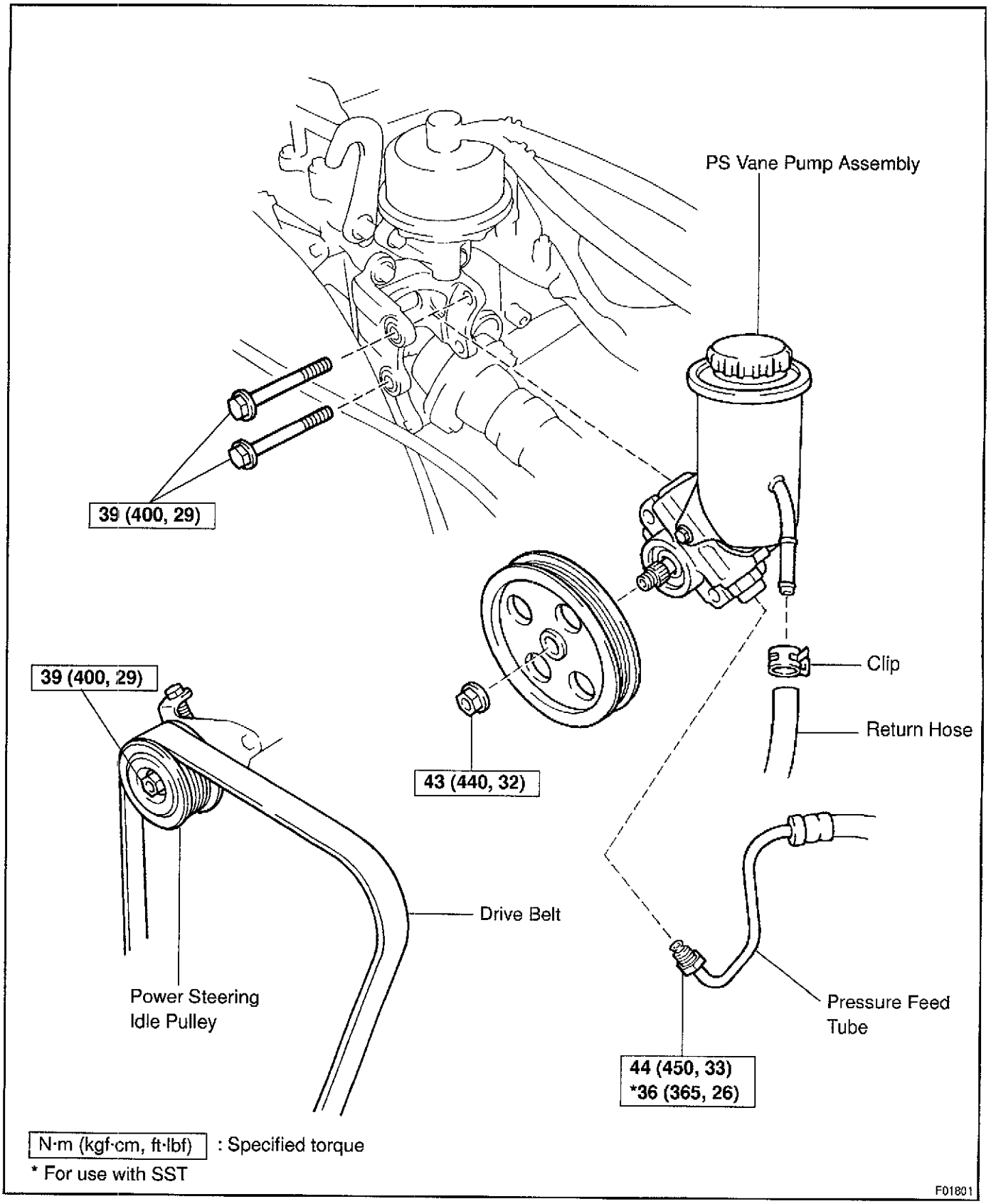
POWER STEERING VANE PUMP (3RZ–F)

COMPONENTS

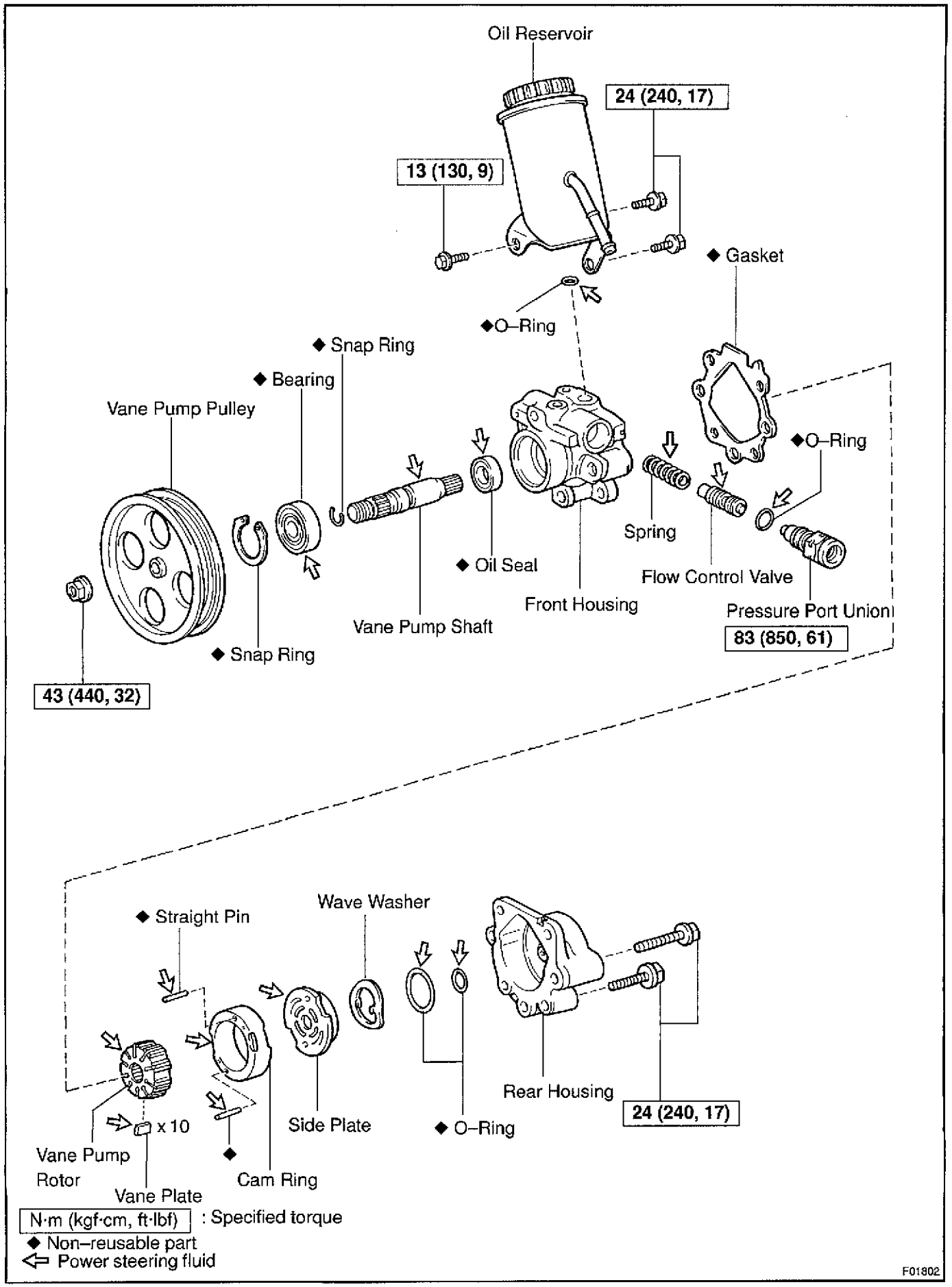
3R05R-01



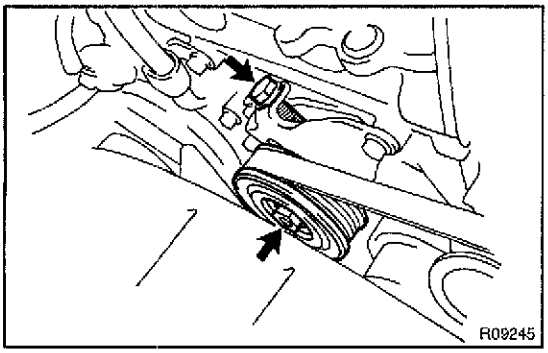
N·m (kgf·cm, ft·lbf) : Specified torque

* For use with SST

F01601


Oil Reservoir
24 (240, 17)
13 (130, 9)
◆ Gasket
◆O–Ring
◆ Snap Ring
◆ Bearing
Vane Pump Pulley
◆O–Ring
Spring
◆ Oil Seal
Flow Control Valve
Front Housing
Pressure Port Union
83 (850, 61)
Vane Pump Shaft
◆ Snap Ring
43 (440, 32)
◆ Straight Pin
Wave Washer
Rear Housing
24 (240, 17)
Side Plate
◆ O–Ring
x 10
Vane Pump Rotor
Vane Plate
Cam Ring
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
⇦ Power steering fluid
F01802

SR09S 01



REMOVAL

1. REMOVE DRIVE BELT

(a) Loosen the power steering idle pulley set bolt.

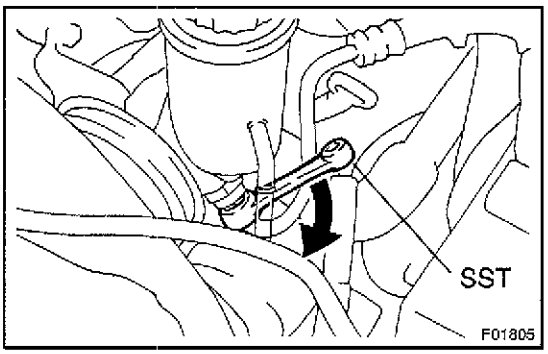
(b) Loosen the belt adjusting bolt.

2. DISCONNECT RETURN HOSE

Remove the clip and disconnect the hose.

NOTICE:

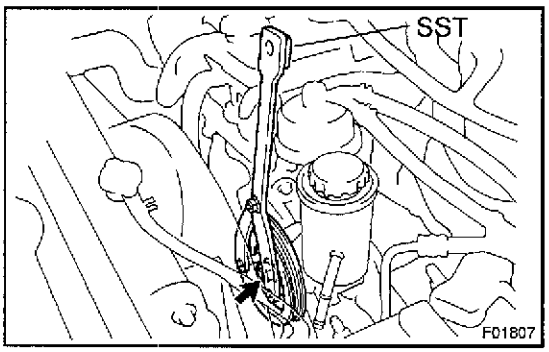
Take care not to spill fluid on the drive belt.



3. DISCONNECT PRESSURE FEED TUBE

Using SST, disconnect the pressure feed tube.

SST 09631–22020



4. REMOVE VANE PUMP PULLEY

Using SST to stop the pulley rotating, remove the nut.

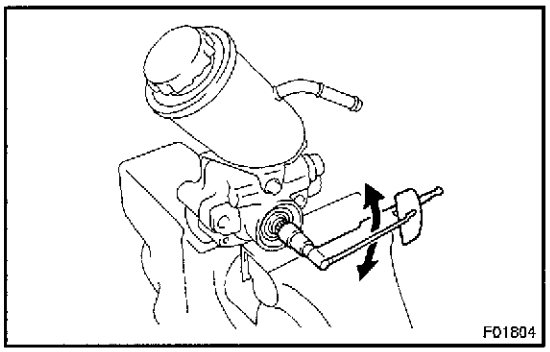
SST 09960–10010 (09962–01000, 09963–01000)

5. REMOVE PS VANE PUMP ASSEMBLY

Remove the 2 pump assembly set bolts.

SR05T–01

DISASSEMBLY



NOTICE:

When using a vise, do not overtighten it.

1. MEASURE PS VANE PUMP ROTATING TORQUE

(a) Check that the pump rotates smoothly without abnormal noise.

(b) Temporarily install the vane pump pulley set nut.

(c) Using a torque wrench, check the pump rotating torque.

Rotating torque:

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

2. REMOVE OIL RESERVOIR

(a) Remove the 3 bolts and oil reservoir.

(b) Remove the O–ring from the oil reservoir.

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

Remove the O–ring from the union.

4. REMOVE REAR HOUSING

(a) Remove the 2 bolts and rear housing.

(b) Remove the 2 O–rings from the housing.

5. REMOVE WAVE WASHER

6. REMOVE SIDE PLATE

7. REMOVE CAM RING, 10 VANE PLATES AND VANE PUMP ROTOR

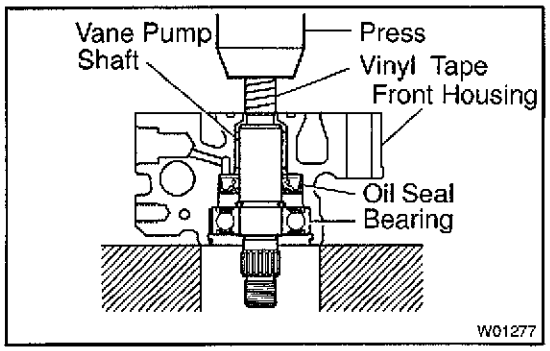
NOTICE:

Be careful not to drop the plate.

8. REMOVE STRAIGHT PINS

Remove the 2 pins from the front housing.

9. REMOVE GASKET



10. REMOVE VANE PUMP SHAFT WITH BEARING

(a) Using snap ring pliers, remove the snap ring from the front housing.

(b) Wind vinyl tape on the serrated part of the vane pump shaft.

(c) Press out the shaft with the bearing.

NOTICE:

Be careful not to damage the oil seal lip.

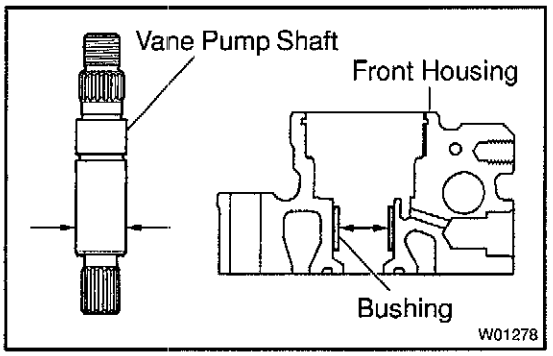
SR09U-01

INSPECTION

NOTICE:

When using a vise, do not overtighten it.

1. CHECK OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING



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

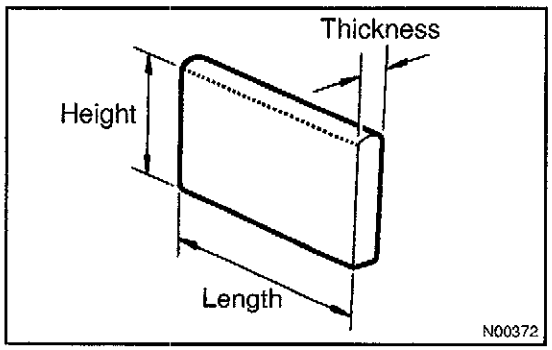
Standard clearance:
0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Maximum clearance: 0.07 mm (0.0028 in.)

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

2. INSPECT VANE PUMP ROTOR AND VANE PLATES

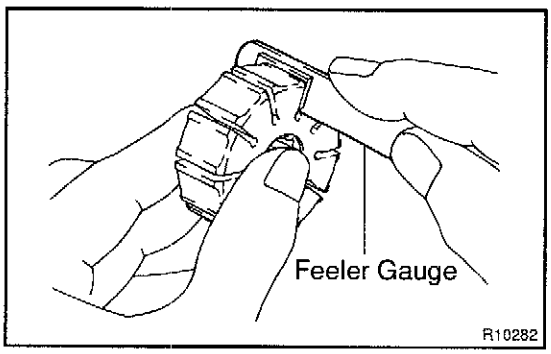
(a) Using a micrometer, measure the height, thickness and length of the 10 plates.

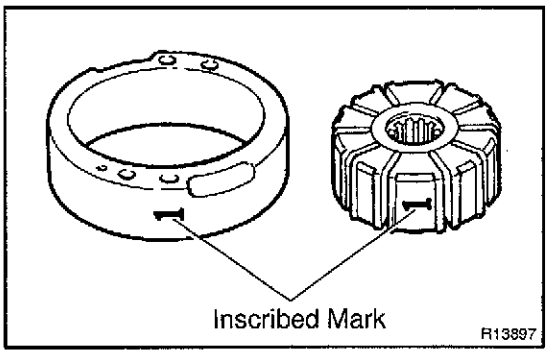
Minimum height: 8.6 mm (0.339 in.)
Minimum thickness: 1.397 mm (0.0550 in.)
Minimum length: 14.991 mm (0.5902 in.)



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

Maximum clearance: 0.033 mm (0.0013 in.)





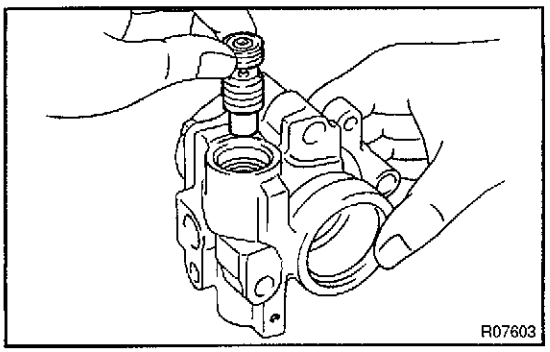
If it is more than the maximum, replace the plate and/or rotor with one having the same mark stamped on the cam ring.

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

HINT:

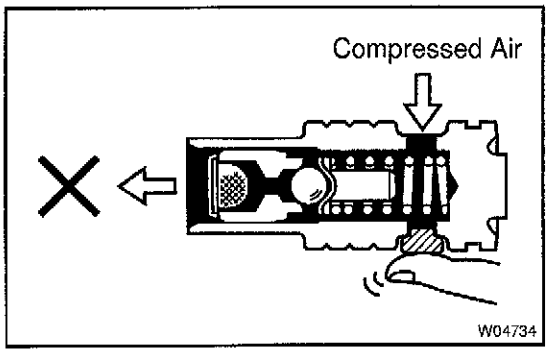
There are 5 vane plate lengths with the following rotor and cam ring marks:

Rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
None	44345–26010	14.999–15.001 (0.59051–0.59059)
1	44345–26020	14.997–14.999 (0.59043–0.59051)
2	44345–26030	14.995–14.997 (0.59035–0.59043)
3	44345–26040	14.993–14.995 (0.59027–0.59035)
4	44345–26050	14.991–14.993 (0.59020–0.59027)

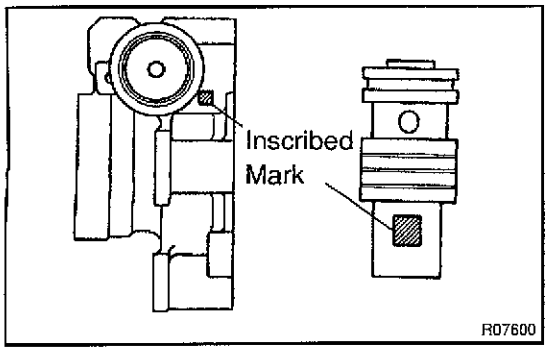


3. INSPECT FLOW CONTROL VALVE

(a) Coat the valve with power steering fluid and check that it falls smoothly into the valve hole by its own weight.

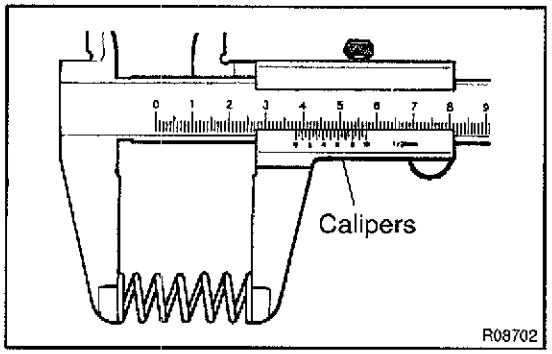


(b) Check the flow control valve for leakage.
Close one of the holes and apply compressed air 392–490 kPa (4–5 kgf/cm^2, 57–71 psi) into the opposite side, and confirm that air does not come out from the end hole.



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

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

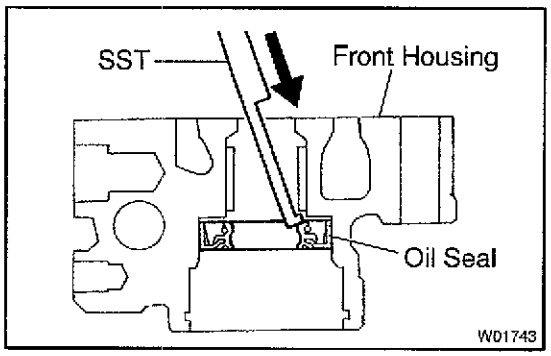


4. INSPECT SPRING

Using calipers, measure the free length of the spring.

Minimum free length: 33.2 mm (1.307 in.)

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

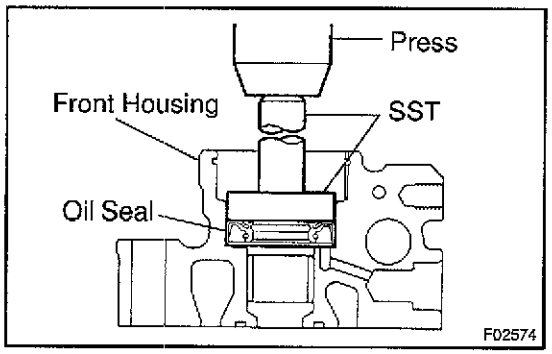


5. IF NECESSARY, REPLACE OIL SEAL

(a) Using SST, tap out the oil seal from the front housing.
SST 09631–10030

NOTICE:

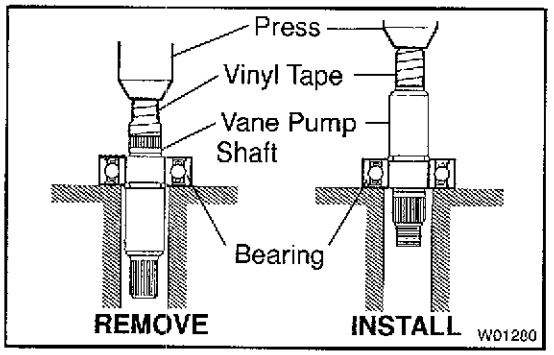
Be careful not to damage the bushing of the front housing.



(b) Coat a new oil seal lip with power steering fluid.
(c) Using SST, press in the oil seal.
SST 09950–60010 (09951–00330),
09950–70010 (09951–07100)

NOTICE:

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



6. IF NECESSARY, REPLACE BEARING

(a) Press out the bearing from the vane pump shaft.
(b) Using snap ring expander, replace the snap ring with new one.

NOTICE:

Be careful not to damage the shaft.

(c) Coat a new bearing with power steering fluid.
(d) Press in the bearing to the shaft.

SR06V–01

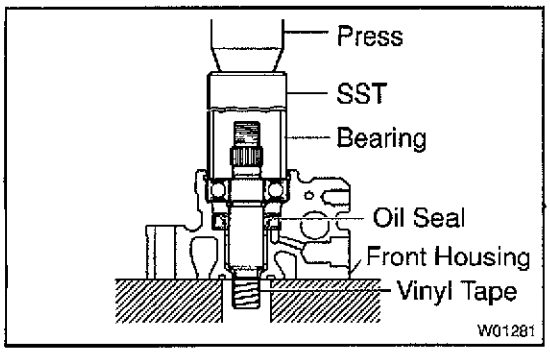
REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT WITH POWER STEERING FLUID

(See page SR–47)



2. INSTALL VANE PUMP SHAFT WITH BEARING

(a) Wind vinyl tape on the serrated part of the vane pump shaft.

(b) Using SST, press in the shaft with the bearing.

SST 09608–04031

NOTICE:

Be careful not to damage the oil seal.

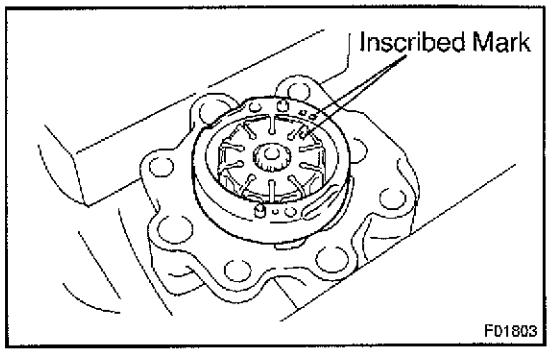
(c) Using snap ring pliers, install a new snap ring to the front housing.

3. INSTALL STRAIGHT PINS

Using a plastic hammer, tap in 2 new pins to the front housing.

NOTICE:

Be careful not to damage the pins.



4. INSTALL CAM RING

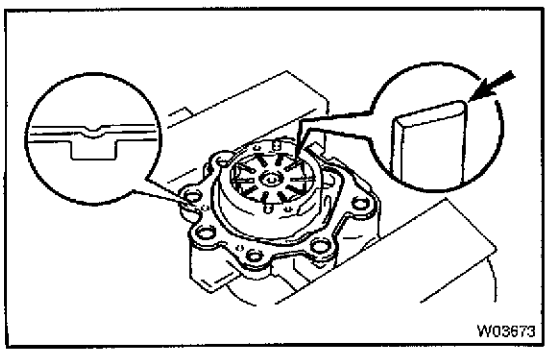
Install the ring with the inscribed mark facing outward.

HINT:

Align the holes of the cam ring with the straight pins.

5. INSTALL VANE PUMP ROTOR

Install the rotor with the inscribed mark facing outward.



6. INSTALL VANE PLATES AND GASKET

(a) Install the 10 plates with the round end facing outward.

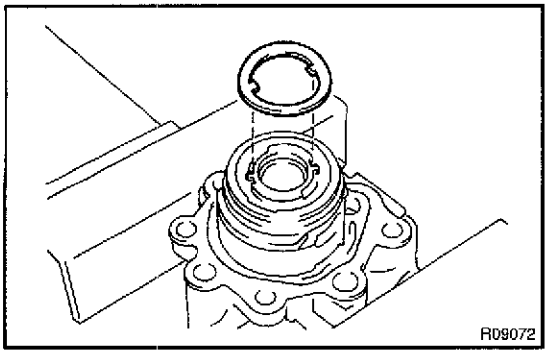
(b) Install a new gasket on the front housing.

NOTICE:

Be careful the direction of the gasket.

7. INSTALL SIDE PLATE

Align the holes of the plate and 2 straight pins.



8. INSTALL WAVE WASHER

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

9. INSTALL REAR HOUSING

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

(b) Torque the 2 bolts.

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

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

(a) Install the valve facing the correct direction.
(See page SR–47)

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

(c) Torque the union.

Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)

11. INSTALL OIL RESERVOIR

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

(b) Install the oil reservoir with the 3 bolts.

Torque:
Front side bolt: 13 N·m (130 kgf·cm, 9 ft·lbf)
Rear side bolts: 24 N·m (240 kgf·cm, 17 ft·lbf)

12. MEASURE PS VANE PUMP ROTATING TORQUE
(See page SR–50)

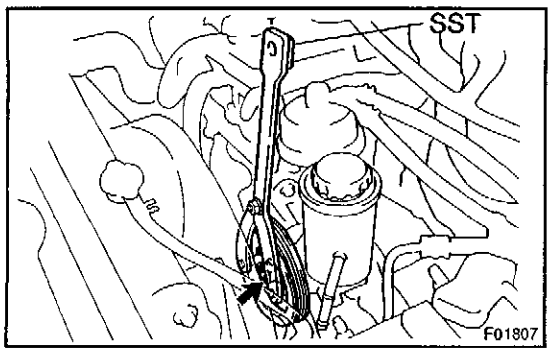
SR09W-01

INSTALLATION

1. INSTALL PS VANE PUMP ASSEMBLY

Torque the 2 pump assembly set bolts.

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

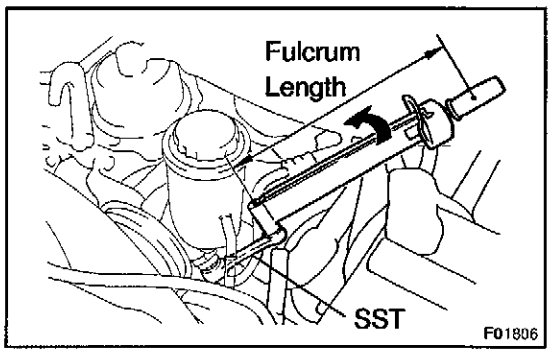


2. INSTALL VANE PUMP PULLEY

Using SST to stop the pulley rotating, torque the nut.

SST 09960–10010 (09962–01000, 09963–01000)

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



3. CONNECT PRESSURE FEED TUBE

Using SST, connect the pressure feed tube.

SST 09631–22020

Torque: 36 N·m (365 kgf·cm, 26 ft·lbf)

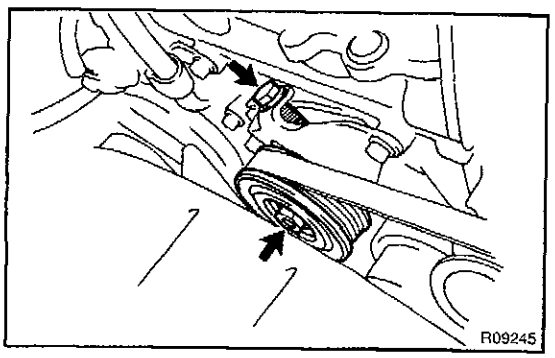
HINT:

- 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. INSTALL DRIVE BELT

(a) Tightening the belt adjusting bolt and adjust drive belt tension.

(See page SR–3)

(b) Torque the power steering idle pulley set nut.

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

6. BLEED POWER STEERING SYSTEM

(See page SR–5)