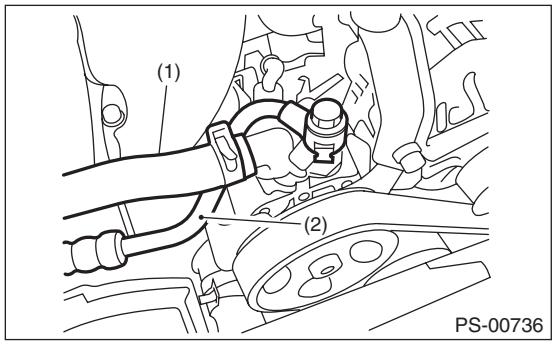
7. Oil Pump

A: REMOVAL

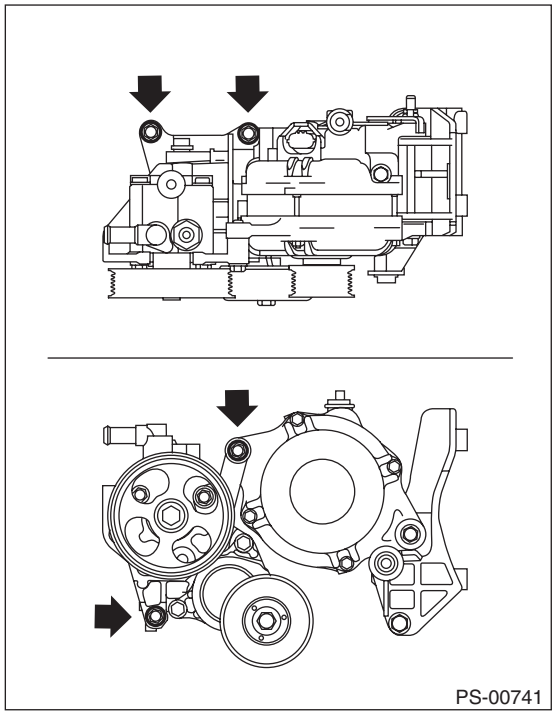
1) Disconnect the ground cable from the battery.
2) Remove the air intake duct. <Ref. to IN(H6DO)-7, REMOVAL, Air Intake Duct.>
3) Remove the pulley belt cover.
4) Remove the V-belts.
5) Disconnect the connector from power steering pump switch.
6) Disconnect the pressure hose and suction hose from power 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.



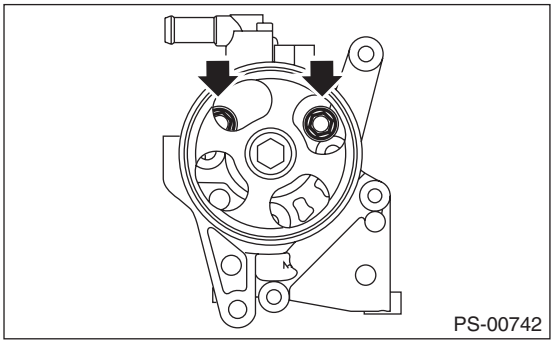
(1) Suction hose
(2) Pressure hose

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

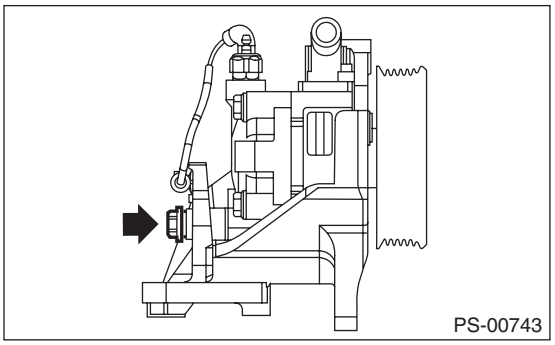


8) Place the oil pump bracket in a vise, and remove the two bolts from the front side of the oil pump.

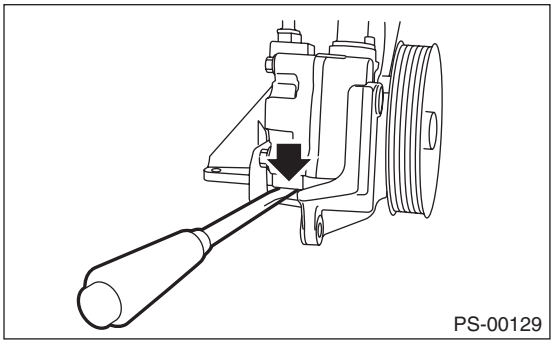
CAUTION:
When securing the oil pump bracket in a vice, hold the oil pump bracket with the least possible force between two pieces of wood.



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.



B: INSTALLATION

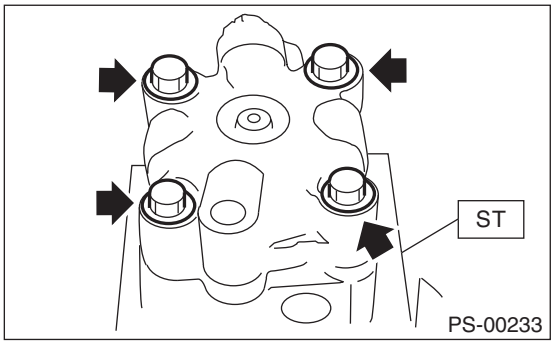
1) Install in the reverse order of removal.
2) Replace the fluid and perform air purge.

Tightening torque:
<Ref. to PS-7, OIL PUMP, COMPONENT, General Description.>

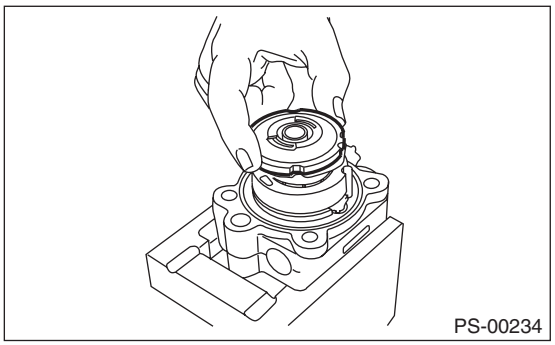
CAUTION:
Never start the engine before filling with fluid, as doing so may cause the vane pump to seize.

C: DISASSEMBLY

1) Using the ST, place the oil pump in the vise, and remove the 4 bolts holding the rear cover.
ST 34199AE020 MOUNT

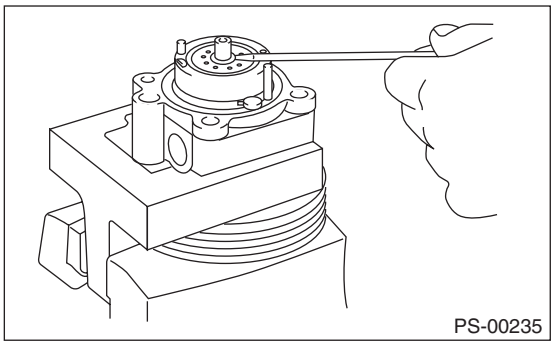


2) Remove the pressure plate.

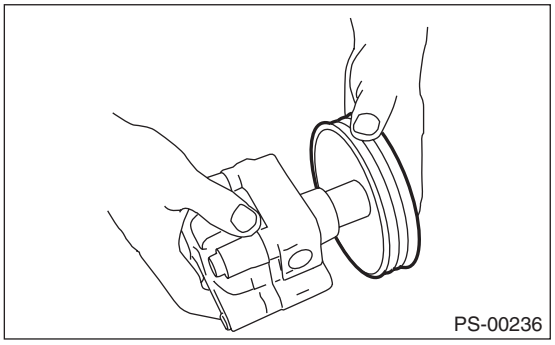


3) Use a screw driver to pry the retaining ring.

CAUTION:
Do not remove the cam rings and rotors.



4) Install the pressure plate.
5) Temporarily tighten the rear cover to the front casing.
6) Remove the oil pump pulley.

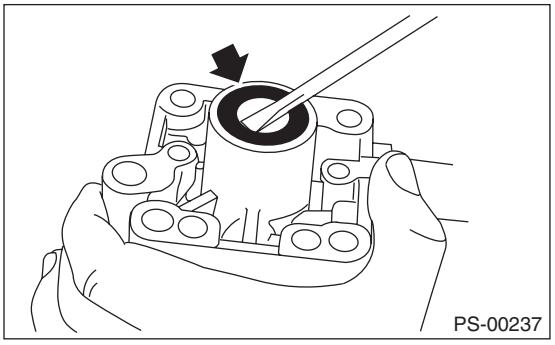


7) Place the oil pump in the vice.

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 screw driver to pry the oil seal out.

CAUTION:
Be careful not to scratch the inner surface of the casing.



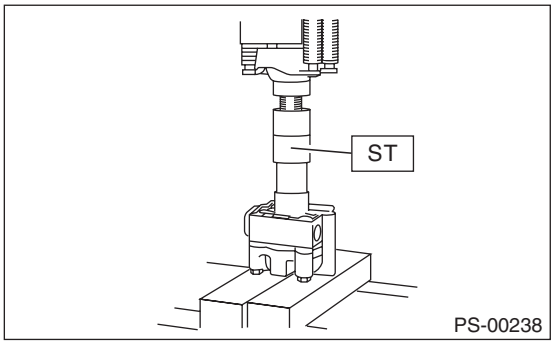
D: ASSEMBLY

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

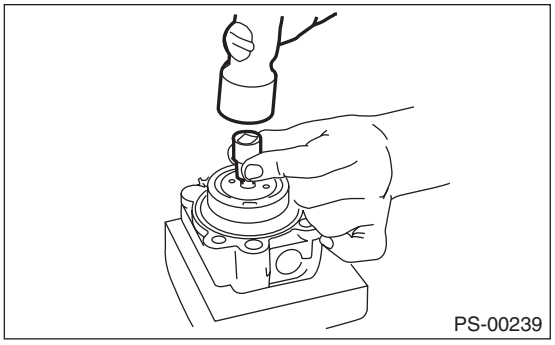
CAUTION:
Make sure the inner surface of the front body is not damaged.

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

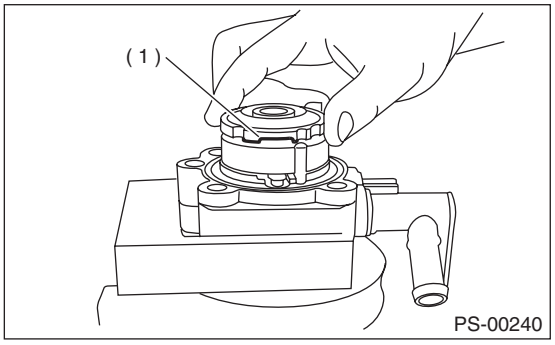
4) Attach ST to the front body. Using the press, install the oil seal.
ST 34199AE030 INSTALLER



5) Install the pump pulley to front body.
6) Using the ST, place the oil pump in a vise.
ST 34199AE020 MOUNT
7) Remove the rear cover.
8) Using a 10 mm box wrench, tap the retaining ring into the shaft groove.



9) Install the pressure plate as shown in the figure.

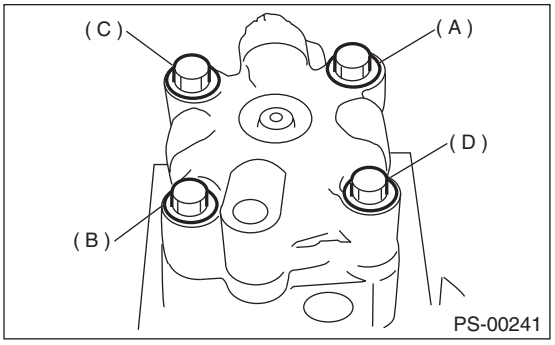


(1) Groove

10) Apply the specified hydraulic oil to the O-rings, and attach to the front casing and pressure plate.
11) Install the seal ring to the pressure plate.
12) With knock pin positions aligned, install the rear cover.

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.

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 pulley 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	Cracking	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.**

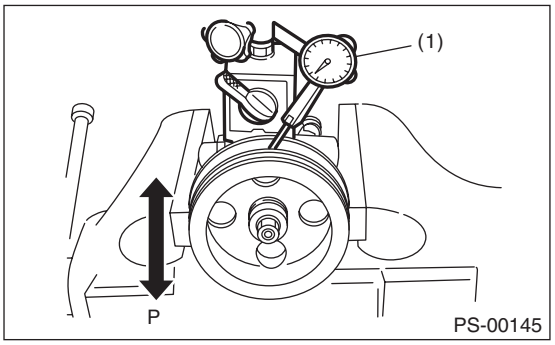
1) Play of the pulley shaft

Condition:

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

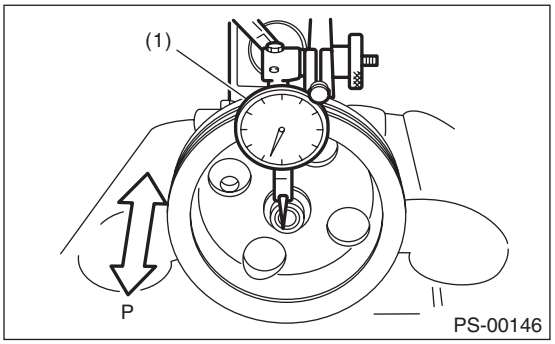
Service limit:

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

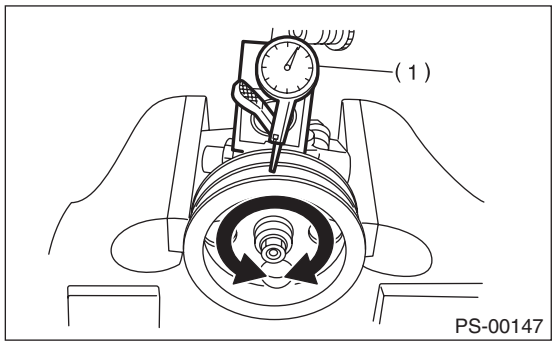


(1) Dial gauge

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.

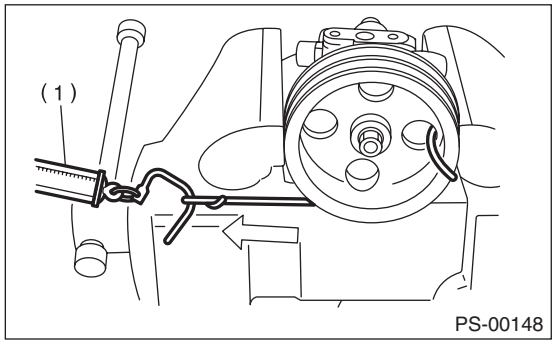


(1) Dial gauge

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

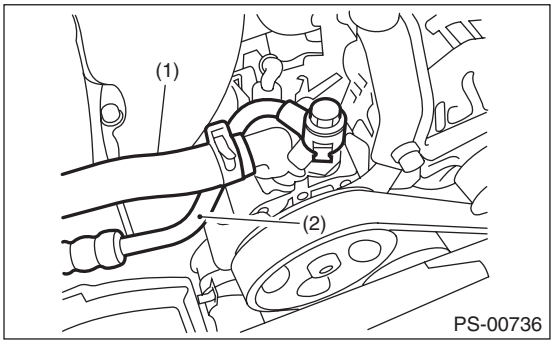
3. HYDRAULIC PRESSURE

NOTE:
• To measure hydraulic pressure correctly, be sure to complete all the items in “INSPECTION”, prior to performing the measurement. <Ref. to PS-50, 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 a wastecloth at locations where fluid can be 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 pipe C from pump.
(4) Using the gasket (Part No. 34621AC021) and bolt (Part No. 34620AC010), install the ST2 to pump instead of pressure hose.

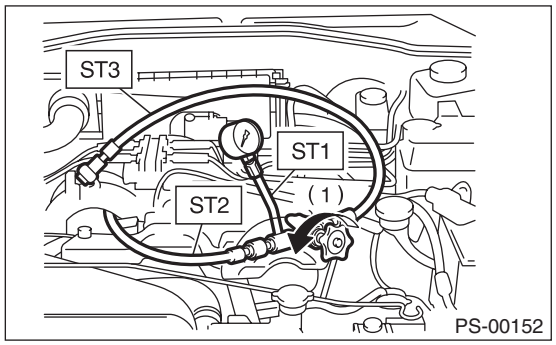


(1) Suction hose
(2) Pressure hose

(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.

(8) Measure the regular pressure.

ST1 925711000 PRESSURE GAUGE
ST2 34099AC020 ADAPTER HOSE B
ST3 34099AC010 ADAPTER HOSE A



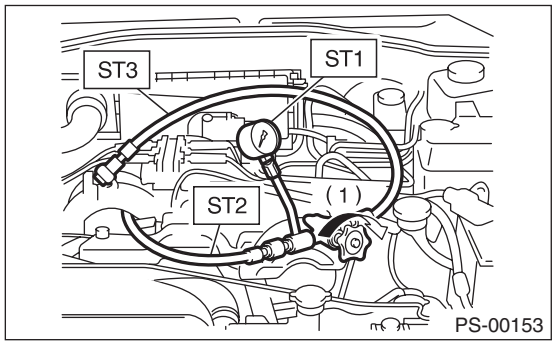
(1) Valve

Service limit:
981 kPa (10 kg/cm^2, 142 psi) or less

(9) If it is not within the specification, replace the problem 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 STs, 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

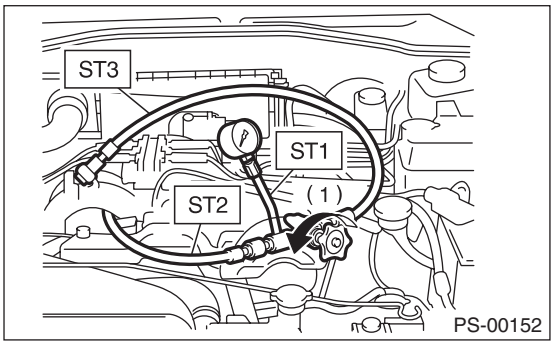
Service limit:
8,800 — 9,400 kPa (90 — 96 kg/cm^2, 1,276 — 1,363 psi)

(4) If it is not within the specification, 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^2, 1,276 — 1,363 psi)

(4) If it is out of specification, measure the steering effort. <Ref. to PS-53, 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.