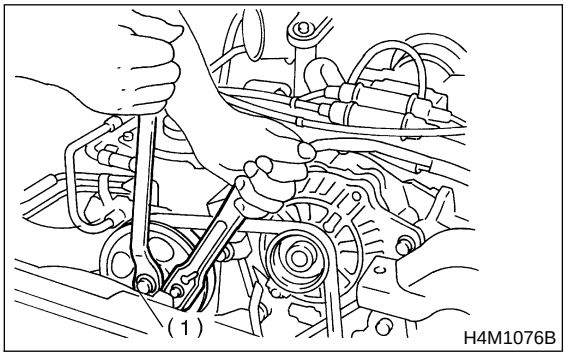
6. Oil Pump (Power Steering System)

A: REMOVAL

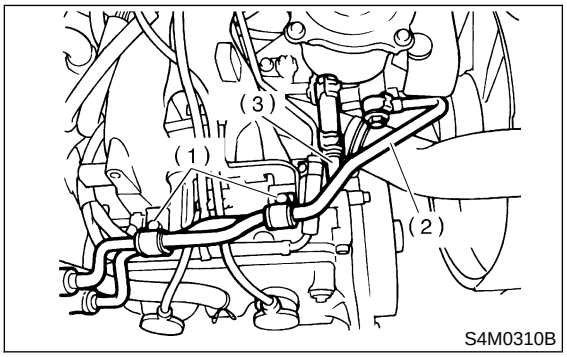
1) Remove ground cable from battery.
2) Drain the working fluid about 0.3 ℓ (0.3 US qt, 0.3 Imp qt) from oil tank.
3) Remove pulley belt cover bracket.
4) Loosen oil pump pulley nut, then remove bolts which secure generator.



(1) Oil pump pulley nut

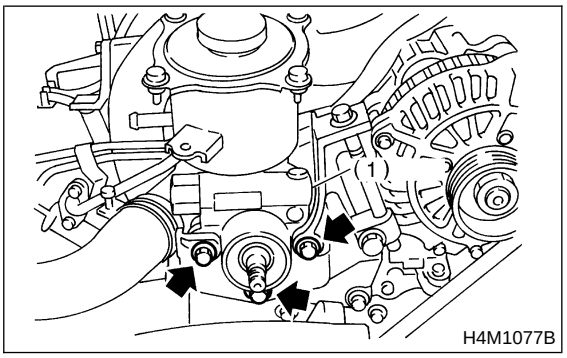
5) Loosen pulley belt(s).
6) Remove the nut and detach oil pump pulley.
7) Disconnect pipe C from oil pump. Disconnect pipe D from oil tank.

CAUTION:
● Do not allow fluid from the hose end to come into contact with pulley belt.
● To prevent foreign matter from entering the hose and pipe, cover the open ends of them with a clean cloth.
● Except when only oil tank needs to be inspected, detach oil tank and oil pump as a unit. Then separate one from the other on a work bench to prevent oil from spilling on any part of the engine.



(1) Bolt A
(2) Pipe C
(3) Pipe D

8) Remove the three bolts from the front side of oil pump and detach the pump.



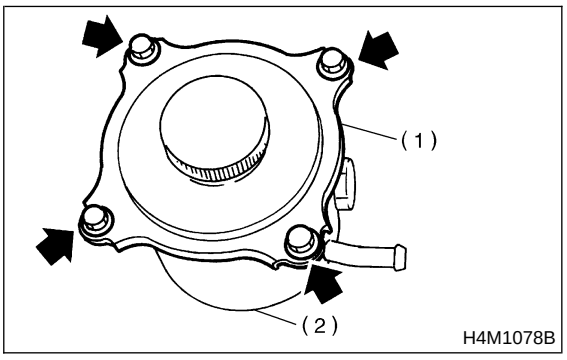
(1) Oil pump

9) Remove the three bolts from the lower side of bracket and detach the bracket.

CAUTION:
The bracket does not need to be removed unless it is damaged.

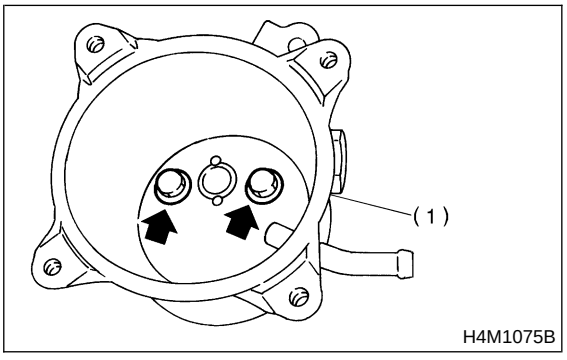
10) Place oil pump in a vise, and remove upper shell and baffle from lower shell.

CAUTION:
Do not clamp oil pump too hard; otherwise oil pump may be dented.



(1) Upper shell
(2) Lower shell

11) Remove lower shell from oil pump.



(1) Lower shell

B: CHECK

● In accordance with the following table, check all removed parts for wear and damage, and make repair or replacement if necessary.

No.	Parts	Inspection	Corrective action
1	Oil pump (Exterior)	(1) Crack, damage or oil leakage	Replace oil pump with a new one.
		(2) Play of pulley shaft	Measure radial play and axial play. If any of these exceeds the service limit, replace oil pump with a new one. <Ref. to 4-3 [W6B1].>
2	Pulley	(1) Damage	Replace it with a new one.
		(2) Bend	Measure V ditch deflection. If it exceeds the service limit, replace pulley with a new one. <Ref. to 4-3 [W6B1].>
3	Cap	Crack or damage	Replace it with a new one.
4	Strainer	(1) Clogging with dirt	Wash it.
		(2) Breakage	Replace it with a new one.
5	Oil pump (Interior)	(1) Defect or burning of vane pump	Check resistance to rotation of pulley. If it is past the service limit, replace oil pump with a new one. <Ref. to 4-3 [W6B1].>
		(2) Bend in the shaft or damage to bearing	Oil pump emits a noise that is markedly different in tone and loudness from a sound of a new oil pump when turning with a string put around its pulley, replace oil pump with a new one.
6	O-ring	Crack or deterioration	Replace it with a new one.
7	Oil tank	Crack, damage or oil leakage	Replace it with a new one.
8	Bracket	Crack	Replace it with a new one.

1. SERVICE LIMIT

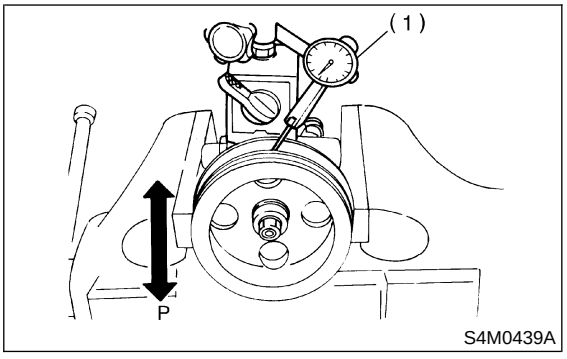
Make a measurement as follows. If it exceeds the specified service limit, replace the parts with new ones.

CAUTION:
● Fix oil pump on a vise to make a measurement. At this time, hold oil pump with the least possible force between two wood pieces.
● Do not set outside of flow control valve or pulley on a vise; otherwise outside or pulley might be deformed. Select properly sized wood pieces.

● **Play of pulley shaft**

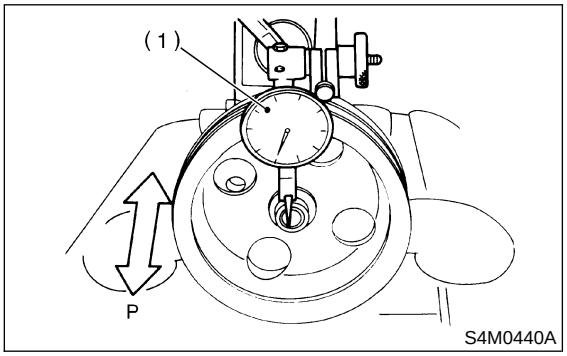
On condition:
P: 9.8 N (1.0 kg, 2.2 lb)

Service limit:
Radial play (Direction ⟷)
0.4 mm (0.016 in) or less



(1) Dial indicator

Axial play (Direction ⇔)
0.9 mm (0.035 in) or less

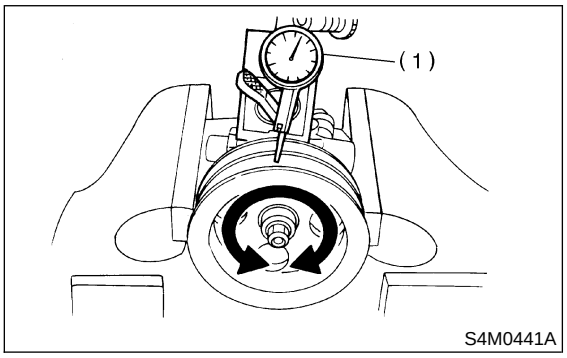


(1) Dial indicator

- **Ditch deflection of pulley**

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.

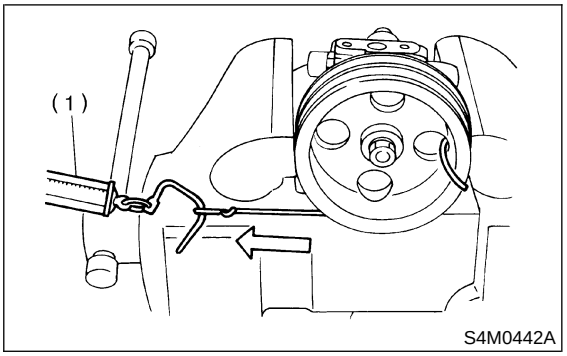


(1) Dial indicator

- **Resistance to rotation of pulley**

Service limit:
Maximum load; 9.22 N (0.94 kg, 2.07 lb) or less

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



(1) Spring balance

C: INSTALLATION

1) Install bracket on engine.

Tightening torque:
22±2 N·m (2.2±0.2 kg-m, 15.9±1.4 ft-lb)

2) Install oil pump on oil tank as follows outside the vehicle:

NOTE:
Prior to installation, make sure that all oil is removed from oil pump, oil tank and pipe.

(1) Place oil pump in a vise and install stay to oil pump.

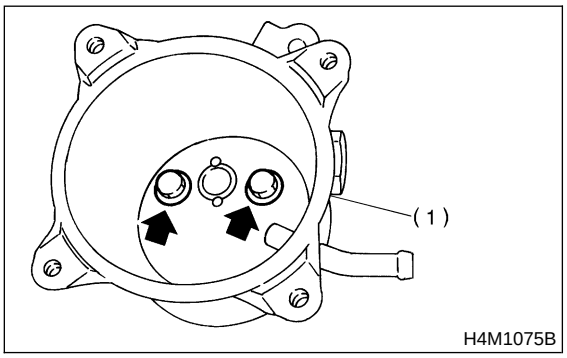
CAUTION:
Do not place oil pump directly in vise; use soft pads and hold oil pump lightly to protect it.

Tightening torque:
15.7±2.4 N·m (1.60±0.24 kg-m, 11.6±1.7 ft-lb)

(2) Install lower shell to oil pump.

Tightening torque:
18^{+5}_{0} N·m ($1.8^{+0.5}_{0}$ kg-m, $13.0^{+3.6}_{0}$ ft-lb)

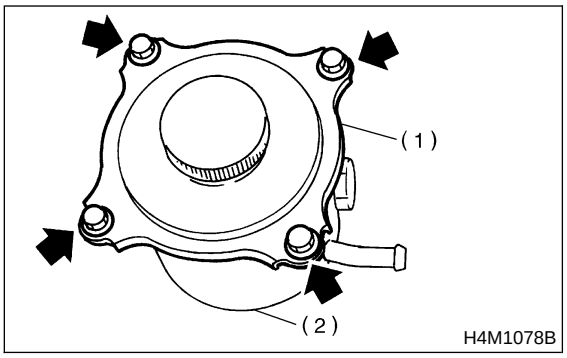
CAUTION:
Be sure to use a new seal washer.



(1) Lower shell

(3) Install upper shell and baffle to lower shell.

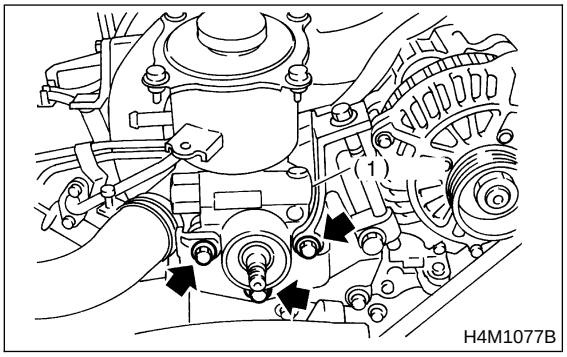
Tightening torque:
13±3 N·m (1.3±0.3 kg-m, 9.4±2.2 ft-lb)



(1) Upper shell
(2) Lower shell

3) Install oil pump, previously assembled to oil tank, on bracket.

Tightening torque:
18^{+5}_{0} N·m ($1.8^{+0.5}_{0}$ kg-m, $13.0^{+3.6}_{0}$ ft-lb)



(1) Oil pump

4) Place oil pump pulley and tighten pulley nut temporarily.

5) Install pulley belt to oil pump.
6) Tighten oil pump pulley nut to the specified torque.

Tightening torque:
52±10 N·m (5.3±1.0 kg-m, 38±7 ft-lb)

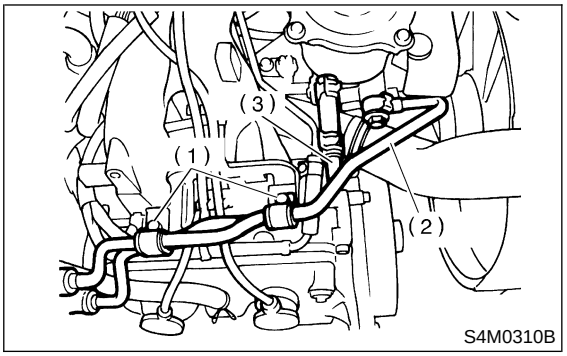
7) Check pulley belt tension. <Ref. to 1-5 [G2A0].>
8) Tighten bolt belt tension.

Tightening torque:
8±2 N·m (0.8±0.2 kg-m, 5.8±1.4 ft-lb)

9) Interconnect pipes C and D.

Tightening torque:
Eye bolt
39±5 N·m (4.0±0.5 kg-m, 28.9±3.6 ft-lb)

CAUTION:
If a hose is twisted at this step, the hose may come into contact with some other parts.



(1) Bolt A
(2) Pipe C
(3) Pipe D

10) Install pulley belt cover bracket.
11) Connect minus terminal of battery.
12) Feed the specified power steering fluid and discharge air. <Ref. to 4-3 [W7A0].>

CAUTION:
Never start the engine before feeding the fluid; otherwise vane pump might be seized up.