

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.

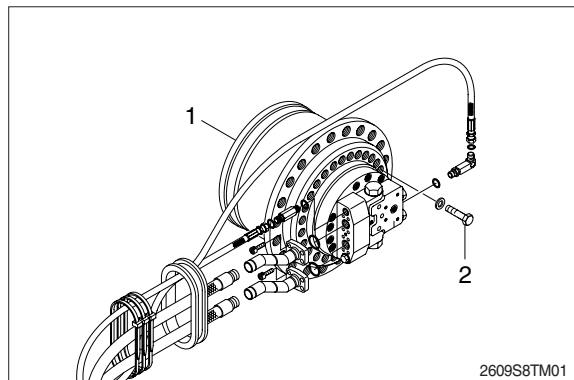
▲ Escaping fluid under pressure can penetrate the skin causing serious injury.

※ 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 : 276 kg (608 lb)

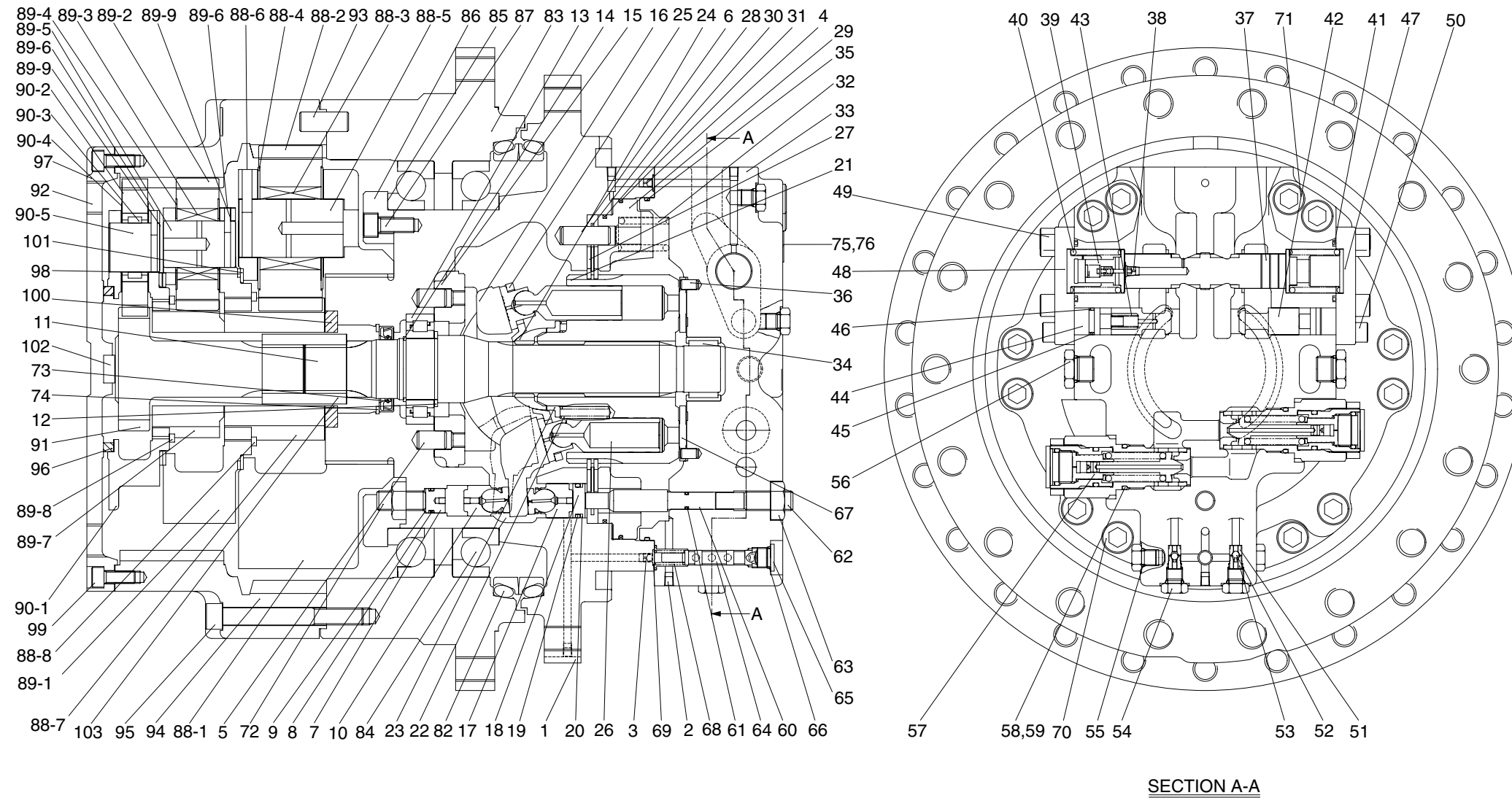
2) INSTALL

- (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. SPECIFICATION

1) TRAVEL MOTOR



SECTION A-A

29092TM30

1 Casing	16 Plate	31 Ring	46 Back up ring	61 O-ring	83 Housing	89-1 Carrier No.2	91 Sun gear No.1
2 Plug	17 Piston	32 Spring	47 Cap	62 Lock screw	84 Bearing	89-2 Planetary gear No.2	92 Plug
3 Screw	18 Stopper	33 Valve casing	48 Cap	63 Nut	85 Shim	89-3 Needle No.2	93 Lock pin
4 Screw	19 O-ring	34 Needle bearing	49 Bolt	64 Spool	86 Retainer	89-4 Thrust washer No.2	94 Ring gear
5 Pin	20 Back up ring	35 O-ring	50 Socket bolt	65 Plug	87 Bolt	89-5 Pin No.2	95 Bolt
6 Pin	21 Cylinder block	36 Pin	51 Seat	66 O-ring	88 Carrier No.3	89-6 Spring pin No.2	96 Thrust ring No.1
7 Stopper	22 Cylinder spring	37 Spool	52 Steel ball	67 Valve plate	88-1 Carrier No.3	89-7 Sun gear No.2	97 Cover
8 O-ring	23 Spacer	38 Screw	53 Stopper	68 Spring	88-2 Planetary gear No.3	89-8 Snap ring No.2	98 Thrust ring No.2
9 Back up ring	24 Guide	39 Damping check	54 Plug	69 O-ring	88-3 Needle No.3	89-9 Spring pin No.2	99 Bolt
10 Piston	25 Plate	40 Spring	55 O-ring	70 Socket bolt	88-4 Thrust washer No.3	90 Carrier No.1	100 Motor ring
11 Shaft	26 Piston & Shoe assy	41 O-ring	56 Plug	71 Socket bolt	88-5 Pin No.3	90-1 Carrier No.1	101 Thrust ring No.3
12 Spacer	27 Plate	42 Plunger	57 Relief valve	72 Lock screw	88-6 Spring pin No.3	90-2 Planetary gear No.1	102 Pad
13 Roller bearing	28 Plate	43 Spring	58 O-ring	73 Oil seal	88-7 Sun gear No.3	90-3 Needle bearing No.1	103 Coupling
14 Stop ring	29 Brake	44 Stopper	59 Back up ring	74 Lock ring	88-8 Snap ring No.3	90-4 Thrust washer No.1	
15 Support	30 Ring	45 O-ring	60 Rod	82 Floating Seal	89 Carrier No.2	90-5 Pin No.1	

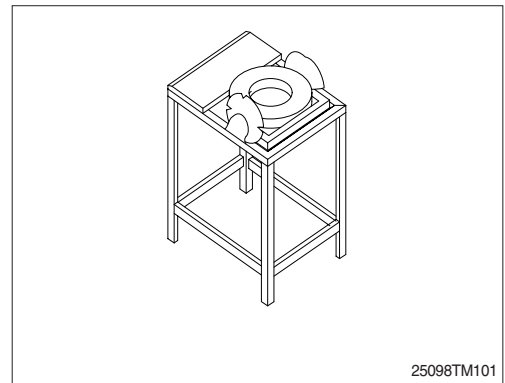
2) TOOLS

(1) Standard tools

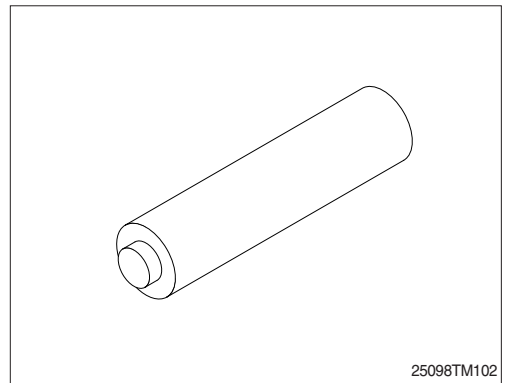
No.	Name	Description/Size	Qty
1	Hexagon wrench (JIS B 4648)	6 (M8) (PT1/4), 8 (M10)	each 1
		10 (M12) (PF1/2)	each 1
		14 (M16), 4 (M6)	1
2	Socket wrench	-	1
3	Torque wrench	Nominal 30 kgf · m dial type	1
		Nominal 90 kgf · m dial type	1
4	Adapter for torque wrench	Socket 22, 30, 32, 41, 40	each 1
		Bar 5, 6, 8, 10, 14	each 1
5	Extension bar (JIS B 4637)	150 mm	1
6	Hammer	12	1
7	Plastic hammer	L=300	1
8	(-) driver	150 mm	1
9	Snap ring plier	For shaft, For hole	1
10	Hanger	Weight : over 300 kgf	1
		Eye bolt (M16)	2
		Eye bolt (M10)	2
		Eye bolt (PF 1/2)	2
		Wire	1
11	Press	Press capacity above 200 kgf	1
12	Compressed air	3~5 kgf/cm ² , nozzle	1
13	Vessel	General vessel : W450 × D300 × H120	2
14	Heating vessel	Heating capacity : over 100 °C	1
		Volume : 500 × 500 × 500	
15	Depth micro-meter	Measuring range : 0.04 ~ 0.3 mm	1
16	Air hammer	BRH-8 (compressed air 5~6 kgf/cm ²)	1
17	Sealant	Silicone rubber (780-RTV)	1

(2) Special tools

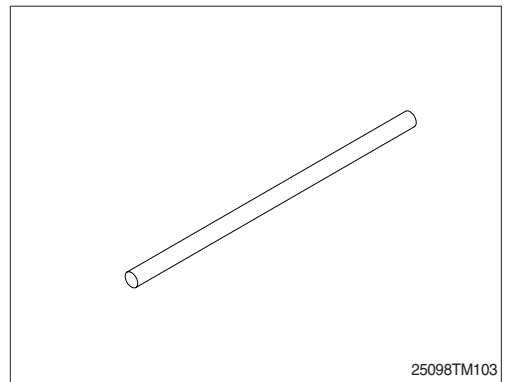
① Inversion working bench



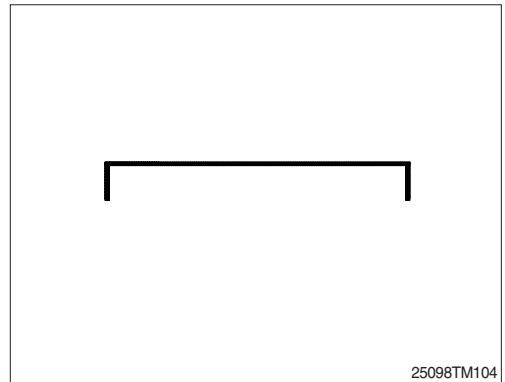
② Retainer (II)



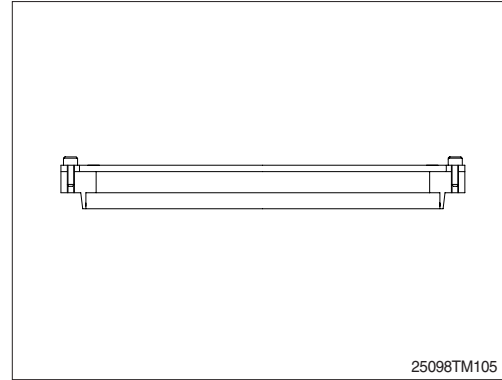
③ Steel bar



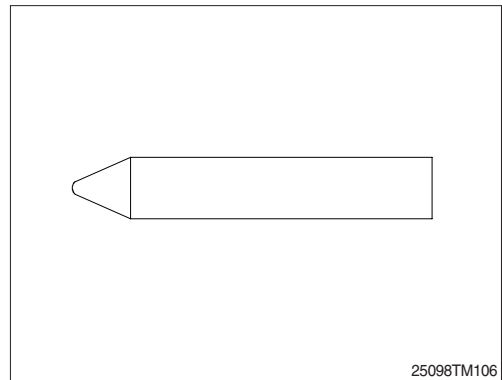
④ Pressurize jig



⑤ Floating sealing



⑥ Caulking jig



3) TIGHTENING TORQUE

Item No.	Parts name	Size	Qty	Tightening torque	
				kgf · m	lbf · ft
24	Plug	M36×1.5	2	45 ± 9	325 ± 65.1
26	Plug	M26×1.5	2	26 ± 4	188 ± 28.9
43	Socket bolt	M16×2.0	12	25.7 ± 4	186 ± 28.9
52	Plug	PF 1/4	2	3.0 ± 0.5	21.7 ± 3.6
54	Plug	NPTF 1/16	7	1.0 ± 0.25	7.2 ± 1.8
55	Plug	PT 1/4	2	3.0 ± 0.5	21.7 ± 3.6
63,128	Plug	PF 1/2	7	10 ± 2	72.3 ± 14.5
124	Socket bolt	M10×1.5	16	5.9 ± 1	42.7 ± 7.2
412	Adjust plug	M8	2	12 ± 1.5	86.8 ± 10.8

3. DISASSEMBLY

3.1 GENERAL PRECAUTIONS

- 1) Spread rubber or vinyl cover on the work bench.
- 2) When disassembling the travel motor, provide a match mark on the mating face of each part.
- 3) Arrange the detached parts to prevent them from being damaged or lost.
- 4) The disassembled seals must be replaced with new ones as a rule even if they are free from damage. For disassembly, therefore, prepare new seals in advance.

3.2 DISASSEMBLY PROCEDURE

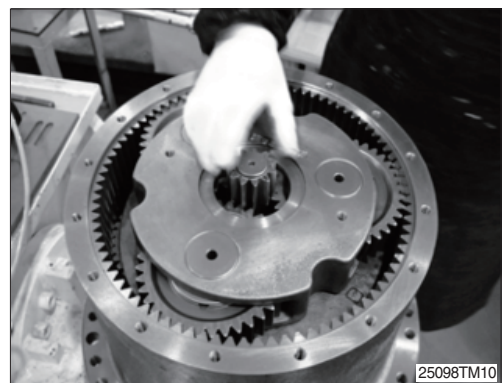
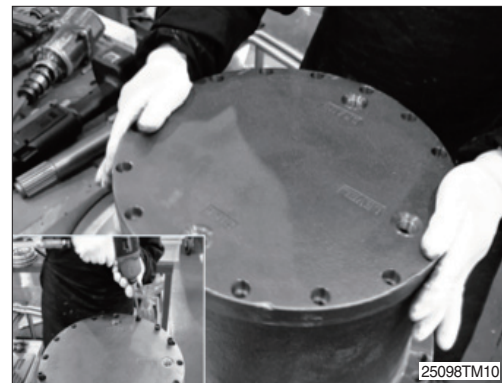
- 1) When inspecting or repairing the travel motors, use the disassembling procedures described below.
- 2) Numerals in brackets () following the part name denote the item numbers used in the structure drawing at page 8-84.
- 3) Prior to disassembly, install the travel motor on an inversion working bench.

3.3 DISASSEMBLING ORDER

1) DISASSEMBLING THE REDUCTION GEAR PART

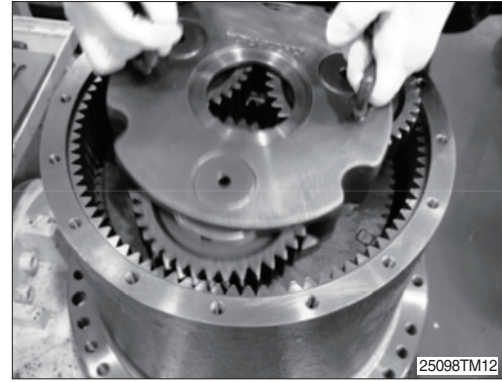
- (1) Remove plugs (128, 3EA) and drain the reduction gear oil.
- (2) Loosen socket bolts (124, 16EA) and remove the cover (123).
 - ※ Remove the cover (123), after hook it, fit the eye bolt in a screw hole for use of the plug (128). If it's impossible, please remove the cover using the rod.
 - ※ You can have difficulty removing it because loctite is spread in the socket bolt (124).
 - ※ Tools
 - Hexagon wrench 8, 10

- (3) Remove drive gear (121).



(4) Remove carrier No.1 assembly.

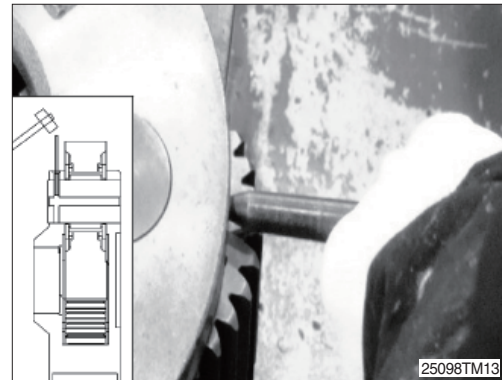
- ※ Carrier no.1 assembly consists of planetary gear (117), needle bearing (118), shaft bearing (107), carrier (134), thrust washer (131) and spring pin (122).



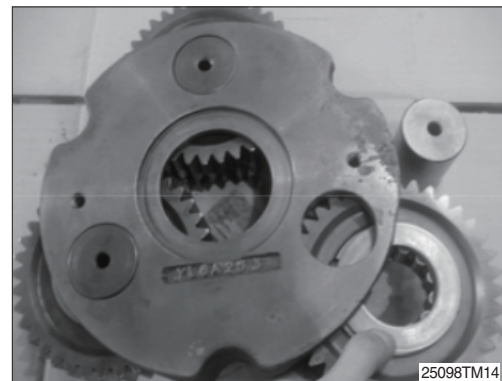
(5) Disassembling the carrier No.1 assembly.

① Drive spring pins (122) into shaft bearing (R) (107).

- ※ Please don't remove if repair isn't necessary.
- ※ Do not reuse the spring pin (122).

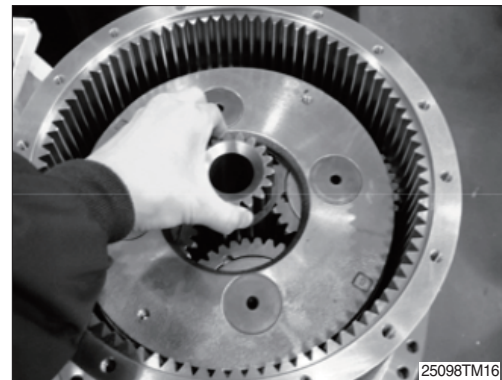


② Remove shaft bearing (R) (107), planetary gears (R) (117), thrust washer (R) (131), needle bearings (118) and thrust washer (R) (131).



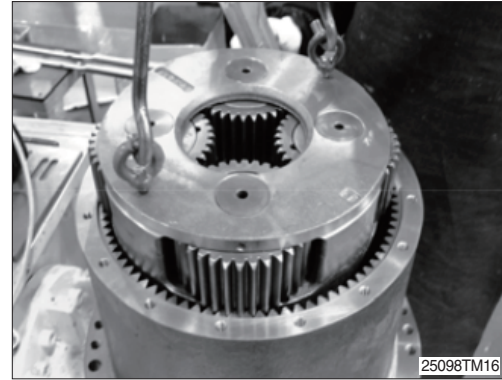
(6) Remove sun gear (114).

- ※ Snap ring (115) is assembled in sun gear (114). Don't remove it if not necessary.



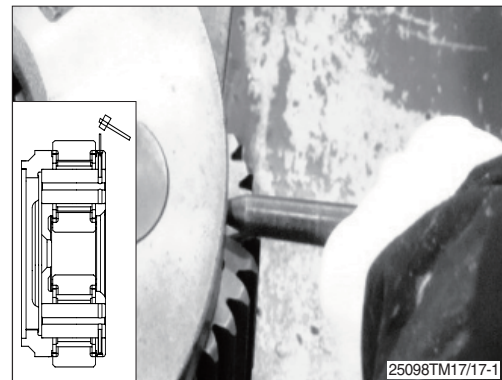
(7) Remove the carrier No.2 assembly.

- ※ Remove it using a crane after M10 eye bolt is assembled.

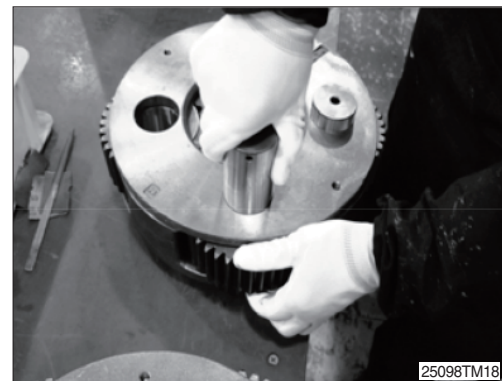


(8) Drive spring pins (110) into shaft bearing (F) (113)

- ※ Do not reuse the spring pin (110).

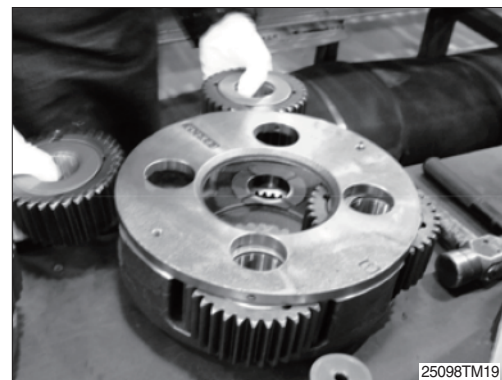


(9) Remove shaft bearing (113, 4EA).

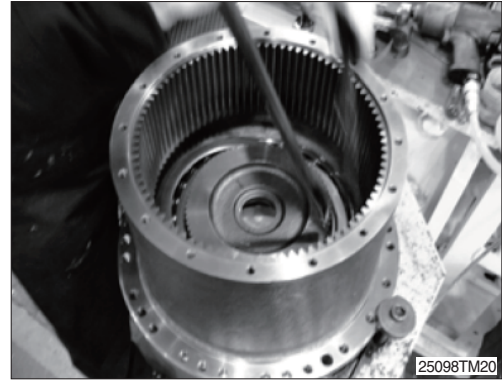


(10) Remove the thrust washer (F) (109), planetary gears (F) (108), needle bearings (111) and floating bushing (112) from carrier No.2 (103).

- ※ Each part consists of the 1st.

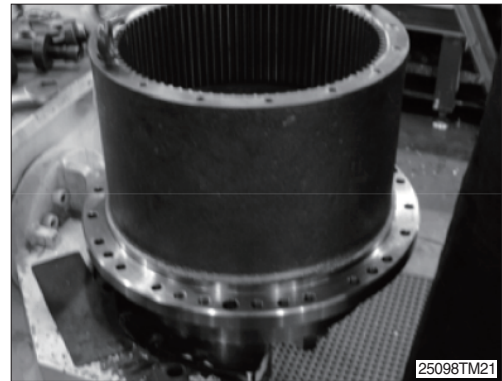


(11) Take off lock shim plate (136) by hammering on chisel or on similar tool placed at parting surface.

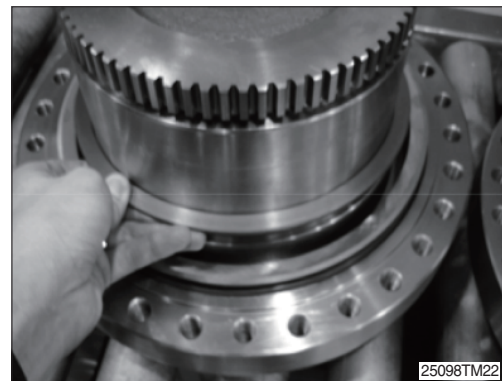


(12) Remove the hub (105) from the spindle (101).

- ※ Remove it using a crane after M16 eye bolt is assembled at the hub (105).

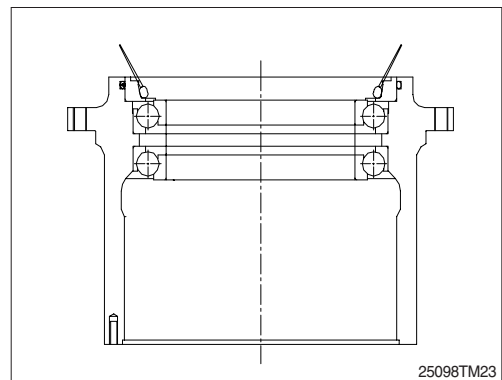


(13) Remove the distance piece (106) from the spindle (101).



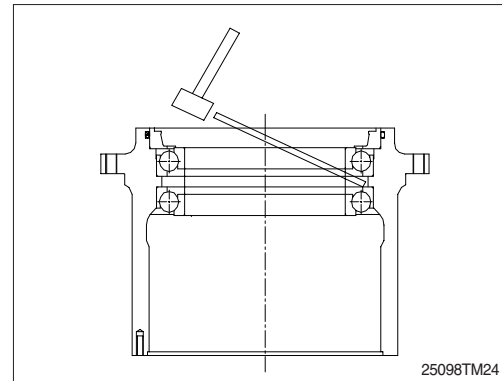
(14) Remove the floating seal (102) from the hub (105) and the spindle (101).

- ※ User can remove easily if using (-) driver.



(15) The sealing (129), the angular bearing (125, 2EA), the O-ring (130) are assembled on the hub (105) with the floating seal (102).

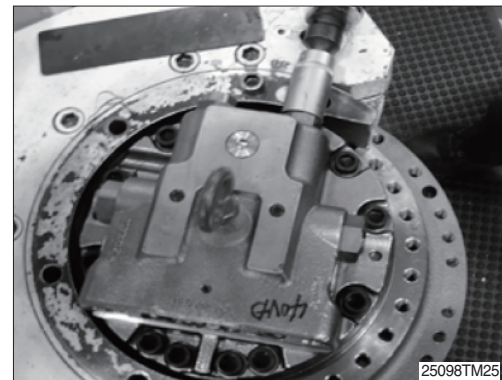
- ※ Don't remove if not necessary.
In case of the removal, be careful not to scratch using aluminum rod or hammer.



2) DISASSEMBLING THE HYDRAULIC MOTOR PART

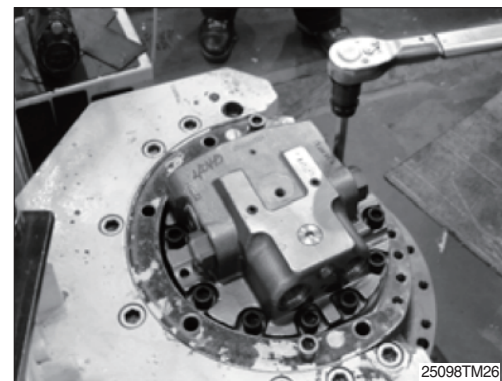
(1) Remove the relief valve (2EA) from rear flange (1).

- ※ Tools
 - Hexagon socket 32
 - Torque wrench



(2) Remove hexagon socket head bolts (43) from the rear flange (1).

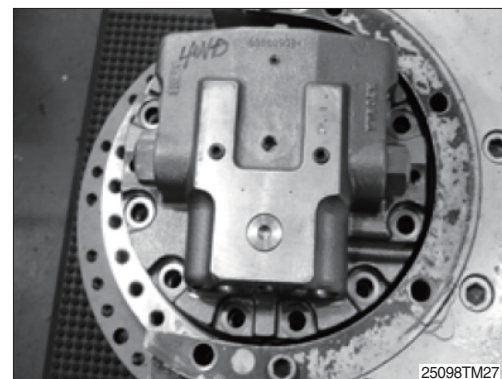
- ※ Tools
 - Hexagon wrench 14



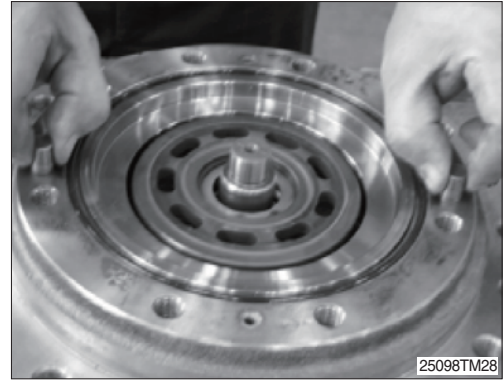
(3) Remove the rear flange (1) from the spindle (101).

(4) Remove the spring (213, 10EA) from the rear flange [1].

- ※ Remove the rear flange (1) carefully after taken using hands. Be careful not to detach the timing plate (209) and the spring (213) if twisted or beated by constraint.

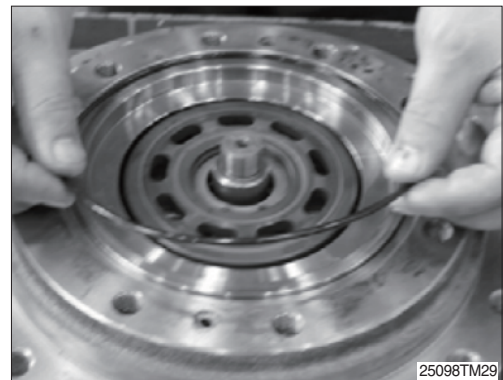


(5) Remove the parallel pin (42) from the spindle (101).



(6) Remove the O-ring (126) from the spindle (101).

※ Do not reuse the O-ring (126).

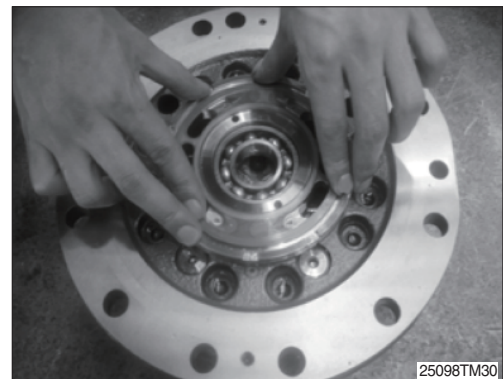


(7) Disassembling the rear flange (1) part

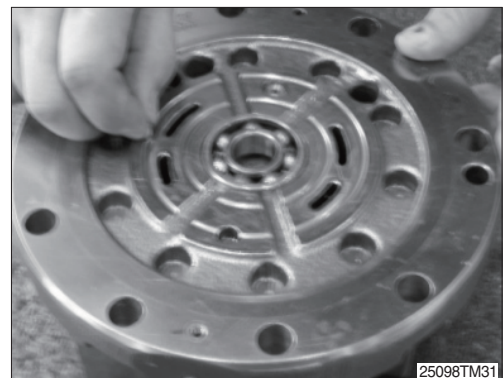
① Remove the timing plate (9) from the rear flange (1).

※ When removing the timing plate, user can have difficulty of the removal due to the close adhesion of rear flange (1) and oil. Remove it after fitting a rod through the hole which is used when a casting is detached.

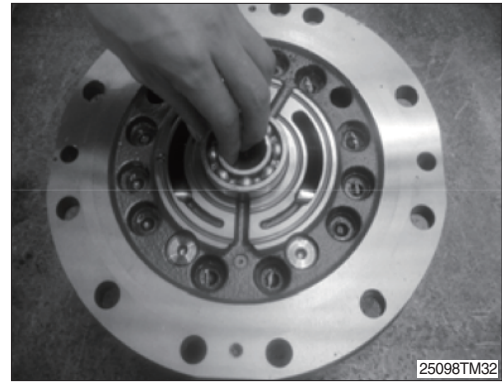
※ Be careful of the leakage due to both surface scratch if using a sharp tool.



② Remove the parallel pin (41) from the rear flange (1).

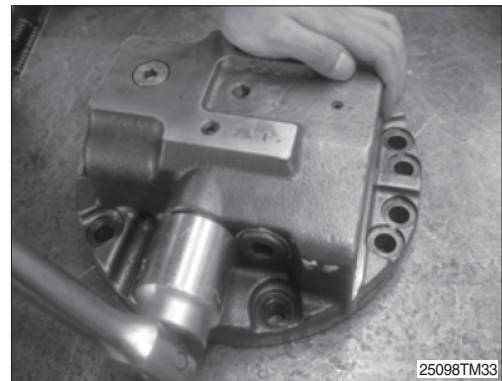


- ③ Remove the ball bearing (250) from the rear flange (1).

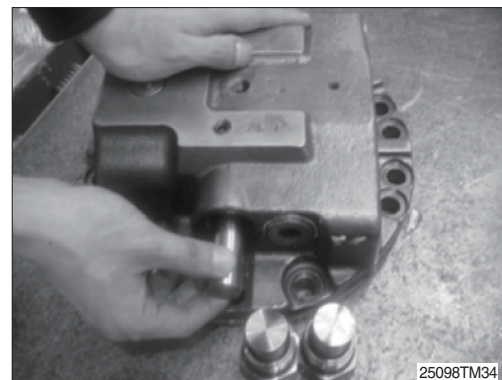


Disassembling the spool

- ① Remove two plugs (24) from the rear flange (1).
- ※ User can work easily if sub-disassembly was done on the reversal table.
 - ※ Tools
 - Hexagon socket 41
 - Torque wrench

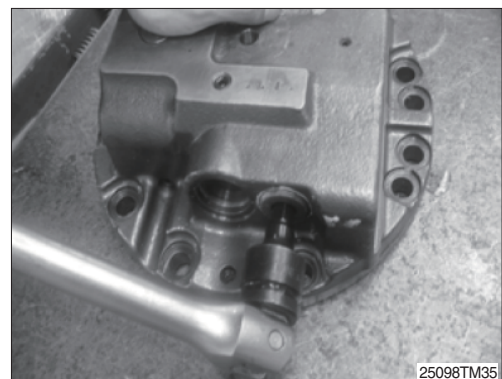


- ② Take out two springs (31), two stopper (25, 26) from the rear flange (1).
- ③ Remove the spool (23) from the rear flange (1).
- ※ Be careful not to damage the outer surface of the spool (23) and the sliding surface of the rear flange (1).
 - ※ Since the rear flange (1) and the spool (23) are of the selective fitting type, replace them together as a kit even if only one of the two parts is damaged.

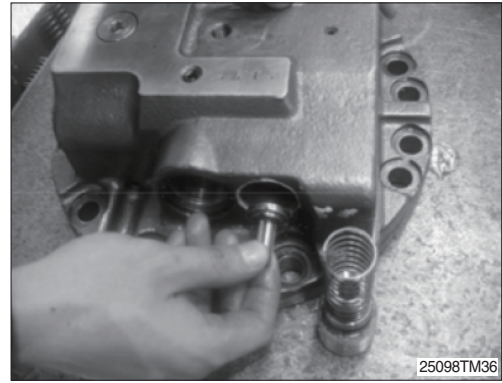


Disassembling the check valve

- ① Remove two plugs (29) from the rear flange (1).
- ※ User can work easily if sub-disassembly was done on the reversal table.
 - ※ Tools
 - Hexagon wrench 14

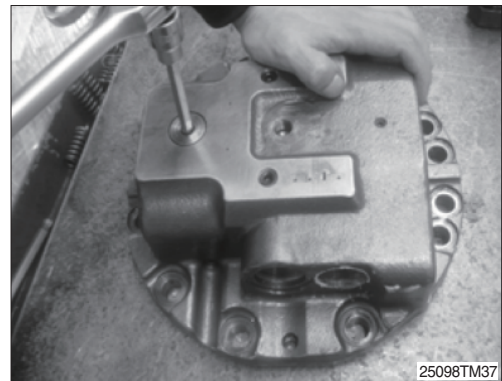


- ② Remove the spring (32, 2EA), valve (30, 2EA) from rear flange (1).

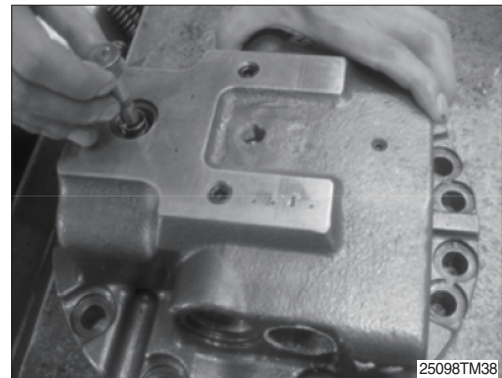


Disassembling the two speed valve

- ① Remove the plug (63) from the rear flange (1).
- ※ User can work easily if sub-disassembly was done on the reversal table.
 - ※ Tools
 - Hexagon wrench 10



- ② Remove the spool (65) and spring (66) from rear flange (1).



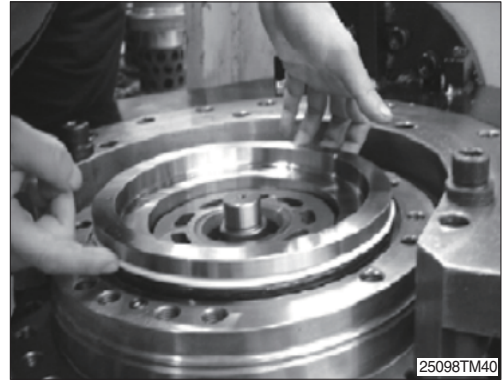
(8) Disassembling the parking brake

- ① Remove the piston (212) by injecting compressed air from the parking brake access hole in the spindle (101).
- ※ Use the protection cover on the upper part of spindle (101) when users put the pressed air into suddenly. Otherwise part damage and accident might go on because the piston (212) is rushed out of the spindle (101).



② Remove the O-rings (235, 239) and backup rings (247, 248) from the piston (212).

※ Do not reuse O-rings (235, 239) and backup rings (247, 248) after removal.

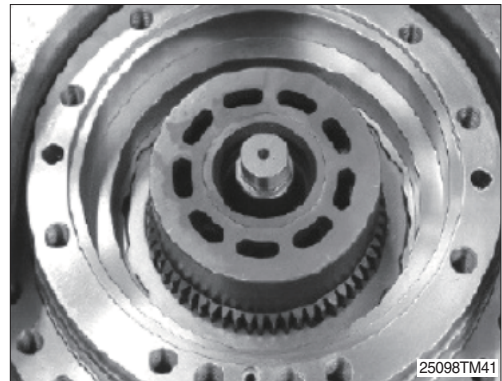


(9) Disassembling the hydraulic motor part

① Lay the travel motor body on the side.

② Drain out the oil from the travel motor.

※ Place an oil receptacle under the travel motor to receive the oil flowing out as the motor is being laid on the side.

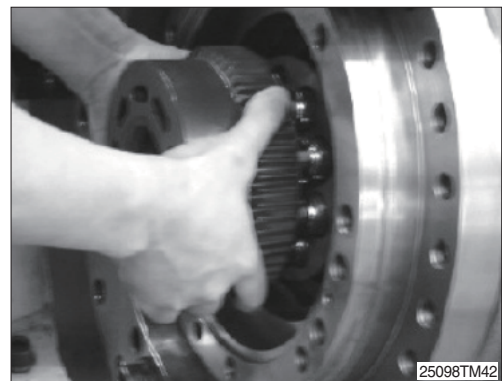


③ Hold the cylinder block (204) with both hands, and remove it from the shaft (202).

④ Remove the mating plates (216) and friction plates (215) from the cylinder block (204).

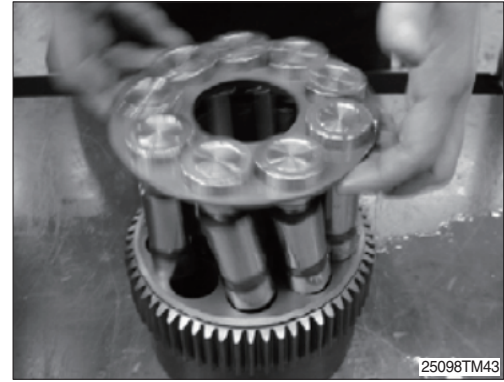
※ Before removal, hold the cylinder block (204) with both hands and turn it two to three times in a clockwise and a counterclockwise direction alternately to detach the shoe (206) from the swash plate (203).

※ Be careful that if an attempt is made to remove the cylinder block (204) without detaching the shoe (206) from the swash plate (203), then the piston, shoe and other parts that are connected to the cylinder block may come the cylinder loose and fall into the spindle.



Disassembling the cylinder block kit

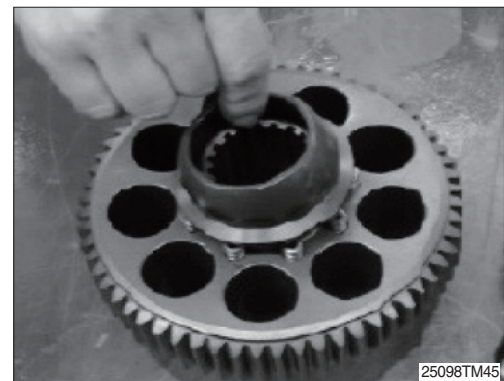
- ① Piston assembly [piston (205), shoe (206)] from the removed cylinder block (204).



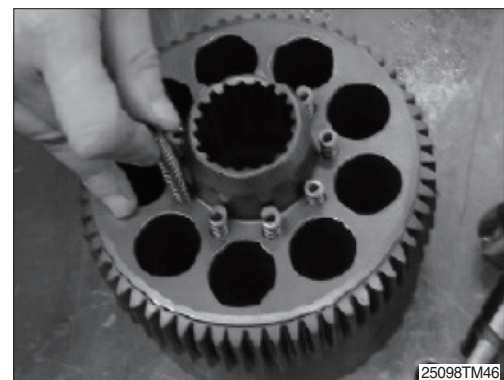
- ② Piston (205) and shoe (206) from the removed retainer plate (207).



- ③ Thrust ball (208) from the removed cylinder block (204).



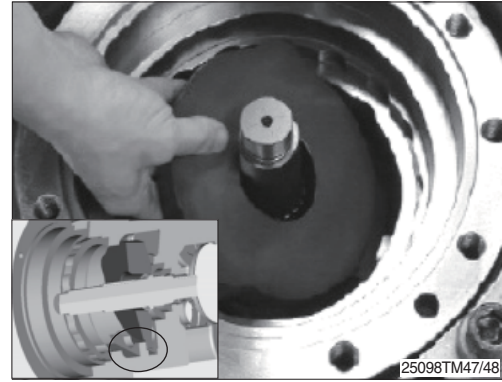
- ④ Spring (214, 9EA) from the removed cylinder block (204).



(10) Remove swash plate (203) from the shaft (202).

(11) Remove shaft (202) from the spindle (101).

- ※ When separating the swash plate, separate and turn it by using hands to free from intervention of the stopper.

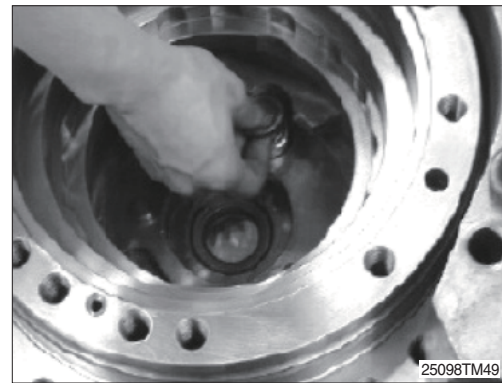


(12) Remove speed selector piston assembly [piston (261) and shoe (262)] from the spindle [101] by feeding compressed air from the access hole in spindle (101).

(13) Remove parallel pin (242) and pivot (267) from the spindle (101).

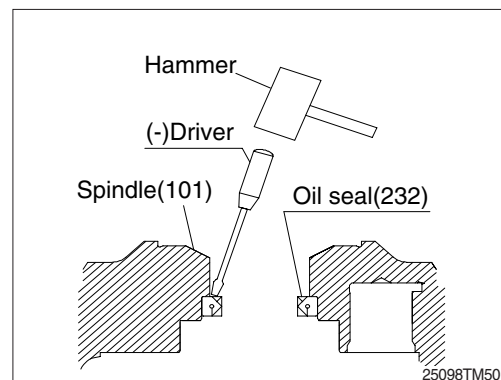
(14) Remove ball bearing (249) from the spindle (101).

- ※ Piston assembly ; Piston (261), Shoe (262)
- ※ Compressed air ; 3~5 kgf/cm² (43~71 psi)
- ※ When piston (261) or shoe (262) is damaged, if exchange is necessary, they have to be exchanged together because the separation is impossible. Use the protection cover on the upper part spindle when users put the pressed air into suddenly. Otherwise part damage and accident might go on because the piston is rushed out of the spindle.



(15) Remove oil seal (232) from the spindle (101).

- ※ Remove the oil seal (232) by hammering using (-) driver.
- ※ Do not reuse the oil seal (232).



4. REASSEMBLY

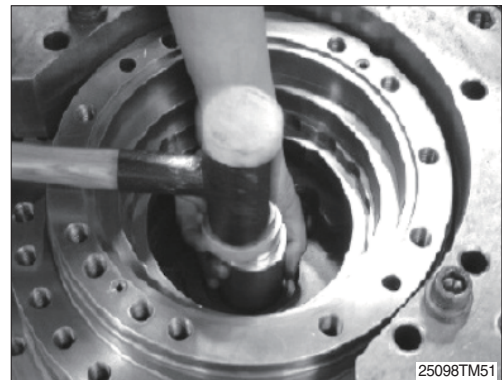
4.1 GENERAL PRECAUTIONS

- 1) Reassemble in a work area that is clean and free from dust and dirt.
- 2) Handle parts with bare hands to keep them free of liny contaminants.
- 3) Repair or replace the damaged parts.
Each parts must be free of burrs its corners.
- 4) Do not reuse O-ring, oil seal and floating seal that were removed in disassembly. Provide the new parts.
- 5) Wash all parts thoroughly in a suitable solvent. Dry thoroughly with compressed air.
Do not use the cloths.
- 6) When reassembling oil motor components of travel motor, be sure to coat the sliding parts of the motor and valve with fresh hydraulic oil. (NAS class 9 or above)
- 7) Use a torque wrench to tighten bolts and plugs, to the torque specified as follows.

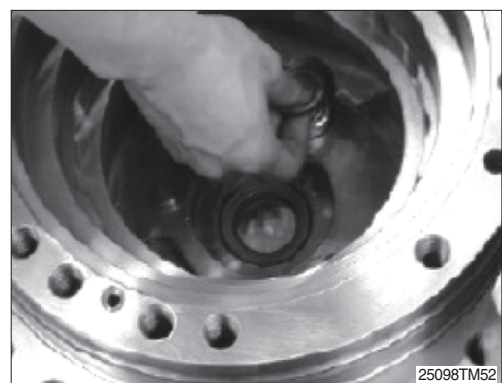
4.2 REASSEMBLY PROCEDURE

1) REASSEMBLE THE HYDRAULIC MOTOR PART

- (1) Install oil seal (232) into the oil seal hole of spindle (101).
 - ※ Apply lithium grease to the lip portion of oil seal (232) position the squarely over the bore of spindle (101).

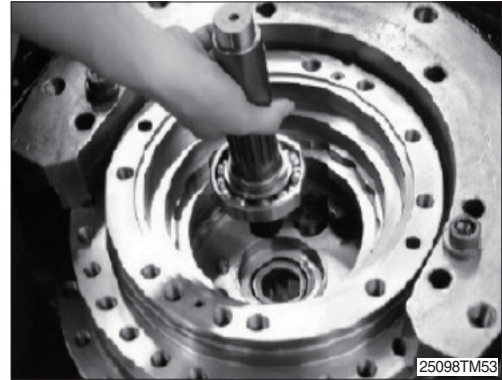


- (2) Install parallel pin (242, 2EA) and two speed piston assembly (261, 262) into the spindle (101).

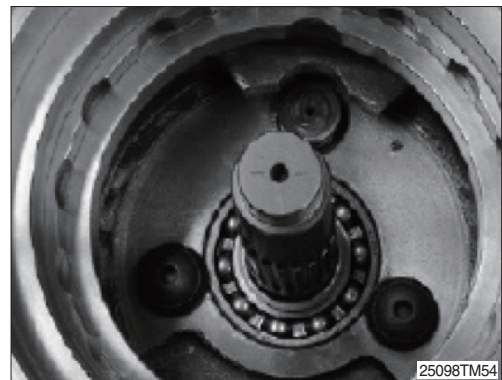


(3) Install shaft (202) into the spindle (101).

※ Assemble after applying grease on oil seal lip (232).

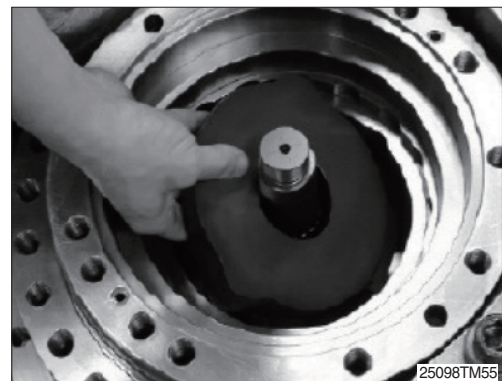


(4) Install pivot (267, 2EA) into the spindle (101).



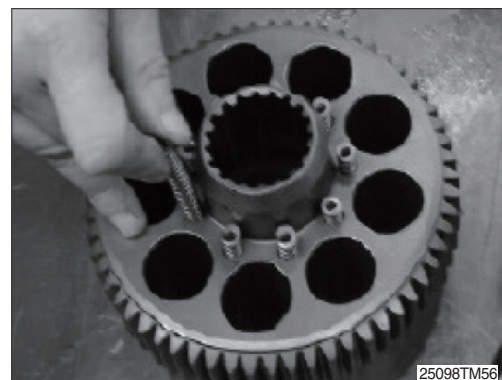
(5) Install swash plate (303) to the spindle (101).

※ The swash plate (203) and the 2 speed stopper of the spindle are interferenced. Install the swash plate (203) after rotating. And then install it as the regular position.

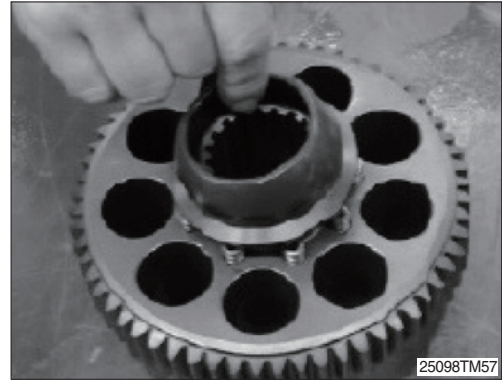


(6) Reassemble the cylinder block kit

① Install spring (214, 9EA) to the cylinder block (204).

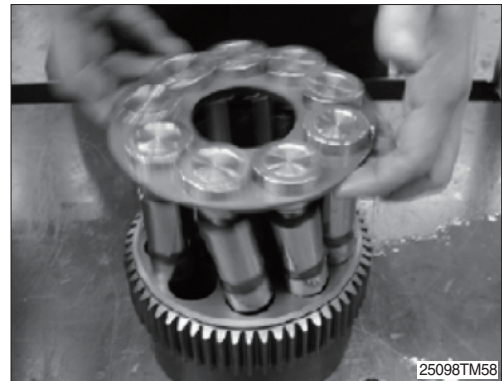


- ② Install thrust ball (208) to the cylinder block (204).



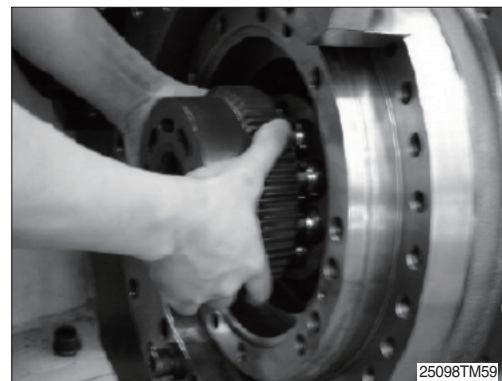
- ③ Insert piston assembly [piston (205) and shoe (206)] into retainer plate (207).
④ Mount the piston assembly into the cylinder block (204).

※ After mounting, immerse the entire them in a working fluid.



- (7) Install cylinder block (204) assembly to the shaft (202).

- ※ After fitting splines of both cylinder block (204) and shaft (202), assemble them.
※ After installing the cylinder (204), confirm whether it revolves or not by turning using both hands.
※ Motor is malfunction when it isn't revolve.



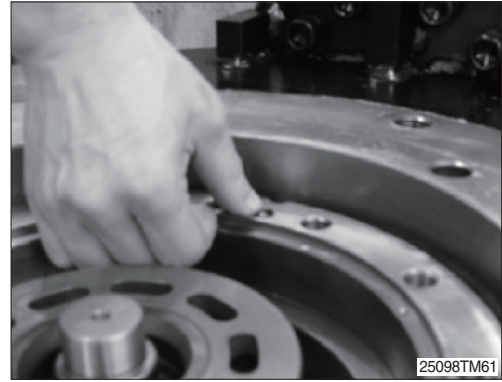
(8) Reassemble the parking brake

- ① Install mating plate (216) first and then a friction plate (215), one by one, into the grooves of the outer surface of the cylinder block (204).

※ Immerse the friction plates (215) in a working fluid before fitting them into the grooves.



- ② Install O-ring (275, 2EA) into the spindle (101).



- ③ Install two O-rings (235, 239) and two back up ring (247, 248) in then O-ring grooves.

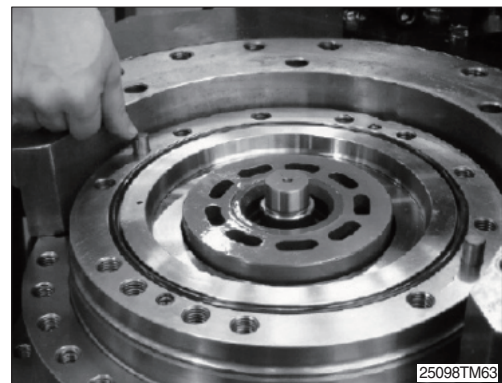
- ④ Mount a piston (212) in the spindle (101).

- ※ Apply a thin coat of grease to the O-rings (235, 239).
- ※ If the piston (212) does not fit into the spindle (101) because of the resistance of the O-ring, tap the edge of the piston (212) lightly and equally with a plastic hammer.
- ※ Be careful not to damage the O-ring and back up ring at this time.



- ⑤ Insert a O-ring (126) into spindle (101).

- ⑥ Insert a paralell pin (42, 2EA) into spindle (101).



1) REASSEMBLE THE REAR FLANGE PART [1]

(1) Reassemble the check valve

① Install O-ring (37, 2EA) on the plug (29, 2EA).

※ Apply grease to the O-ring (37).

② Install spring (32) and a valve (30) into the plug (29).

③ Install plug (29) into the rear flange (1).

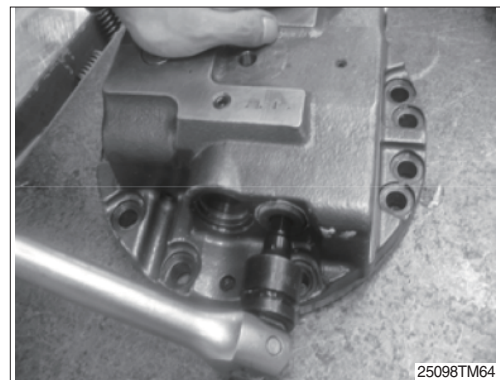
※ Install a spring (32) and a valve (30) into the plug (29), and then grease the spring (32) and the valve (30) and hand-lock the former.

④ Install plug (29) in conjunction with the spring (32) and the valve (30) into the rear flange (1), and tighten the plug to the required torque.

※ Tightening torque : $26 \pm 4.0 \text{ kgf} \cdot \text{m}$ ($188 \pm 28.9 \text{ lbf} \cdot \text{ft}$)

※ Tools

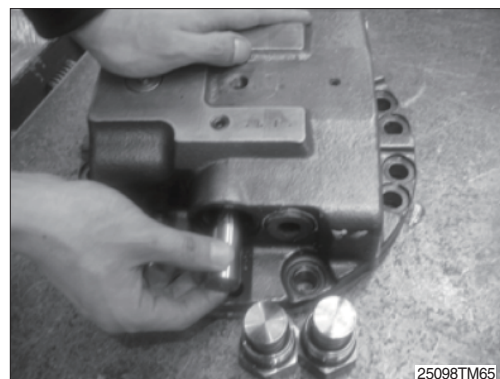
- Adapter for hexagon wrench 14
- Torque wrench



(2) Reassemble the spool

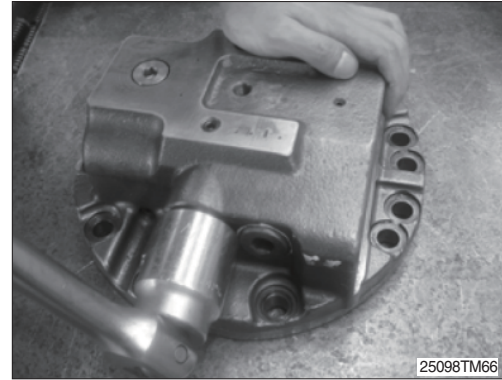
① Install spool (23) into the rear flange (1).

※ Before installing the spool (23), apply hydraulic oil to the spool. Be careful not to damage the spool's surface and the inner of rear flange (1).



- ② Install O-ring (36) on the plug (24).
- ③ Install spring (31) and a stopper (25, 26) into the plug (24).
- ④ Install plug (24) into the rear flange (1).
- ⑤ Tighten the plug (24) to the required torque.

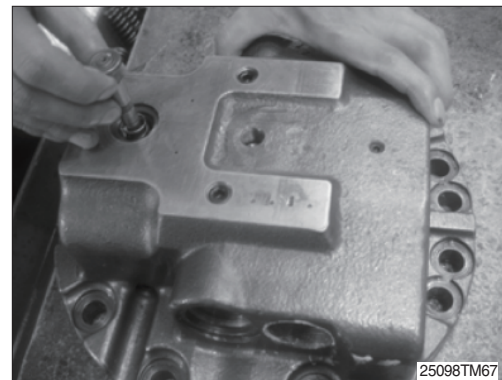
- ※ Apply grease to the O-ring (36).
- ※ Tightening torque : $45 \pm 9 \text{ kgf} \cdot \text{m}$ ($325 \pm 65.1 \text{ lbf} \cdot \text{ft}$)
- ※ Exchange it as the rear flange kit if the exchange is necessary, because the rear flange (301), the spool (323) insist of the rear flange kit.
- ※ Sochet (#41)/Torque for hexagon wrench.
- ※ Tools
 - Hexagon socket 41
 - Torque wrench



(3) Reassemble the two speed valve

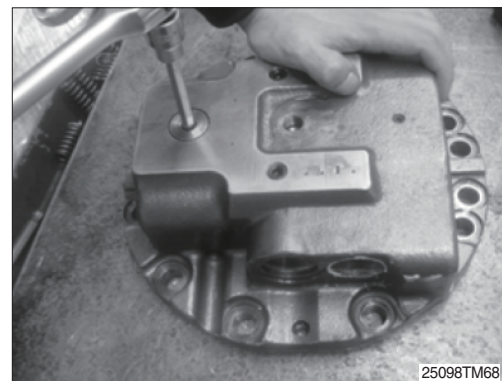
- ① Install O-rings (46) on plugs (63).
- ② Insert a spool (65) and spring (66) into the rear flange (1).

- ※ Apply grease to the O-ring (46).
- ※ Apply hydraulic oil to the spool (65), while the spool (65) is installed into the rear flange (1).
- ※ Be careful not to damage the hole's inner of the rear flange (1) and the spool (65) outer. It brings on low efficiency of the travel motor because of the leakage increase after reassembling.
- ※ The shaft center should align with the hole center because of little gap.
- ※ It is in order to protect the damage and smooth assembling of the rear flange (1) and the spool (65).



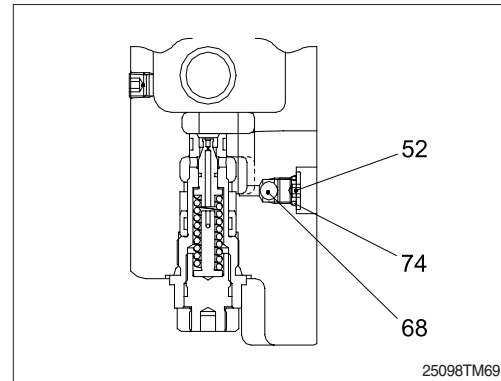
- ③ Insert a plug (63) into the rear flange (1).

- ※ Tightening torque : $10 \pm 2 \text{ kgf} \cdot \text{m}$ ($72.3 \pm 14.5 \text{ lbf} \cdot \text{ft}$)
- ※ Tools
 - Adapter for hexagon wrench 10
 - Torque wrench

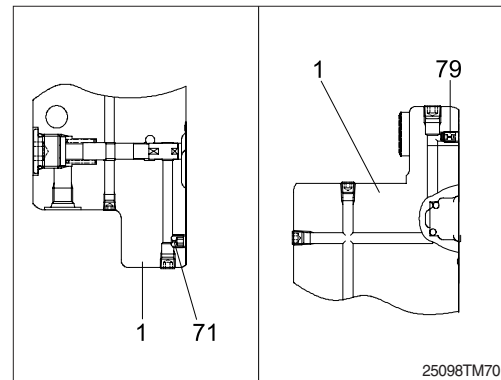


(4) Assembling of the rear flange's inner parts

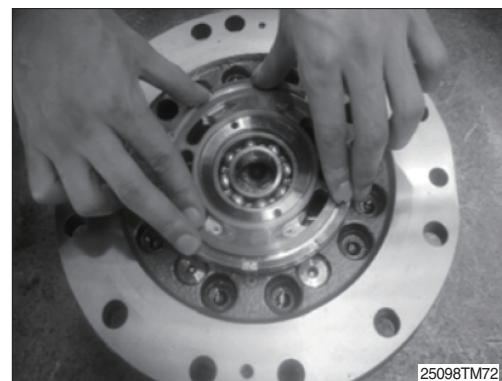
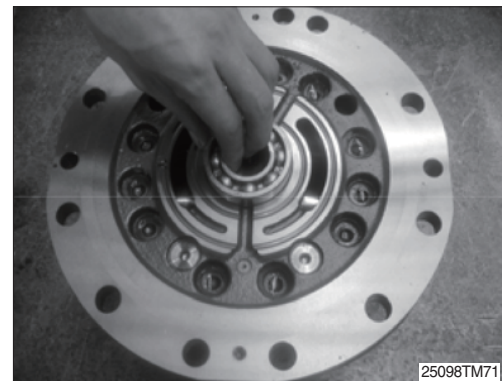
- ① After installing the O-ring (74) on the plug (52), install the steel ball (68) and the plug (52) into the rear flange (1).
- ※ Apply grease to the O-ring (74).
 - ※ Do not disassemble and assemble if not necessary.



- ② Install orifice (71), filter (79) into the rear flange (1). Caulk it after assembling certainly.
- ※ Do not disassemble and assemble if not necessary.



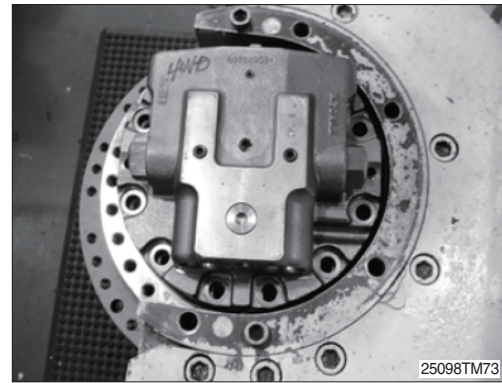
- ⑤ Insert a ball bearing (250), timing plate (209), parallel pin (41, 1EA) and spring (213, 12EA) into the rear flange (1).
- ※ Be careful not so that the spring (213) and the timing plate (209) should not separate from the rear flange (1).
 - ※ Apply hydraulic oil to the ball bearing (250).



(6) Reassemble the rear flange (1) and spindle (101).

① Mount the rear flange (1) on the spindle (101).

- ※ When the rear flange (1) is mounted on the spindle (101), fix the spring (13) applied grease to not drop.

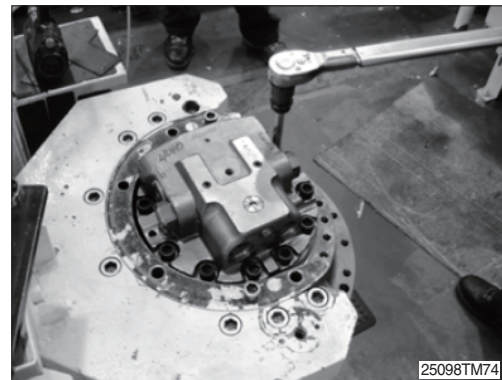


② Tighten the socket bolt (43) into the spindle (101) to the required torque.

- ※ Tightening torque : $5.9 \pm 1.0 \text{ kgf} \cdot \text{m}$ ($42.7 \pm 7.2 \text{ lbf} \cdot \text{ft}$)

※ Tools

- Adapter for hexagon wrench 14
- Torque wrench

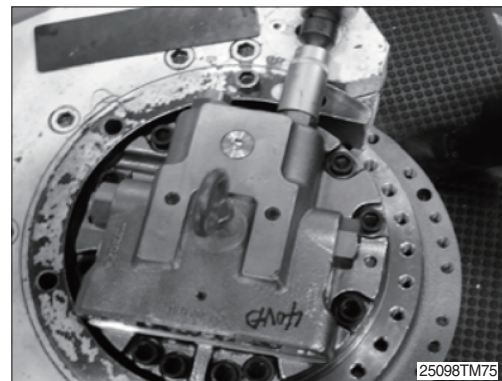


(7) Tighten the relief valve into the rear flange (1) to the required torque.

- ※ Tightening torque : $25 \pm 5 \text{ kgf} \cdot \text{m}$ ($181 \pm 36.2 \text{ lbf} \cdot \text{ft}$)

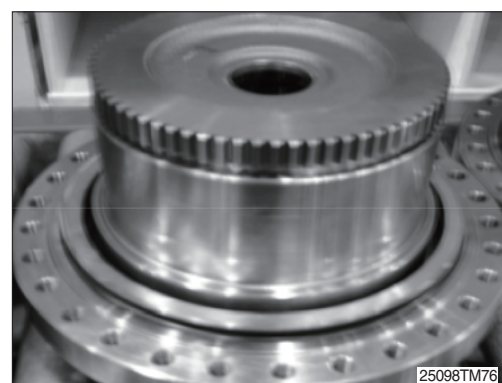
※ Tools

- Hexagon socket 32
- Torque wrench



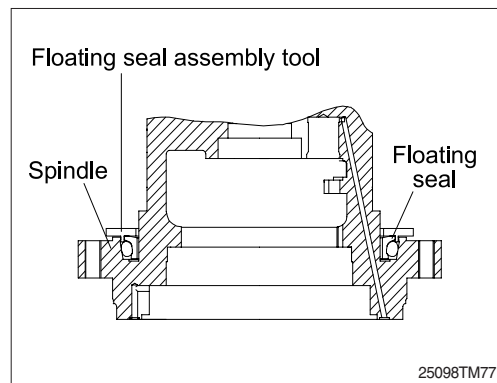
3) THE REDUCTION GEAR ASSEMBLY

(1) Rotate the travel motor through 180 degrees to make the spindle side face upward.



(2) Install floating seal (102) on the spindle (101).

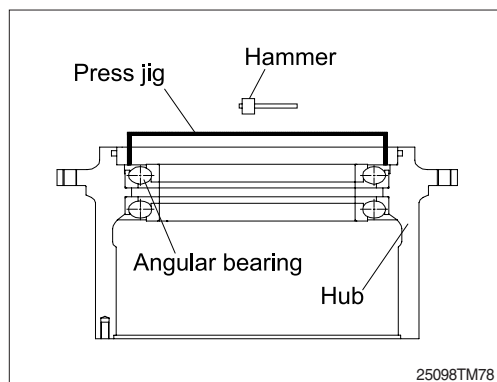
※ Apply grease to the floating seal (102).



(3) Hub assembly

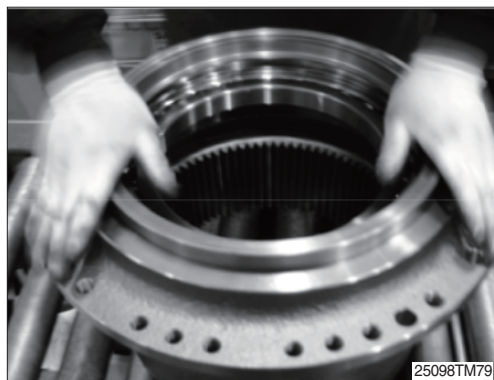
① Install angular bearing (125) into the hub (105).

※ Be careful for the insert direction.



② Insert the O-ring (130), the sealing (129) in the hub (105).

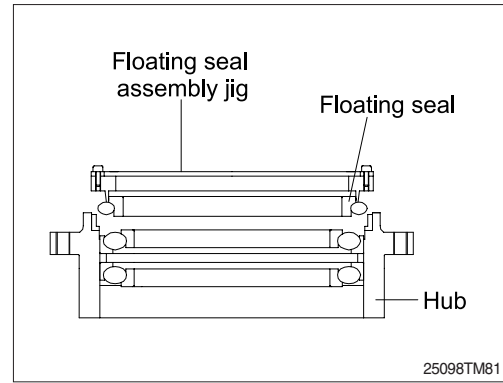
※ Apply grease to the O-ring (130) thinly.



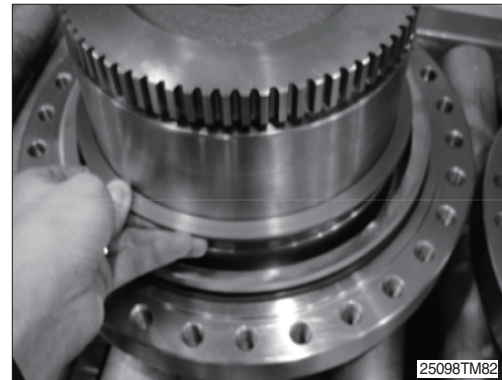
③ Install floating seal (102) on the hub (105).



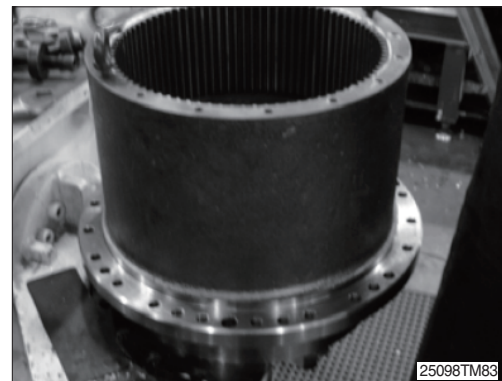
※ Apply grease to the floating seal (102).



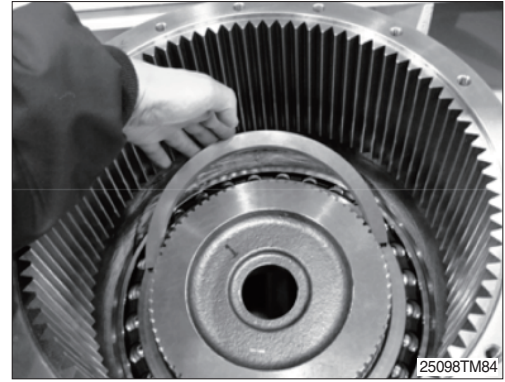
④ Install distance piece (106) into the spindle.



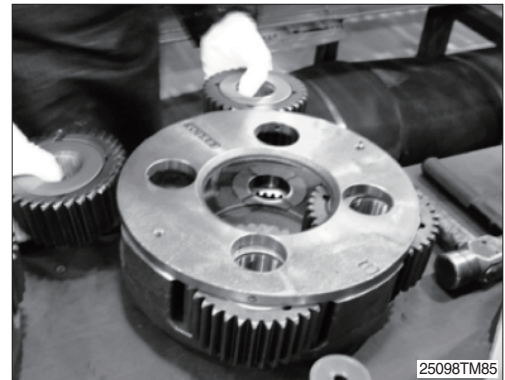
⑤ Install the hub assembly into the spindle.



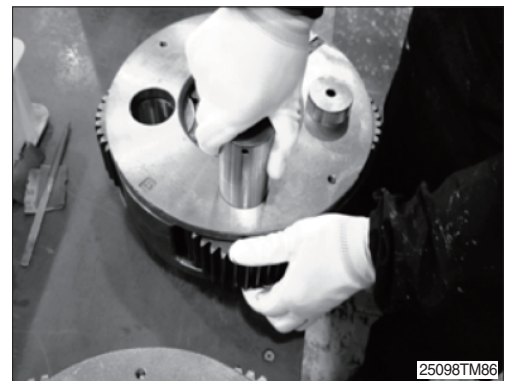
- ⑥ Use a press, and press inner face of bearing (125) into its full depth.
- ⑦ While pressing flange of spindle (101), install shim plate (136) into groove.



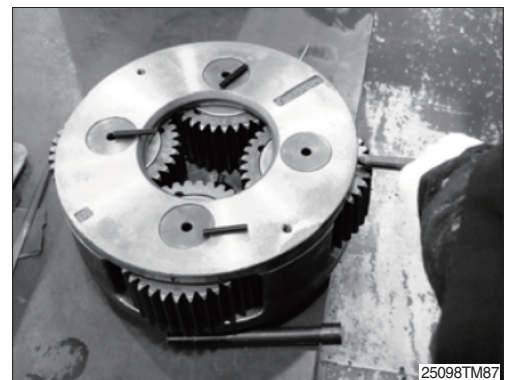
- ⑧ Install thrust washer (F) (109), planetary gears (F) (108), needle bearings (111) and floating bushing (112) from carrier No.2 (103).



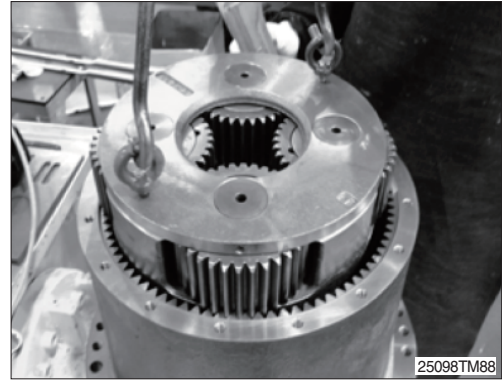
- ⑨ Install shaft bearing (113) into the carrier No.2 (103).



- ⑩ Install spring pin (110) into the carrier No.2 (103).



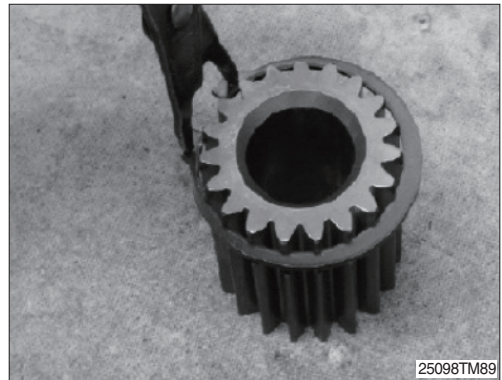
⑪ Place carrier No.2 assembly into hub (105).



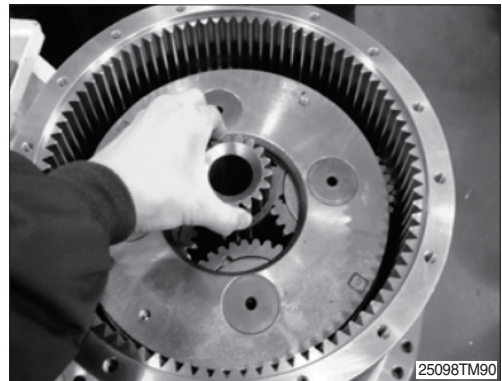
⑫ Fit the snap ring (115) on the sun gear (114).

※ Tools

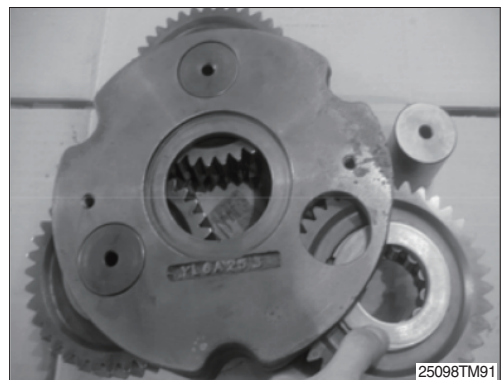
· Snap ring plier (C-75(S))



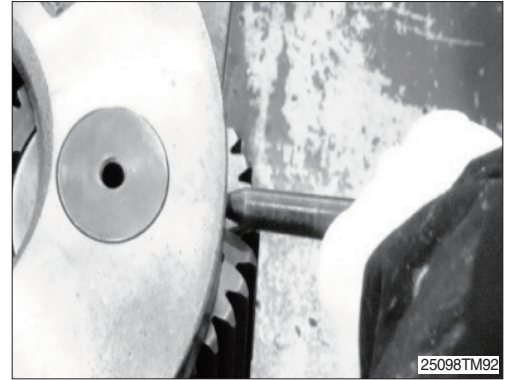
⑬ Install sun gear (114).



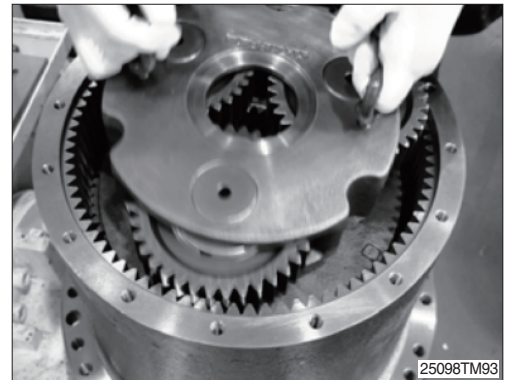
⑭ Install thrust washer (R) (131), planetary gears (R) (117), needle bearings (118) and shaft bearing (R) (107) from carrier No.1 (134).



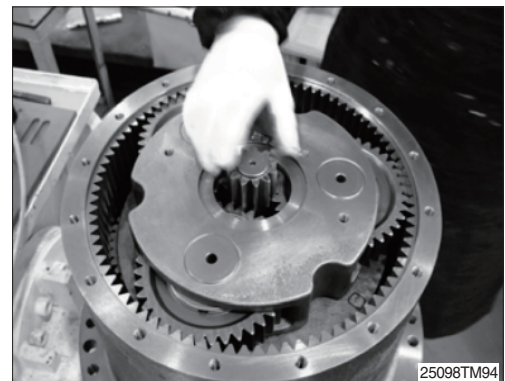
- ⑮ Install the spring pin (122) into the carrier No.1 (134).



- ⑯ Place carrier No.1 assembly into hub (105).

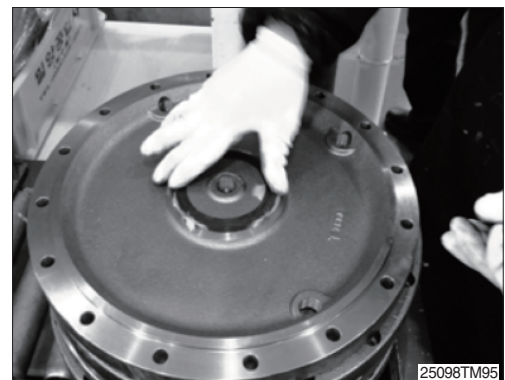


- ⑰ Install drive gear (121) in the carrier No.1 assembly.

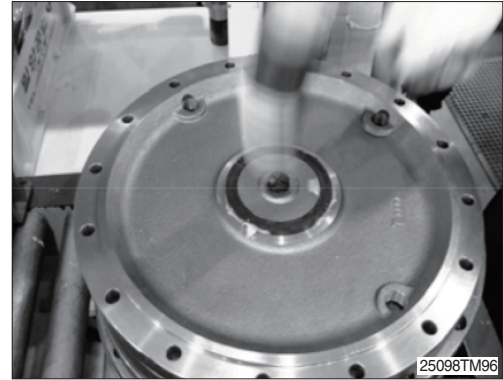


- ⑱ Install thrust plate (133) in the cover (123).

※ Apply grease to the thrust plate (133).



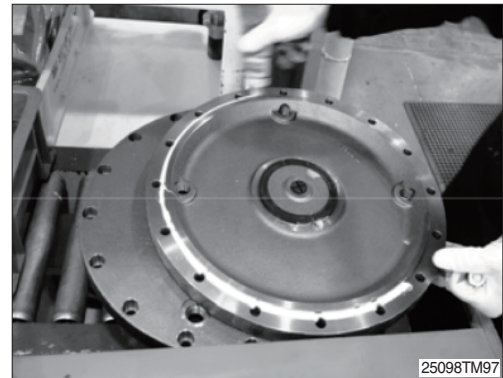
①⑨ Install thrust washer (M) (132) in the cover (123).



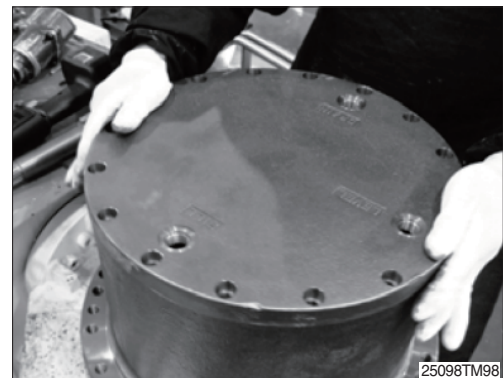
②⑩ Apply sealant to the cover (123) after installing with the hub (105).

※ Tools

- Sealant : Silicone rubber (780-RTV)



②⑪ Mount the cover (123) on the hub (105).



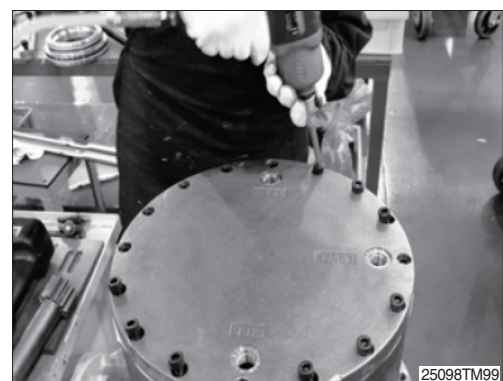
②⑫ Tighten the socket bolt (124, 16EA) to the specified torque.

※ Tightening torque : 5.9 ± 1.0 kgf · m (42.7 ± 7.2 lbf · ft)

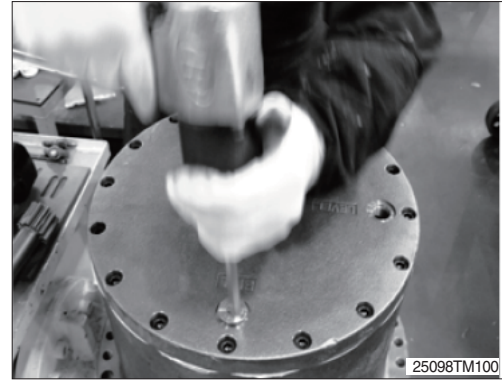
※ Tools

- Adapter for hexagon wrench 8
- Torque wrench

※ Apply loctite to the socket bolt (124) and then install it.



- ②③ Install O-ring (38) in the plug (128).
- ②④ Tighten the plug (128) to the specified torque into the cover (123).
- ※ Apply grease to the O-ring (38).
- ※ Tightening torque : $10 \pm 2.0 \text{ kgf} \cdot \text{m}$
($72.3 \pm 14.5 \text{ lbf} \cdot \text{ft}$)
- ※ Tools
 - Adapter for hexagon wrench 10
 - Torque wrench



3.3 CHECKING FACTS AFTER ASSEMBLY

1) AIR TEST OF REDUCTION GEAR

Disassemble plug (032) of reduction gear part. When compressed air (0.3 kgf/cm^2) is inserted that in water during the 2 minutes, it should be not happened air bubble.

Fill the gear oil.

- Oil amount : 3.3 liter (0.87 U.S.gallon)

2) AIR TEST OF HYDRAULIC MOTOR

One port should be opened, the others port should be closed. When compressed air (3 kgf/cm^2) is inserted opened port in water during the 2 minutes, it should be not happened air bubble.

Fill the hydraulic oil.

- Oil amount : 1.0 liter (0.26 U.S.gallon)