

GROUP 3 PUMP DEVICE

1. REMOVAL AND INSTALL

1) REMOVAL

- (1) Lower the work equipment to the ground and stop the engine.
- (2) Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping
- (3) Loosen the breather slowly to release the pressure inside the hydraulic tank.

▲ Escaping fluid under pressure can penetrate the skin causing serious injury.

- (4) Loosen the drain plug under the hydraulic tank and drain the oil from the hydraulic tank.

· Hydraulic tank quantity : 20 l

(5.3 U.S.gal)

- (5) Disconnect hoses (71) and remove connectors (32, 33).
- (6) Disconnect pilot line hoses (70, 72) and remove connectors (10, 30, 32).
- (7) Remove socket bolts (54) and disconnect pump suction tube (9).

※ When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.

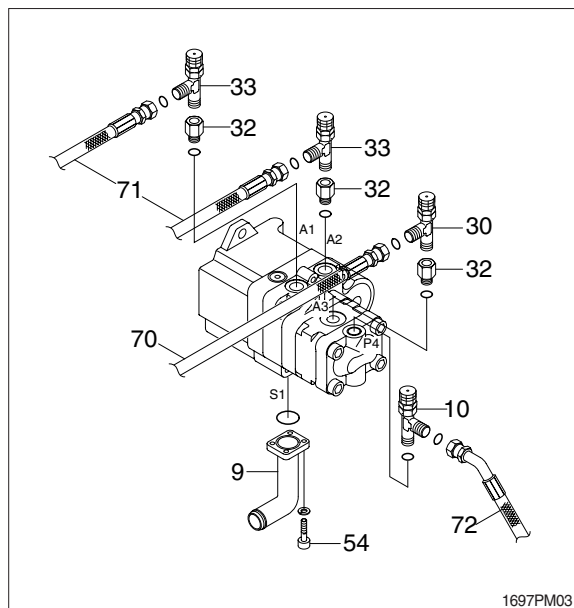
- (8) Sling the pump assembly and remove the pump mounting bolts.

· Weight : 17 kg (37 lb)

※ Pull out the pump assembly from housing. When removing the pump assembly, check that all the hoses have been disconnected.



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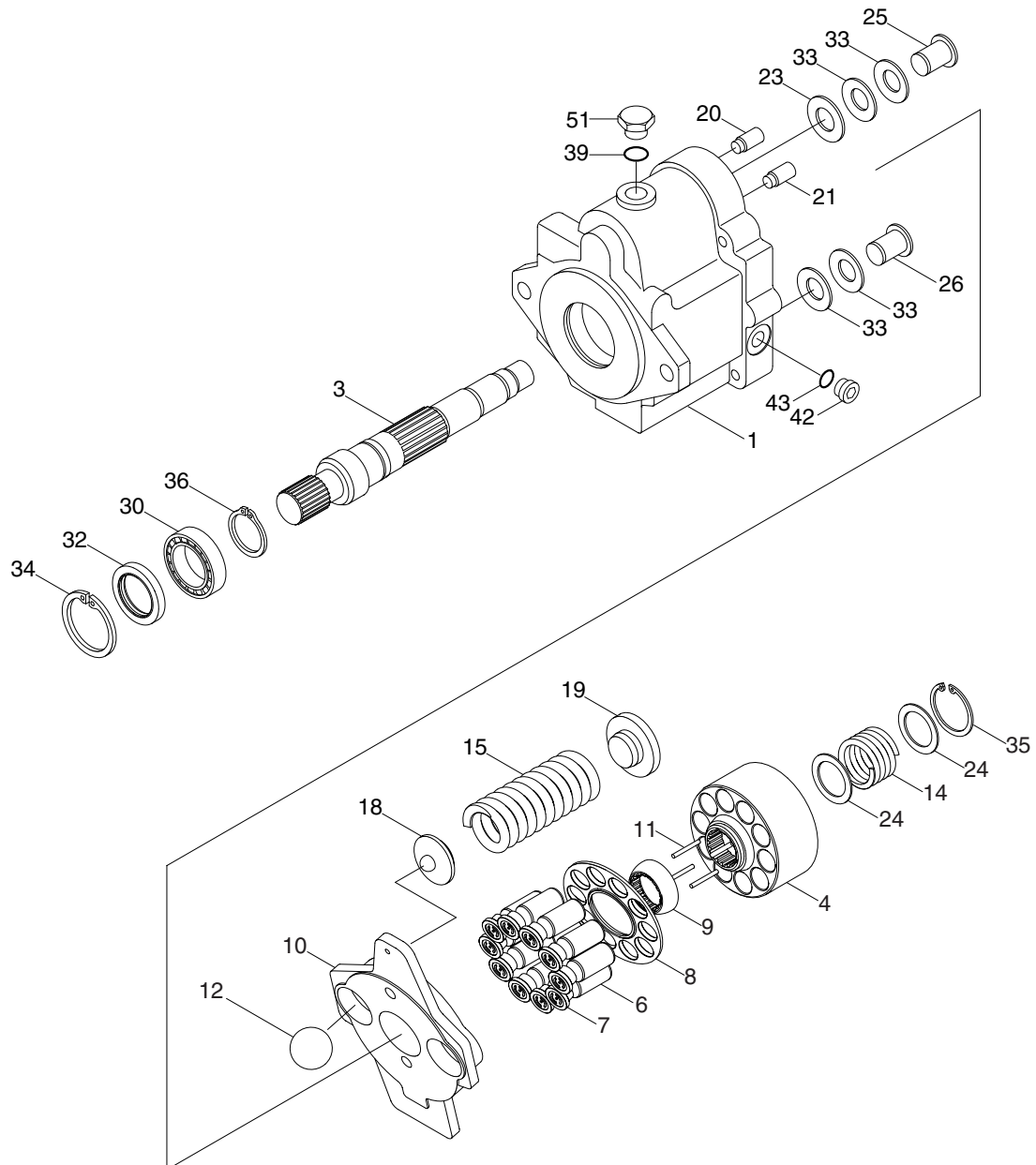
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2) INSTALL

- (1) Carry out installation in the reverse order to removal.
- (2) Remove the suction strainer and clean it.
- (3) Replace return filter with new one.
- (4) Remove breather and clean it.
- (5) After adding oil to the hydraulic tank to the specified level.
- (6) Bleed the air from the hydraulic pump.
 - ① Remove the air vent plug (1EA).
 - ② Tighten plug lightly.
 - ③ Start the engine, run at low idling, and check oil come out from plug.
 - ④ Tighten plug.
- (7) Start the engine, run at low idling (3~5 minutes) to circulate the oil through the system.
- (8) Confirm the hydraulic oil level and check the hydraulic oil leak or not.

2. MAIN PUMP

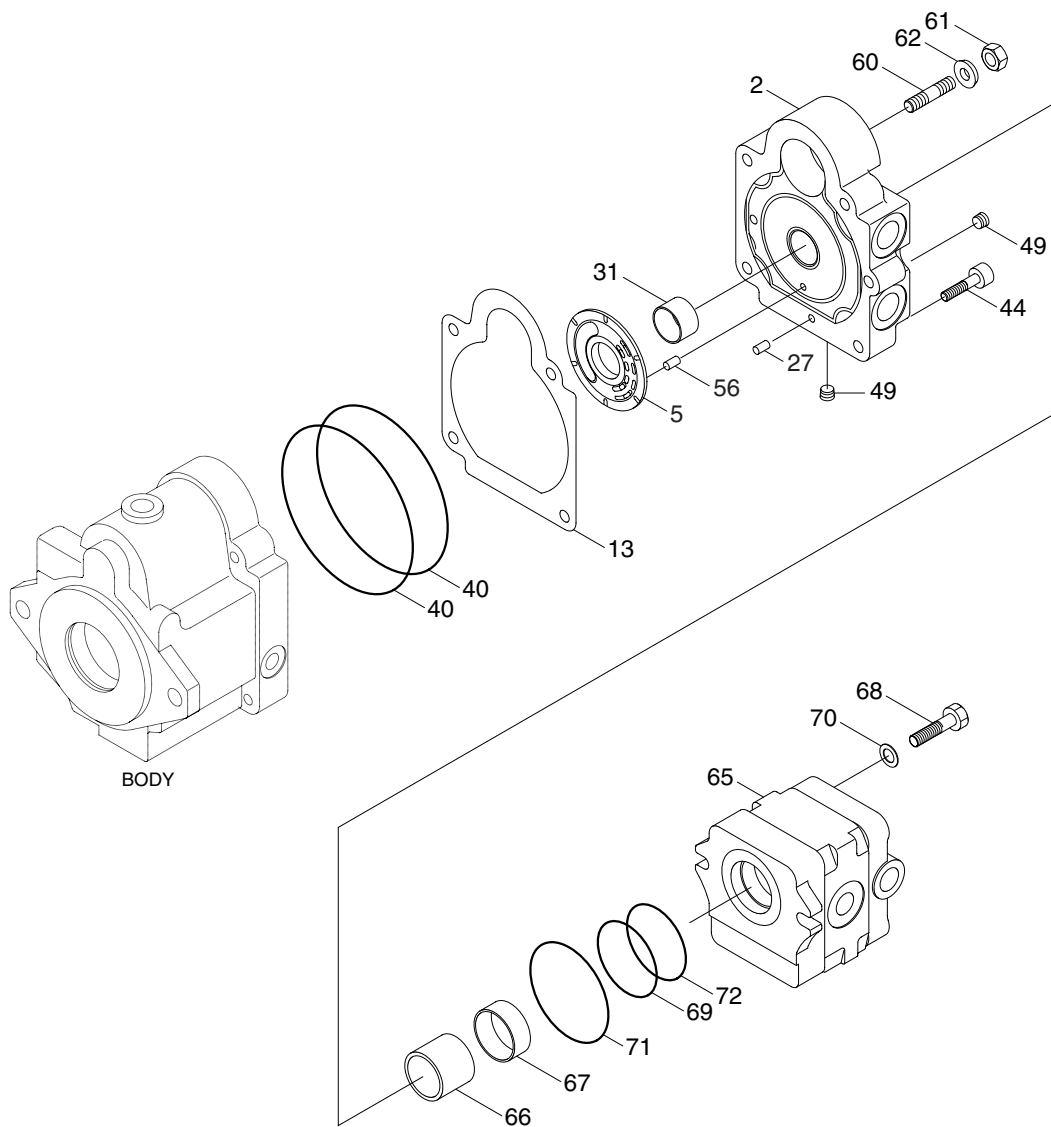
1) STRUCTURE (1/2)



1	Body S	14	Spring C	30	Ball bearing
3	Shaft	15	Spring T1	32	Oil seal
4	Cylinder barrel	18	Spring holder	33	Dish spring
6	Piston	19	Spring guide	34	Snap ring
7	Shoe	20	Pin	35	Snap ring
8	Shoe holder	21	Rod G	36	Snap ring
9	Barrel holder	23	Washer	39	O-ring
10	Swash plate	24	Retainer	42	Plug
11	Needle	25	Stopper pin A	43	O-ring
12	Ball	26	Stopper pin B	51	Plug

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STRUCTURE (2/2)



- | | | | | | |
|----|----------------|----|-------------|----|--------|
| 2 | Body H | 49 | Plug | 67 | Collar |
| 5 | Valve plate | 56 | Spring pin | 68 | Screw |
| 13 | Packing | 60 | Screw | 69 | O-ring |
| 27 | Pin | 61 | Nut | 70 | Washer |
| 31 | Needle bearing | 62 | Seal washer | 71 | O-ring |
| 40 | O-ring | 65 | Gear pump | 72 | O-ring |
| 44 | Screw | 66 | Coupling | | |

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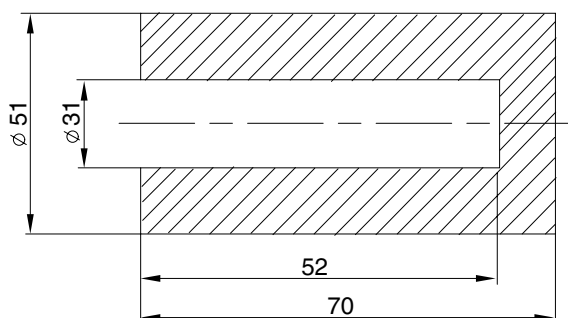
3. ASSEMBLE AND DISASSEMBLE

1) General precautions

- (1) Before disassembling, it is important to have fully understood the internal structure of the pump.
 - ※ The gasket (13), oil seal (32) and O-rings will be probably damaged when you disassemble it, so be sure to have prepared spares.
- (2) After having drained oil inside the pump, wash the pump and put it on a working bench covered with clean paper, cloth, or rubber mat for disassembling and assembling. Then, disassemble and assemble the pump slowly and carefully with necessary tools. Use care not to scratch even slightly, and take proper measures to prevent foreign matters from entering the assembly.

2) Tools

Tool name	Size	Quantity
Hexagon wrench	4, 6, 8 mm	1 each
Circlip player	For hole	1
Spanner wrench	13 mm	1
Torque wrench	45N (JIS B 4650) 90N (JIS B 4650)	1 1
Resin hammer	-	1
Special tooling for oil seal	See below	1
Seal kit	-	1 set
Grease	-	Small amount



Special tooling for oil seal

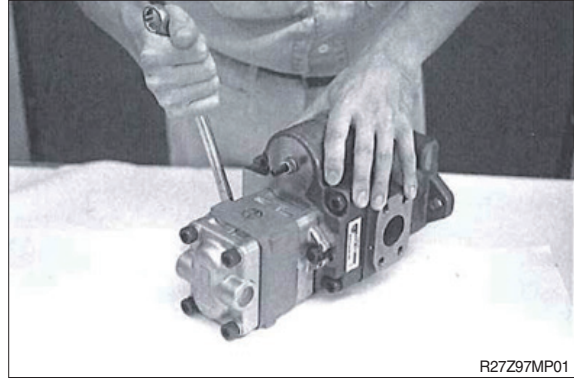
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3) DISASSEMBLING

(1) Disassembling of gear pump

Remove two screws (68) with spanner wrench 13 mm, and after that remove gear pump (65), collar (67) and coupling (66).

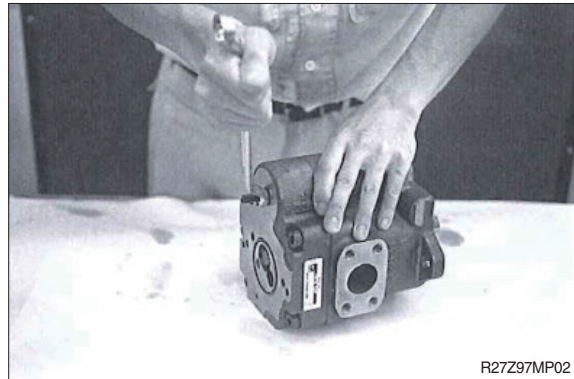
- ※ Coupling (66) and collar (67) may be attached with gear pump kit (65).



(2) Remove the adjustment screw

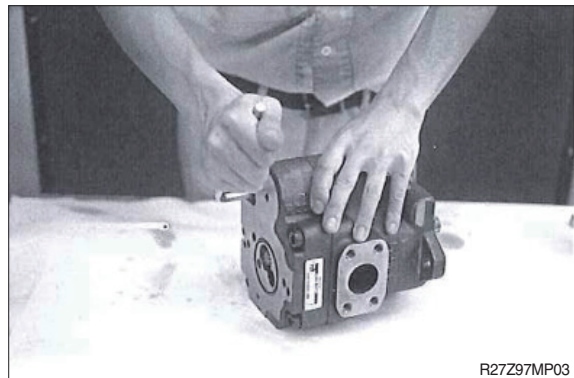
Loose hexagon nut (61) with spanner wrench 13 mm, then remove the adjustment screw (60) with hexagon wrench 4 mm.

- ※ Suggest you to measure the outside length of the adjustment screw. Because it is a good help when you readjust it after reassembling.



(3) Separation of body S and body H

Remove five screws (44) with hexagon wrench 8 mm.

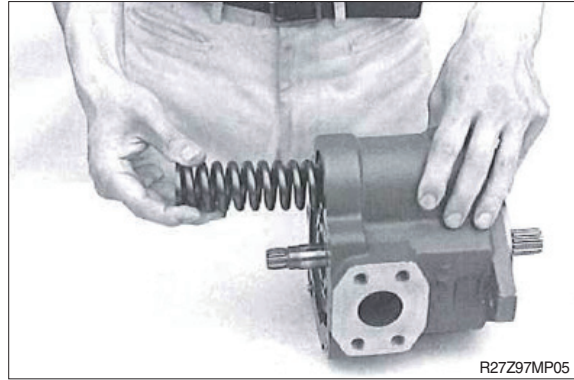


- ※ If you tap the part of inserted spring of body H with hummer softly, it is easy for separation.



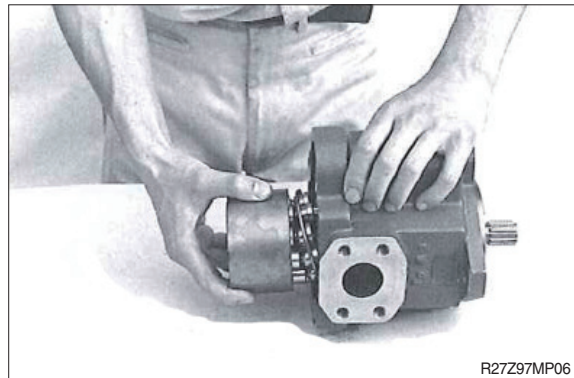
(4) Disassembling of body S kit

Remove spring T1 (15) from body S kit, then take off spring holder (18).



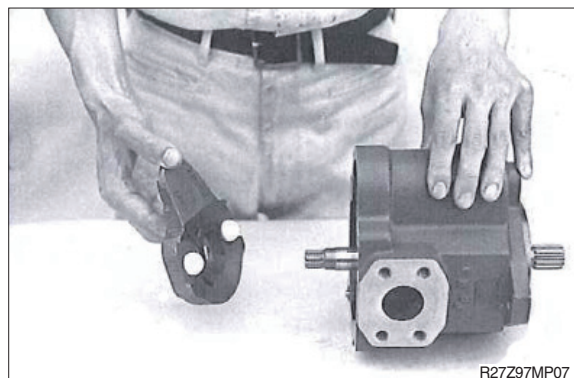
(5) Disassembling of body S kit

Remove cylinder barrel kit.



(6) Disassembling of body S kit

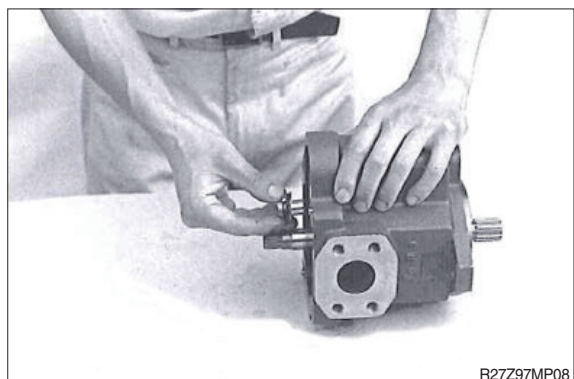
Remove swash plate (10) and two balls (12).



(7) Disassembling of body S kit

Remove stopper pin A (25), stopper pin B (26), dish springs (33), washer (23), rod G (21) and rod C (22).

- ※ The length of the stopper pin A and B is different. Pay attention not to swap when reassembling.
- ※ Refer to the parts list about number and position of washer (23).



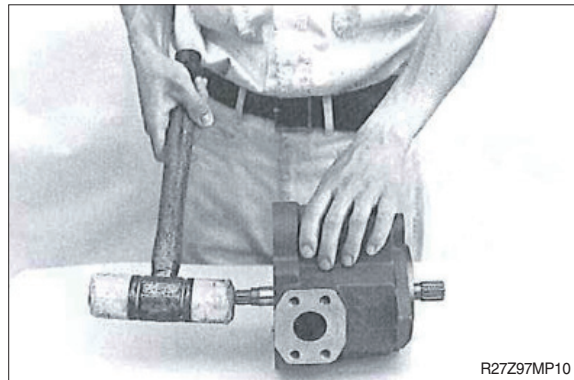
(8) Disassembling of body S kit

Remove snap ring (34) from body S (1).



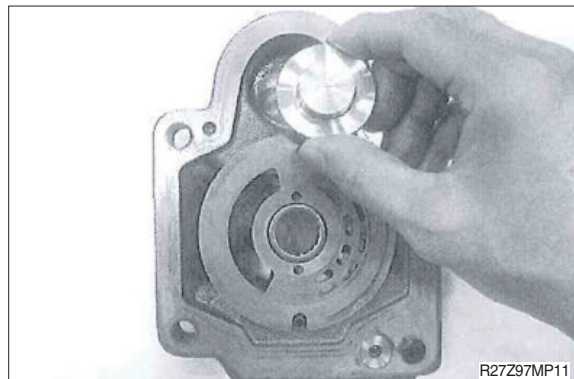
(9) Disassembling of body S kit

Tap the end of shaft (3) with hammer, then oil seal (32) and shaft with bearing (30) come off.



(10) Disassembling of body H kit

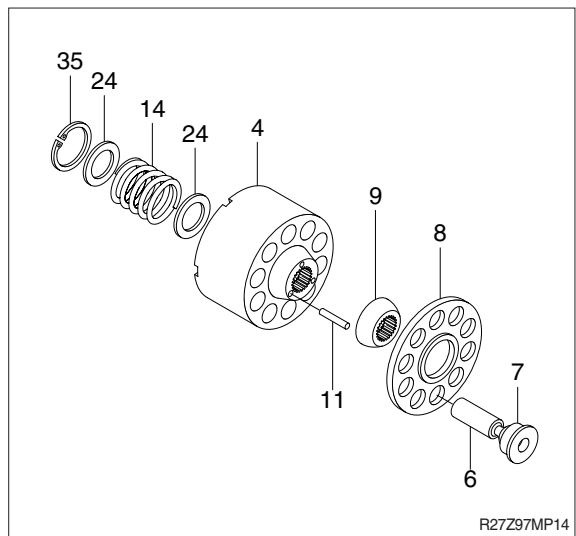
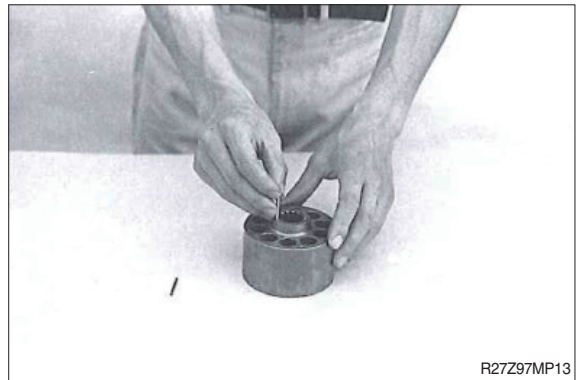
Remove spring guide (19) and valve plate (5) from body H.



(11) Disassembling of cylinder barrel kit

Remove shoe holder (8) on which piston shoe assemblies (6) and (7) are set and disassemble it in the order of barrel holder (9) and needle (11).

Also, take off snap ring (35), retainer (24), spring C (14) and retainer (24), which are set in the cylinder barrel (4) in this order.



4) ASSEMBLING

(1) Precautions during assembling

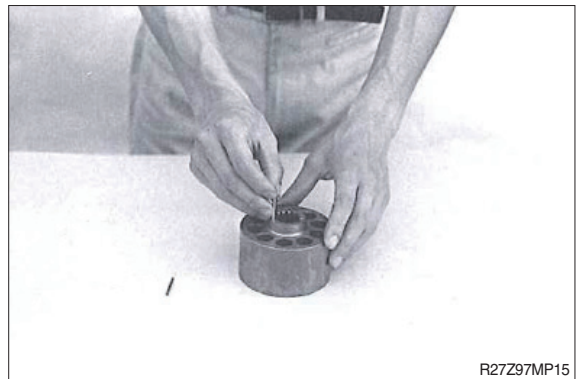
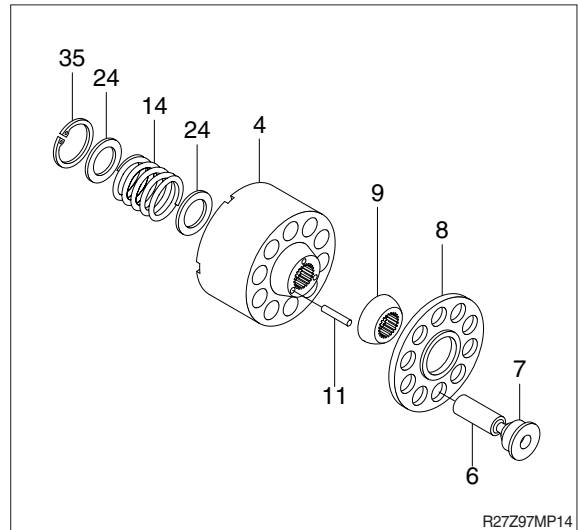
Reverse the above procedures for assembling.

When assembling, be very careful to wash parts in clean oil, to prevent dusts and water from adhering to parts entering assemblies and not to scratch on the sliding surfaces of all parts.

- ※ Apply small quantity of grease to the periphery of O-rings to be set in socket and spigot joints to prevent the O-rings from being damaged.

(2) Assembling of cylinder barrel kit

Set retainer (24), spring C (14), retainer (24) and snap ring (35) in the shaft center hole of cylinder barrel (4) in this order, and carefully set shoe holder (8), on which needle (11), barrel holder (9) and ten piston shoe assemblies have already been set, in cylinder barrel from the opposite side.

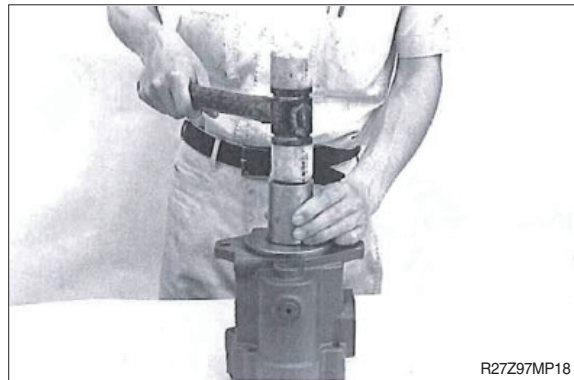
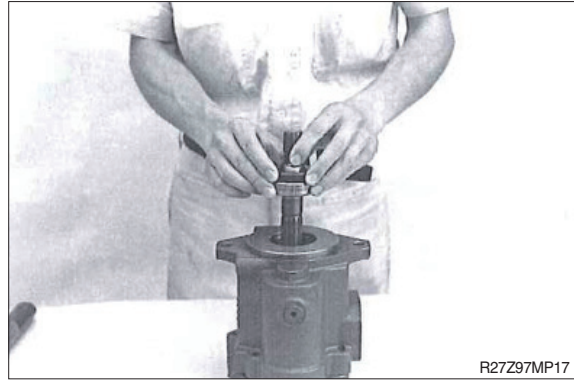


(3) Assembling of body S kit

Set shaft (3) with bearing (30), oil seal (32) and snap ring (34) in this order into body S (1).

- ※ Use new oil seal for assembling. Before assembling, apply a small quantity of grease to the periphery of oil seal lip and tap it together with the special tooling with hammer.

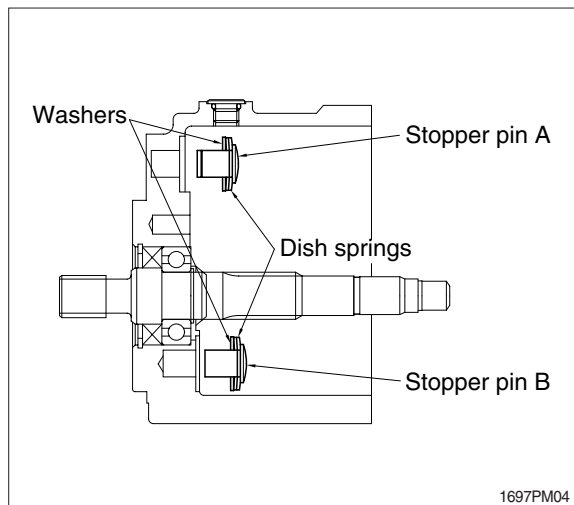
When assembling, put body S (1) onto body H (2) tentatively for easy work.



(4) Assembling of body S kit

Set each four dish springs (33) and washers (23) to stopper pin A (25) and stopper pin B (26), then set them into body S (1).

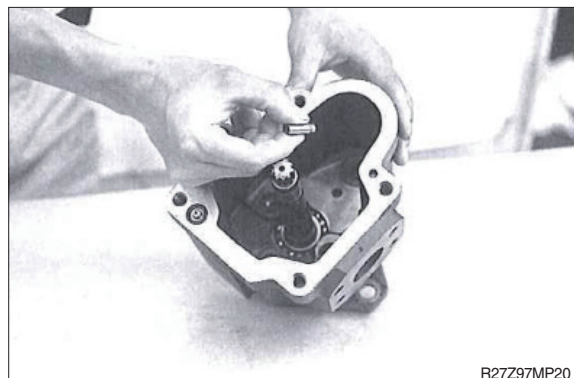
- ※ Pay attention to the direction of the dish washer and refer to the parts list about number and position of washers (23).
- ※ Pin A and pin B have different length. Set them to the original position. Otherwise, pump displacement changes, and engine stall or insufficient speed can occur.



(5) Assembling of body S kit

Set rod G (21) and rod C (22) into body S (1).

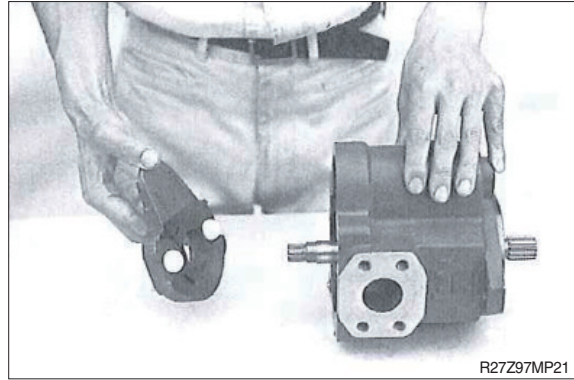
- ※ Pay attention to the direction of the rod G and rod C. (See cross section drawing for the direction.)



(6) Assembling of body S kit

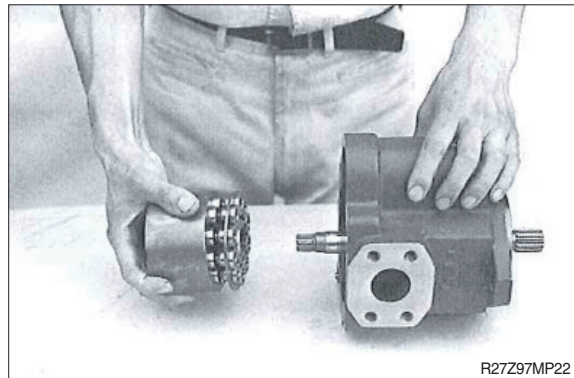
Put two balls (12) in the hole of swash plate (10) and install it in body S.

※ Apply grease on the balls if they drop out.



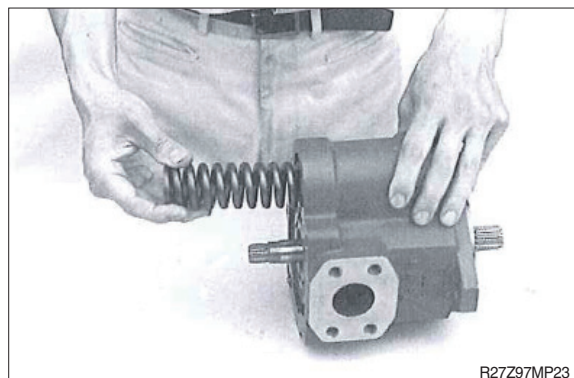
(7) Assembling of body S kit

Assemble cylinder barrel kit into the body S (1).



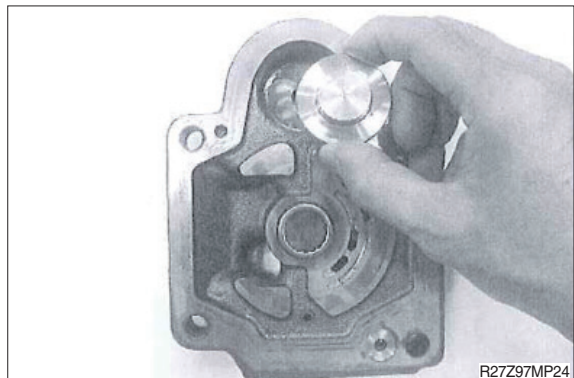
(8) Assembling of body S kit

Set spring T1 (15) to spring holder (18), then set them together into the hole on swash plate (10).



(9) Assembling of body H kit

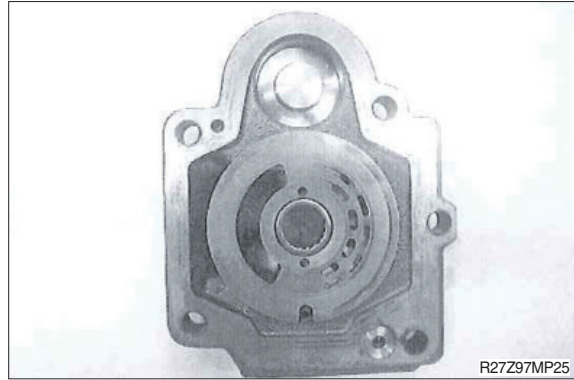
Set spring guide (19) in body H (2).



(10) Assembling of body H kit

Place valve plate (5) slowly on body H (2) by positioning it with spring pin (56).

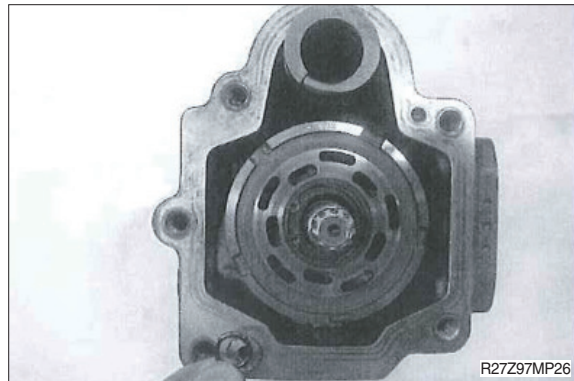
- ※ V notch copper alloy side of valve plate slides with cylinder barrel (4) and be careful not to set the valve plate to a wrong direction.



(11) Assembling of body S kit with body H kit

Place O-ring (40) on body S.

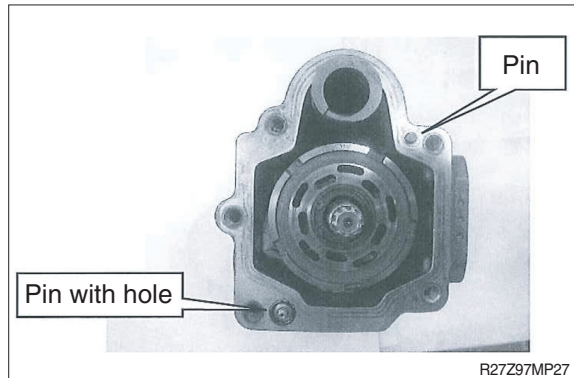
- ※ Use new O-ring for assembling.



(12) Assembling of body S kit with body H kit

Set pin (20) and pin (27) on body S.

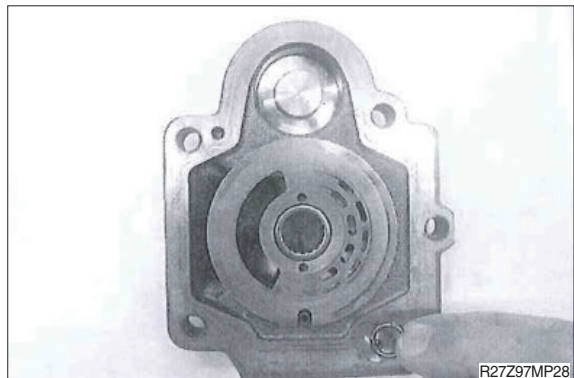
- ※ Pay attention to the position of each pin. Pin (27) has a hole.



(13) Assembling of body S kit with body H kit

Place O-ring (40) on body H.

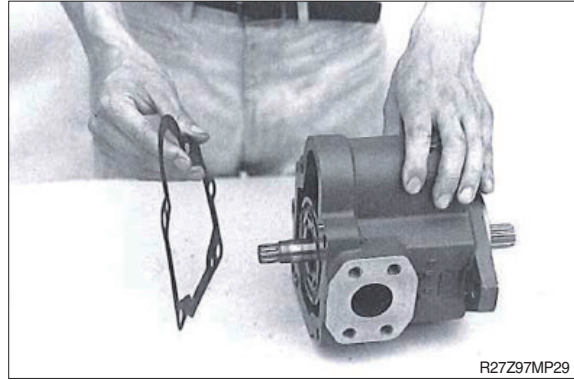
- ※ Use new O-ring for assembling.



(14) Assembling of body S kit with body H kit

Place packing (13), position it with locating pin (27) on body S.

※ Use new packing for assembling.



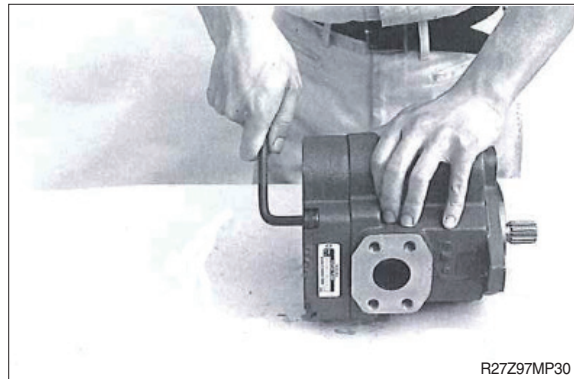
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(15) Assembling of body S kit with body H kit

Set two screws (M10×65) into the upper side two screw holes, and tighten them until the distance between body S and body H comes to 5 to 10 mm.

Then set three screws (44) into the three screw holes, after that, replace the upper side two screws (M10×65) to the regular size screws (44) and fix them.

· Tightening torque : 5.2~6.6 kgf · m
(37.6~47.7 lbf · ft)

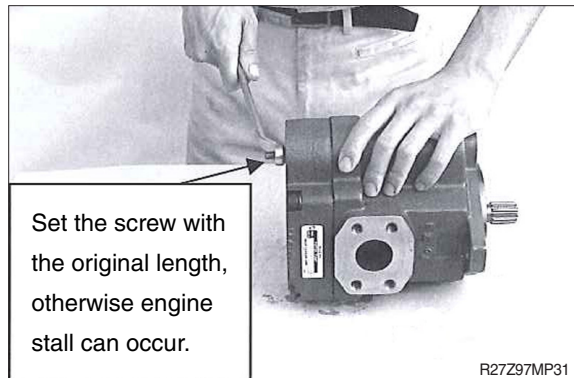


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(16) Installation of the adjusting screw

Fasten the adjusting screw (60) with hexagon wrench 4 mm, then adjust the outside length of adjusting screw and fix locknut (61) with spanner wrench 13 mm. At that time, change the seal washer (62) to new one.

· Tightening torque : 1.5~2.0 kgf · m
(10.8~14.5 lbf · ft)

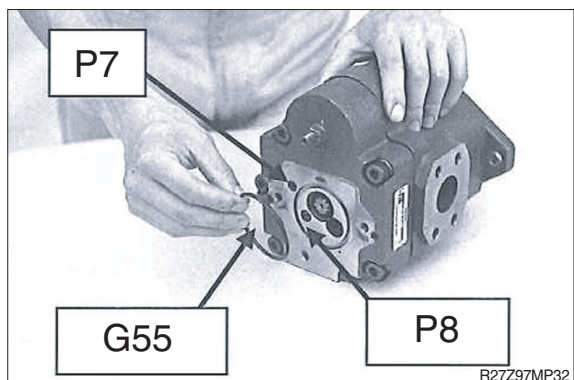


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(17) Installation of gear pump kit

Place O-ring (69, 71, 72) on the installation side of body H.

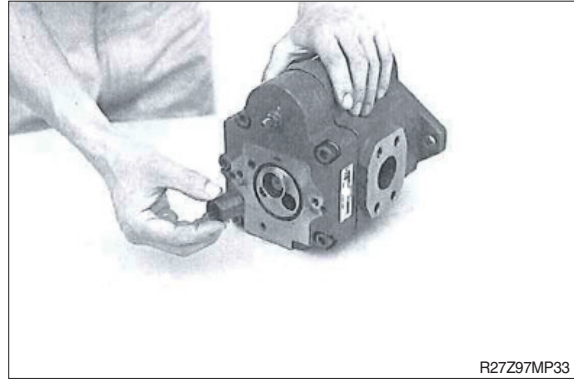
※ Use new O-ring for assembling.



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(18) Installation of gear pump kit

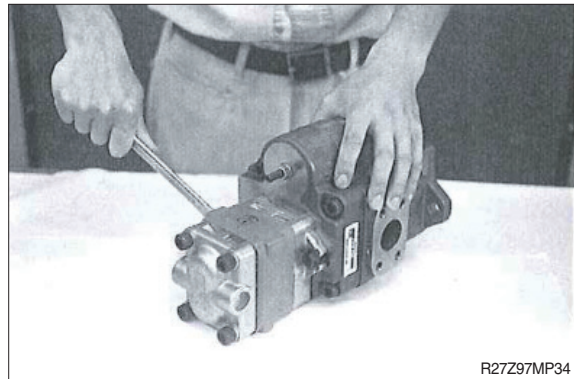
Set collar (67) and coupling (66).



(19) Installation of gear pump kit

Install gear pump kit (65) and fix it by two screws (68) and washers (70) with spanner wrench 13 mm.

- Tightening torque : 2.0~2.4 kgf · m
(14.5~17.3 lbf · ft)



(20) Inspection of assembling

After completed the assembling of pump, make sure that pump shaft rotates smoothly by hand.