POWER STEERING GEAR (4WD and PRERUNNER)

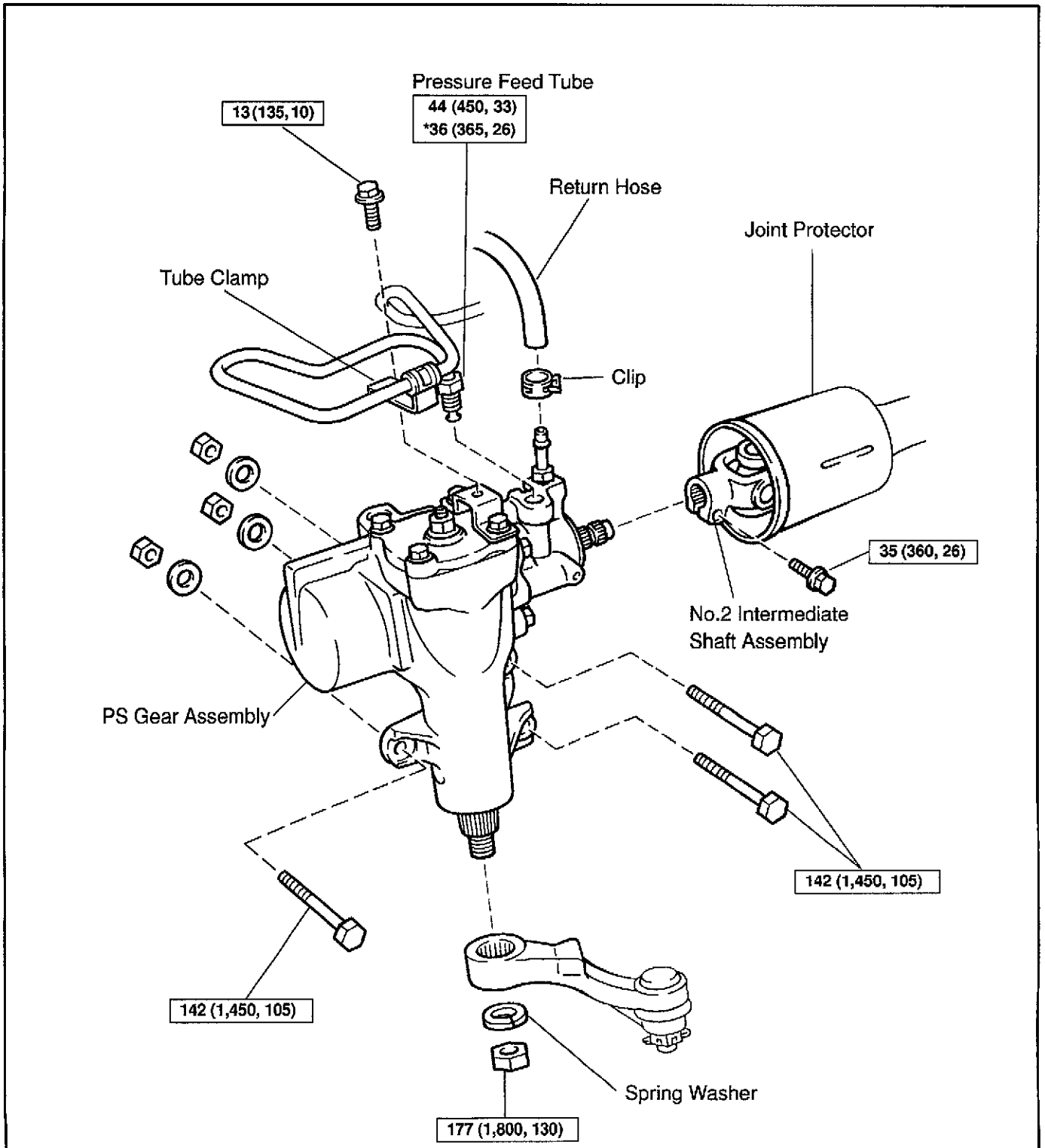
COMPONENTS

SR0AR-01

HINT:

Prerunner is the model described below.

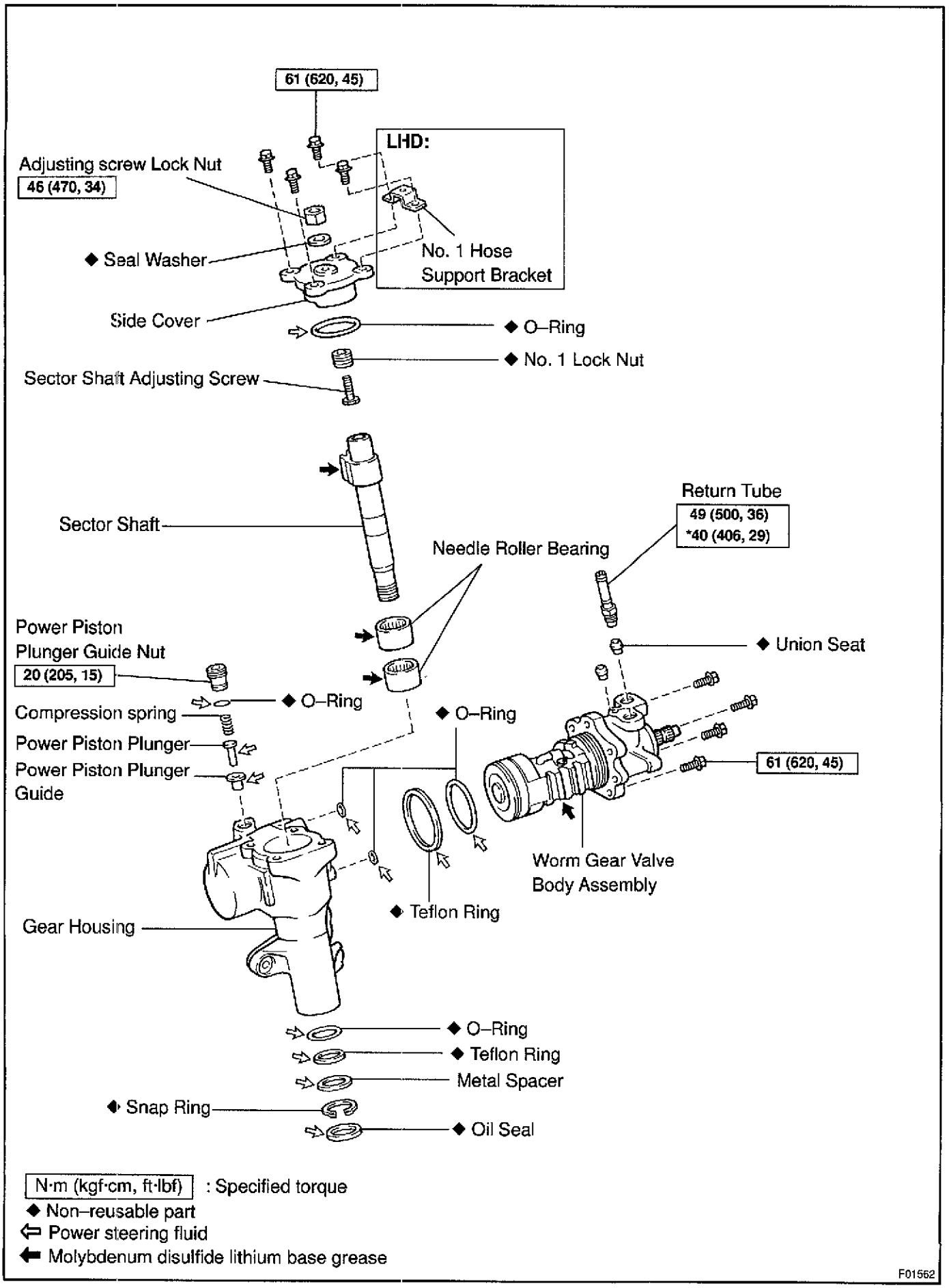
RZN193L – PRMDK, LN191L – PRMDS



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

* For use with SST

F01866



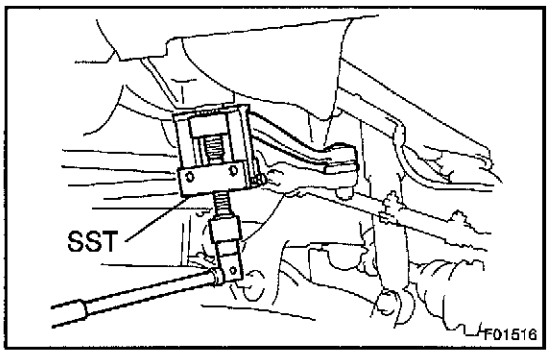
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
⇦ Power steering fluid
⬅ Molybdenum disulfide lithium base grease

F01562

SR0AS–01

REMOVAL

1. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
2. **w/ Airbag:**
   REMOVE STEERING WHEEL PAD
   (See page SR–17)
3. **w/ Airbag:**
   REMOVE STEERING WHEEL
   (See page SR–17)



4. **DISCONNECT PITMAN ARM**

(a) Remove the nut and spring washer.

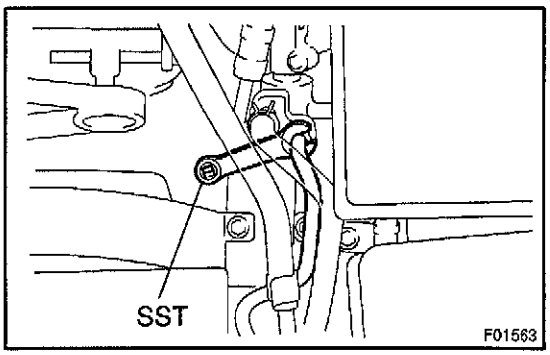
(b) Using SST, disconnect the pitman arm from the gear assembly.
   SST 09628–62011

5. **DISCONNECT TUBE CLAMP**

Remove the bolt.

6. **DISCONNECT RETURN HOSE**

Remove the clip and disconnect the hose.



7. **DISCONNECT PRESSURE FEED TUBE**

Using SST, disconnect the tube.
   SST 09631–22020

8. **DISCONNECT NO.2 INTERMEDIATE SHAFT ASSEMBLY**
   (See page SR–17)
9. **REMOVE PS GEAR ASSEMBLY**

Remove the 3 bolts, nuts and washers.

SR0AT-01

DISASSEMBLY

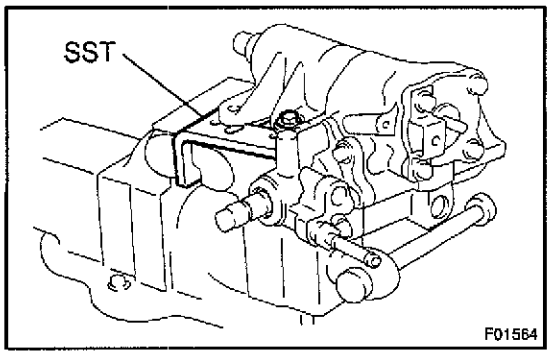
NOTICE:

When using a vise, do not overtighten it.

1. SECURE PS GEAR ASSEMBLY IN VISE

Mount the gear assembly on SST and clamp SST in a vise.

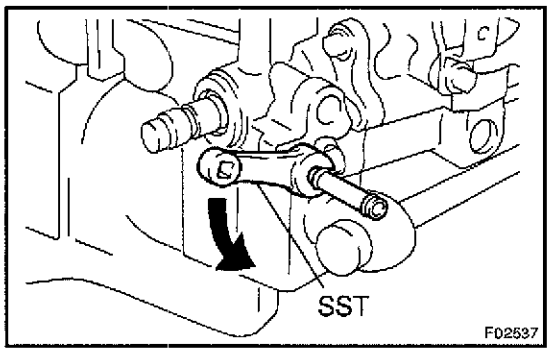
SST 09630–00014 (09631–00142)



2. REMOVE RETURN TUBE

Using SST, remove the tube.

SST 09631–22020



3. REMOVE ADJUSTING SCREW LOCK NUT AND SEAL WASHER

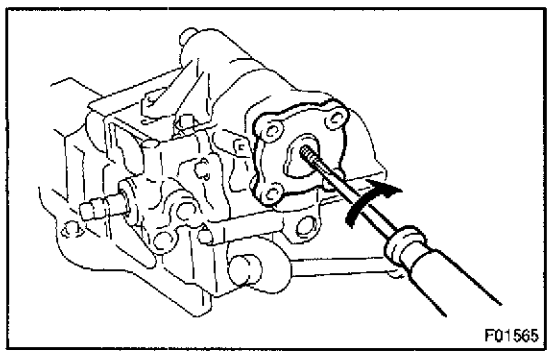
4. REMOVE SIDE COVER

(a) Remove the 4 bolts.

(b) LHD:
Remove the No.1 hose support bracket.

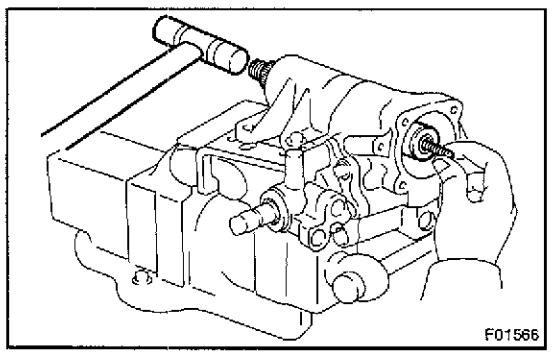
(c) Using a screwdriver, turn the sector shaft adjusting screw clockwise until the cover comes off.

(d) Remove the O–ring from the cover.



5. REMOVE SECTOR SHAFT

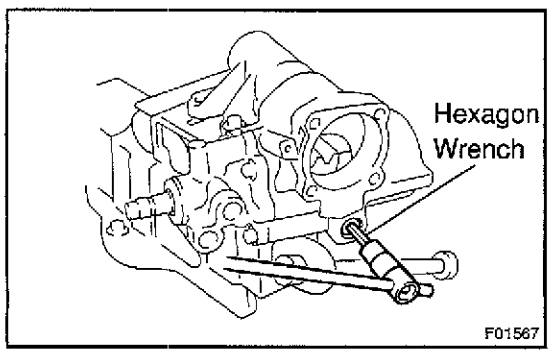
Using a plastic hammer, tap on the sector shaft end and pull out the shaft.

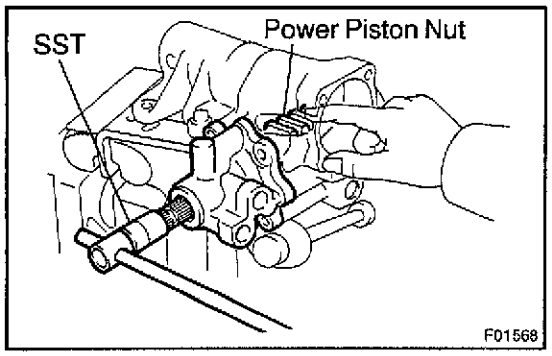


6. REMOVE POWER PISTON PLUNGER GUIDE NUT, COMPRESSION SPRING, POWER PISTON PLUNGER AND POWER PISTON PLUNGER GUIDE

(a) Using a hexagon wrench (10 mm), remove the plunger guide nut.

(b) Remove the O–ring from the plunger guide nut.





7. REMOVE WORM GEAR VALVE BODY ASSEMBLY

(a) Remove the 4 bolts.

(b) Using SST, turn the valve body shaft clockwise with holding the power piston nut by your finger so it cannot move.
SST 09616–00010

(c) Pull out the valve body assembly.

NOTICE:

Ensure that the power piston nut does not come off the worm shaft.

(d) Remove the 2 O–rings from the gear housing.

SRDAU–01

INSPECTION

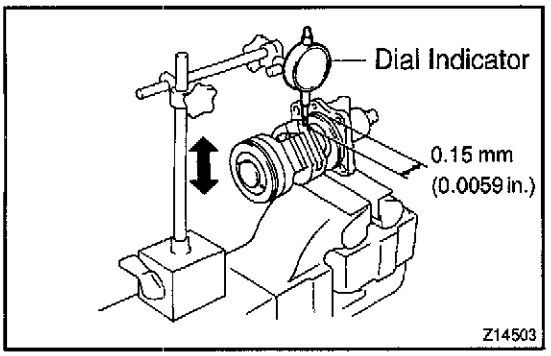
NOTICE:

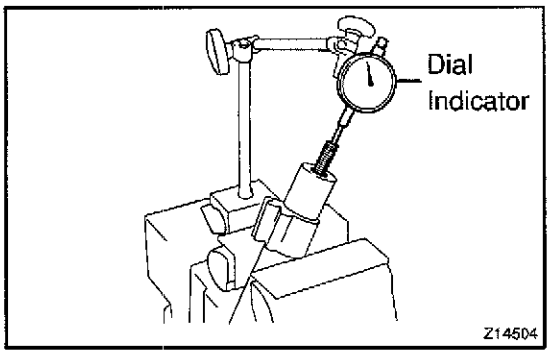
When using a vise, do not overtighten it.

1. INSPECT BALL CLEARANCE

Using a dial indicator, check the ball clearance. Move the power piston nut up and down.

Maximum clearance: 0.15 mm (0.0059 in.)

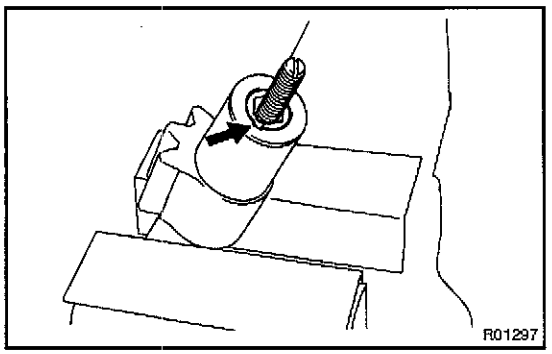




2. INSPECT SECTOR SHAFT ADJUSTING SCREW THRUST CLEARANCE

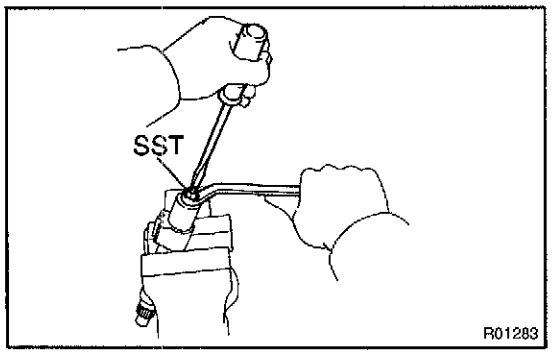
Using a dial indicator, measure the thrust clearance.

Standard clearance:
0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Maximum clearance: 0.05 mm (0.0020 in.)



3. IF NECESSARY, ADJUST SECTOR SHAFT ADJUSTING SCREW THRUST CLEARANCE

(a) Using a chisel and hammer, unstake the No.1 lock nut.

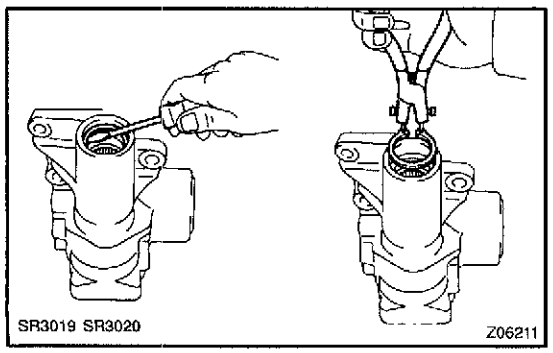


(b) Using SST, remove the No.1 lock nut.
SST 09630–00014 (09631–00051)

(c) Using a screwdriver, adjust the adjusting screw for the correct thrust clearance.

(d) Tighten a new lock nut.

(e) Stake the lock nut.

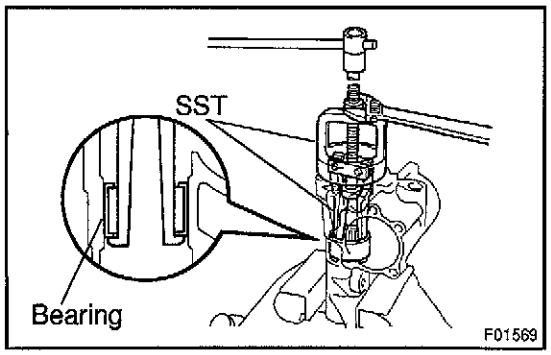


4. IF NECESSARY, REPLACE 2 NEEDLE ROLLER BEARINGS

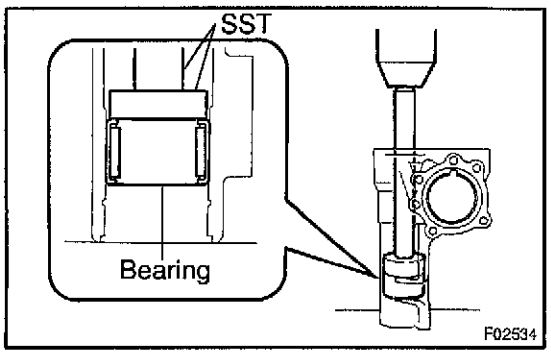
(a) Using a screwdriver, pry out the oil seal from the gear housing.

(b) Using snap ring pliers, remove the snap ring from the gear housing.

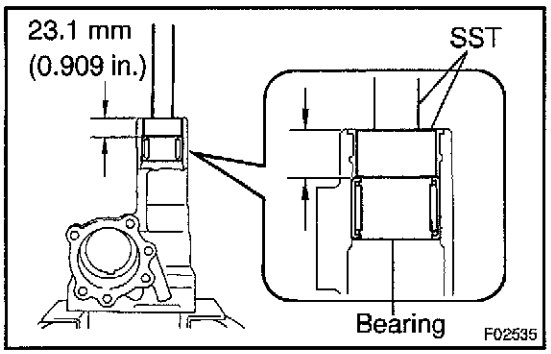
(c) Remove the metal spacer, teflon ring and O–ring from the gear housing.



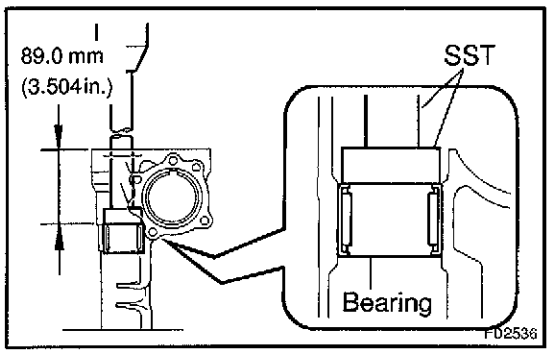
(d) Using SST, remove the bearing from the gear housing.
SST 09612–65014 (09612–01030, 09612–65013)



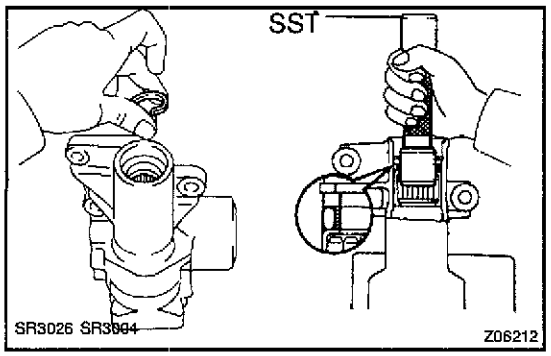
(e) Using SST, press out the bearing from the gear housing.
SST 09950–60010 (09951–00400),
09950–70010 (09951–07200)



(f) Coat a new bearing with molybdenum disulfide lithium base grease.
(g) Using SST, press in the bearing, as shown in the illustration.
SST 09950–60010 (09951–00400),
09950–70010 (09951–07200)

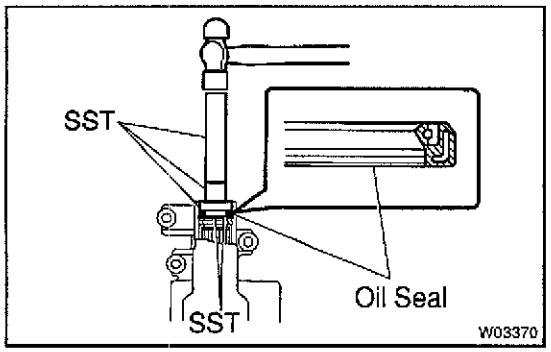


(h) Coat a new bearing with molybdenum disulfide lithium base grease.
(i) Using SST, press in the bearing, as shown in the illustration.
SST 09950–60010 (09951–00400),
09950–70010 (09951–07200)
(j) Coat a new O–ring and metal spacer with power steering fluid.
(k) Install the O–ring and metal spacer.
(l) Using snap ring pliers, install a new snap ring.
(m) Coat a new teflon ring with power steering fluid.



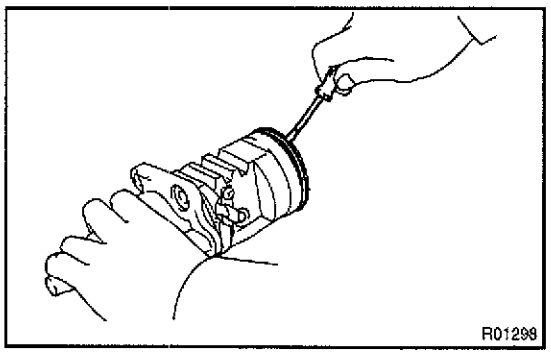
(n) Form the teflon ring into a heart shape and install it by hand.
(o) Using SST, install the teflon ring.
SST 09630–00014 (09631–00121)

NOTICE:
The teflon ring must be squeezed before inserting the sector shaft or damage will result.



(p) Coat a new oil seal lip with power steering fluid.
(q) Using SST, drive the oil seal into the gear housing.
SST 09950–60010 (09951–00320, 09951–00400, 09952–06010), 09950–70010 (09951–07200)

NOTICE:
Make sure to install the oil seal facing the correct direction.



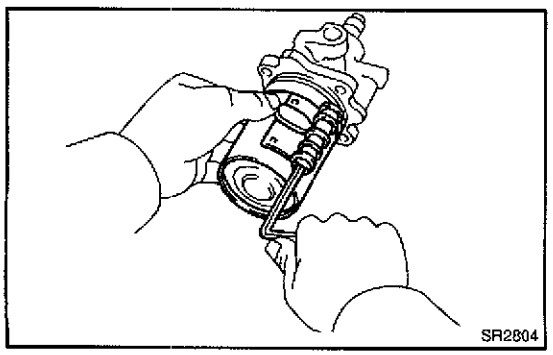
5. IF NECESSARY, REPLACE TEFLON RING AND O–RING

(a) Using a screwdriver, remove the teflon ring and O–ring from the worm gear valve body assembly.

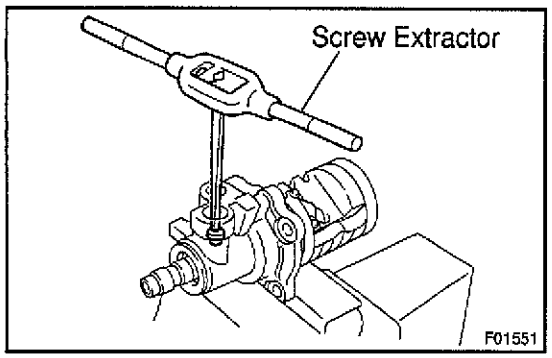
NOTICE:
Be careful not to damage the worm gear valve body assembly.

(b) Coat a new O–ring with power steering fluid and install it.
(c) Expand a new teflon ring with your fingers.

NOTICE:
Be careful not to overexpand the teflon ring.

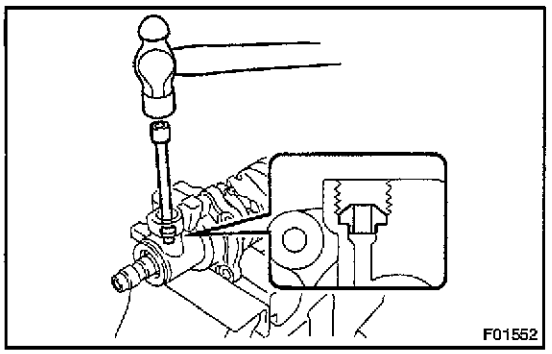


(d) Install the teflon ring.
(e) Coat the teflon ring with power steering fluid and snug it down with a piston ring compressor for 5 – 7 minutes.



6. IF NECESSARY, REPLACE UNION SEATS

(a) Using a screw extractor, remove the 2 union seats from the worm gear valve body assembly.



(b) Using a hammer and an extension bar, tap in 2 new union seats.

NOTICE:

Before installing the union seat, remove dust sticking to the worm gear valve body assembly.

SR0AV-01

REASSEMBLY

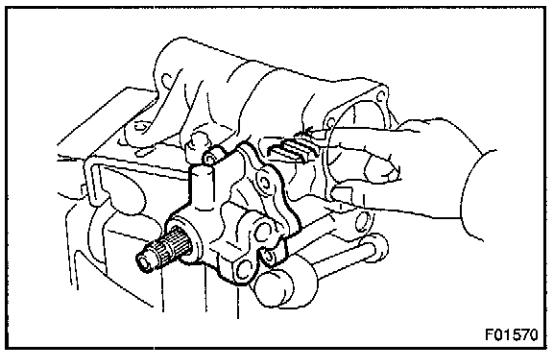
NOTICE:

When using a vise, do not overtighten it.

1. COAT WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page SR–114)

2. INSTALL WORM GEAR VALVE BODY ASSEMBLY

(a) Coat 2 new O–rings with power steering fluid and install them to the gear housing.



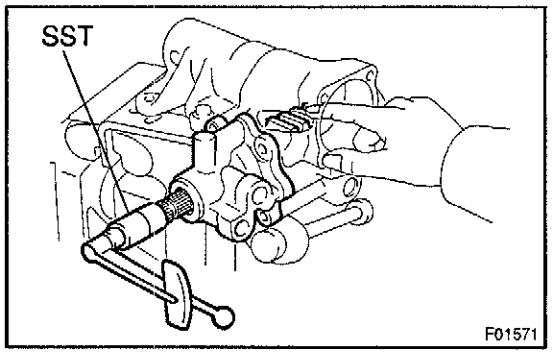
(b) Install the valve body assembly into the gear housing.

NOTICE:

- **Ensure that the power piston nut does not come off the worm shaft.**
- **Be careful not to damage the teflon ring.**

(c) Torque the 4 bolts.

Torque: 61 N·m (620 kgf·cm, 45 ft·lbf)



(d) Using SST and a torque wrench, check the valve body assembly rotating torque.

SST 09616–00010

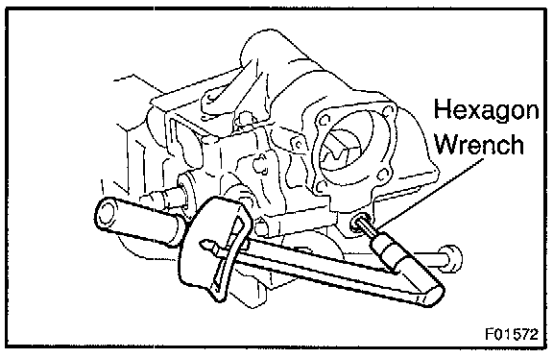
Rotating torque:

0.3 – 0.5 N·m (3 – 5.5 kgf·cm, 2.6 – 4.8 in.·lbf)

HINT:

Hold the worm gear to prevent it from turning.

If rotating torque is not correct, replace the worm gear valve body assembly.

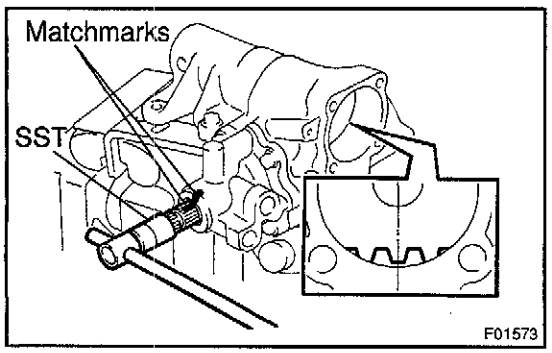


3. INSTALL POWER PISTON PLUNGER GUIDE, POWER PISTON PLUNGER, COMPRESSION SPRING AND POWER PISTON PLUNGER GUIDE NUT

(a) Coat a new O–ring with power steering fluid and install it to the plunger guide nut.

(b) Install the plunger guide nut with a hexagon wrench (10 mm).

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

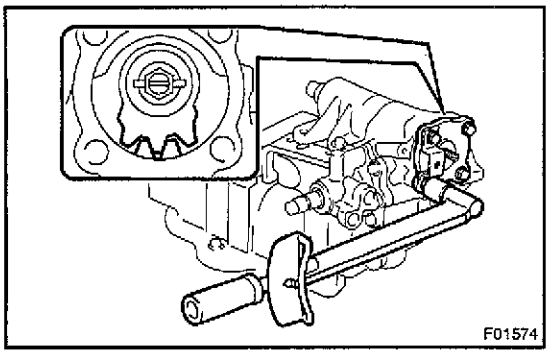


4. DETERMINE CENTER POSITION

(a) Using SST, turn the worm gear valve body shaft so full lock in both directions and determine the exact center.

SST 09616–00010

(b) Place matchmarks on the worm gear valve body shaft and gear housing to show neutral position.



5. INSTALL SECTOR SHAFT AND SIDE COVER

(a) Coat a new O–ring with power steering fluid and install it to the side cover.

(b) Assemble the sector shaft to the side cover.

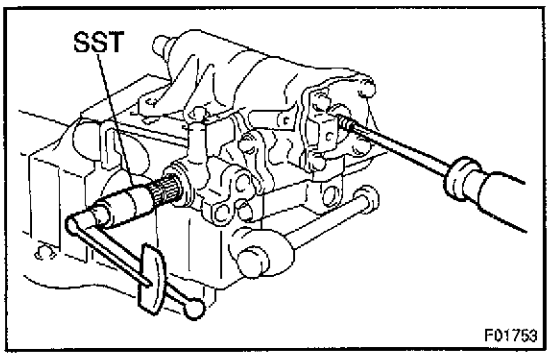
HINT:

Fully loosen the sector shaft adjusting screw.

(c) Install and push the sector shaft into the gear housing so that the center teeth mesh together.

(d) LHD:
Install the No.1 hose support bracket.

(e) Torque the 4 bolts in a diagonal pattern.
Torque: 61 N·m (620 kgf·cm, 45 ft·lbf)

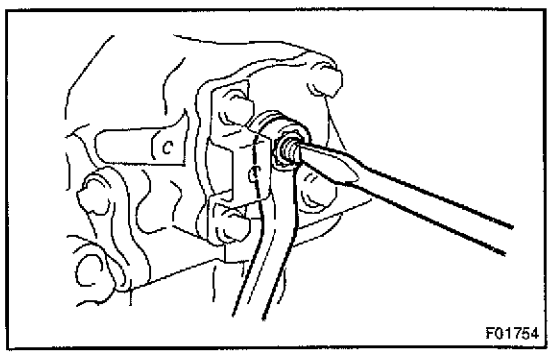


6. ADJUST TOTAL PRELOAD

(a) Install SST with a torque wrench on the worm gear valve body shaft.
SST 09616–00010

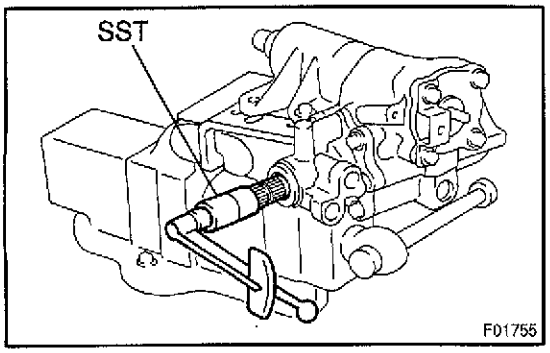
(b) Turn the adjusting screw until the preload is within the specification.
Preload (Turning):
0.5 – 0.9 N·m (5 – 9.5 kgf·cm, 4.3 – 8.3 in.·lbf)

7. INSTALL NEW SEAL WASHER



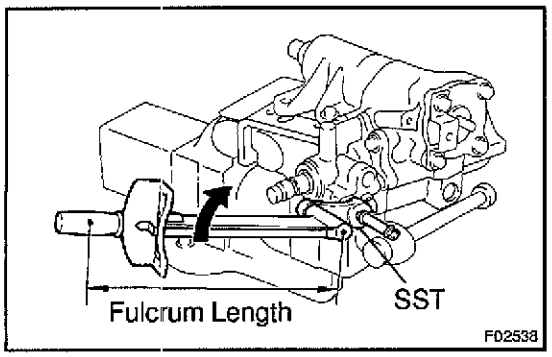
8. INSTALL ADJUSTING SCREW LOCK NUT

Torque the lock nut while holding the sector shaft adjusting screw.
Torque: 46 N·m (470 kgf·cm, 34 ft·lbf)



9. CHECK TOTAL PRELOAD

Using SST and a torque wrench, check total preload.
SST 09616–00010
Total preload (Turning):
0.5 – 0.9 N·m (5 – 9.5 kgf·cm, 4.3 – 8.3 in.·lbf)



10. INSTALL RETURN TUBE

Using SST, install the tube.

SST 09631–22020

Torque: 40 N·m (406 kgf·cm, 29 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.

SR0AW–01

INSTALLATION

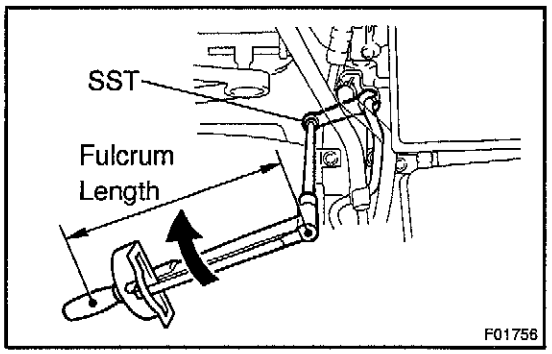
1. INSTALL PS GEAR ASSEMBLY

Install the 3 bolts, washers and nuts.

Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)

2. CONNECT NO.2 INTERMEDIATE SHAFT ASSEMBLY

(See page SR–25)



3. CONNECT PRESSURE FEED TUBE

Using SST, connect the tube.

SST 09631–22020

Torque: 36 N·m (365 kgf·cm, 26 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.

4. CONNECT RETURN HOSE

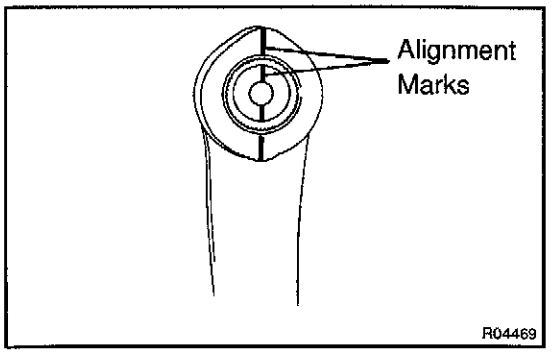
(a) Connect the hose.

(b) Install the clip.

5. CONNECT TUBE CLAMP

Torque the bolt.

Torque: 13 N·m (135 kgf·cm, 10 ft·lbf)



6. CONNECT PITMAN ARM

(a) Align the alignment marks on the pitman arm and sector shaft.

(b) Install the spring washer and nut.

Torque: 177 N·m (1,800 kgf·cm, 130 ft·lbf)

7. w/ Airbag:

PLACE FRONT WHEEL FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

8. w/ Airbag:

CENTER SPIRAL CABLE

(See page SR–25)

9. w/ Airbag:

INSTALL STEERING WHEEL

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

(b) Temporarily tighten the wheel set nut.

(c) Connect the connector.

10. **BLEED POWER STEERING SYSTEM**
    (See page SR–5)
11. **CHECK STEERING WHEEL CENTER POINT**
12. **w/ Airbag:**
    TORQUE STEERING WHEEL SET NUT
    Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)
13. **w/ Airbag:**
    INSTALL STEERING WHEEL PAD
    (See page SR–25)
14. **CHECK FRONT WHEEL ALIGNMENT**
    (See page SA–12)