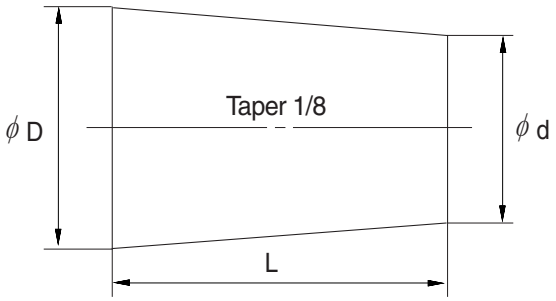
SECTION 6 DISASSEMBLY AND ASSEMBLY

GROUP 1 PRECAUTIONS

1. REMOVAL WORK

1) Lower the work equipment completely to the ground.
   If the coolant contains antifreeze, dispose of it correctly.
2) After disconnecting hoses or tubes, cover them or fit blind plugs to prevent dirt or dust from entering.
3) When draining oil, prepare a container of adequate size to catch the oil.
4) Confirm the match marks showing the installation position, and make match marks in the necessary places before removal to prevent any mistake when assembling.
5) To prevent any excessive force from being applied to the wiring, always hold the connectors when disconnecting the connectors.
6) Fit wires and hoses with tags to show their installation position to prevent any mistake when installing.
7) Check the number and thickness of the shims, and keep in a safe place.
8) When raising components, be sure to use lifting equipment of ample strength.
9) When using forcing screws to remove any components, tighten the forcing screws alternately.
10) Before removing any unit, clean the surrounding area and fit a cover to prevent any dust or dirt from entering after removal.
11) When removing hydraulic equipment, first release the remaining pressure inside the hydraulic tank and the hydraulic piping.
12) If the part is not under hydraulic pressure, the following corks can be used.

Nominal number	Dimensions		
	D	d	L
06	6	5	8
08	8	6.5	11
10	10	8.5	12
12	12	10	15
14	14	11.5	18
16	16	13.5	20
18	18	15	22
20	20	17	25
22	22	18.5	28
24	24	20	30
27	27	22.5	34



2. INSTALL WORK

1) Tighten all bolts and nuts(Sleeve nuts) to the specified torque.
2) Install the hoses without twisting or interference.
3) Replace all gaskets, O-rings, cotter pins, and lock plates with new parts.
4) Bend the cotter pin or lock plate securely.
5) When coating with adhesive, clean the part and remove all oil and grease, then coat the threaded portion with 2-3 drops of adhesive.
6) When coating with gasket sealant, clean the surface and remove all oil and grease, check that there is no dirt or damage, then coat uniformly with gasket sealant.
7) Clean all parts, and correct any damage, dents, burrs, or rust.
8) Coat rotating parts and sliding parts with engine oil.
9) When press fitting parts, coat the surface with antifriction compound(LM-P).
10) After installing snap rings, check that the snap ring is fitted securely in the ring groove(Check that the snap ring moves in the direction of rotation).
11) When connecting wiring connectors, clean the connector to remove all oil, dirt, or water, then connect securely.
12) When using eyebolts, check that there is no deformation or deterioration, and screw them in fully.
13) When tightening split flanges, tighten uniformly in turn to prevent excessive tightening on one side.
14) When operating the hydraulic cylinders for the first time after repairing and reassembling the hydraulic cylinders, pumps, or other hydraulic equipment or piping, always bleed the air from the hydraulic cylinders as follows:

(1) Start the engine and run at low idling.
(2) Operate the control lever and actuate the hydraulic cylinder 4-5 times, stopping 100㎜ before the end of the stroke.
(3) Next, operate the piston rod to the end of its stroke to relieve the circuit. (The air bleed valve is actuated to bleed the air.)
(4) After completing this operation, raise the engine speed to the normal operating condition.

※ If the hydraulic cylinder has been replaced, carry out this procedure before assembling the rod to the work equipment.
※ Carry out the same operation on machines that have been in storage for a long time after completion of repairs.

3. COMPLETING WORK

1) If the coolant has been drained, tighten the drain valve, and add water to the specified level. Run the engine to circulate the water through the system. Then check the water level again.

2) If the hydraulic equipment has been removed and installed again, add engine oil to the specified level. Run the engine to circulate the oil through the system. Then check the oil level again.

3) If the piping or hydraulic equipment, such as hydraulic cylinders, pumps, or motors, have been removed for repair, always bleed the air from the system after reassembling the parts.

4) Add the specified amount of grease(Molybdenum disulphied grease) to the work equipment related parts.

GROUP 2 TIGHTENING TORQUE

1) BOLT AND NUT

(1) Coarse thread

Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 6 × 1.0	0.85 ~ 1.25	6.15 ~ 9.04	1.14 ~ 1.74	8.2 ~ 12.6
M 8 × 1.25	2.0 ~ 3.0	14.5 ~ 21.7	2.7 ~ 4.1	19.5 ~ 29.7
M10 × 1.5	4.0 ~ 6.0	28.9 ~ 43.4	5.5 ~ 8.3	39.8 ~ 60
M12 × 1.75	7.4 ~ 11.2	53.5 ~ 81.0	9.8 ~ 15.8	70.9 ~ 114
M14 × 2.0	12.2 ~ 16.6	88.2 ~ 120	16.7 ~ 22.5	121 ~ 163
M16 × 2.0	18.6 ~ 25.2	135 ~ 182	25.2 ~ 34.2	182 ~ 247
M18 × 2.5	25.8 ~ 35.0	187 ~ 253	35.1 ~ 47.5	254 ~ 344
M20 × 2.5	36.2 ~ 49.0	262 ~ 354	49.2 ~ 66.6	356 ~ 482
M22 × 2.5	48.3 ~ 63.3	349 ~ 458	65.8 ~ 98.0	476 ~ 709
M24 × 3.0	62.5 ~ 84.5	452 ~ 611	85.0 ~ 115	615 ~ 832
M30 × 3.0	124 ~ 168	898 ~ 1214	169 ~ 229	1223 ~ 1656
M36 × 4.0	174 ~ 236	1261 ~ 1704	250 ~ 310	1808 ~ 2242

(2) Fine thread

Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 8 × 1.0	2.2 ~ 3.4	15.9 ~ 24.6	3.0 ~ 4.4	21.7 ~ 31.8
M10 × 1.2	4.5 ~ 6.7	32.5 ~ 48.5	5.9 ~ 8.9	42.7 ~ 64.4
M12 × 1.25	7.8 ~ 11.6	56.4 ~ 83.9	10.6 ~ 16.0	76.7 ~ 116
M14 × 1.5	13.3 ~ 18.1	96.2 ~ 131	17.9 ~ 24.1	130 ~ 174
M16 × 1.5	19.9 ~ 26.9	144 ~ 195	26.6 ~ 36.0	192 ~ 260
M18 × 1.5	28.6 ~ 43.6	207 ~ 315	38.4 ~ 52.0	278 ~ 376
M20 × 1.5	40.0 ~ 54.0	289 ~ 391	53.4 ~ 72.2	386 ~ 522
M22 × 1.5	52.7 ~ 71.3	381 ~ 516	70.7 ~ 95.7	511 ~ 692
M24 × 2.0	67.9 ~ 91.9	491 ~ 665	90.9 ~ 123	658 ~ 890
M30 × 2.0	137 ~ 185	990 ~ 1339	182 ~ 248	1314 ~ 1796
M36 × 3.0	192 ~ 260	1390 ~ 1880	262 ~ 354	1894 ~ 2562

2) PIPE AND HOSE (FLARE type)

Thread size (PF)	Width across flat (mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130
1"	41	21	152
1-1/4"	50	35	253

3) PIPE AND HOSE (ORFS type)

Thread size (UNF)	Width across flat (mm)	kgf · m	lbf · ft
9/16-18	19	4	28.9
11/16-16	22	5	36.2
13/16-16	27	9.5	68.7
1-3/16-12	36	18	130
1-7/16-12	41	21	152
1-11/16-12	50	35	253

4) FITTING

Thread size	Width across flat (mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130
1"	41	21	152
1-1/4"	50	35	253

GROUP 3 MAIN CONTROL VALVE

1. REMOVAL INSTALLATION OF THE CONTROL BLOCK

1) GENERAL RECOMMENDATIONS

※ **Property damages risk**

- Before removing the control block from the machine,the block and its surroundings must be thoroughly cleaned (Do not direct the jet of a pressure washing unit directly at the unit).
- No impurities must enter the hydraulic system.Plastic plugs are to be fitted on lines and orifices immediately following their removal.

⚠ **Oil pressure and heavy product**

- Wear protective clothing and use suitable equipment to prevent accidents, particularly concerning the hydraulic fluid.
- Use the lifting eyes and suitable handling equipment.
- Set all actuators connected to the machine in neutral position (on the ground, at lower limit ...) to avoid accidents which could result from uncontrolled movements of the equipment when the hydraulic system is disconnected.
- With the machine off, release the pressure remaining in the system by manipulating all of the distribution spools. This is performed by moving the handle in all directions.

2) REMOVAL OF THE CONTROL BLOCK

- Install a vacuum pump on the tank to limit oil leakage when connections are removed.
- After disconnecting the lines from the block, immediately fit the sealing plugs. Make sure to collect any possible oil leakage in a suitable receptacle.
- Unscrew the mounting screws and remove the control block.

3) INSTALLATION OF THE CONTROL BLOCK

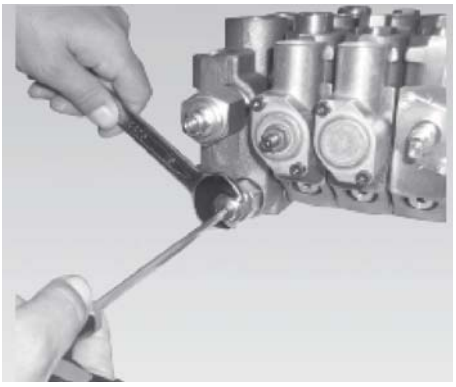
- Contact faces must be perfectly clean.
- Check the evenness of support area on the machine (Tolerance: 0.5 mm).
- Check the condition of line connector seals.
- Clean the block if it has been in storage for a long period of time.
- Correctly place and secure the control block onto the machine with the mounting screws.
- Connect the lines to the block as per the connecting diagram and tighten to the torque specification.
- Ensure that hoses are not twisted or rub.

4) STARTING, MAXIMAL PRESSURE SET UP

- Break the locking cover with a pair of pliers.
- Decalibrate the LS pressure relief valve (17 mm open end spanner on counternut ; 6 mm socket wrench) before starting the machine.
- Maintain one of the control block spool valve in action before the linked hydraulic receiver is at the end of stroke.
- On the spool valve, the value of the secondary valve pressure must be greater than that of the LS pressure relief valve to adjust.
- Adjust the maximum pressure measured in M using the LS pressure relief valve (17 mm open end spanner on counternut ; 6 mm socket wrench).
- Tighten the counternut of the adjusting screw to the torque :

  2.04 kgf · m

  Protect the setting by putting a new locking cover. Fit together two half covers.



2. INLET ELEMENT REPAIR PROCEDURE

1) LS PRESSURE RELIIEF VALVE REPLACEMENT

※ **The control block does not need to be removed from the machine to perform this operation.**

⚠ **Oil pressure**

- Place all of the machine's actuators connected to the control block in neutral position.
- **Release stored pressure by** operating all the spools.

※ Environment damages risk

- Install a vacuum pump on the tank to limit oil leakage during this operation.
- Collect possible leaks with a suitable receptacle.

Reassembly:

1) Install the LS pressure relief valve on the inlet element.
   - Torque : 4.6 kgf · m
2) Set the LS pressure relief valve to the specified value.
3) Fit a new appropriate locking cover.

2) PLUG FOR THE REGULATING UNIT REPLACEMENT

※ The control block does not need to be removed from the machine to perform this operation.

⚠ Oil pressure
Place all of the machine's actuators connected to the control block in neutral position.
Release stored pressure by operating all the spools.

Environment damages risk
Install a vacuum pump on the tank to limit oil leakage during this operation.
Collect possible leaks with a suitable receptacle.

Unscrew the plug (27 mm socket wrench or open end spanner).

Reassembly :

- Install the plug on the inlet element.
- Torque : 10.5 ± 10% kg.m

3) FLOW REGULATOR REPLACEMENT

※ The control block does not need to be removed from the machine to perform this operation.

⚠ Oil pressure
Place all of the machine's actuators connected to the control block in neutral position.
Release stored pressure by operating all the spools.

Environment damages risk
Install a vacuum pump on the tank to limit oil leakage during this operation.
Collect possible leaks with a suitable receptacle.

Unscrew the flow regulator (6 mm socket wrench).

Reassembly :
- Install the plug on the inlet element.
- Torque : 2.3 ± 10% kg.m

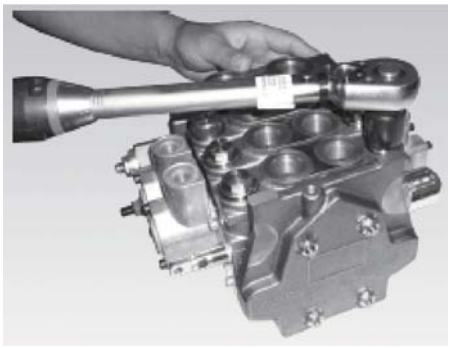
3. DISTRIBUTION ELEMENT REPAIR PROCEDURE

1) SECONDARY VALVES REPLACEMENT

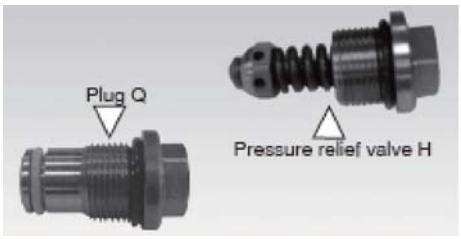
※ The control block does not need to be removed from the machine to perform this operation.

Pressure relief valve

On the distribution element in question, unscrew the relief valve or the plug (17 mm ring wrench).



Reassembly :
Install the plug on the inlet element.
Torque : 6.6 ± 10% kg.m



2) PRESSURE COMPENSATOR REPLACEMENT

※ The control block does not need to be removed from the machine to perform this operation.

Below the distribution element in question, unscrew the compensator plug (8 mm socket wrench).

Remove the compensator piston using a magnet to extract it from its bore.

※ Risk of contamination when using magnetic tool.

Clean parts to remove any attracted metal particle.

Do not use magnet for reassembly.

Reassembly :

Install the plug on the inlet element.

Torque : 5.1 ± 10% kg.m

3) CHECK VALVE REPLACEMENT

※ The control block does not need to be removed from the machine to perform this operation.

Below the distribution element in question, unscrew one of the check valves. (6 mm socket wrench).

Reassembly :

Install the check valve on the distribution element.

Torque: 4.08 ± 10% kg.m

4. REMOVAL OF A SPOOL

※ The control block does not need to be removed from the machine to perform this operation.

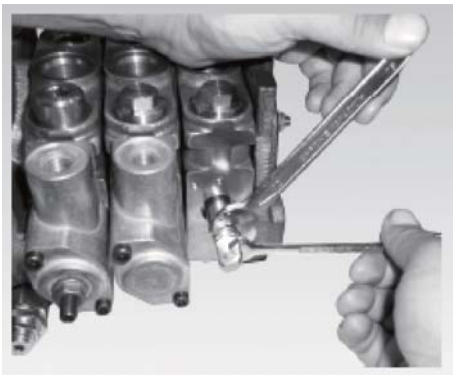
Tonguw Z1 side

On the distribution element in question, unscrew the mounting screws on the plate (4 mm socket wrench).

Remove :

- The 2 mounting screws (L = 8 mm).
- The plate.
- The wiper ring and the o-ring. (Push & Pull the spool in order to disengage rings from the body

Tongue replacement (if necessary) : hold the end of the spool with a 12 mm open end spanner and unscrew the tongue with a 6 mm open end spanner.



Reassembly:

- Change the wiper ring and the o-ring,

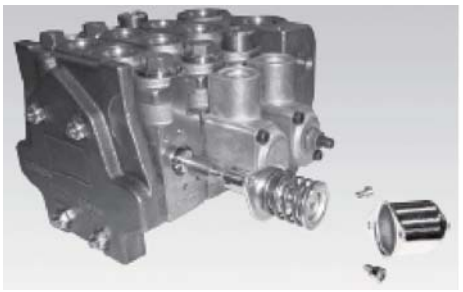
※ Position the lip part of the wiper ring on the outside. Lip must fit under the plate.

- Reassemble parts in reverse order.
- Torque for the 2 mounting screws : 0.36 ± 10% kg.m
- Torque for the tongue : 0.92 ± 10% kg.m

Cover side A2
On the distribution element in question, unscrew the 2 mounting screws (L = 8 mm) on the cover (4 mm socket wrench).

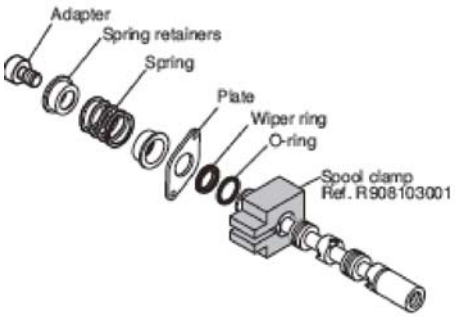
Remove the cover.

Remove the spool from the distribution element.



Use the spool clamp and a vuce to secure the spool.

※ In order to avoid damaging the spool, place it approximately 30 mm from the end of the spool (Never on center).



Remove the adapter (4mm socket wrench).

Remove
- The 2 spring retainers.
- The spring.
- The plate.
- The o-ring and the wiper ring.

Reassembly:

- Change the wiper ring and the o-ring.

※ Seals must be fitted on the end of the spool so that they are not damaged on the spool. Grooves and their tightness property does not deteriorate.

※ Position the lip part of the wiper ring on the outside. Lip must fit under the plate.

- Reassemble parts in reverse order.
- Torque for the adapter : 0.92 ± 10% kg.m
- Mount the spool inside the distribution element.
- Torque for the 2 cover screws : 0.36 ± 10% kg.m

5. REMOVAL OF A HYDRAULIC OPERATION

Removal of the hydraulic cover

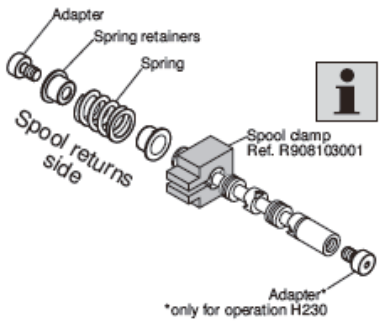
Remove the 2 mounting screws (4 mm socket wrench).

Remove
- The cover.
- The o-ring.

Reassembly:
- Replace the cover o-ring,
- Reassemble parts in reverse order,
- Torque for the 2 mounting screws :
  0.51 ± 10% kg.m

Spool return by means of spring system

※ Remove the spool from the distribution element on the spool returns side.



Use the spool clamp and a vuce to secure the spool.
In order to avoid damaging the spool.
Place it approximately 30 mm from the end of the spool (never on centre).

Unscrew the adapter (4 mm socket wrench).

※ Memorize the orientation of the spool for reassembly.

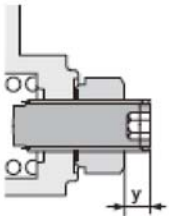
Remove:
- The 2 spring retainers.
- The spring

Reassembly:

Reassemble parts in reverse order, considering the spool orientation.
Torque for the adapter : 0.92 ± 10% kg.m

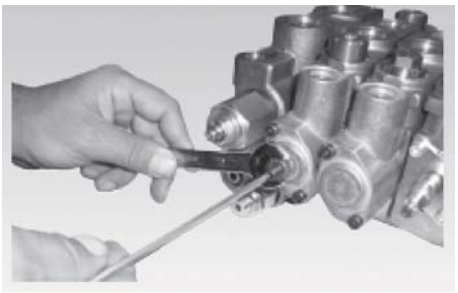
Setting of the stroke limitor

Using a vernier, measure before replacement the dimension y between the stop screw and the nut tip (see diagram below).



This value y is to be thoroughly respected when reassembling to ensure an identical flow adjustment.

Perform the adjustment on the new cover with a 13 mm open end spanner on the nut and 4 mm socket wrench on the screw.
Torque for the nut : 1.02 ± 10% kg.m



6. Complet control block disassembly / assembly

Remove the control block from the machine.
Remove the 4 nuts (13 mm ring wrench).

Remove the outlet element.
Separate the distribution elements with the seal plates from the inlet element.

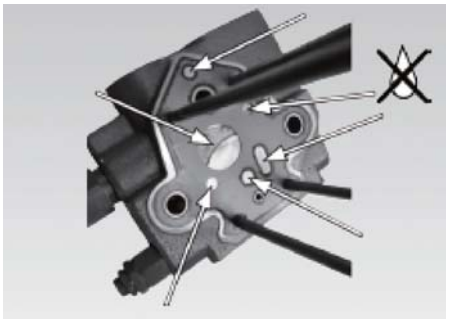
In case of inlet element replacement, remove the tie rods with a stud puller.

Reassembly:

Check the cleanliness of the element faces.
Replace the seal plates between distribution elements, the inlet element and the outlet element.

※ When reassembling, make sure the seals plates are correctly positionned so that the seals location fit with the canals.

Carefully wipe oil traces of no-opening cavities between element face and seal plate.
If the inlet element is to be replaced, torque for the 4 tie rods :
- 3.06 ± 10% kg.m



Reassemble elements in reverse order.

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 (2, 3).

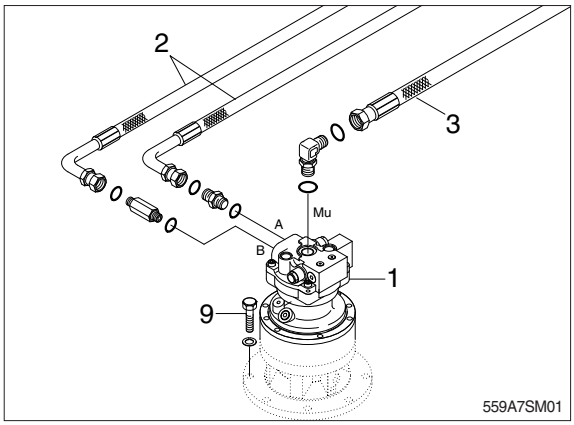
(5) Disconnect pilot line hoses (4, 5, 6, 7, 8).

(6) Sling the swing motor assembly (1) and remove the swing motor mounting bolts (9).

※ Motor device weight : 23 ㎏ (51 ㏪)

(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.

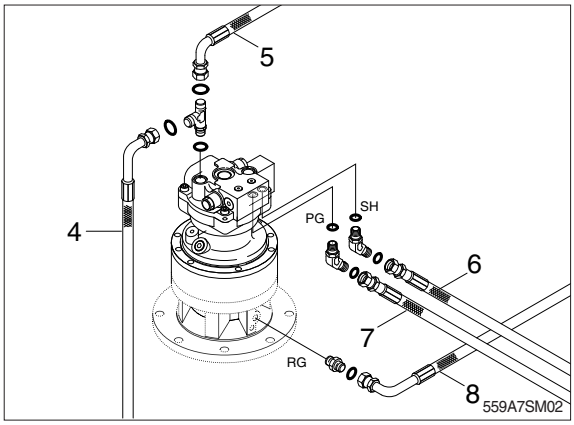
② Pour in hydraulic oil until it overflows from the port.

③ Tighten plug lightly.

④ Start the engine, run at low idling and check oil come out from plug.

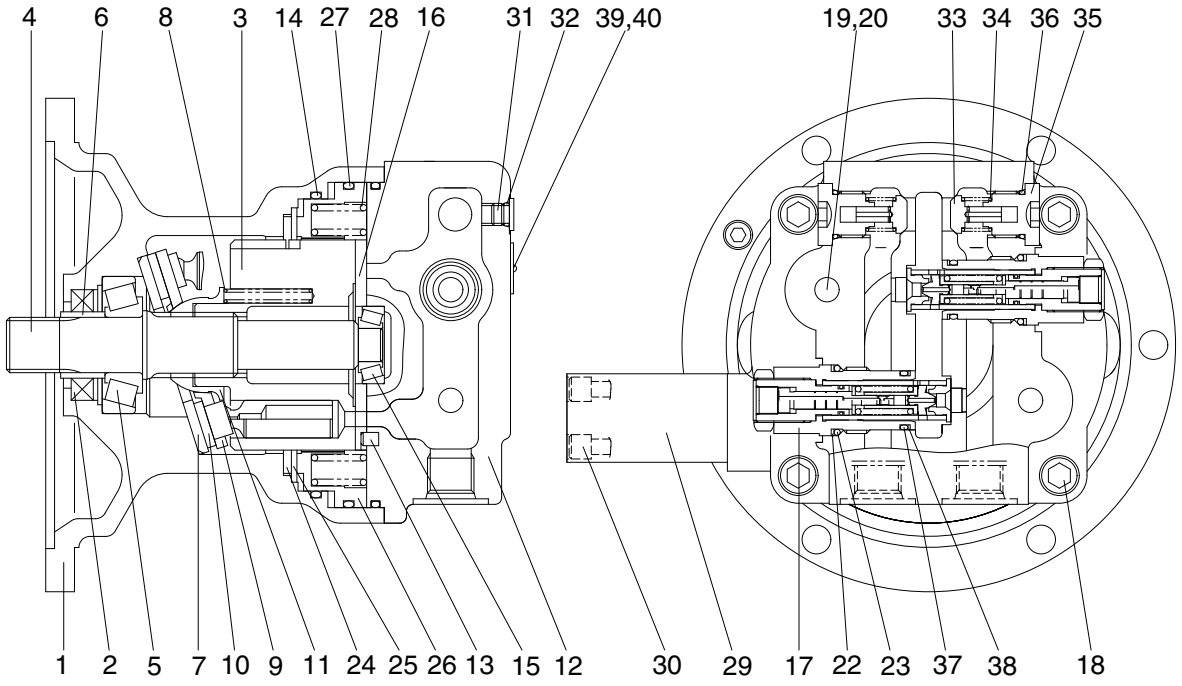
⑤ Tighten plug fully.

(3) Confirm the hydraulic oil level and check the hydraulic oil leak or not.



2. DISASSEMBLY AND ASSEMBLY OF SWING MOTOR

1) STRUCTURE



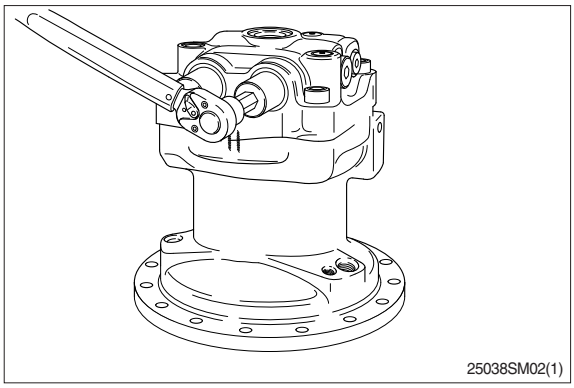
HX60A2SM03

1	Body	15	Taper bearing	30	Socket bolt
2	Oil seal	16	Valve plate	31	Plug
3	Cylinder block	17	Relief valve assy	32	O-ring
4	Shaft	18	Socket bolt	33	Valve
5	Taper bearing	19	Plug	34	Spring
6	Bushing	20	O-ring	35	Plug
7	Shoe plate	22	Back up ring	36	O-ring
8	Spring	23	O-ring	37	O-ring
9	Set plate	24	Friction plate	38	Back up ring
10	Piston shoe assy	25	Plate	39	Name plate
11	Ball guide	26	Parking piston	40	Rivet
12	Rear cover	27	O-ring		
13	Pin	28	Spring		
14	O-ring	29	Time delay valve		

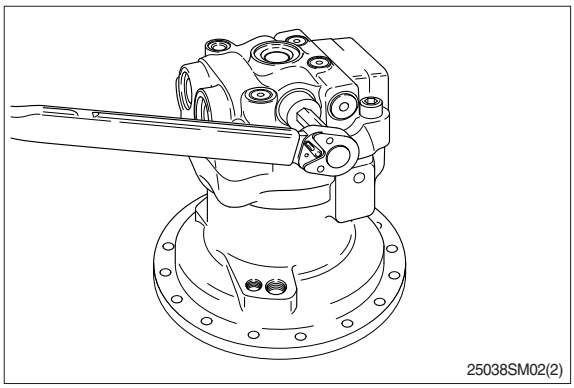
2) DISASSEMBLY

(1) Removal of relief valve assembly
Remove cap of relief valve assembly (17) with 14 ㎜ hexagonal wrench.

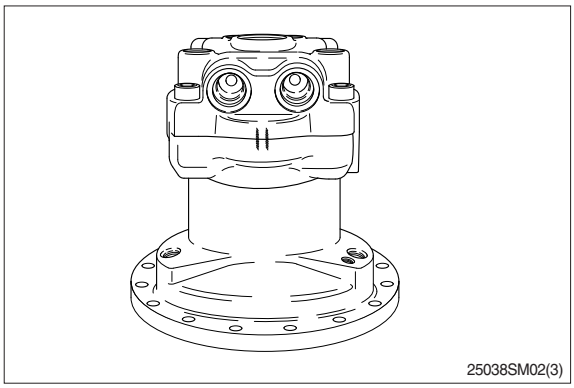
※ Assemble removed relief valve assembly (17) to original state when reassembling.


25038SM02(1)

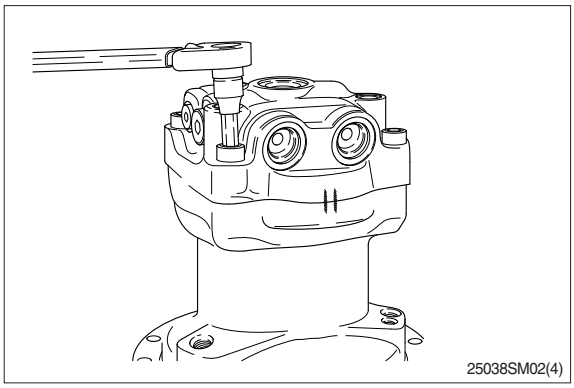
(2) Removal of make up valve and bypass valve assembly
Loosen plug (35) with 14 ㎜ hexagonal wrench, and remove check valve (33) and spring (34).


25038SM02(2)

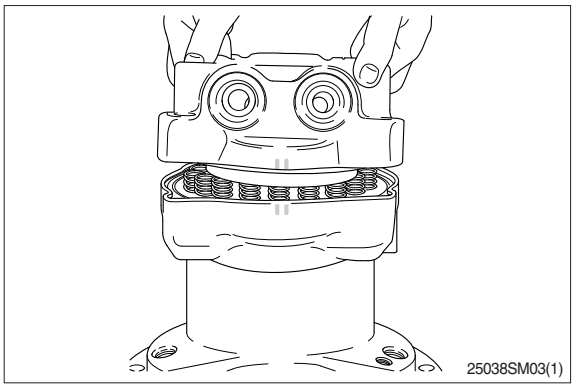
(3) Marking at swing motor
Before disassembling motor, make a matching mark between cover (12) and housing (1) for easy reassembling.


25038SM02(3)

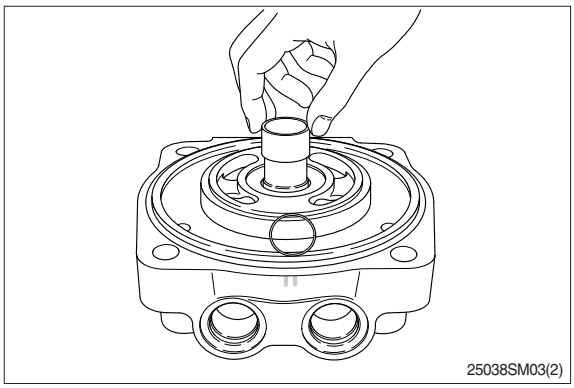
(4) Remove mounting bolts of cover
Loosen hexagon socket bolt (18) with 12 ㎜ hexagonal wrench.


25038SM02(4)

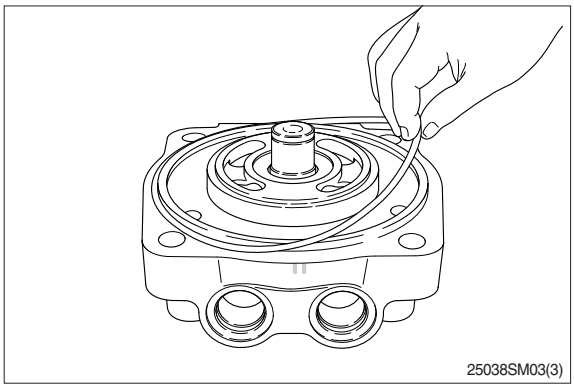
(5) Removal of cover assembly
Place shaft of motor assembly to downward and take cover (12) out.



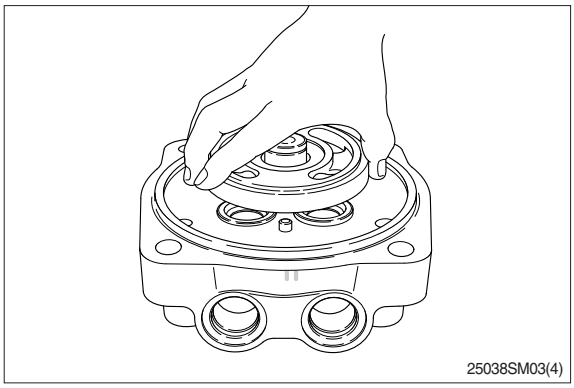
(6) Remove inner race of needle bearing (15) by bearing puller.



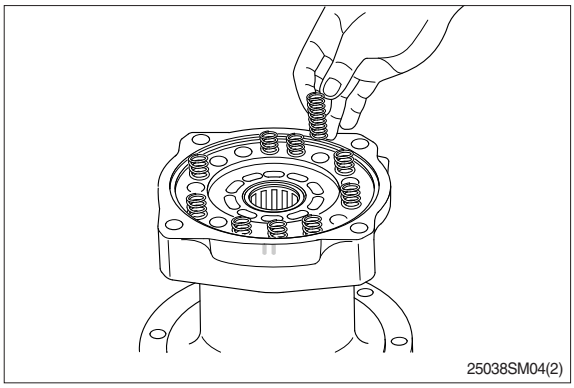
(7) Remove O-ring (27) from cover.



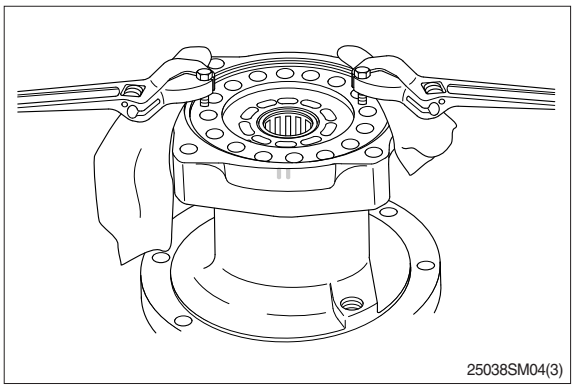
(8) Remove balance plate
Valve plate (16) is adhered on end surface of cylinder (3) by oil viscosity. Take off balance plate (16) with hands.
Assembling method of balance plate (16) depends on cover (12).
(Band groove and round groove of high · low pressure transmission area)
Before removing, check and record location of balance plate (16) to prevent misassembling.



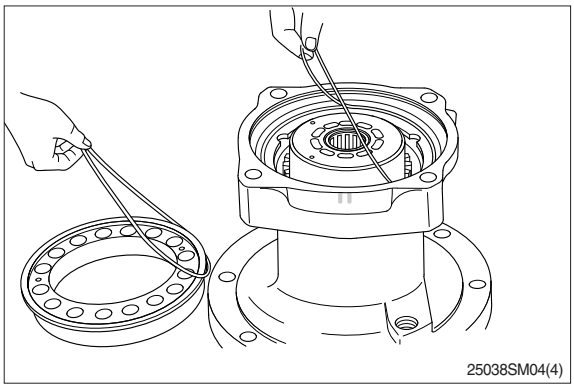
(9) Removal of spring (28, brake area)
Remove spring (28) from piston (26).
Check and record original position of each spring (28) for correct assembling.


25038SM04(2)

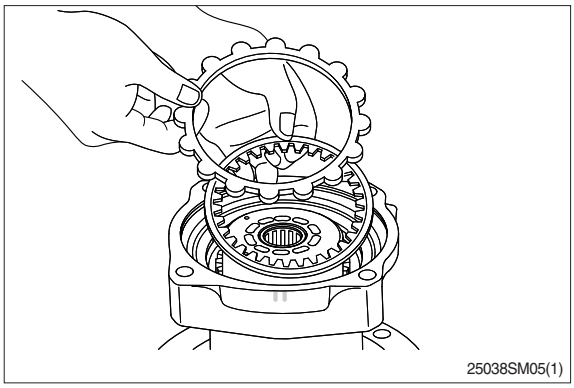
(10) Removal of brake piston
When removing piston (26) from body (1), there is a sliding resistance against tightening of O-rings (14, 27). Use tap hole on piston (26) as shown in the picture.


25038SM04(3)

(11) Remove O-rings (14, 27) from piston (26) and body (1).


25038SM04(4)

(12) Remove friction plate (24) and lining plate (25) from body (1).


25038SM05(1)

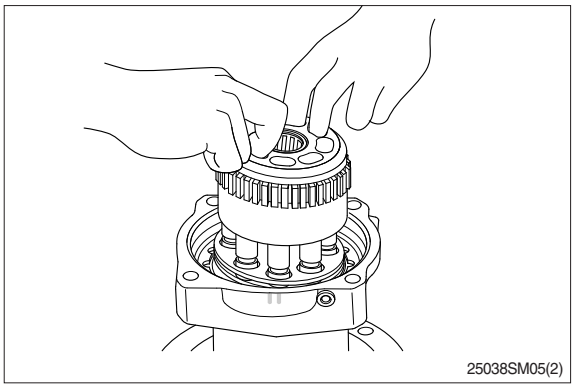
(13) Removal of cylinder assembly

Holding end of cylinder assembly (3) with hand, draw out cylinder assembly from housing.

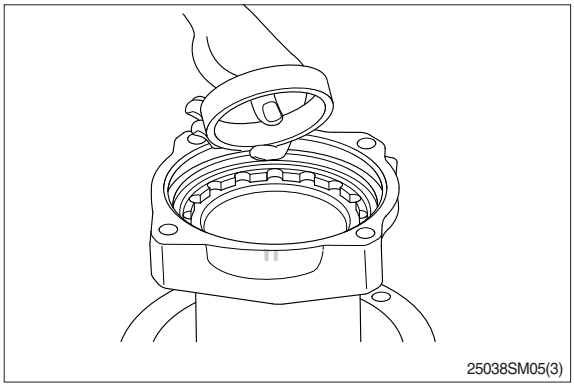
※ Oil seal (2) and outer race of taper roller bearing (15) are left inside of housing.

※ End surface of cylinder (3) is sliding face . So, protect the surface with a scrap of cloth against damage.

※ Make a matching mark on piston hole of cylinder (3) and piston assembly (10) to fit piston into the same hole when reassembling.


25038SM05(2)

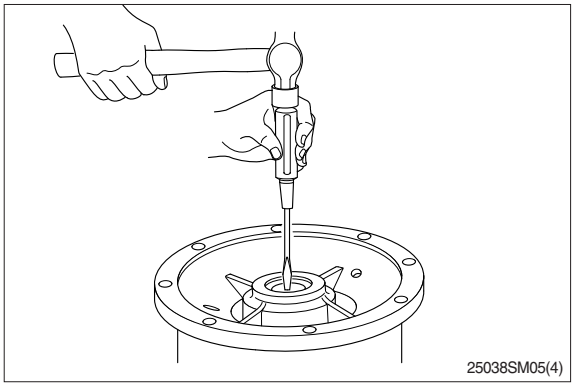
(14) Separate outer race of taper roller bearing (5) from housing.


25038SM05(3)

(15) Removal of oil seal

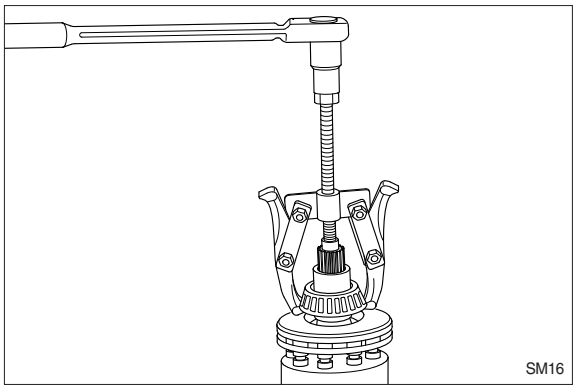
Remove oil seal (2) from body (1) with driver and hammer.

※ **Do not reuse oil seal after removal.**

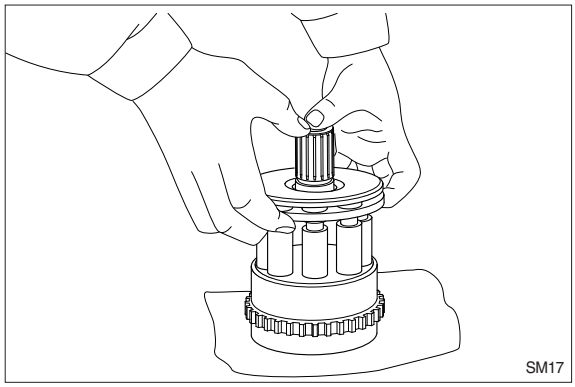

25038SM05(4)

(16) Disassembly of cylinder assembly

① Removal of inner race of taper roller bearing (5).
Lift out cylinder block (3) with 2 inner race of roller bearing (5) by applying gear puller at the end of spline in the cylinder.

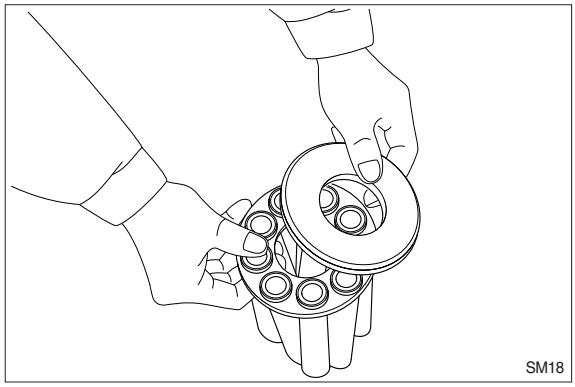

SM16

② Separate shoe plate (7), piston assembly (10), set plate (9) from cylinder block (3).

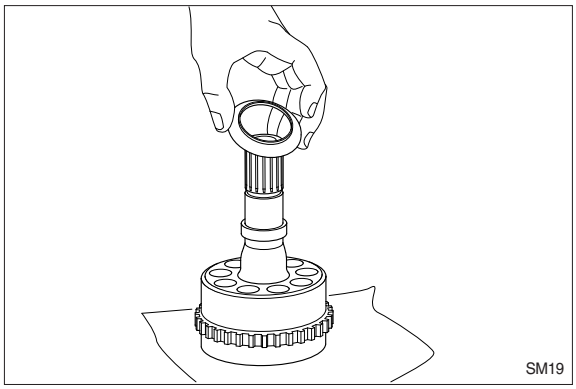

SM17

③ Get shoe plate (7) slide on sliding face of piston assembly (10) and remove it.

※ Be cautious not to damage on sliding face of cam plate.


SM18

④ Remove ball guide (11) from cylinder block (3).


SM19

This completes disassembly.

3) ASSEMBLY

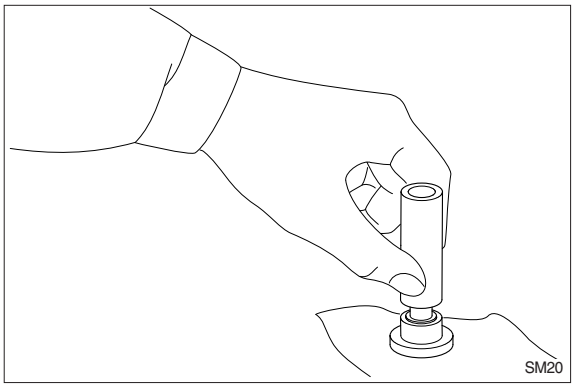
(1) Preparation

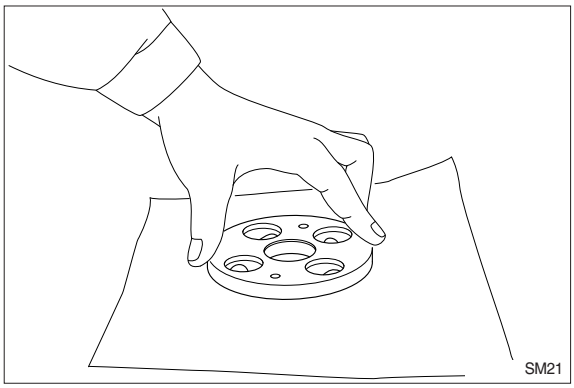
Before reassembling, perform below procedure.

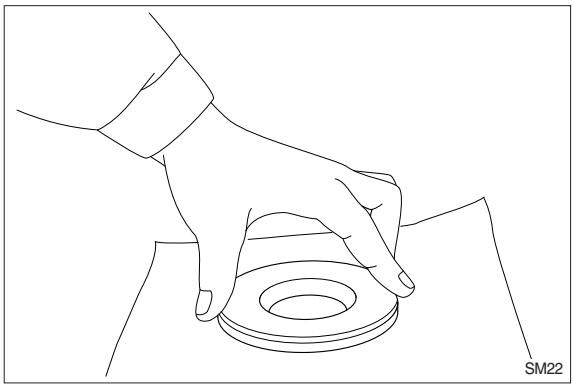
① Check each part for damage caused by using or disassembling. If damaged, eliminate damage by grinding with proper sandpaper, wash them with cleaning oil and dry with compressed air.

② Replace seal with new one.

③ Grind sliding face of piston assembly (10), valve plate (16) and shoe plate (7) with sandpaper #2000.





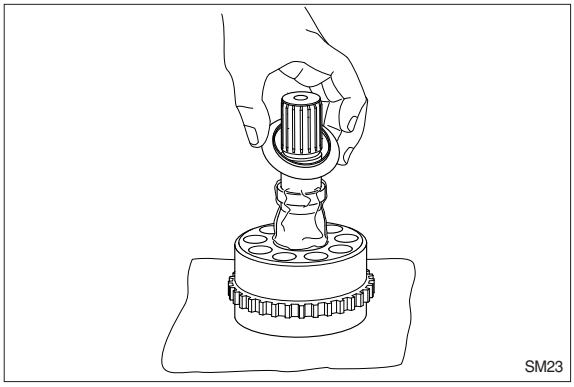


④ When assembling, lubricate with specified clean hydraulic oil.

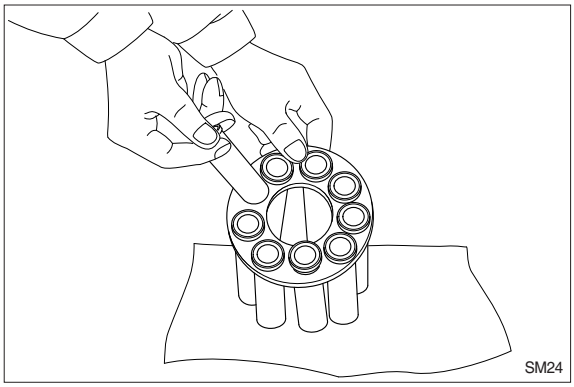
⑤ When assembling piston assembly (10) to piston hole of cylinder block (3), check matching mark between them.

(2) Cylinder assembly

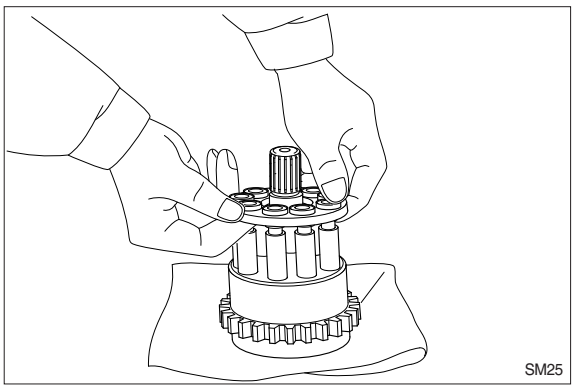
① Lubricate grease on round area (Contacting area withball guide (11)) of cylinder block (3) and assemble spring (8).



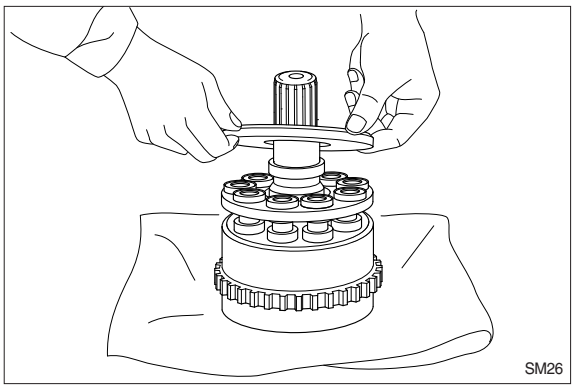
② Insert piston assembly (10) in hole of set plate (9).



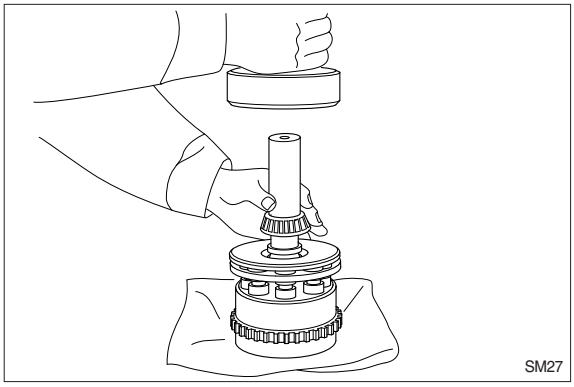
③ Assemble piston assembly (10) and set plate (9) to cylinder block (3). When assembling, check matching mark between them. Before assembling, lubricate specified hydraulic oil in piston hole of cylinder block (3).



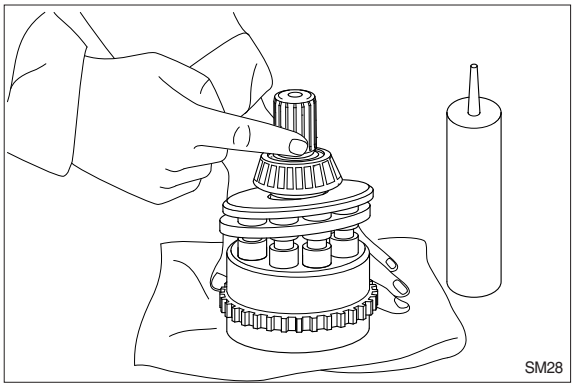
④ Lubricate specified hydraulic oil on shoe sliding face of piston assembly (10) and assemble shoe plate (7).



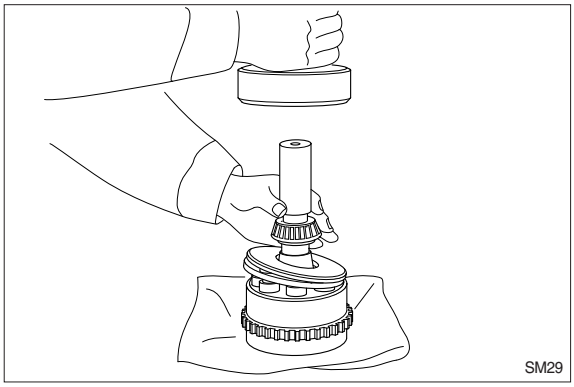
⑤ Assemble inner race of taper roller bearing (5) to cylinder block (3).



⑥ Apply loctite to bearing mounting area of inner race of cylinder block (3) lightly.



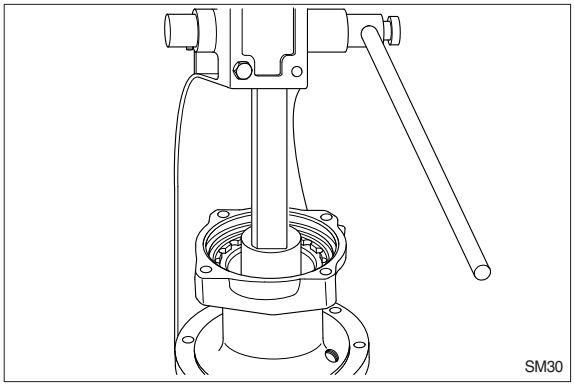
⑦ Assemble bushing (6) to cylinder block (3).



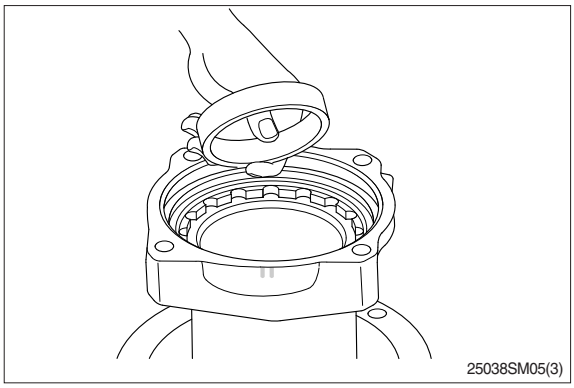
(3) Oil seal

Apply three bond of white color on outer surface of oil seal (2) and assemble and insert it.

※ Before assembling, lubricate lip of oil seal with grease.



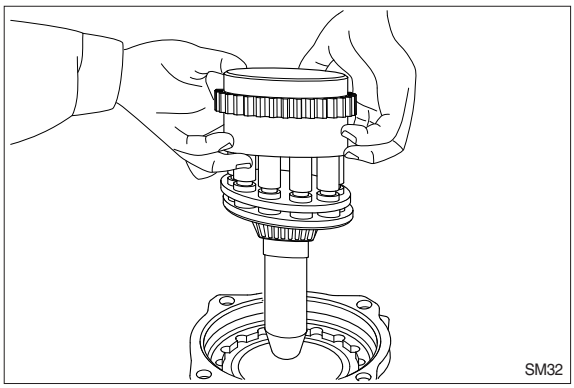
(4) Assemble outer race of taper roller bearing (5) to motor housing (1).



(5) Cylinder assembly

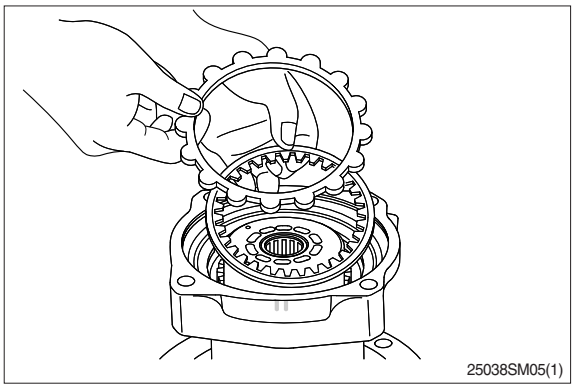
Hold end of cylinder assembly(3) with hands and assemble cylinder assembly to housing(1). Be careful to prevent damage of seal by spline of shaft.

※ When assemble cylinder assembly, spline shaft of cylinder is protruded from end of housing, therefore put pads with length 30~50㎜ under bottom of housing.



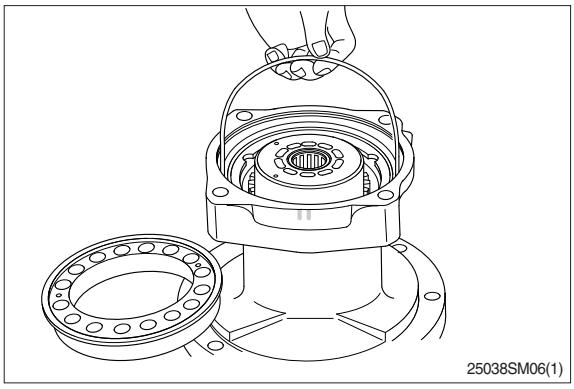
(6) Assemble friction plate (24) and lining plate (25).

※ Lubricate specified hydraulic oil on each side.



(7) Insert O-rings (14,27) into body (1) and piston (26).

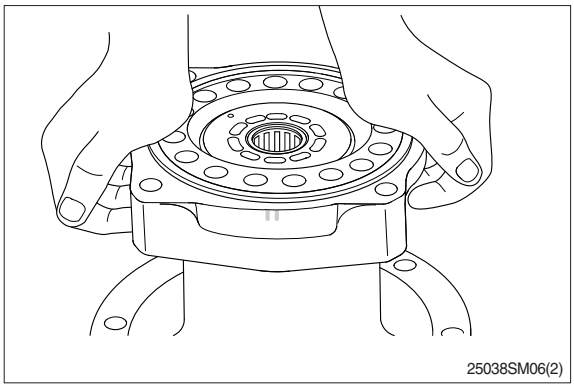
※ Lubricate O-ring with grease.



(8) Brake piston

Lubricate specified hydraulic oil on outer sliding face of piston (26) and assemble brake piston to housing (1).

※ It is too tight to assemble piston (10) because O-rings (14, 29) are fitted, therefore it is recommended to push piston (26) horizontally by hands at once.

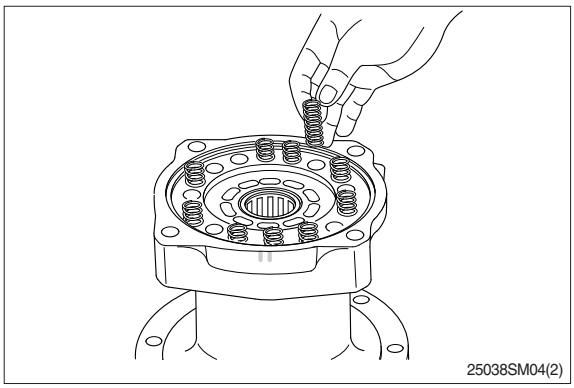


25038SM06(2)

(9) Spring (28, brake unit)

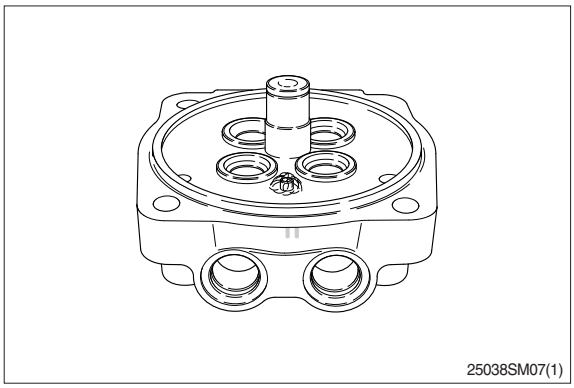
Assemble spring (28) to piston (26) of brake unit.

※ Insert spring (28) into original position.



25038SM04(2)

(10) Lubricate locating pin for antirotation of valve plate (16) of cover (12) with grease sufficiently and install locating pin to housing.

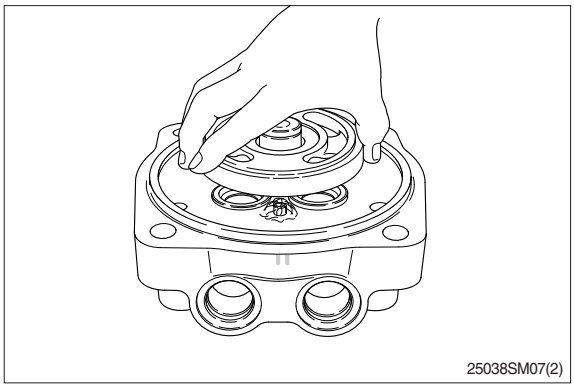


25038SM07(1)

(11) Balance plate

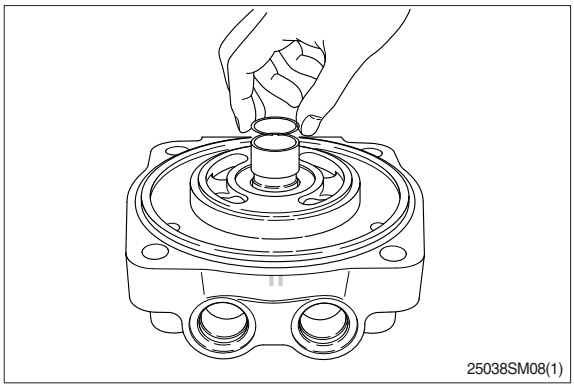
Assemble valve plate (16) to cover (12).

※ Be cautious of assembling direction.



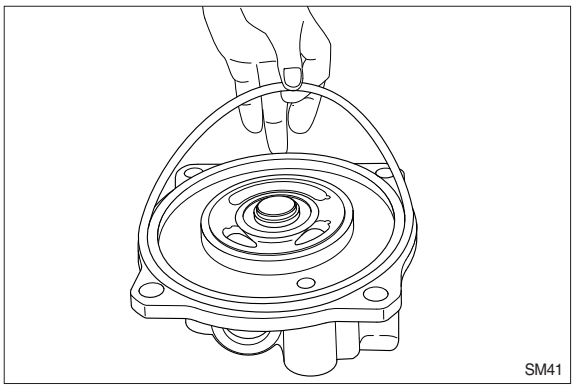
25038SM07(2)

(12) Assemble inner race of needle bearing (15) to cover (12).

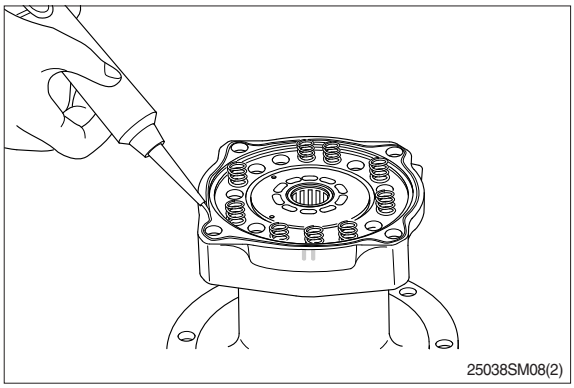


(13) Assemble O-ring (27) to cover (12).

※ Lubricate O-ring with grease.



(14) Apply three bond of white color to distinguish oil leakage from remaining oil in bolt hole of cover (12).

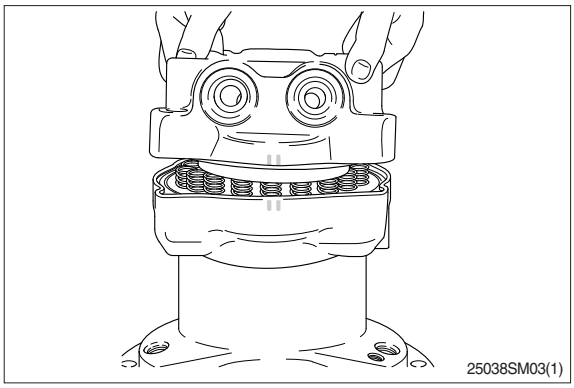


(15) Cover

Assemble cover (12) and valve plate (16) to body (1) lightly, holding them up with hands.

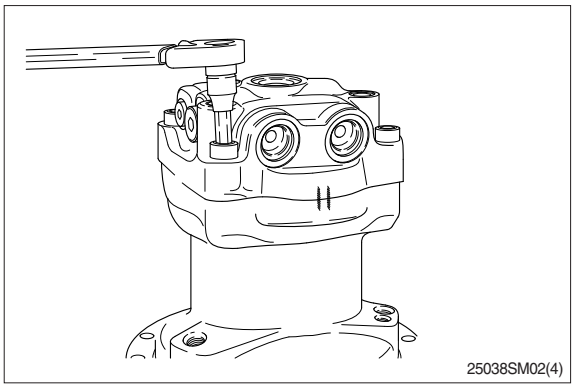
※ When assembling, be careful not to detach valve plate (16) and bushing (6) from cover (12).

※ Fit matching marks on body (1) and cover (12) made before disassembling.



(16) Tighten cover (12) and body (1) with 12 mm hexagonal socket bolt (18).

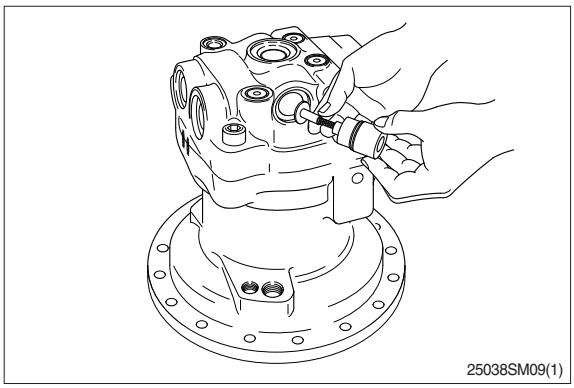
· Tightening torque : 16 kgf · m (116 lbf · ft)



(17) Make up valve

Assemble valve (33) and spring(34) to cover(12) and tighten plug (35) with 14 mm hexagonal socket bolt.

· Tightening torque : 14 kgf · m (101 lbf · ft)

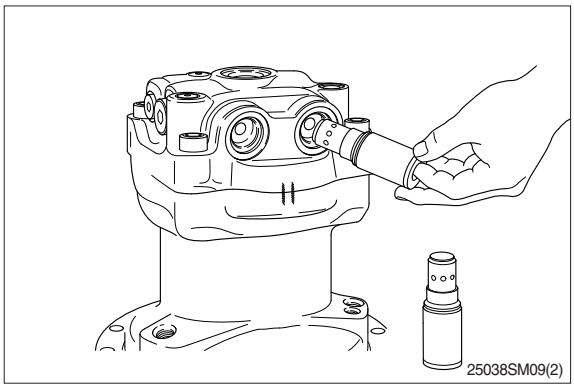


(18) Relief assembly

Assemble relief valve assembly (17) to cover (12) with 14mm hexagonal socket bolt.

· Tightening torque : 8 kgf · m (58 lbf · ft)

※ Be cautious of assembling method.



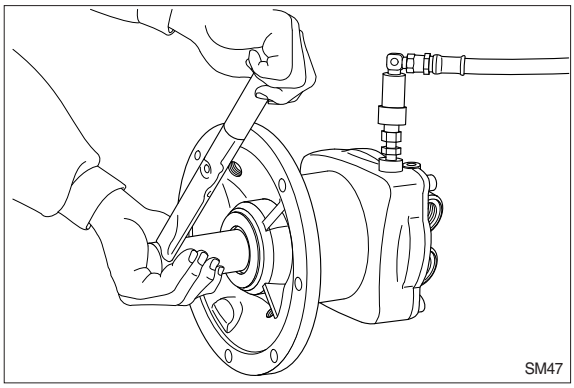
(19) Check of assembly

Load pilot pressure of 20 kgf/cm^2 to brake release port after opening inlet and outlet port.

Check if output shaft is rotated smoothly around torque of 0.5~1 kgf · m.

If not rotated, disassemble and check.

This completes assembly.



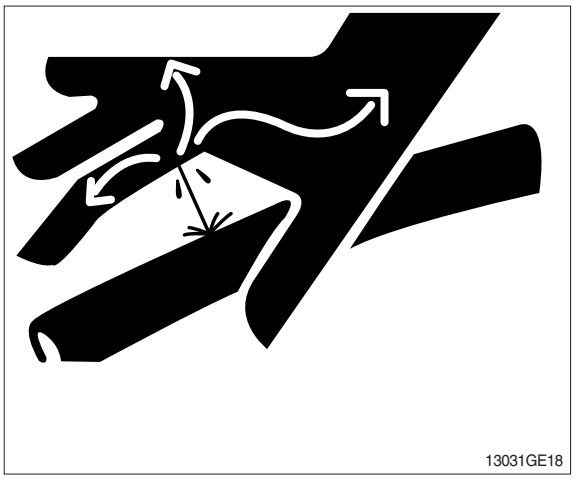
3. REMOVAL AND INSTALL OF REDUCTION GEAR

1) REMOVAL

(1) Remove the swing motor assembly.
For details, see removal of swing motor assembly.

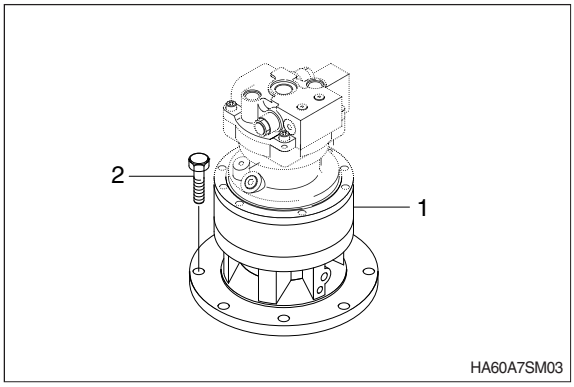
(2) Sling reduction gear assembly (1) and remove mounting bolts (2).

(3) Remove the reduction gear assembly.
· Reduction gear device weight : 45 kg (99 lb)


13031GE18

2) INSTALL

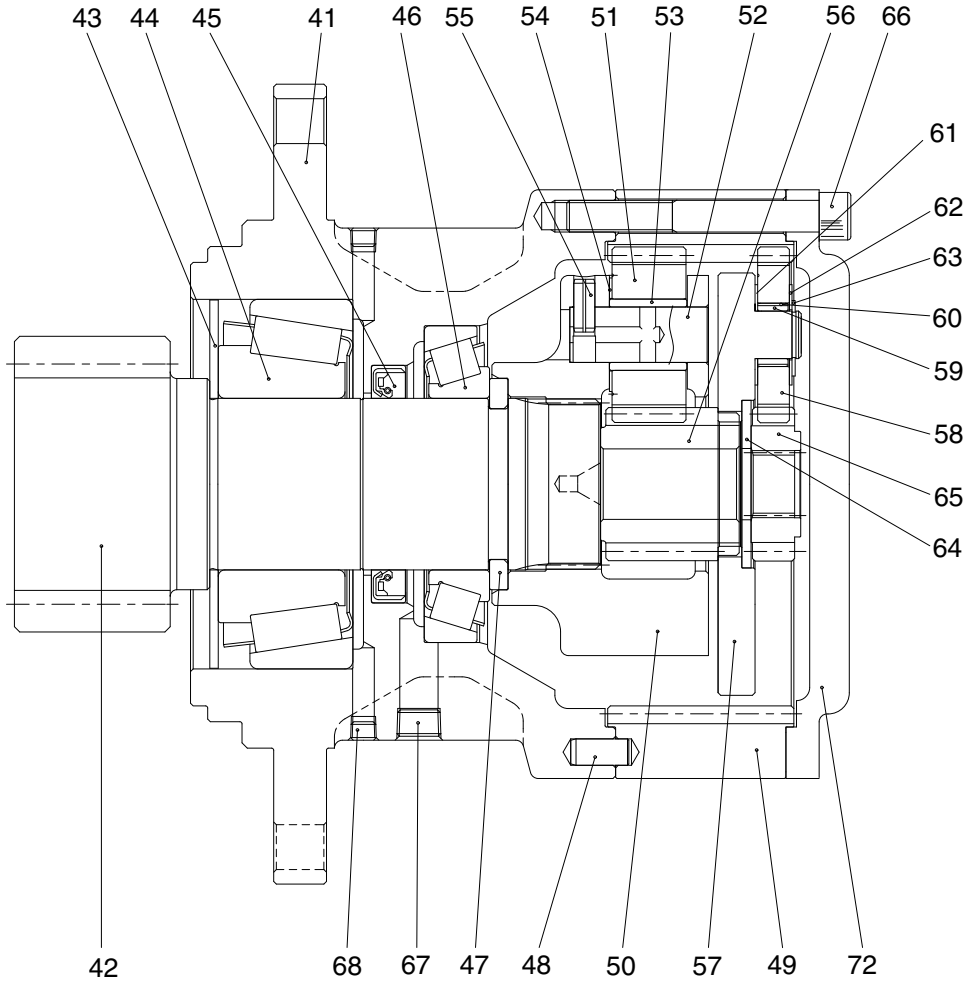
(1) Carry out installation in the reverse order to removal.
· Tightening torque :
29.7 ± 4.5 kgf · m



HA60A7SM03

4. DISASSEMBLY AND ASSEMBLY OF REDUCTION GEAR

1) STRUCTURE

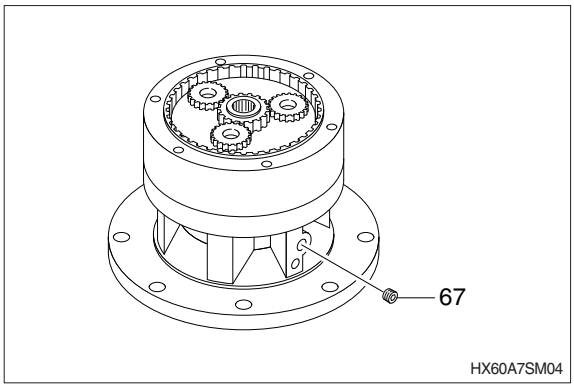


HX60A2SM02

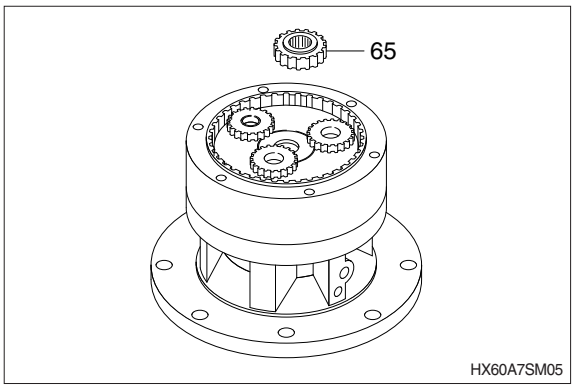
41	Case	52	Pin 2	63	Snap ring
42	Pinion gear	53	Needle roller bearing	64	Side plate
43	Bearing cover	54	Thrust washer 2	65	Sun gear 1
44	Taper roller bearing	55	Spring pin	66	Bolt
45	Oil seal	56	Sun gear 2	67	Plug
46	Taper roller bearing	57	Carrier assy 1	68	Plug
47	Lock collar	58	Planet gear 1	69	Level bar
48	Knock pin	59	Needle roller bearing	70	Level pipe
49	Ring gear	60	Collar	71	Air breather
50	Carrier assy 2	61	Thrust washer 1	72	Cover
51	Planet gear 2	62	Thrust washer 2		

2) DISASSEMBLY

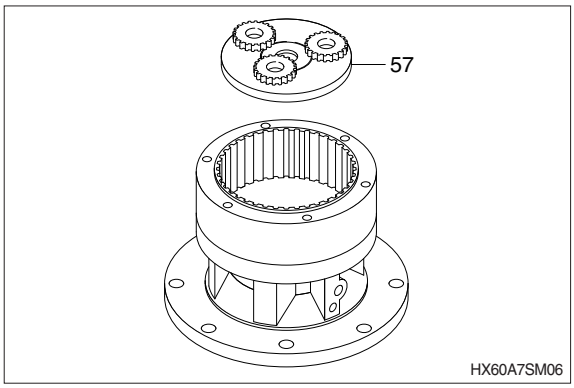
(1) Remove the plug (67) and drain out gear oil.



(2) Remove the No.1 sun gear (65).

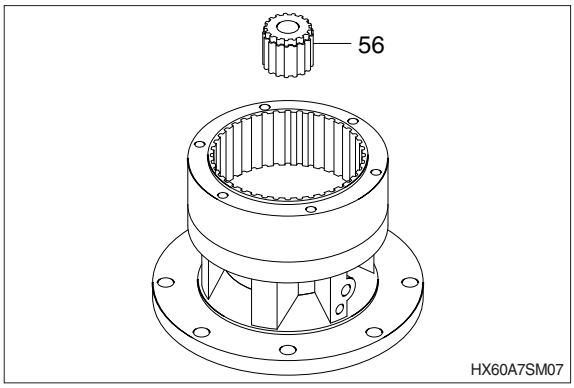


(3) Remove the No.1 carrier sub-assembly (57) using the jig.

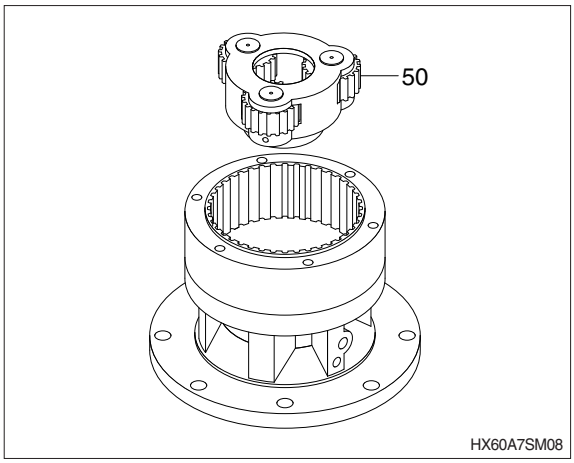


(4) Remove the No.2 sun gear (56).

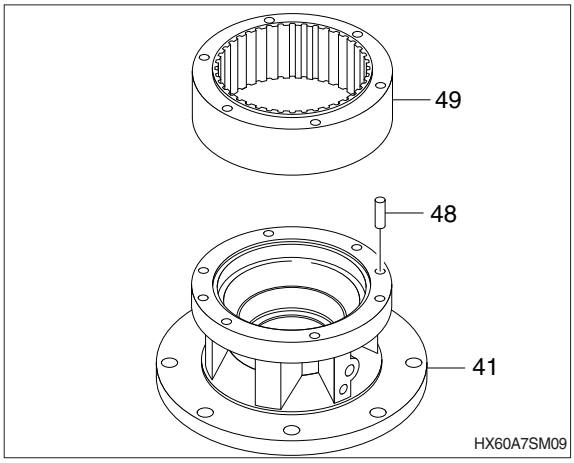
※ Pay attention to ensure the gear is not damaged during disassembling.



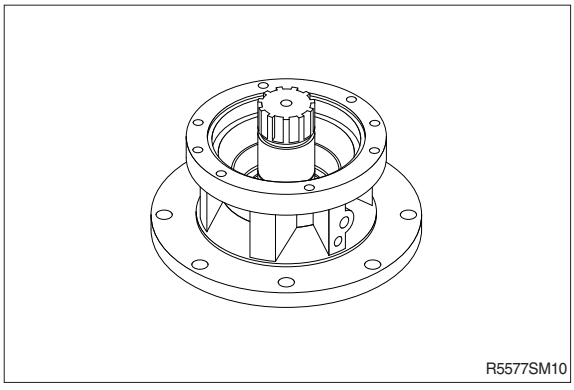
(5) Remove the No.2 carrier sub assembly (50).



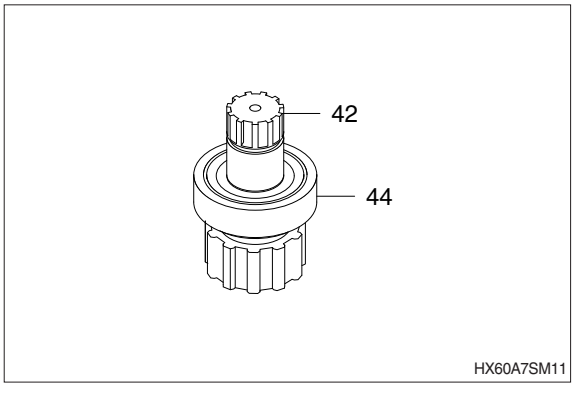
(6) Remove the ring gear by the removal groove between the ring gear (49) and casing (41) by using jig.
Full out the knock pin (48).
Do not need to remove the knock pin (48) if it is not worn or damaged.



(7) Put it on the working table with the drive shaft up.

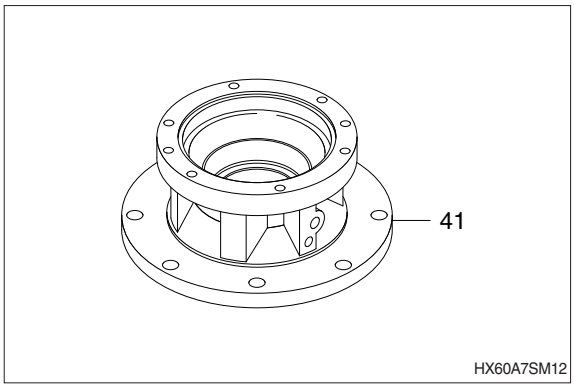


(8) Disassemble the drive shaft (42) with bearing (44) by using jig.



3) ASSEMBLING SWING REDUCTION GEAR

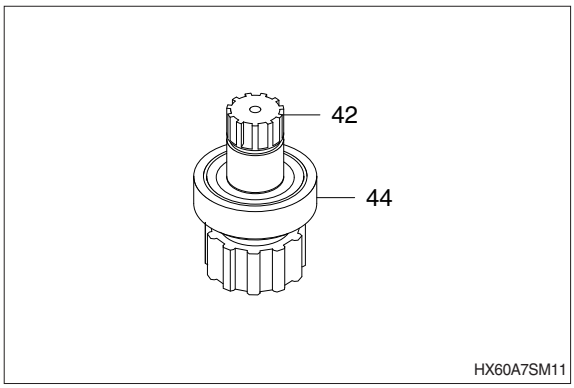
(1) Place the case (41) on the reversing machine having the flange side of the case up.



(2) Install shaft assembly (42) into case (41).

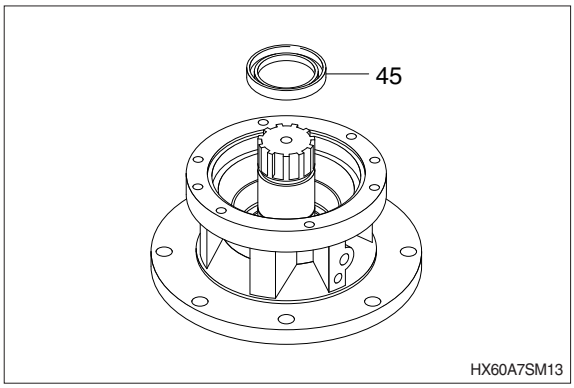
※ Be sure to clean the case before install, using washing machine with the temperature of 80°C

※ Do not install shaft assembly by force.

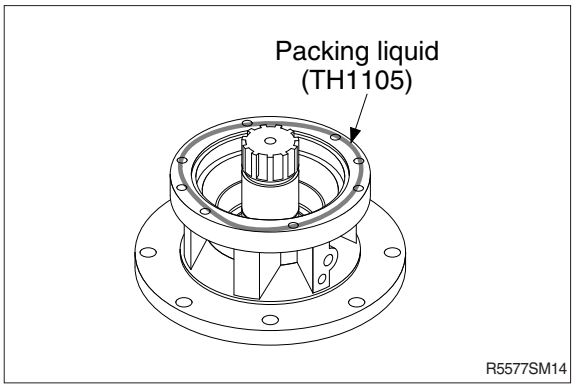


(3) Reverse case and press to insert oil seal (45) by using pressing jig after spreading grease oil around the outside ring of the seal and bearing.
Coat grease oil slightly on the lip surface to prevent any scratch when installing.

※ Be sure to check by eye that the oil seal is seated completely after being installed.



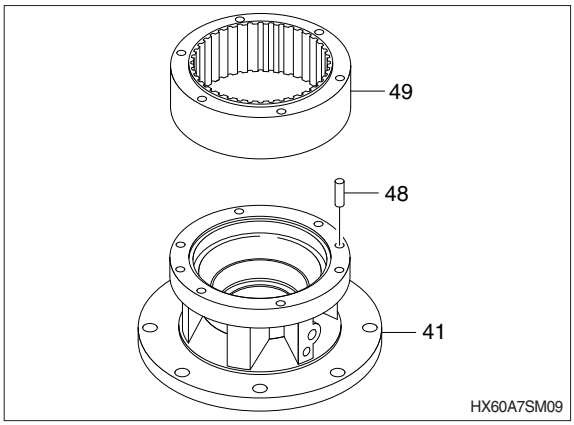
(4) Clean the assembling surface of case and spread packing liquid (TH1105) as shown in figure.



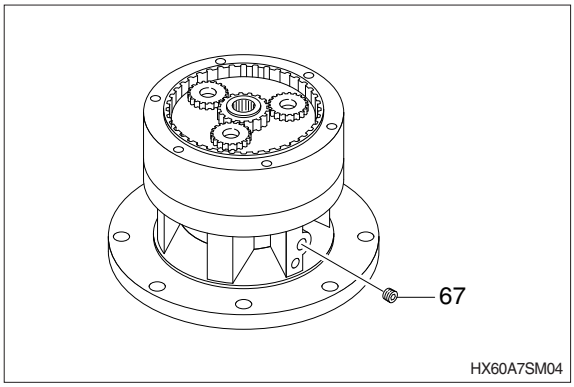
(5) Place ring gear (49) on the case by matching it with knock pin (48) hole.

(6) Insert 2 knock pins (48) by using jig.

※ Be sure to check the hole location of oil gage before inserting.

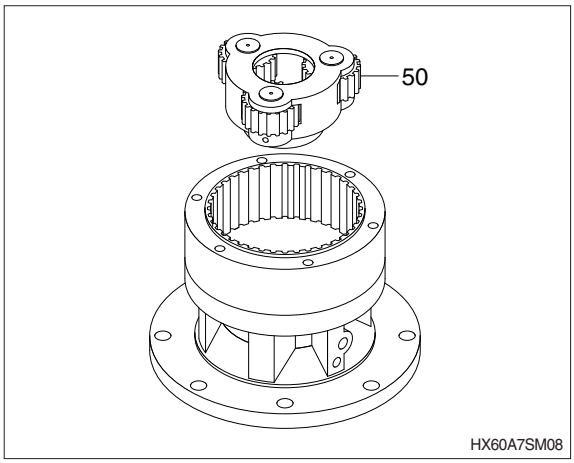


(7) Screw drain plug into drain plug (67) after winding sealing tape.



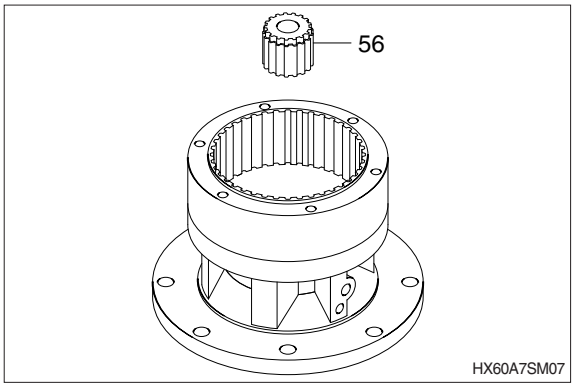
(8) Mount No.2 carrier assembly (50) in the case sub assembly and install bolts into 2 TAP holes (M6) as shown in figure.

※ Turn the carrier slowly by hand to adjust the matching holes when assembling.



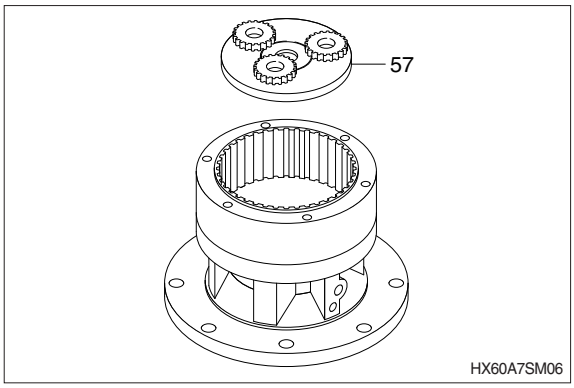
(9) Install No.2 sun gear (56).

※ Be sure to check the direction of sun gear (56) when assembling.

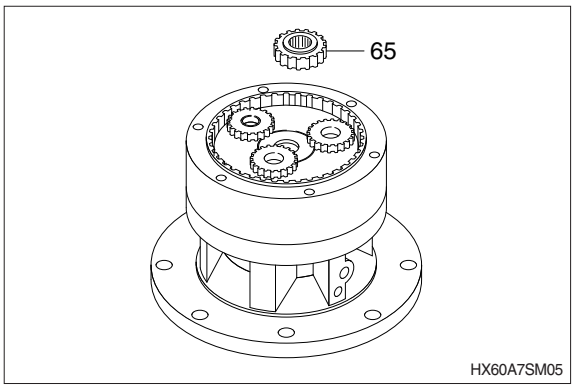


(10) Mount No.1 carrier assembly (57) in the case sub assembly and install bolts into 2 TAP holes (M6) as shown in figure.

※ Turn the carrier slowly by hand to adjust the matching holes when assembling.



(11) Assemble No.1 sun gear (65).



GROUP 5 TRAVEL DEVICE

1. GENERAL ATTENTION AT ASSEMBLING AND DISASSEMBLING

1) Pay attention to the followings at assembling and disassembling.

(1) Work at the clean area, and pay attention to clean each part from rubbish, peace of paint and water. Prepare the clean case for disassembled parts.

(2) Remove the rubbish from the outside of the wheel motor before disassembling, and remove the peace of paint by wiring brush.

(3) Put a mark on each part before disassembling for keeping the correct position at assembling of them.

(4) Handle disassembled parts with special care.

(5) Clean each part with cleaning solvents.

(6) Check disassembled parts with no damage, and removes any burrs.

(7) Use the new seal parts and snap rings.

(8) The press-fitting parts (for example, bearing and pin) can not be disassembled.

2. ASSEMBLING AND DISASSEMBLING PROCEDURE

(1) Please refer to the cross-sectional drawing and the parts list.

NECESSARY TOOL TO ASSEMBLE

No.	Necessary tool	
1	Torque wrenches	45N (J I S B4650)
2		90N (J I S B4650)
3		280N (J I S B4650)
4	Hexagon socket	Hexagon size 5 mm
5		Hexagon size 8 mm
6	Socket wrenches	Hexagon size 36 mm
7	Hexagon socket wrenches	Hexagon size 5 mm
8		Hexagon size 8 mm
9	Screwdrivers	Width 6~10 mm
10	Snap ring pliers	35 mm for hole
11		22 mm for shaft
12		35 mm for shaft
13		140 mm for shaft
14	Plastic hammer	
15	Other	Grease
16		Oil
17		Sand paper
18		C-cramps

1. REDUCTION GEAR SECTION (DISASSEMBLING)

1) Remove the plug (G1/8).

※ Hexagon size: 5mm

7078TM03

2) Remove the 2 plugs (G3/8).

※ Hexagon size : 8 mm

7078TM04/04A

3) Remove the O-snap ring.

※ Put the screwdriver into the notch of the body. And then pull the O-ring.

7078TM05/05A

4) Remove the cover.

7078TM06

5) Remove the slide ring from the cover.

7078TM03

6) Remove the O-ring from the body.

7078TM04/04A

7) Remove the carrier~ 2 kit, s2 gear and the s1 gear from the body.

7078TM05/05A

7078TM06

8) Remove the 3 snap rings, 1 thrust plate 2, 3 b2 gears, 69 needles, 3 rings and 3 thrust washers.

※ Pay attention not to lose the each part.

7078TM03

7078TM04/04A

7078TM05/05A

9) Remove the 4 snap rings and the thrust plate 1.

7078TM03

10) Remove the 4 thrust washers.

7078TM04/04A

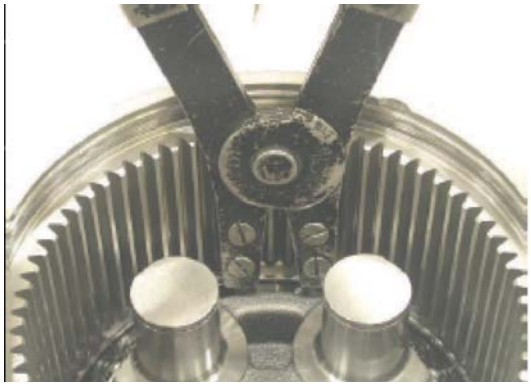
11) Remove the 4 b1 gears, 136 needles, 4 rings, 4 thrust washers.

7078TM05/05A

12) Remove the 1 thrust washer.

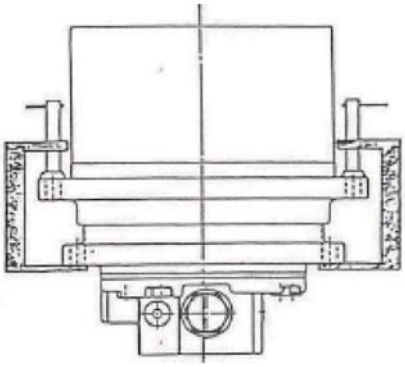
7078TM06

13) Remove the snap ring.
Tighten the speed reducer flange and the motor flange with C-cramps or a hydraulic press to make it easy (See the illustration).



7078TM03

14) Remove the Body with bearings and floating seatfrom the Hydraulic motor.



7078TM04/04A

15) Remove the floating seat with O-ring from the body.

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

7078TM05/05A

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

7078TM06

2. HYDRAULIC MOTOR SECTION (DISASSEMBLING)

1) Remove the seven hexagon socket head cap bolts.

※ Hexagon sixe: 8mm

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

7078TM03

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

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

7078TM04/04A

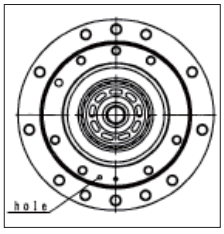
3) Remove the valve plate, spring-B and retainer.

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

7078TM05/05A

4) Remove the brake piston assembly from the body-2.

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



7078TM06

5) Remove the 3 Steal plates and 2 Disc plates from the body-2.

7078TM03

7078TM04/04A

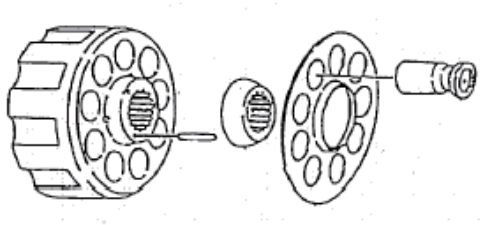
7078TM05/05A

16) Remove the cylinder barrel assembly from the body-2.

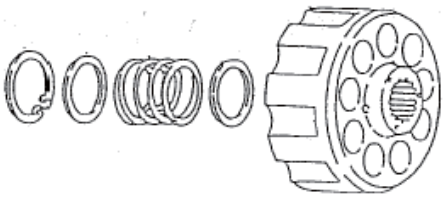
※ Pay attention not to lose the each part.

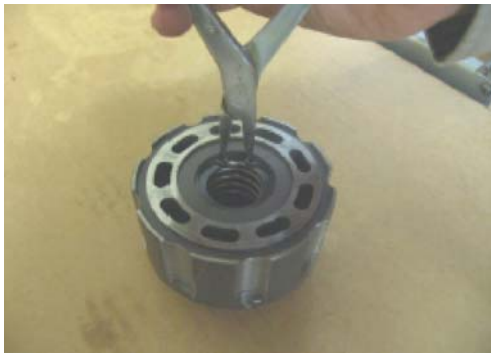
7078TM06

7) Remove the 9 piston-shoe assemblies, shoe holder, barrelholder and 3 pins.



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





7078TM04/04A

9) Remove the swash plate and 2 balls from the body-2.

7078TM05/05A

10) Remove the shaft from the body-2.

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

7078TM06

11) Remove the control piston from the body-2.

12) Remove the oil seal from the body-2.

7078TM04/04A

13) Remove the O-ring from the body-2.

7078TM05/05A

14) Remove the pin from the body-2.

7078TM06

15) Remove the 2 plugs with O-ring from the body-1.

※ Hexagon size : 36 mm

16) Remove the 2 spring-V2, 2 rings and spool assembly.

※ The spool assembly is not able to disassemble.

7078TM04/04A

7078TM05/05A

7078TM06

17) Remove the 2 plugs with O-ring from the body-1.

※ Hexagon size : 8 mm

18) Remove the two-speed spool, spool-B, spool-C andspring-V3.

※ Pay attention not to lose the each part.

7078TM04/04A

19) Remove the 2 plugs with O-ring from the body-1.

※ Hexagon size : 5 mm

7078TM05/05A

20) Remove the shuttle spool.

7078TM06

3. Hydraulic motor section (assembling)

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

7078TM03

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

※ The spool assembly is not able to disassemble.
※ Plugs tightening torque: 20.0 to 24.9 kg.m (Both sides)
※ Hexagon size : 36 mm

3) Insert the spring-V3, spool-B, spool-C intothe two-speed spool.
Insert its assembly into the body-1, and screwthe 2 plugs (1pc/side) with O-ring (1pc/side).

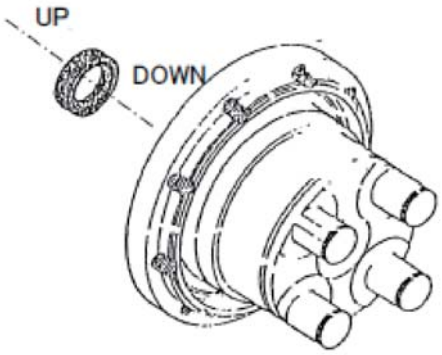
※ Plugs tightening torque : 4.7 to 5.2 kg.m (Both sides).
※ Hexagon size : 8 mm.
※ Pay attention to the direction of the spool. (See cross sectional drawing for the direction).
※ Pay attention not to lose the each part.

4) Insert the shuttle spool into the body-1, and then screwthe 2 plugs (1pc/side), with O-ring (1pc/side).

※ Plugs tightening torque: 1.22~1.84 kg.m
※ (Both sides)
Hexagon size : 5 mm.

5) Press-fit the oil seal into the body-2.

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



6) Place the pin into the Body-2.

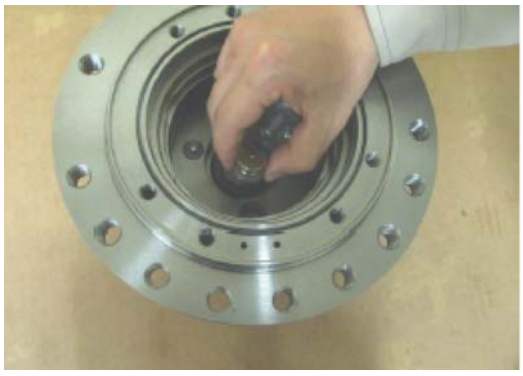
7078TM04/04A

7) Press-fit the bearing into the shaft.

7078TM05/05A

8) Insert the control piston into the body 2.

※ Pay attention to the direction of the control piston.(See cross sectional drawing for the direction).



7078TM06

9) Place the shaft with bearing into the body-2.

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

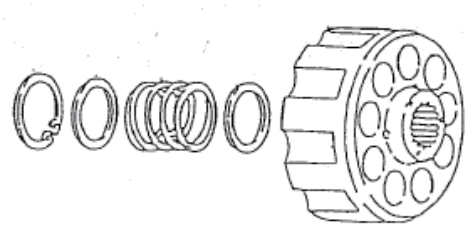
10) Place the 2 balls and the swash plate onto the body-2.

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

7078TM04/04A

7078TM05/05A

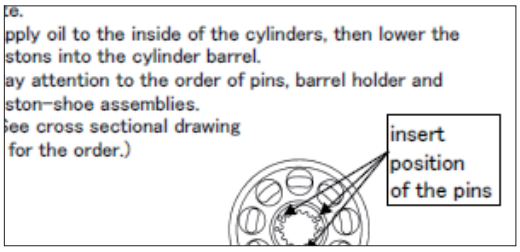
11) Place the retainer,spring and retainer in that order into thecylinder barrel, and then secure them with the snap ring.

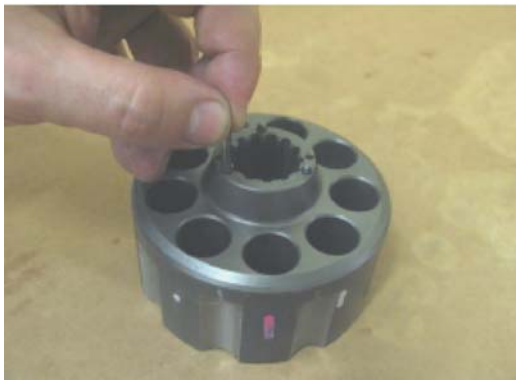


7078TM06

12) Place the piston-shoe assemblies into the shoe holder.

13) Place 3 pins,barrel holder and 9 piston-shoe assembliesin that order into the cylinder barrel.





7078TM04/04A

※ Apply oil to the inside of the cylinders, then lower the pistons into the cylinder barrel.

※ Pay attention to the order of pins, barrel holder and piston-shoe assemblies. (See cross sectional drawing for the order.)

7078TM05/05A

14) Inset the cylinder barrel assembly into the body 2 so that the shoes contact the swash plate.

※ Pay attention not to lose the each part.

7078TM06

15) Place the steel plate, disk plate, steel plate, disk plate, steelplate in that order into the body-2 along the groove.

16) Place the 2 O-rings and 2 back-up rings onto the brake piston.

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

7078TM04/04A

17) Inset the brake piston assembly into the body-2.

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

7078TM05/05A

18) Fill the body-2 with hydraulic oil for lubrication.

19) Place O-ring onto the body-2.

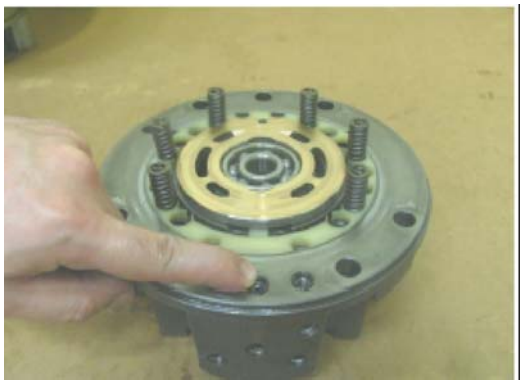
20) Place the 2 O-rings, retainer, valve plate and spring-Bonto the body-1.

※ The copper face of the valve plate should be uppermost.

※ Apply oil to the copper face of the valve plate.

※ In case the valve plate drops out, apply grease to the steel face of it.

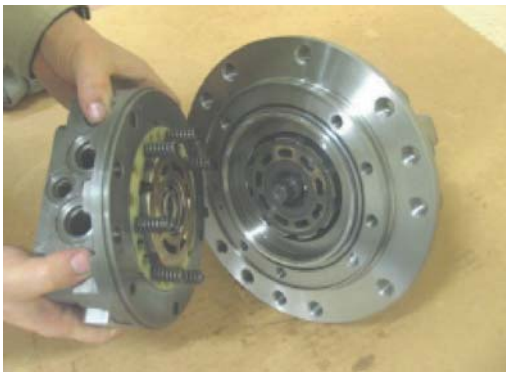
※ Please refer to the parts list for the number and the position with the spring-B.



7078TM04/04A

21) Join the body-1 to the body-2.

※ Pay attention not to lose the each part.



7078TM05/05A

22) Bolt them with seven hexagon sockets head cap bolts.

※ Bolt tightening torque : 5.2 to 6.6 kg.m

※ Hexagon size : 8 mm.

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

7078TM06

4. REDUCTION GEAR SECTION (ASSEMBLING)

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

7078TM03

2) Place the 2 bearings and snap ring into the body.

※ Pay attention to the direction of the 2 bearings.
(See cross sectional drawing for the direction.)

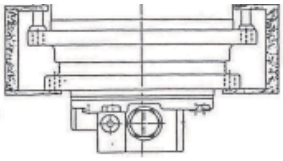
3) Put the floating seal with O-ring onto the body.

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

※ Degrease the surface of floating seal.

※ Hit around the body by the resinous hammer equally to make it easy.

※ Tighten the speed reducer flange and the motor flange with C-cramps or a hydraulic press when the snap ring is fastened.



5) Place the thrust washer onto the body-2.

6) Place the 4 thrust washers (1pc/1pin), 4 rings (1pc/1pin),4 b1 gears (1pc/1pin), 136 needles (34pcs/1pin).

※ Pay attention to the direction of the thrust washers.
(See cross sectional drawing for the direction.)

7078TM04/04A

7) Place the 4 thrust washers (1pc/1pin) and thrust plate 1 inthatorder onto the body-2, and secure it with 4 snap rings.

7078TM05/05A

8) Place the thrust plate 1 in thatorder onto the body-2, and secure it with 4 snap rings.

※ Pay attention to the direction of the snap rings and thrust plate 1. The edge side should be uppermost.

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

7078TM06

9) Place the 3 rings(1pc/1pin), 3 thrust washers (1pc/1pin), 3 b2gears (1pc/1pin),69 needles (23pcs/1pin) and thrust plate,andsecure it with 3 snap rings.

※ Pay attention to the direction of the b2 gears.(See cross sectional drawing for the direction.)
※ Pay attention to the direction of the snap ring.The edge side should be uppermost.
※ Pay attention not to open the snap ring too much. A snap ring which loses tension should be replaced.

10) Place the S2 gear and S1 gear into the carrier-2 assembly.

11) Place the thrust washer onto the body-2.

※ Pay attention not to become scattering the carrier-2 assembly, S1 gear and S2.

※ When not assembled, please change and assemble the position of the gear.

12) Place the O-ring to the body.

※ Apply grease to the O-ring.

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

7078TM04/04A

13) Insert the slide ring in the cover.

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

7078TM05/05A

14) Fill 800cm3 gear oil in the body, then insert cover in thebody.

7078TM06

15) Place the thrust washer onto the body-2.

※ Pay attention not to become scattering the carrier-2 assembly, S1 gear and S2.

※ When not assembled, please change and assemble the position of the gear.

16) Put the O-snap ring into the groove of t

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

17) Screw the 2 plugs (size: G3/8) with Plug.

※ Tightening torque: 4.76 to 5.2 kg.m

※ Hexagon size : 8 mm

18) Screw the plug (size : G1/8) with O-ring (1pc/plug)to the cover.

※ Plug tightening torque: 1.22 to 1.84 kg.m

※ Hexagon size : 5 mm.

GROUP 6 RCV LEVER

1. REMOVAL AND INSTALL

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.**

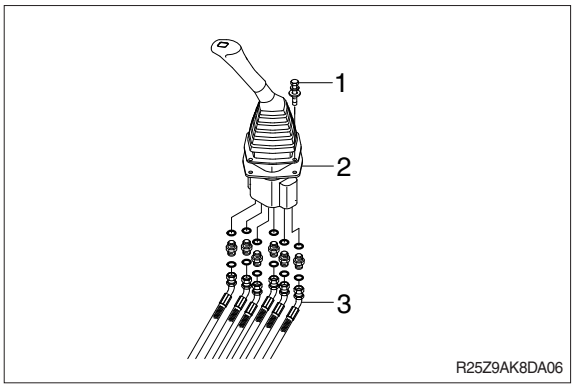
(4) Loosen the socket bolt(1).

(5) Remove the cover of the console box.

(6) Disconnect pilot line hoses(3).

(7) Remove the pilot valve assembly(2).

※ When removing the pilot valve assembly, check that all the hoses have been disconnected.



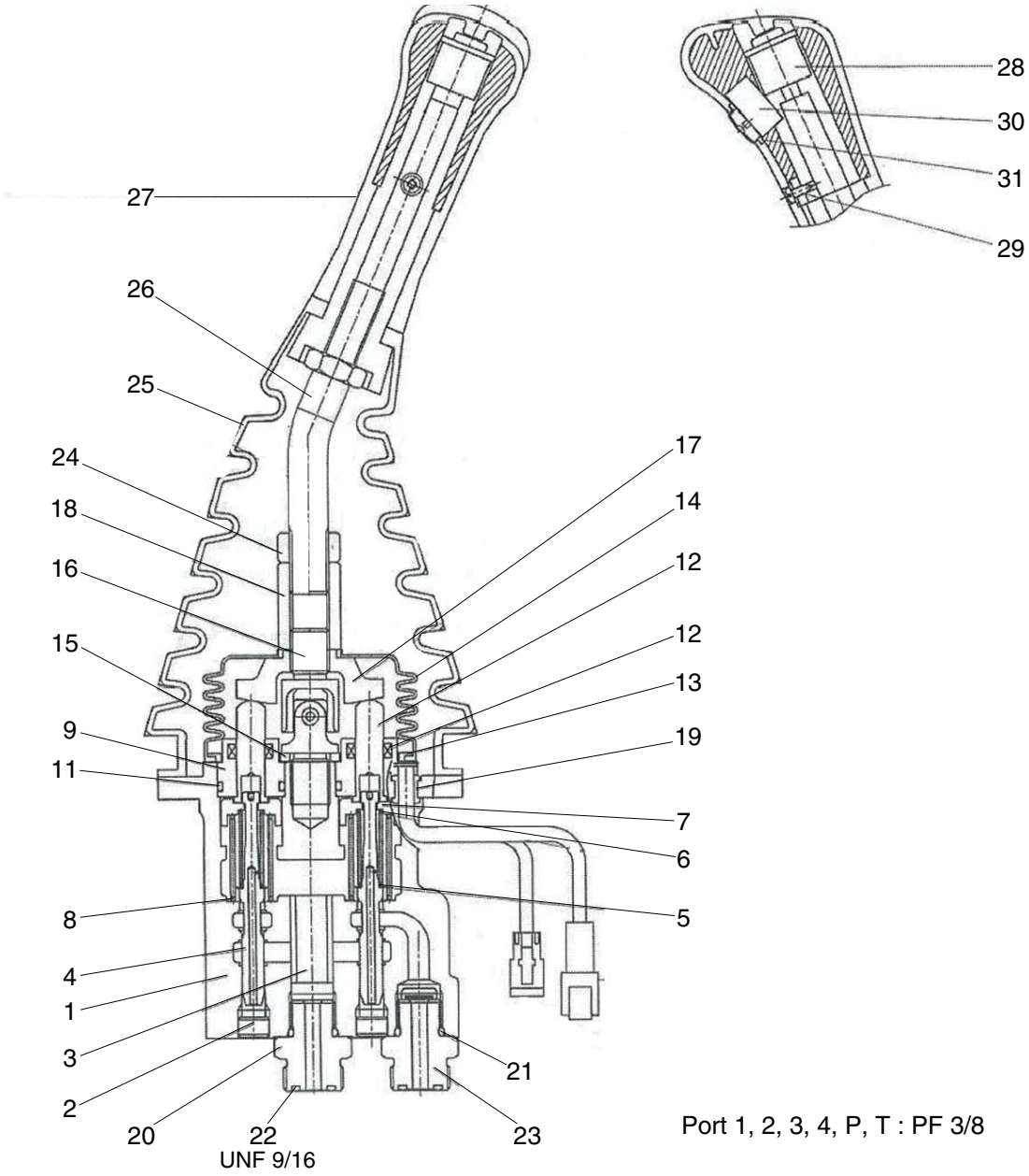
2) INSTALL

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

(2) Confirm the hydraulic oil level and check the hydraulic oil leak or not.

2. DISASSEMBLY AND ASSEMBLY

1) STRUCTURE



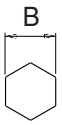
Port 1, 2, 3, 4, P, T : PF 3/8

60S7RC02

1	Case	12	Rod seal	23	Last guard filter
2	Plug	13	Plate	24	Nut
3	Bushing	14	Inner boots	25	Boots
4	Spool	15	Spacer	26	Handle bar
5	Shim	16	Joint assembly	27	Handle assembly
6	Spring	17	Swash plate	28	Switch assembly
7	Spring seat	18	Nut	29	Screw
8	Spring	19	Bushing	30	Switch
9	Plug	20	Connector	31	Switch cover
10	Push rod	21	O-ring		
11	O-ring	22	O-ring		

2) TOOLS AND TIGHTENING TORQUE

(1) Tools

Tool name	Remark	
(L) Hexagonal wrench	10	
Spanner	22	
	27	
(+) Driver	Length 150	
(-) Driver	Width 4~5	
Torque wrench	Capable of tightening with the specified torques	

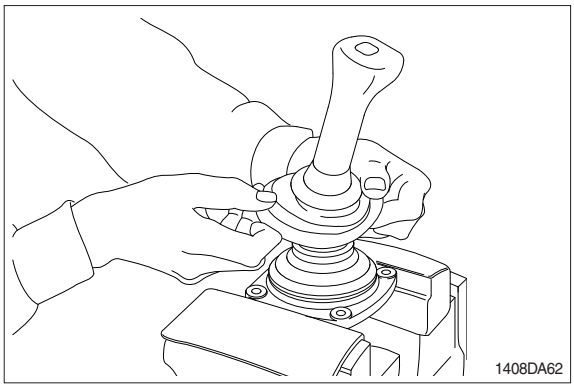
3) DISASSEMBLY

(1) Clean pilot valve with kerosene.

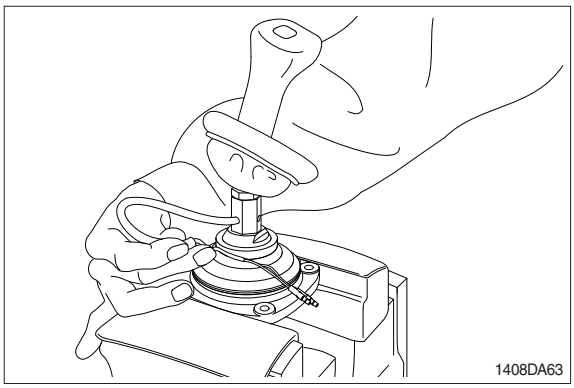
※ Put blind plugs into all ports.

(2) Fix pilot valve in a vise with copper (or lead) sheets.

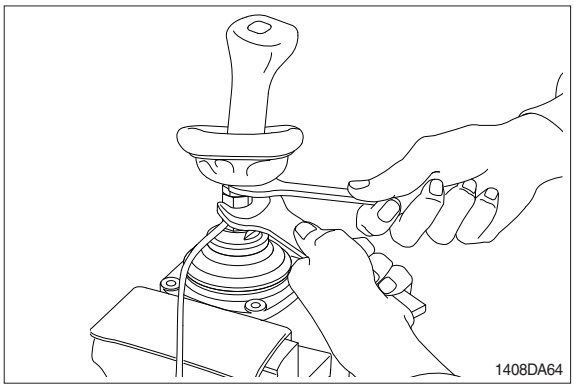
(3) Remove end of boots (25) from case (1) and take it out upwards.



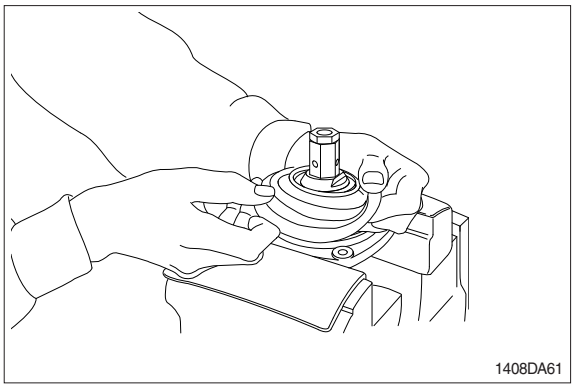
※ For valve with switch, remove cord also through hole of casing.



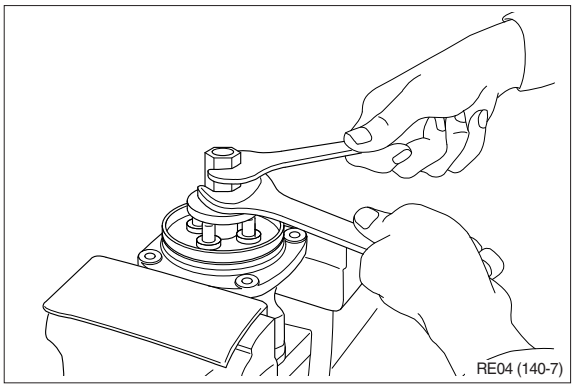
(4) Loosen lock nut (24) and adjusting nut (18) with spanners on them respectively, and take out handle section as one body.

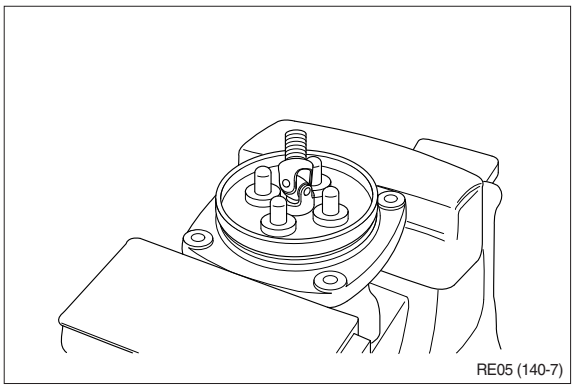


(5) Remove the boots (14).



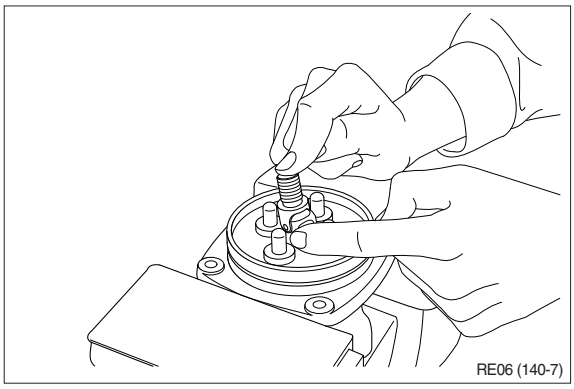
(6) Loosen adjusting nut (18) and plate (13) with spanners on them respectively, and remove them.

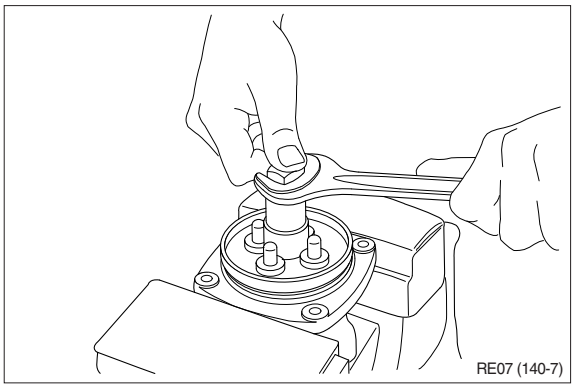

RE04 (140-7)


RE05 (140-7)

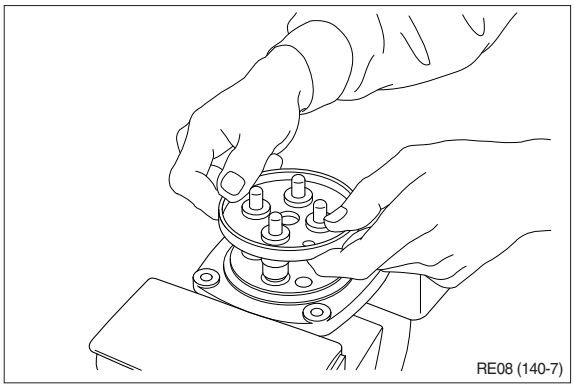
(7) Turn joint anticlockwise to loosen it, utilizing jig (special tool).

※ When return spring (6,8) is strong in force, plate (13), plug (9) and push rod (10) will come up on loosening joint. Pay attention to this.


RE06 (140-7)


RE07 (140-7)

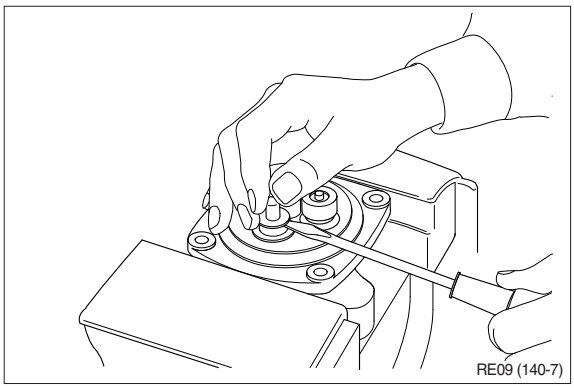
(8) Remove plate (13).


RE08 (140-7)

(9) When return spring (6, 8) is weak in force, plug (9) stays in casing because of sliding resistance of O-ring.

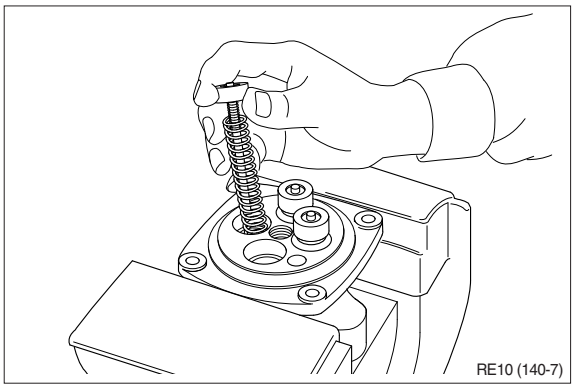
※ Take it out with minus screwdriver.
Take it out, utilizing external periphery groove of plug and paying attention not to damage it by partial loading.

※ During taking out, plug may jump up due to return spring (6, 8) force.
Pay attention to this.

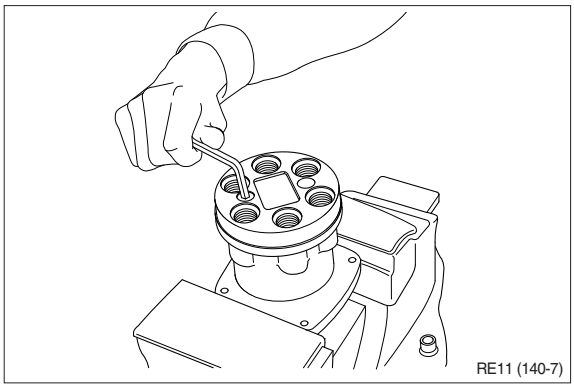

RE09 (140-7)

(10) Remove reducing valve subassembly and return spring (6, 8) out of casing.

※ Record relative position of reducing valve subassembly and return springs.


RE10 (140-7)

(11) Loosen hexagon socket head plug (2) with hexagon socket screw key.

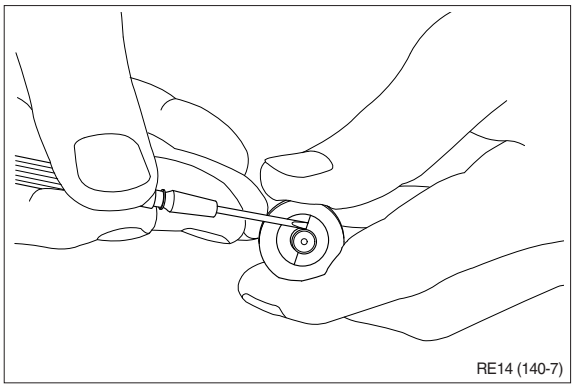

RE11 (140-7)

(12) For disassembling reducing valve section, stand it vertically with spool (4) bottom placed on flat workbench. Push down spring seat (7) and remove two pieces of semicircular stopper with tip of small minus screwdriver.

※ Pay attention not to damage spool surface.

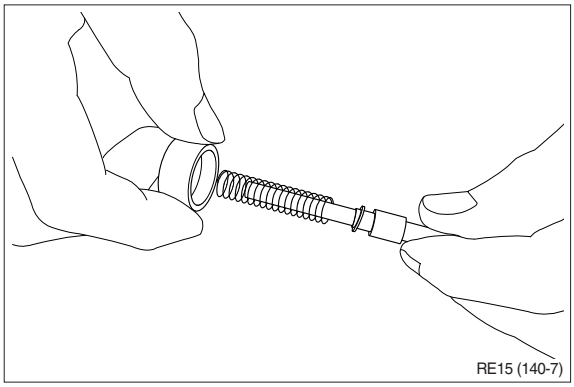
※ Record original position of spring seat (7).

※ Do not push down spring seat more than 6 mm.



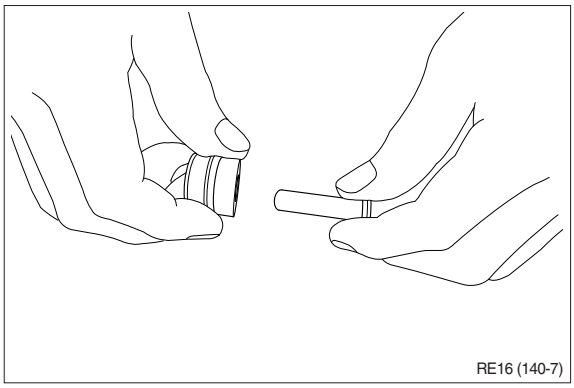
RE14 (140-7)

(13) Separate spool (4), spring seat (7), spring (6, 8) and shim (5) individually.
Until being assembled, they should be handled as one subassembly group. ※



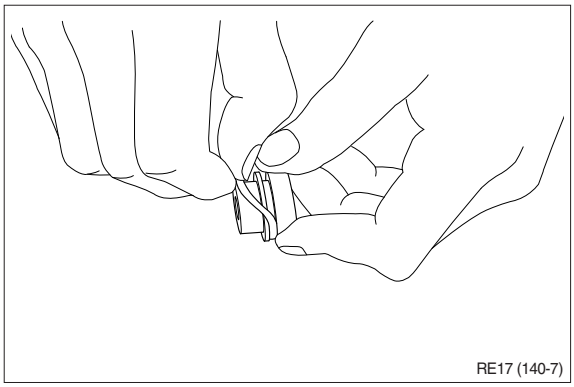
RE15 (140-7)

(14) Take push rod (10) out of plug (9).

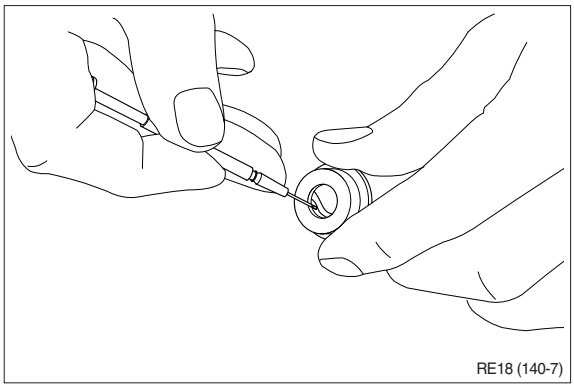


RE16 (140-7)

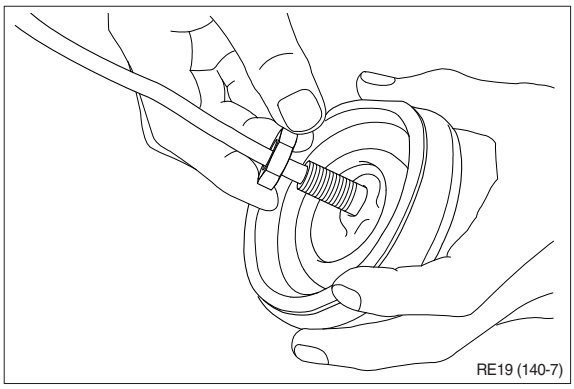
(15) Remove O-ring (11) and seal (12) from plug (9).
Use small minus screwdriver or so on to remove this seal.

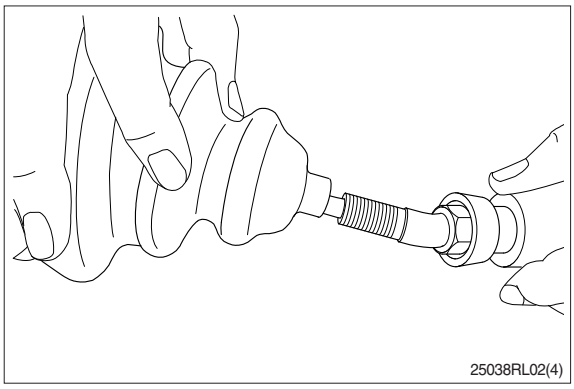


RE17 (140-7)


RE18 (140-7)

(16) Remove lock nut (24) and then boots (25).


RE19 (140-7)


25038RL02(4)

(17) Cleaning of parts

① Put all parts in rough cleaning vessel filled with kerosene and clean them (rough cleaning).

※ If dirty part is cleaned with kerosene just after putting it in vessel, it may be damaged. Leave it in kerosene for a while to loosen dust and dirty oil.

※ If this kerosene is polluted, parts will be damaged and functions of reassembled valve will be degraded.
Therefore, control cleanliness of kerosene fully.

② Put parts in final cleaning vessel filled with kerosene, turning it slowly to clean them even to their insides (finish cleaning).

※ Do not dry parts with compressed air, since they will be damaged and/or rusted by dust and moisture in air.

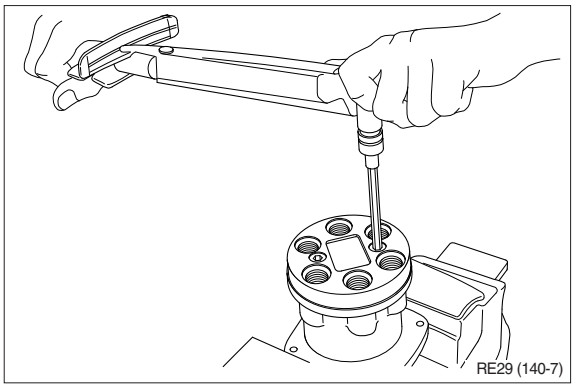
(18) Rust prevention of parts.
Apply rust-preventives to all parts.

※ If left as they after being cleaned, they will be rusted and will not display their functions fully after being reassembled.

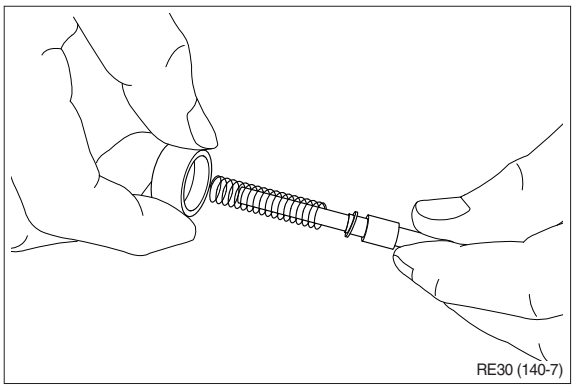
4) ASSEMBLY

(1) Tighten hexagon socket head plug (2) to the specified torque.

※ Tighten two bolts alternately and slowly.

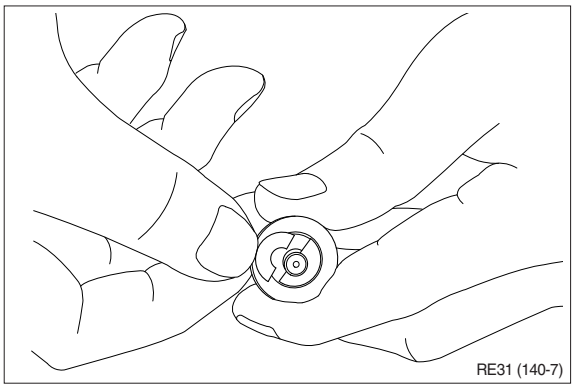

RE29 (140-7)

(2) Put spring shim (5), springs (6, 8) and spring seat (7) onto spool (4) in this order.


RE30 (140-7)

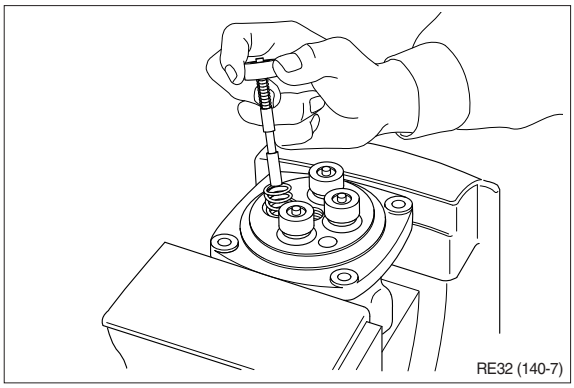
(3) Stand spool vertically with its bottom placed on flat workbench, and with spring seat pushed down, put two pieces of semicircular stopper on spring seat without piling them on.

※ Assemble stopper so that its sharp edge side will be caught by head of spool.
Do not push down spring seat more than 6 mm.

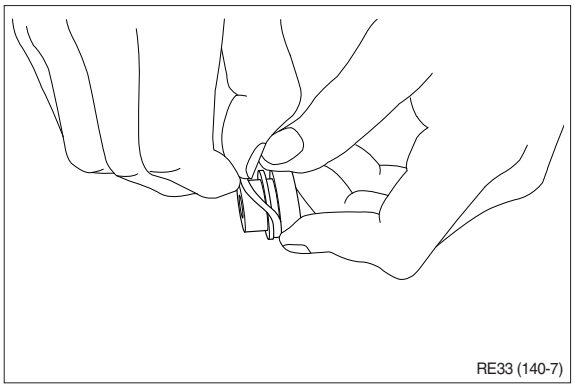

RE31 (140-7)

(4) Assemble spring (6, 8) into casing (1). Assemble reducing valve subassembly into casing.

※ Assemble them to their original positions.

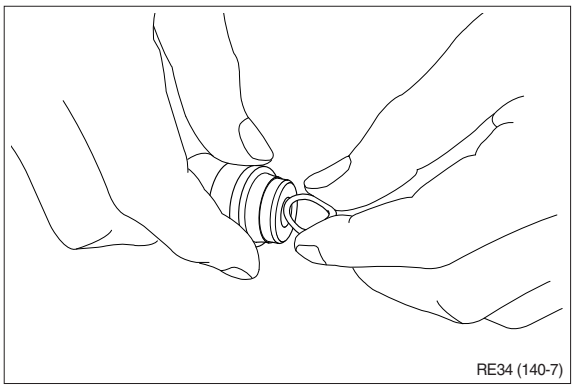

RE32 (140-7)

(5) Assemble O-ring (11) onto plug (9).


RE33 (140-7)

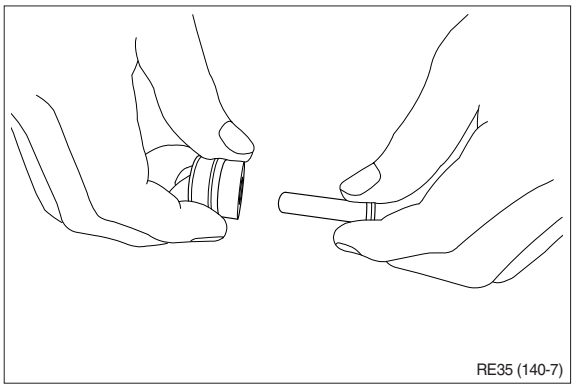
(6) Assemble seal (12) to plug (9).

※ Assemble seal in such lip direction as shown below.


RE34 (140-7)

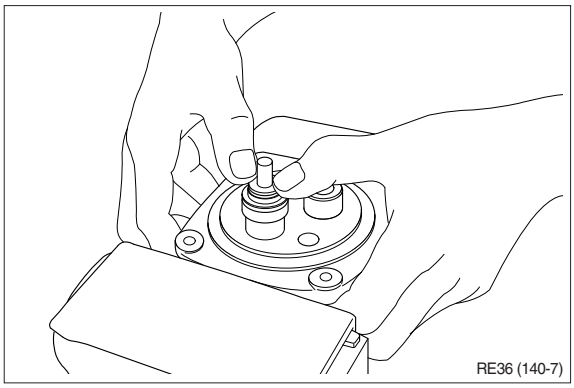
(7) Assemble push rod (10) to plug (9).

※ Apply working oil on push-rod surface.


RE35 (140-7)

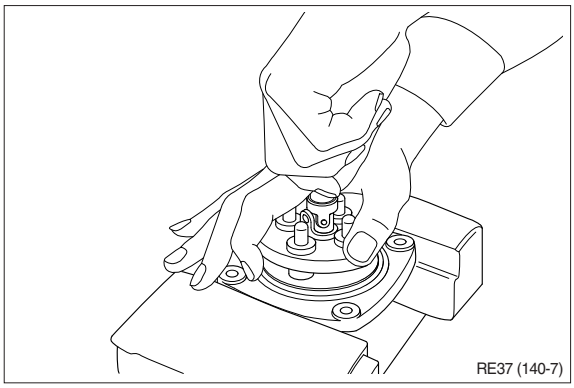
(8) Assemble plug subassembly to casing.

※ When return spring is weak in force, subassembly stops due to resistance of O-ring.

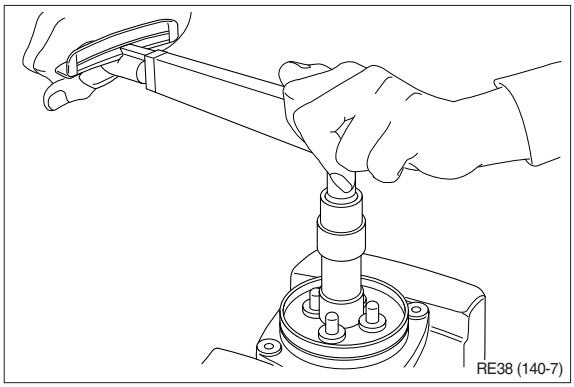

RE36 (140-7)

(9) When return spring is strong in force, assemble 4 sets at the same time, utilizing plate (13), and tighten joint (16) temporarily.

(10) Fit plate (13).


RE37 (140-7)

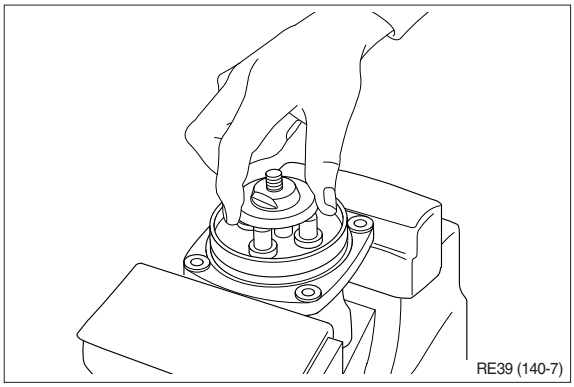
(11) Tighten joint (16) with the specified torque to casing, utilizing jig.


RE38 (140-7)

(12) Assemble spacer (15) to joint (16).

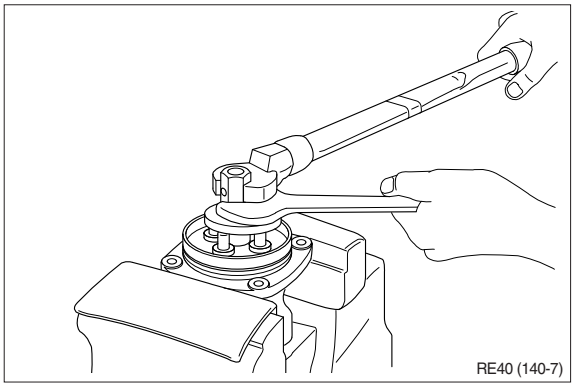
※ Screw it to position that it contacts with 4 push rods evenly.

※ Do not screw it over.

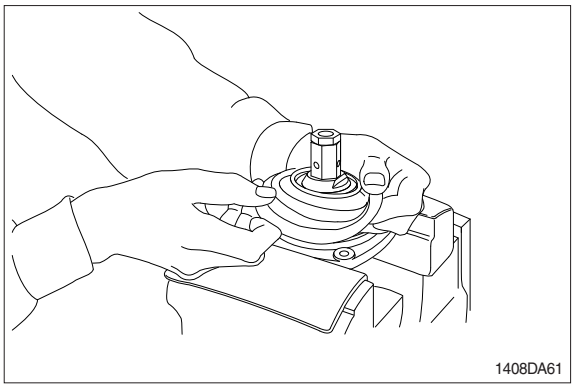

RE39 (140-7)

(13) Assemble adjusting nut (18), apply spanner to width across flat of swash plate (17) to fix it, and tighten adjusting nut to the specified torque.

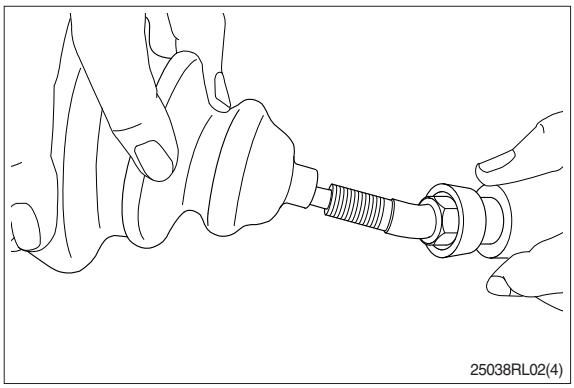
※ During tightening, do not change position of disk.

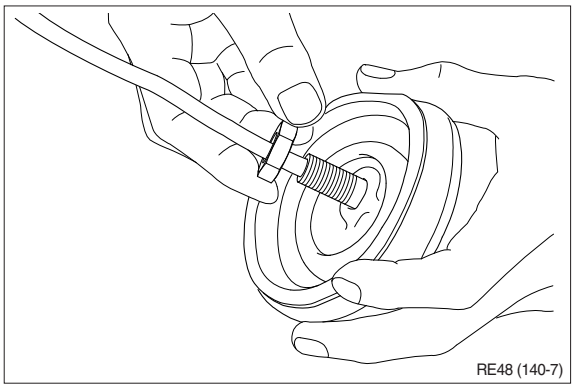

RE40 (140-7)

(14) Fit boot (14) to plate.

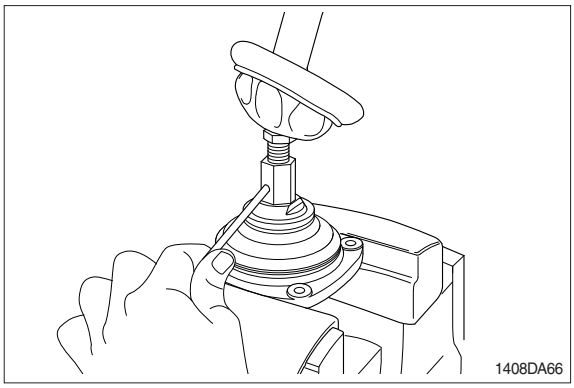


(15) Fit boot (25) and lock nut (24), and handle subassembly is assembled completely.



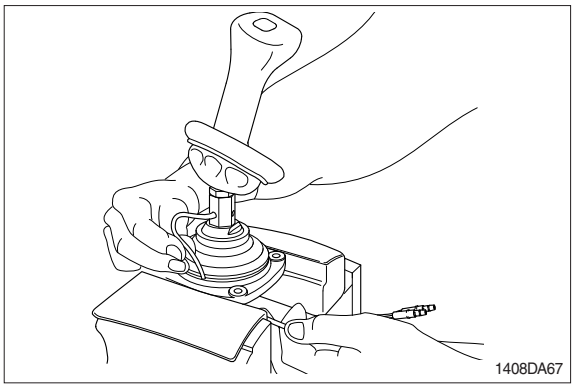


(16) Pull out cord and tube through adjusting nut hole provided in direction 60° to 120° from casing hole.

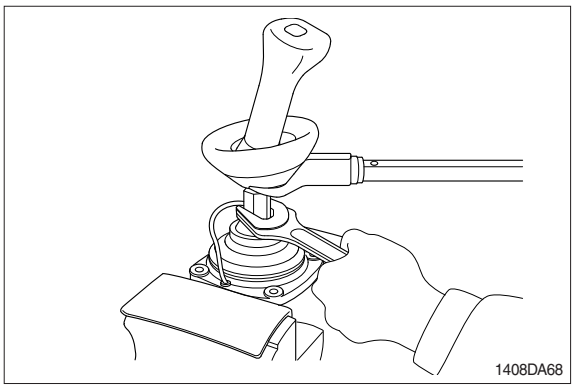


(17) Assemble bushing (19) to plate and pass cord and tube through it.

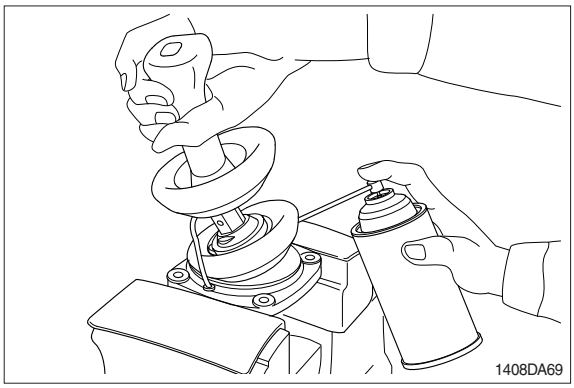
※ Provide margin necessary to operation.



(18) Determine handle direction, tighten lock nut (24) to specified torque to fix handle.

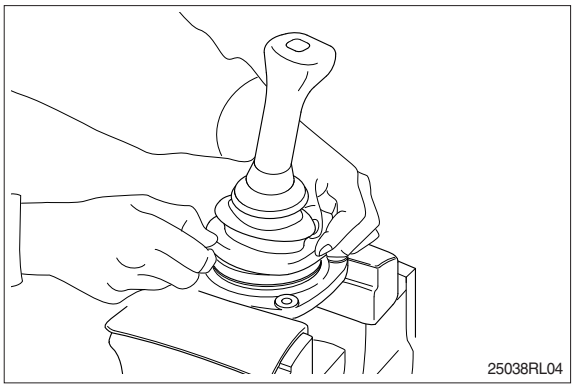


(19) Apply grease to rotating section of joint and contacting faces of disk and push rod.



(20) Assemble lower end of bellows to casing.

(21) Inject volatile rust-preventives through all ports and then put blind plugs in ports.



GROUP 7 TURNING JOINT

1. REMOVAL AND INSTALL

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.**

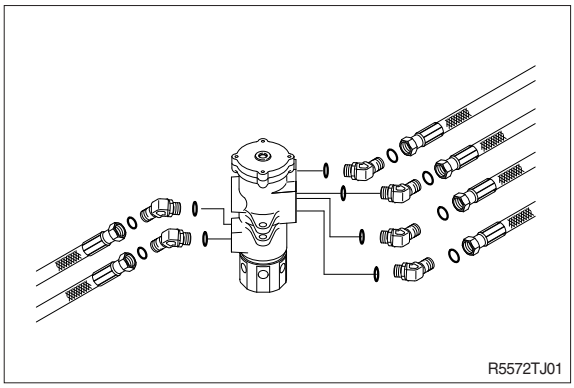
※ When pipes and hoses are disconnected, the oil inside the piping will flow out, so catch it in oil pan.

(4) Disconnect all hoses.

(5) Sling the turning joint assembly (1) and remove the mounting bolt (2).

· Weight : 30 kg (70 lb)

· Tightening torque : 12.3± 1.3 kgf · m (88.9± 9.4 lbf · ft)



(6) Remove the turning joint assembly.

※ When removing the turning joint, check that all the hoses have been disconnected.

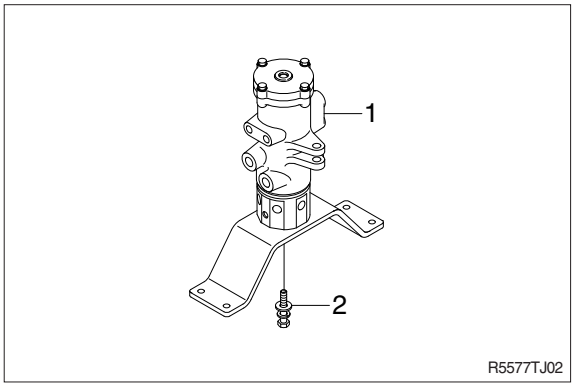
2) INSTALL

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

※ Take care of turning joint direction.

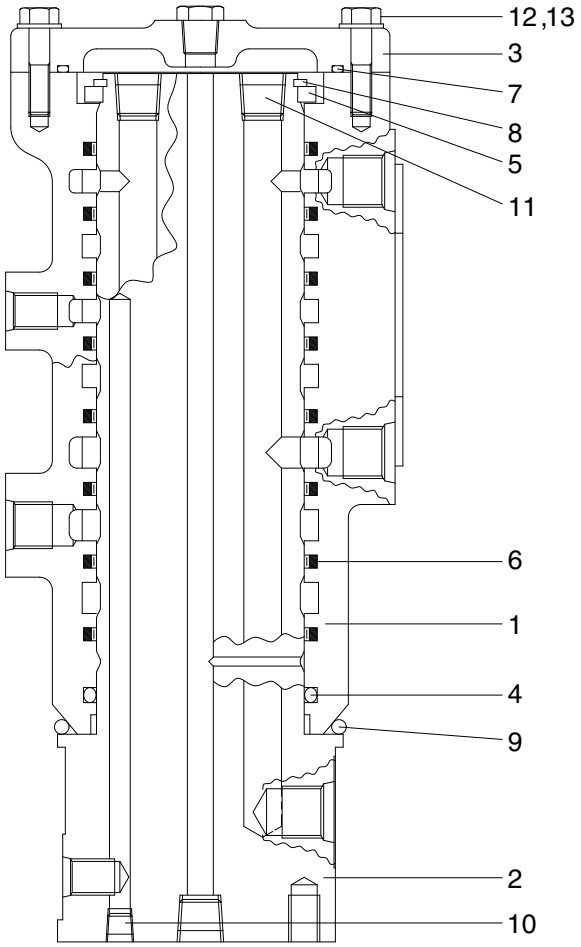
※ Assemble hoses to their original positions.

※ Confirm the hydraulic oil level and check the hydraulic oil leak or not.



2. DISASSEMBLY AND ASSEMBLY

1) STRUCTURE



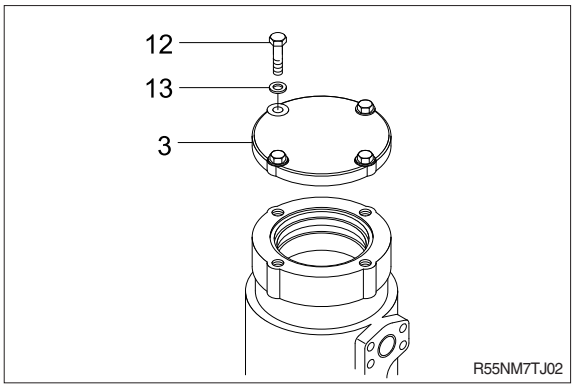
555K7TJ03

1	Hub	6	Slipper seal	10	Plug
2	Shaft	7	O-ring	11	Plug
3	Cover	8	Retainer ring	12	Hexagon bolt
4	O-ring	9	O-ring	13	Spring washer
5	Ring				

2) DISASSEMBLY

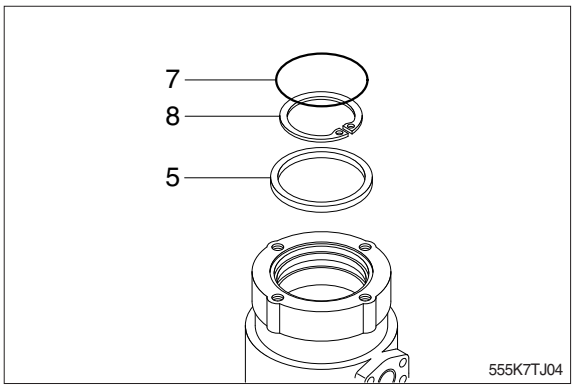
※ Before the disassembly, clean the turning joint.

(1) Remove bolts (12), washer (13) and cover (3).



(2) Remove O-ring (7).

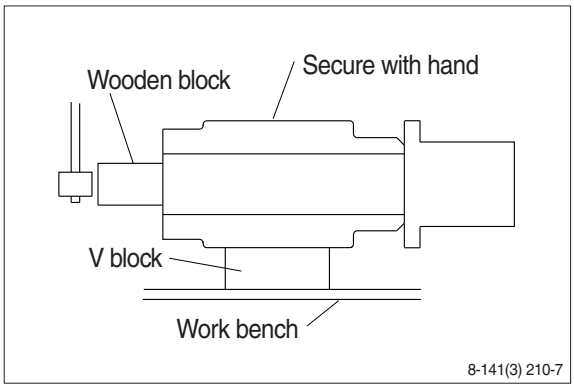
(3) Remove retainer ring (8) and ring (5).



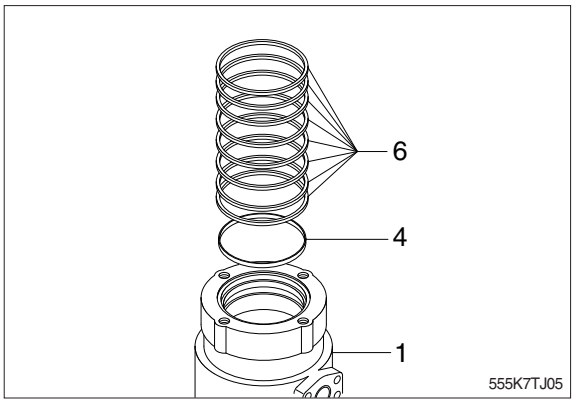
(4) Place hub (1) on a V-block and by using a wood buffer at the shaft end, hit out shaft (2) to about 1/2 from the body with a hammer.

※ Take care not to damage the shaft (2) when remove hub (1) or rest it sideway.

※ Put a fitting mark on hub (1) and shaft (2).



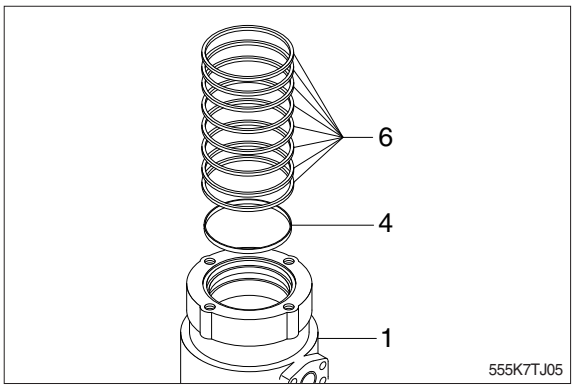
(5) Remove eight slipper seals (6) and O-ring (4) from hub (1).



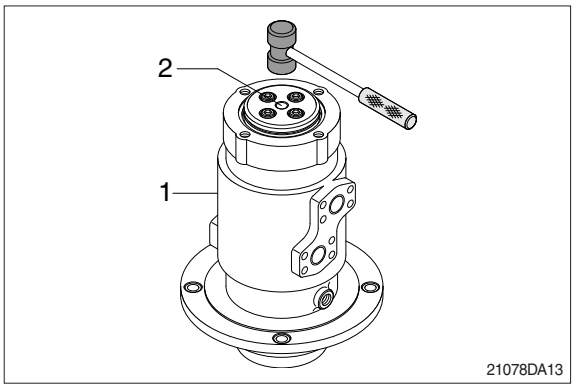
3) ASSEMBLY

※ Clean all parts.
※ As a general rule, replace oil seals and O-ring.
※ Coat the sliding surfaces of all parts with engine oil or grease before installing.

(1) Fix eight slipper seal (6) and O-ring (4) to hub (1).

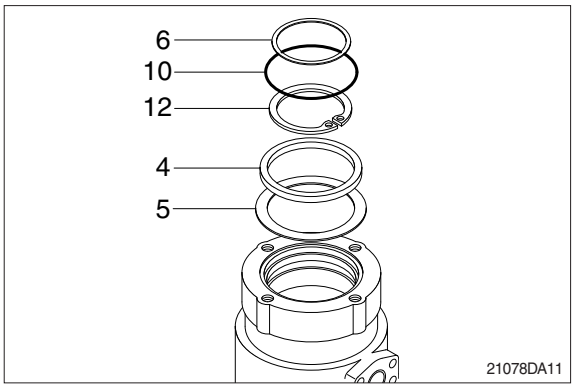


(2) Set shaft (2) on block, tap hub (1) with a plastic hammer to install.

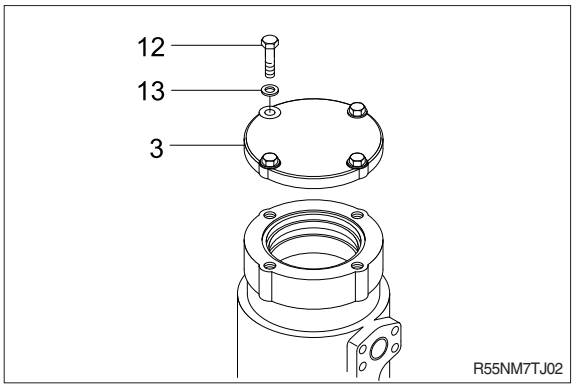


(3) Ring (5) and retainer ring (8) to shaft (2).

(4) Fit O-ring (7) to hub (1).



(5) Install cover (3) to body (1) and tighten bolts (12) with washer (13).



1. REMOVAL AND INSTALL

1) BUCKET CYLINDER

(1) Removal

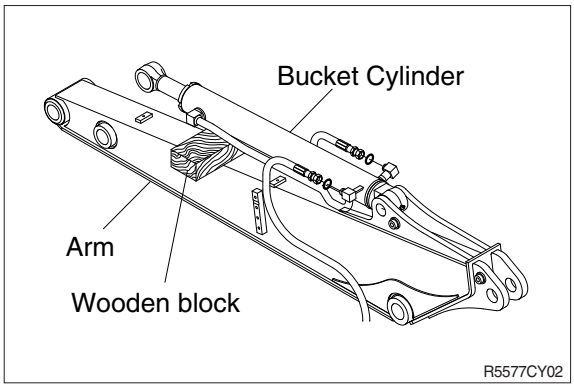
※ Expand the arm and bucket fully, lower the work equipment to the ground and stop the engine.

※ Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping.

⚠ **Loosen the breather slowly to release the pressure inside the hydraulic tank. Escaping fluid under pressure can penetrate the skin causing serious injury.**

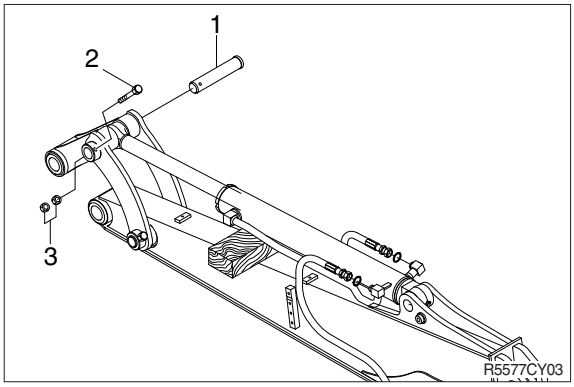
※ Fit blind plugs in the hoses after disconnecting them, to prevent dirt or dust from entering.

① Set block between bucket cylinder and arm.

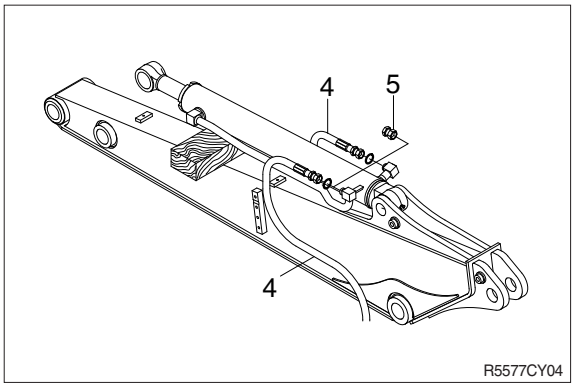


② Remove bolt (2), nut (3) and pull out pin (1).

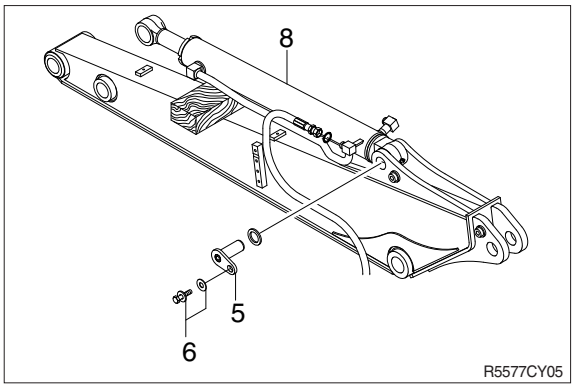
※ Tie the rod with wire to prevent it from coming out.



③ Disconnect bucket cylinder hoses (4) and put plugs (5) on cylinder pipe.



④ Sling bucket cylinder assembly (8) and remove bolt (6) then pull out pin (5).
⑤ Remove bucket cylinder assembly (8).
· Weight : 36 kg (79 lb)



(2) Install

① Carry out installation in the reverse order to removal.

⚠ When aligning the mounting position of the pin, do not insert your fingers in the pin hole.

※ Bleed the air from the bucket cylinder.
※ Confirm the hydraulic oil level and check the hydraulic oil leak or not.

2) ARM CYLINDER

(1) Removal

※ Expand the arm and bucket fully, lower the work equipment to the ground and stop the engine.

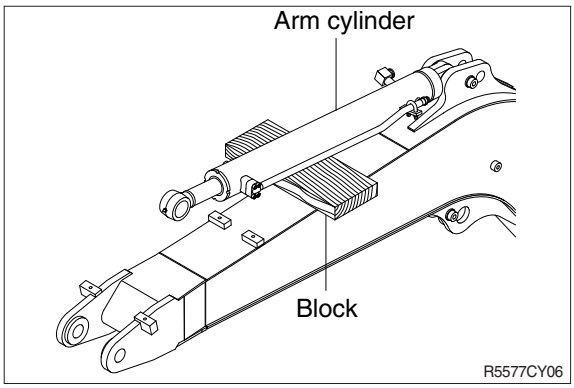
※ Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping.

⚠ Loosen the breather slowly to release the pressure inside the hydraulic tank.

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

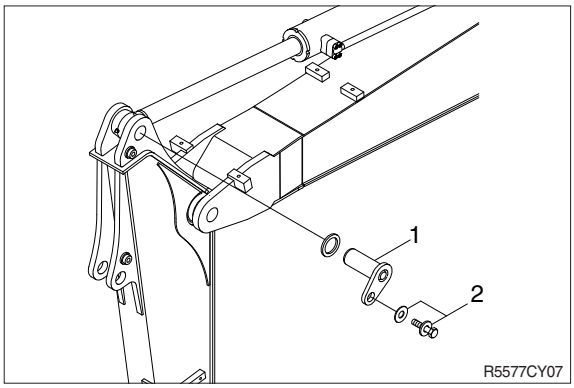
※ Fit blind plugs in the hoses after disconnecting them, to prevent dirt or dust from entering.

① Set block between arm cylinder and boom.



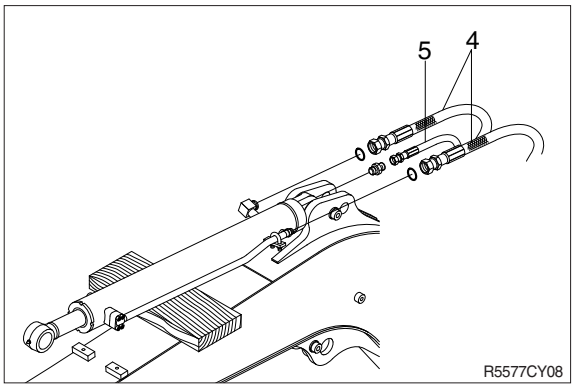
② Remove bolt (2) and pull out pin (1).

※ Tie the rod with wire to prevent it from coming out.

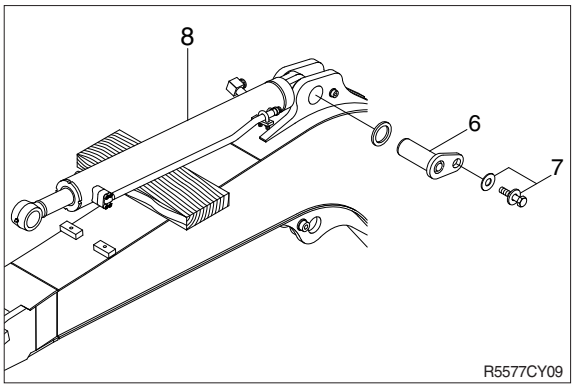


③ Disconnect arm cylinder hoses (4) and put plugs on cylinder pipe.

④ Disconnect greasing pipings (5).



⑤ Sling arm assembly (8) and remove bolt (7) then pull out pin (6).
⑥ Remove arm cylinder assembly (8).
· Weight : 54 kg (119 lb)



(2) Install

① Carry out installation in the reverse order to removal.

⚠ When aligning the mounting position of the pin, do not insert your fingers in the pin hole.

※ Bleed the air from the arm cylinder.
※ Confirm the hydraulic oil level and check the hydraulic oil leak or not.

3) BOOM CYLINDER

(1) Removal

※ Expand the arm and bucket fully, lower the work equipment to the ground and stop the engine.

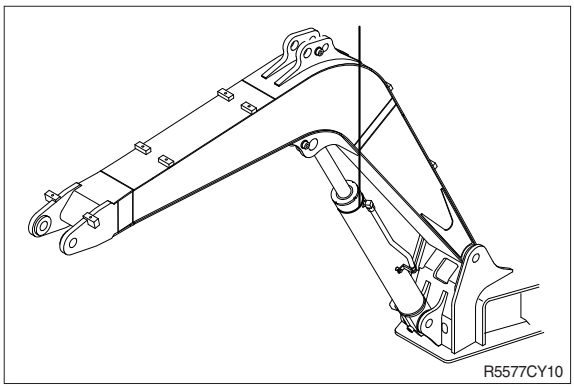
※ Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping.

⚠ Loosen the breather slowly to release the pressure inside the hydraulic tank.

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

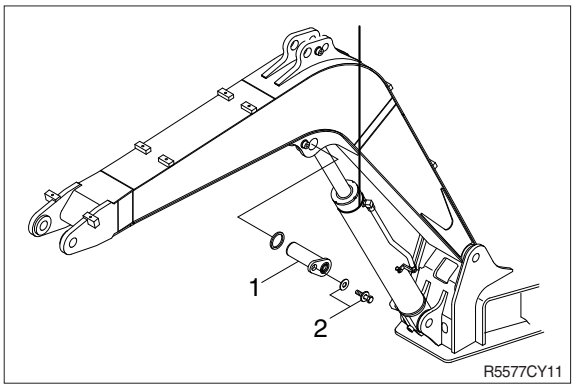
※ Fit blind plugs in the hoses after disconnecting them, to prevent dirt or dust from entering.

① Disconnect greasing hoses (1).
② Sling boom cylinder assembly.

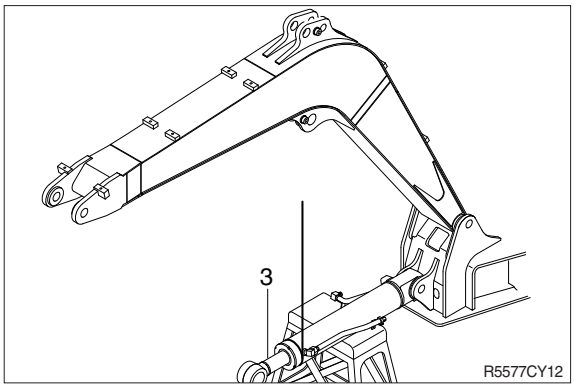


③ Remove bolt (2) and pull out pin (1).

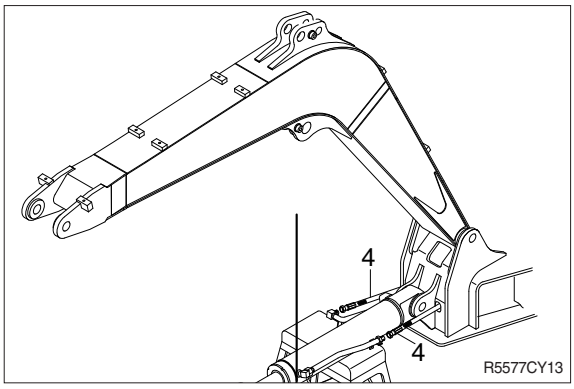
※ Tie the rod with wire to prevent it from coming out.



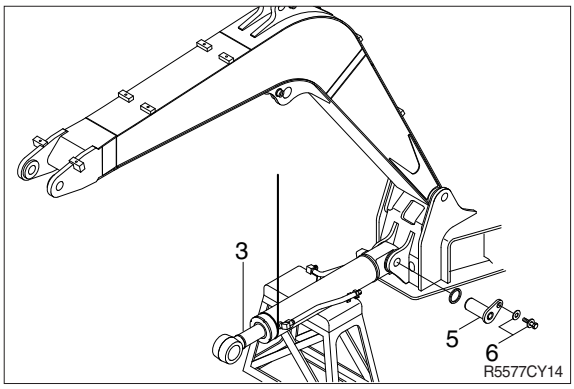
④ Lower the boom cylinder assembly (3) on a stand.



⑤ Disconnect boom cylinder hoses (4) and put plugs on cylinder pipe.



⑥ Remove bolt (6) and pull out pin (5).
⑦ Remove boom cylinder assembly (3).
· Weight : 72 kg (159 lb)



(2) Install

① Carry out installation in the reverse order to removal.

⚠ When aligning the mounting position of the pin, do not insert your fingers in the pin hole.

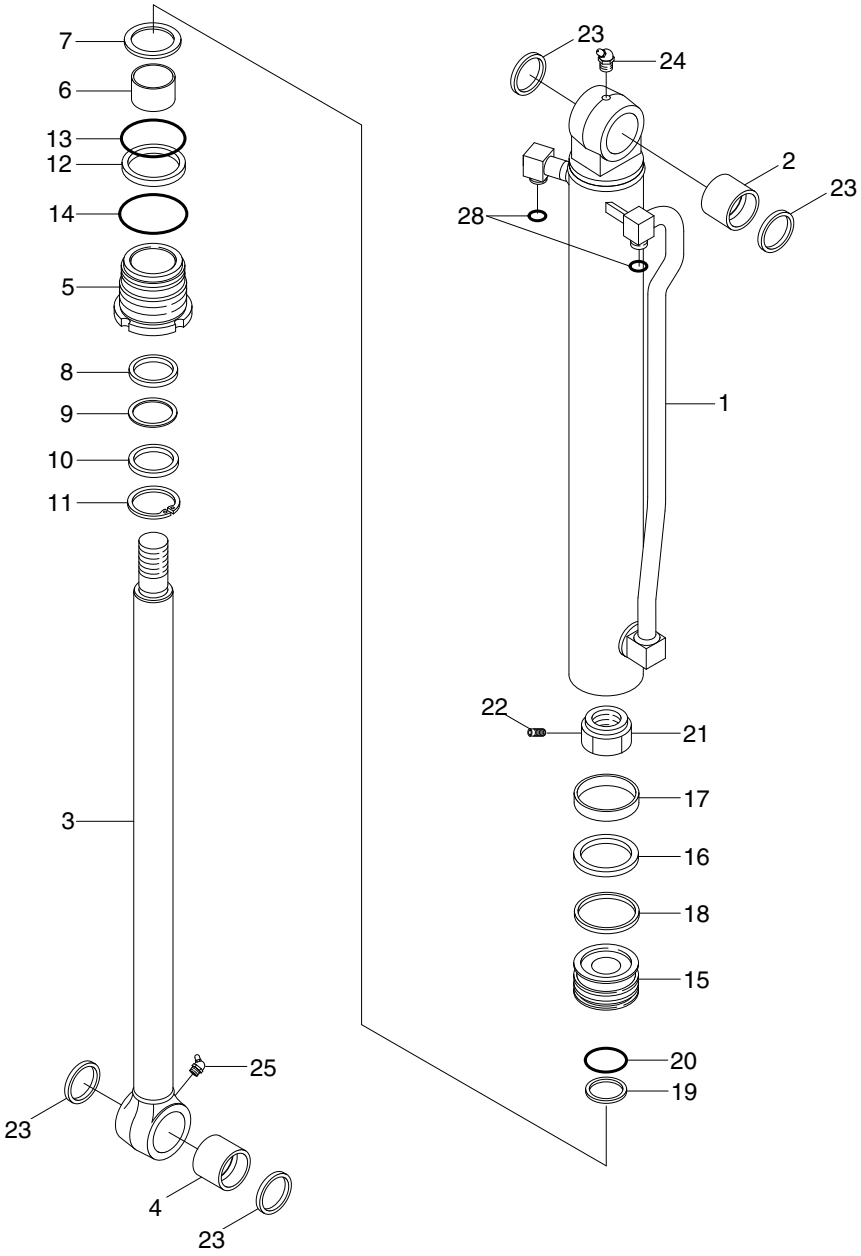
※ Bleed the air from the boom cylinder.

※ Conformed the hydraulic oil level and check the hydraulic oil leak or not.

2. DISASSEMBLY AND ASSEMBLY

1) STRUCTURE

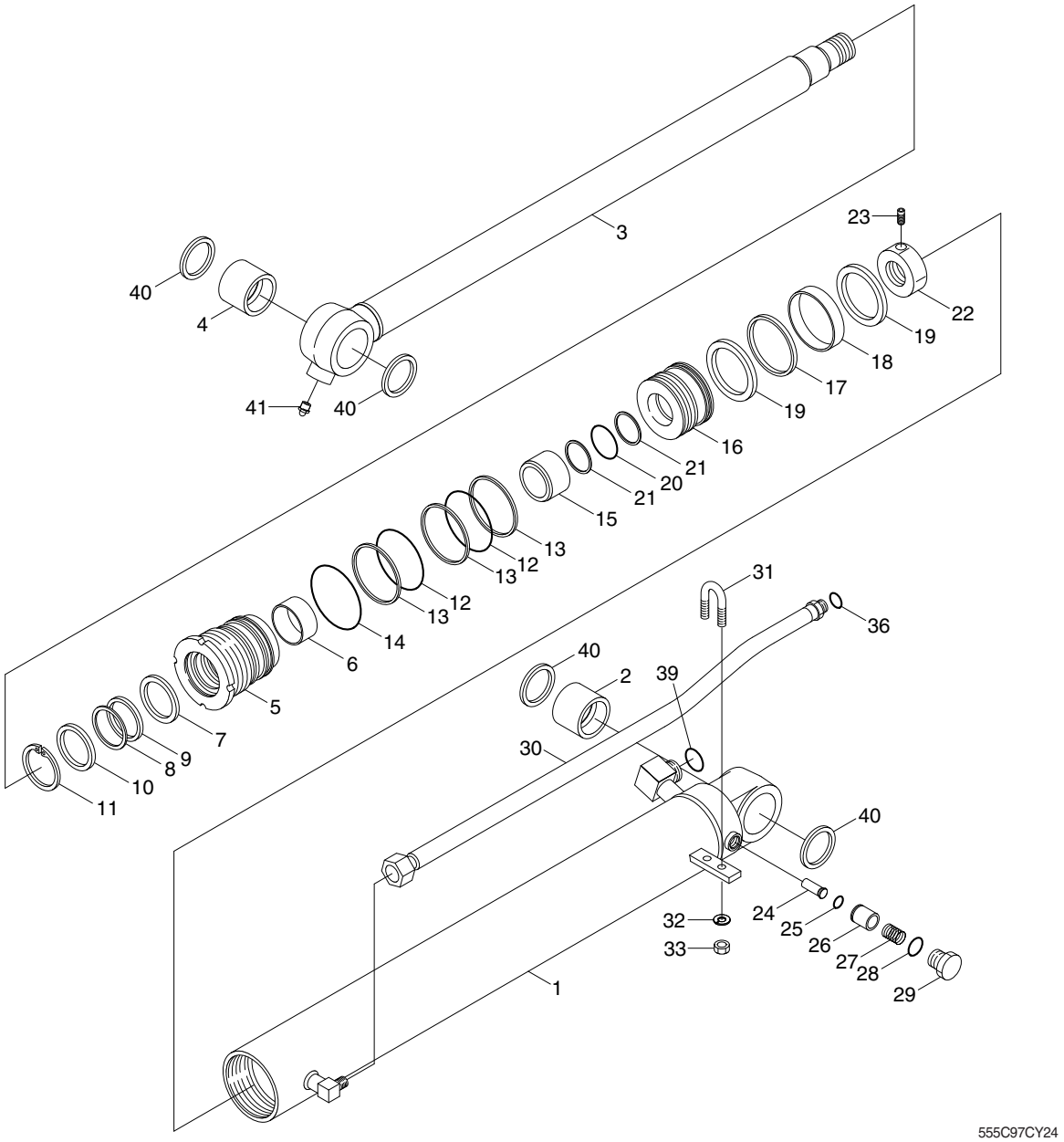
(1) Bucket cylinder



555C97CY22

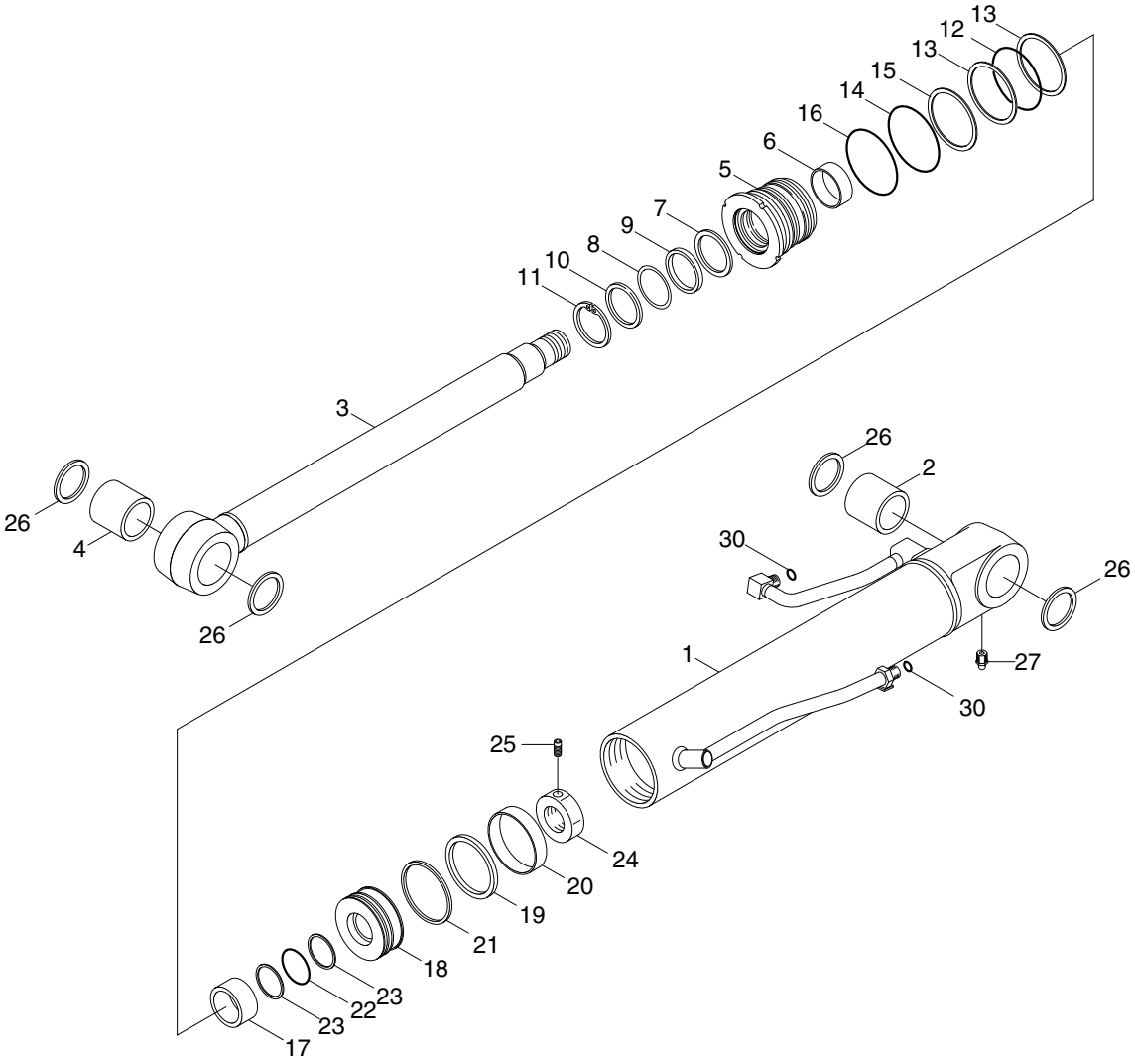
1	Tube assembly	10	Dust seal	19	Back-up ring
2	Bushing	11	Retaining ring	20	O-ring
3	Bushing	12	Back-up ring	21	Piston nut
4	Du bushing	13	O-ring	22	Set screw
5	Rod cover	14	O-ring	23	Dust seal
6	Rod bushing	15	Piston	24	Grease nipple
7	Retaining ring	16	Piston seal	25	Grease nipple
8	Buffer ring	17	Wear ring	28	O-ring
9	U-packing	18	Dust ring		

(2) Arm cylinder



1	Tube assembly	14	O-ring	27	Spring
2	Bushing	15	Cushion ring	28	Support spring
3	Rod	16	Piston	29	Socket plug
4	Bushing	17	Piston seal	30	Pipe assy
5	Rod cover	18	Wear ring	31	U-bolt
6	Rod bushing	19	Dust ring	32	Spring washer
7	Buffer seal	20	O-ring	33	Hex nut
8	U-packing	21	Back-up ring	36	O-ring
9	Back-up ring	22	Piston nut	39	O-ring
10	Dust wiper	23	Set screw	40	Dust seal
11	Retaining ring	24	Cushion plunger	41	Grease nipple
12	O-ring	25	Stop ring		
13	Back-up ring	26	Check valve		

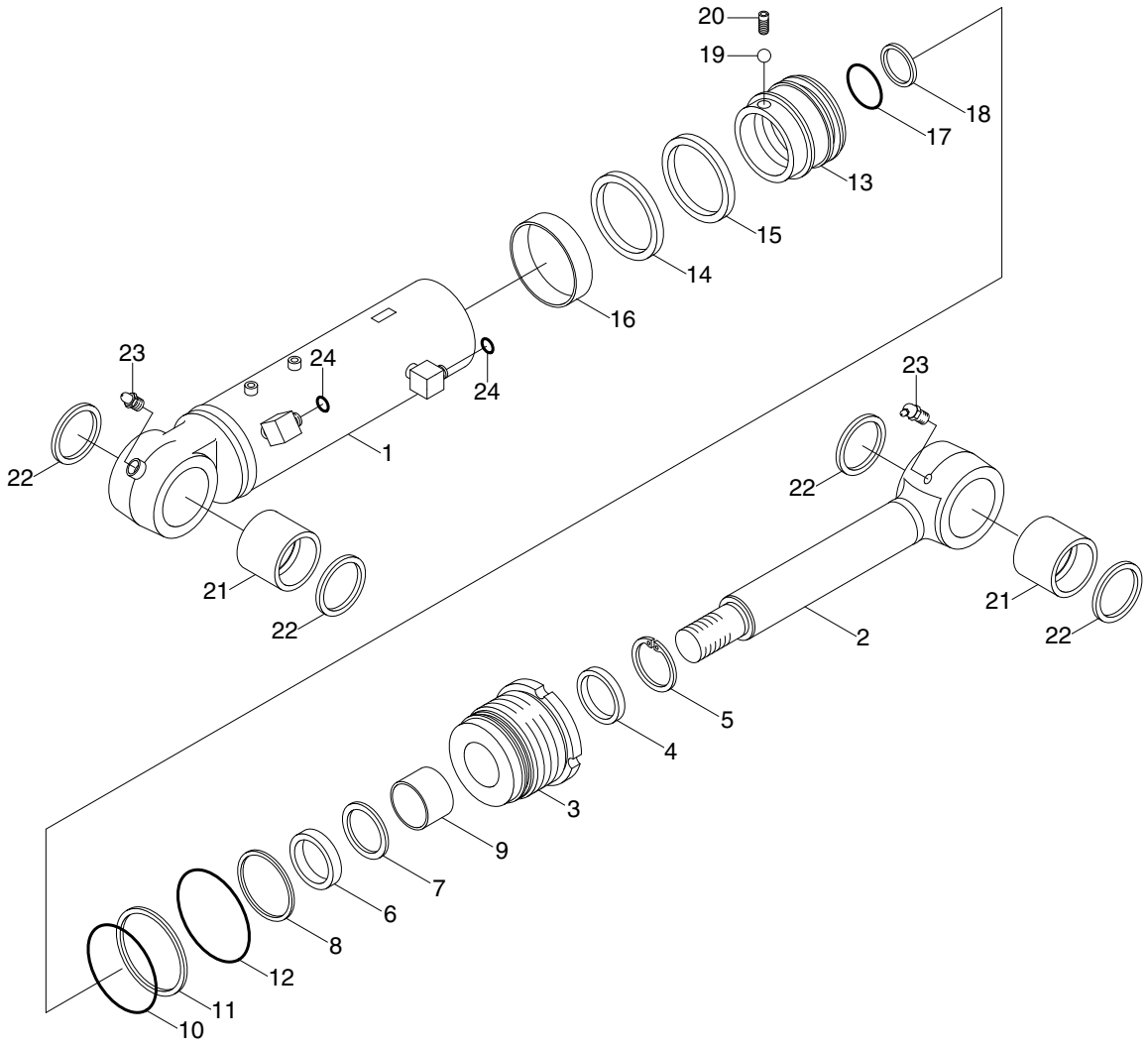
(3) Boom cylinder



555C97CY21

1	Tube assembly	11	Retaining ring	21	Dust ring
2	Bushing	12	O-ring	22	O-ring
3	Bushing	13	Back-up ring	23	Back-up ring
4	Du bushing	14	O-ring	24	Piston nut
5	Rod cover	15	Back-up ring	25	Set screw
6	Rod bushing	16	O-ring	26	Dust seal
7	Buffer ring	17	Cushion ring	27	Grease nipple
8	U-packing	18	Piston	30	O-ring
9	Back-up ring	19	Piston seal		
10	Dust seal	20	Wear ring		

(4) Dozer cylinder

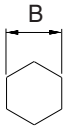


5597CY23

1	Tube assembly	9	DU bushing	17	O-ring
2	Rod assembly	10	O-ring	18	Back-up ring
3	Gland	11	Back-up ring	19	Steel ball
4	Dust wiper	12	O-ring	20	Set screw
5	Retaining ring	13	Piston	21	Bushing
6	Rod seal	14	Piston seal	22	Dust seal
7	Back-up ring	15	Dust ring	23	Grease nipple
8	Buffer ring	16	Wear ring	24	O-ring

2) TOOLS AND TIGHTENING TORQUE

(1) Tools

Name	Specification	
Allen wrench	8	
	10	
Spanner	M22	
Hook spanner	Suitable size	
(-) Driver	Small and large sizes	
Torque wrench	Capable of tightening with the specified torques	

(2) Tightening torque

Part name		Item	Size	Torque	
				kgf · m	lbf · ft
Rod cover	Boom cylinder	5	M115	70±7.0	510±51
	Arm cylinder	5	M95	70±7.0	510±51
	Bucket cylinder	3	M85	75±7.5	540±54
	Dozer cylinder	3	M115	95±9.5	690±69
Piston nut	Boom cylinder	24	M45	75±7.5	540±54
	Arm cylinder	22	M39	75±7.5	540±54
	Bucket cylinder	21	M36	75±7.5	540±54
Piston	Dozer cylinder	13	M45	113±11.3	817±137
Set screw	Boom cylinder	25	M8	1.5	10.8
	Arm cylinder	23	M8	1.5	10.8
	Bucket cylinder	22	M8	1.5	10.8
	Dozer cylinder	20	M8	2±0.2	14.5±1.4

3) DISASSEMBLY

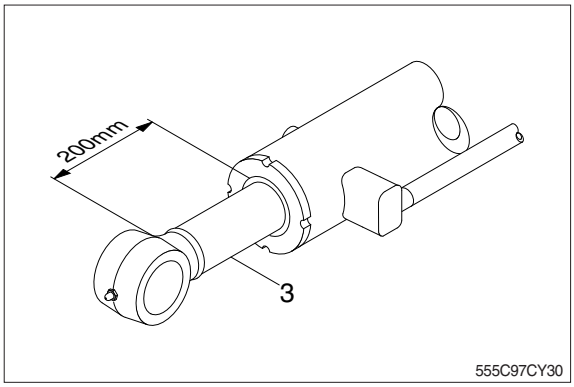
(1) Remove cylinder head and piston rod

※ Procedure are based on the bucket cylinder.

① Hold the clevis section of the tube in a vise.

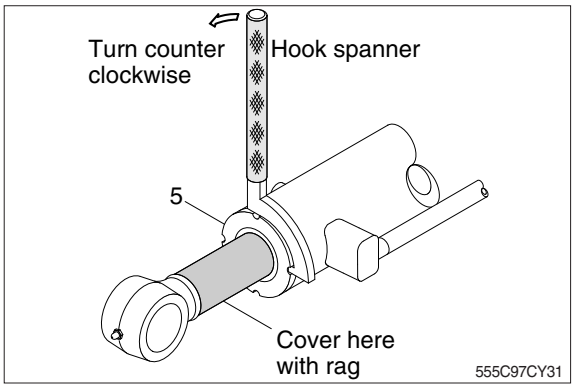
※ Use mouth pieces so as not to damage the machined surface of the cylinder tube. Do not make use of the outside piping as a locking means.

② Pull out rod assembly (3) about 200 ㎜ (7.1 in). Because the rod assembly is rather heavy, finish extending it with air pressure after the oil draining operation.



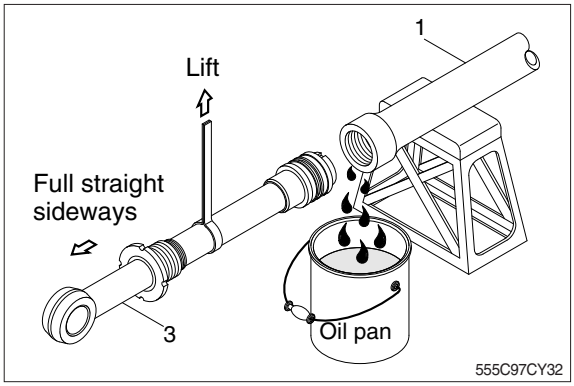
③ Remove rod cover (5) by hook spanner.

※ Cover the extracted rod assembly (3) with rag to prevent it from being accidentally damaged during operation.



④ Draw out cylinder head and rod assembly (3) together from tube assembly (1).

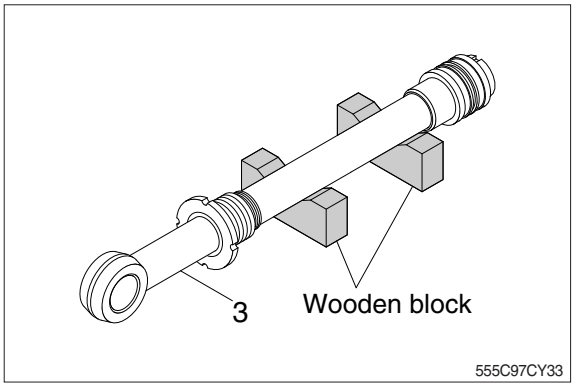
※ Since the rod assembly is heavy in this case, lift the tip of the rod assembly (3) with a crane or some means and draw it out. However, when rod assembly (3) has been drawn out to approximately two thirds of its length, lift it in its center to draw it completely.



Note that the plated surface of rod assembly (3) is to be lifted. For this reason, do not use a wire sling and others that may damage it, but use a strong cloth belt or a rope.

⑤ Place the removed rod assembly on a wooden V-block that is set level.

※ Cover a V-block with soft rag.

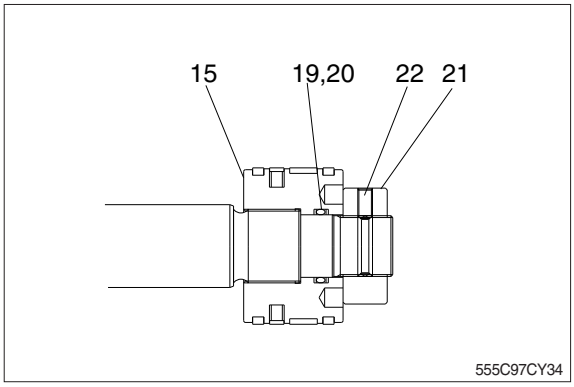


(2) Remove piston and rod cover

① Loosen set screw (22) and remove piston nut (21).

※ Since piston nut (21) is tightened to a high torque, use a hydraulic and power wrench that utilizers a hydraulic cylinder, to remove the piston nut (21).

② Remove piston assembly (15), back up ring (19), and O-ring (20).

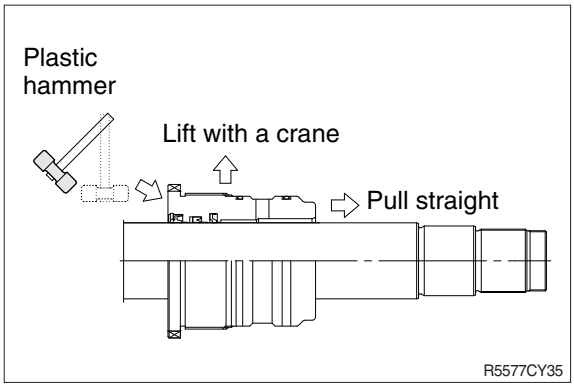


③ Remove the rod cover from rod assembly (3).

※ If it is too heavy to move, move it by striking the flanged part of gland with a plastic hammer.

※ Pull it straight with cylinder head assembly lifted with a crane.

Exercise care so as not to damage the lip of Du bushing (6) and packing (8, 9, 10, 11, 12, 13, 14) by the threads of rod assembly (3).

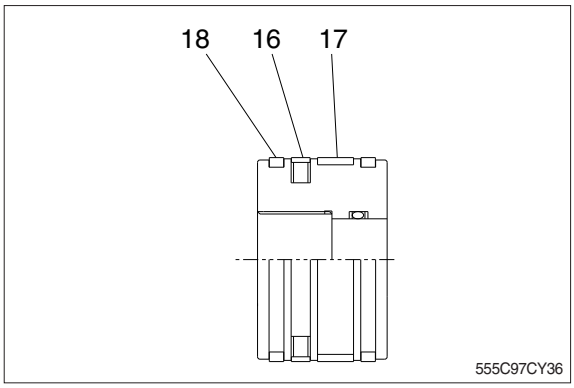


(3) Disassemble the piston assembly

① Remove wear ring (17).

② Remove dust ring (18) and piston seal (16).

※ Exercise care in this operation not to damage the grooves.



(4) Disassemble gland assembly

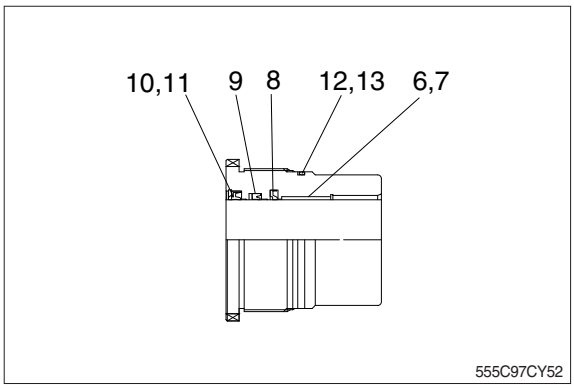
① Remove back up ring (12) and O-ring (13).

② Remove snap ring (11), dust wiper (10).

③ Remove U-packing (9) and buffer seal (8).

※ Exercise care in this operation not to damage the grooves.

※ Do not remove seal and ring, if does not damaged.

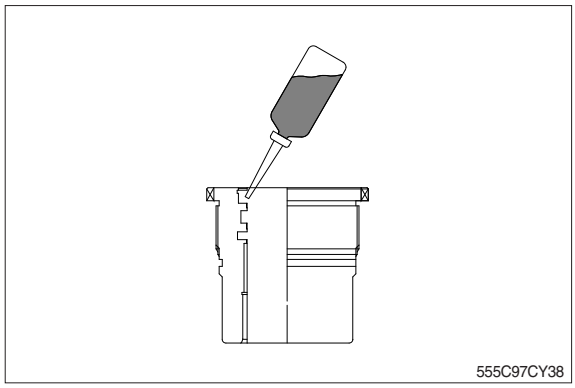


4) ASSEMBLY

(1) Assemble cylinder head assembly

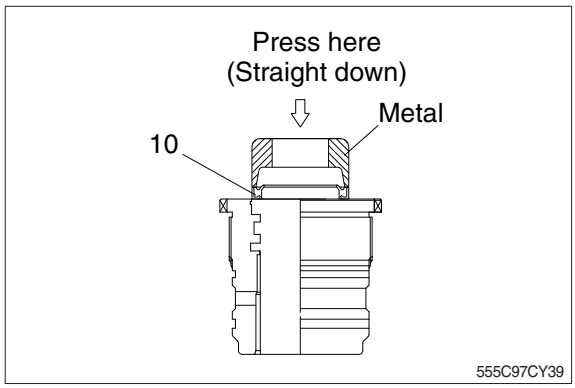
※ Check for scratches or rough surfaces if found smooth with an oil stone.

① Coat the inner face of rod cover (5) with hydraulic oil.



② Coat dust wiper (10) with grease and fit dust wiper (10) to the bottom of the hole of dust seal.
At this time, press a pad metal to the metal ring of dust seal.

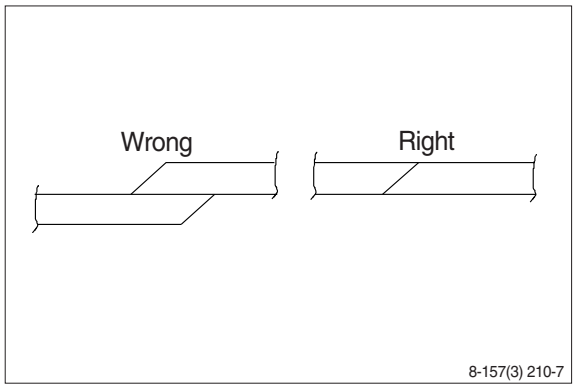
③ Fit snap ring (11) to the stop face.



④ Fit U-packing (9) and buffer seal (8) to corresponding grooves, in that order.

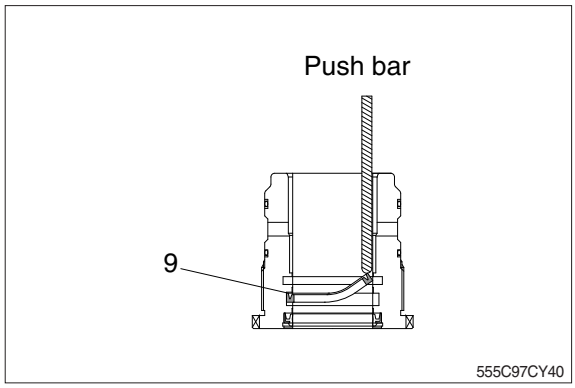
※ Coat each packing with hydraulic oil before fitting it.

※ Insert the backup ring until one side of it is inserted into groove.



※ U-packing (9) has its own fitting direction. Therefore, confirm it before fitting them.

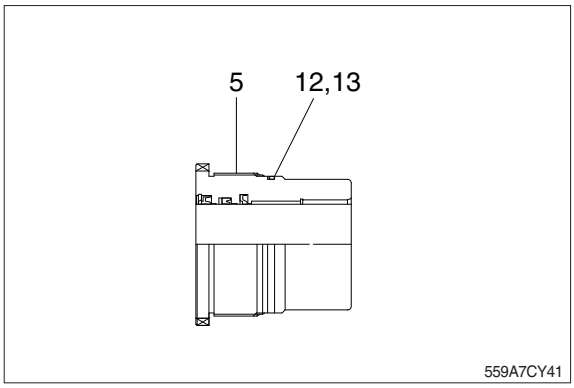
※ Fitting U-packing (9) upside down may damage its lip. Therefore check the correct direction that is shown in fig.



⑤ Fit back up ring (12) to rod cover (5).

※ Put the backup ring in the warm water of 30~50˚C .

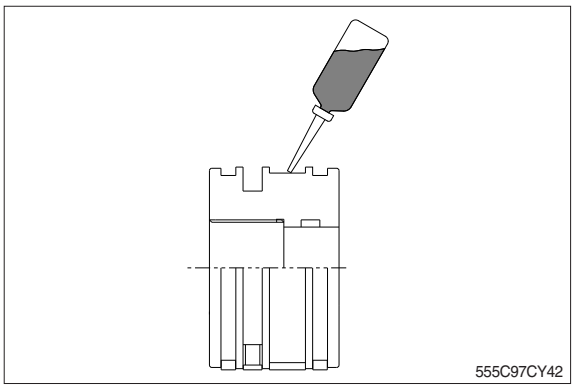
⑥ Fit O-ring (13) to rod cover (5).



(2) Assemble piston assembly

※ Check for scratches or rough surfaces. If found smooth with an oil stone.

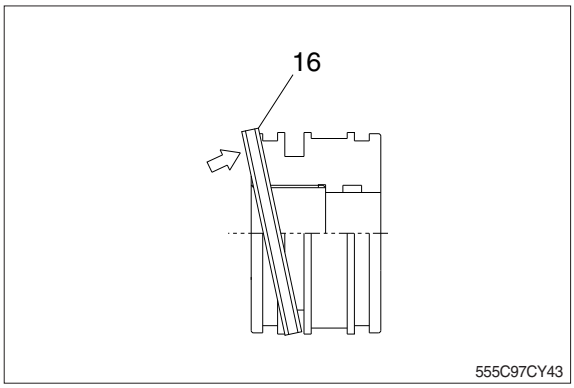
① Coat the outer face of piston (15) with hydraulic oil.



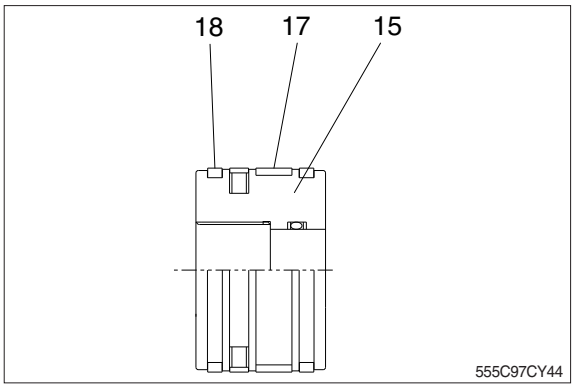
② Fit piston seal (16) to piston.

※ Put the piston seal in the warm water of 60~100˚C for more than 5 minutes.

※ After assembling the piston seal, press its outer diameter to fit in.



③ Fit wear ring (17) and dust ring (18) to piston (15).

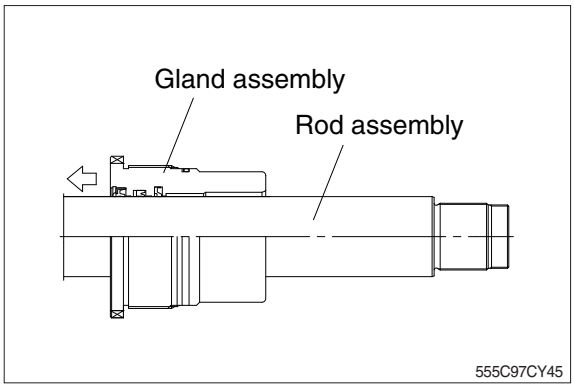


(3) Install piston and cylinder head

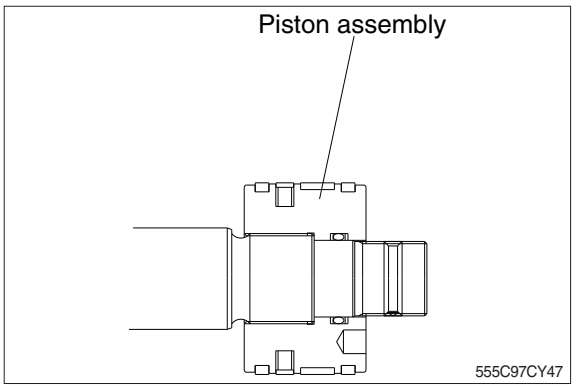
① Fix the rod assembly to the work bench.

② Apply hydraulic oil to the outer surface of rod assembly, the inner surface of piston and cylinder head.

③ Insert cylinder head assembly to rod assembly.

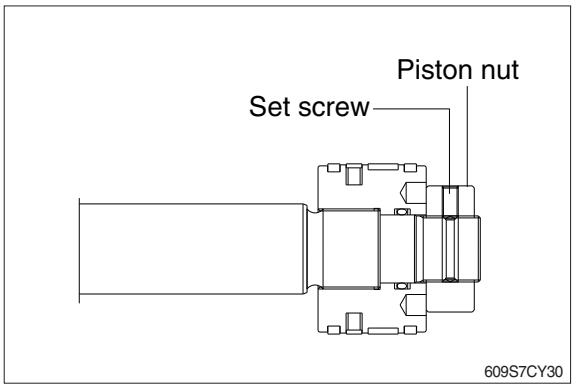


⑤ Fit piston assembly to rod assembly.



⑥ Fit piston nut and tighten the set screw (22).

· Tightening torque : Refer to page 7-130.



(3) Overall assemble

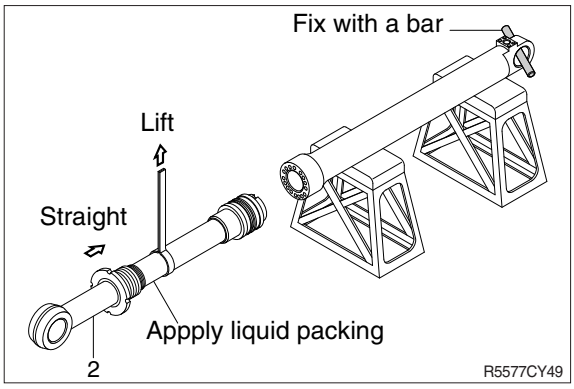
① Place a V-block on a rigid work bench. Mount the tube assembly (2) on it and fix the assembly by passing a bar through the clevis pin hole to lock the assembly.

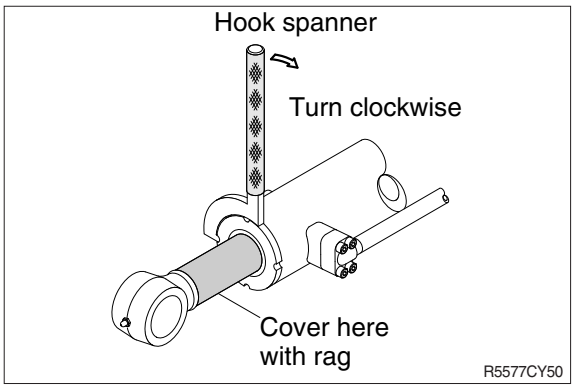
② Insert the rod assembly in to the tube assembly, while lifting and moving the rod assembly with a crane.

※ Be careful not to damage piston seal by thread of tube assembly.

③ Match the bolt holes in the cylinder head flange to the tapped holes in the tube assembly and tighten socket bolts to a specified torque.

※ Refer to the table of tightening torque.





1. TRACK LINK

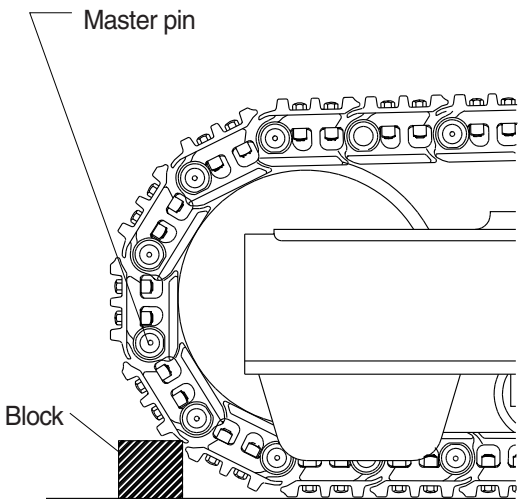
1) REMOVAL

(1) Move track link until master pin is over front idler in the position put wooden block as shown.

(2) Loosen tension of the track link.

※ If track tension is not relieved when the grease valve is loosened, move the machine backwards and forwards.

(3) Push out master pin by using a suitable tool.

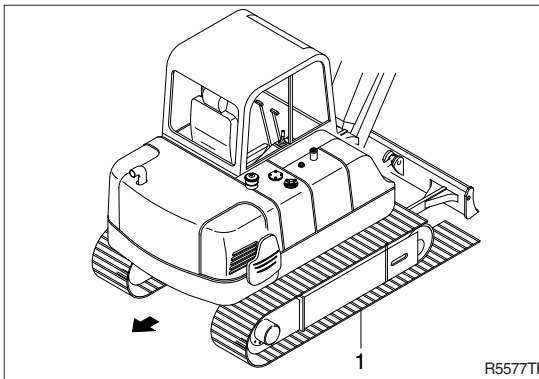


8-161(1) 140-7

(4) Move the machine slowly in reverse, and lay out track link assembly (1).

※ Jack up the machine and put wooden block under the machine.

※ Don't get close to the sprocket side as the track shoe plate may fall down on your feet.



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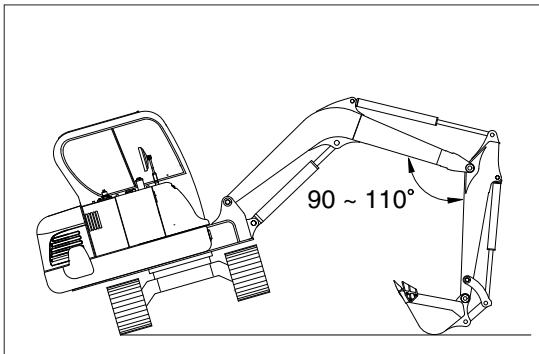
2) INSTALL

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

※ Adjust the tension of the track link.



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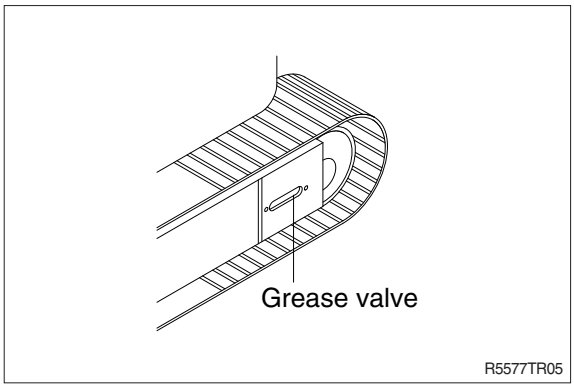
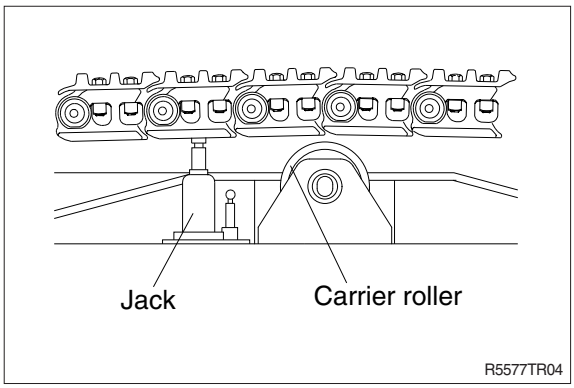
2. CARRIER ROLLER

1) REMOVAL

(1) Loosen tension of the track link.

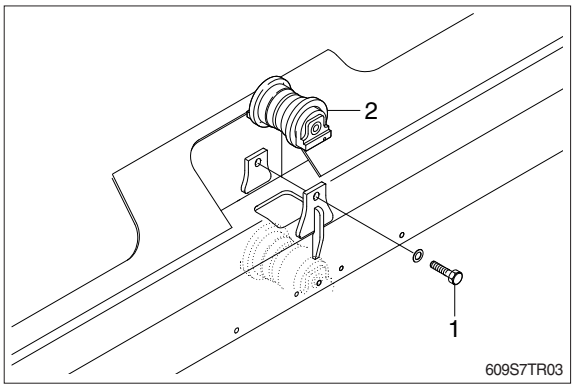


(2) Jack up the track link height enough to permit carrier roller removal.



(3) Remove bolt (1) at both side.

(4) Remove carrier roller (2).
· Weight : 12 kg (26 lb)



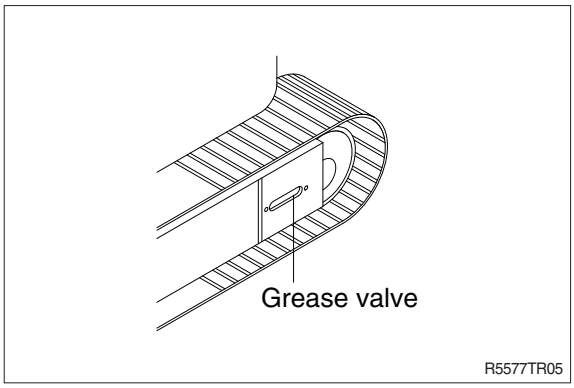
2) INSTALL

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

3. TRACK ROLLER

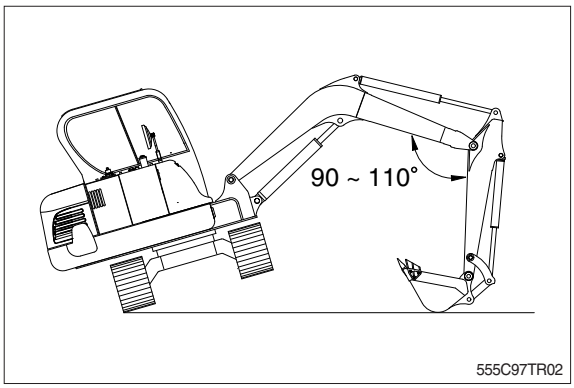
1) REMOVAL

(1) Loosen tension of the track link.



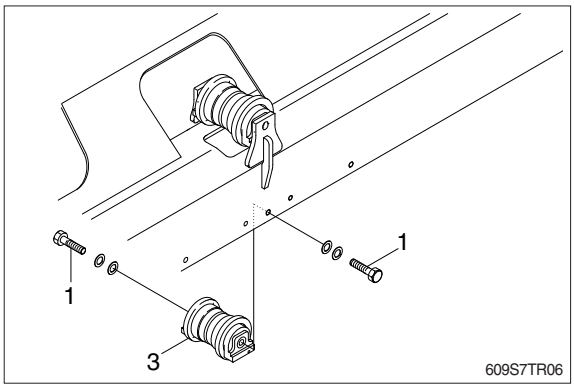
(2) Using the work equipment, push up track frame on side which is to be removed.

※ After jack up the machine, set a block under the unit.



(3) Remove the mounting bolt (1) and draw out the track roller (3).

· Weight : 12 kg (26 lb)



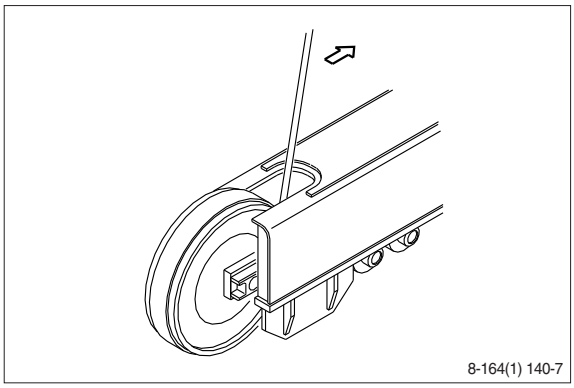
2) INSTALL

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

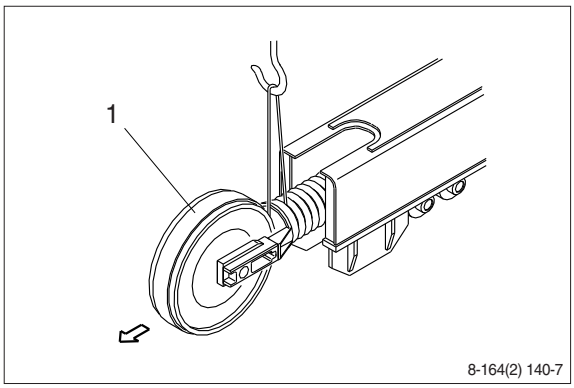
4. IDLER AND RECOIL SPRING

1) REMOVAL

(1) Remove the track link.
For detail, see removal of track link.

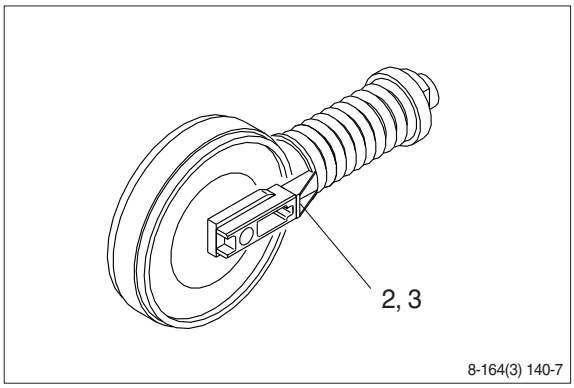

8-164(1) 140-7

(2) Sling the recoil spring (1) and pull out idler and recoil spring assembly from track frame, using a pry.
· Weight : 100 kg (220 lb)



8-164(2) 140-7

(3) Remove the bolts (2), washers (3) and separate idler from recoil spring.

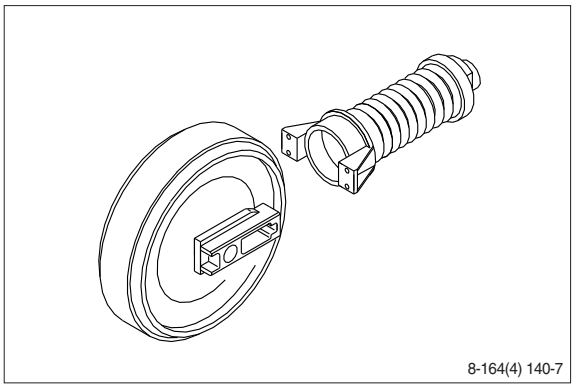


8-164(3) 140-7

2) INSTALL

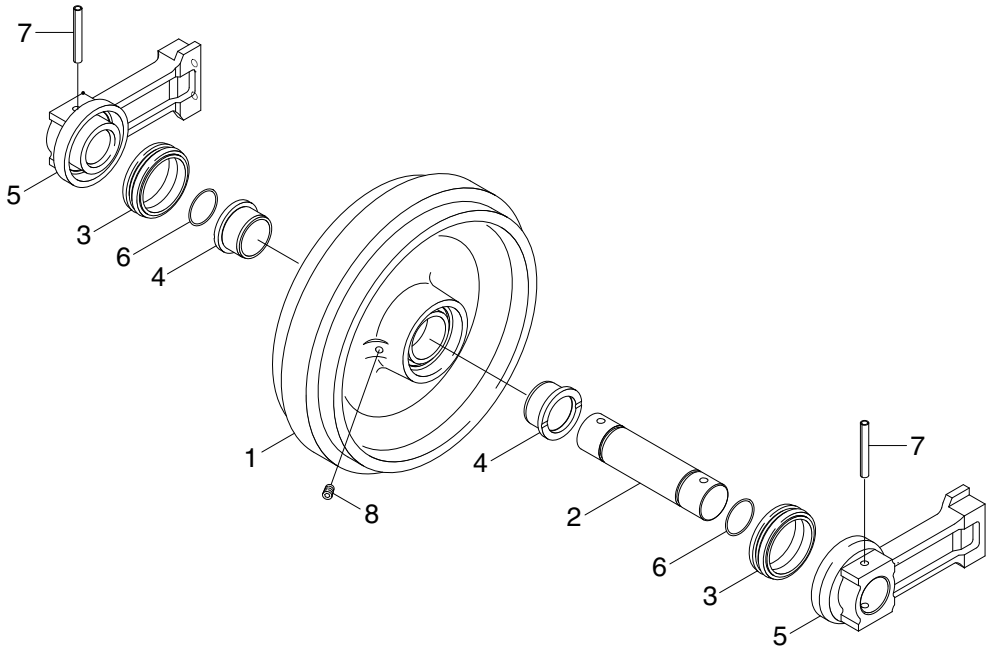
(1) Carry out installation in the reverse order to removal.

※ Make sure that the boss on the end face of the recoil cylinder rod is in the hole of the track frame.


8-164(4) 140-7

3) DISASSEMBLY AND ASSEMBLY OF IDLER

(1) Structure



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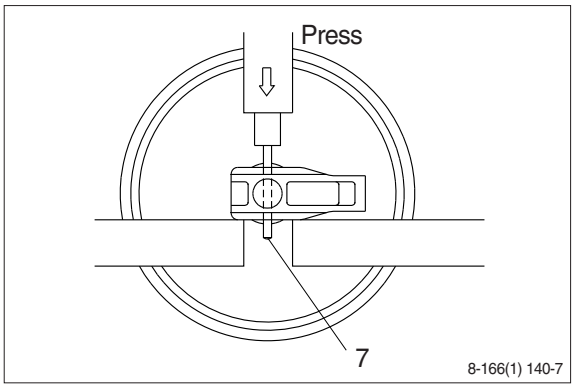
1	Shell	4	Bushing	7	Spring pin
2	Shaft	5	Bracket	8	Plug
3	Seal assembly	6	O-ring		

(2) Disassembly

① Remove plug and drain oil.

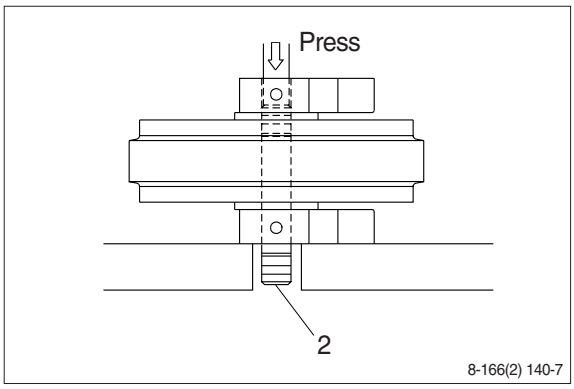
② Draw out the spring pin (7), using a press.



③ Pull out the shaft (2) with a press.

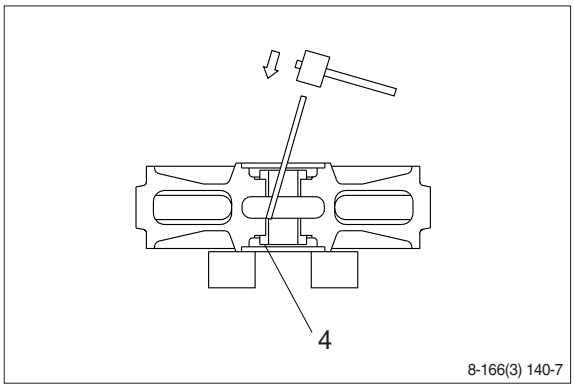
④ Remove seal (3) from idler (1) and bracket (5).

⑤ Remove O-ring (6) from shaft.



⑥ Remove the bushing (4) from idler, using a special tool.

※ Only remove bushing if replacement is necessity.

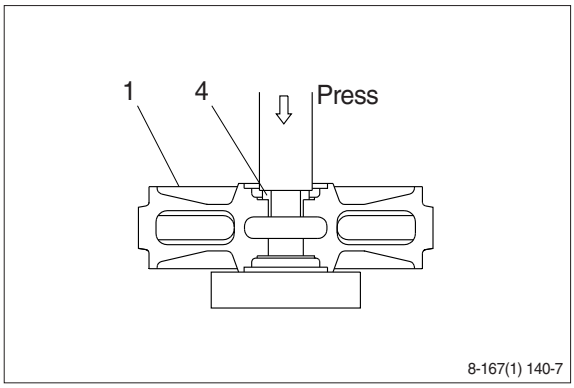


(3) **Assembly**

※ Before assembly, clean the parts.

※ Coat the sliding surfaces of all parts with oil.

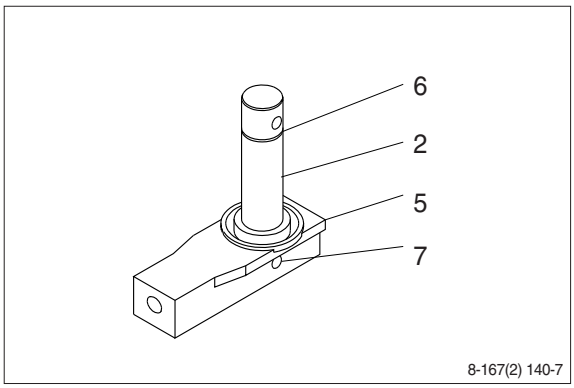
① Cool up bushing (4) fully by some dry ice and press it into shell (1).
Do not press it at the normal temperature, or not knock in with a hammer even after the cooling.



8-167(1) 140-7

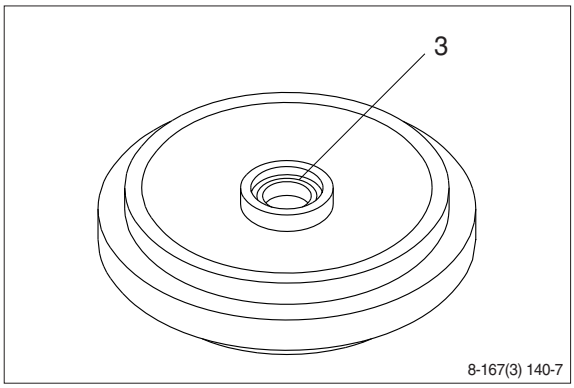
② Coat O-ring (6) with grease thinly, and install it to shaft (2).

③ Insert shaft (2) into bracket (5) and drive in the spring pin (7).



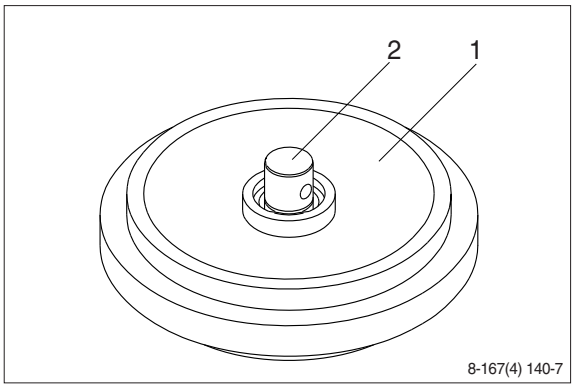
8-167(2) 140-7

④ Install seal (3) to shell (1) and bracket (5).



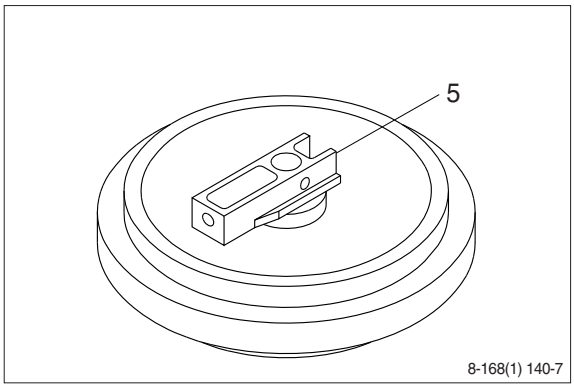
8-167(3) 140-7

⑤ Install shaft (2) to shell (1).

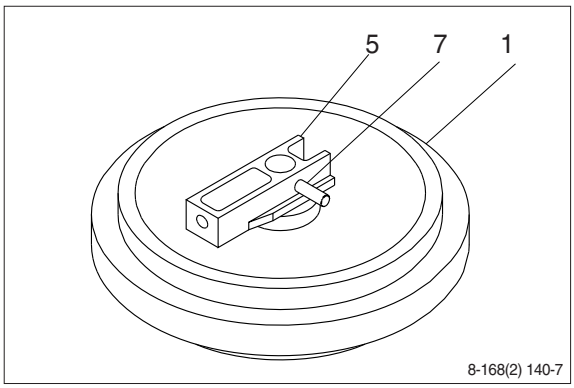


8-167(4) 140-7

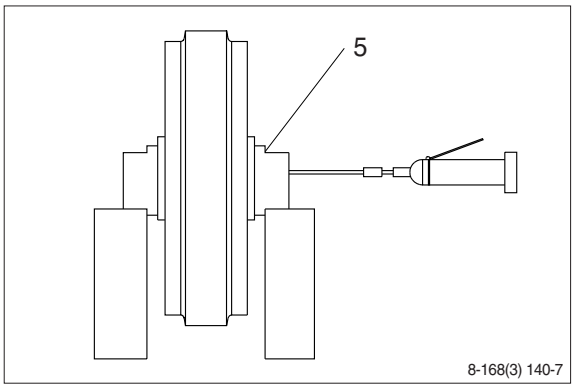
⑥ Install bracket (5) attached with seal (3).



⑦ Knock in the spring pin (7) with a hammer.

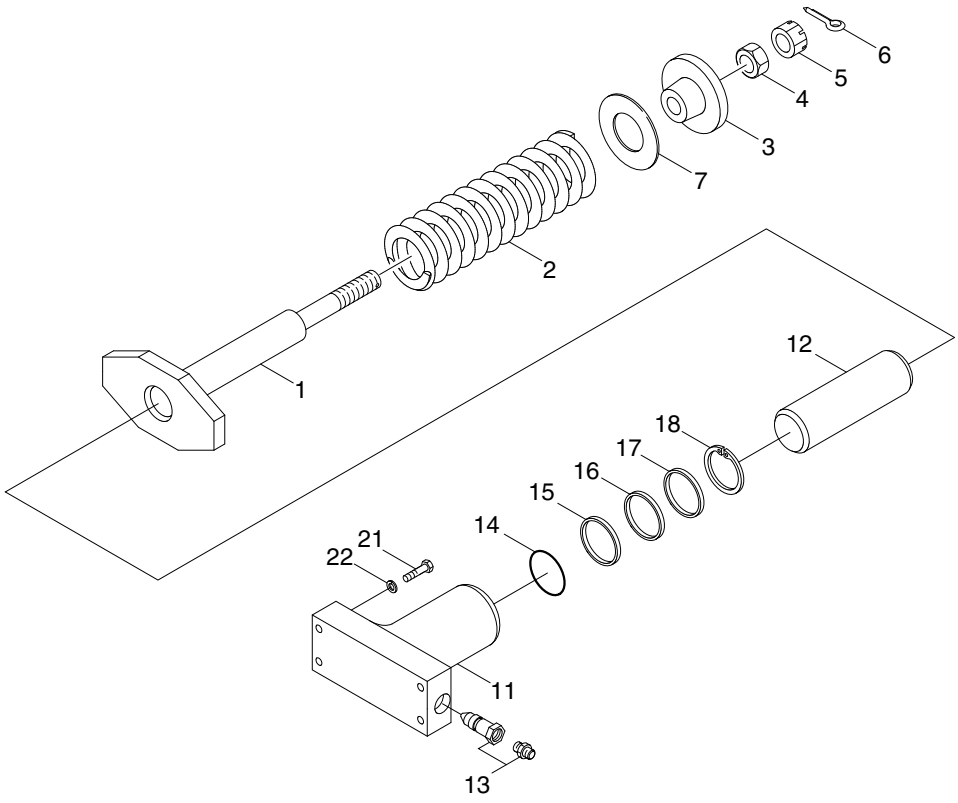


⑧ Lay bracket (5) on its side.
Supply engine oil to the specified level, and tighten plug.



4) DISASSEMBLY AND ASSEMBLY OF RECOIL SPRING

(1) Structure



R5577RS01

1	Rod	7	Spacer	16	Dust-seal
2	Spring	11	Bracket	17	Spacer
3	Lock washer	12	Piston	18	Retaining ring
4	Hex-nut	13	Grease valve	21	Bolt
5	Slotted hex-nut	14	O-ring	22	Washer
6	Split pin	15	Back-up ring		

(2) Disassembly

① Apply pressure on spring (3) with a press.
The spring is under a large installed load.

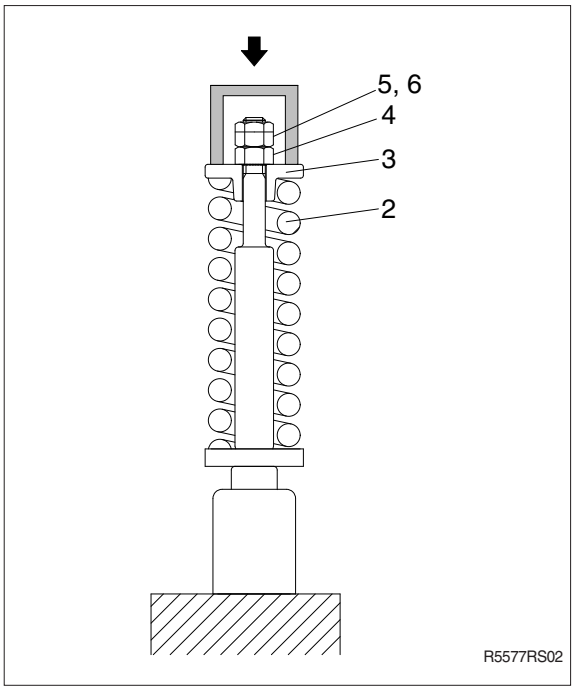
※ This is dangerous, so be sure to set properly.

· Spring set load : 3900 kg (8600 lb)

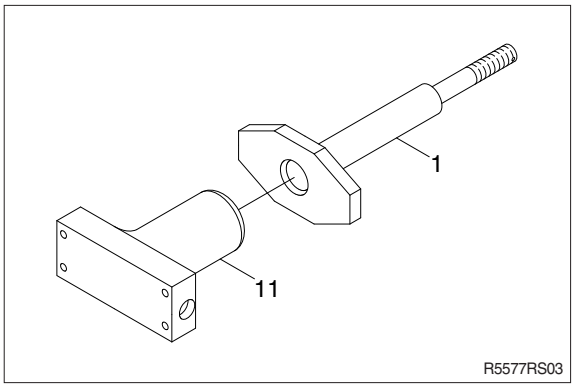
② Remove split pin (6) and nut (5).

③ Remove lock nut (4).
Take enough notice so that the press which pushes down the spring, should not be slipped out in its operation.

④ Lighten the press load slowly and remove lock washer (3) and spring (2).

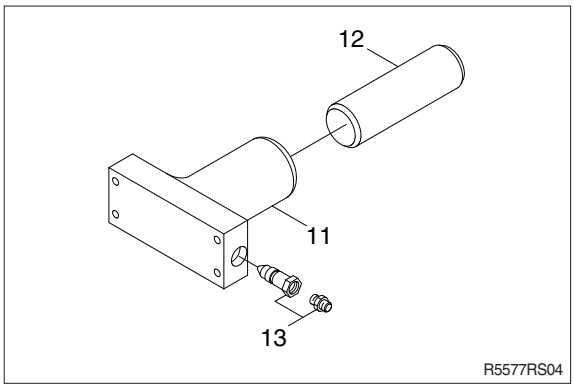


⑤ Remove rod (1) from bracket (11).

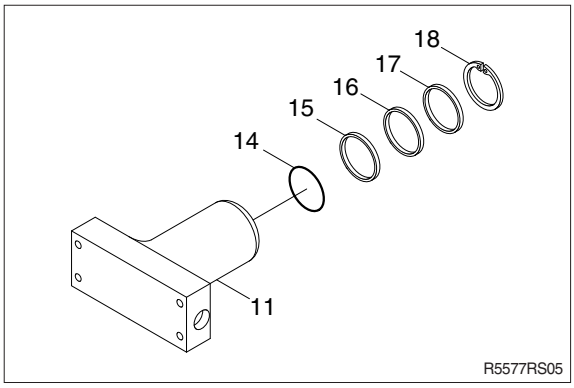


⑥ Remove grease valve (13) from bracket (11).

⑦ Remove piston (12) from bracket (11).



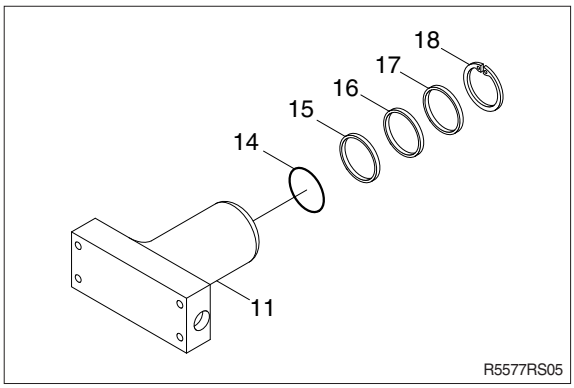
⑧ Remove retaining ring (18), spacer (17), dust seal (16), back-up ring (15) and O-ring (14).



(3) Assembly

① Install O-ring (14), back-up ring (15), dust seal (16), spacer (17) and retaining ring (18) to bracket (11).

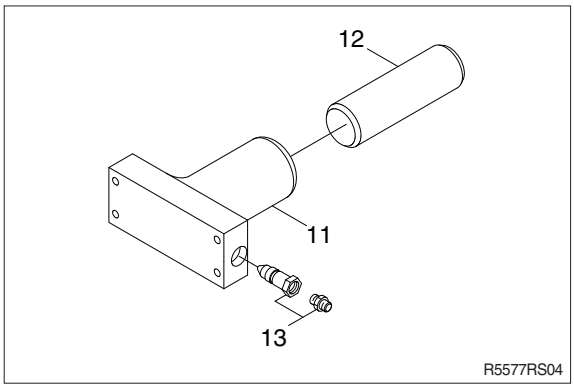
※ When installing dust seal (16) take full care so as not to damage the lip.



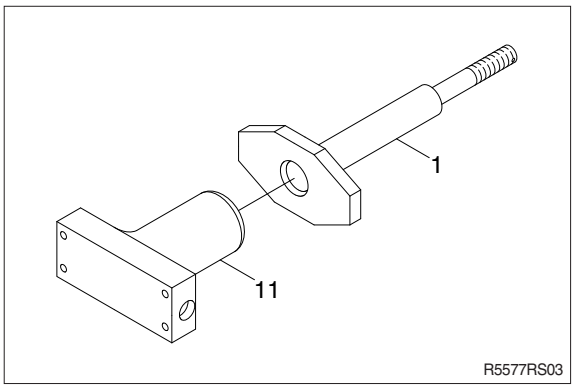
② Pour grease into bracket (11), then push in piston (12) by hand.
After take grease out of grease valve mounting hole, let air out.

※ If air letting is not sufficient, it may be difficult to adjust the tension of crawler.

③ Fit grease valve (13) to bracket (11).
· Tightening torque : 8±1.0 kg · m
(57.9±7.2 lb · ft)



④ Install rod (1) to bracket (11).



⑤ Install spring (3) and bracket (4) to body (1).

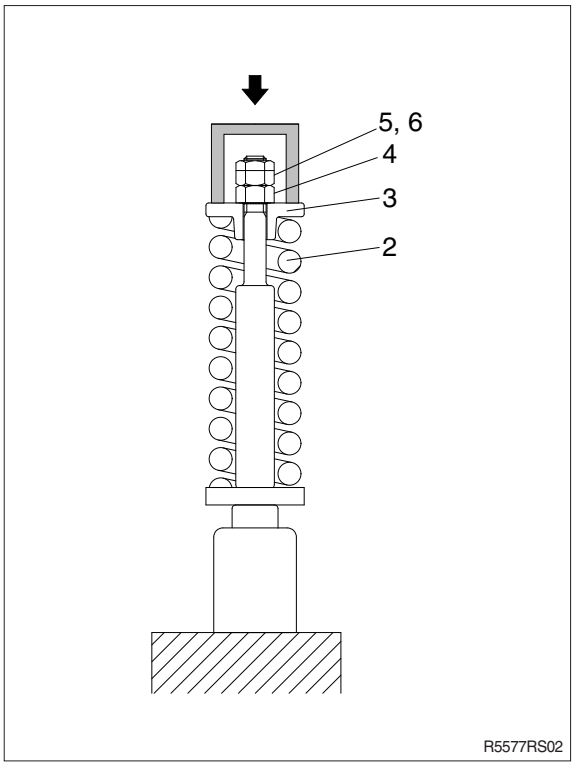
⑥ Apply pressure to spring (3) with a press and tighten nut (4).

※ Apply sealant before assembling.

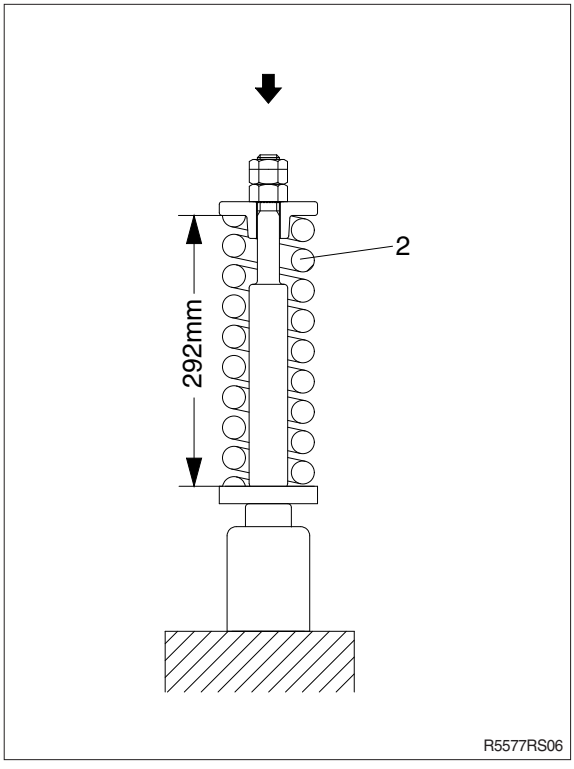
※ During the operation, pay attention specially to prevent the press from slipping out.

· Tightening torque : 30±3 kgf · m
(217±21 lbf · ft)

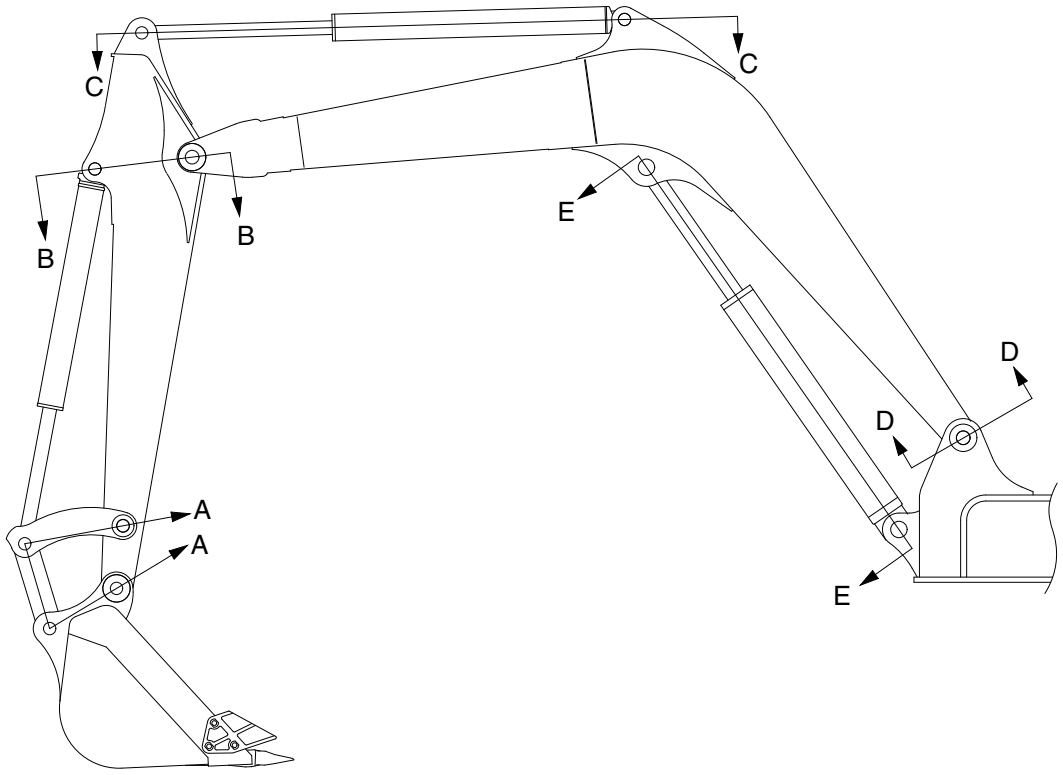
⑦ Tighten nut (5) and insert split pin (6).

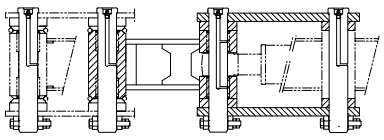


⑧ Lighten the press load and confirm the set length of spring (2).

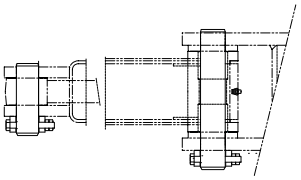


1. STRUCTURE

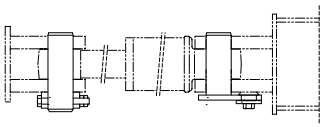




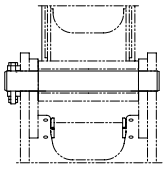
SECTION A-A



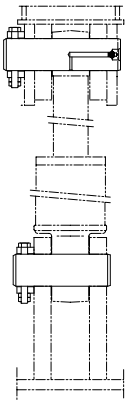
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

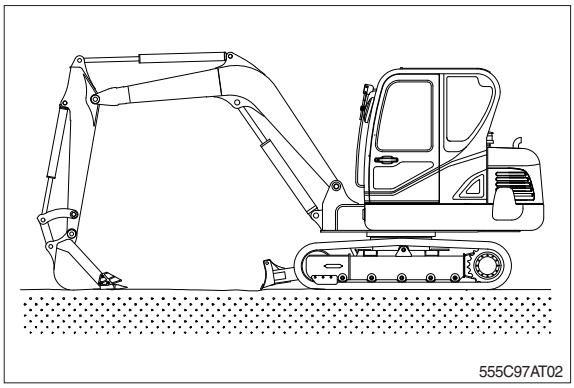
R5577AT01

2. REMOVAL AND INSTALL

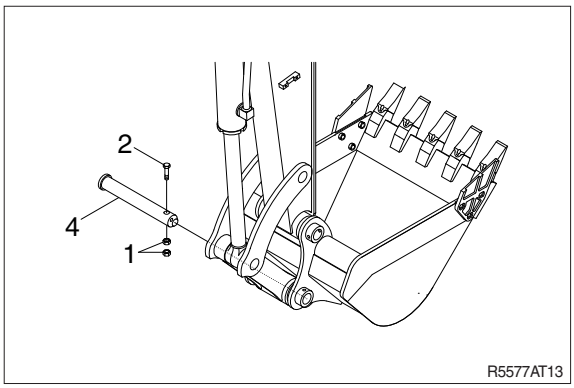
1) BUCKET ASSEMBLY

(1) Removal

① Lower the work equipment completely to ground with back of bucket facing down.

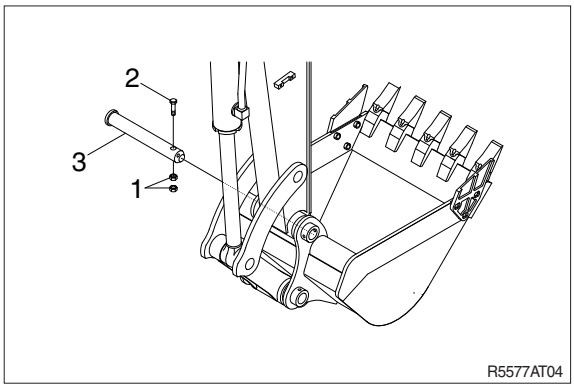


② Remove nut (1), bolt (2) and draw out the pin (4).



③ Remove nut (1), bolt (2) and draw out the pin (3) then remove the bucket assembly.

· Weight (0.18m^3) : 168kg (370 lb)

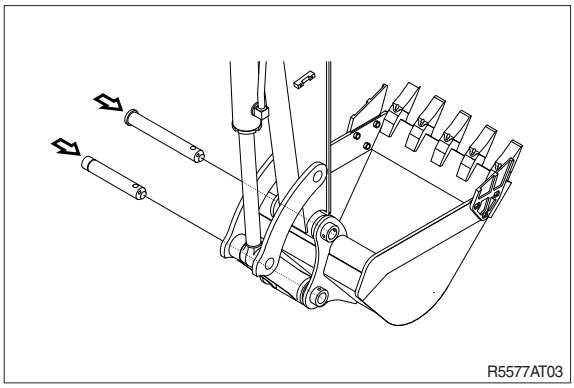


(2) Install

① Carry out installation in the reverse order to removal.

⚠ **When aligning the mounting position of the pin, do not insert your fingers in the pin hole.**

※ Adjust the bucket clearance.
For detail, see operation manual.



2) ARM ASSEMBLY

(1) Removal

※ Loosen the breather slowly to release the pressure inside the hydraulic tank.

⚠ Escaping fluid under pressure can penetrated the skin causing serious injury.

① Remove bucket assembly.
For details, see removal of bucket assembly.

② Disconnect bucket cylinder hose (4).

⚠ Fit blind plugs (5) in the piping at the chassis end securely to prevent oil from spurting out when the engine is started.

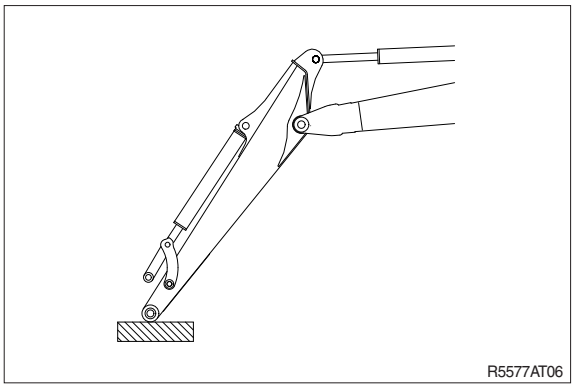
③ Sling arm cylinder assembly, remove spring, pin stopper and pull out pin.

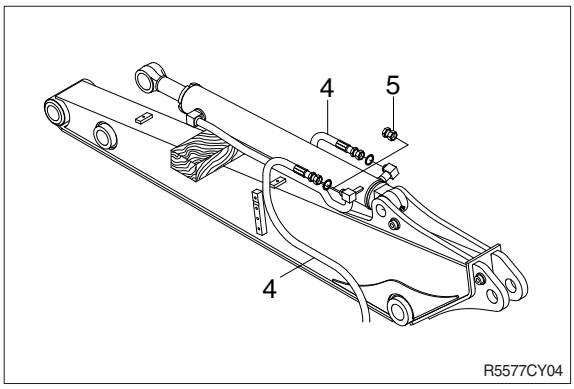
※ Tie the rod with wire to prevent it from coming out.

④ For details, see removal of arm cylinder assembly.
Place a wooden block under the cylinder and bring the cylinder down to it.

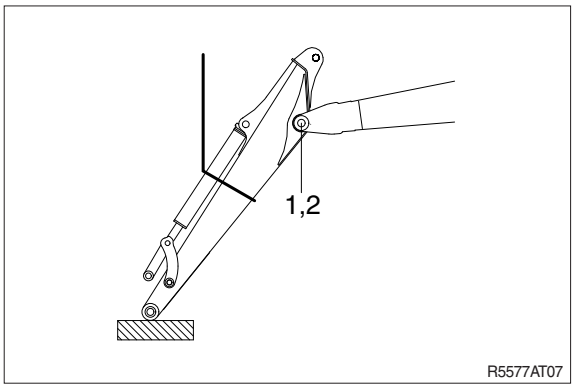
⑤ Remove bolt (1) and pull out the pin (2) then remove the arm assembly.
· Weight (1.6 m) : 128 kg (282 lb)

※ When lifting the arm assembly, always lift the center of gravity.


R5577AT06



R5577CY04



R5577AT07

(2) Install

① Carry out installation in the reverse order to removal.

⚠ When lifting the arm assembly, always lift the center of gravity.

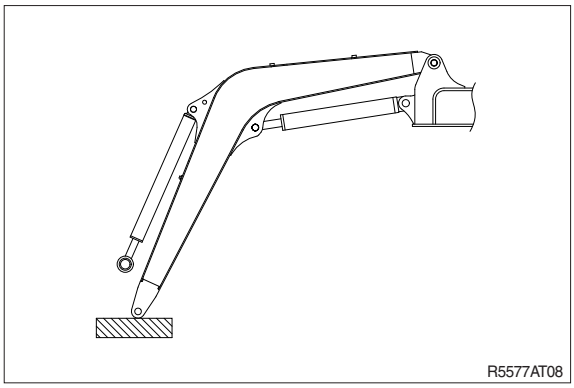
※ Bleed the air from the cylinder.

3) BOOM CYLINDER

(1) Removal

① Remove arm and bucket assembly.

② For details, see removal of arm and bucket assembly.
Remove boom cylinder assembly from boom.
For details, see removal of arm cylinder assembly.

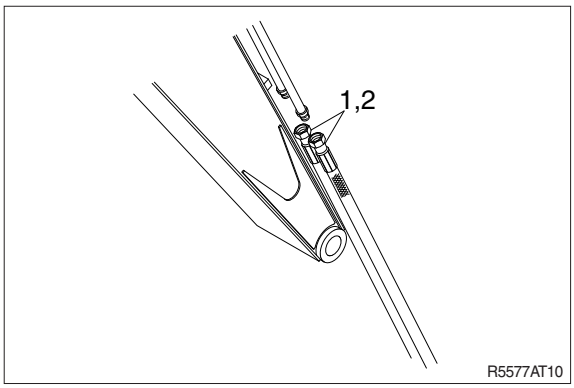

R5577AT08

③ Disconnect head lamp wiring.

④ Disconnect bucket cylinder hose (2) and arm cylinder hos e(1).

※ When the hose are disconnected, oil may spurt out.

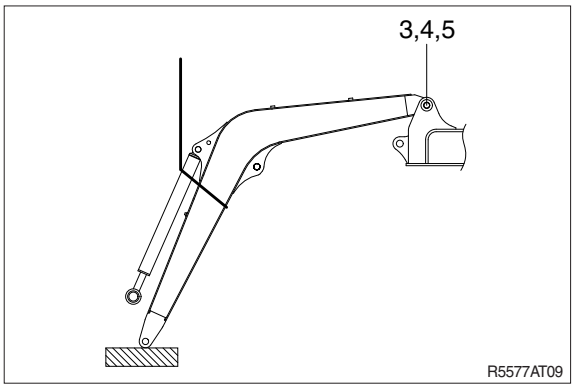
⑤ Sling boom assembly (3).



R5577AT10

⑥ Remove bolt (3), nut (4) and pull out the pin (5) then remove boom assembly.
· Weight (3.0 ㎥) : 282 kg (622 lb)

※ When lifting the boom assembly always lift the center of gravity.



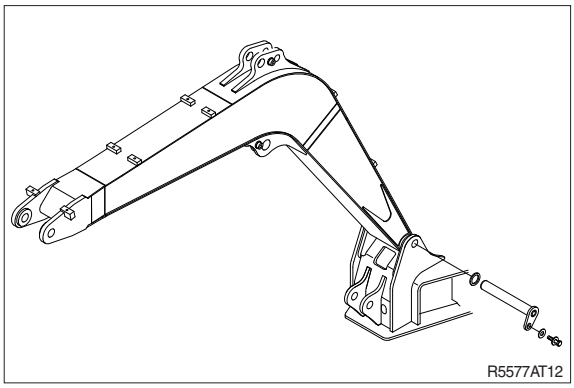
R5577AT09

(2) Install

① Carry out installation in the reverse order to removal.

⚠ **When lifting the arm assembly, always lift the center of gravity.**

※ Bleed the air from the cylinder.


R5577AT12