has become level, using SST and press, install the oil seal.

SST 09950-60010 (09951-00430), 09950-70010 (09951-07360)



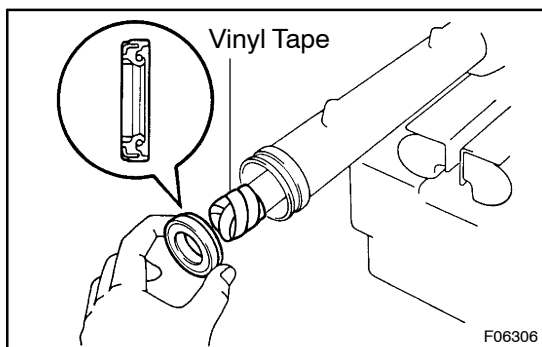
3. INSTALL STEERING RACK

- (a) Install SST to the rack.
SST 09631-33010

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 09631-33010

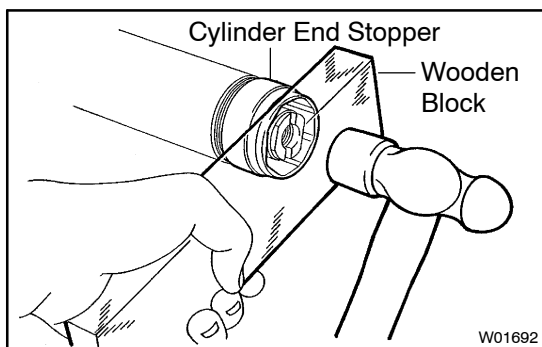


4. INSTALL OIL SEAL

- (a) Coat a new oil seal lip with power steering fluid.
- (b) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
- (c) Install the oil seal by pushing it into the rack housing without tilting.

NOTICE:

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

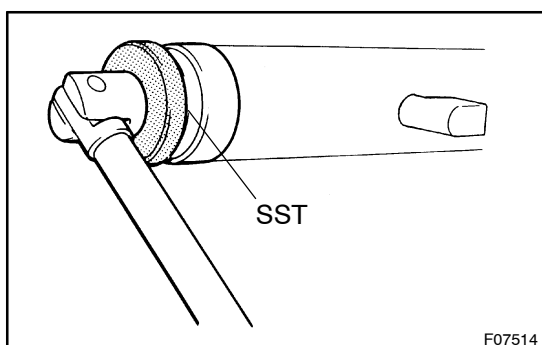


5. INSTALL CYLINDER END STOPPER AND SPACER

- (a) Install the spacer.
- (b) Coat a new O-ring with power steering fluid and install it to the cylinder end stopper.
- (c) Using a wooden block and hammer, drive in the cylinder end stopper until it is tightly installed.

NOTICE:

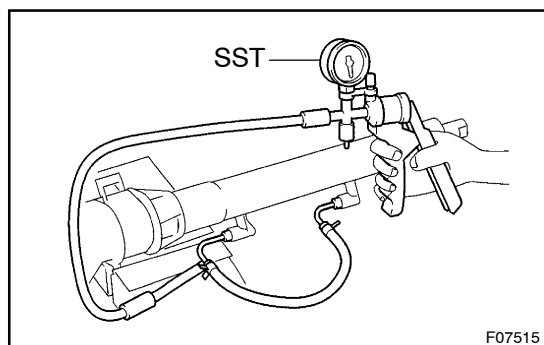
Be careful not to damage the O-ring.



- (d) Using SST, torque the cylinder end stopper.

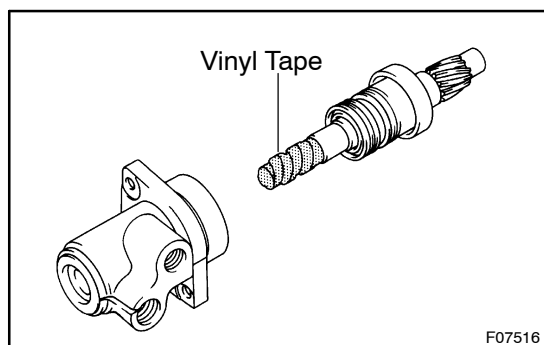
SST 09631-20090

Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)



6. AIR TIGHTNESS TEST

- Install SST to the rack housing.
SST 09631-12071
 - Apply 53 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.
 - Check that there is no change in the vacuum.
- If there is a change in the vacuum, check the installation of the oil seals.

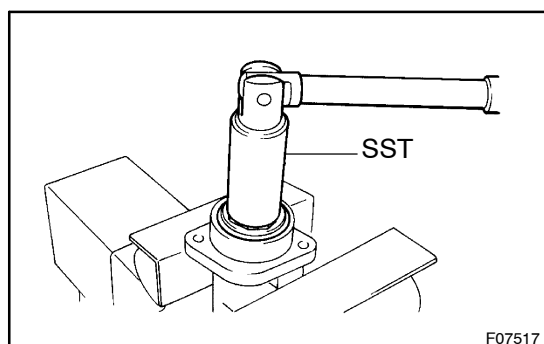


7. INSTALL CONTROL VALVE ASSEMBLY

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

NOTICE:

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

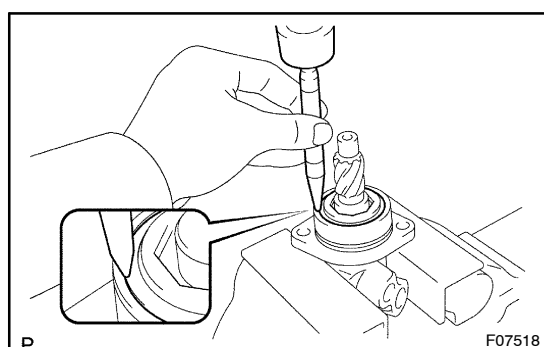


8. INSTALL BEARING GUIDE NUT

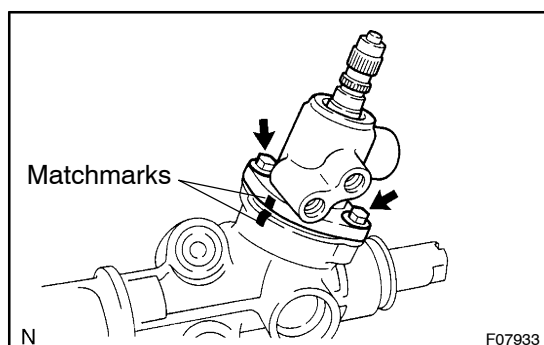
- Coat a new O-ring with power steering fluid, and install it to the bearing guide nut.
- Using SST, install the bearing guide nut.
SST 09631-20060
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

NOTICE:

Be careful not to damage the oil seal lip.



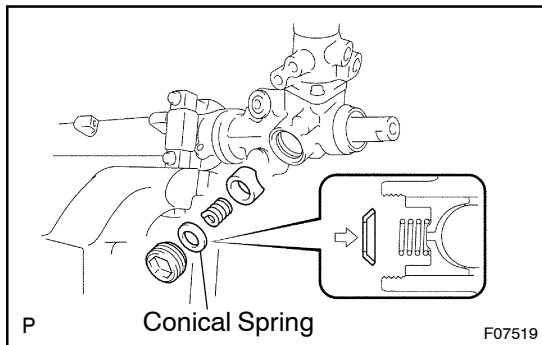
- Using a punch, stake the bearing guide nut.



9. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

- Coat a new O-ring with power steering fluid, and install it to the control valve housing.
- Align the matchmarks on the valve housing and rack housing.
- Install the 2 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

10. INSTALL DUST COVER



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

- (a) Install the rack guide sub-assembly, rack guide spring and conical spring.

NOTICE:

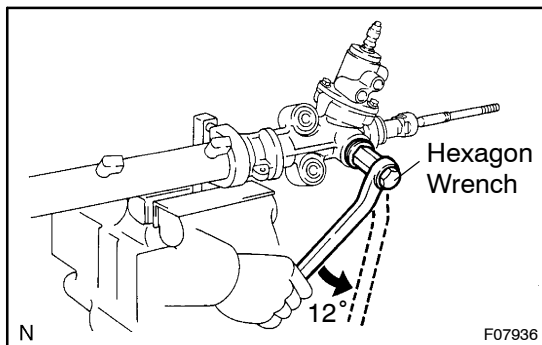
Make sure that the conical spring is installed facing in the correct direction.

- (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.



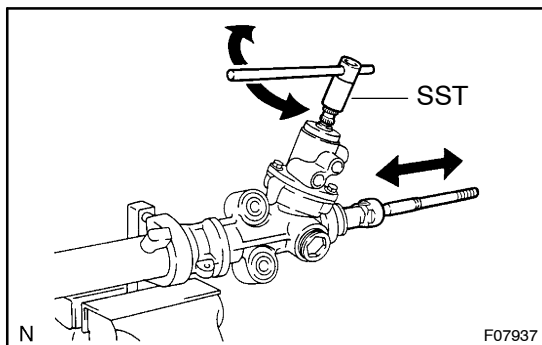
12. ADJUST TOTAL PRELOAD

- (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 (24 mm), torque the rack guide spring cap.

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

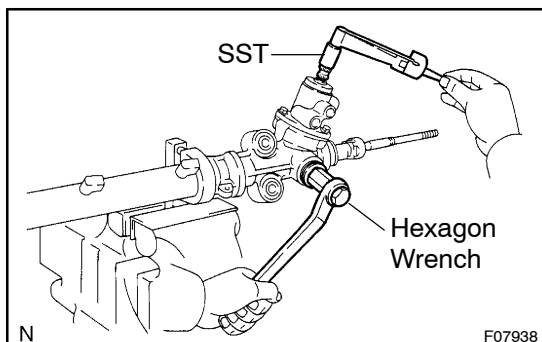
- (c) Using a hexagon wrench (24 mm), return the rack guide spring cap 12°.



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

SST 09616-00010

- (e) Using a hexagon wrench (24 mm), loosen the rack guide spring cap until the rack guide spring is not functioning.

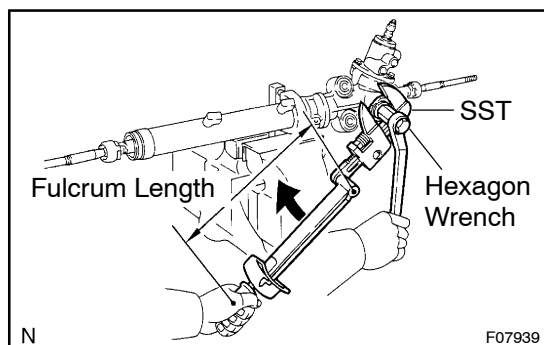


- (f) Using SST, a torque wrench and hexagon wrench (24 mm), tighten the rack guide spring cap until the preload is within the specification.

SST 09616-00010

Preload (turning):

1.15 - 1.95 N·m (11.7 - 19.9 kgf·cm, 10.2 - 17.3 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 (24 mm), hold the rack guide spring cap and using SST, torque the rack guide spring cap lock nut.

SST 09922-10010

Torque: 50 N·m (513 kgf·cm, 37 ft·lbf)

NOTICE:

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

HINT:

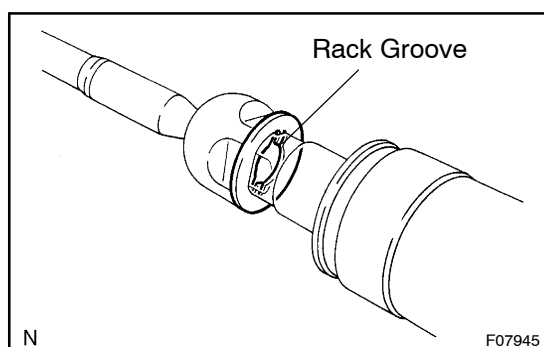
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

- (d) Recheck the total preload.

Preload (turning):

1.15 – 1.95 N·m (11.7 – 19.9 kgf·cm, 10.2 – 17.3 in.·lbf)

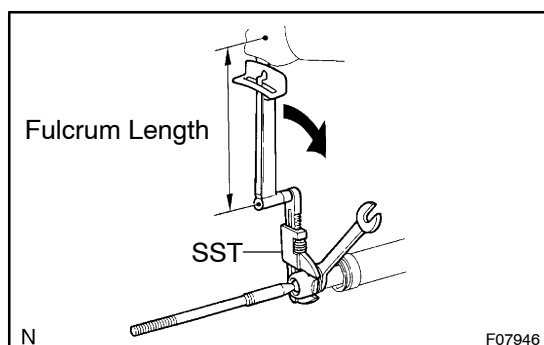
- (e) Remove the RH and LH rack ends.

**14. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS**

- (a) Install a new claw washer, and temporarily install the rack end.

HINT:

Align the claws of the claw washer with the steering rack grooves.



- (b) Using a spanner, hold the steering rack steadily and using SST, torque the rack end.

SST 09922-10010

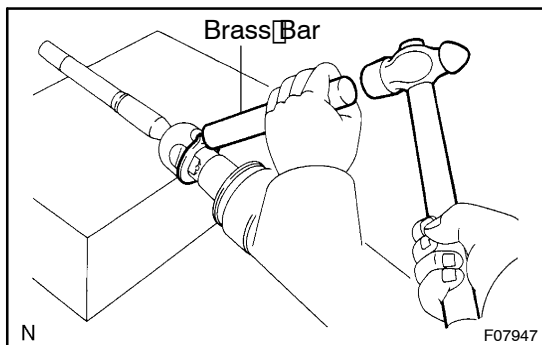
Torque: 76 N·m (780 kgf·cm, 56 ft·lbf)

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.).

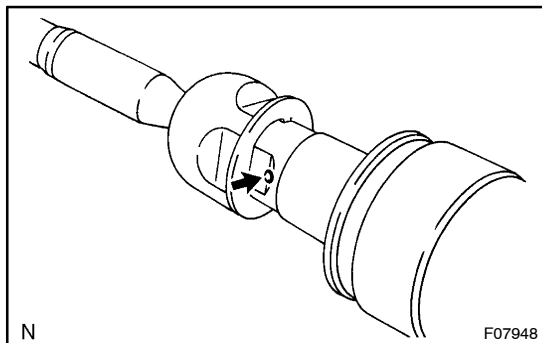


(c) Using a brass bar and a hammer, stake the washer.

NOTICE:

Avoid any impact on the steering rack.

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



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

(a) Ensure that the steering rack 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.

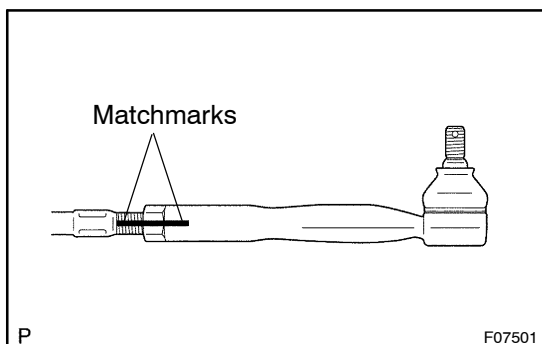
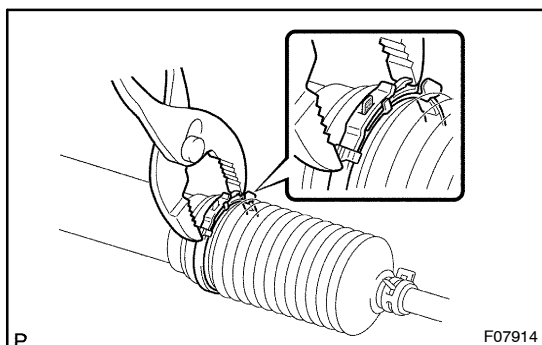
(b) Install the boot, clip and a new clamp.

NOTICE:

Be careful not to damage or twist the boot.

(c) Tighten the clamp as shown in the illustration.

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



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

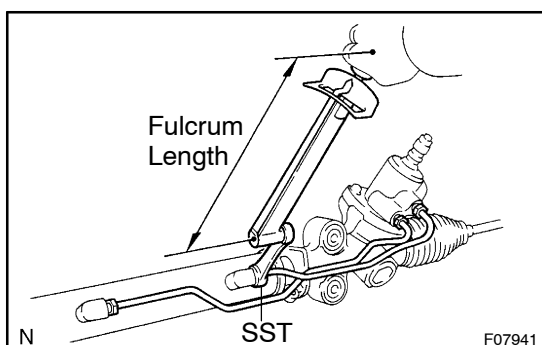
(a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.

(b) After adjusting toe-in, torque the nut

(See page SA-5)

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

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



17. INSTALL 2 TURN PRESSURE TUBES

Using SST, install the 2 turn pressure tubes.

SST 09633-00020

Torque: 20 N·m (203 kgf·cm, 15 ft·lbf)

HINT:

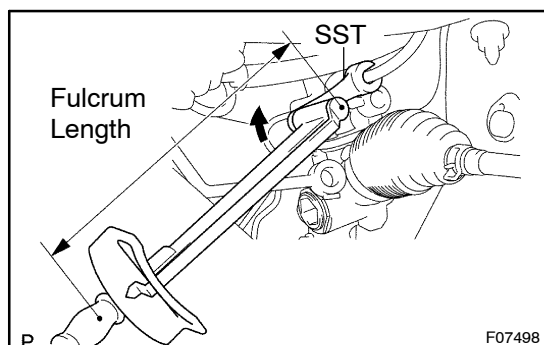
- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

INSTALLATION

1. INSTALL GROMMET, BRACKET AND PS GEAR ASSEMBLY

Install the grommet, bracket and PS gear assembly with the 4 bolts.

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



2. CONNECT RETURN TUBE

Using SST, connect the return tube.

SST 09631-22020

Torque: 37 N·m (374 kgf·cm, 27 ft·lbf)

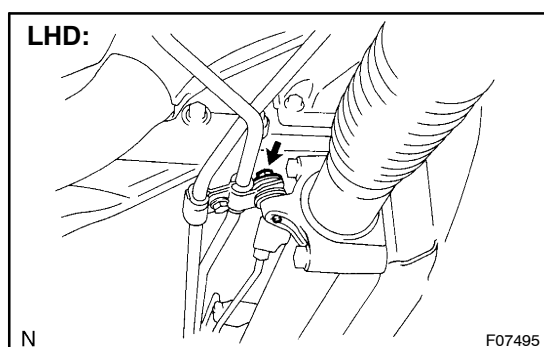
HINT:

- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

3. CONNECT PRESSURE FEED TUBE

(a) Install a new gasket, then connect the pressure feed tube with the union bolt.

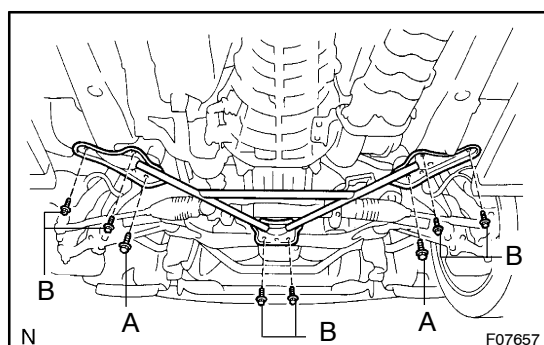
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)



(b) LHD:

Connect the pressure feed tube clamp with the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)



4. INSTALL FRONT SUSPENSION MEMBER BRACE

Install the front suspension member with the 7 bolts.

Torque:

Bolt A: 119 N·m (1,210 kgf·cm, 88 ft·lbf)

Bolt B: 58 N·m (590 kgf·cm, 43 ft·lbf)

5. CONNECT SLIDING YOKE (See page SR-23)

6. CONNECT RH AND LH TIE ROD ENDS

(See page SA-34)

7. INSTALL RH AND LH FRONT BRAKE CALIPERS

(See page BR-30)

8. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

9. CENTER SPIRAL CABLE (See page SR-23)**10. INSTALL STEERING WHEEL**

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

11. BLEED POWER STEERING SYSTEM

(See page SR-5)

12. CHECK STEERING WHEEL CENTER POINT**13. TORQUE STEERING WHEEL SET NUT**

Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

14. INSTALL STEERING WHEEL PAD (See page SR-23)**15. CHECK FRONT WHEEL ALIGNMENT**

(See page SA-5)