

# Oil Pump

## POWER ASSISTED SYSTEM (POWER STEERING)

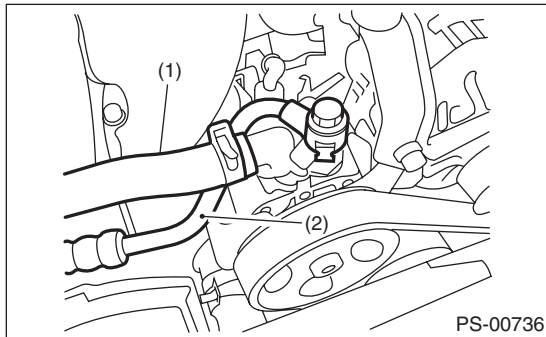
### 7. Oil Pump

#### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the air intake duct. <Ref. to IN(H6DO)-9, REMOVAL, Air Intake Duct.>
- 3) Remove the pulley belt cover.
- 4) Remove the V-belts.
- 5) Disconnect the connector from power steering pump switch.
- 6) Disconnect the pressure hose and suction hose from power steering pump.

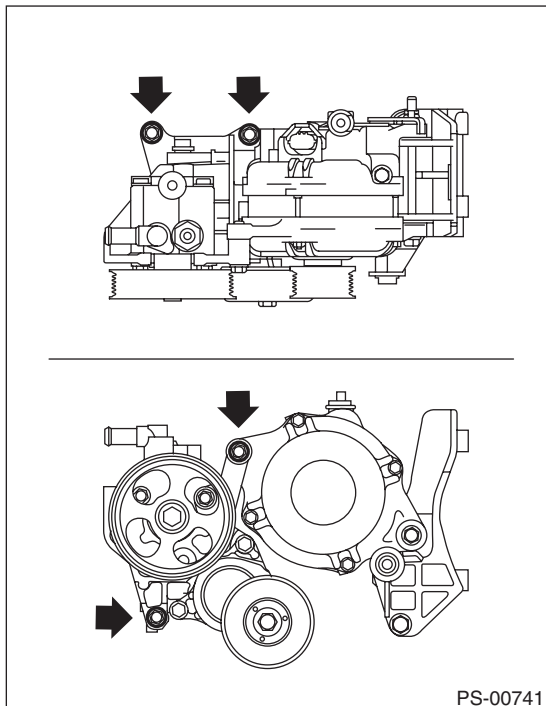
#### CAUTION:

- Do not spill power steering fluid.
- To prevent foreign matter from entering the hose and pipe, cover the open ends with clean cloth.



- (1) Suction hose
- (2) Pressure hose

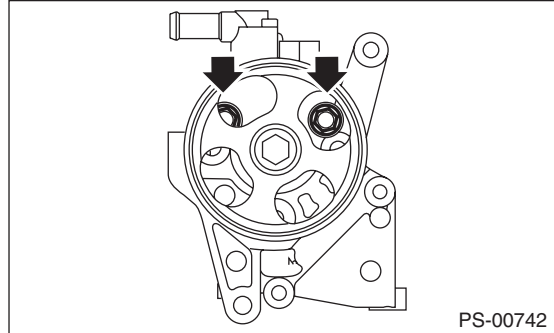
- 7) Remove the installation bolt of the power steering pump bracket.



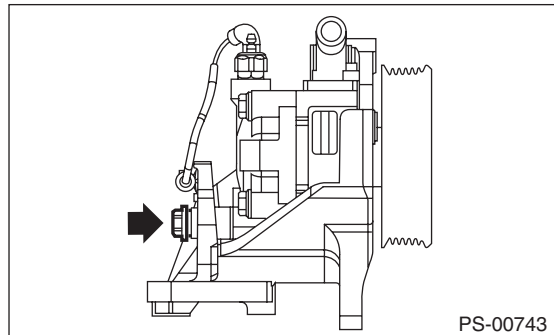
- 8) Place the oil pump bracket in a vise, and remove the two bolts from the front side of the oil pump.

#### CAUTION:

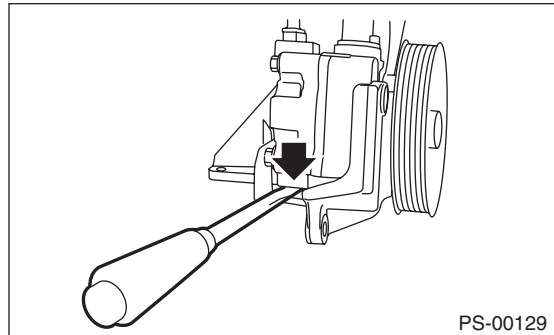
When securing the oil pump bracket in a vise, hold the oil pump bracket with the least possible force between two pieces of wood.



- 9) Remove the bolt from the rear side of oil pump.



- 10) Disassemble the oil pump and bracket by inserting a flat tip screwdriver as shown in the figure.



# Oil Pump

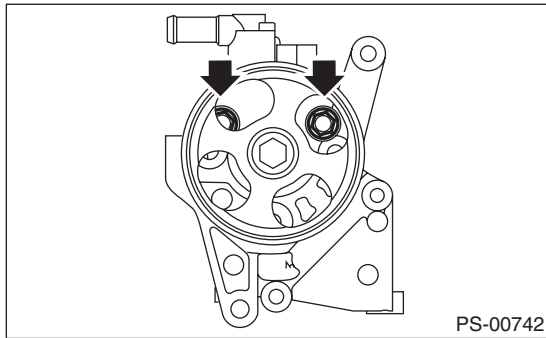
POWER ASSISTED SYSTEM (POWER STEERING)

## B: INSTALLATION

1) Install the oil pump to bracket.

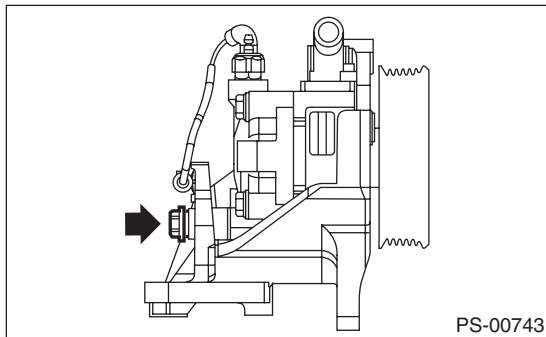
**Tightening torque:**

**15.7 N·m (1.6 kgf-m, 11.6 ft-lb)**



**Tightening torque:**

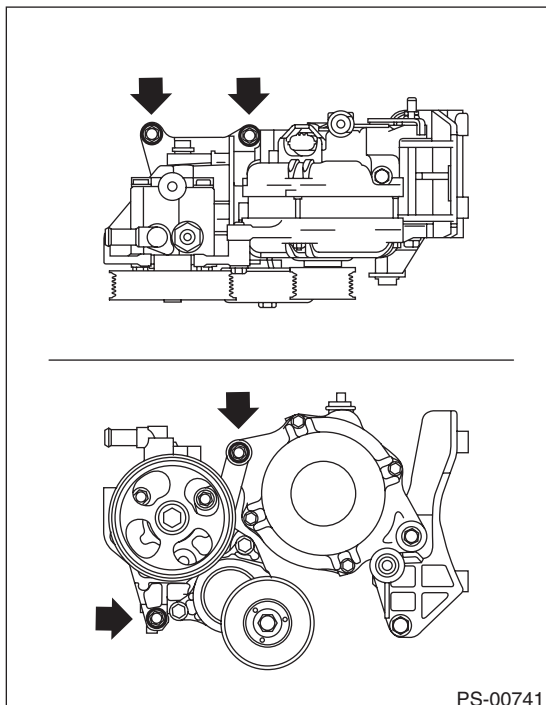
**36.8 N·m (3.8 kgf-m, 27.1 ft-lb)**



2) Install the power steering pump bracket.

**Tightening torque:**

**<Ref. to PS-6, OIL PUMP, COMPONENT, General Description.>**



3) Connect the pressure hose and suction hose.

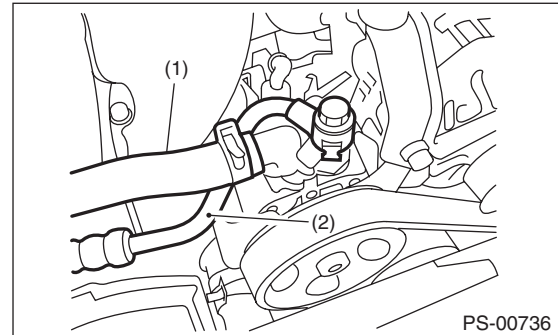
**Tightening torque:**

**Eyebolt**

**40 N·m (4.1 kgf-m, 29.5 ft-lb)**

**CAUTION:**

**Be careful when installing; If the hose is twisted it may come into contact with other parts.**



(1) Suction hose

(2) Pressure hose

4) Connect the connector to the power steering oil pressure switch.

5) After installing the oil pump, fill the oil pump with as much fluid as possible by rotating the pulley by hand.

6) Install the tensioner adjuster.

7) Install the V-belts.

8) Install the cover of the pulley belt.

9) Connect the ground cable to battery.

10) Pour the specified power steering fluid. <Ref. to PS-50, Power Steering Fluid.>

**CAUTION:**

**Never start the engine before filling with fluid; otherwise the vane pump may become seized.**

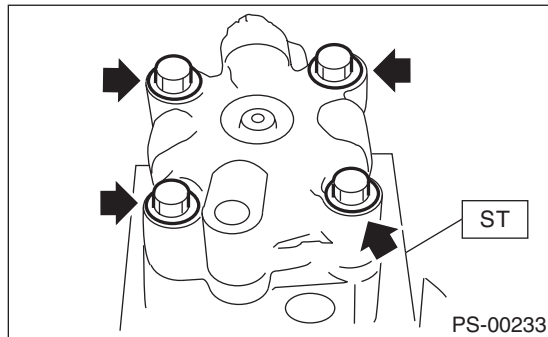
# Oil Pump

## POWER ASSISTED SYSTEM (POWER STEERING)

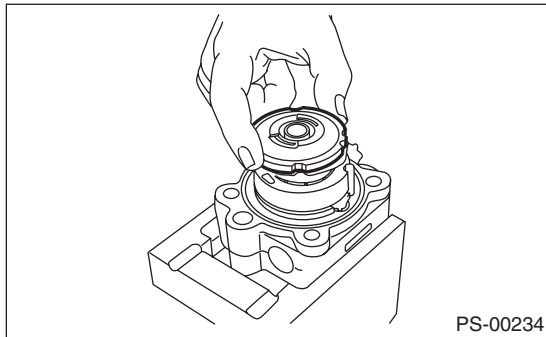
### C: DISASSEMBLY

1) Using the ST, place the oil pump in the vise, and remove the 4 bolts holding the rear body.

ST 34199AE020 ATTACHMENT



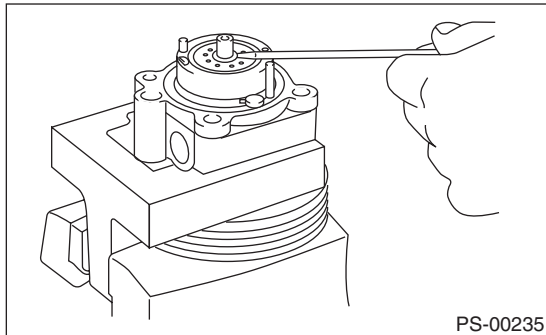
2) Remove the side plate rear.



3) Use a screwdriver to pry the snap ring.

#### CAUTION:

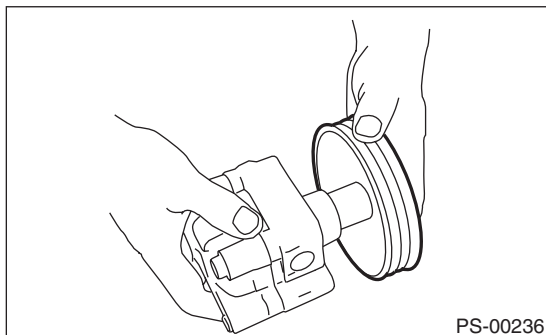
**Do not remove the cam rings and rotors.**



4) Attach the side plate rear.

5) Temporarily tighten the rear body to the front casing.

6) Remove the oil pump pulley.



7) Place the oil pump in the vice.

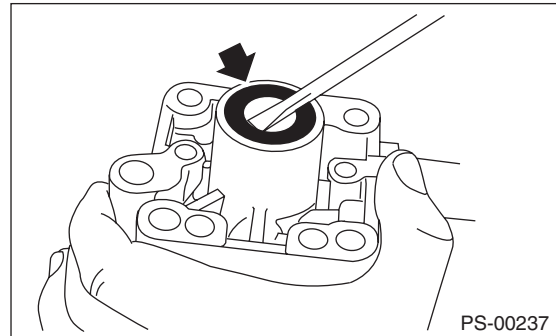
#### CAUTION:

**Do not place the oil pump in the vise directly. Support the oil pump lightly using soft pads to protect it.**

8) Use a screwdriver to pry the oil seal out.

#### CAUTION:

**Be careful not to scratch the inner surface of the casing.**



### D: ASSEMBLY

1) Caution during reassembly

(1) When removing O-rings, oil seals and snap rings, always replace with new parts.

(2) Thoroughly wash the parts and allow to dry. Make sure the parts do not come into contact with cleaning oil or dust.

(3) The reassembly must be performed in a clean place. Make sure lint or other foreign objects do not stick to parts.

(4) Cleaning oil tends to remain inside the front casing. Use compressed air to completely clean out any remaining cleaning oil.

(5) Make sure the parts are not rusted. Once the parts are washed and dried, use a specified hydraulic oil to prevent rust.

(6) Reassemble in the reverse order of removal.

# Oil Pump

## POWER ASSISTED SYSTEM (POWER STEERING)

2) At the bearing positions, apply grease to the oil seal and front casing inner surfaces.

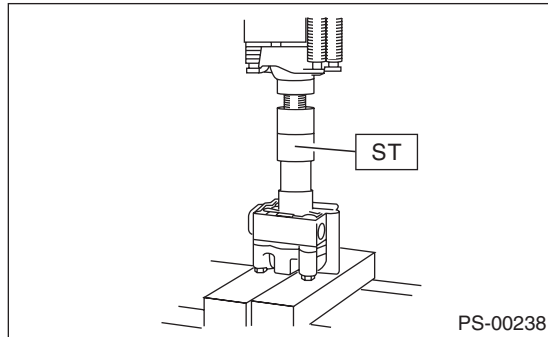
### CAUTION:

**Make sure the inner surface of the front casing is not damaged.**

3) Temporarily tighten the rear body to the front casing.

4) Attach ST to the front casing. Using the press, install the oil seal.

ST 34199AE030 INSTALLER



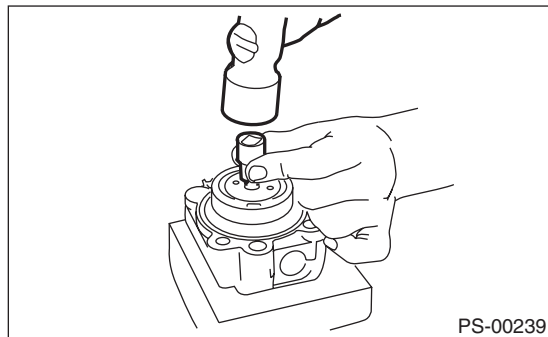
5) Install the pump pulley to front casing.

6) Using the ST, place the oil pump in a vise.

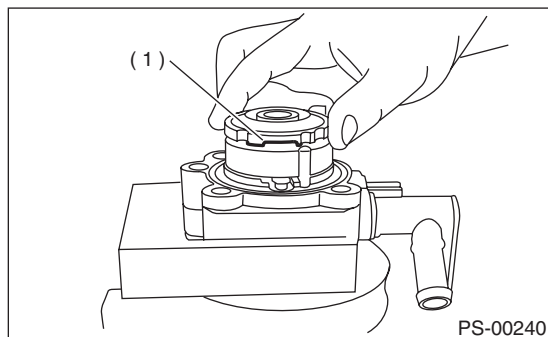
ST 34199AE020 ATTACHMENT

7) Remove the rear body.

8) Using a 10 mm box wrench, tap the snap ring into the shaft groove.



9) Install the side plate rear as shown in the figure.



(1) Groove

10) Apply the specified power steering fluid to the O-rings, and attach to the front casing and side plate rear.

11) Install the back-up ring to the side plate rear.

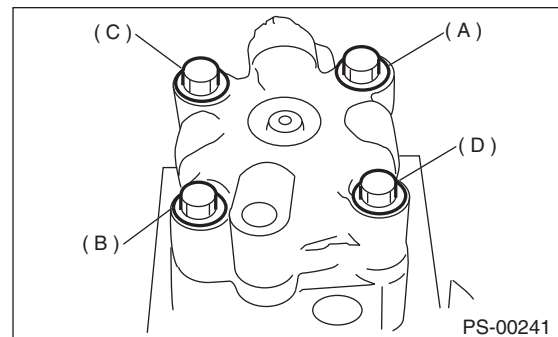
12) With knock pin positions aligned, install the rear body.

### Tightening torque:

**27.5 N·m (2.8 kgf·m, 20.3 ft·lb)**

### CAUTION:

**Temporarily tighten the bolts in the order of (A), (B), (C), (D) as shown in the figure. Then, tighten in the same sequence.**



13) When reassembly is complete, turn the shaft by hand to make sure that rotation is smooth. If it is excessively tight or there is a clear problem, detach and check for foreign objects on the slide surface, or whether there is any problems in the attachment, and remove the cause of the problem.

# Oil Pump

## POWER ASSISTED SYSTEM (POWER STEERING)

### E: INSPECTION

#### 1. BASIC INSPECTION

Perform the following inspection procedures and replace faulty parts.

| No. | Parts               | Inspection                                 | Corrective action                                                                                                                                                                                          |
|-----|---------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Oil pump (Exterior) | (1) Crack, damage or oil leakage           | Replace the oil pump with a new part.                                                                                                                                                                      |
|     |                     | (2) Play of pulley shaft                   | Measure the radial play and axial play. If any of these exceeds the service limit, replace the oil pump with a new part.                                                                                   |
| 2   | Pulley              | (1) Damage                                 | Replace with a new part.                                                                                                                                                                                   |
|     |                     | (2) Bend                                   | Measure the V groove deflection. If it exceeds the service limit, replace the oil pump with a new part.                                                                                                    |
| 3   | Oil pump (Interior) | (1) Faulty or seized of vane pump          | Check the rotating resistance of pulley. If it exceeds the service limit, replace the oil pump with new part.                                                                                              |
|     |                     | (2) Bend in the shaft or damage to bearing | If the a string is wrapped on the pulley and rotated, and the oil pump emits a noise that is markedly different in tone and loudness from a sound of a new oil pump, replace the oil pump with a new part. |
| 4   | O-ring              | Cracking or deterioration                  | Replace with a new part.                                                                                                                                                                                   |
| 5   | Bracket             | Cracks                                     | Replace with a new part.                                                                                                                                                                                   |

#### 2. SERVICE LIMIT

Make a measurements as follows. If it exceeds the service limit, replace with a new part.

##### CAUTION:

- When securing the oil pump on a vise, hold the oil pump with the least possible force between two pieces of wood.
- Do not set the outside of flow control valve or pulley on a vise; otherwise outside or pulley might be deformed. Select properly sized wood pieces.

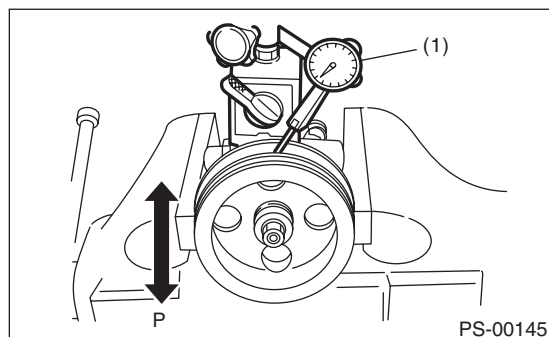
1) Play of the pulley shaft

##### Condition:

**P:** When applying the force of 9.8 N (1.0 kgf, 2.2 lb)

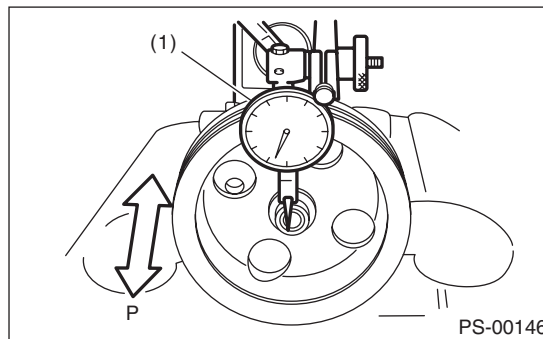
##### Service limit:

**Play in the radial direction (Direction ◀ ▶)**  
0.2 mm (0.008 in) or less



(1) Dial gauge

**Axial play (Direction ⇐ ⇒)**  
0.6 mm (0.024 in) or less



(1) Dial gauge

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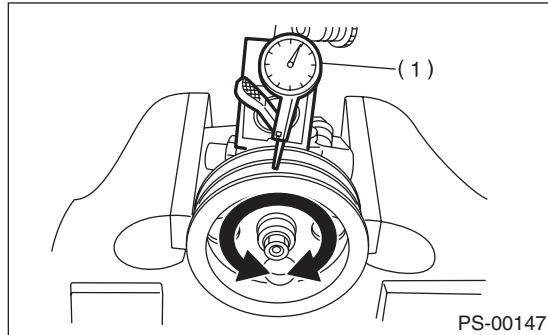
## 2) Deflection of the pulley groove

### Service limit:

**1.0 mm (0.039 in) or less**

### NOTE:

Read the value for one surface of V ditch, and then the value for another off the dial.



(1) Dial gauge

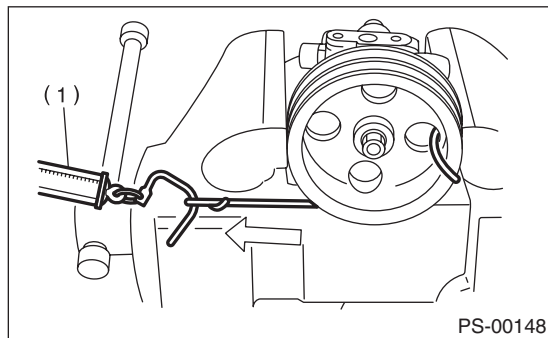
## 3) Rotating resistance of pulley

### Service limit:

**Maximum load: 9.22 N (0.94 kgf, 2.07 lb) or less**

### NOTE:

- A rather higher value may be indicated when pulley starts turning.
- Measure the load during rotation to make a judgment.



(1) Spring scale

## 3. HYDRAULIC PRESSURE

### NOTE:

- To measure hydraulic pressure correctly, be sure to complete all the items in "INSPECTION", prior to performing the measurement. <Ref. to PS-51, INSPECTION, General Diagnostic Table.>
- Do not leave the valve of pressure gauge closed or hold the steering wheel at lock for 5 seconds or more in any case, this can damage the oil pump.
- Before attaching a pressure gauge, place cloth at locations where fluid is expected to spill. Wipe off any spilt fluid completely after the measurement.

### 1) Regular pressure measurement

(1) Connect the ST1, ST2 and ST3.

ST1 925711000 PRESSURE GAUGE

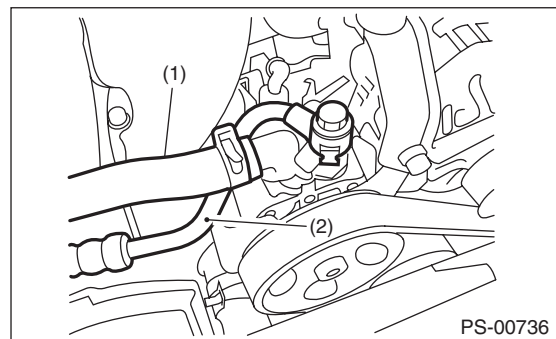
ST2 34099AC020 ADAPTER HOSE B

ST3 34099AC010 ADAPTER HOSE A

(2) Remove the air intake duct.

(3) Disconnect the pressure hose from the pump.

(4) Using the gasket (Part No. 34621AC024) and bolt (Part No. 34620AC010), install the ST2 to pump instead of pressure hose.



(1) Suction hose

(2) Pressure hose

(5) Attach the ST3 to the end of pressure hose which is removed from pump.

(6) Replenish power steering fluid up to the specified level.

(7) Open the valve, and start the engine.



# Oil Pump

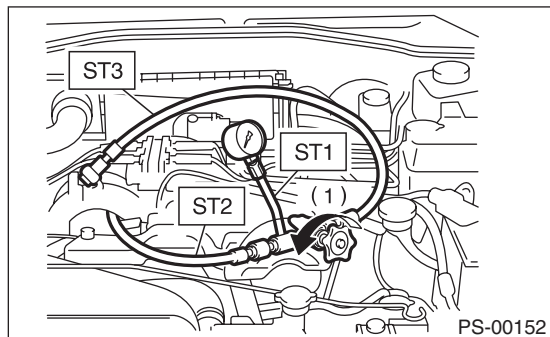
## POWER ASSISTED SYSTEM (POWER STEERING)

(8) Measure the regular pressure.

ST1 925711000 PRESSURE GAUGE

ST2 34099AC020 ADAPTER HOSE B

ST3 34099AC010 ADAPTER HOSE A



(1) Valve

### Service limit:

**981 kPa (10 kg/cm<sup>2</sup>, 142 psi), or less**

(9) If it is not within the specification, replace the faulty part for the following problems. (Pipe or hose clogged, leaks from fluid line, and mixture of foreign matter in fluid line)

2) Measure the relief pressure.

(1) Using the ST, measure the relief pressure.

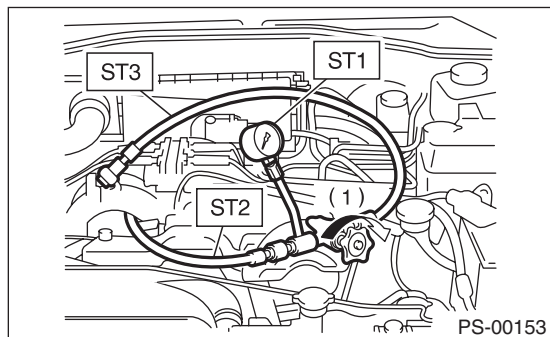
(2) Close the valve.

(3) Measure the relief pressure.

ST1 925711000 PRESSURE GAUGE

ST2 34099AC020 ADAPTER HOSE B

ST3 34099AC010 ADAPTER HOSE A



(1) Valve

### Service limit:

**8,800 — 9,400 kPa (90 — 96 kg/cm<sup>2</sup>, 1,276 — 1,363 psi)**

(4) If the torque is not within specified range, replace the oil pump.

3) Measure the working pressure.

(1) Using the ST, measure the working pressure.

(2) Open the valve.

(3) Measure the working pressure of control valve by turning steering wheel from stop to stop.

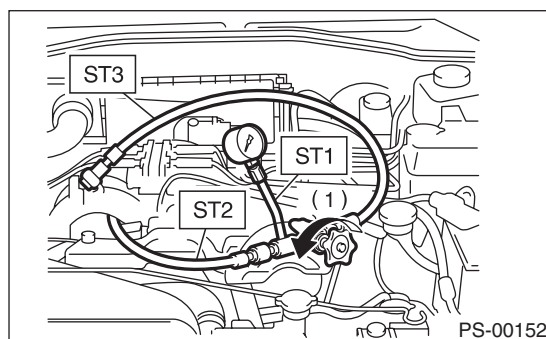
### NOTE:

Because of the power steering system setup, there are conditions where the pressure will not rise to the repair limit value even if the steering wheel is turned to the maximum steering angle. In this case, turn the steering wheel further than the maximum steering angle to measure the operational pressure.

ST1 925711000 PRESSURE GAUGE

ST2 34099AC020 ADAPTER HOSE B

ST3 34099AC010 ADAPTER HOSE A



(1) Valve

### Service limit:

**8,800 — 9,400 kPa (90 — 96 kg/cm<sup>2</sup>, 1,276 — 1,363 psi)**

(4) If it is out of specification, measure the steering effort. <Ref. to PS-54, MEASUREMENT OF STEERING EFFORT, INSPECTION, General Diagnostic Table.> If it is not within specification, replace the control valve itself or control valve and pinion as a single unit, using new parts.