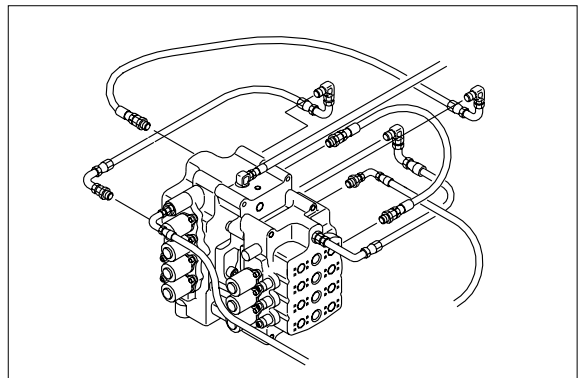
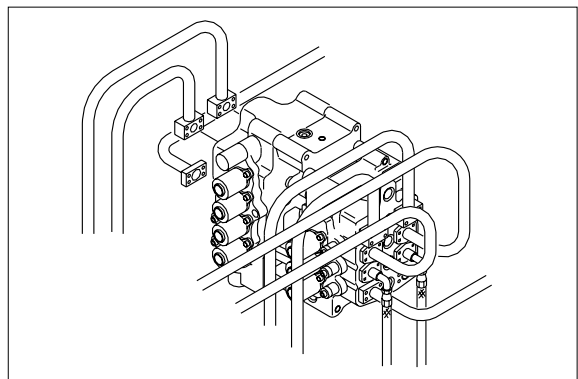


GROUP 4 MAIN CONTROL VALVE

1. REMOVAL AND INSTALL

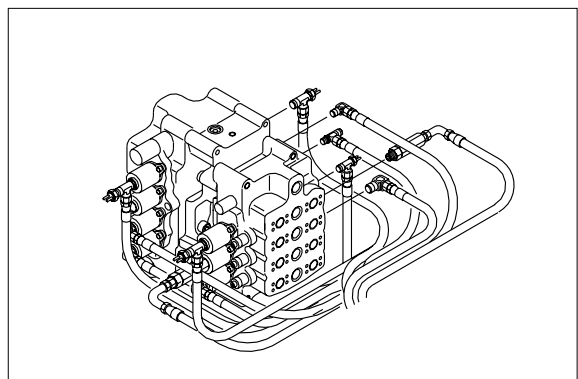
1) REMOVAL

- (1) Lower the work equipment to the ground and stop the engine.
- (2) 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.
- (3) Remove bolts and disconnect pipe.
- (4) Disconnect pilot line hoses.
- (5) Disconnect pilot piping.
- (6) Sling the control valve assembly and remove the control valve mounting bolt.
 - weight : 124kg(273 lb)
- (7) Remove the control valve assembly.
 - ※ When removing the control valve assembly, check that all the piping have been disconnected.

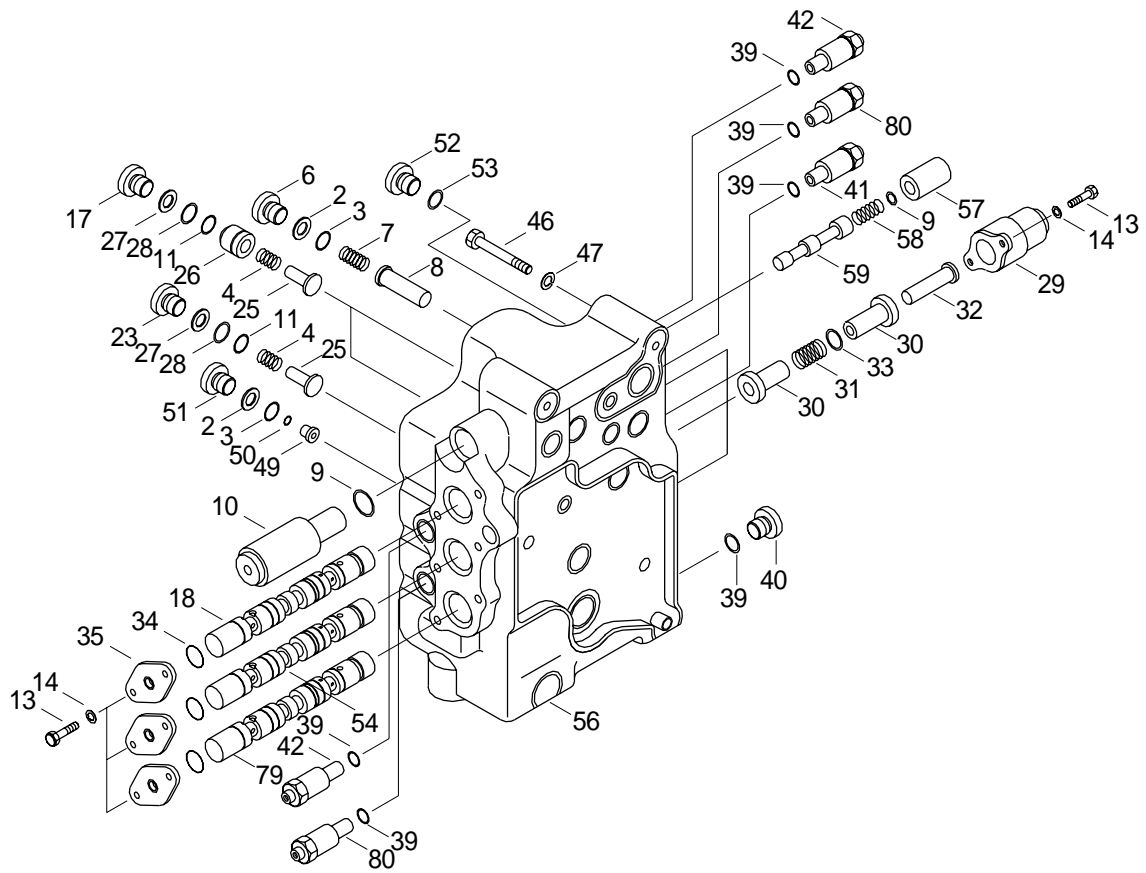


2) INSTALL

- (1) Carry out installation in the reverse order to removal
- (2) Bleed the air from below items.
 - ① Cylinder (boom, arm, bucket)
 - ② Swing motor
 - ③ Travel motor
 - ※ See each item removal and install
- (3) Confirmed the hydraulic oil level and recheck the hydraulic oil leak or not.

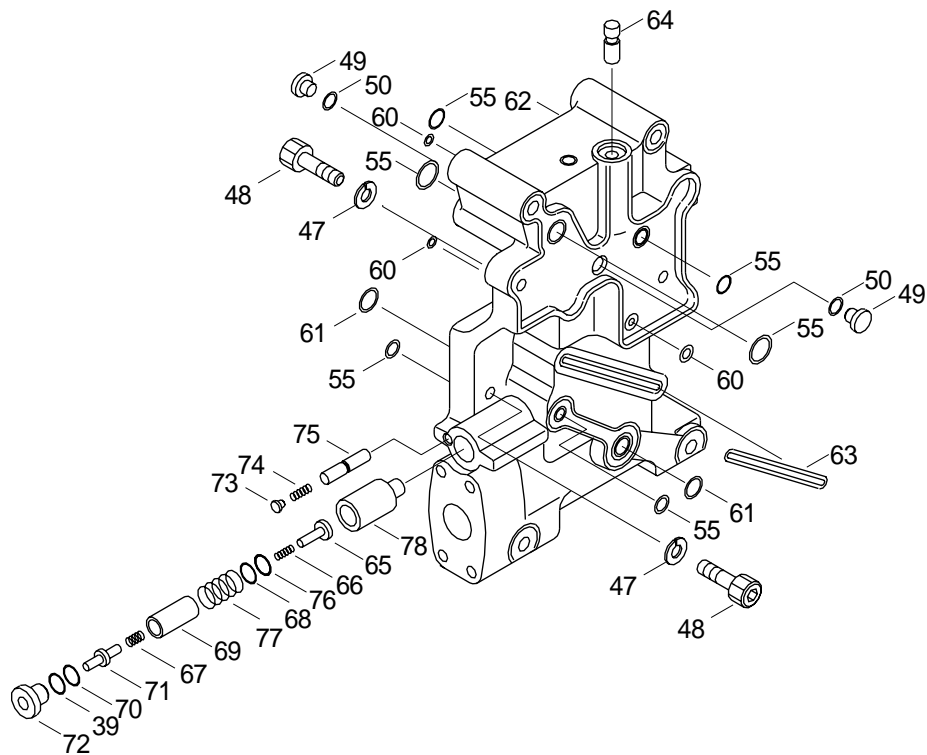


2. STRUCTURE(1/3)



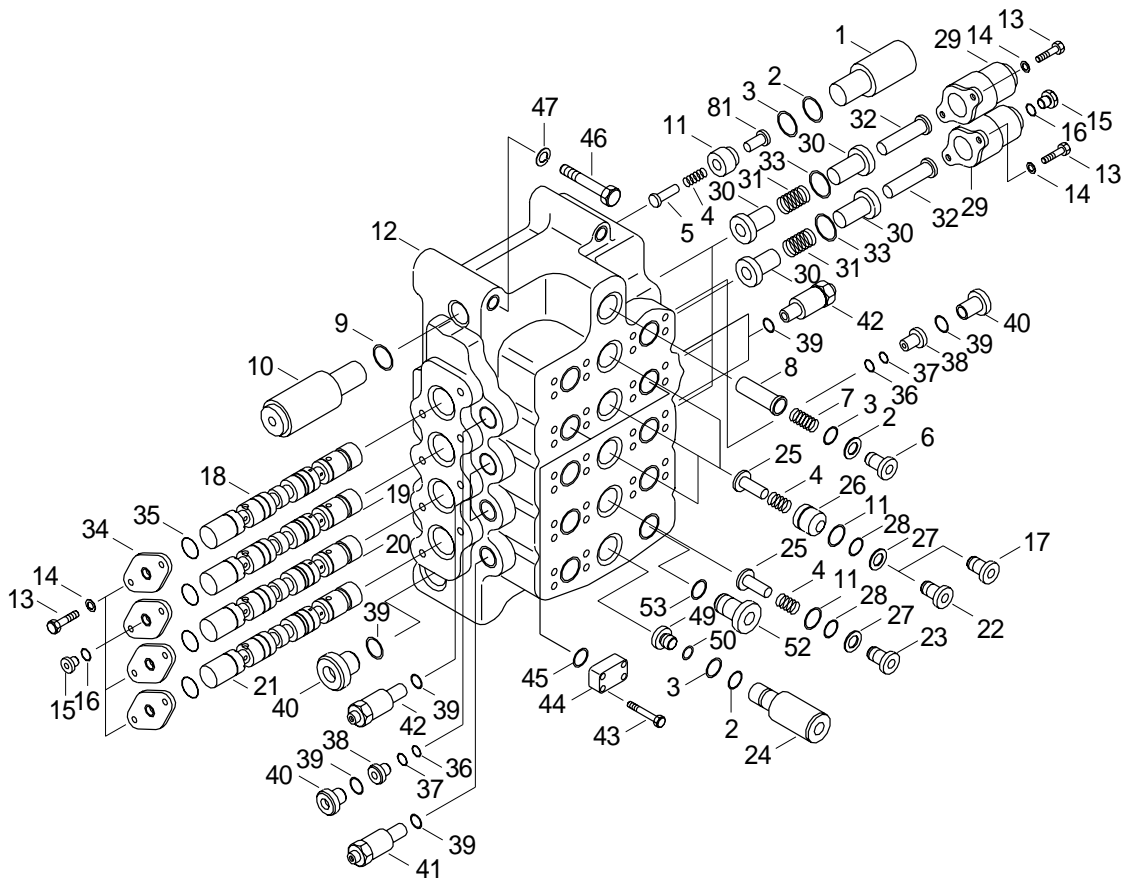
2	Back up ring	26	Check	47	Spring washer
3	O-ring	27	Back up ring	49	Cap
4	Spring	28	O-ring	50	O-ring
6	Cap	29	Cover	51	Cap
7	Spring	30	Spring guide	52	Cap
8	Poppet	31	Spring	53	O-ring
9	O-ring	32	Plunger cap	54	Plunger
10	Port relief valve	33	O-ring	56	Housing
11	Nylon chip	34	Retainer	57	Cap
13	Bolt	35	O-ring	58	Spring
14	Spring washer	39	O-ring	59	Spool
17	Cap	40	Cap	79	Plunger
18	Plunger	41	Main relief	80	Port relief
23	Cap	42	Port relief		
25	Check	46	Bolt		

STRUCTURE(2/3)



39	O-ring	63	O-ring	72	Cap
47	Spring washer	64	Orifice	73	Plug
48	Bolt	65	Check	74	Spring
49	Cap	66	Spring	75	Check
50	O-ring	67	Spring	76	Back up ring
55	O-ring	68	O-ring	77	Spring
60	O-ring	69	Sleeve	78	Poppet
61	O-ring	70	O-ring		
62	Manifold	71	Piston		

STRUCTLURE(3/3)



- | | | | | | |
|----|---------------|----|--------------|----|---------------|
| 1 | Cap | 19 | Plunger | 37 | Back up ring |
| 2 | Back up ring | 20 | Plunger | 38 | Plug |
| 3 | O-ring | 21 | Plunger | 39 | O-ring |
| 4 | Spring | 22 | Plunger | 40 | Cap |
| 5 | Check | 23 | Cap | 41 | Main relief |
| 6 | Cap | 24 | Cap | 42 | Port relief |
| 7 | Spring | 25 | Check | 43 | Bolt |
| 8 | Poppet | 26 | Check | 44 | Plunger |
| 9 | O-ring | 27 | Back up ring | 45 | O-ring |
| 10 | Port relief | 28 | O-ring | 46 | Bolt |
| 11 | Nylon chip | 29 | Cover | 47 | Spring washer |
| 12 | Housing | 30 | Spring guide | 49 | Cap |
| 13 | Bolt | 31 | Spring | 50 | O-ring |
| 14 | Spring washer | 32 | Plunger cap | 52 | Cap |
| 15 | Cap | 33 | O-ring | 53 | O-ring |
| 16 | O-ring | 34 | Retainer | 81 | Check |
| 17 | Cap | 35 | O-ring | | |
| 18 | Plunger | 36 | O-ring | | |

3. DISASSEMBLY AND ASSEMBLY

1) PRECAUTION

(1) Disassembly

- ① Handle the components carefully not to drop them or bump them with each other as they are made with precision.
- ② Do not force the work by hitting or twisting as burred or damaged component may not be assembled or result in oil leakage or low performance.
- ③ When disassembled, tag the components for identification so that they can be re-assembled correctly.
- ④ Once disassembled, O-rings and backup rings are usually not to be used again. (Remove them using a wire with its end made like a shoehorn. Be careful not to damage the slot.)
- ⑤ If the components are left disassembled or half-disassembled, they may get rust from moisture or dust. If the work has to be interrupted, take measures to prevent rust and dust.

(2) Assembly

- ① Take the same precautions as for disassembly.
- ② When assembling the components, remove any metal chips or foreign objects and check them for any burrs or dents. Remove burrs and dents with oil-stone, if any.
- ③ O-rings and backup rings are to be replaced with new ones, as a rule.
- ④ When installing O-rings and backup rings, be careful not to damage them. (Apply a little amount of grease for smoothness.)
- ⑤ Tighten the bolts and caps with specified torque.

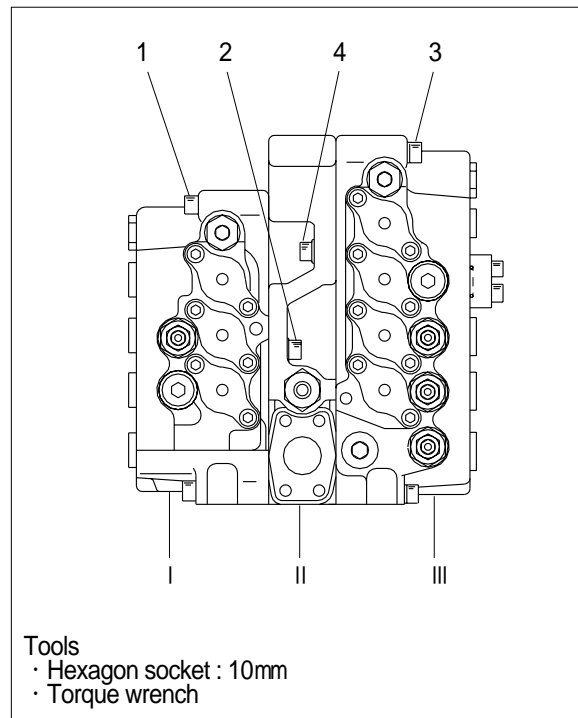
2) MOUNTING AND DISMOUNTING VALVES

(1) Disassembly

- ① Remove socket bolts (1, 2) and separate 3-spool valve(I) from block(II)
- ② Remove socket bolts (3, 4) and separate 4-spool valve(III) from block(II)

(2) Assembly

- ① In the reverse manner of disassembly, reassemble 4-spool valve(III).
 - ② reassemble 3-spool valve(I).
 - ③ Tighten the bolts to the torque of 10kgf · m (72.3lbf · ft)
- ※ Before reassembly, see if the O-Rings are fitted in between the blocks.



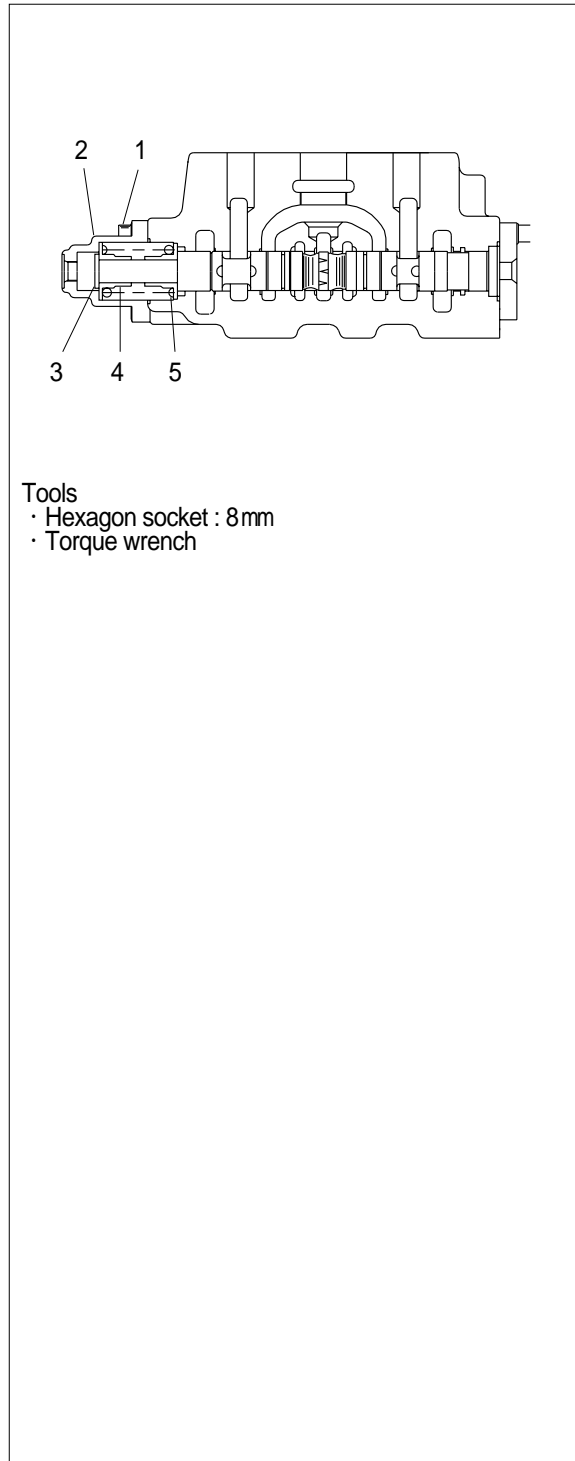
3) OPERATING SECTION OF HYDRAULIC PACK

(1) Disassembling

- ① Loosen socket bolt (1) to remove cover (2).
- ② Pull the plunger out while holding the spring.
 - ※ Do not pull it out violently, but draw it out gently while making sure of its contact with HG hole.
- ③ Place the plunger between holders and loosen plunger cap (3) by using a vise.
- ④ Remove plunger cap (3), guide (4) and spring (5) in this order.

(2) Assembling

- ① Place the plunger between holders and clamp the holders with the vise.
- ② Mount guide (4), spring (5) and plunger cap (3) to the plunger.
- ③ Tighten plunger cap (3) at the specified torque.
- ④ Tightening torque : 6kgf · m (43.4lbf · ft)
Restore the plunger to the valve while holding the spring section.
 - ※ Insert the plunger into the valve hole while turning it slowly so that it is well aligned with the HG hole. In particular, be careful not to hit it against the first round corner.
- ⑤ Install cover (2) after making sure that O-ring is placed on the edge of the valve hole and tighten socket bolt (1) with the specified torque.
Tightening torque : 5kgf · m (36.2lbf · ft)



4) LOGIC ASSEMBLY(Boom, Arm)

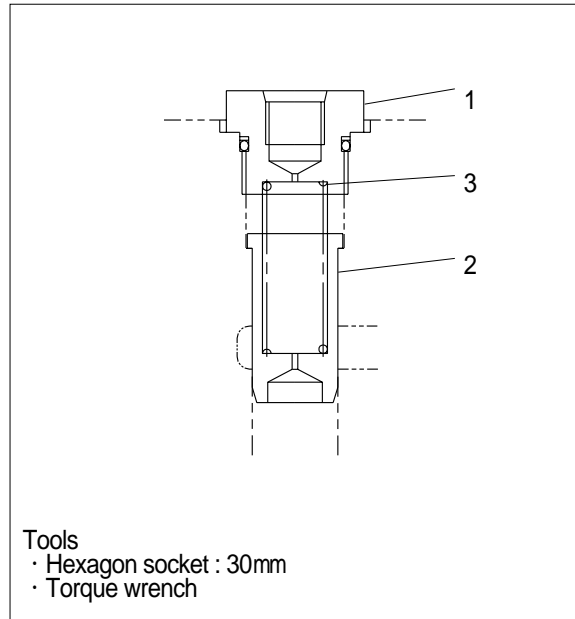
(1) Disassembling

- ① Remove cap (1)
- ② Remove spring (3) and poppet (2).

(2) Assembling

- ① Mount poppet (2) and spring (3) to the valve housing.
 - ② Tighten cap (1) at the specified torque.
- ※ Be careful for the backup ring not to protrude.

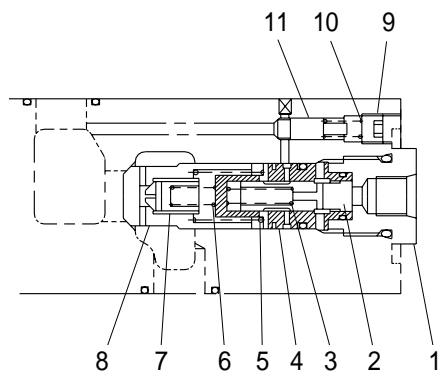
Tightening torque : 8kgf · m (57.9lbf · ft)



5) LOGIC CHECK ASSEMBLY(Boom Operation)

(1) Disassembling

- ① Remove the cap(1).
- ② Remove the spool (2) and the spring (3).
- ③ Remove the sleeve (4). Be careful not to damage the sleeve surface.
- ④ Remove the springs (5, 6), check valve(7) and poppet (8).
- ⑤ Remove the plug(9), spring(10) and check valve(11).



Tools

- Hexagon socket : 32mm
- Torque wrench

(2) Assembling

- ① Reassemble the check valve(11) and the spring(10).
- ② Tighten the plug(9) to the specified torque of 2kgf · m(14.5lb · ft)
- ③ Reassemble sleeve(4) with cap(1) after inserting spring(3) and piston(2) to the sleeve(4)
- ④ Reassemble poppet(8), check valve(7) and spring(6)
- ⑤ Reassemble the cap assembly(1) and tighten it to specified torque of 6kgf.m(43.4lbf · ft)

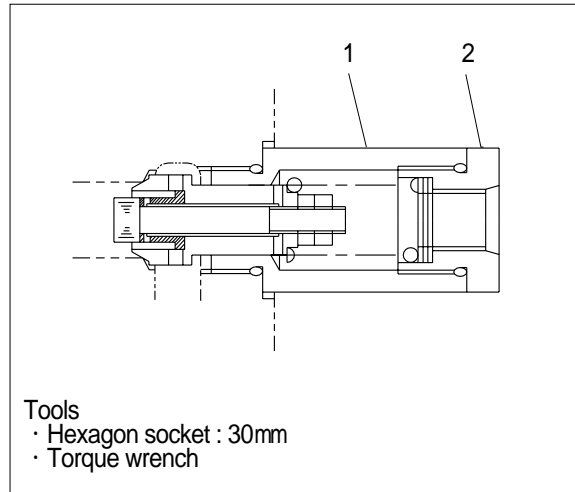
6) FOOT RELIEF ASSEMBLY

(1) Disassembling

- ① Remove valve(1) from valve block.
- ※ Do not disassemble internal part of valve assembly because it is not easy to adjust them.

(2) Assembling

Reassemble valve(1) and tighten the cap(2) to the specified torque of 6kgf.m(43.4lb · ft)



7) SELECTOR ASSEMBLY(traveling straight)

(1) Disassembling

- ① Remove the cap(1).
- ② Remove the spring(2) and the spool(3).

(2) Assembling

- ① Reassemble the spool(3) and the spring(2).
- ② Tighten the cap(1) to the specified torque of 6kgf.m(43.4lb · ft)

