

GROUP 5 SWING DEVICE

1. REMOVAL AND INSTALL OF MOTOR

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.

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

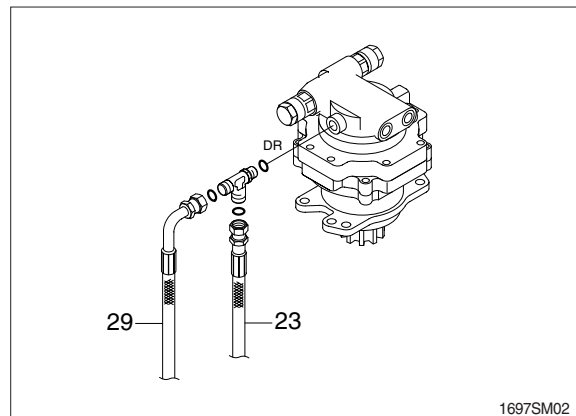
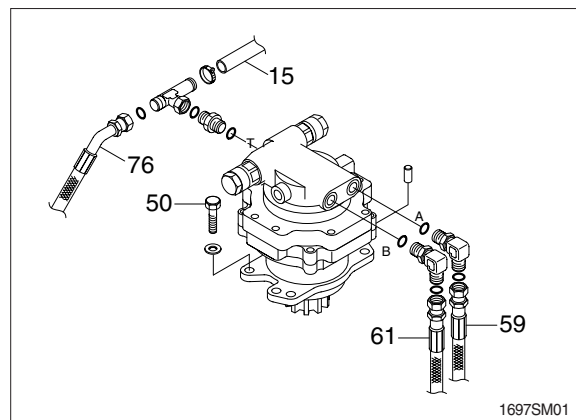
- (4) Disconnect hose assembly (59, 61, 76).
- (5) Disconnect pilot line hoses (23, 29).
- (6) Sling the swing motor assembly (1) and remove the swing motor mounting bolts (50).

※ Motor device weight : 23 kg (50 lb)

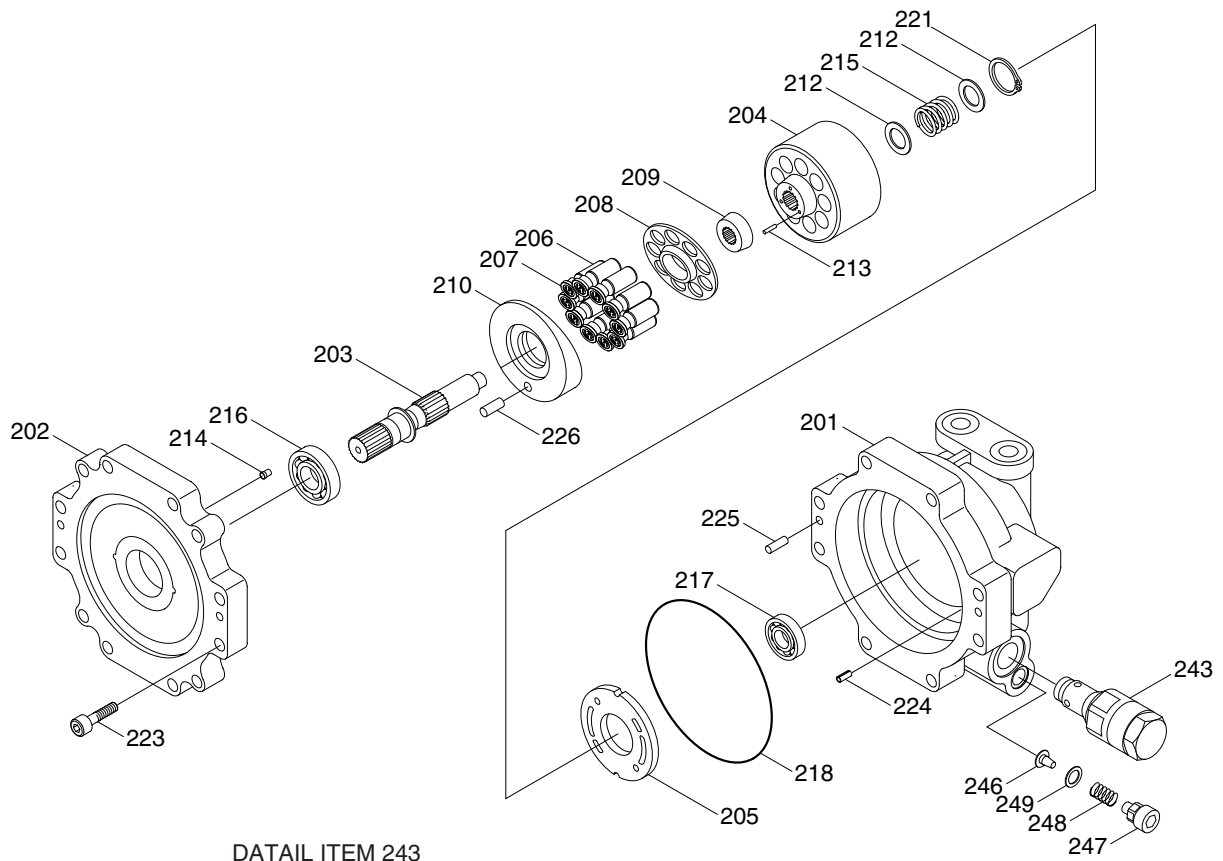
- (7) Remove the swing motor assembly.
※ When removing the swing motor assembly, check that all the piping have been disconnected.

2) INSTALL

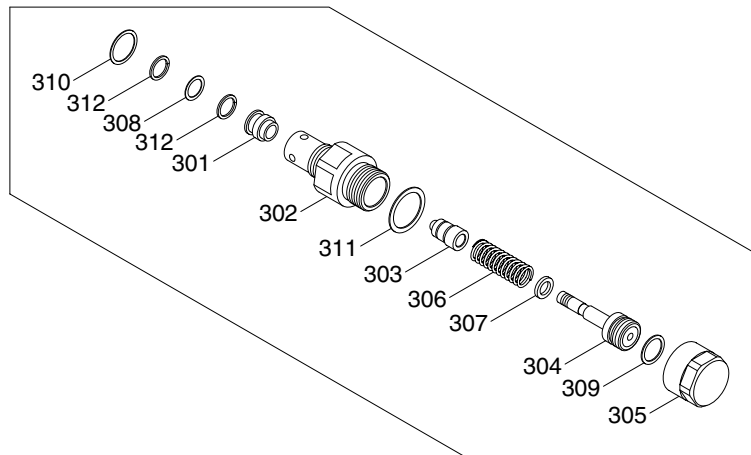
- (1) Carry out installation in the reverse order to removal.
- (2) Bleed the air from the swing motor.
 - ① Remove the air vent plug.
 - ② Pour in hydraulic oil until it overflows from the port.
 - ③ Tighten plug lightly.
 - ④ Start the engine, run at low idling and check oil come out from plug.
 -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



2) COMPONENTS (1/2)



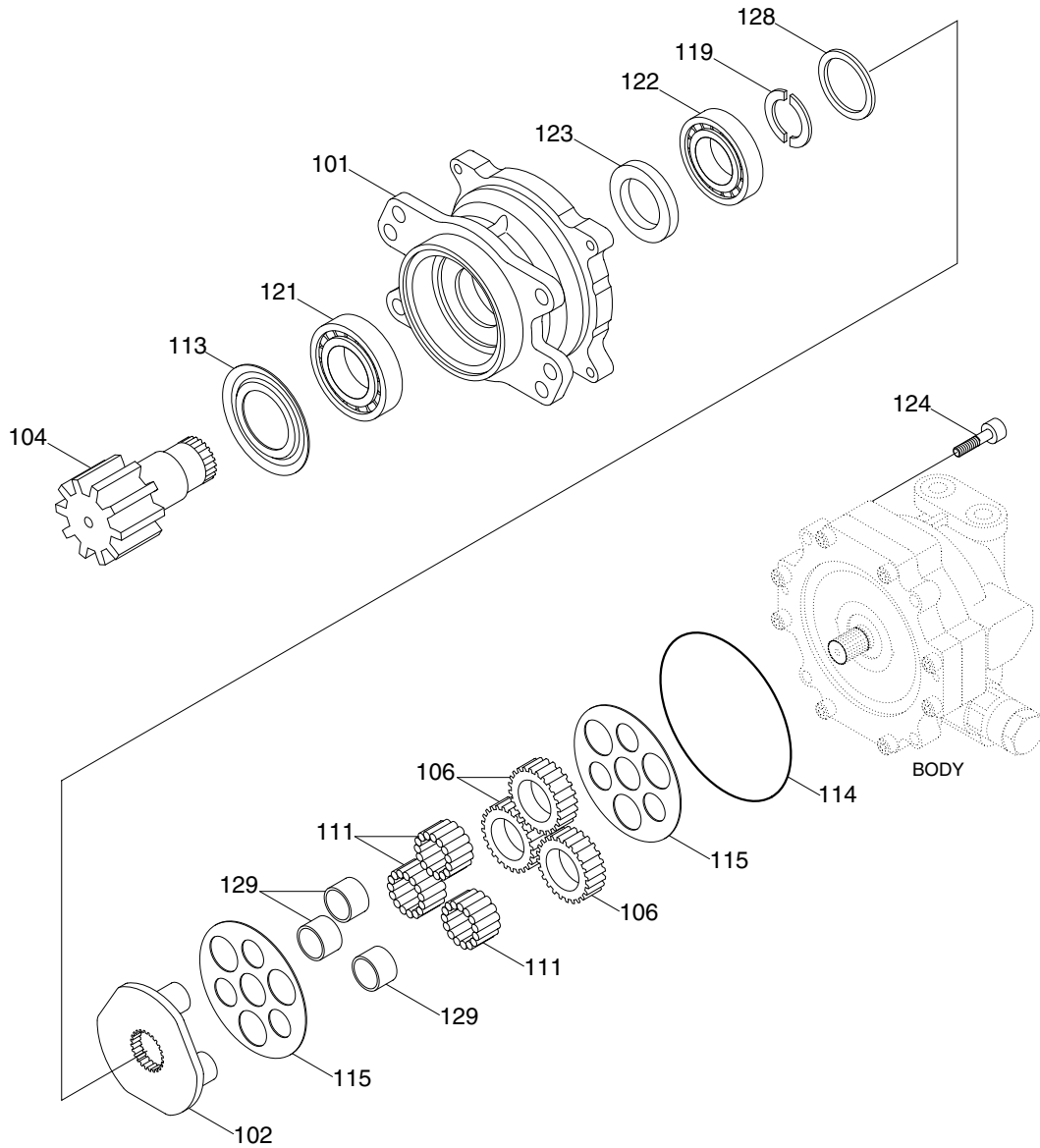
DETAIL ITEM 243



1692SM06

201	Body	212	Retainer	225	Pin	304	Piston
202	Plate	213	Pin	226	Pin	305	Cap
203	Shaft	214	Filter	243	Relief valve	306	Spring
204	Cylinder barrel	215	Spring C	246	Check valve	307	Spacer
205	Valve plate	216	Bearing	247	Plug	308	O-ring
206	Piston	217	Bearing	248	Spring	309	O-ring
207	Shoe	218	O-ring	249	O-ring	310	O-ring
208	Shoe holder	221	Snap ring	301	Seat	311	O-ring
209	Barrel holder	223	Screw	302	Retainer	312	Back up-ring
210	Swash plate	224	Spring pin	303	Poppet		

COMPONENTS (2/2)



1692SM07

101	Body	114	O-ring	123	Oil seal
102	Carrier 1	115	Thrust plate 1	124	Screw
104	Pinion shaft	119	Preload collar	128	Ring
111	Needle	121	Bearing	129	Ring 1
113	Seal ring	122	Bearing		

2) GENERAL ATTENTION

Please pay attention following points.

- (1) Working should be done at the clean place and pay attention not to attach dust, paint cake and water. And prepare the clean box to put into the disassembled parts.
- (2) Before disassembling, clean up the dust which is attached to the outside of the swing motor and take out paint which is attached to the binding parts by the wire brush.
- (3) To make the original position when assembling, make a marking before disassembling.
- (4) Give special care to protect parts from damage.
- (5) Wash parts with washing oil sufficiently.
- (6) Check parts whether there is friction loss or seize and take out burr with sand paper.
- (7) Change the seals and snap rings to new ones.

3) DISASSEMBLY AND ASSEMBLY PROCEDURE

As the swing motor composes 2 blocks (hydraulic motor and reduction gear), explain each block disassembly and assembly procedure.

And please refer to the page 7-37~38.

4) TOOLS FOR DISASSEMBLY AND ASSEMBLY

No.	Tool	
1	Preset type hand torque wrench	45 N (JIS B4650)
2		90 N (JIS B4650)
4	Hexagon bar bit for above wrench	Two-plane width 6
5		Two-plane width 8
6	Single purpose type hand torque wrench	T = 15 ± 1.5 kgf · m (108 ± 10.8 lbf · ft) Two-plane 36
8	Hexagon bar wrench	Two-plane width 6
9		Two-plane width 8
10	Spanner	Two-plane width 36
11	Minus driver	Width 6~10
12	Snap ring pliers	∅ 28 For hole
13	Hammer	-
14	Plastic hammer	-
15	Other	Grease
16		(Oil designated hydraulic oil)
17		Wire brush
18		Sand paper
19		Anti-loose adhesive (three bond #1305)

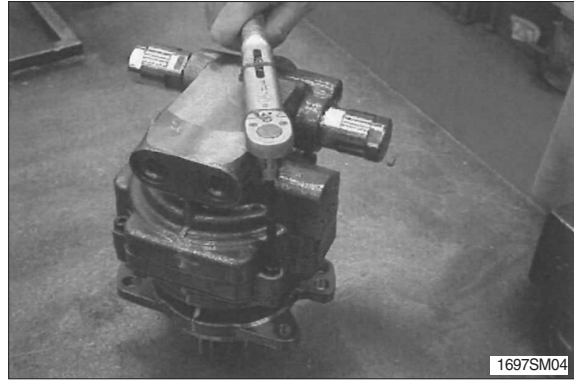
3. DISASSEMBLY

1) HYDRAULIC MOTOR

(1) Loose the hexagon socket head cap bolts (124), and take out the hydraulic motor assembly from the reduction gear body.

- Tools required :
Hexagon bar wrench : 6 mm

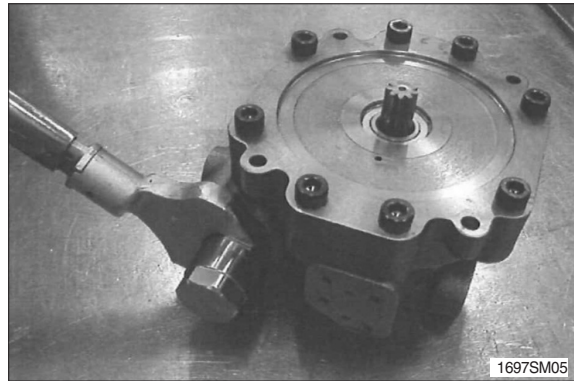
※ When taking out the hydraulic motor assembly from the reduction gear body, the drain port should be open.
When it is difficult to take out, insert the minus driver into the binding face to the body and take out the burr completely.



(2) Take out the relief valve assembly.

- Tools required :
Spanner : 36 mm

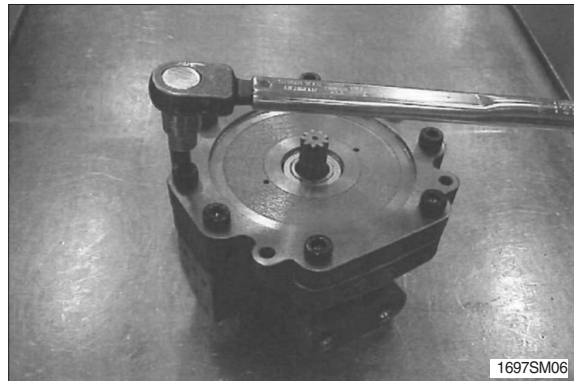
※ Do not disassemble the relief valve assembly, unless it is necessary.



(3) Loose the hexagon socket head cap bolts (223), and take out the plates (202).

- Tools required :
Hexagon bar wrench : 8 mm

※ Pay attention not to drop out the swash plate (210).



(4) Take out the swash plate (210) and the shaft kit from the plate S (202).

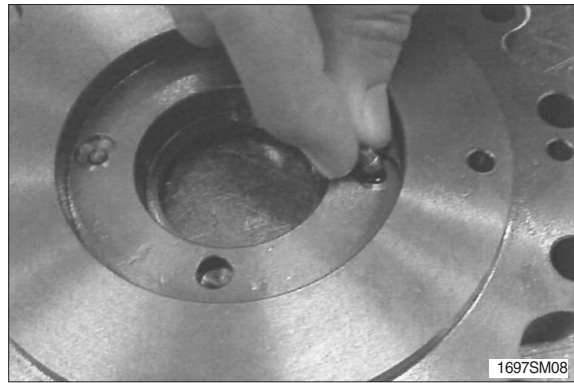
※ When it is difficult to take out the shaft, hit the opposite side slightly by the plastic hammer.

As the bearing (216) is pressed into the shaft, do not disassemble unless it is necessary to change the bearing.



(5) Take out the filter (214) and the parallel pin (225) from the plate S (202).

- Filter (214) : 2 pcs
- Parallel pin (225) : 3 pcs



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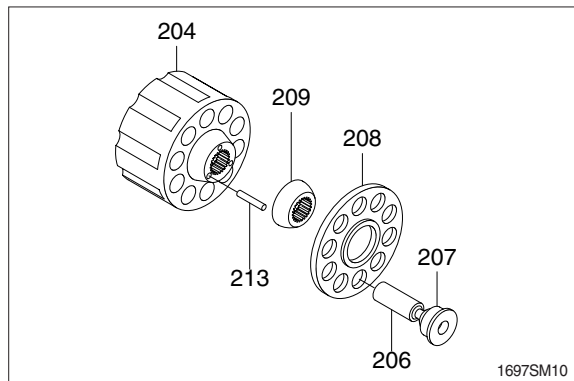
(6) Take out the cylinder barrel kit.

- ※ The small parts are easily dispersed, pay attention not to miss.
- The valve plate (205) is sometime attached, pay attention not to drop out.



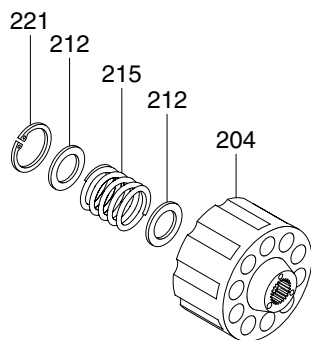
1697SM09

(7) Take out the piston (206) and the shoe (207) assembly, the shoe holder (208), the barrel holder (209) and the pin (213).



1697SM10

(8) Take out the snap ring (221), the retainer (212) and the spring C (215).

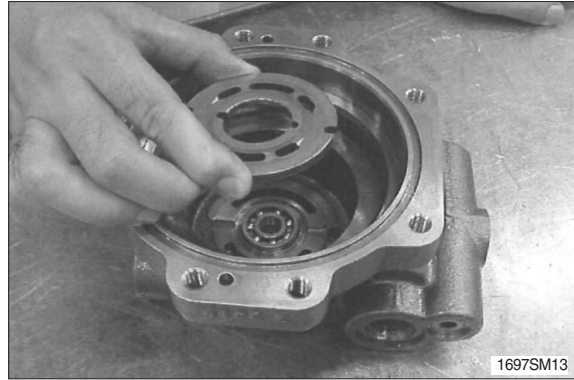


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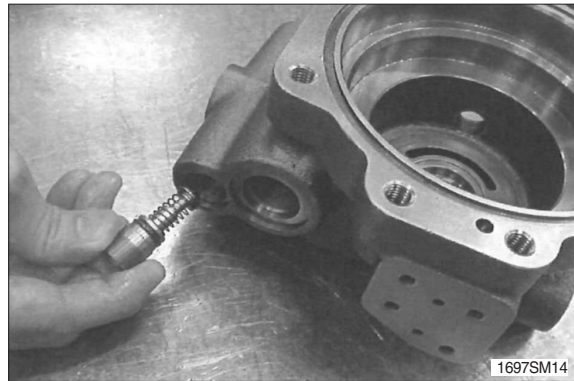
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(9) Take out the valve plate (205).



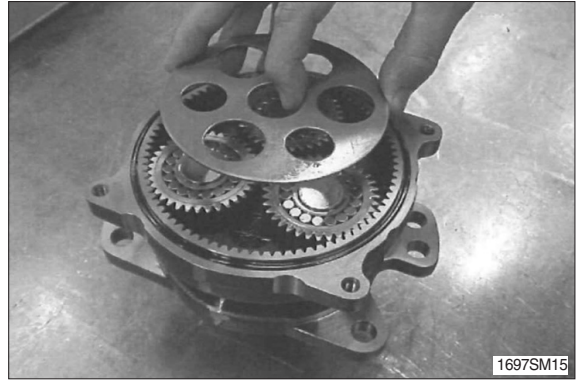
(10) Loose the plug (247), and take out the check valve (246) and the spring (248). (2 locations)

- Tools required :
Hexagon bar wrench : 8 mm



2) REDUCTION GEAR

(1) Take out the thrust plate (115).



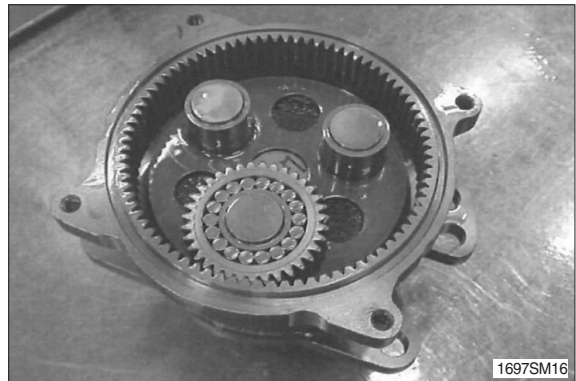
(2) Take out carrier 1 (102), the b1 gears (106), the needles (111) and the rings (129).

Needle (111) : 18 pcs / b1 gear 1pc

b1 gear (106) : 3 pcs

Ring (129) : 3 pcs

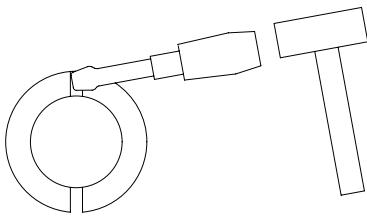
※ The small parts are easily dispersed.
Pay attention not to miss.



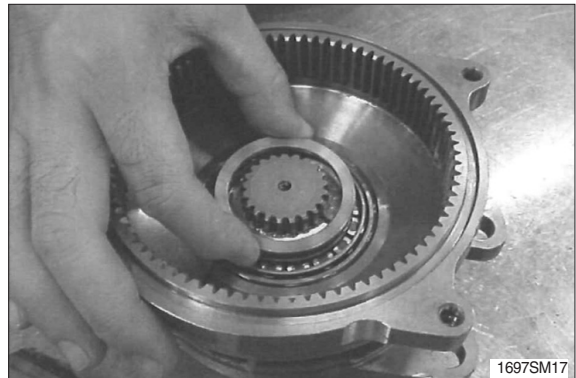
(3) Take out the ring (128) and the pre-load collar (119).

※ To attach the minus driver to the gap of 2 pcs pre-load collar, and take out by hitting with the hammer.

As pre-adjusted the gap with the bearing, do not disassemble unless it is necessary.



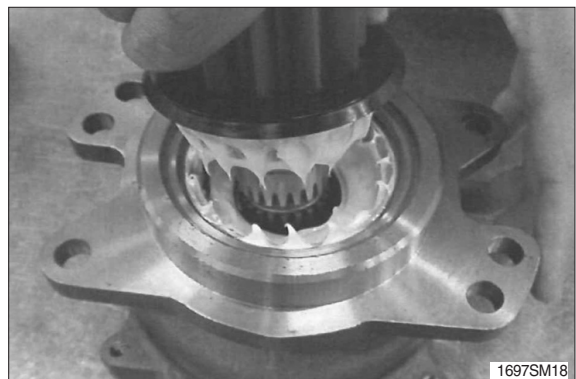
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(4) Take out the pinion shaft (104).

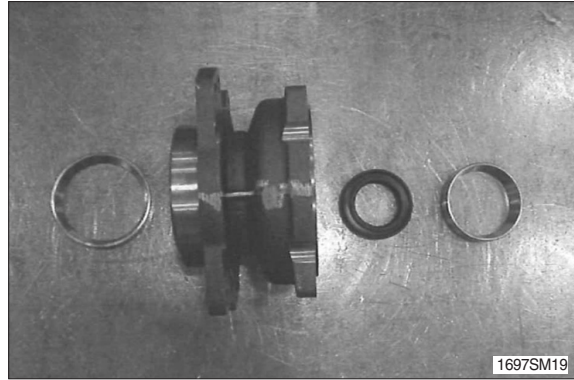
※ To secure the drawing space of the pinion shaft, attach the approximate 100 mm pad to the flange part, and push out the pinion shaft (104) by the press.

As pre-adjusted the gap with the bearing, do not disassemble unless it is necessary.



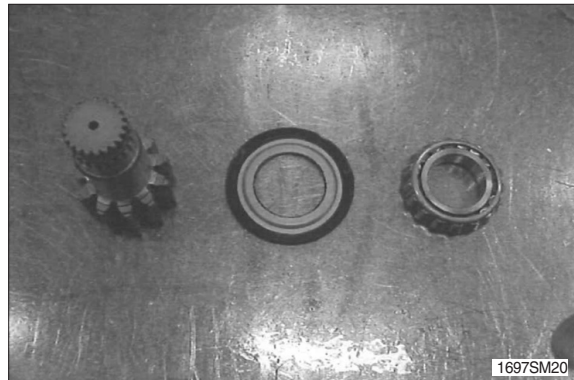
(5) Take out the out ring of the bearing (121, 122), and the oil seal (123).

- ※ As it is difficult to take out the outer ring of the bearing (121, 122), do not disassemble unless it is necessary.
Do not use again the oil seal.



(6) Take out the inner ring of the bearing (121) and the ring seal (113).

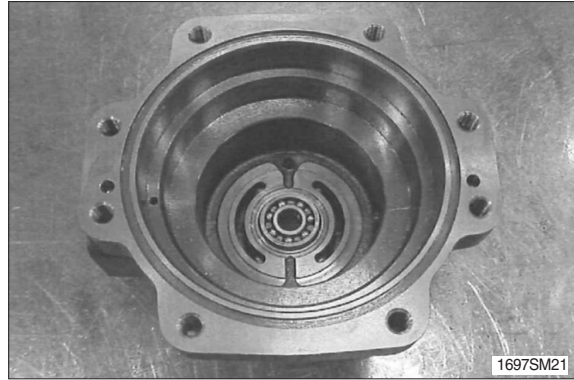
- ※ As the inner ring of the bearing (121) is press-fitting one, do not disassemble unless it is necessary.
Do not use again the ring seal (113).



4. ASSEMBLY

1) HYDRAULIC MOTOR SECTION

- (1) Press-fit the bearing (217) and spring pin (224) into the body H (201).



- (2) Insert the 2 check valves (246) (1 pc/ side), 2 springs (248) (1pc/side) and 2 plugs (247) (1pc/side) with O-ring (249) in that order into the body H (201).

· Tools required :

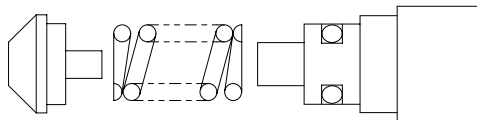
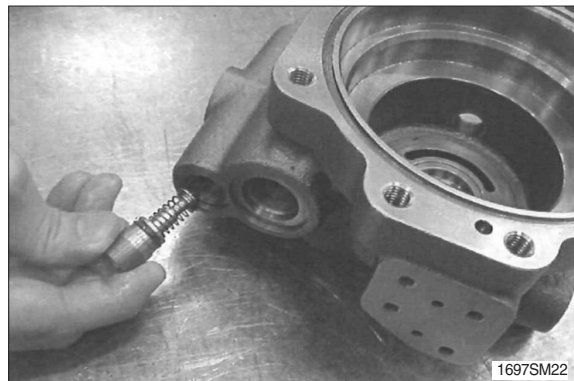
Hexagon bar wrench : 8 mm

Torque wrench

- ※ Apply grease slightly to the O-ring and assemble to pay attention not biting the seals.

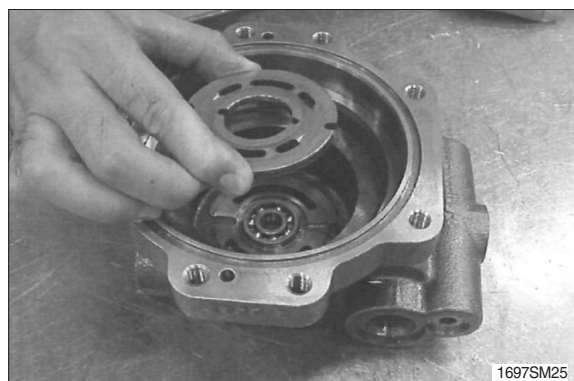
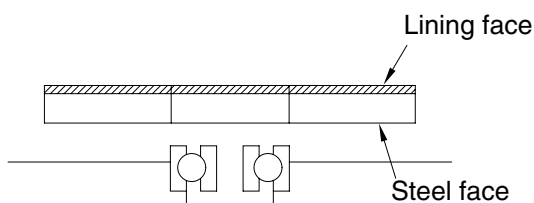
· Plug tightening torque :

$6 \pm 0.3 \text{ kgf} \cdot \text{m}$ ($43.4 \pm 2.17 \text{ lbf} \cdot \text{ft}$)

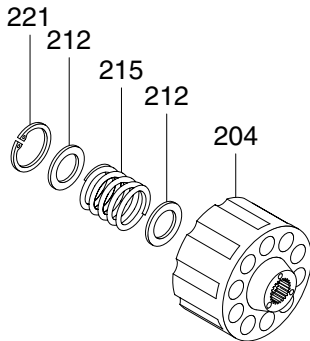


- (3) Place the valve plate (205) onto the body H (201).

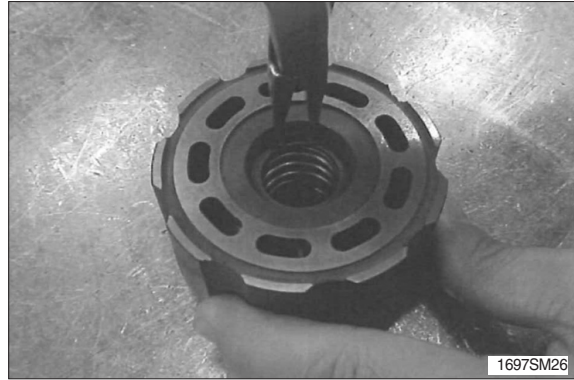
- ※ The steel face of the valve plate should be downside and assemble.



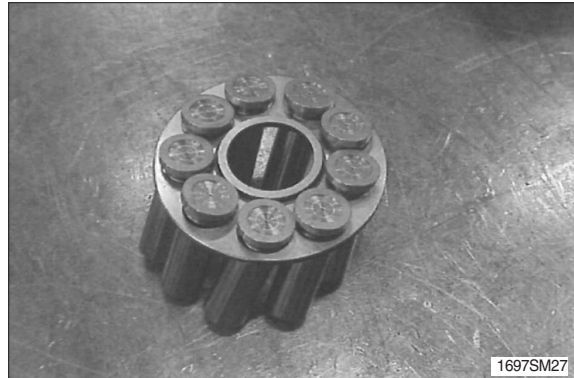
- (4) Place the retainer (212), spring C (215) and retainer (212) in that order into the cylinder barrel (204), and then secure them with the snap ring (221).



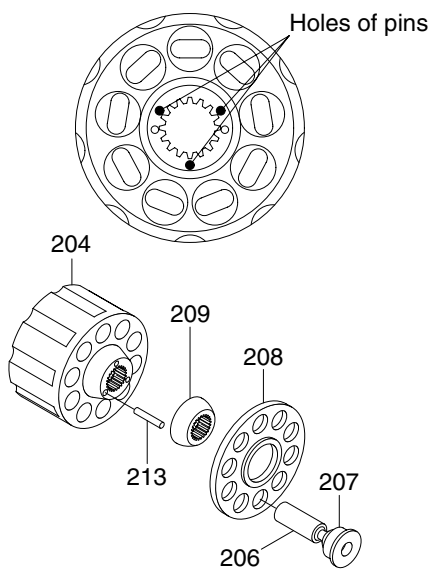
R27Z97SM38



- (5) Make the shoe holder assembly which has the 9 piston-shoe (206, 207) assemblies placed on the shoe holder (208).



- (6) Place the 3 pins (213), barrel holder (209) and the shoe holder assembly onto the cylinder barrel (204) to make up a cylinder barrel assembly.



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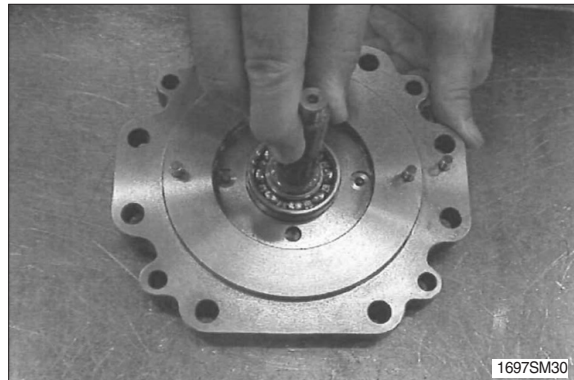
(7) Place the filter (214) and the parallel pins (225) into the plate S (202).

Filter (214) : 2 pc

Parallel pin (225) : 1 pcs

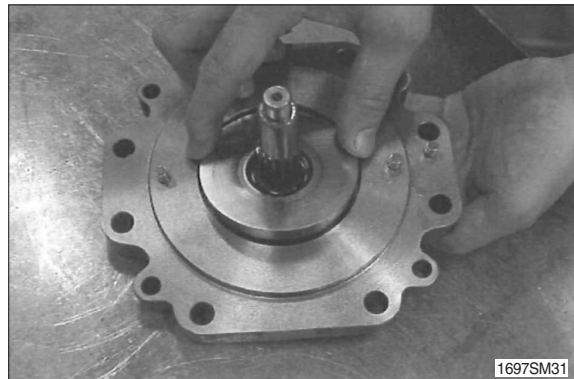


(8) Place the shaft assembly into the plate S.



(9) Place the swash plate (210) onto the plate S (202).

In case the swash plate drops out, apply grease to the plate S side of it.



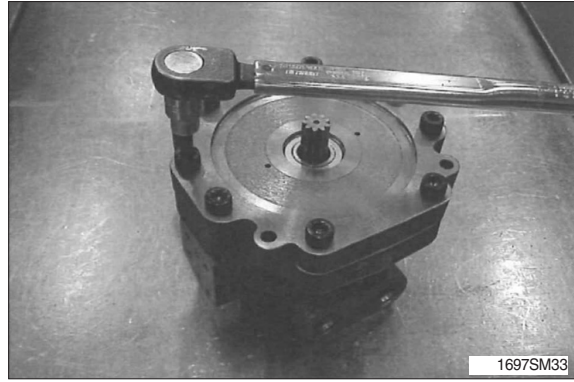
(10) Join the body H (201) and the plate S (202).

※ Align the serration of the shaft which is assembled to the plate S to the serration of the cylinder barrel assembly which is assembled to the body H.



(11) Bolt the plate S (202) together with the 8 hexagon socket head cap bolts (223).

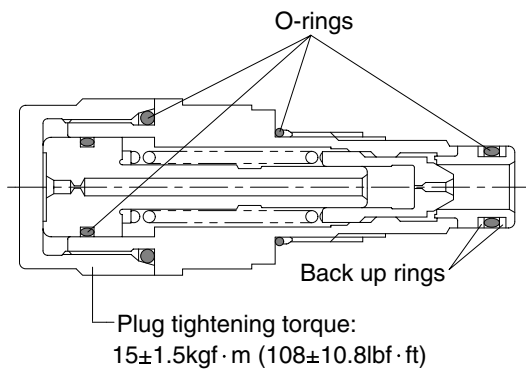
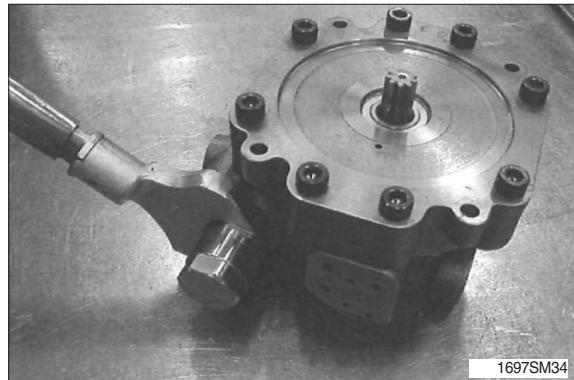
- Tools required :
Hexagon bar wrench : 8 mm
Torque wrench
- Plug tightening torque :
 $6 \pm 0.3 \text{ kgf} \cdot \text{m}$ ($43.4 \pm 2.17 \text{ lbf} \cdot \text{ft}$)



(12) Screw up the relief valve assembly.
(both side)

- Tools required :
Spanner : 36 mm
Torque wrench
- Plug tightening torque :
 $15 \pm 1.5 \text{ kgf} \cdot \text{m}$ ($108 \pm 10.8 \text{ lbf} \cdot \text{ft}$)

※ Once the relief valve is disassembled, replace the O-ring and the back up ring in the below, and screw the cap with the following torque.



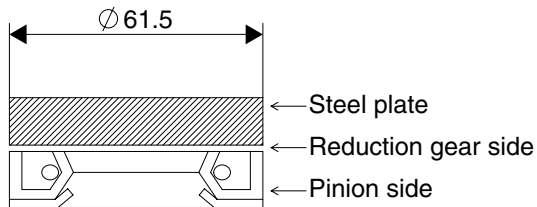
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2) REDUCTION GEAR SECTION

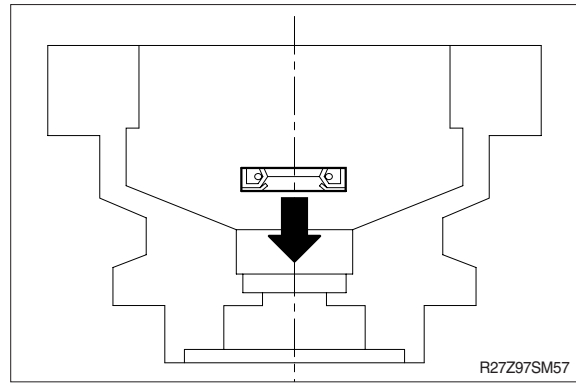
(1) Press-fit the oil seal (123) into the body (101).

※ Pay attention to the direction of the oil seal, use round steel plate for pressing to prevent misalignment.

Steel plate outer diameter : $\varnothing 61.5$



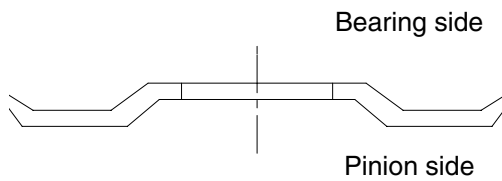
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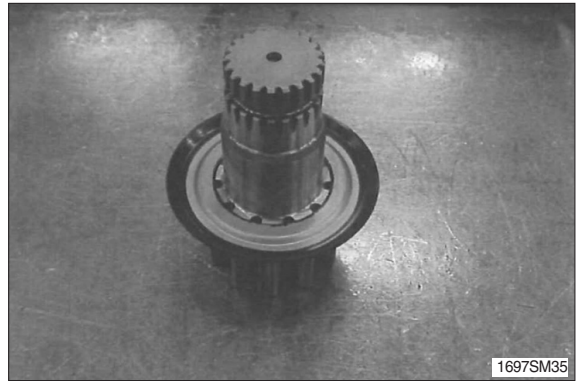
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(2) Place the ring seal (113) onto the pinion shaft (104).

※ Pay attention to direction of the ring seal.



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1697SM35

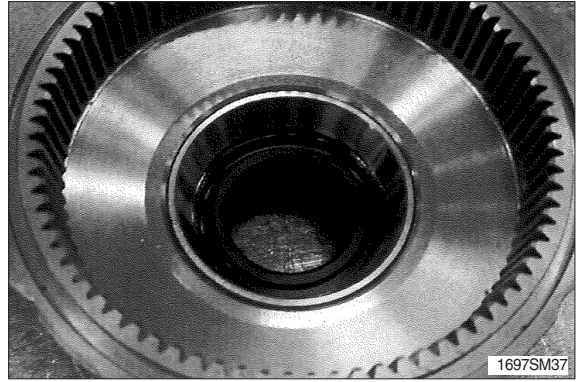
(3) Press-fit the inner ring of the bearing (121) to the pinion shaft (104).

※ After press fitting, apply grease onto the surface of the rollers, and turn them manually so that the grease can spread to the whole roller surface.

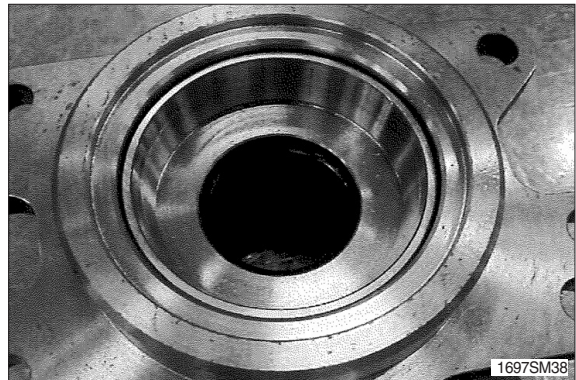


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- (4) Press-fit the outer ring of the bearing (122) into the body (101).

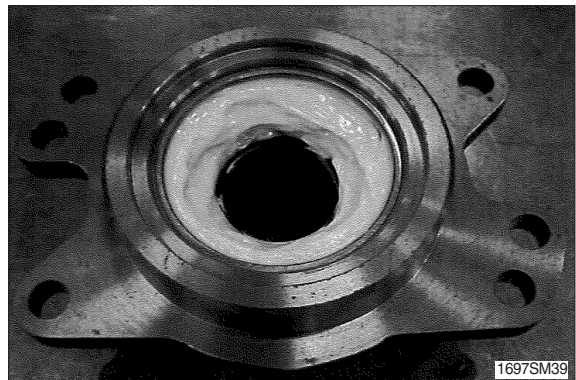


- (5) Press-fit the outer ring of the bearing (121) into the body (101).



- (6) Fill grease in the bearing (121) section of the body (101).

- ※ Grease amount : approx. 80% of the space inside the outer ring.

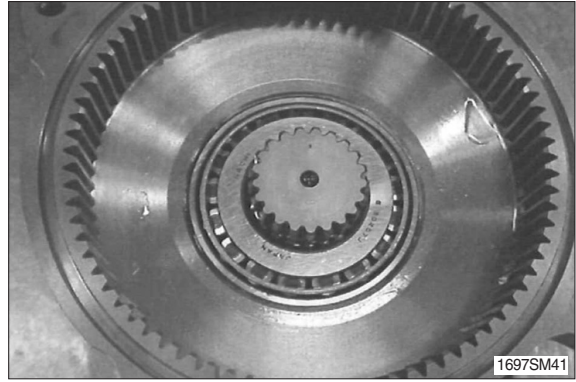


- (7) Insert the pinion shaft (104) into the body (101).

- ※ Pay attention not to damage the lip of the oil seal.

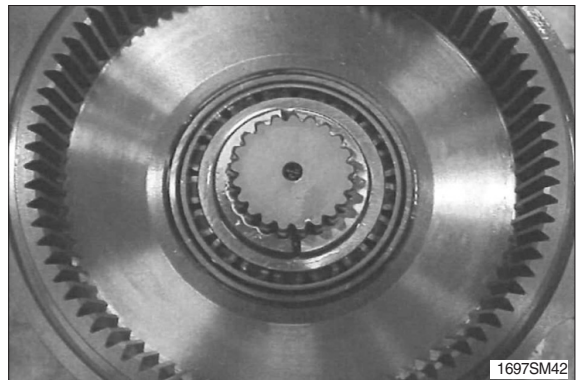
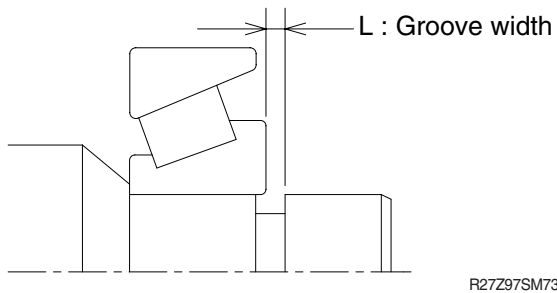


- (8) Turn over the body (101), then press-fit inner ring of the bearing (122).

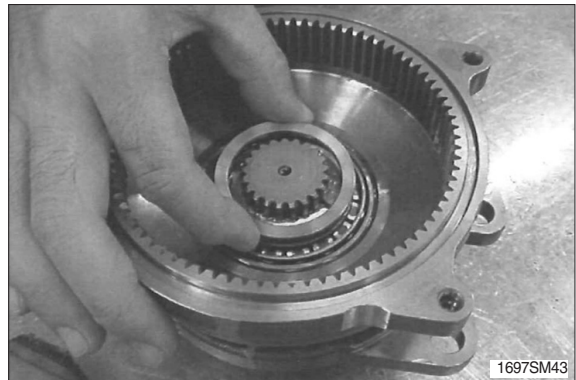


- (9) Fix the pinion shaft (104) with the 2 pre-load collars (119).

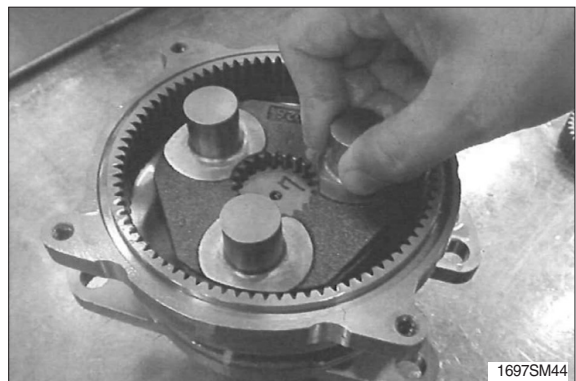
- ※ Thickness of the pre-load collar must be adjusted for the below L dimension.
Standard's +0 to +0.05 mm



- (10) Place the ring (128) over the pinion shaft.

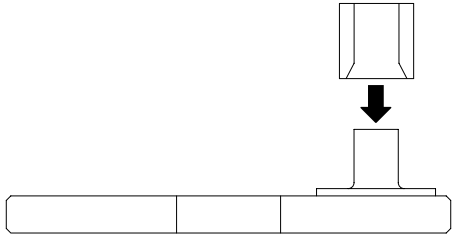


- (11) Align the spline of the carrier 1 (102) to the pinion shaft (104) and place the carrier 1 (102) into the body.

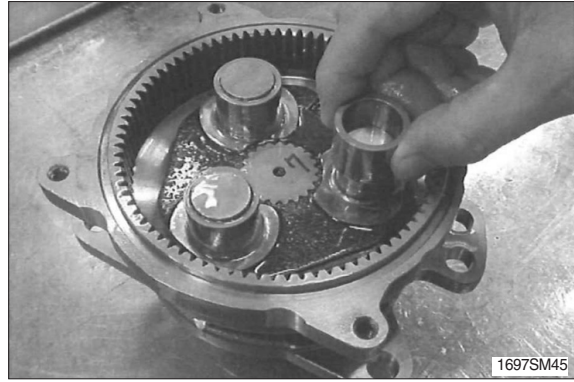


(12) Place the 3 rings (129) (1 pc/pin) onto the 3 pins of the carrier 1 (102).

- ※ Pay attention to direction of the ring. Beveling part of the ring should be down side.

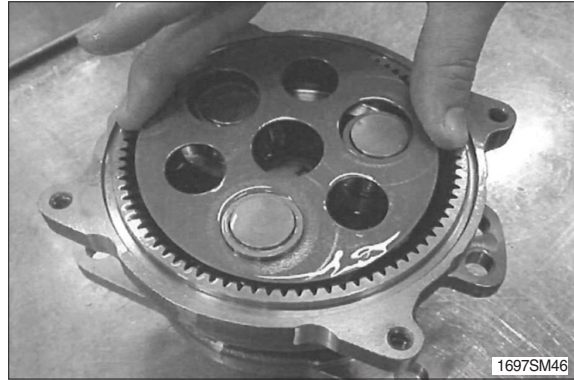


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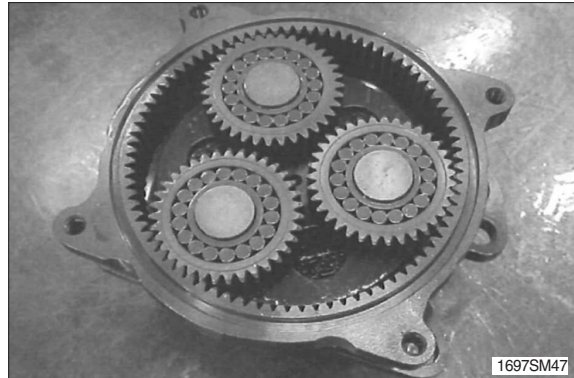
(13) Place the thrust plate (115) onto the carrier 1.

- ※ Larger size holes are aligned to the pins.



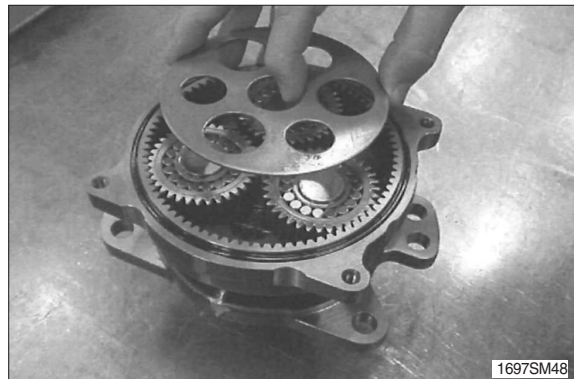
(14) Place the 3 b1 gears (106) (1 ps/pin) and 54 needles (111) (18 pc/pin) in that order onto the 3 pins of the carrier 1.

- ※ Pay attention not to drop the needles in the body.



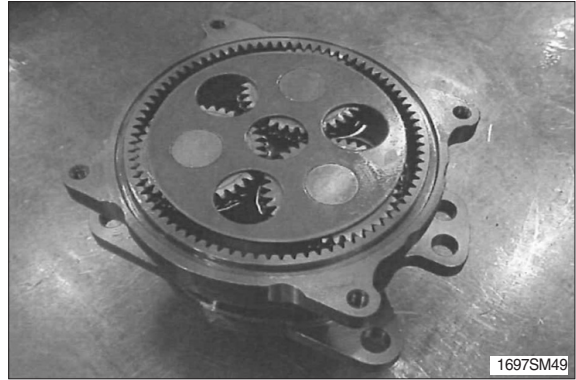
(15) Place the thrust plate (115) onto the carrier 1.

- ※ Smaller size holes are aligned to the pins.

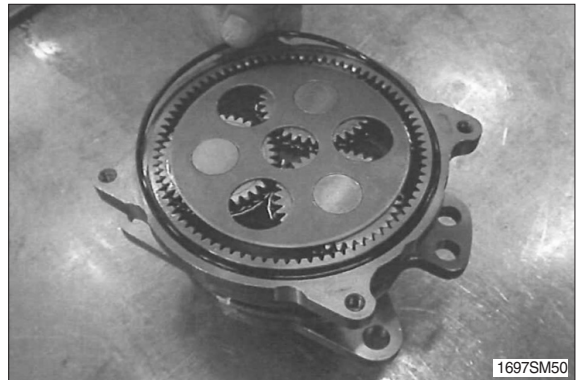


(16) Fill body (101) with hydraulic oil.

- ※ Oil : ISO VG 46 or equivalent
Oil amount : 3 to 4 mm below top of the thrust plate
Wipe oil off flange surface if it is spilled.



(17) Place the O-ring (114) onto the body (101).



(18) Join the hydraulic motor and the body, and then bolt them together with the 4 hexagon socket head cap bolts (124).

- Tools required :
Hexagon bar wrench : 6 mm
Torque wrench

- ※ Align the shaft of the motor to the b1 gear.
Apply anti-loose adhesive to the screws.

- Plug tightening torque :
 $3 \pm 0.3 \text{ kgf} \cdot \text{m}$ ($21.7 \pm 2.17 \text{ lbf} \cdot \text{ft}$)

