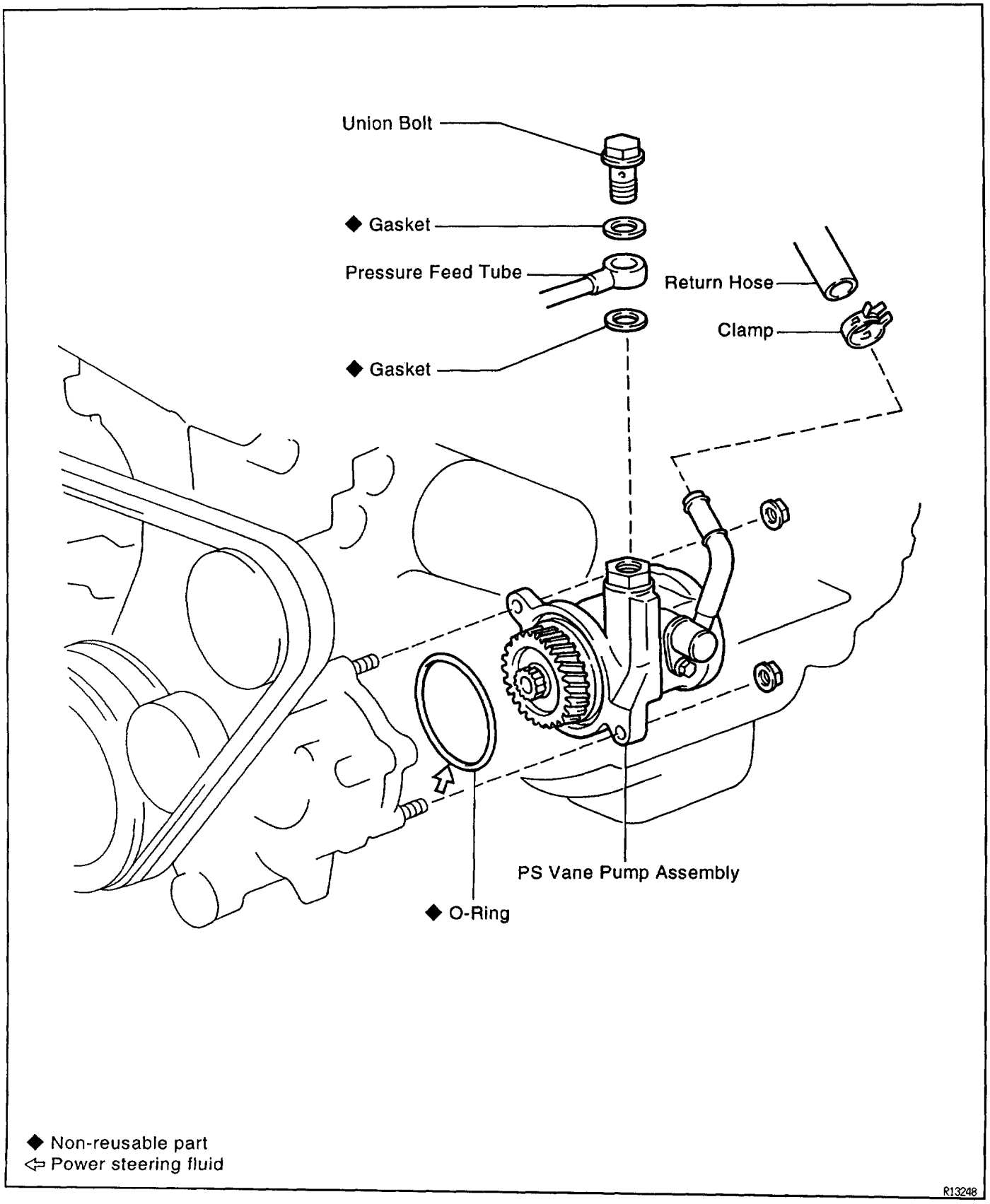
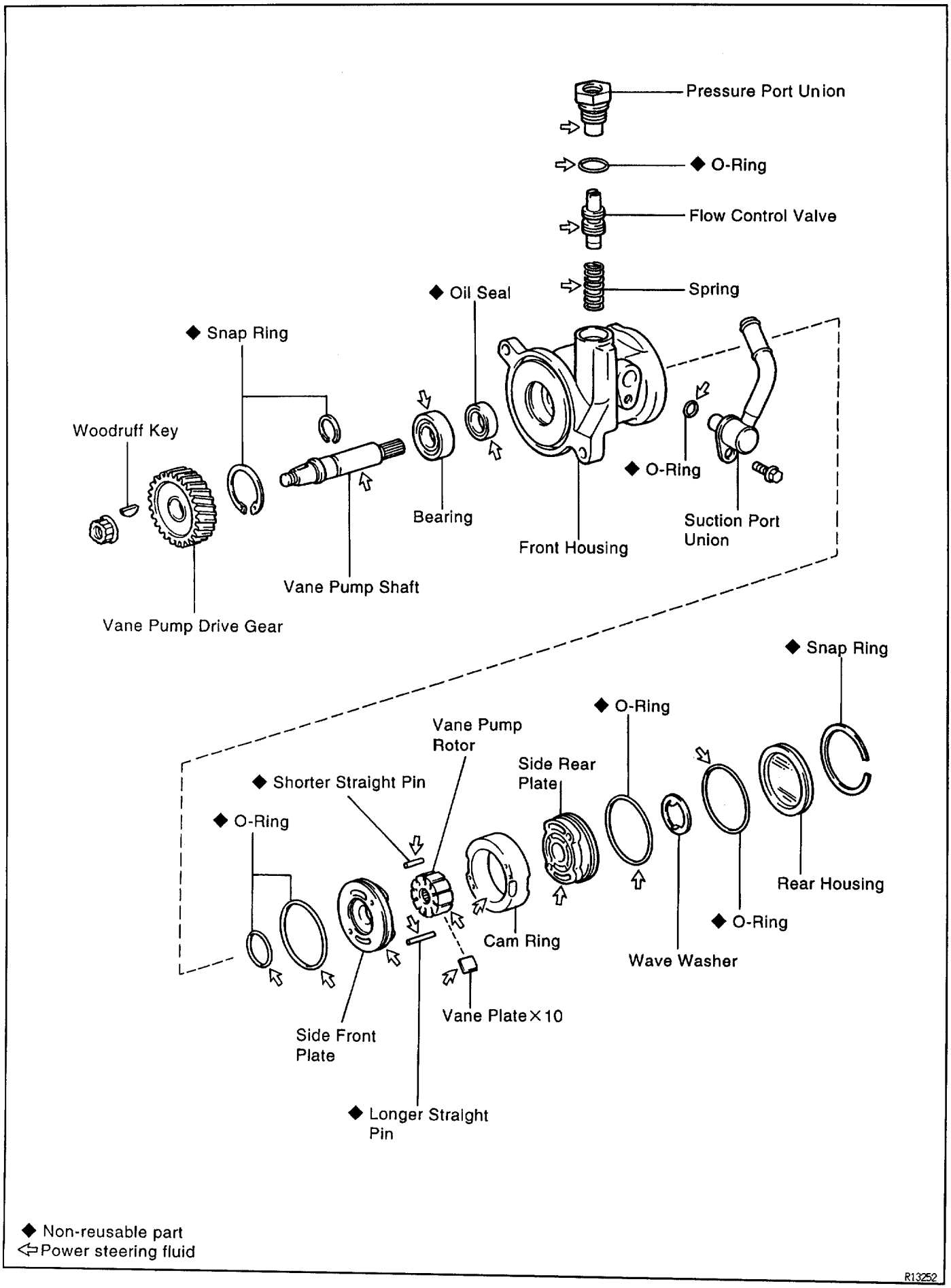
POWER STEERING VANE PUMP

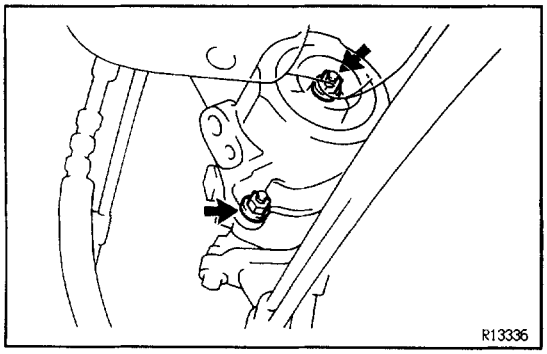
COMPONENTS





◆ Non-reusable part
⇦ Power steering fluid

R13252



POWER STEERING VANE PUMP REMOVAL

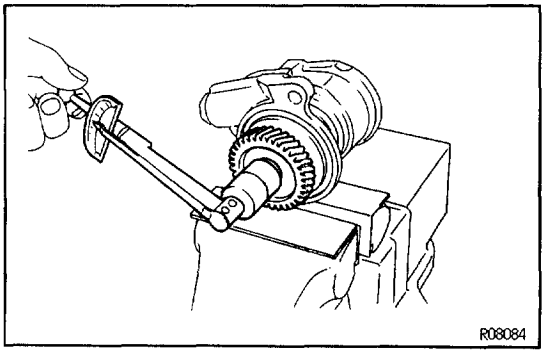
1. DISCONNECT RETURN HOSE

2. DISCONNECT PRESSURE FEED TUBE
(See page SR–8)

3. REMOVE PS VANE PUMP ASSEMBLY

(a) Remove the 2 nuts.

(b) Remove the O–ring from the vane pump assembly.



POWER STEERING VANE PUMP DISASSEMBLY

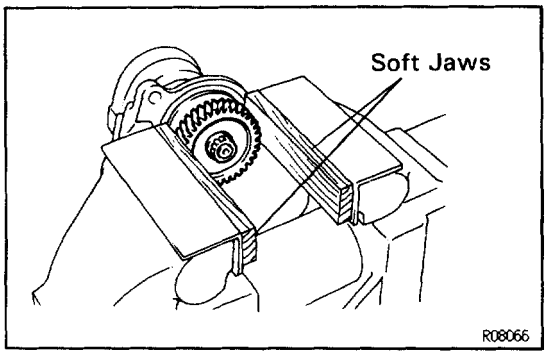
NOTICE: When using a vise, do not overtighten it.

1. MEASURE POWER STEERING VANE PUMP ROTATING TORQUE

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

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

Rotation torque:
0.3 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less



2. REMOVE SUCTION PORT UNION

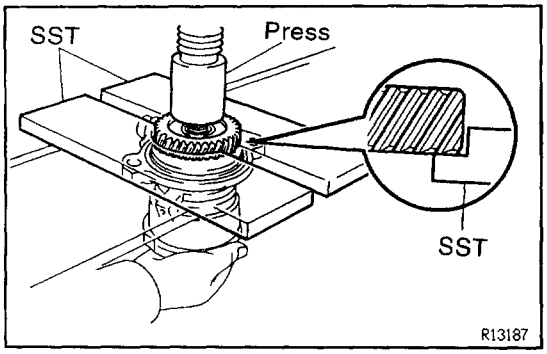
(a) Remove the bolt.

(b) Remove the O–ring from the union.

3. REMOVE VANE PUMP DRIVE GEAR

(a) Using soft jaws on a vise, clamp the gear in the vise.
NOTICE: Be careful not to damage the gear.

(b) Remove the gear set nut.

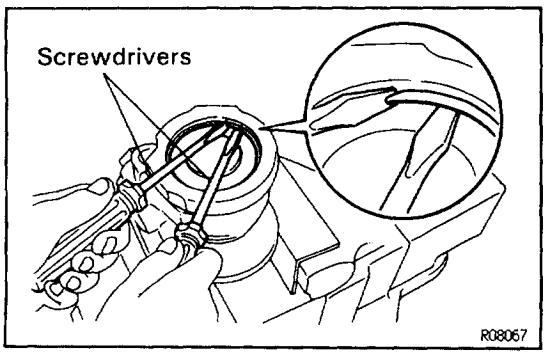


(c) Using SST, press out the gear.
SST 09527–10011
NOTICE:
- Be careful not to damage the gear.
- To avoid dropping the PS pump assembly, support the pump assembly with your hand.

(d) Remove the woodruff key from the vane pump shaft.

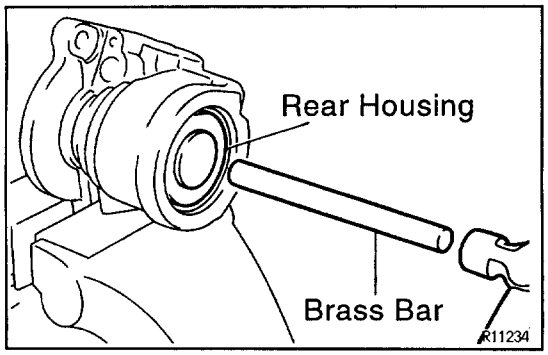
4. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

Remove the O–ring from the union.

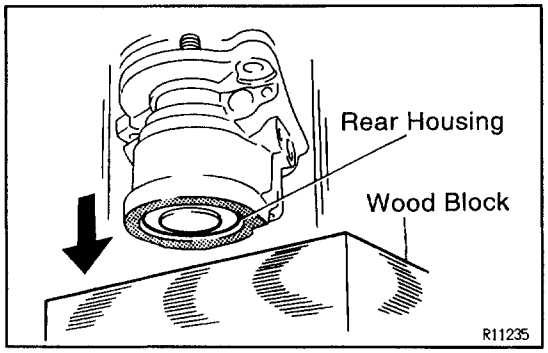


5. REMOVE REAR HOUSING AND WAVE WASHER

(a) Using 2 screwdrivers, remove the snap ring.
NOTICE: Take care not to damage the housing.



(b) Using a brass bar and hammer, tap the housing so that the spring force of the wave washer pushes the housing forward.



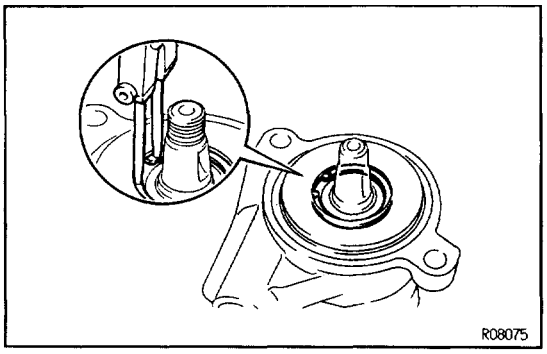
(c) Gently tap the PS pump assembly on a wood block and remove the housing and washer.
(d) Remove the O–ring from the housing.

6. REMOVE SIDE REAR PLATE

(a) Gently tap the PS pump assembly on a wood block and remove the plate.
(b) Remove the O–ring from the plate.

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

NOTICE: Be careful not to scratch the cam ring, rotor or vane plates.

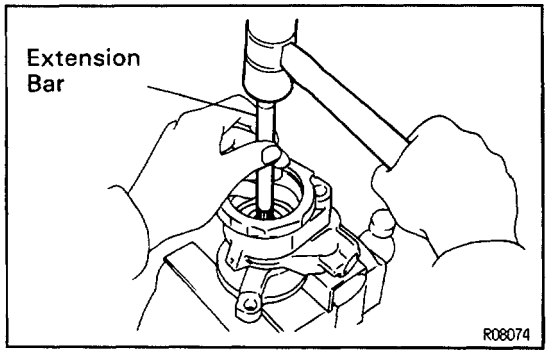


8. REMOVE SHORTER STRAIGHT PIN

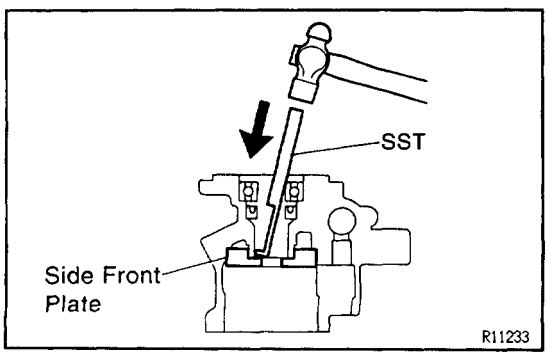
Remove the pin from the side front plate.

9. REMOVE VANE PUMP SHAFT WITH BEARING

(a) Using snap ring pliers, remove the snap ring.



(b) Using an extension bar and hammer, tap out the shaft with the bearing.

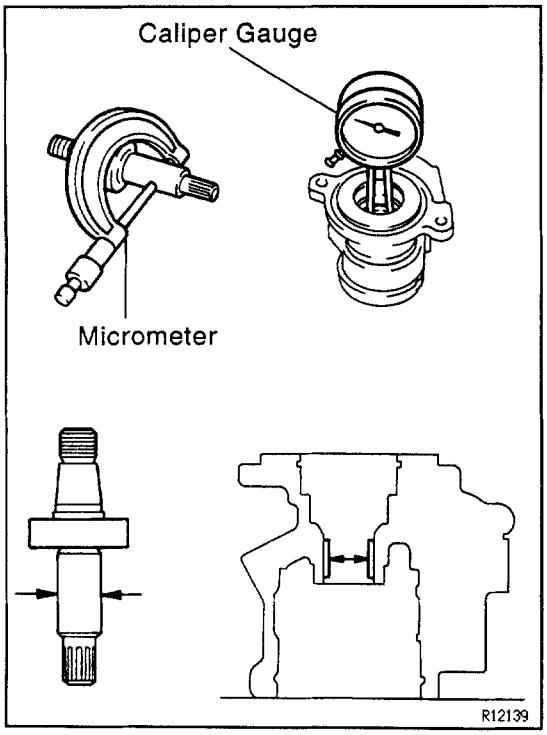


10. REMOVE SIDE FRONT PLATE

(a) Using SST, tap out the plate.
SST 09631–10030
(b) Remove the 2 O–rings from the plate.

11. REMOVE LONGER STRAIGHT PIN

Using pliers, remove the pin from the front housing.

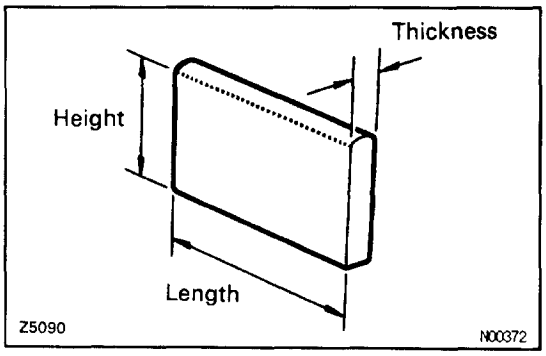


POWER STEERING PUMP INSPECTION AND REPLACEMENT

1. MEASURE OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

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

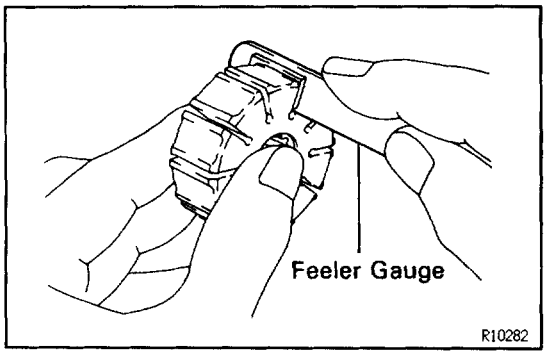
	Clearance mm (in.)
Standard	0.03–0.05 (0.0012–0.0020)
Minimum	0.07 (0.0028)



2. INSPECT VANE PUMP ROTOR AND 10 VANE PLATES

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

	Minimum mm (in.)
Height	8.6 (0.339)
Thickness	1.397 (0.05500)
Length	14.991 (0.59016)



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

Maximum clearance:

0.033 mm (0.00130 in.)

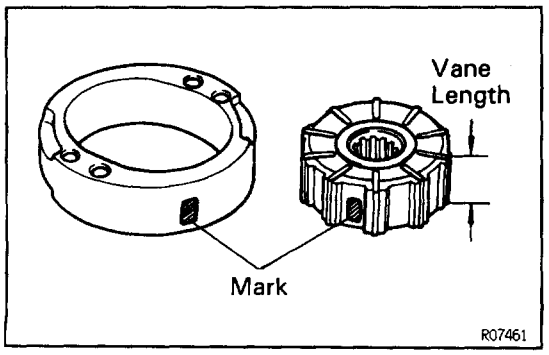
If more than maximum, replace the plate and/or rotor with one having the mark equivalent to the mark stamped on the cam ring.

Inscribed mark:

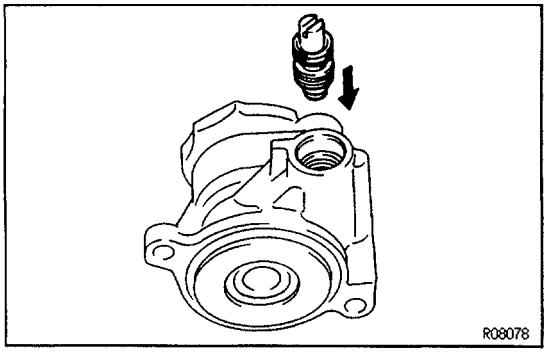
Vane pump rotor: 1, 2, or None

Cam ring: 2, 3, or 4

HINT: There are 3 vane lengths for the following rotor and cam ring marks.

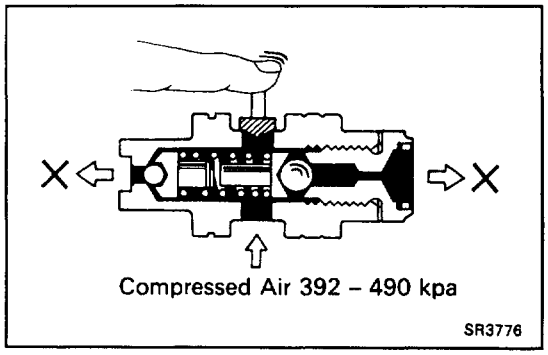


Rotor mark	Cam ring mark	Vane length mm (in.)
None	2	14.995–14.997 (0.59035–0.59043)
1	3	14.993–14.995 (0.59027–0.59035)
2	4	14.991–14.993 (0.59020–0.59027)

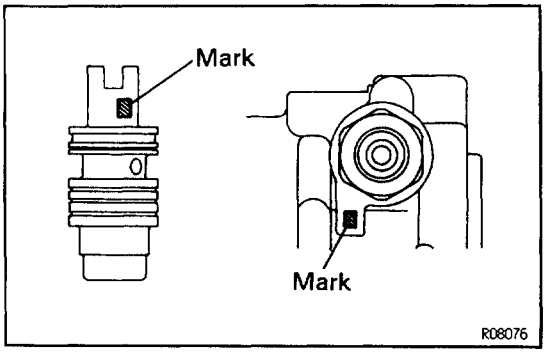


3. INSPECT FLOW CONTROL VALVE

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



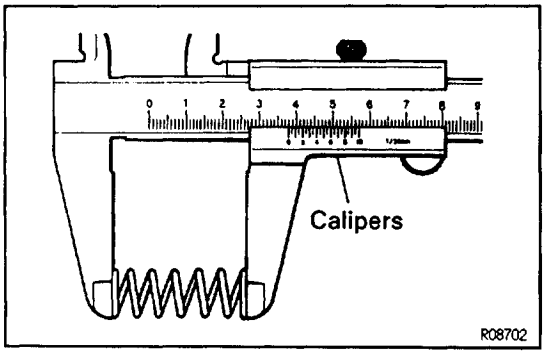
(b) Check the valve for leakage. Close one of the holes and apply 392–490 kPa (4–5 kgf/cm, 57–71 psi) of compressed air into the opposite side, and confirm that air does not come out from the end holes.



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

Inscribed mark:

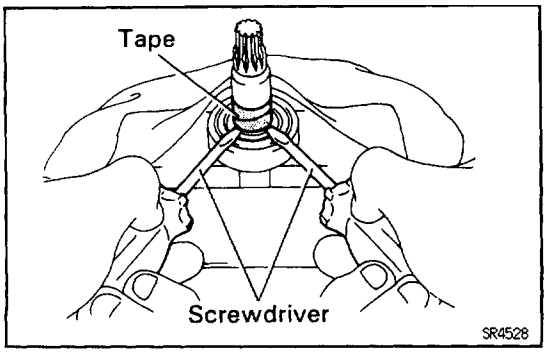
A, B, C, D, E or F



4. INSPECT SPRING

Using calipers, measure the free length of the spring.

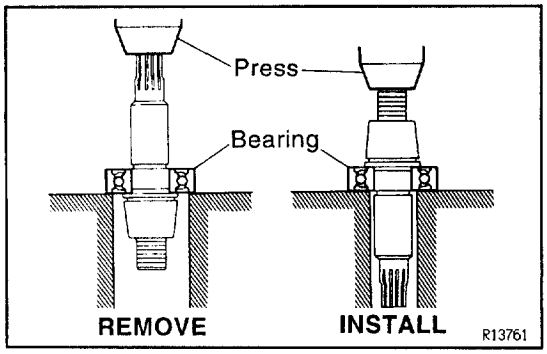
	Minimum mm (in.)
Free length	35–37 (1.38–1.46)



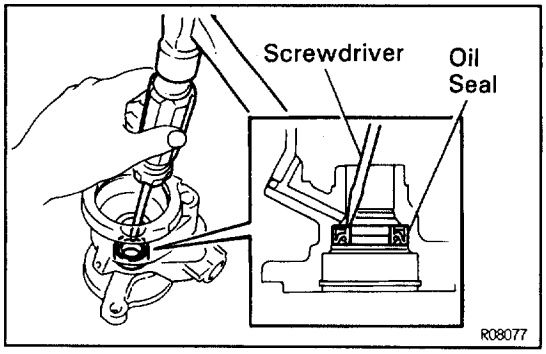
5. IF NECESSARY, REPLACE BEARING

(a) Using 2 screwdrivers, remove the snap ring from the vane pump shaft.

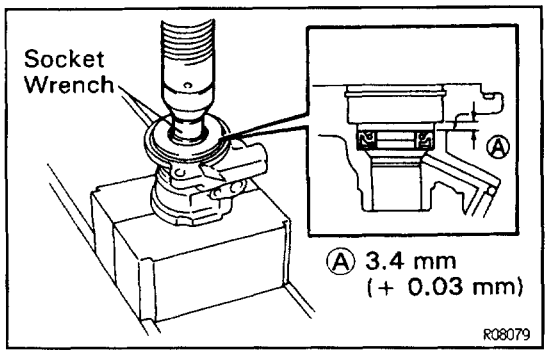
NOTICE: To prevent vane pump shaft damage, wind tape on the shaft.



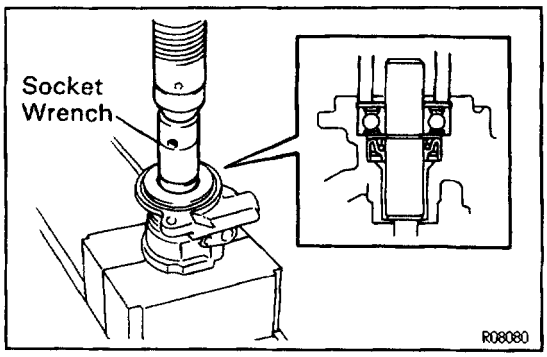
(b) Using a press, press out the bearing.
(c) Using a press, press in a new bearing.
NOTICE: Be careful not to damage the shaft.
(d) Install a new snap ring to the shaft.



6. IF NECESSARY, REPLACE OIL SEAL
(a) Using a screwdriver and hammer, tap out the oil seal from the front housing.
NOTICE: Be careful not to damage the housing.



(b) Coat a new oil seal lip with power steering fluid.
(c) Using a socket wrench (23 mm), press in the oil seal as shown in the illustration.
NOTICE:
- Make sure you install the oil seal facing the correct direction.
- Be careful not to damage the front housing.

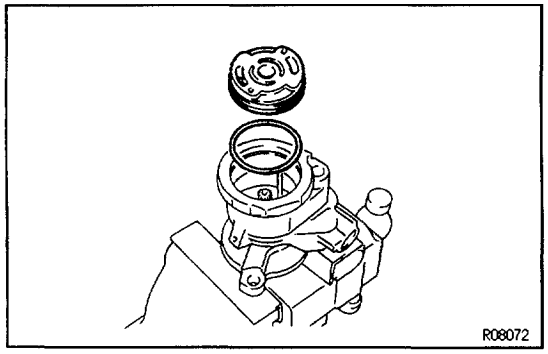


POWER STEERING PUMP ASSEMBLY

NOTICE: When using a vise, do not overtighten it.

1. COAT WITH POWER STEERING FLUID
(See page SR–23)

2. INSTALL VANE PUMP SHAFT WITH BEARING
(a) Using a socket wrench (29 mm), press in the shaft with the bearing to the front housing.
NOTICE: Be careful not to damage the oil seal lip.
(b) Using snap ring pliers, install a new snap ring to the front housing.



3. INSTALL LONGER STRAIGHT PIN

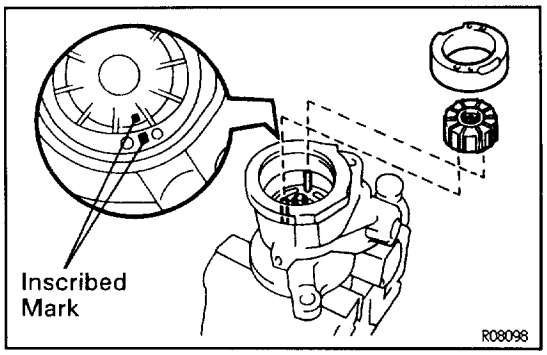
Install a new pin to the front housing.

NOTICE: Be careful not to damage the pin.

4. INSTALL SIDE FRONT PLATE

(a) Coat a new O–ring with power steering fluid.
(b) Install the O–ring to the plate.
(c) Align the hole of the plate and longer straight pin.

NOTICE: Make sure you install the plate facing the correct direction.



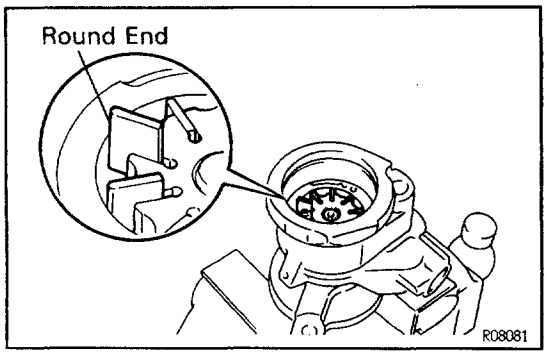
5. INSTALL SHORTER STRAIGHT PIN

Install a new pin to the side front plate.

NOTICE: Be careful not to damage the pin.

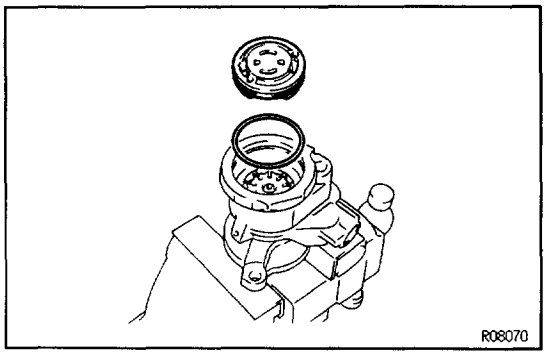
6. INSTALL CAM RING AND VANE PUMP ROTOR

Install the ring and rotor with the inscribed marks facing outward.



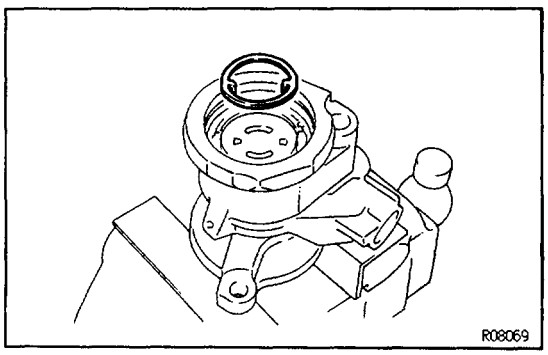
7. INSTALL VANE PLATES

Install the 10 plates with the round end facing outward.



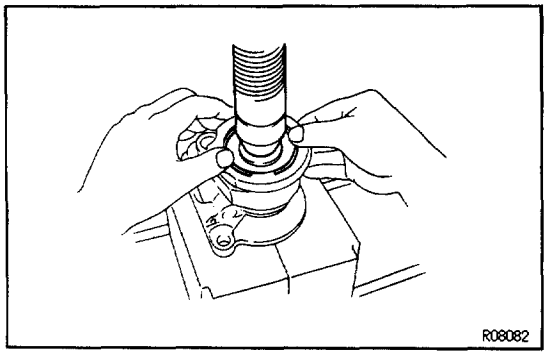
8. INSTALL SIDE REAR PLATE

(a) Coat a new O–ring with power steering fluid.
(b) Install the O–ring to the plate.
(c) Align the holes of the plate with the straight pins.



9. INSTALL WAVE WASHER

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

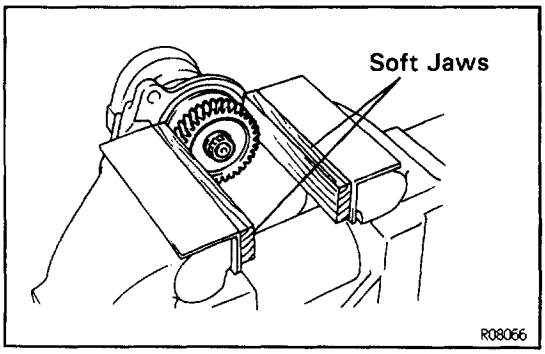


10. INSTALL REAR HOUSING

(a) Coat a new O–ring with power steering fluid.
(b) Install the O–ring to the housing.
(c) Using a press, 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

(a) Install the valve facing the correct direction.
(See page SR–23)



(b) Coat a new O–ring with power steering fluid.
(c) Install the O–ring to the union.
(d) Torque the union.
Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

12. INSTALL VANE PUMP DRIVE GEAR

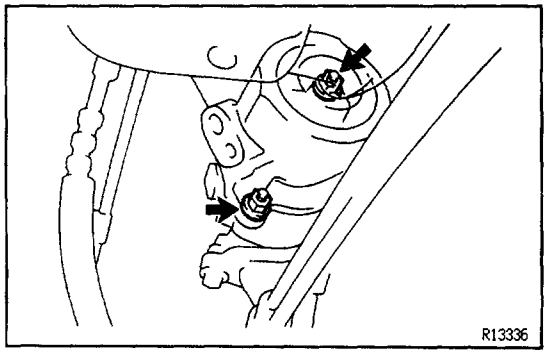
(a) Using soft jaws on a vise, clamp the gear in the vise.
NOTICE: Be careful not to damage the gear.
(b) Torque the gear set bolt.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

13. MEASURE POWER STEERING PUMP ROTATING TORQUE (See page SR–24)

14. INSTALL SUCTION PORT UNION

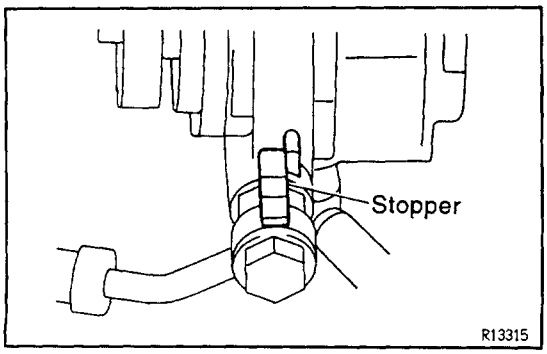
(a) Coat a new O–ring with power steering fluid.
(b) Install the O–ring to the union.
(c) Torque the bolt.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

POWER STEERING VANE PUMP INSTALLATION



1. INSTALL PS VANE PUMP ASSEMBLY

(a) Coat a new O–ring with power steering fluid.
(b) Install the O–ring to the vane pump assembly.
(c) Torque the 2 nuts.
Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)



2. CONNECT PRESSURE FEED TUBE

Torque the union bolt with 2 new gaskets.
Torque: 56 N·m (575 kgf·cm, 42 ft·lbf)
HINT: Make sure the stopper of the tube is touching the PS pump body, as shown then torque the union bolt.

3. CONNECT RETURN HOSE

4. BLEED POWER STEERING SYSTEM
(See page SR–7)