CRAWLER EXCAVATOR R320LC-7

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.

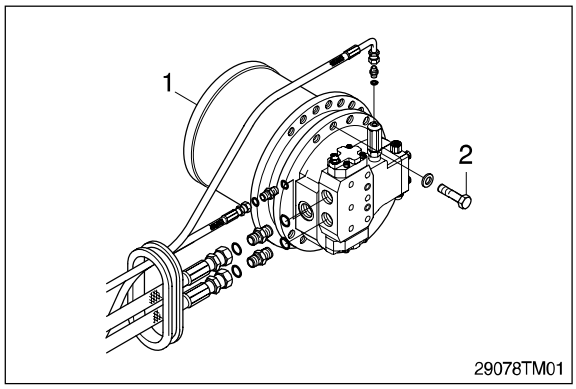
(6) Remove the hose.

※ 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 : 305kg(670lb)



2) INSTALL

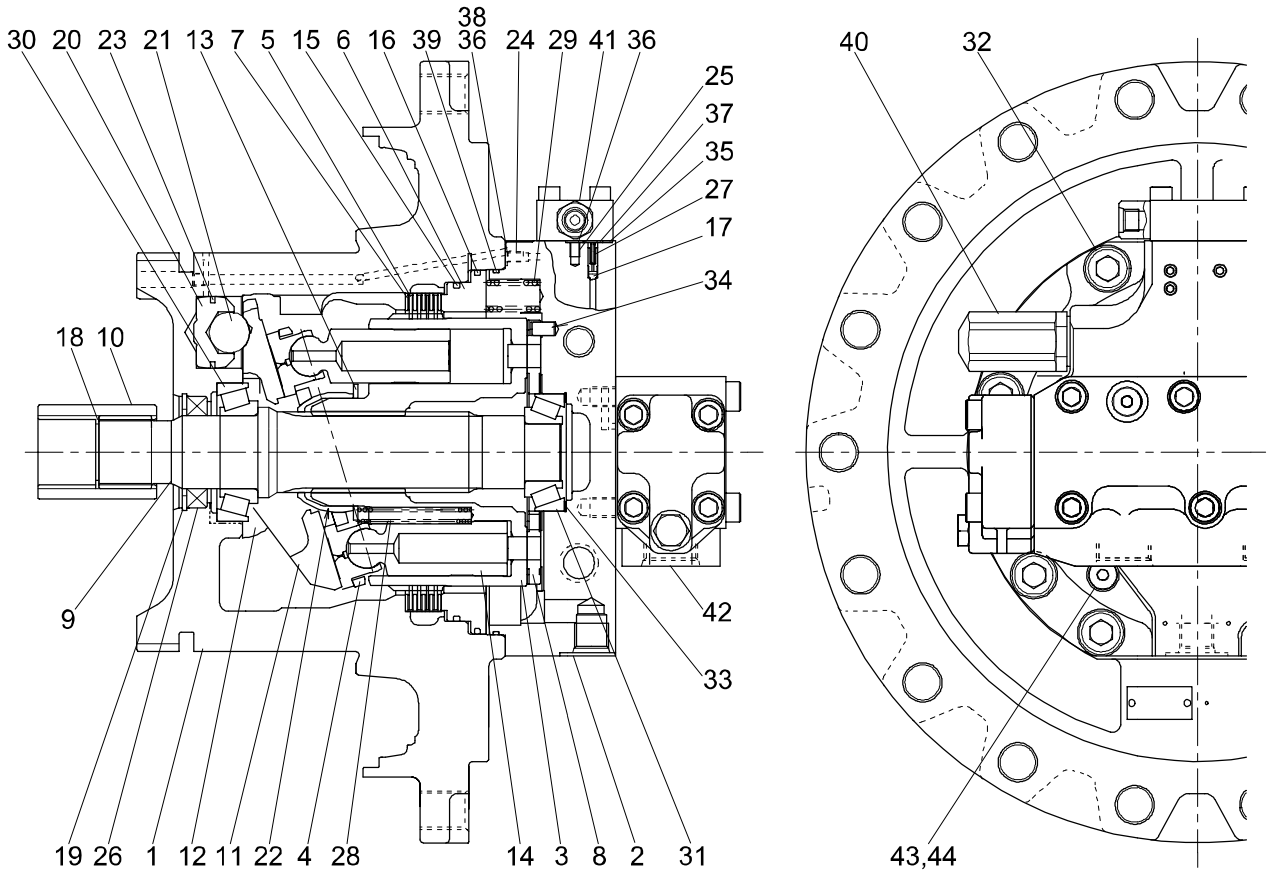
(1) Carry out installation in the reverse order to removal.

(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. TRAVEL MOTOR

1) STRUCTURE

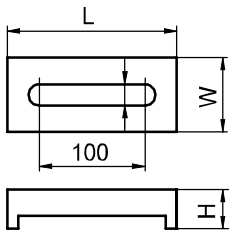
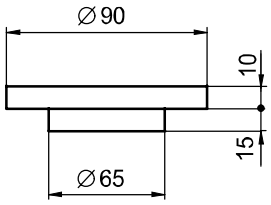
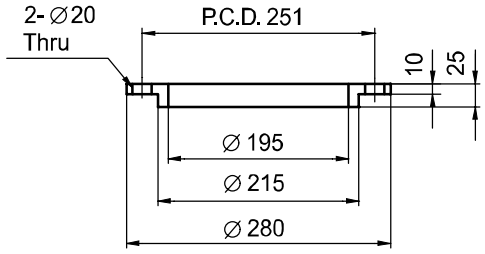


29078TM02

1	Casing	16	D-ring(Big)	31	Bearing
2	Rear cover	17	Check valve	32	Hexagon socket head bolt
3	Cylinder block	18	C type retaining ring	33	Shim
4	Shoe retainer	19	Retaining ring	34	Parallel pin
5	Friction plate	20	Inclined piston	35	O-ring
6	Brake piston	21	Steel ball	36	O-ring
7	Separating plate	22	Ball joint	37	O-ring
8	Valve plate	23	Piston seal	38	O-ring
9	Shaft	24	M6 restrictor(0.6)	39	O-ring
10	Coupling	25	M6 restrictor(0.8)	40	Overload relief valve
11	Swash plate	26	Oil seal	41	Pilot valve
12	Pivot	27	Check valve spring	42	Brake valve
13	Spring holder	28	Cylinder spring	43	Plug
14	Piston assy	29	Brake spring	44	O-ring
15	D-ring(Small)	30	Bearing		

2) TOOLS AND TIGHTENING TORQUE

(1) Tools

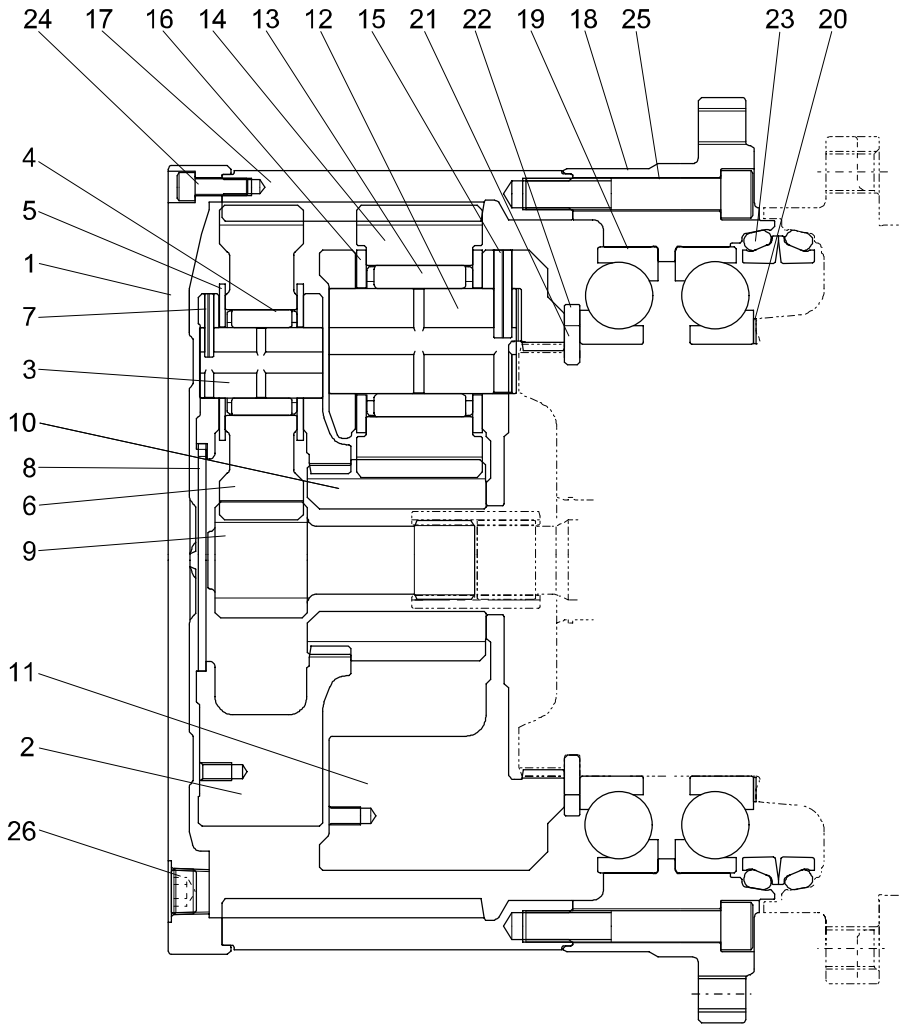
Description	Specification
Hexagon key	Width across flat 5, 6, 10, 14mm
Spanner	Width across flat 19, 27, 32, 35mm
Snap ring prier	For shaft ∅45
Snap ring prier	For bore ∅32~∅80
Plastic hammer	-
Screw driver	Minus(-), medium size, 2 pieces
Torque wrench	0~33kgf · m(0~238.7lbf · ft)
Gear(Bearing) puller	Work size : Dia 75 × Width 45 can be handled
Mount metal(2 pieces) Jig for inserting oil seal	 Mount metal  Jig for inserting oil seal
Jig for inserting brake piston	 Jig for inserting brake piston
Others	Seal tape, kerosene, grease, hydraulic oil, compressed air, waists etc.

(2) Tightening torque

Item	Part name	Size	Torque		Wrench size	
			Kgf · m	lbf · ft	in	mm
10	Hexagon socket head bolt	M 8	2	14.5	0.24	6
14	Hexagon socket head bolt	M12	8	57.9	0.4	10
32	Hexagon socket head bolt	M18	33	239	0.55	14
40	Overload relief valve	ORV-240L6	10~12	72.3~86.8	1.26	32
41	Hexagon socket head bolt	M 8	2	14.5	0.24	6
42	Hexagon socket head bolt	M12	8	57.9	0.4	10
43	Plug	PF 1/4	2.5~3	18.1~21.7	0.25	6.35

3. TRAVEL REDUCTION GEAR

1) STRUCTURE

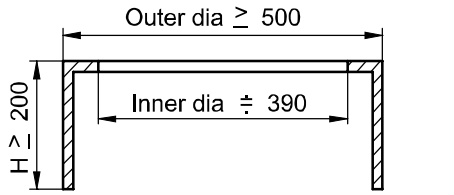


29078TM03

1	Cover	10	Sun gear 2	19	Angular bearing
2	Carrier 1	11	Carrier 2	20	Shim
3	Carrier pin 1	12	Carrier pin 2	21	Lock washer
4	Needle bearing	13	Needle bearing	22	Support ring
5	Thrust washer 1	14	Planetary gear 2	23	Floating seal
6	Planetary gear 1	15	Spring pin	24	Hexagon socket head bolt
7	Spring pin	16	Thrust washer 2	25	Hexagon socket head bolt
8	Thrust plate	17	Ring gear	26	Socket head taper plug
9	Sun gear 1	18	Housing		

2) TOOLS AND TIGHTENING TORQUE

(1) Tools

Description	Specification
Torque wrench	For 0~50kgf · m(0~361lbf · ft)
Hexagon socket wrench	Width across flats 8, 14mm
Work stand	 Thickness 16mm
Micro depth gauge	0~15mm
Vernier caliper	0~150mm
Pin	For knocking in spring pins item 7 and 15 ∅4.5 × 80, ∅9.5 × 60
Eye bolt	M10 and M20(Or equiv. hooks) each 3 pcs each
Others small items	Kerosene as cleaner, solvent, gear oil, grease, Loctite No.242 and No.515, seal tape, waists etc.
Vertical press and jigs	To press in angular bearings and to assemble its lock washers.

(2) Tightening torque

Item	Part name	Size	Torque		Wrench size	
			Kgf · m	lbf · ft	in	mm
24	Socket head bolt	M10 × 30	7	50.61	0.31	8
25	Socket head bolt	M18 × 110	38.5	278.4	0.55	14
26	Socket head plug	R(PT) 3/4	10	72.3	0.75	19

4. DISASSEMBLING

1) GENERAL INSTRUCTIONS

(1) Generally, hydraulic equipment is precisely manufactured and clearances between each parts are very narrow. Therefore, disassembling and assembling works should be performed on the clean place where dusts hardly gather. Tools and kerosene to wash parts should also be clean and handled with great care.

(2) When motor is removed from the host machine, wash around the ports sufficiently and put the plugs so that no dust and/or water may invade. Take off these plugs just before the piping works when re-attach it to the host machine.

(3) Before disassembling, review the sectional drawing and prepare the required parts, depending on the purpose and the range of disassembling.
Seals, O-rings, etc., if once disassembled, are not reusable.
There are some parts that should be replaced as a subassembly.
Consult with the parts manual in advance.

(4) The piston can be inserted to whichever cylinder block for the initial assembling.
However, their combination should not be changed if they are once used. To reuse them, put the matching mark on both pistons and cylinder block before disassembling.

⚠ Take great care not to pinch your hand between parts while disassembling nor let fall parts on your foot while lifting them.

2) DISASSEMBLING REDUCTION UNIT

(1) Preparation for disassembling

① The reduction units removed from excavator are usually covered with mud. Wash outside of propelling unit and dry it.

② Loosen taper screw plug of drain port and drain oil from reduction gear.

※ While oil is still hot, inside of the unit may be pressurized.

⚠ Take care of the hot oil gushing out of the unit when loosening the plug.

③ **Mark for mating**

Put marks on each mating parts when disassembling so as to reassemble correctly as before.

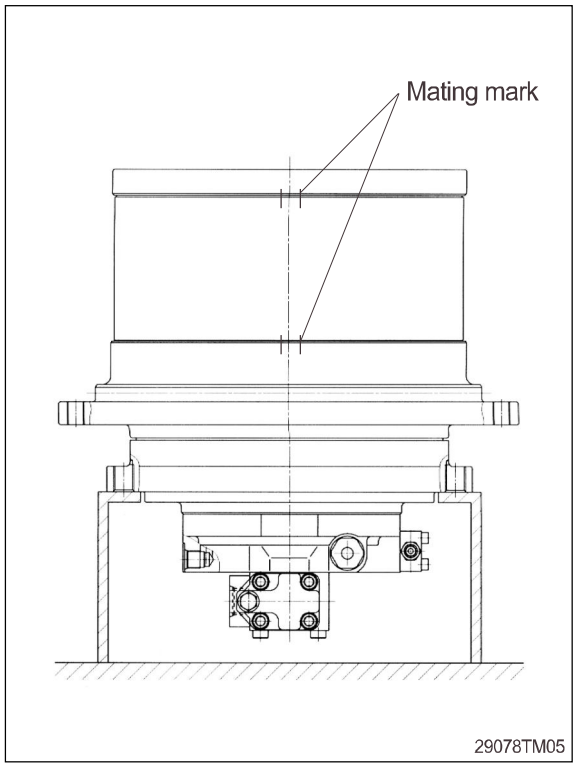
※ Figure in ( ) shown after the part name corresponds to the number on structure drawing.

(2) Setting reduction unit(Or whole propelling unit) on work stand for disassembling

① Remove M10 hexagon socket head bolts(24) at 3 places from cover(1) almost equally apart each other, then install M10 eye bolts.

Lift up the unit using them and place it on work stand with cover(1) upward.

⚠ Take great care not to pinch your hand between parts while disassembling nor let fall parts on your foot while lifting them.

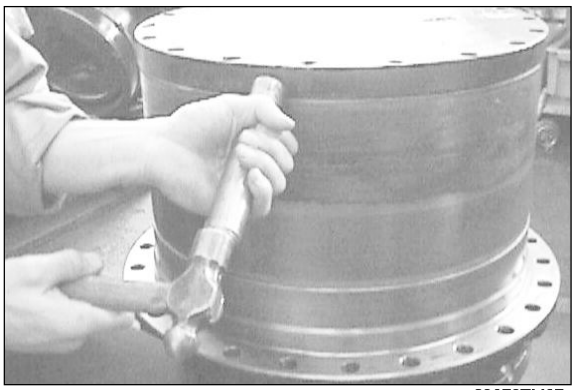


(3) Removing cover

① Remove the rest of M10 hexagon socket head bolts(24) that secure cover(1).

29078TM06

② As the cover(1) is adhered to ring gear (17), remove cover(1) by lightly hammering slantwise upward by wooden bar aiming at projection of cover(1).



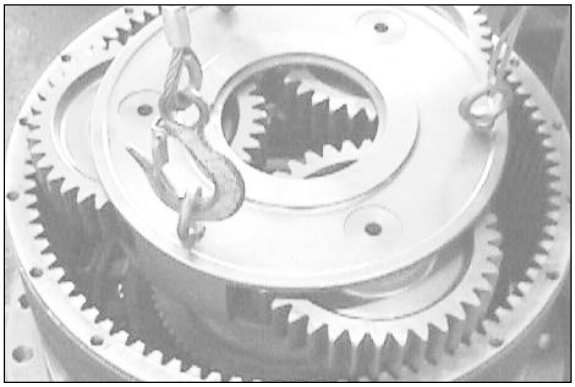
29078TM07

(4) Removing carrier 1 assembly

① Remove thrust plate(8).

② Remove sun gear 1(9).

③ Screw three M10 eye bolts in carrier 1(2) and lift up and remove carrier 1 as subassembly(2, 3, 4, 5, 6, 7).

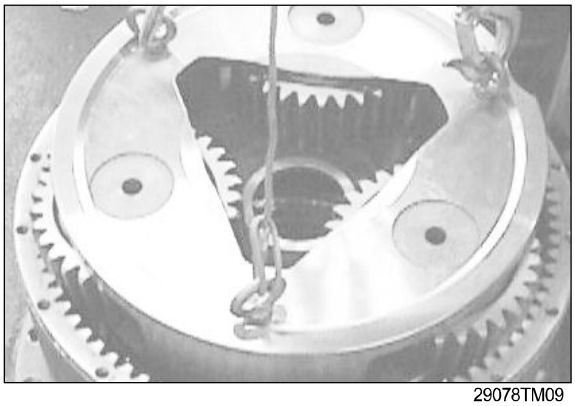


29078TM08

(5) Removing carrier 2 assembly

① Remove sun gear 2(10).

② Screw three M10 eye bolts in carrier 2(11) and lift up and remove carrier 2 as subassembly(11, 12, 13, 14, 15, 16).



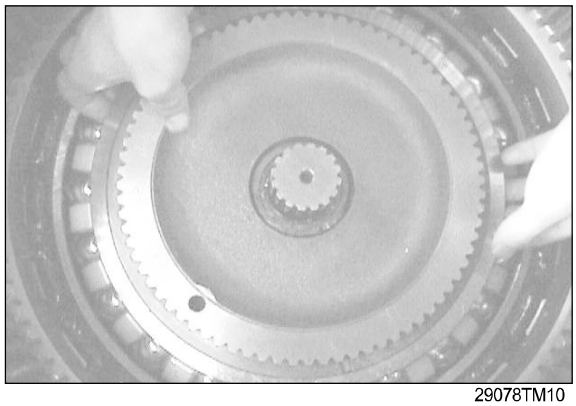
29078TM09

(6) Removing housing assembly

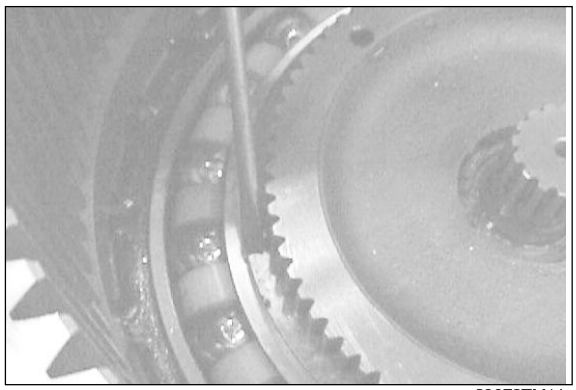
① Remove support ring(22).

② Take off lock washers(21) by tapping on screw driver or on similar tool placed at parting surface of them.

③ Screw three M10 eye bolts in ring gear(17) and remove housing assembly including ring gear(17), housing(18), angular bearing(19), and a piece of floating seal(23) together.



29078TM10



29078TM11

(7) Disassembling housing assembly

① Place housing assembly on steel blocks or a stand with ring gear(17) below.
Make the mating mark on both housing (18) and ring gear(17).

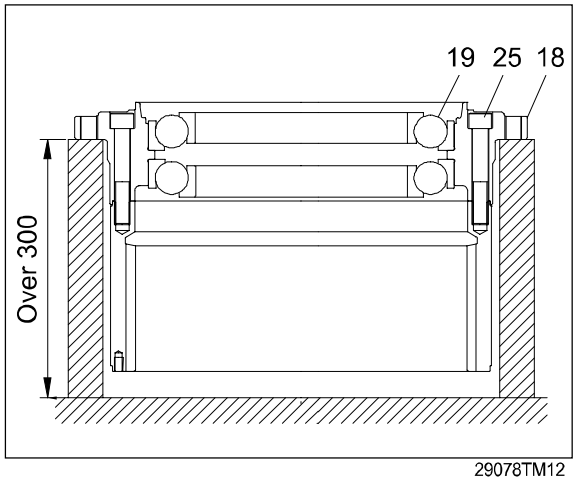
② Remove floating seal(23) from housing (18).

③ Remove M18 hexagon socket head bolts (25), leaving two of them at 180 ◦ apart position.

④ Loosen the two hexagon socket head bolts(25) and tap lightly the head of them then ring gear(17) can be easily removed from housing(18).

※ Take care not to damage the sliding surface of floating seal(23) or its O-ring.

※ Bearings(19) have been tightly press fitted in housing(18). Don't remove the bearings(19) unless their exchange is needed.
In case bearings removed, don't reuse them. New bearings should be used and shim adjusting be required.



29078TM12

(8) Removing floating seal

① Remove a piece of floating seal(23) of motor side.

29078TM13

(9) Disassembling carrier 1 assembly

※ When carrier pins 1(3) are to be reused, mark each pin with its mated hole of carrier 1(2) to assure the same combination as before.

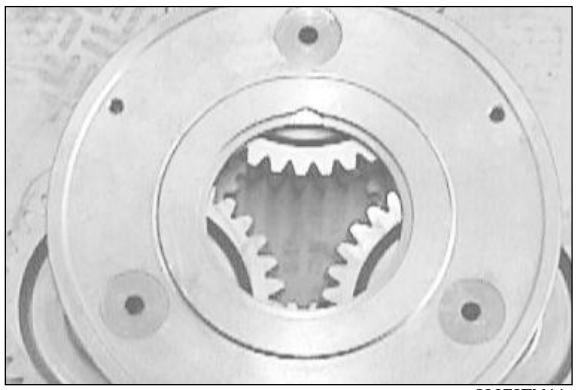
① Knock spring pins(7) fully into carrier pins 1(3).

② Tap carrier pins 1(3) out from carrier 1(2).

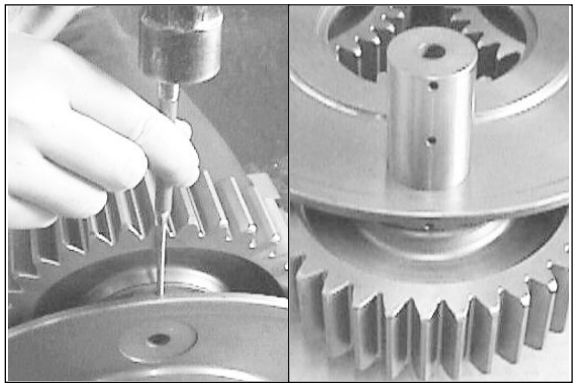
③ Remove thrust washers 1(5), planetary gears 1(6) and needle bearings(4).

④ Knock out spring pins(7) from carrier pins 1(3) for reassembling.

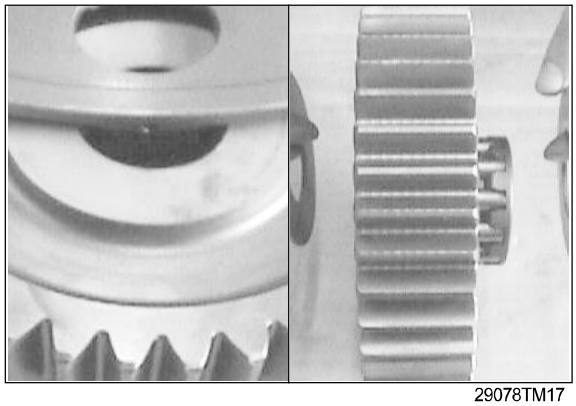
※ When carrier pin 1(3) or planetary gear 1(6) is needed to be exchanged, three pins or three gears should be all exchanged.



29078TM14



29078TM15



29078TM17

(10) Disassembling carrier 2 assembly

※ When carrier pins 2(12) are to be reused, mark each pin with its mated hole of carrier 2(11) to assure the same combinations as before.

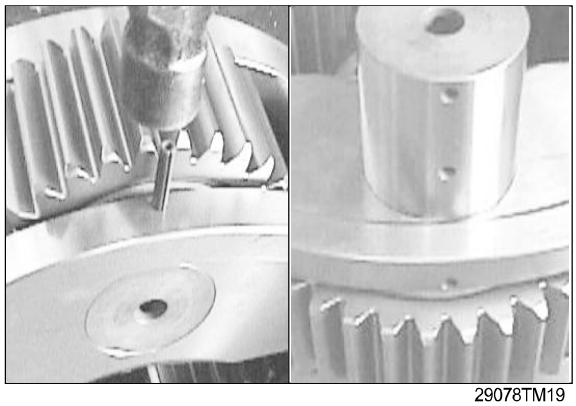
① Knock spring pins(15) fully into carrier pins 2(12).

② Tap carrier pins 2(12) out from carrier 2(11).

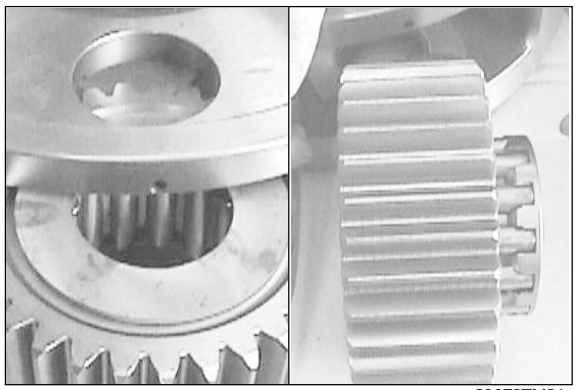
③ Remove planetary gears 2(14) and spherical roller bearings(13).

④ Knock out spring pins(15) from carrier pins 2(12) for reassembling.

※ When carrier pin 2(12) or planetary gear 2(14) is needed to be exchanged, three pins or three gears should be all exchanged.



29078TM19



29078TM21

3) DISASSEMBLING TRAVEL MOTOR

(1) Removing accessory valves

Before disassembling motor, remove accessory valves.

① Remove brake valve(42).

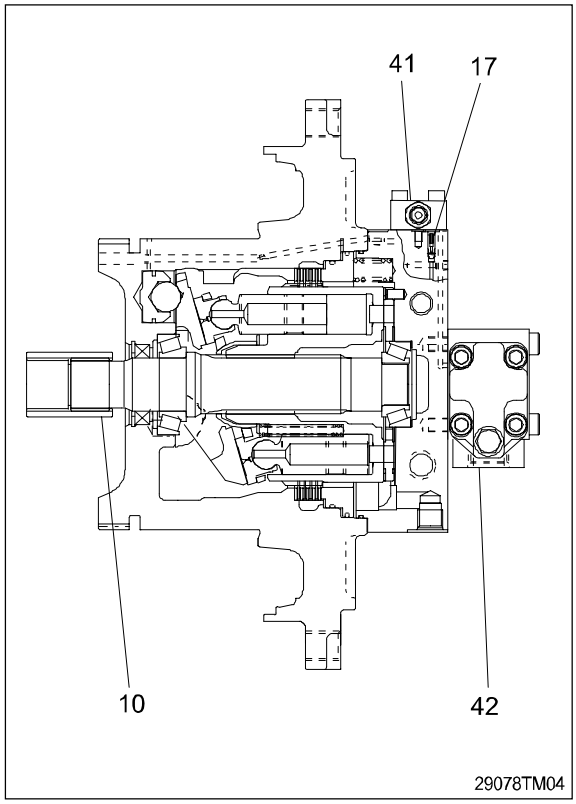
② Remove pilot valve(41).

③ Remove check valve(17).

④ Remove overload relief valves(40).

⑤ Remove coupling(10).

※ According to disassembling purpose, select the valves to be removed.
However, you cannot disassemble the motor without removing valves.



29078TM04

(2) Disassembling motor

① Place the motor with the shaft horizontal, remove hexagon socket head bolt(32) of rear cover(2) leaving two on diagonally upper and lower position.

② Loosen slowly and simultaneously the remaining two hexagon socket head bolt (32).

③ Remove rear cover(2) and brake springs (29) taking care cylinder block(3) is not coming out stuck with rear cover(2).

※ Do not fall, at this moment, valve plate(8), brake springs(29) and/or O-rings(36, 38).

※ If cylinder block(3) would come out with rear cover(2), then push in the cylinder block(3) by a rounded point bar of ∅5~8 through the oil hole of rear cover(2), taking care not to make any scratch on these parts, pulling out the rear cover(2) only.

④ Remove valve plate(8) without pulling out cylinder block(3).

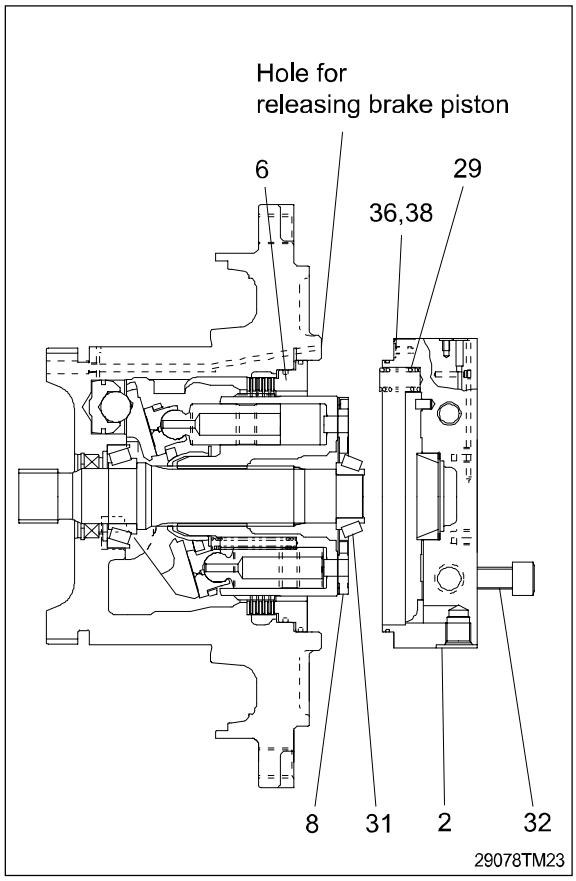
※ Put the matching mark on both valve plate(8) and rear cover(2) so that valve plate(8) should not be reversed on reassembly.

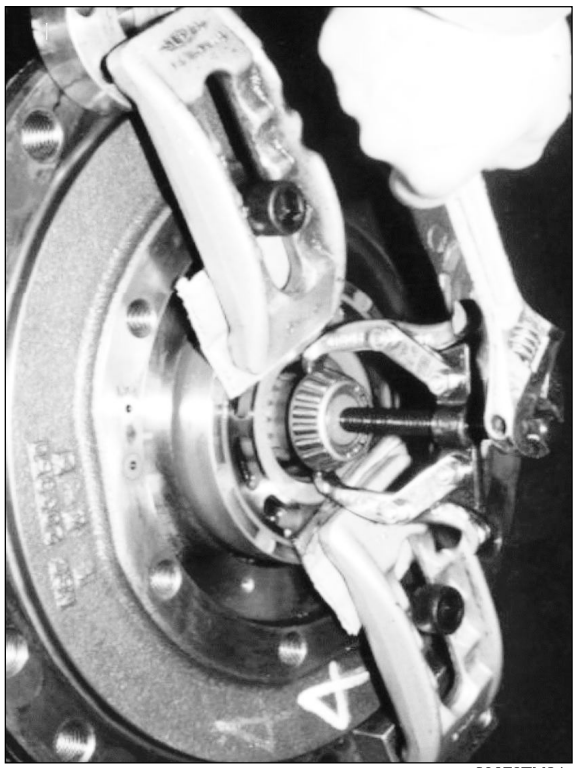
⑤ Using removed hexagon socket head bolt, fasten two mount metals so as to push in cylinder bolck(3) without damaging it then inner race of rear bearing(31) comes out.

⑥ Put two fingers of gear(Bearing) puller under the inner race of rear bearing(31) and remove the race.

⑦ Attaching a hand on brake piston(6), supply plant air through oil hole for releasing brake and push out the piston(6).

⚠ Be aware of piston popping out.





⑧ Put as a mark on a piston assembly(14) such as a paper pipe and put a matching mark on cylinder block(3) so that they can be reassembled at the same position as before.

⑨ Remove cylinder block(3), spring holder (13) and cylinder spring(29).

⑩ Remove separator plates(7) and friction plates(5).

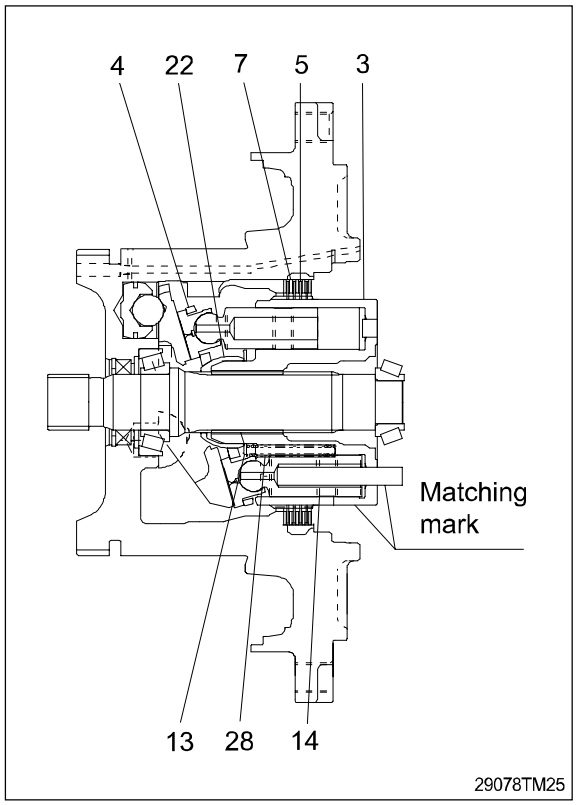
⑪ Remove 9 piston assemblys(14), shoe retainer(4) and ball joint(22) as an assembly.

※ Put piston assemblys(14) into the cylinder block(3) matching the matching mark with shoe retainer(4) as if assembled. The purpose is to put piston assemblys (14) in the same bore of cylinder block(3) as before when reassembled.

※ Take care not to scratch polished surfaces.
Do not reuse damaged ones.

※ It is impossible to disassemble piston and shoe because they are calked together.

※ Above disassembling is mentioned as a motor only and naturally can be applied to the motor with reduction gears. The situation is rather easier for with reduction gears because the shaft is rather restricted by a gear to move.



⑫ Remove swash plate(11).

⑬ Do not detach inclined piston(20). If forced to detach, attach a hand on inclined piston and supply plant air through the hole shown and push it out.

⚠ Be aware of piston popping out.

⑭ Shaft(9) can comes out now.

⑮ Remove retaining ring(19) and knock out oil seal(26).

If bearings happen to be changed, remove inner races and outer races using bearing puller if needed and exchange to new ones as an assembly.

※ Under the outer race of rear bearing(31) are shim(33). Reuse them as they are when reassembling.

※ When changing bearings(30, 31), shaft(9), casing(1) or rear cover(2), it affects the clearance of the bearings. So shim(33) should be adjusted.

Shim adjustment should be performed by measuring correctly the clearance for shim and change shim that meets the clearance.

Other jigs and tools are needed to measure and decide the thickness of the shim.

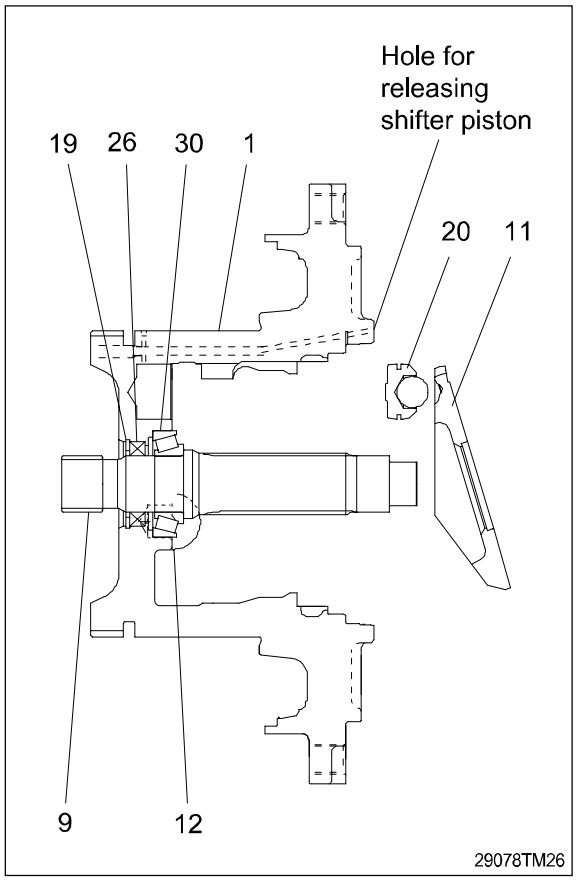
Please contact dealers for them if necessary.

※ Do not remove pivots(12).

If forced to remove them, put matching mark on pivots(12) with casing(1).

※ Never detach oil seal(26) only for the purpose of inspecting it.

If disassembled, never fail to replace oil seal(26) with new one.



Deciding shim thickness for tapered roller bearings.

※ This work should be done only when you have changed bearings(30, 31), shaft(9), casing(1) or rear cover(2).

a. Measure the assembling width **E**

※ Take care not to tip shaft(9)

b. Measure the depth **F** of rear cover(2)

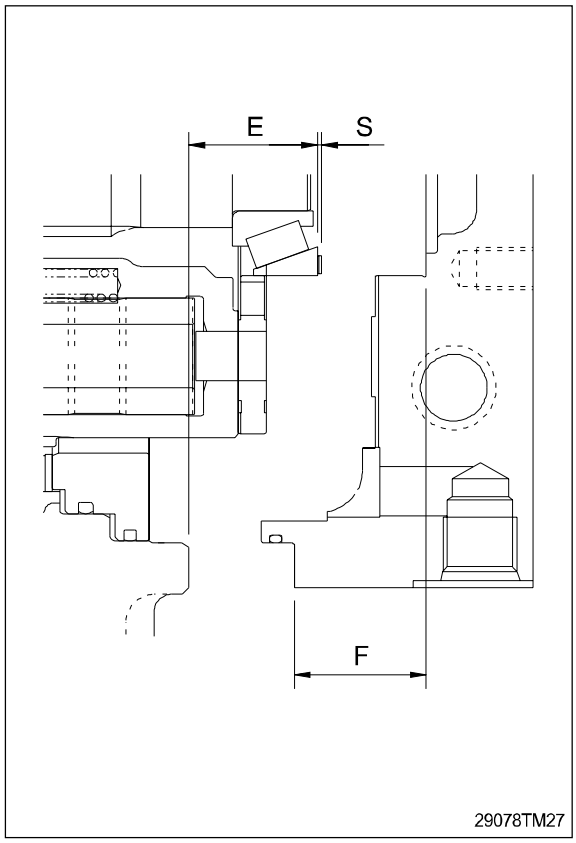
※ Measure them at crossed 4 places on the circuit, then calculate their mean value.

c. When thickness of shim(33) to be used is placed as **S**, the clearance **Y** can be calculated as follows:

$Y = F - (E + S)$

d. Select one or two shim(33) so as the clearance **Y** to come to 0~0.1mm (Clearance) on this unit.

※ Select from the shim kit.

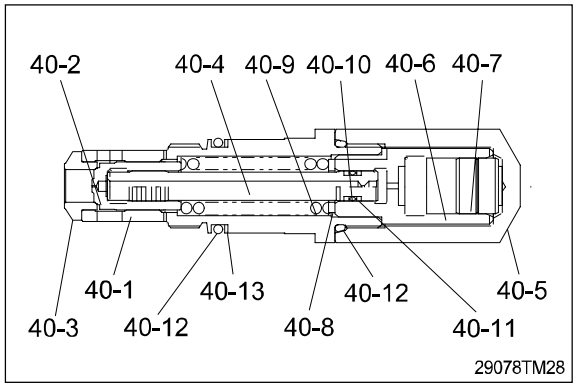


(3) Disassembling overload relief valve

① Remove overload relief valve(40) as an assembly utilizing hexagonal flats on socket(40-1).

② As a rule, overload relief valve(40) should be handled as one service part.
If forced to disassemble it, detach cap (40-5) from socket(40-1) and take out component parts.

※ Valve seat(40-3) is fitted tight to the hole of socket(40-1).
Never disassemble them if not required, since the hole of socket may be damaged.



5. REASSEMBLING

1) GENERAL INSTRUCTIONS

(1) Wash each parts sufficiently with kerosene and blow them by plant air.

(2) Assemble sliding parts after coating clean hydraulic oil on them.

⚠ Take great care not to pinch your hand between parts or tools while assembling nor let fall parts on your foot while lifting them.

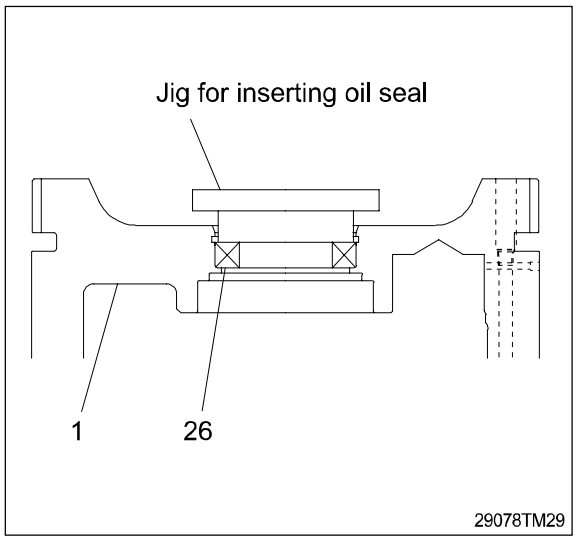
2) REASSEMBLING MOTOR

(1) Coat outer surface of oil seal(26) and inner face of casing(1) with grease. Using jig, rightly and evenly press in the oil seal(26) into casing(1).

(2) Fix oil seal(26) by retaining ring(19).

(3) Put the outer race of bearing(30) on casing(1)(This fit is loose), and press the inner race on shaft(9)(This fit is tight).

※ It is easier to fit inner race if the inner race is heated or boiled under 100 ℃.
Never over heat.

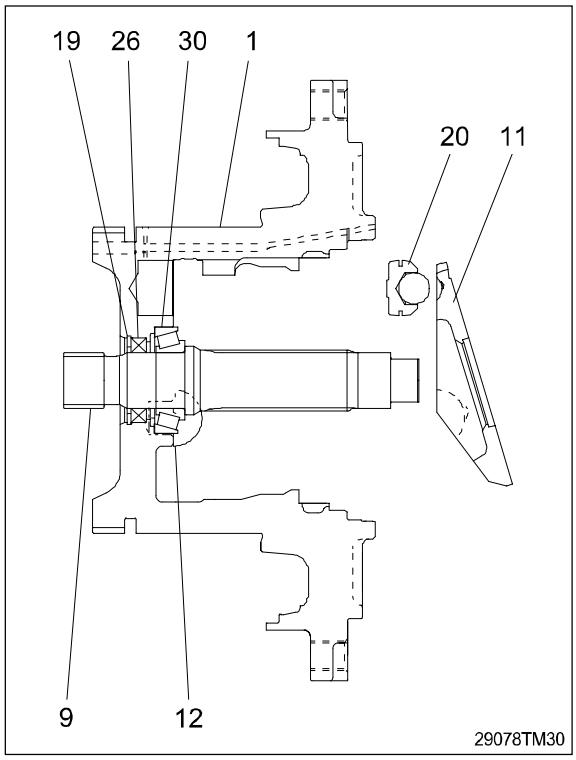


(4) Insert shaft(9) into casing(1) after coating grease on the contact surface to oil seal (26) lip.

(5) Put inclined piston(20) into casing(1).

(6) Insert pivots(12) into the casing(1).
Take care to match the matching mark with casing(1) and also to coincide the direction of sliding trace on sphere surface with those contact trace on swash plate (11) if the motor was operated for a certain hours.

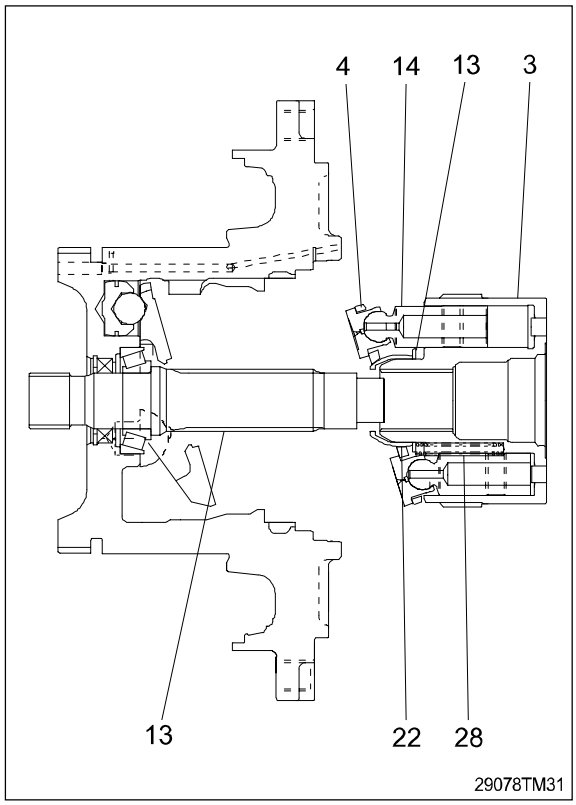
(7) Coat three spherical recess of swash plate(11) with ample grease and assemble it in casing(1).



(8) Insert piston assemblys(14), shoe retainer (4), ball joint(22), spring holder(13), cylinder spring(28) on to cylinder block(3) as shown and then insert the whole assembly to shaft(9).

※ Piston assemblys(14) should be inserted into the same bore as before.

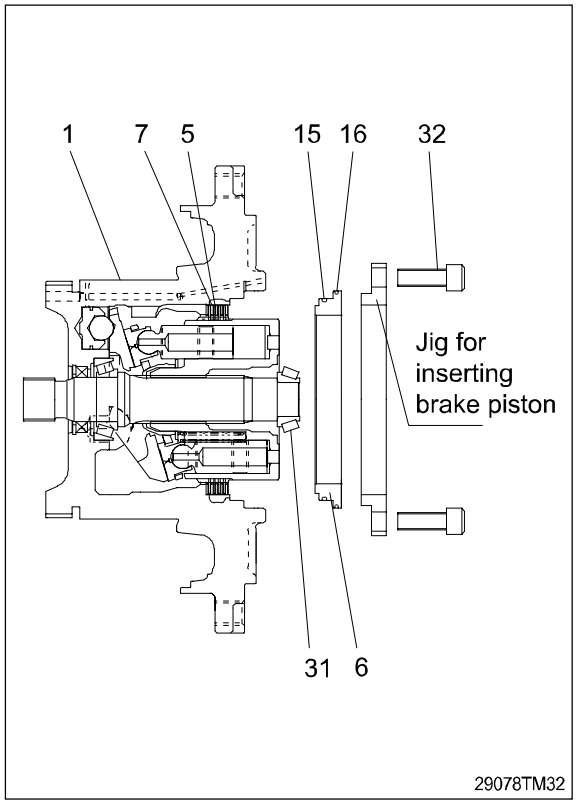
(9) Rightly knock in the inner race of rear bearing(31) to the rear end of shaft(9).



(10) Install all the separator plates(7) and friction plates(5) alternately between casing(1) and cylinder block(3) adjusting on the notches and splines.
Separator plates(7) comes both first and last.

(11) Insert brake piston(6) into casing(1) using inserting jig after attaching D-rings(15, 16) to brake piston(6).

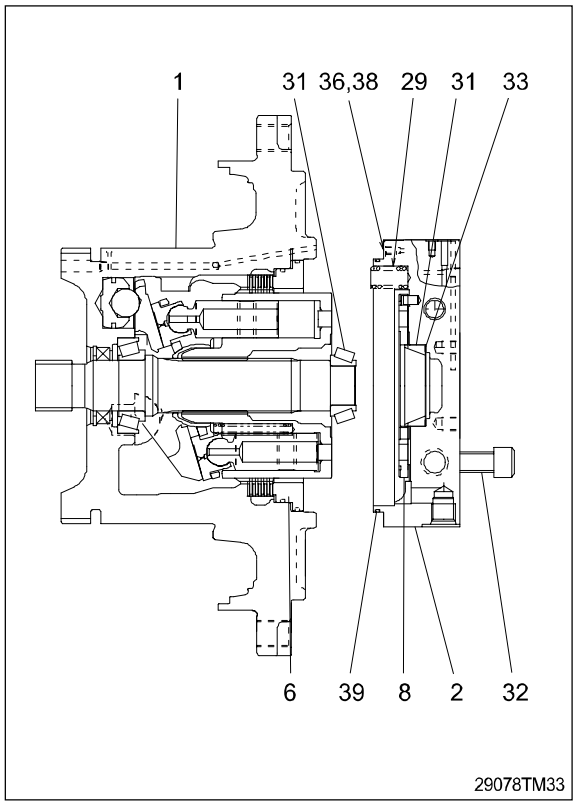
※ Two kinds of D-rings are used on brake piston(6). The larger one(16) is first inserted into the hole, then the smaller one(15) enters.
It is impossible to see how the smaller ring goes into the hole. Therefore, never push it forcibly into the hole. Otherwise, it may be scraped off by the edge of the hole of casing(1).



(12) Lay down rear cover(2) to mount valve plate(8) coinciding matching mark made prior to disassembling and also place brake springs(29) with ample grease to be attached to rear cover(2) while this assembling.
Also set O-ring(39) on rear cover(2).
Then, insert rear cover(2) to casing(1) and fasten hexagon socket head bolt(32).

(13) Put coupling(10) on the shaft(9).

※ Tightening torque of hexagon socket head bolt(32) is 33kgf · m(238.6lbf · ft) with rust preventive on the threads.



3) ASSEMBLING ACCESSORY VALVES

After reassembling motor, assemble accessory valves.

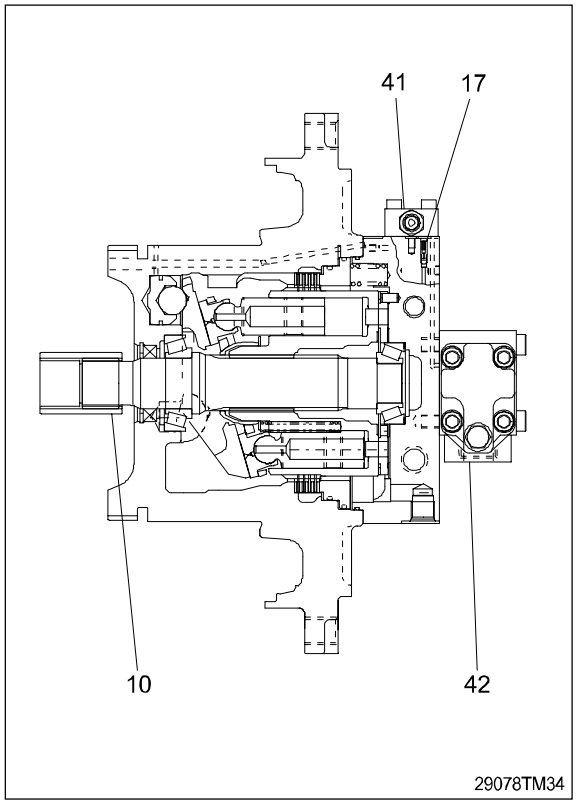
(1) Assemble brake valve(42).

(2) Assemble check valve(17).

(3) Assemble pilot valve(41).

(4) Assemble overload relief valves(40).

(5) Assemble coupling(10).



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