

## GROUP 6 TRAVEL DEVICE

### 1. REMOVAL AND INSTALL

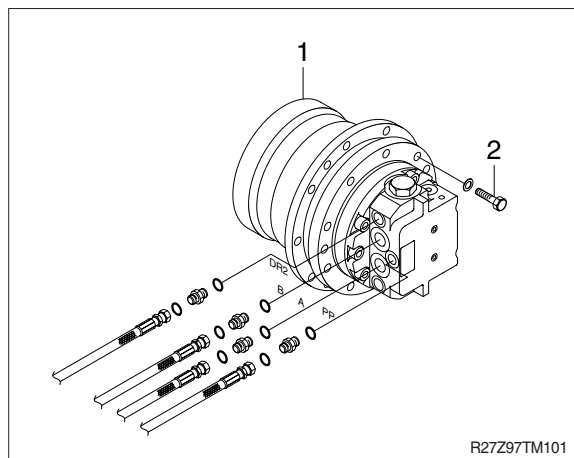
#### 1) REMOVAL

- (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.

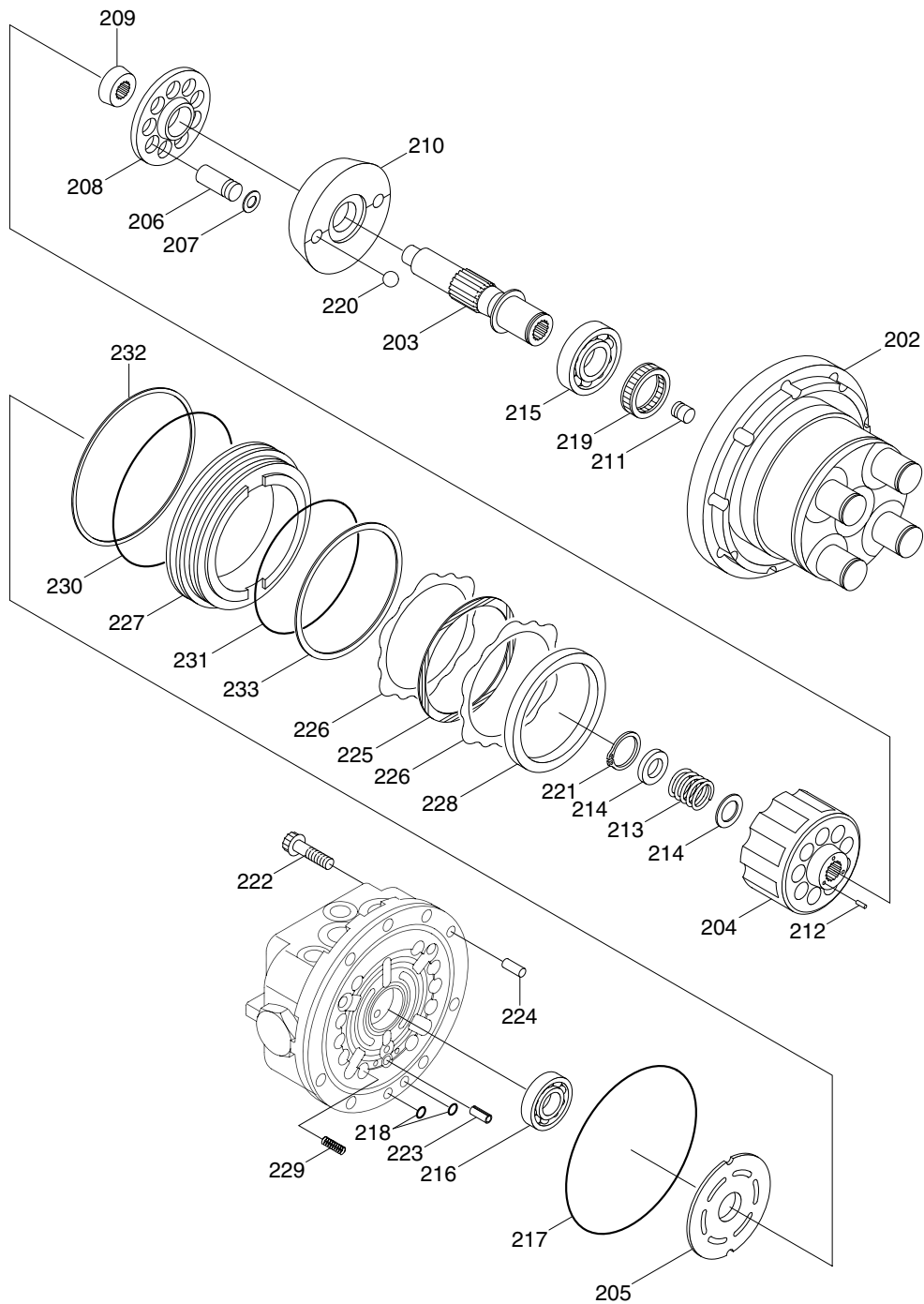
- (4) Remove the track shoe assembly.  
For details, see removal of track shoe assembly.
- (5) Remove the cover.
- (6) Remove the hose.  
※ Fit blind plugs to the disconnected hoses.
- (7) Remove the bolts and the sprocket.
- (8) Sling travel device assembly (1).
- (9) Remove the mounting bolts (2),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

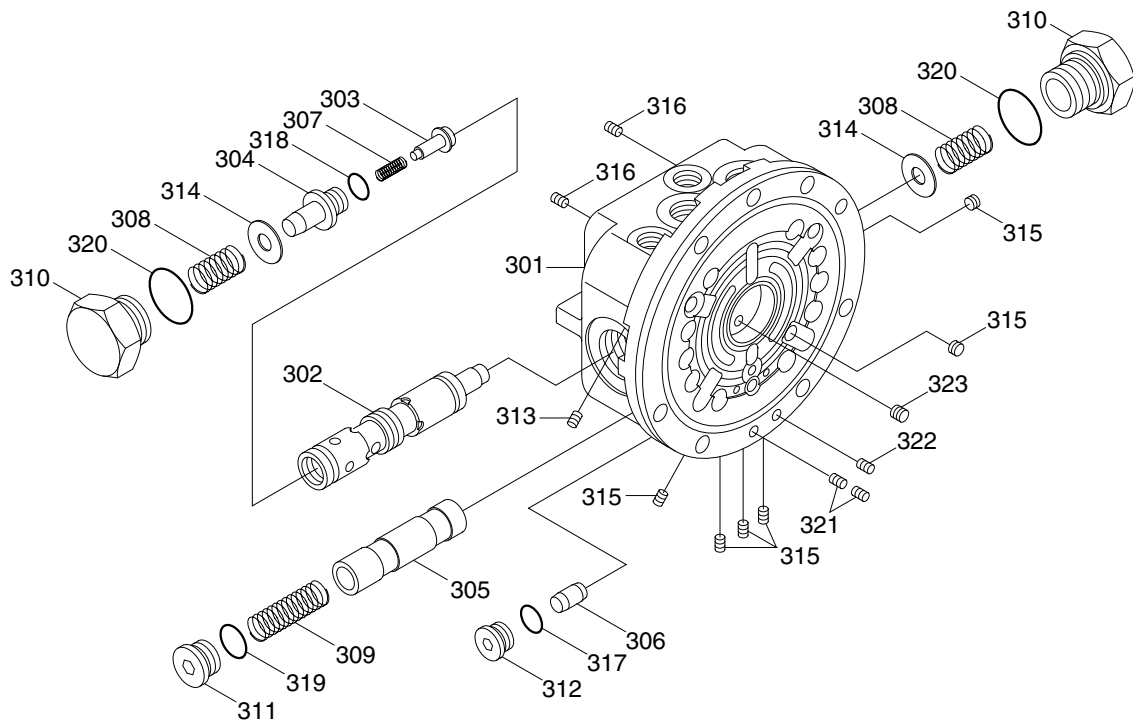
## 2) STRUCTURE (1/3)



202	Body 2	213	Spring C	224	Pin
203	Shaft	214	Retainer	225	Disk plate
204	Cylinder barrel	215	Bearing	226	Steel plate
205	Valve plate	216	Bearing	227	Brake piston
206	Piston	217	O-ring	228	Brake spacer
207	Shoe	218	O-ring	229	Spring B
208	Shoe holder	219	Oil seal	230	O-ring
209	Barrel holder	220	Ball	231	O-ring
210	Swash plate	221	Snap ring	232	Back up-ring
211	Control piston	222	Screw	233	Back up-ring
212	Pin	223	Spring pin		

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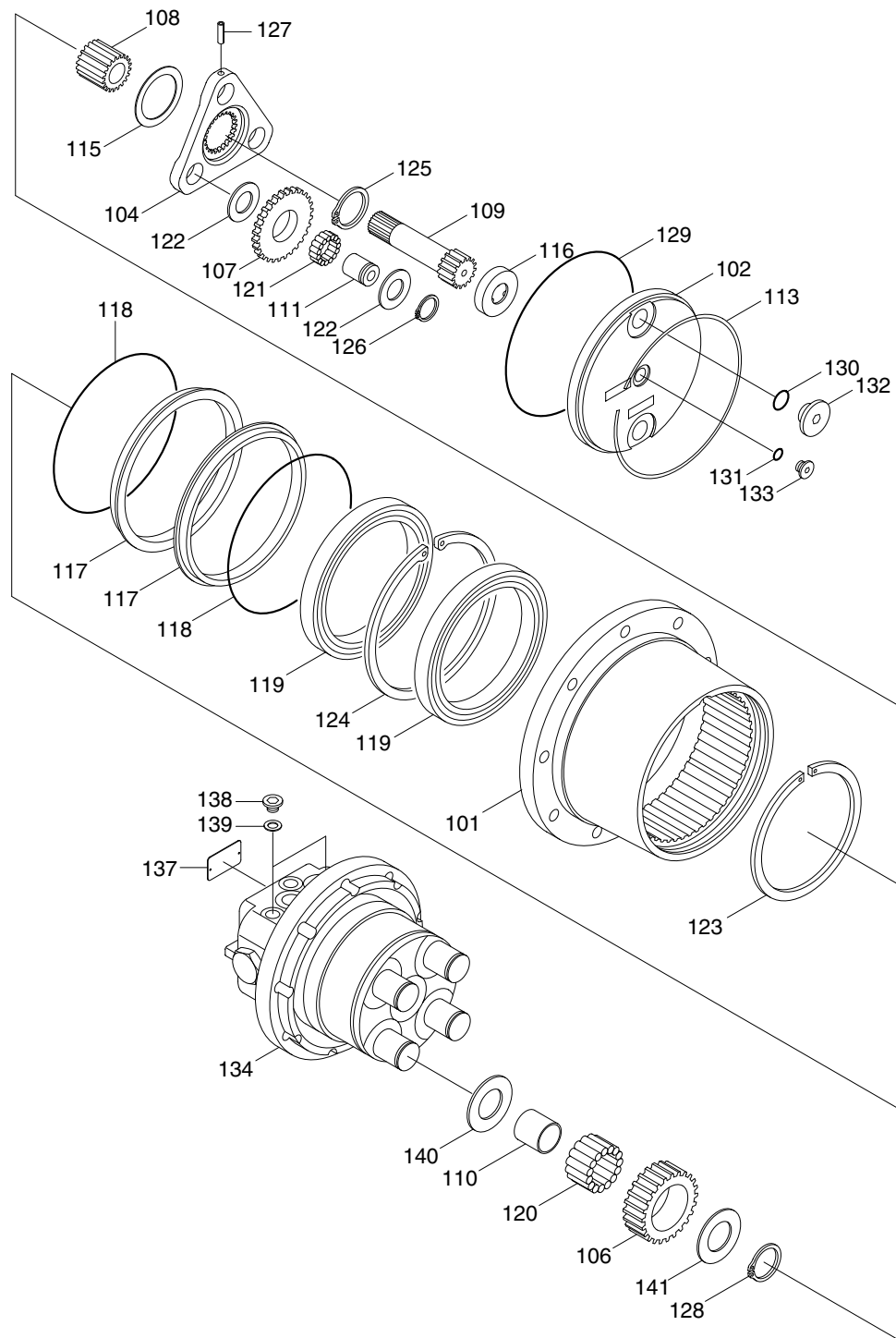
## STRUCTURE (2/3)



R27Z92TM24

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	O-ring
305	Spool	313	Choke	321	Choke
306	spool	314	Ring	322	Choke
307	Spring V1	315	Plug	323	Plug
308	Spring V2	316	Plug		

### STRUCTURE (3/3)



R27Z92TM25

101	Body	113	Snap ring	122	Thrust washer	131	O-ring
102	Cover	115	Thrust collar	123	Snap ring	132	Plug
104	Carrier 2	116	Slide ring	124	Snap ring	133	Plug
106	Gear B1	117	Floating seat	125	Snap ring	134	Hydraulic motor
107	Gear B2		(Incl 118)	126	Snap ring	137	Name plate
108	Gear S1	118	O-ring	127	Spring pin	138	Plug
109	Gear S2	119	Bearing	128	Snap ring	139	O-ring
110	Ring	120	Needle	129	O-ring	140	Thrust washer
111	Pin B2	121	Needle	130	O-ring	141	Thrust washer

### 3) MAINTENANCE INSTRUCTION

#### (1) Necessary tool to assemble

No.	Necessary tool	
1 2 3	Torque wrenches	45N (JIS B4650) 90N (JIS B4650) 280N (JIS B4650)
4 5	Hexagon socket	Hexagon size : 5 mm Hexagon size : 8 mm
6	Socket wrenches	Hexagon size : 36 mm
7 8	Hexagon socket wrenches	Hexagon size : 5 mm Hexagon size : 8 mm
9	Screwdrivers	Width : 6~10 mm
10 11 12 13 14	Snap ring pliers	∅ 28 mm for hole ∅ 25 mm for shaft ∅ 28 mm for shaft ∅ 30 mm for shaft ∅ 130 mm for shaft
15	Plastic hammer	-
16 17 18 19	Other	Grease Oil Sand paper C-clamps

## **2. DISASSEMBLY**

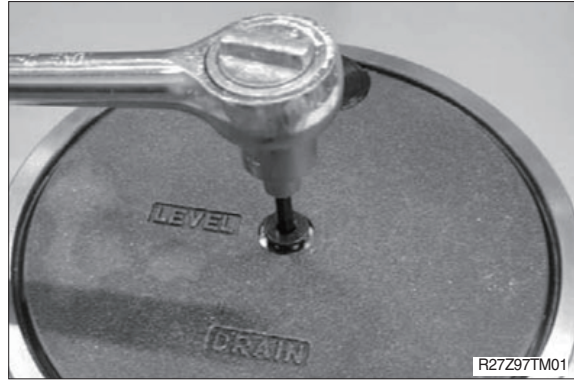
### **1) GENERAL PRECAUTIONS**

- (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 three plugs (PF3/8 and PF1/8).

- Tools required :  
Hexagon size : 8 mm  
Hexagon size : 5 mm



(2) Remove the snap-ring.

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



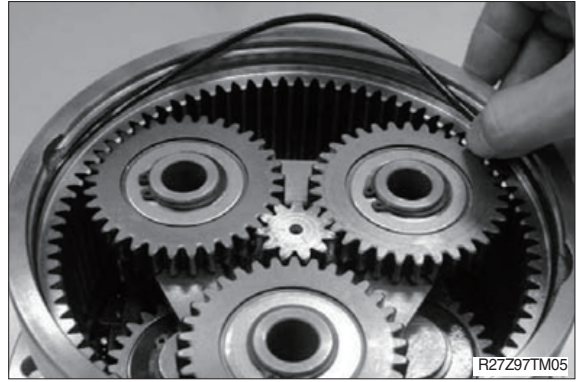
(3) Remove the cover.



(4) Remove the slide ring from the cover.



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



(6) Remove the s2 gear, the carrier 2 kit and thrust collar from the body.

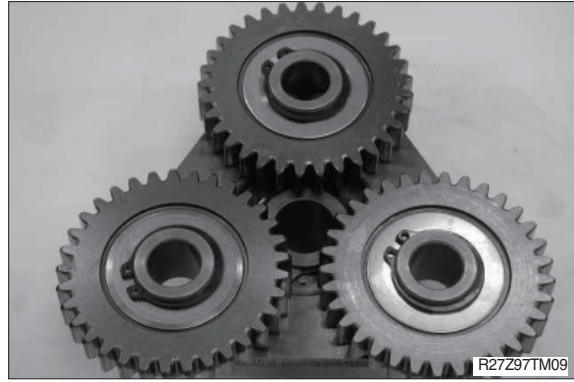
※ There is possibility the thrust collar sticks to the carrier 2 kit.



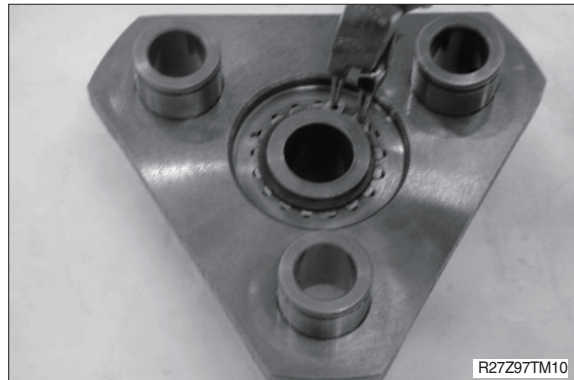
(7) Remove the three snap rings, three thrust washers, three b2 gears, forty-eight needles and three thrust washers.

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

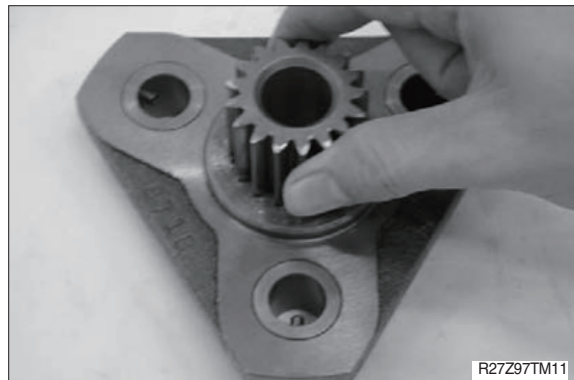
※ The b2 pins and spring pins are not able to disassemble, because they are press-fitted.



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



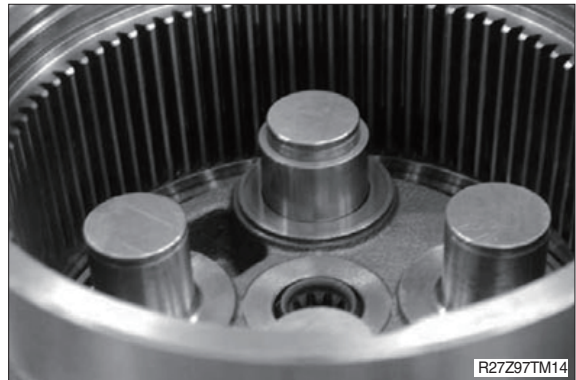
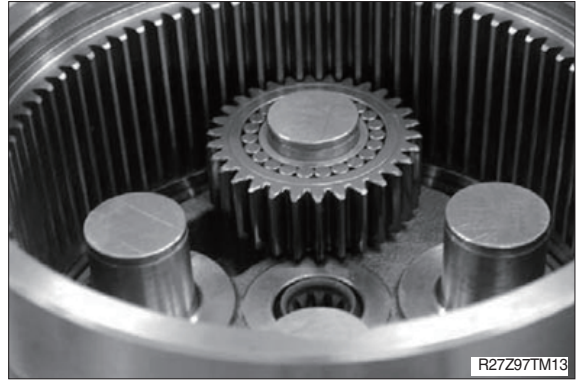
(9) Remove the s1 gear from the carrier 2.



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

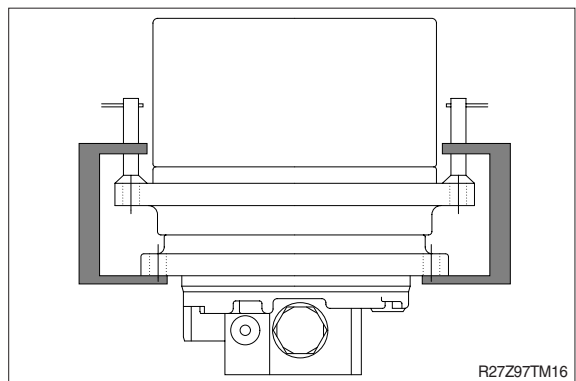


(11) Remove the four b1 gears, ninety-two needles, four thrust washers and four rings.



(12) Remove the snap ring and remove the body from the hydraulic motor.

※ 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 floating seat with O-ring from the body.



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



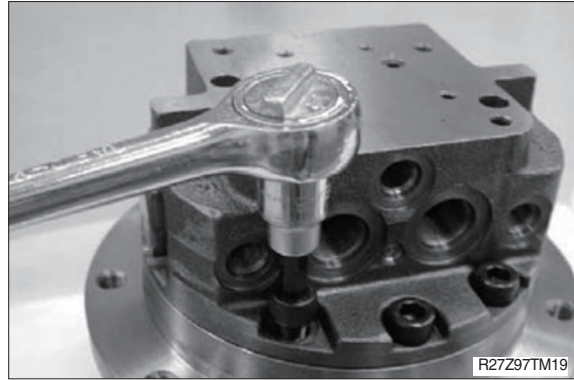
### 3) HYDRAULIC MOTOR SECTION

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

· Tools required :

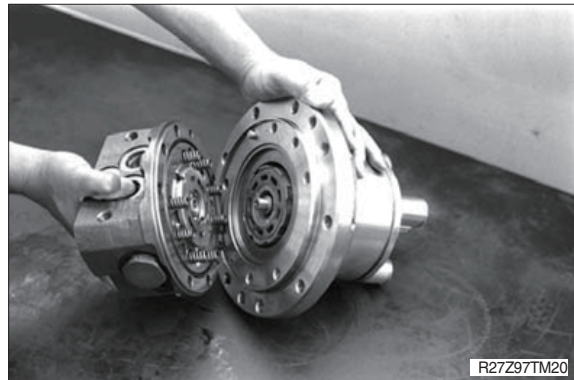
Hexagon size : 8 mm

※ 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 and the ten spring B.



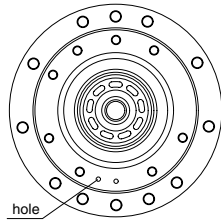
(4) Remove the three O-rings from the body 1.

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

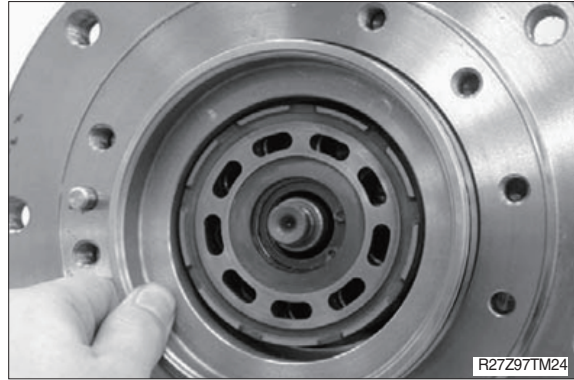


(5) Remove the brake piston assembly from the body 2.

※ The brake piston removes when the air comes into the inside from the hole. Do not blow it suddenly, the brake piston assembly fly out.

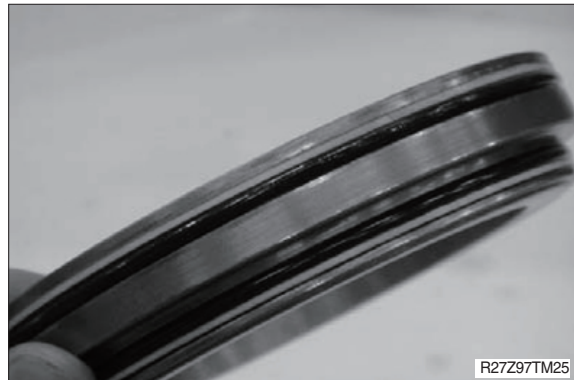


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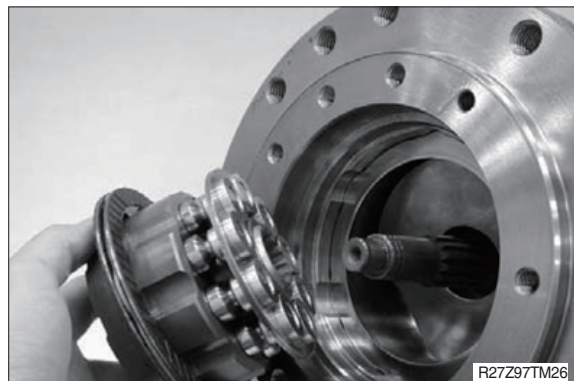
(6) Remove the two O-rings and two back up rings from the brake piston.



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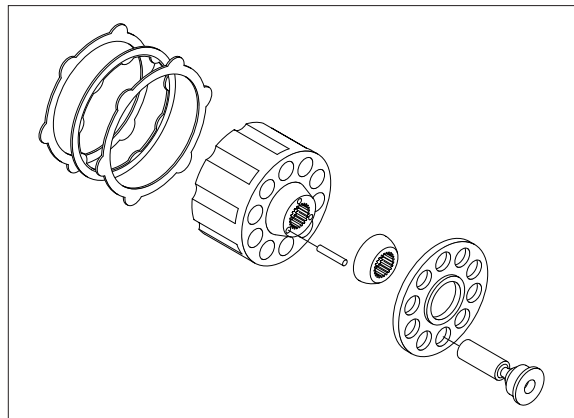
(7) Remove the cylinder barrel assembly and brake spacer from the body 2.

※ Pay attention not to lose the each part.



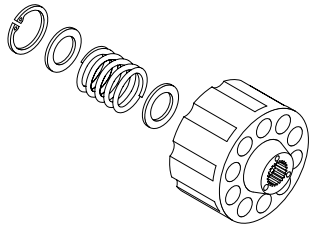
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(8) Remove the nine piston-shoe assemblies, shoe holder, barrel holder, three pins, two steel plates and disk plate.



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

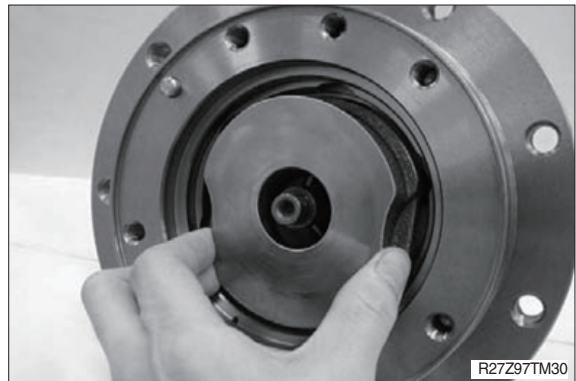


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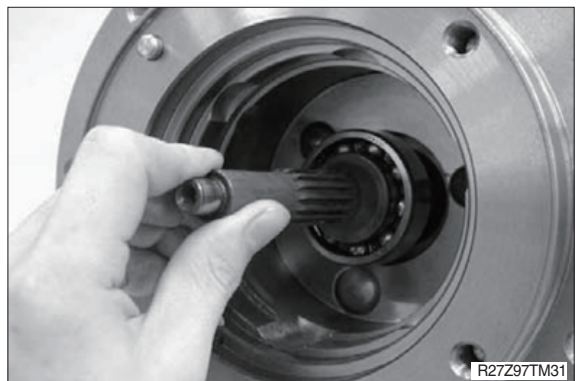
(10) Remove the swash plate and two balls from the body 2.



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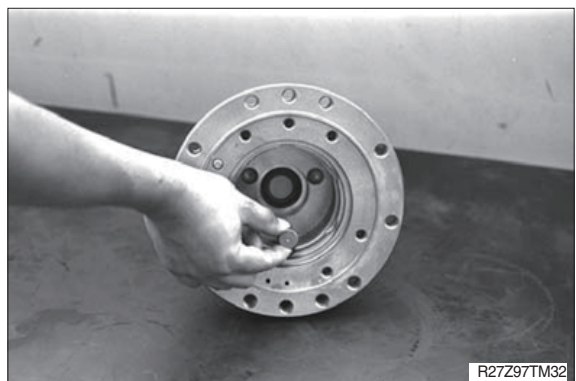
(11) Remove the shaft from the body 2.

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



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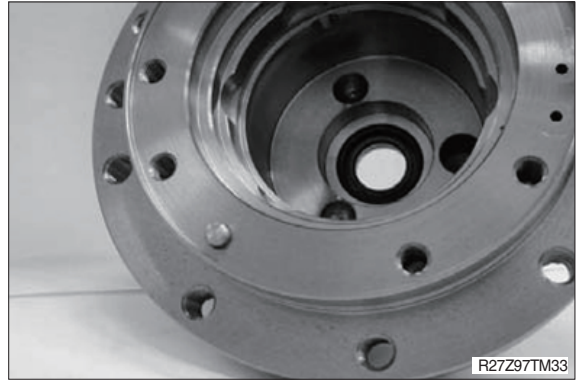
(12) Remove the control piston from the body 2.



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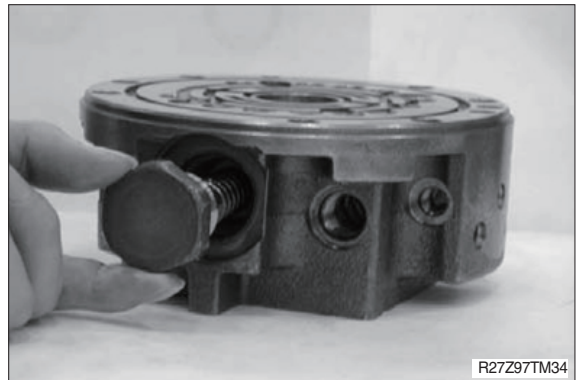
(13) Remove the oil seal from the body 2.

(14) Remove the pin from the body 2.



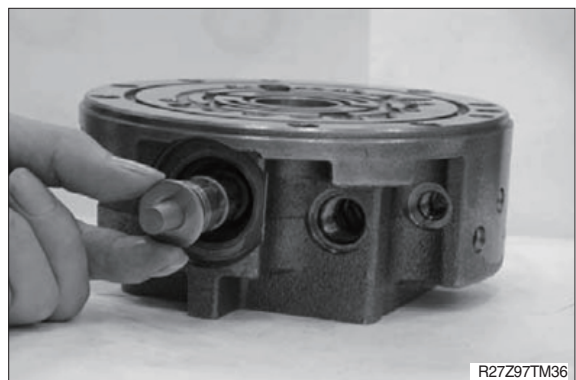
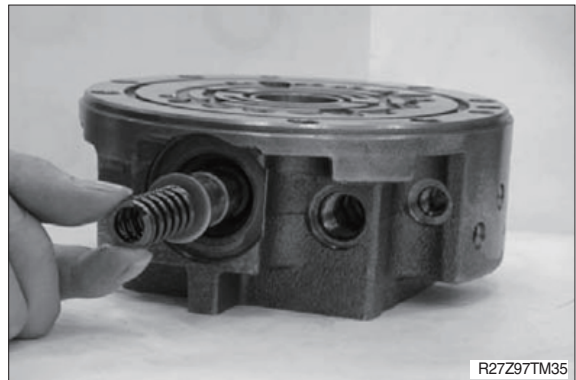
(15) Remove the two plugs with O-rings from the body 1.

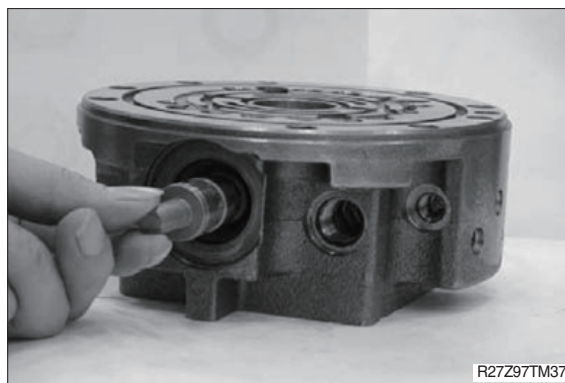
- Tools required :  
Hexagon size : 36 mm



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

- ※ The spool assembly is not able to disassemble.





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

- Tools required :  
Hexagon size : 8 mm

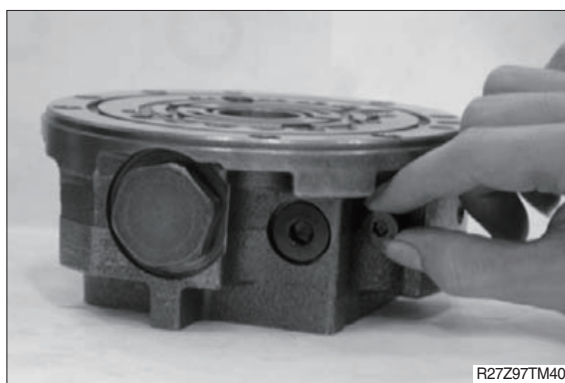


(18) Remove the spring V3 and two speed spool.

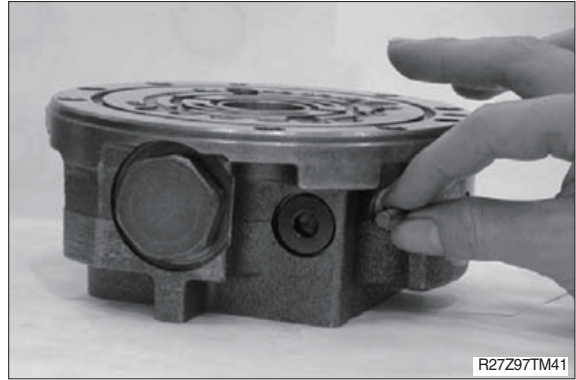


(19) Remove the plugs with O-rings from the body 1.

- Tools required :  
Hexagon size : 5 mm



(20) Remove the shuttle spool.



### 3. ASSEMBLY

#### 1) HYDRAULIC MOTOR SECTION

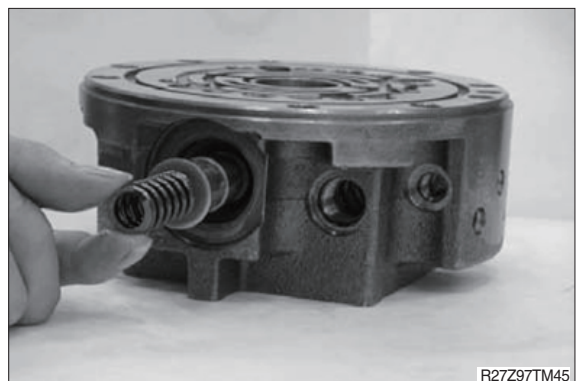
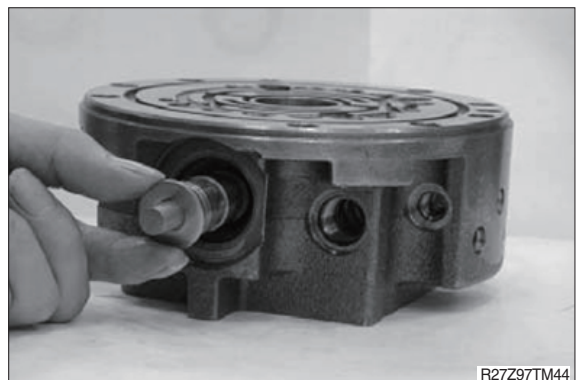
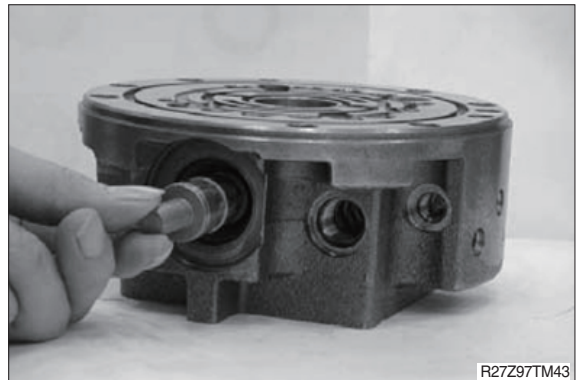
- (1) Press-fit the bearing and the spring pin into the body 1.

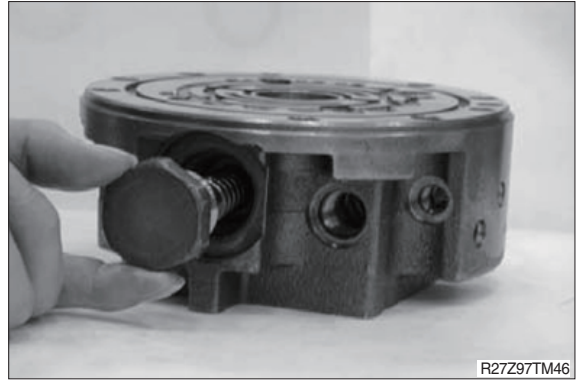


- (2) Insert the spool assembly, two rings (1pc/side) and two springs (1pc/side) in that order into the body 1, and then screw the two plugs (1pc/side) with two O-rings (1pc/side).

※ The spool assembly is not able to disassemble.

- Plugs tightening torque :  
20~25 kgf · m (145~180 lbf · ft)
- Hexagon size : 36 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).

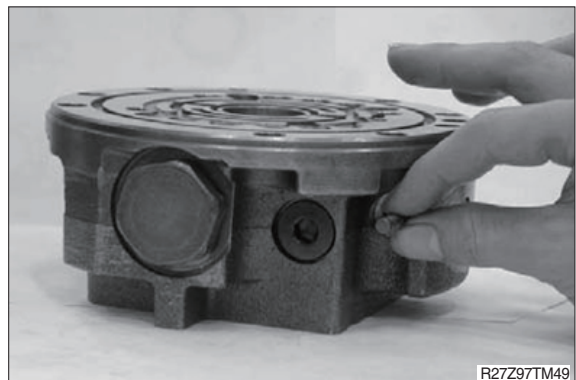
- Plugs tightening torque :  
4.69~5.2 kgf · m (33.9~37.6 lbf · ft)
- Hexagon size : 8 mm

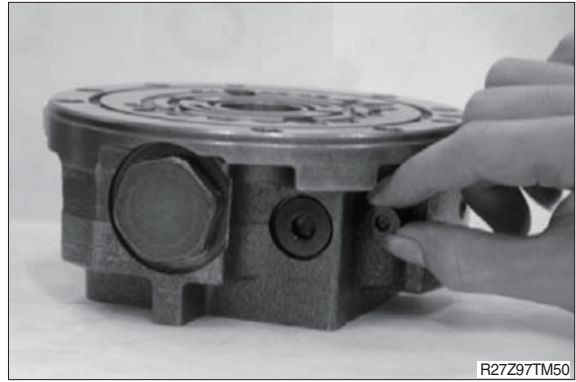
※ Pay attention to the direction of the spool.  
(See cross sectional drawing for the direction, page 7-59~61).



(4) Insert the shuttle spool into the body 1, and then screw the two plugs (1pc/side), with two O-rings (1pc/side).

- Plugs tightening torque :  
1.22~1.84 kgf · m (8.82~13.3 lbf · ft)
- Hexagon size : 5 mm





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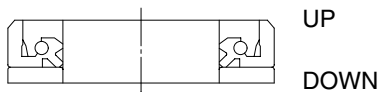
(5) Place three O-rings onto the body 1.



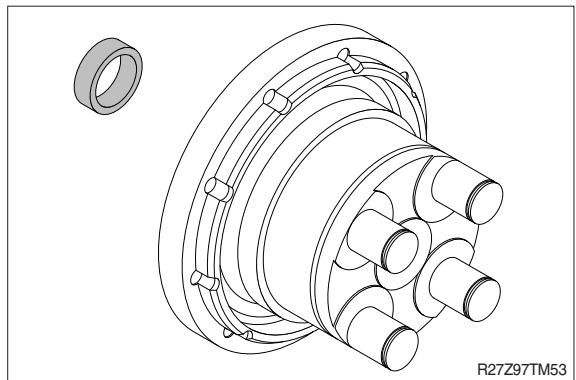
R27Z97TM51

(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.

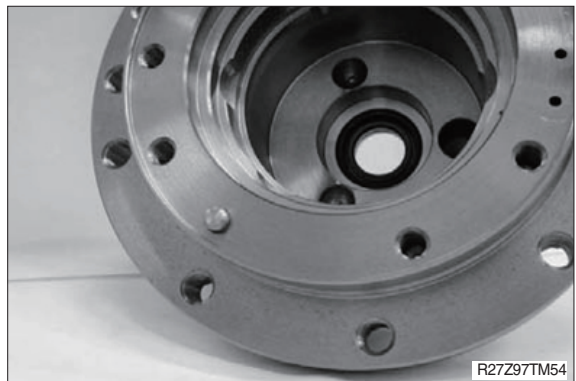


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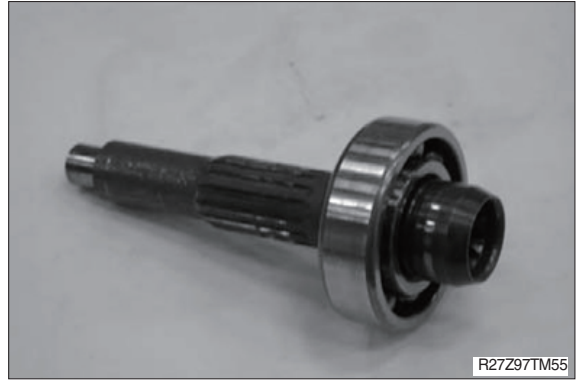
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(7) Place the pin into the body 2.



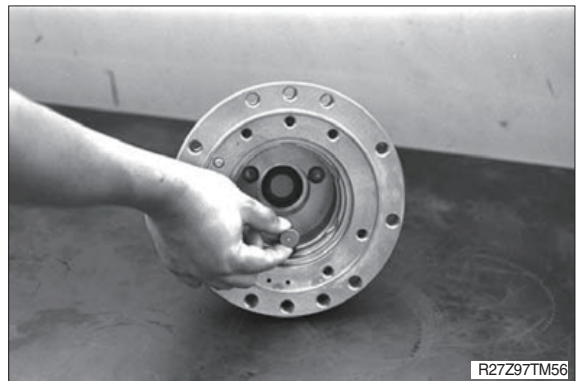
R27Z97TM54

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



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

- ※ Pay attention to the direction of the control piston. (See cross sectional drawing for the direction, page 7-59~61).



(10) Place the shaft into the body 2.

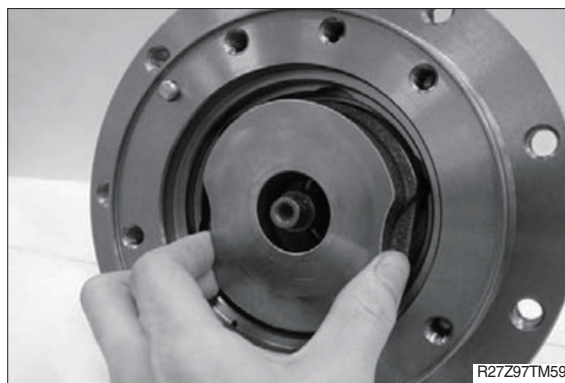
- ※ Pay attention not to damage the oil seal with the shaft.
- A oil which damaged should be replaced.



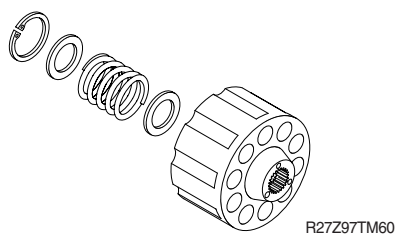
(11) Place the two balls and the swash plate onto the body 2.

- ※ 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 and retainer in that order into the cylinder barrel, and then secure them with the snap ring.

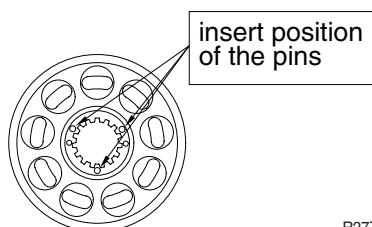


(13) Place the piston-shoe assemblies into the shoe holder.



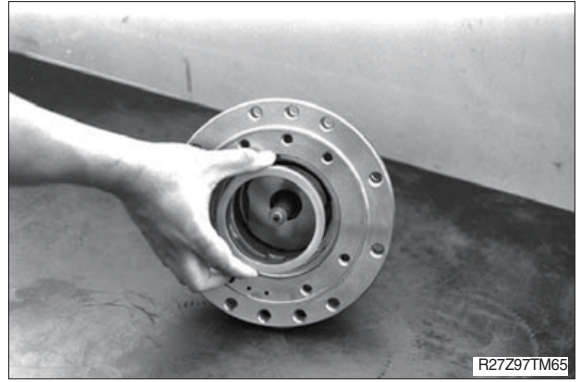
(14) Place the three pins, barrel holder and piston-shoe assemblies in that order into the cylinder barrel.

- ※ 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.

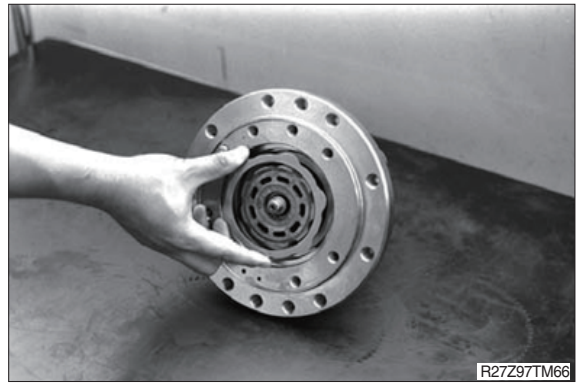


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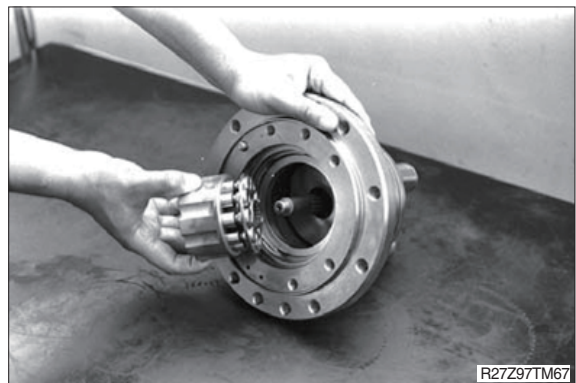
(15) Place the brake spacer plate into the body 2.



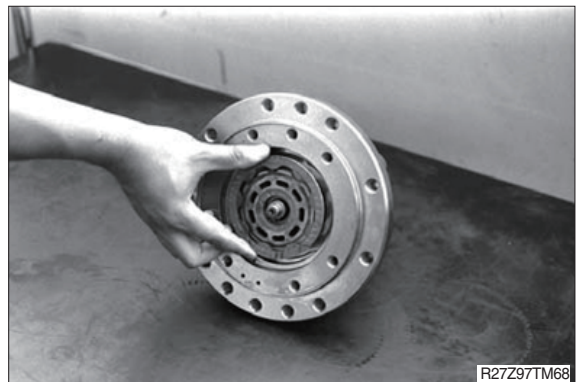
(16) Place the steel plate into the body 2 along the groove.



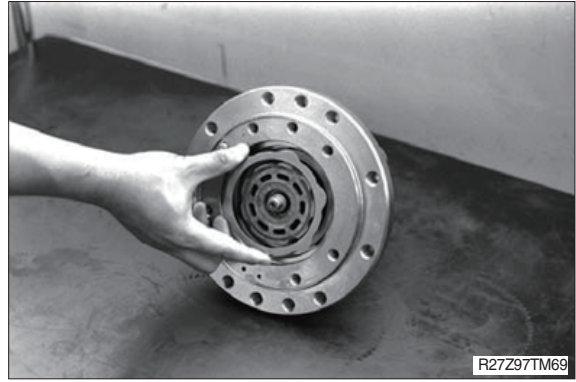
(17) Insert the cylinder barrel assembly into the body 2 so that the shoes contact the swash plate.



(18) Place the disk plate into the body 2 along the groove.

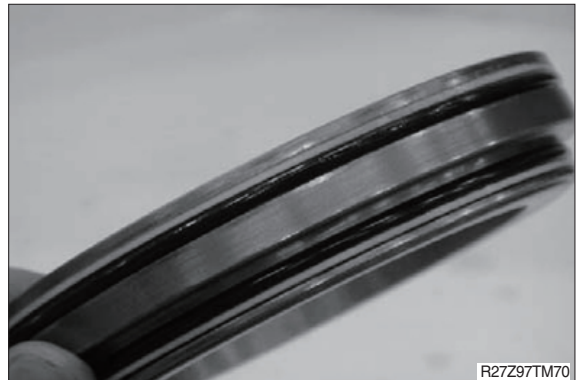


(19) Place the steel plate into the body 2 along the groove.



(20) Place the two O-rings and two back up rings onto the brake piston.

- ※ Pay attention to the direction of O-rings and back up rings.  
(See cross sectional drawing for the direction.)



(21) Inset the brake piston assembly into the body 2.

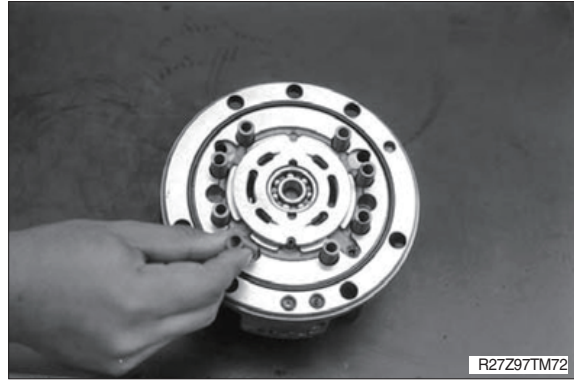
- ※ Apply grease to the O-ring to make it easy.



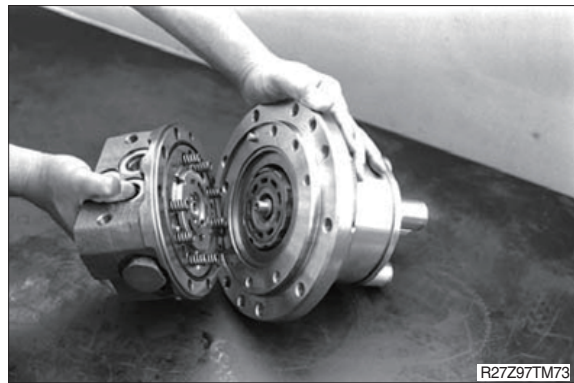
(22) Fill the body 2 with 0.1ℓ hydraulic oil for lubrication.

(23) Place the valve plate and ten springs 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.
- ※ In case the springs drop out, apply grease to the bottom of it.
- ※ Please refer to the parts list for the number and the position with the spring B.



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



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

- Bolt tightening torque :  
5.2~6.6 kgf · m (37.6~47.7 lbf · ft)
- Hexagon size : 8 mm

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



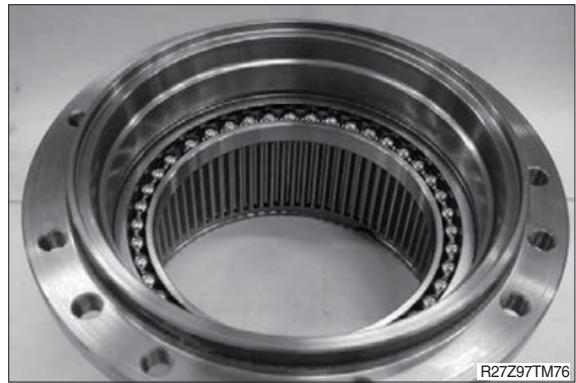
## 2) REDUCTION GEAR SECTION

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



- (2) Join the bearing and snap ring to the body.

- ※ Pay attention to the direction of the bearings.  
(See cross sectional drawing for the direction, page 7-59~61).

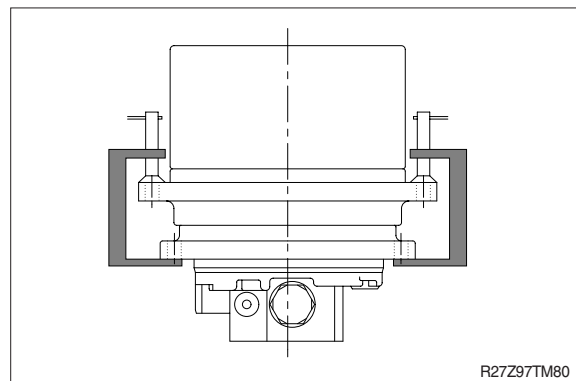


- (3) Put the floating seal with O-ring onto the body.



- (4) Join the body to the motor, and secure it with snap ring.

- ※ Degrease the surface of floating seal.
- ※ Hit around the body by the resinous hammer equally to make it easy.
- ※ Tighten the speed reducer flange and the motor flange with C-clamps or a hydraulic press when the snap ring is fastened.
- ※ The pre-load for the bearings is adjusted by thickness of the snap ring.

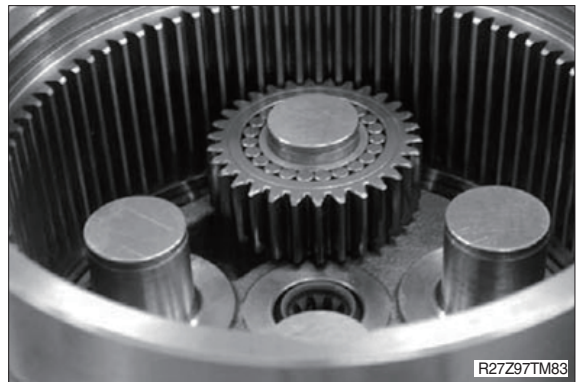
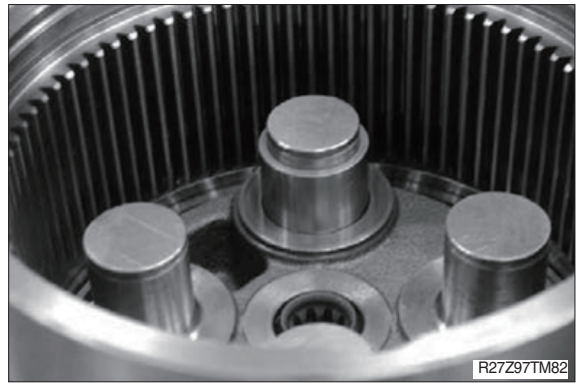


(5) Place the four rings (1pc/1pin), four thrust washers (1pc/1pin), four b1 gears (1pc/1pin) and ninety-two needles (23pcs/1pin), and four thrust washers in that order onto the body 2, and secure it with four snap rings.

※ Pay attention to the direction of the b1 gears (see cross sectional drawing for the direction, page 7-59~61).

※ Pay attention to the direction of the snap ring. The edge side should be uppermost.

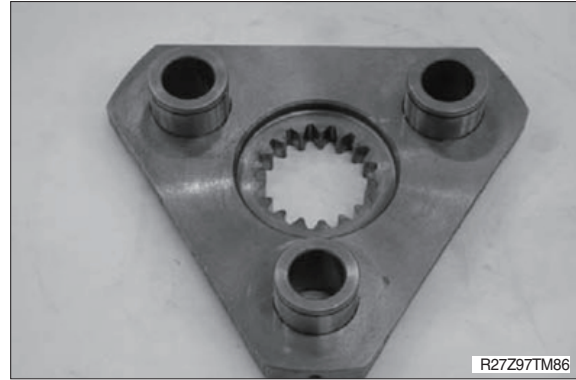
※ Pay attention not to open the snap ring too much. A snap ring which loses tension should be replaced.



(6) Place thrust collar onto the gears.

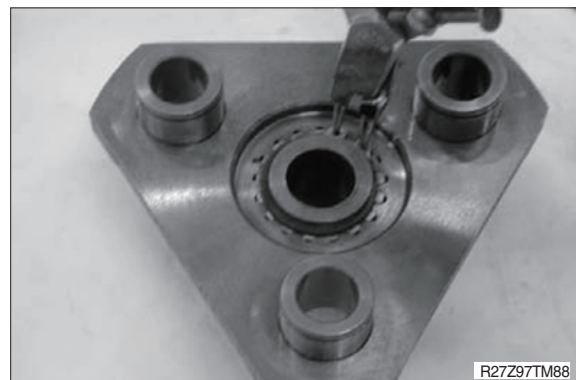
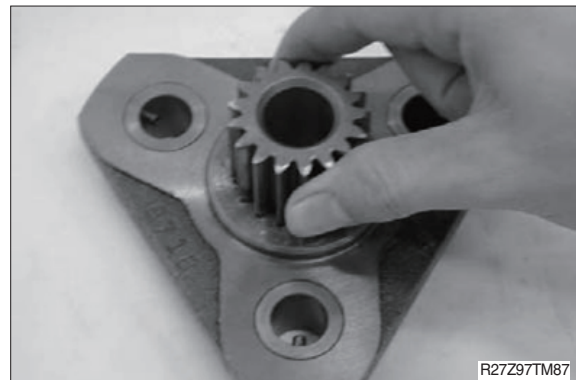


- (7) Press-fit the three b2 pins and three spring pins (1pc/pin) into the carrier 2.



- (8) 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.

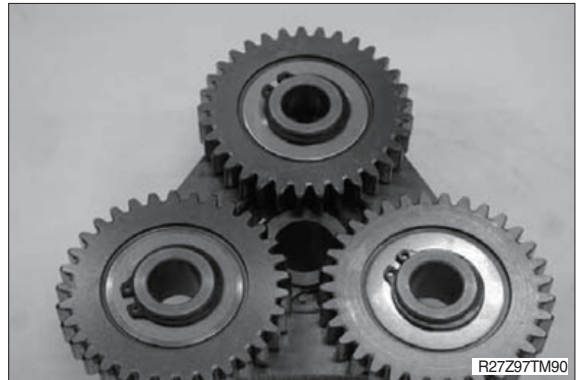
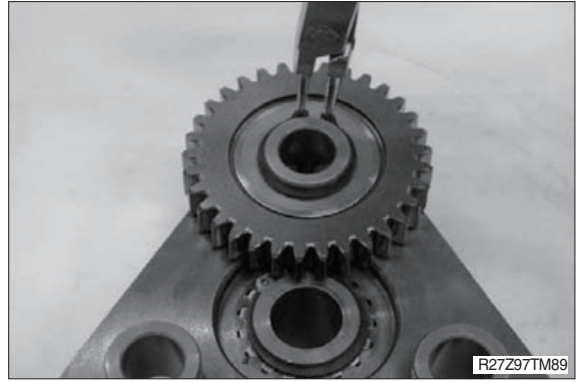


(9) Place the three thrust washers (1pc/1pin), three b2 gears (1pc/1pin), forty-eight needles (16pcs/1pin) and the three thrust washers (1pc/1pin), and secure it with three snap rings.

※ Pay attention to the direction of the b2 gears (see cross sectional drawing for the direction).

※ 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.



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

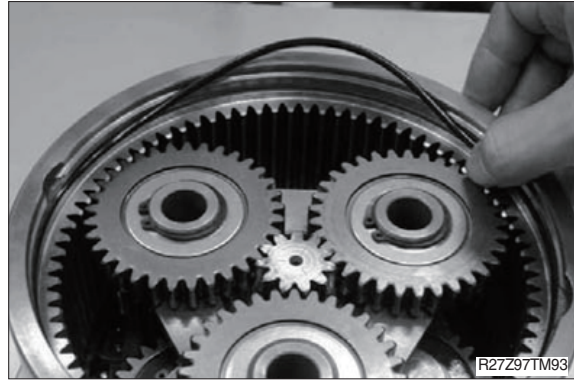


(11) Join the S2 gear to the body.



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

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



(13) Fill 0.6 ℓ (0.16 U.S. gal) gear oil in the body.

(14) Insert the slide ring in the cover.

- ※ Pay attention to the direction of the slide ring (see cross sectional drawing for the direction, page 7-59~61).
- ※ Apply grease to the slide ring to prevent it dropping out.



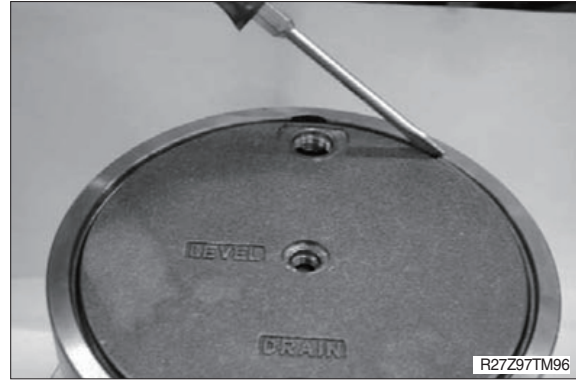
(15) Insert cover in the body.

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



(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 two plugs (size : PF3/8) with O-rings to the cover.

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



(18) Screw the three plugs (size : PF3/8, PF1/8) 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)
- Plug tightening torque (PF1/8) :  
1.22~1.84 kgf · m (8.82~13.3 lbf · ft)
- Hexagon size : 5 mm (PF1/8)

