

GROUP 6 TRAVEL DEVICE

1. REMOVAL AND INSTALL

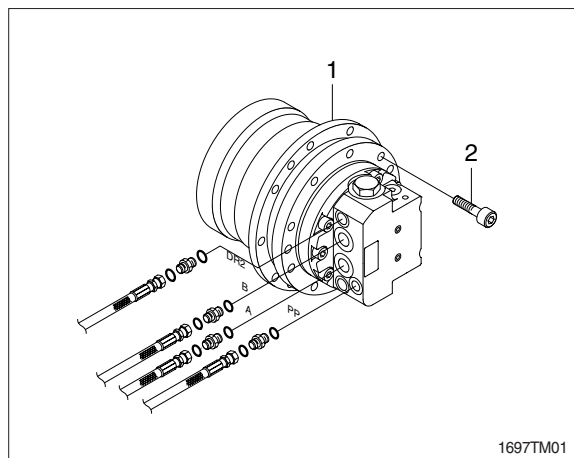
1) REMOVAL

- (1) Swing the work equipment 90° and lower it completely to the ground.
- (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.

※ When pipes and hoses are disconnected, the oil inside the piping will flow out, so catch it in oil pan.

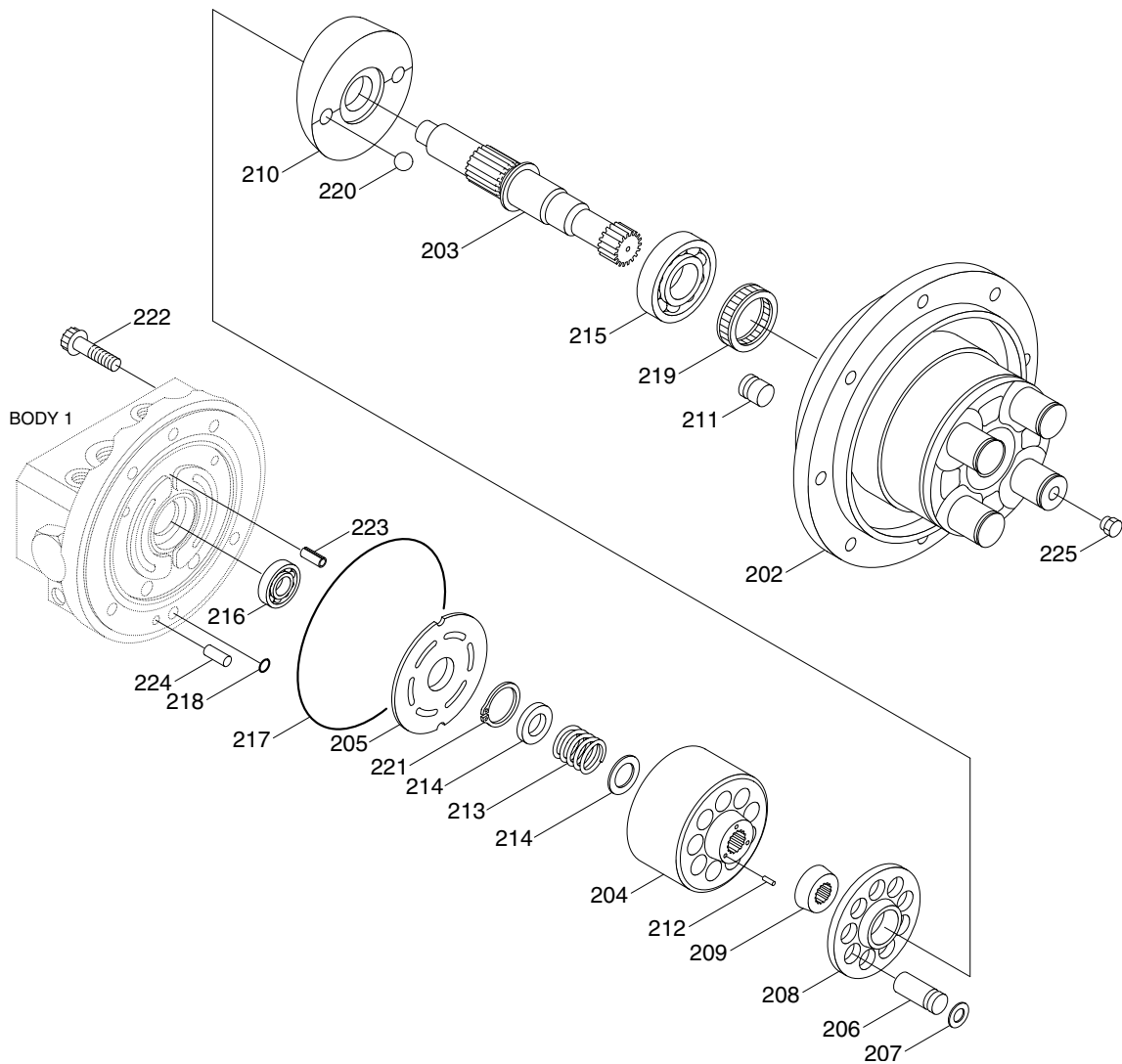
- (4) Remove the track shoe assembly.
For details, see removal of track shoe assembly.
- (5) Remove the cover.
- (6) Remove the hose.
※ Fit blind plugs to the disconnected hoses.
- (7) Remove the bolts and the sprocket.
- (8) Sling travel device assembly (1).
- (9) Remove the mounting bolts (2), then remove the travel device assembly.
· Weight : 36 kg (80 lb)



2) INSTALL

- (1) Carry out installation in the reverse order to removal.
- (2) Bleed the air from the travel motor.
 - ① Remove the air vent plug.
 - ② Pour in hydraulic oil until it overflows from the port.
 - ③ Tighten plug lightly.
 - ④ Start the engine, run at low idling, and check oil come out from plug.
 - ⑤ Tighten plug fully.
- (3) Confirm the hydraulic oil level and check the hydraulic oil leak or not.

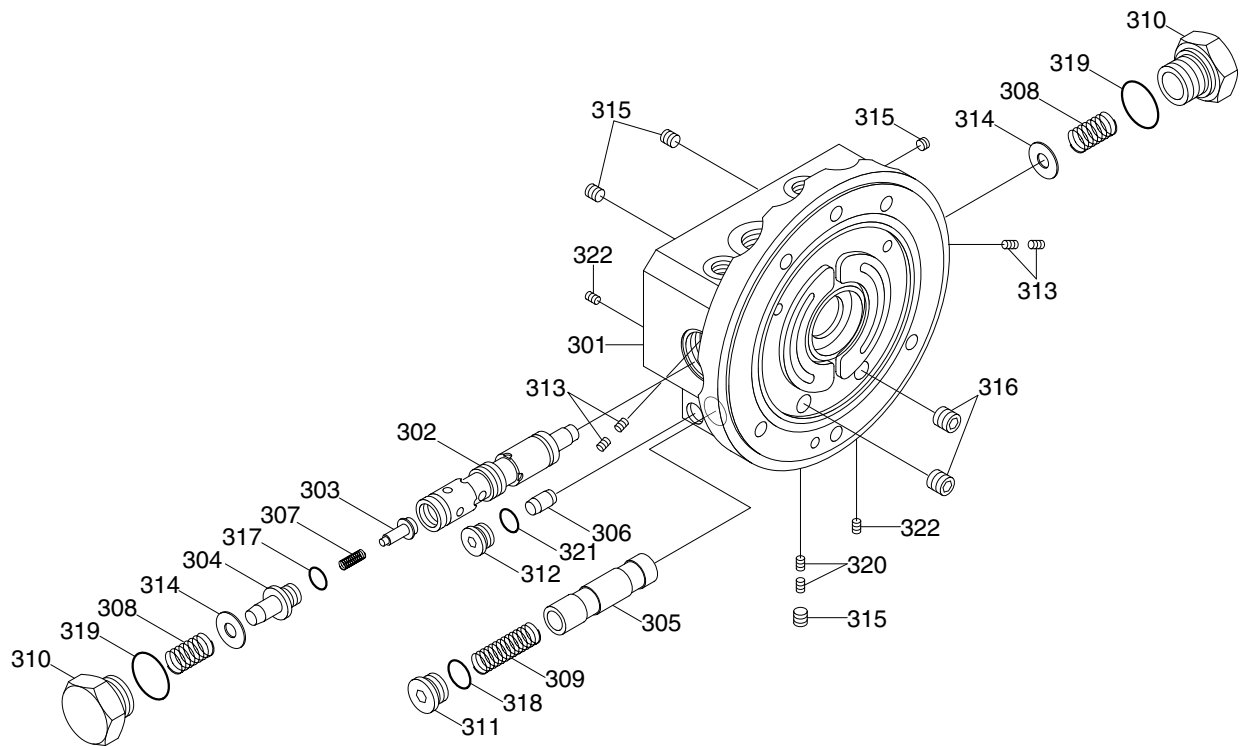
2) STRUCTURE (1/3)



1692TM02

202	Body 2	210	Swash plate	218	O-ring
203	Shaft	211	Control piston	219	Oil seal
204	Cylinder barrel	212	Pin	220	Ball
205	Valve plate	213	Spring C	221	Snap ring
206	Piston	214	Retainer	222	Screw
207	Shoe	215	Bearing	223	Spring pin
208	Shoe holder	216	Bearing	224	Pin
209	Barrel holder	217	O-ring	225	Plug

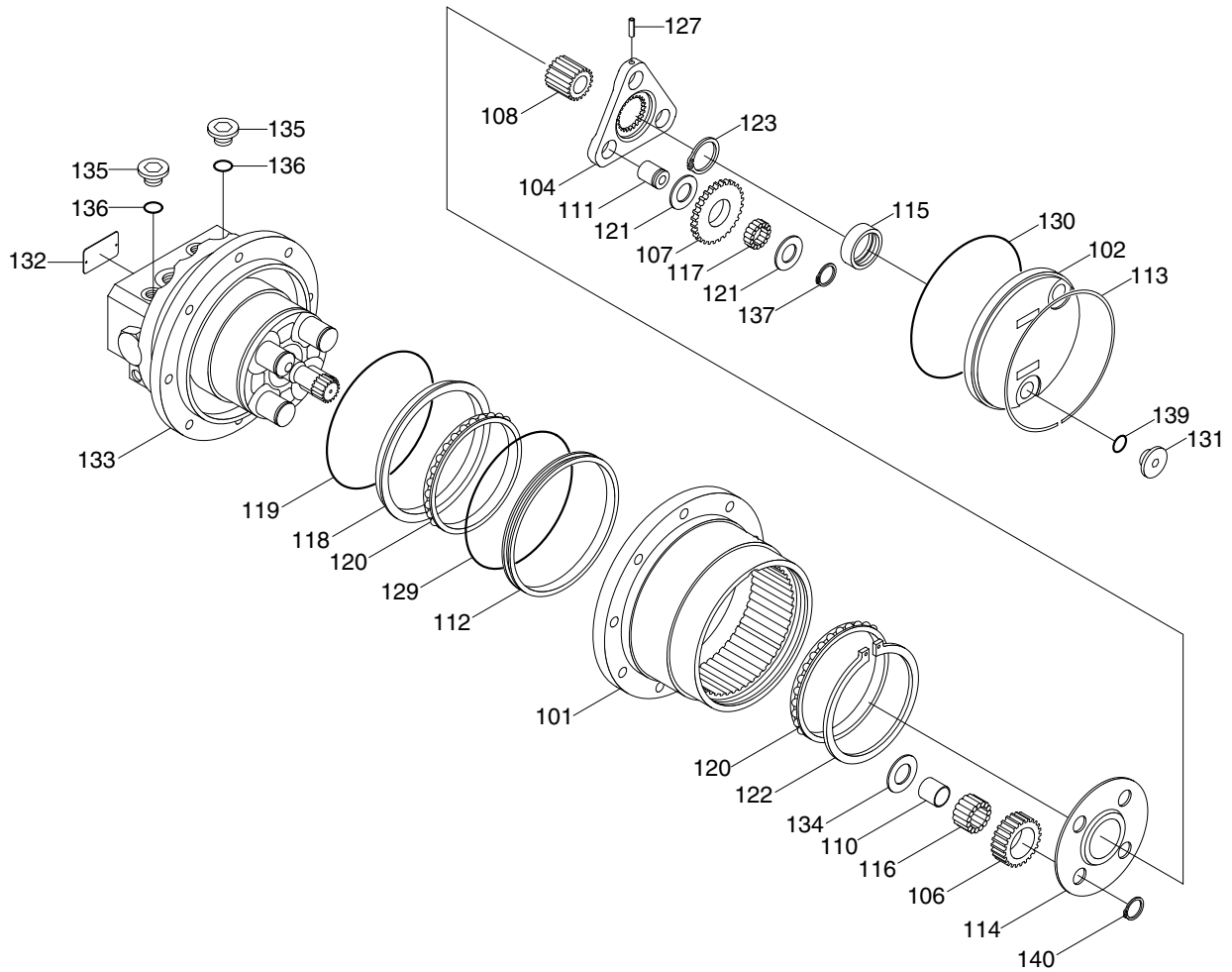
STRUCTURE (2/3)



1692TM03

301	Body 1	309	Spring V3	317	O-ring
302	Spool	310	Plug	318	O-ring
303	Check valve	311	Plug	319	O-ring
304	Spring guide	312	Plug	320	Choke
305	Spool	313	Choke	321	Pin
306	Shuttle spool	314	Ring	322	Plug
307	Spring V1	315	Plug		
308	Spring V2	316	Plug		

STRUCTURE (3/3)



1692TM04

101	Body	113	Snap ring	121	Thrust washer	134	Thrust washer
102	Cover	114	Thrust plate	122	Snap ring	135	Plug
104	Carrier 2	115	Slide ring	123	Snap ring	136	O-ring
106	Gear B1	116	Needle	127	Spring pin	137	Snap ring
107	Gear B2	117	Needle	129	O-ring	139	O-ring
108	Gear S1	118	Floating seat (Incl 119)	130	O-ring	140	Snap ring
110	Ring	119	O-ring	131	Plug		
111	Pin B2	120	Bearing	132	Name plate		
112	Seal ring			133	Hydraulic motor		

3) MAINTENANCE INSTRUCTION

(1) Necessary tool to assemble

No.	Necessary tool	
1 2 3	Torque wrenches	12N (JIS B4650) 90N (JIS B4650) 180N (JIS B4650)
4 5 6	Hexagon socket	Hexagon size : 4 mm Hexagon size : 6 mm Hexagon size : 8 mm
7	Socket wrenches	Hexagon size : 27 mm
8 9 10	Hexagon socket wrenches	Hexagon size : 4 mm Hexagon size : 6 mm Hexagon size : 8 mm
11	Screwdrivers	Width : 6~10 mm
12 13 14 15 16	Snap ring pliers	∅ 28 mm for hole ∅ 15 mm for shaft ∅ 18 mm for shaft ∅ 26 mm for shaft ∅ 90 mm for shaft
17	Plastic hammer	-
18 19 20 21	Other	Grease Oil Sand paper C-clamps

2. DISASSEMBLY

1) GENERAL PRECAUTIONS

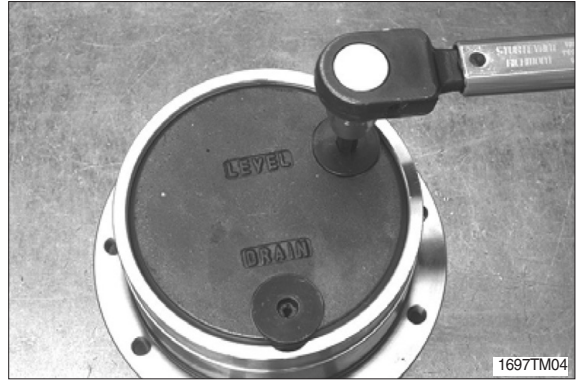
- (1) Before disassembling the TM motors, check the items to be inspected and, for remedy against trouble, closely examine the nature of the trouble, so that the motor can be disassembled effectively.
- (2) To disassemble the motor, use the disassembling procedures described in section 2-2, and select a clean place.
- (3) Place a rubber or vinyl sheet or other such protective materials on your working bench to protect the surface of the motor to be serviced.
- (4) During disassembly, give a match mark to the mating surfaces of each part.
- (5) Arrange removed parts in order so that they will not become damaged or missing during disassembly.
- (6) Once seals have been disassembled, they should be replaced even if damage is not observed. Have replacement seals ready on hand before starting your disassembling job.

2) REDUCTION GEAR SECTION

(1) Remove the two plugs (PF3/8).

- Tools required :
Hexagon size : 8 mm

※ Remove the plug of "LEVEL" side first.

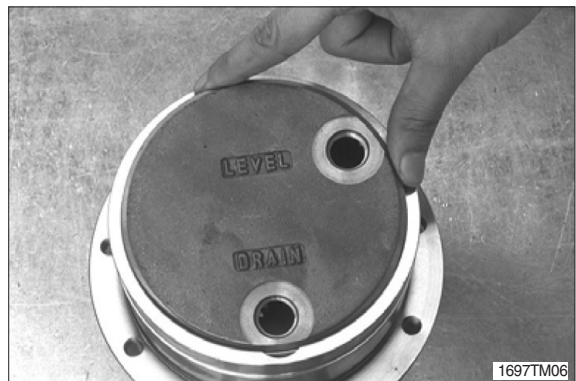


(2) Remove the snap-ring.

※ Put the screwdriver into the notch of the body, and then pull the snap-ring.



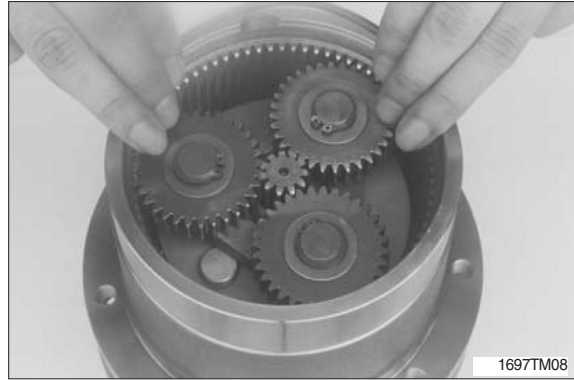
(3) Remove the cover.



(4) Remove the slide ring from the cover.



(5) Remove the O-ring from the body.



(6) Remove the carrier 2 kit from the body.



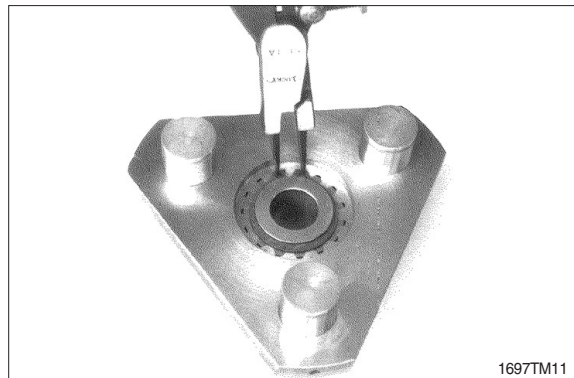
(7) Remove the three snap rings, three thrust washers, three b2 gears, forty-nine needles and three thrust washers.

※ The thrust washers on both sides of the b2 gears are the same.

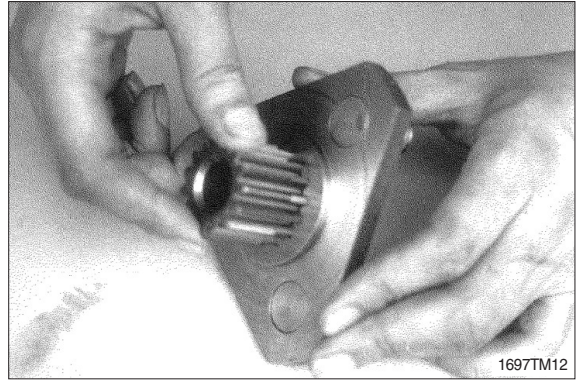
※ The b2 pins and spring pins are not able to disassemble, because they are press-fitted.



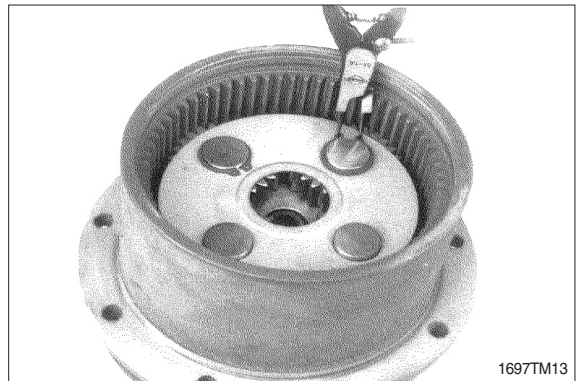
(8) Remove the snap ring from the carrier 2.



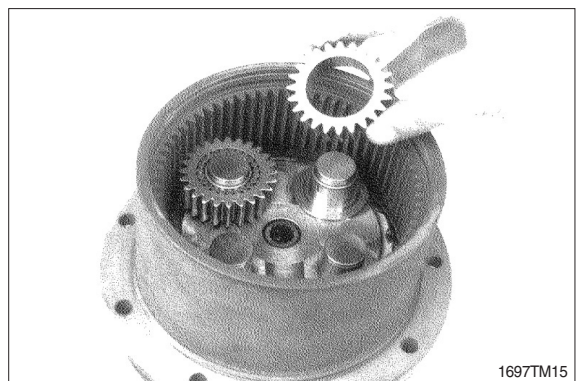
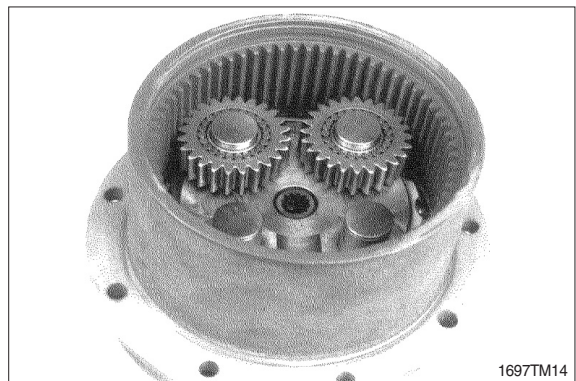
(9) Remove the s1 gear from the carrier 2.



(10) Remove the four snap rings and the four thrust plate.

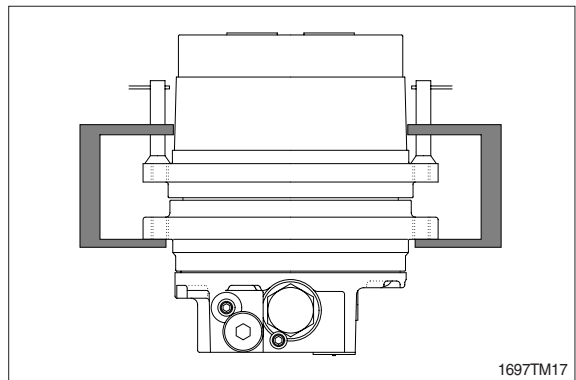
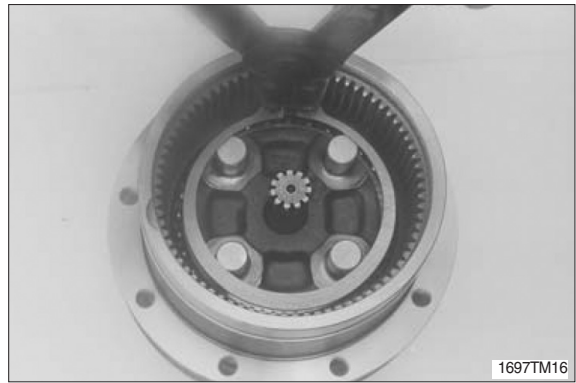


(11) Remove the four b1 gears, ninety-six needles, four thrust washers and four rings.



(12) Remove the snap ring.

- ※ Tighten the speed reducer flange and the motor flange with C-clamps or a hydraulic press (see the illustration) to make it easy.



(13) Remove the speed reducer with the iron balls with retainer and the internal ring of bearing.

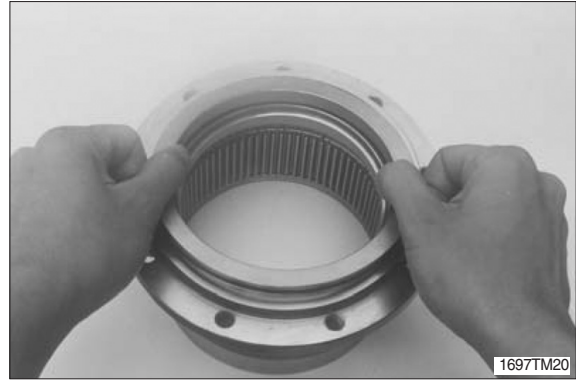


(14) Remove the iron balls with retainer from the speed reducer.

- ※ Pay attention not to lose the balls from retainer.

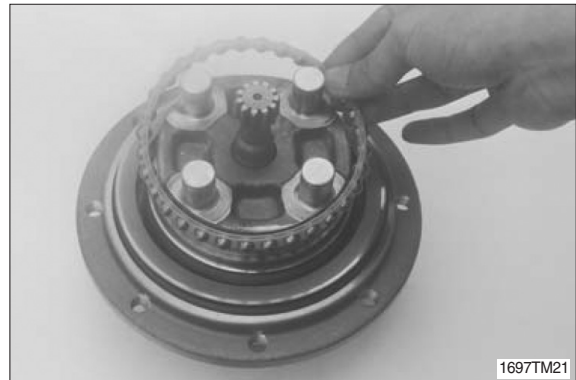


(15) Remove the seal ring from the speed reducer.



(16) Remove the iron balls with retainer and the internal ring of bearing from the hydraulic motor.

※ Pay attention not to lose the balls from retainer.



(17) Remove the floating seat with O-ring from the hydraulic motor.



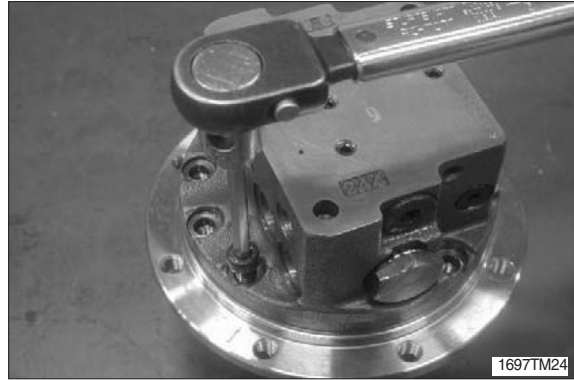
3) HYDRAULIC MOTOR SECTION

(1) Remove the seven hexagon socket head cap bolts.

· Tools required :

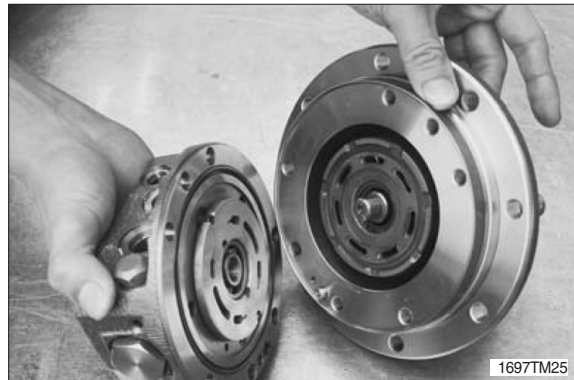
Hexagon size : 6 mm

※ If you fix the motor with a vice, protect it with aluminum plates or equivalent.

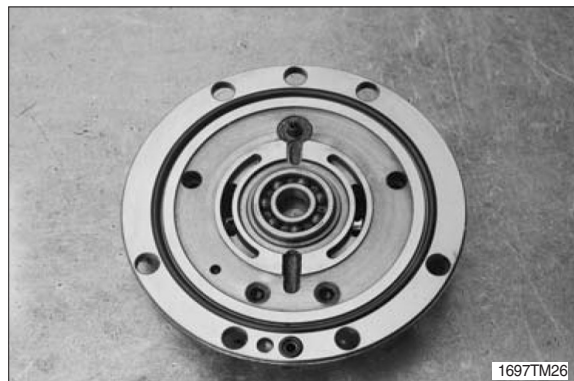


(2) Remove the body 1 from the body 2.

※ Pay attention not to come off and damage the valve plate.

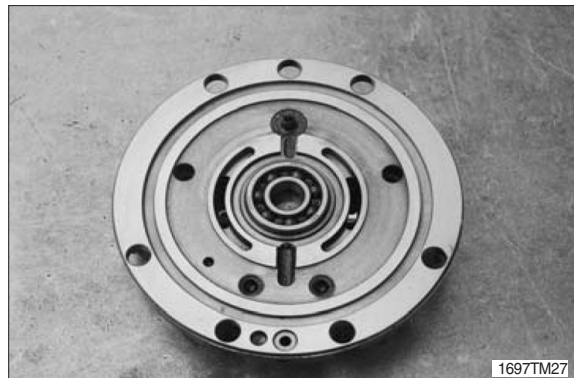


(3) Remove the valve plate.



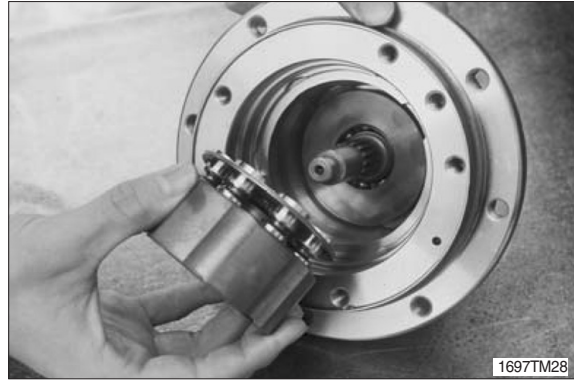
(4) Remove the two O-rings from the body 1.

※ The bearing and spring pins are not able to disassemble, because they are press-fitted.

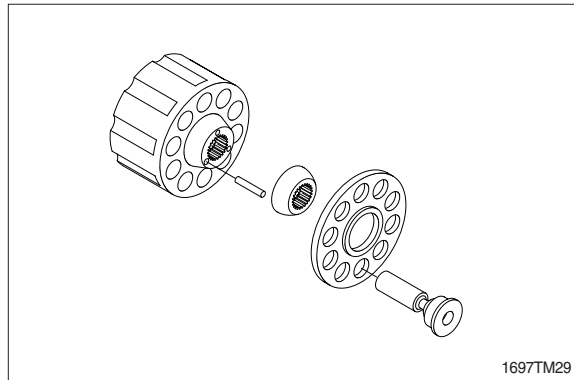


(5) Remove the cylinder barrel assembly from the body 2.

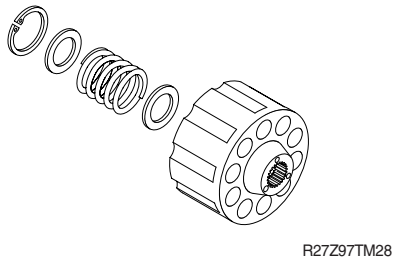
※ Pay attention not to lose the each part.



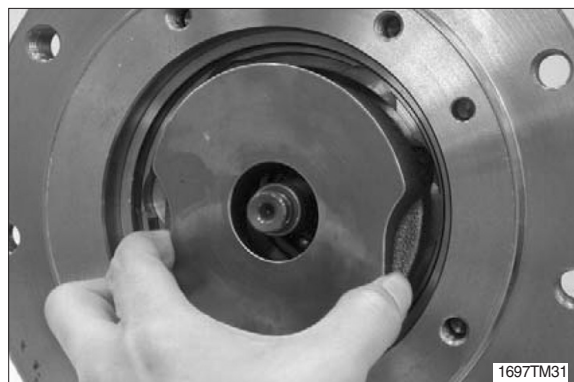
(6) Remove the seven piston-shoe assemblies, shoe holder, barrel holder, three pins.



(7) Remove the snap ring, retainer, spring-C and retainer.



(8) Remove the swash plate and two balls from the body 2.



(9) Remove the shaft from the body 2.

※ The bearing is not able to disassemble,
because they are press-fitted.



(10) Remove the control piston from the body 2.



(11) Remove the oil seal from the body 2.

(12) Remove the pin from the body 2.



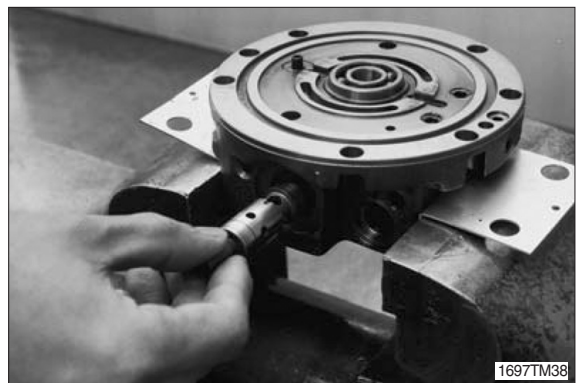
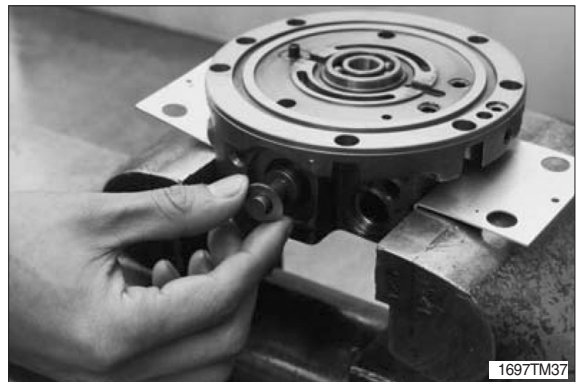
(13) Remove the two plugs with O-rings from
the body 1.

• Tools required :
Hexagon size : 27 mm



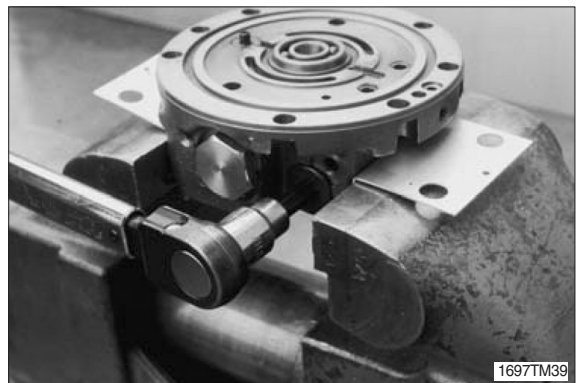
(14) Remove the two spring V2, two rings and spool assembly.

※ The spool assembly is not able to disassemble.



(15) Remove the two plugs with O-rings from the body 1.

· Tools required :
Hexagon size : 8 mm

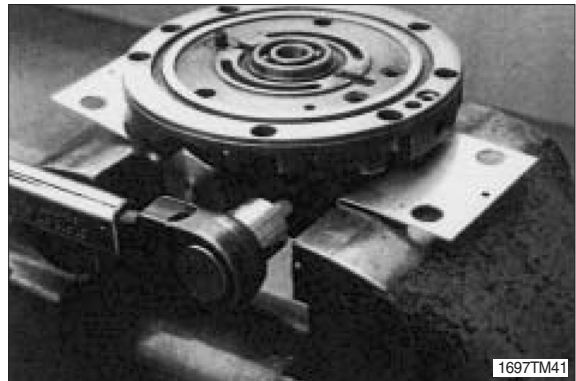


(16) Remove the spring V3 and two speed spool.



(17) Remove the two plugs from the body 1.

- Tools required :
Hexagon size : 4 mm



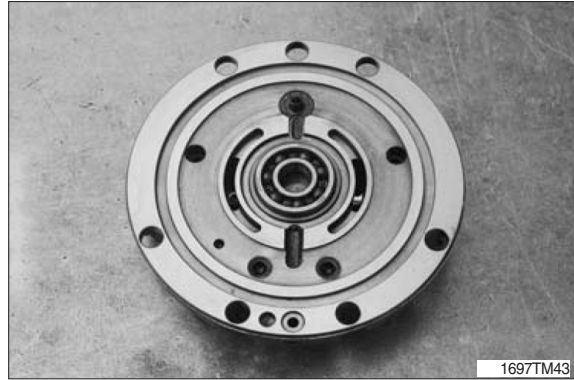
(18) Remove the two needles and shuttle spool.



3. ASSEMBLY

1) HYDRAULIC MOTOR SECTION

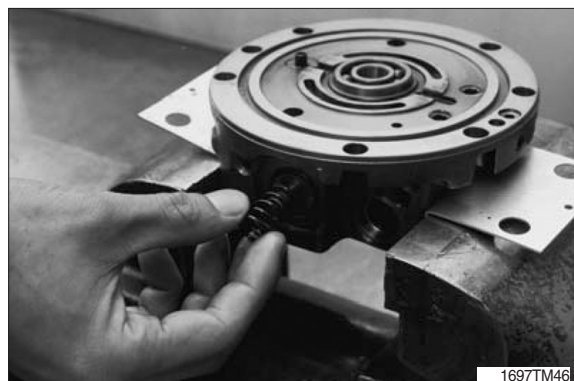
- (1) Press-fit the bearing and the spring pin into the body 1.

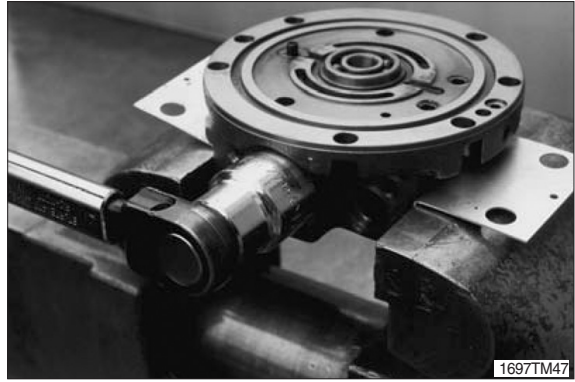


- (2) Insert the spool assembly, two rings (1pc/side) and two springs (1pc/side) in that order into the body 1, and then screw the two plugs (1pc/side) with two O-rings (1pc/side).

※ The spool assembly is not able to disassemble.

- Plugs tightening torque :
13~17 kgf · m (94~123 lbf · ft)
- Hexagon size : 27 mm

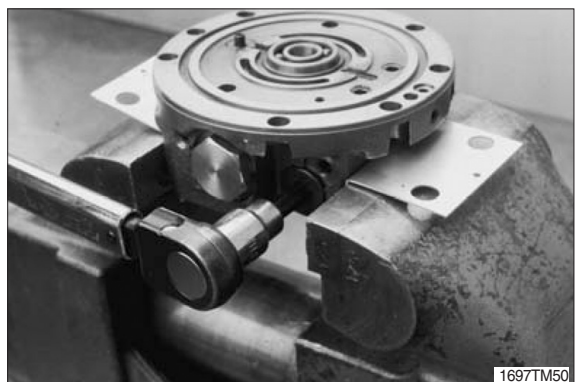
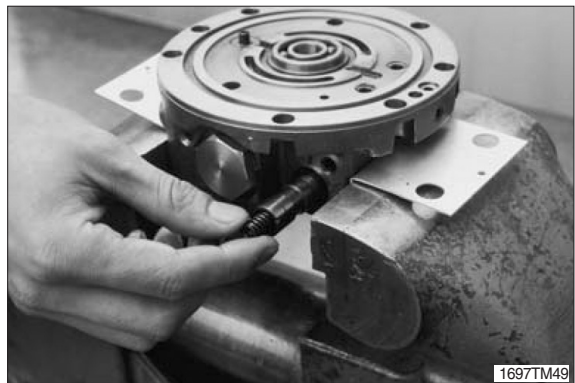




(3) Insert the spring V3 and two speed spool into the body 1, and screw the two plugs (1pc/side) with two O-rings (1pc/side).

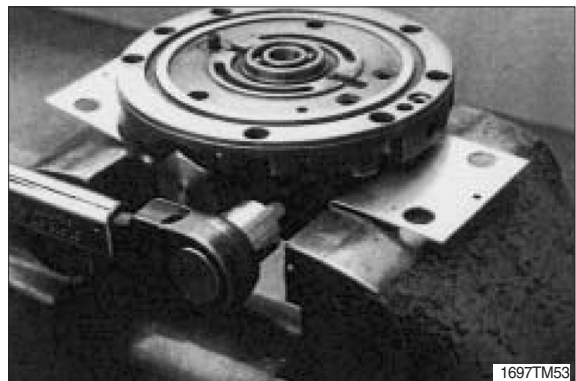
- Plugs tightening torque :
4.69~5.2 kgf · m (33.9~37.6 lbf · ft)
- Hexagon size : 8 mm

※ Pay attention to the direction of the spool.
(See cross sectional drawing for the direction, page 7-56~58).



(4) Insert the shuttle spool and two needles (1pc/side) into the body 1, and then screw them in with the two plugs (1pc/side).

- Plugs tightening torque :
0.6 kgf · m (4.3 lbf · ft, both sides)
- Hexagon size : 4 mm

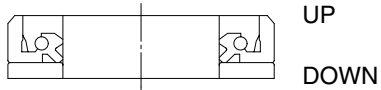


(5) Place two O-rings onto the body 1.

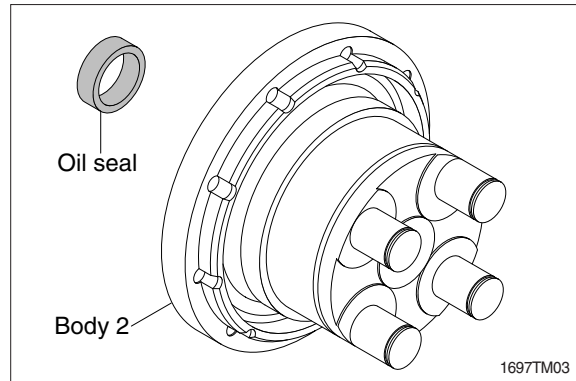


(6) Press-fit the oil seal into the body 2.

- ※ Apply grease to the periphery of the oil seal.
- ※ Pay attention to the direction of the oil seal, and do not slant it.



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(7) Place the pin into the body 2.

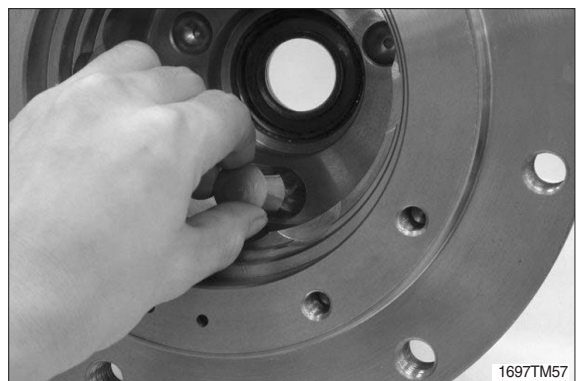


(8) Press-fit the bearing with the shaft.



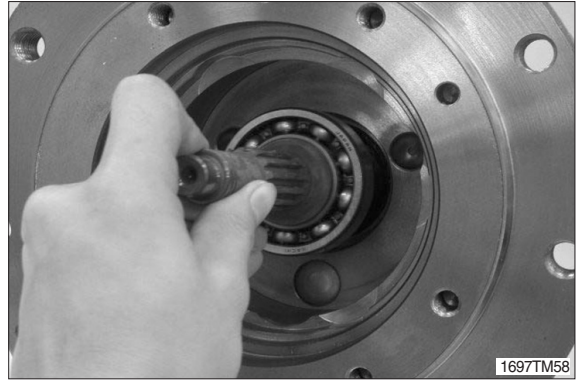
(9) Insert the control piston into the body 2.

- ※ Assemble the control piston, which spherical surface should be upper side.



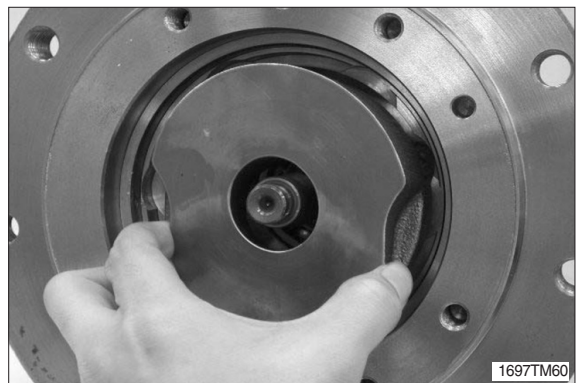
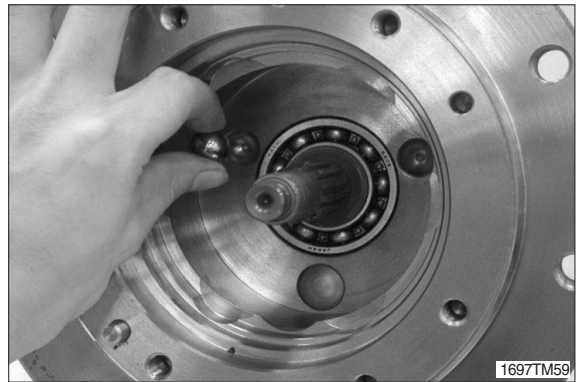
(10) Place the shaft into the body 2.

- ※ Pay attention not to damage the oil seal with the shaft.
- A oil which damaged should be replaced.

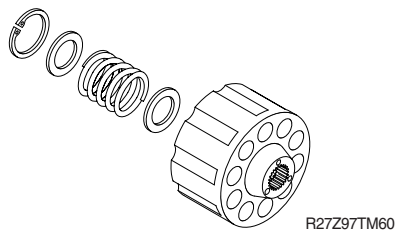


(11) Place the two balls and the swash plate onto the body 2.

- ※ Apply oil to the working face of the swash plate.
- ※ In case the swash plate drops out, apply grease to the back of it.



(12) Place the retainer, spring C and retainer in that order into the cylinder barrel, and then secure them with the snap ring.

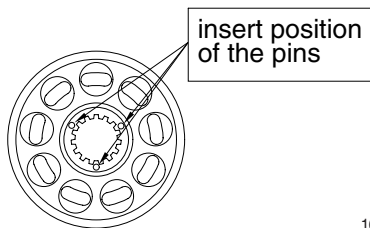


(13) Place the piston-shoe assemblies into the shoe holder.

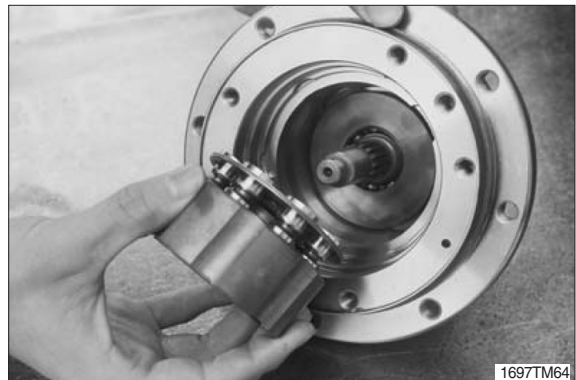


(14) Place the three pins, barrel holder and piston-shoe assemblies in that order into the cylinder barrel.

- ※ Apply oil to the inside of the cylinders, then lower the pistons into the cylinder barrel.
- ※ Pay attention to the order of pins, barrel holder and piston-shoe assemblies.



(15) Insert the cylinder barrel assembly into the body 2 so that the shoes contact the swash plate.



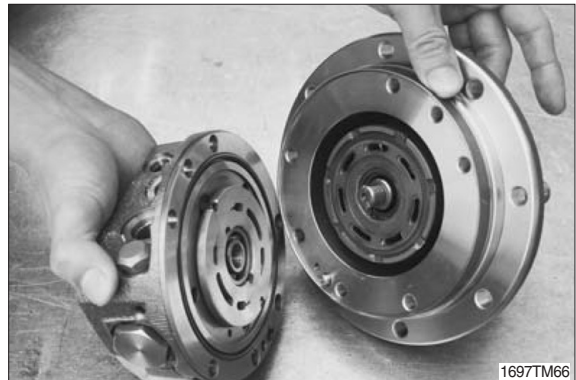
(16) Fill the body 2 with 0.1ℓ hydraulic oil for lubrication.

(17) Place the valve plate onto the body 1.

- ※ The copper face of the valve plate should be uppermost.
- ※ Apply oil to the copper face of the valve plate.
- ※ In case the valve plate drops out, apply grease to the steel face of it.



(18) Join the body 1 to the body 2.



(19) Bolt them with seven hexagon socket head cap bolts.

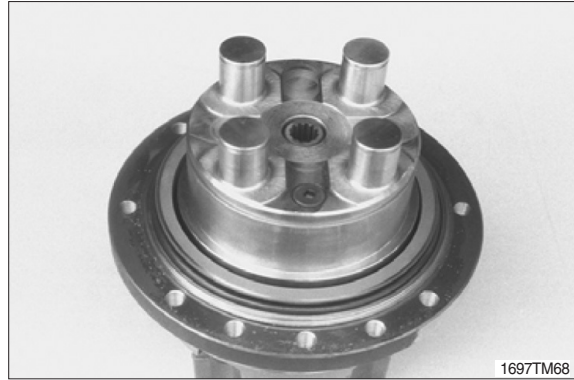
- Bolt tightening torque :
2.9~3.1 kgf · m (21.0~22.4 lbf · ft)
- Hexagon size : 6 mm

- ※ If you fix the motor with a vice, protect it with aluminum plates or equivalent.



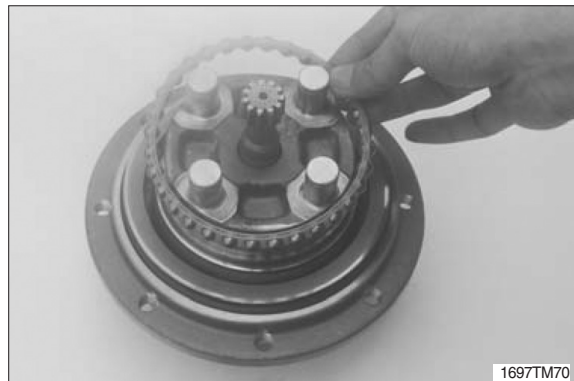
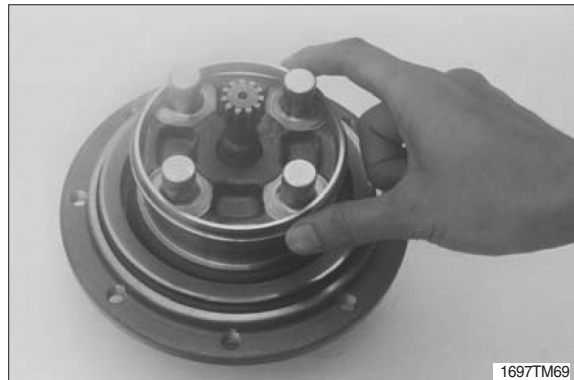
2) REDUCTION GEAR SECTION

- (1) Place the floating seal with O-ring into the hydraulic motor.



- (2) Place inner ring, retainer with balls of the bearing in that order, onto the hydraulic motor.

- ※ Pay attention to the direction of the inner ring and the retainer.
(See cross sectional drawing for the direction.)
- ※ Pay attention not to disassemble the balls from the retainer.



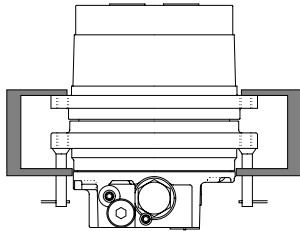
- (3) Put the seal ring with O-ring onto the body.

- ※ Apply grease to the O-ring to make it easy, and then wipe grease from the seal surface.



(4) Join the body to the motor.

- ※ Wipe grease from the seal surface.
- ※ Tighten the speed reducer flange and the motor flange with C-cramps or a hydraulic press.



1697TM95



1697TM72

(5) Place retainer with balls, inner ring of the bearing in that order the hydraulic motor.

- ※ Pay attention to the direction of the inner ring and the retainer.
- ※ Pay attention not to disassemble the balls from retainer.
(See cross sectional drawing for the direction.)



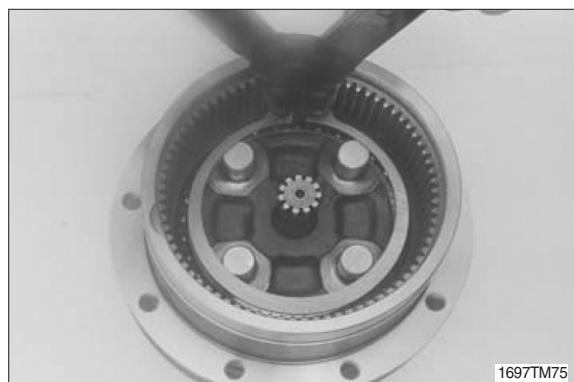
1697TM73



1697TM74

(6) Fix the bearing with the snap ring.

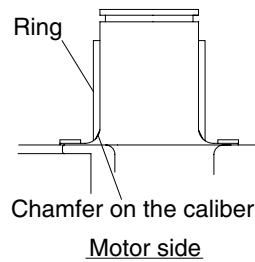
- ※ The pre-load for the bearings is adjusted by thickness of the snap ring.



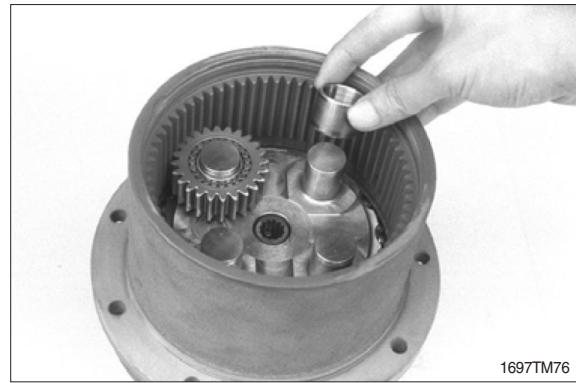
1697TM75

(7) Place the four rings (1pc/1pin), four thrust washers (1pc/1pin), four b1 gears (1pc/1pin) and ninety-six needles (24pcs/1pin) in that order onto the body 2.

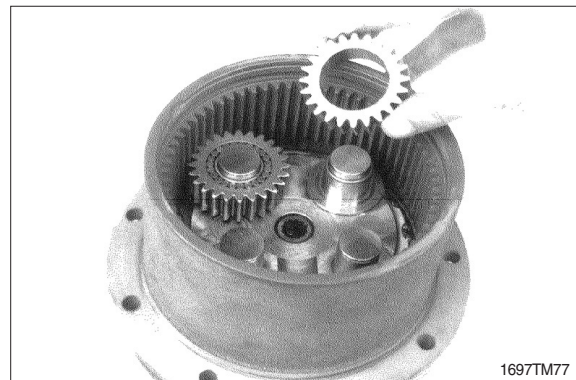
- ※ Pay attention to the direction of the ring. The chamfer on the caliber of the ring direction is motor side.



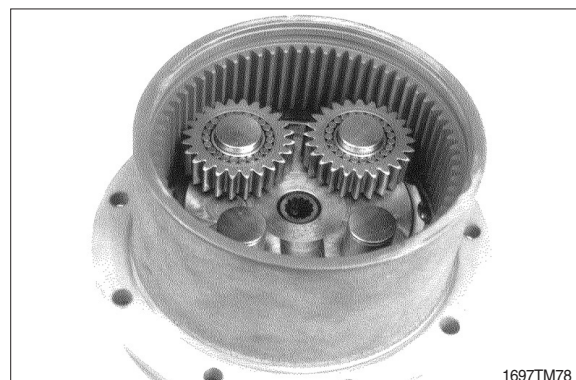
1697TM94



1697TM76



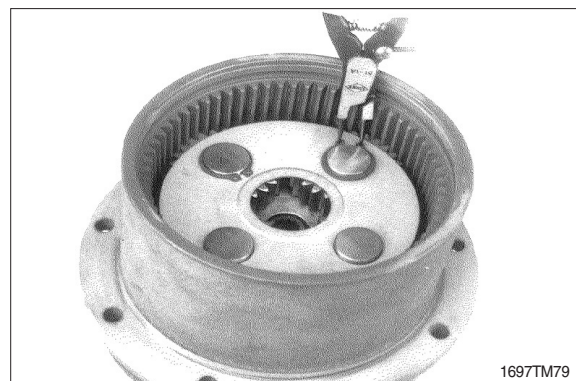
1697TM77



1697TM78

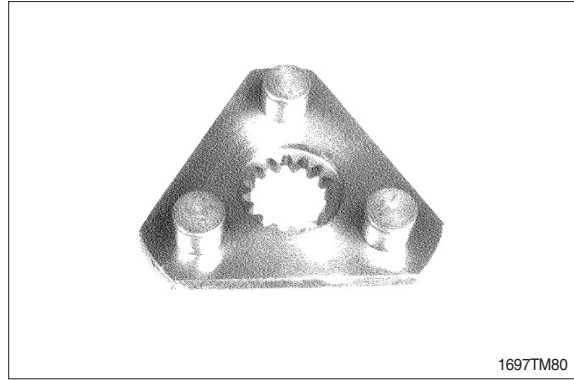
(8) Place thrust plate onto the gears and secure it with four snap rings.

- ※ Pay attention to the direction of the thrust plate. The convex side should be uppermost. (see cross sectional drawing for the direction, page 7-56~58).
- ※ Pay attention to the direction of the snap ring. The edge side should be uppermost.
- ※ Pay attention not to open the snap ring too much. A snap ring which loses tension should be replaced.



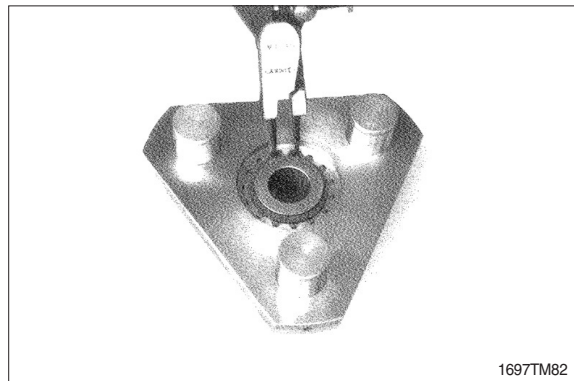
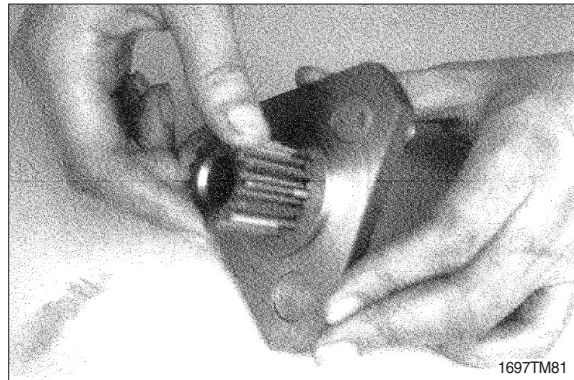
1697TM79

(9) Press-fit the three b2 pins and three spring pins (1pc/pin) into the carrier 2.



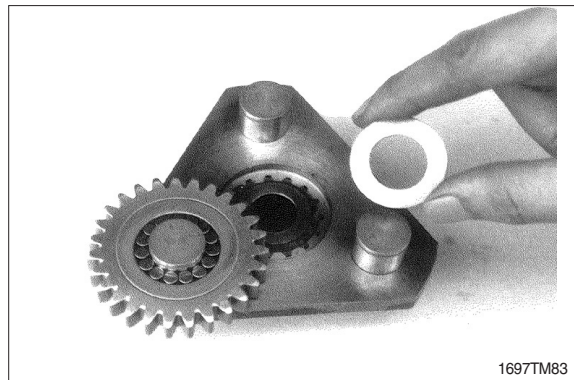
(10) Put the S1 gear to the carrier 2, and then secure them with the snap ring.

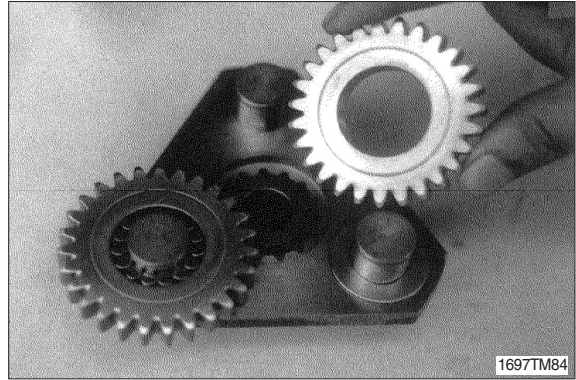
- ※ Pay attention to the direction of the snap ring. The edge side should be uppermost.
- ※ Pay attention not to open the snap ring too much. A snap ring which loses tension should be replaced.



(11) Place the three thrust washers (1pc/1pin), three b2 gears (1pc/1pin), forty-nine needles (13pcs/1pin) and the three thrust washers (1pc/1pin), in that order the carrier 2 and secure them with the three snap rings.

- ※ Pay attention to the direction of the snap ring. The edge side should be uppermost.
- ※ Pay attention not to open the snap ring too much. A snap ring which loses tension should be replaced.



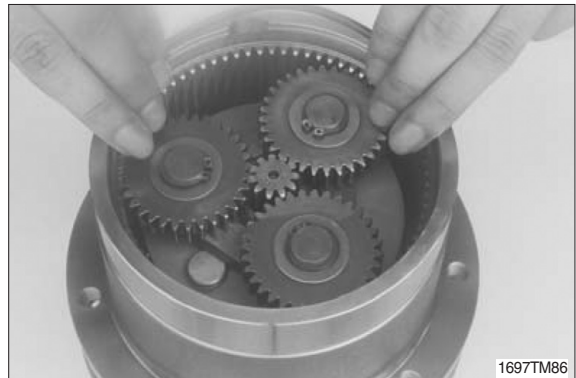


(12) Place the carrier 2 assembly into the body.



(13) Place the O-ring to the body.

- ※ Apply grease to the O-ring.
- ※ Pay attention not the rubbish in the O-ring groove.



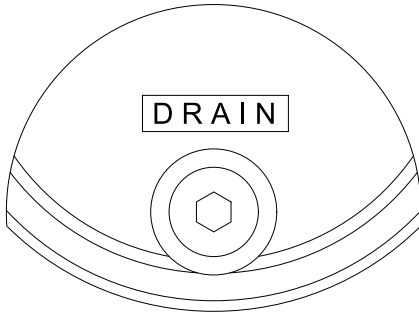
(14) Place the slide ring onto the cover.

- ※ Apply grease to the slide ring to prevent it dropping out.

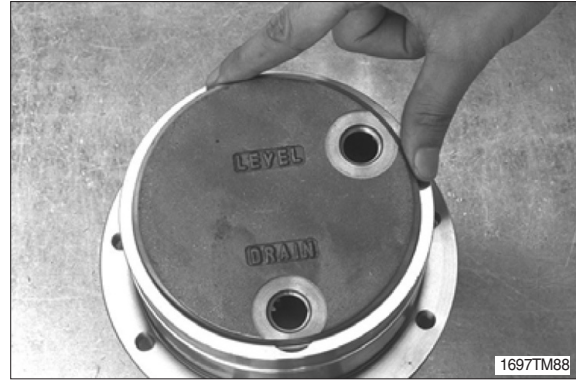


(15) Fill 0.33 ℓ gear oil in the body and insert cover.

- ※ Pay attention not to damage the O-ring.
- ※ The "DRAIN" side tapped hole should be aligned with notches of the body.

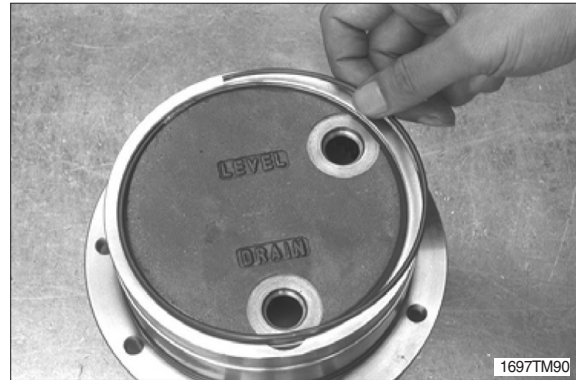


1697TM89



(16) Put the snap ring into the groove of the body to secure the cover.

- ※ Put the flat blade-flared tip screwdriver to the end of the snap ring, and tap it in the direction of the circumference.



(17) Screw the three plugs (size : PF3/8) with O-rings (1pc/plug) to the cover.

- Plug tightening torque (PF3/8) :
4.69~5.2 kgf · m (33.9~37.6 lbf · ft)
- Hexagon size : 8 mm (PF3/8)

※ Screw the plug of "DRAIN" side first.

