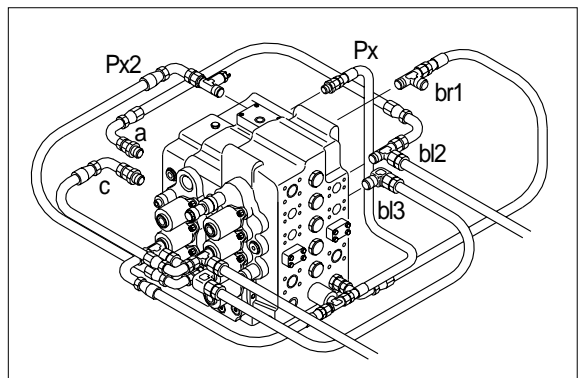
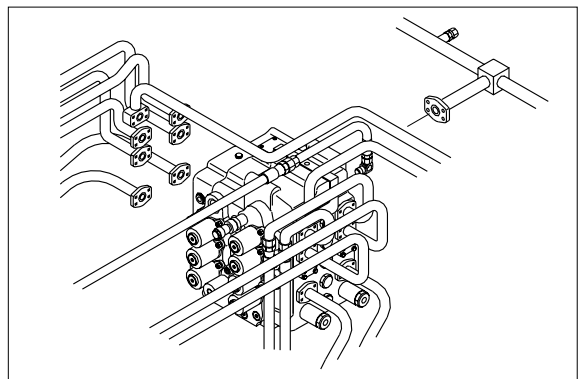


GROUP 4 MAIN CONTROL VALVE

1. REMOVAL AND INSTALL

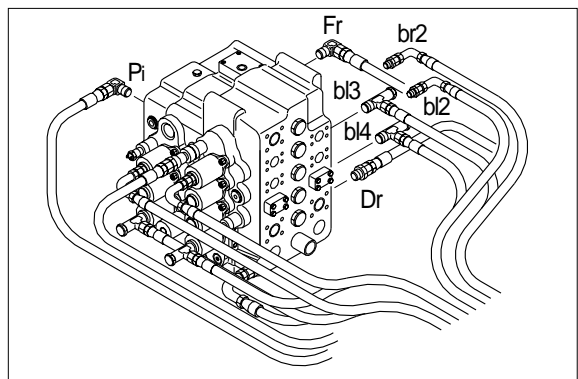
1) REMOVAL

- (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 : 230kg(510 lb)
- (7) Remove the control valve assembly.
 - ※ When removing the control valve assembly, check that all the piping have been disconnected.

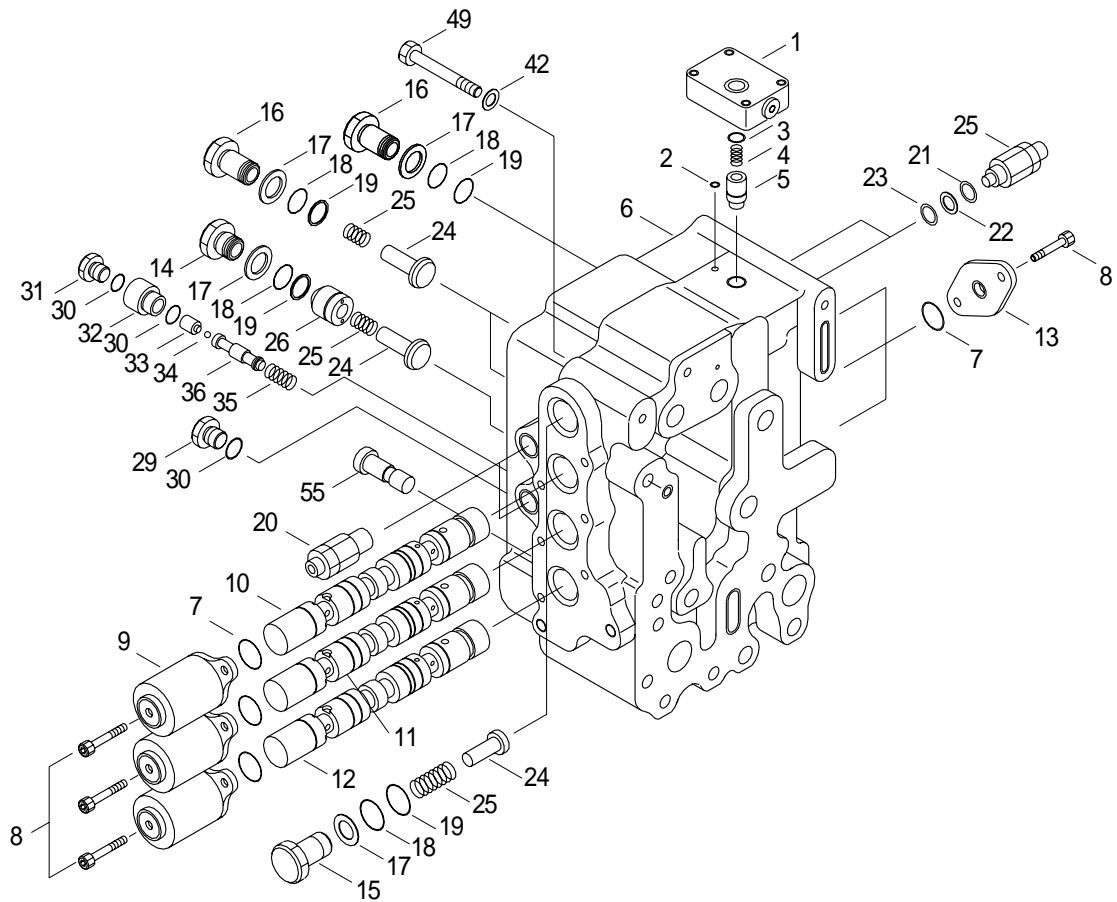


2) INSTALL

- (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.

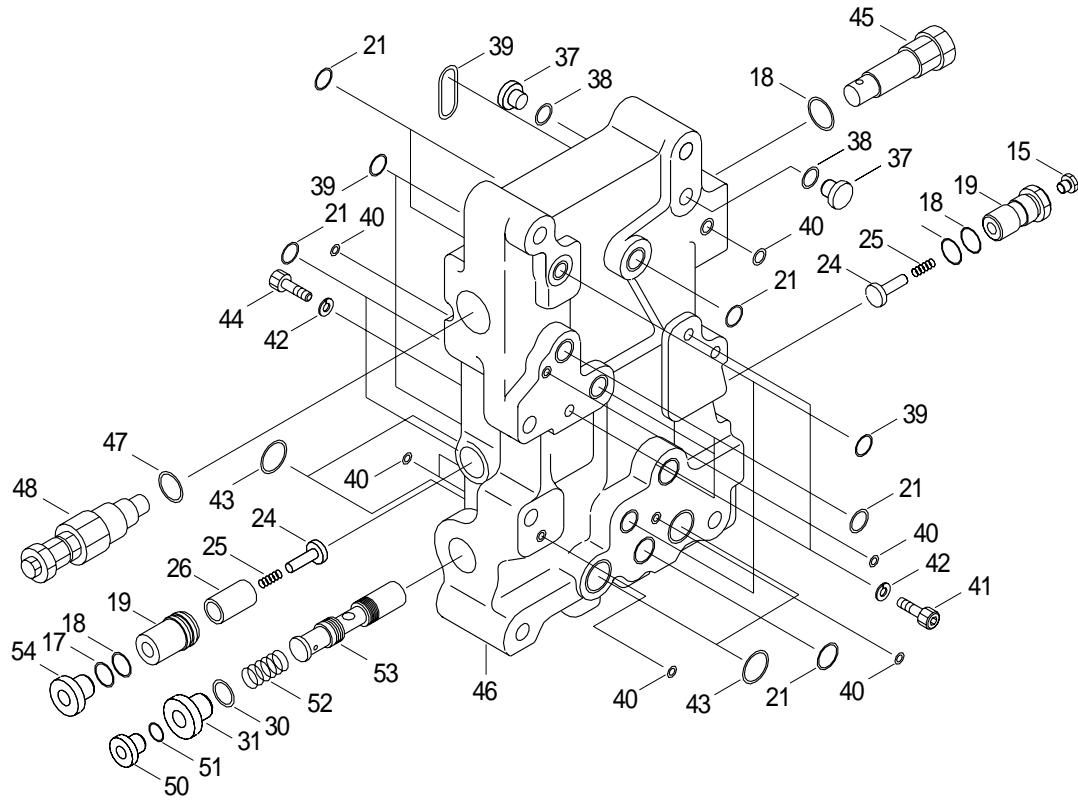


2. STURCTURE (1/3)



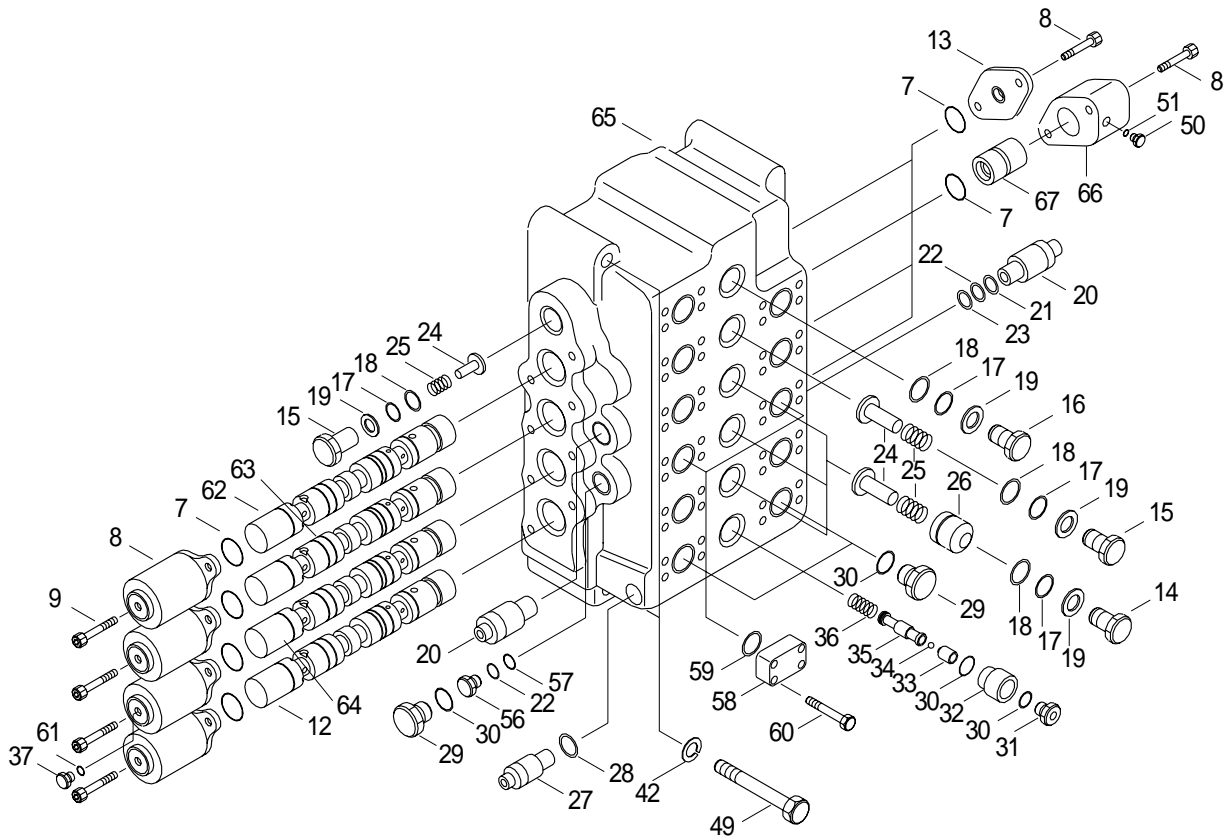
1	Cover	14	Cap	27	Foot relief valve
2	O-ring	15	Cap	28	O-ring
3	O-ring	16	Cap	29	Cap
4	Spring	17	Back up ring	30	O-ring
5	Poppet	18	O-ring	31	Cap
6	Housing	19	Nylon chip	32	Cap
7	O-ring	20	Over load relief valve	33	Piston
8	Bolt	21	O-ring	34	Steel ball
9	Cover	22	Back up ring	35	Spring
10	Plunger	23	O-ring	36	Spool
11	Plunger	24	Check	42	Washer
12	Plunger	25	Spring	49	Bolt
13	Cover	26	Check		

STURCTURE (2/3)



15	Cap	37	Cap	47	O-ring
17	Back up ring	38	O-ring	48	Main relief valve
18	O-ring	39	O-ring	50	Cap
19	Nylon chip	40	O-ring	51	O-ring
21	O-ring	41	Bolt	52	Spring
24	Check	42	Washer	53	Spool
25	Spring	43	O-ring	54	Cap
26	Check	44	Bolt	55	Orifice
30	O-ring	45	Logic check valve		
31	Cap	46	Manifold		

STURCTURE (3/3)



- | | | | | | |
|----|-----------------------|----|-------------------|----|---------|
| 7 | O-ring | 24 | Check | 49 | Bolt |
| 8 | Bolt | 25 | Spring | 50 | Cap |
| 9 | Cover | 26 | Check | 51 | O-ring |
| 12 | Plunger | 27 | Foot relief valve | 56 | Plug |
| 13 | Cover | 28 | O-ring | 57 | O-ring |
| 14 | Cap | 29 | Cap | 58 | Plunger |
| 15 | Cap | 30 | O-ring | 59 | O-ring |
| 16 | Cap | 31 | Cap | 60 | Bolt |
| 17 | Back up ring | 32 | Cap | 61 | O-ring |
| 18 | O-ring | 33 | Piston | 62 | Plunger |
| 19 | Nylon chip | 34 | Steel ball | 63 | Plunger |
| 20 | Overload relief valve | 35 | Spring | 64 | Plunger |
| 21 | O-ring | 36 | Spool | 65 | Housing |
| 22 | Back up ring | 37 | Cap | 66 | Cover |
| 23 | O-ring | 42 | Washer | 67 | Piston |

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.

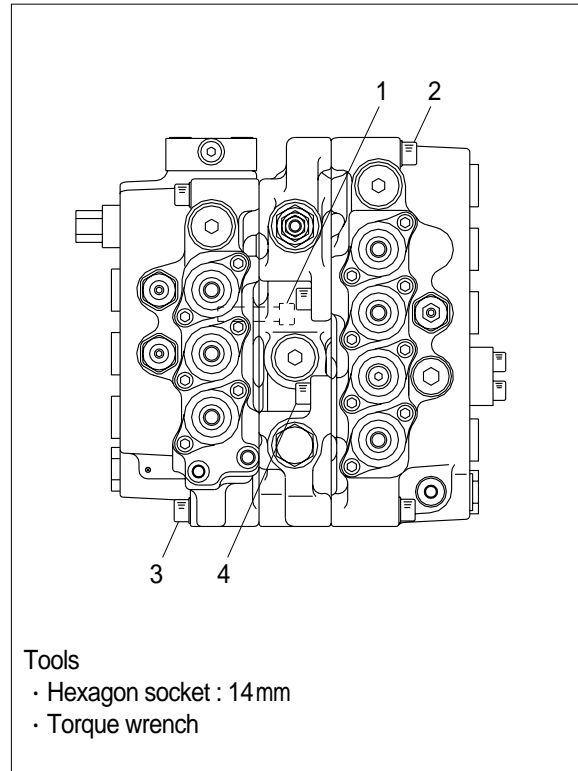
2) MOUNTING AND DISMOUNTING VALVES

(1) Disassembly

4 spool valve can be removed by loosening socket bolts (1,4), while 3 spool valve can be removed by loosening socket bolt (2,3).

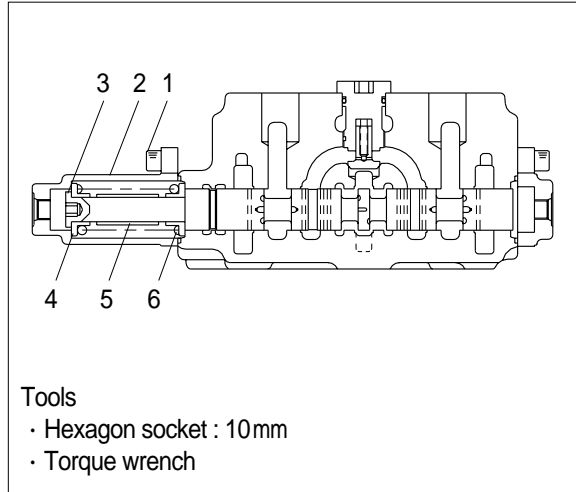
(2) Assembly

- ※ Valves should be mounted after making sure that all O-rings and cap are placed on the assembling faces and check spacer is placed on assembling faces of 3-plunger valve.
- Place the valve assembly on plane surface and assemble 3 spool valve to manifold and then assemble 4 spool valve.
- Tighten the socket bolts at specified torque after making sure that the assembly is leveled.
- Tightening torque : 25 kgf · m (181 lbf · ft)

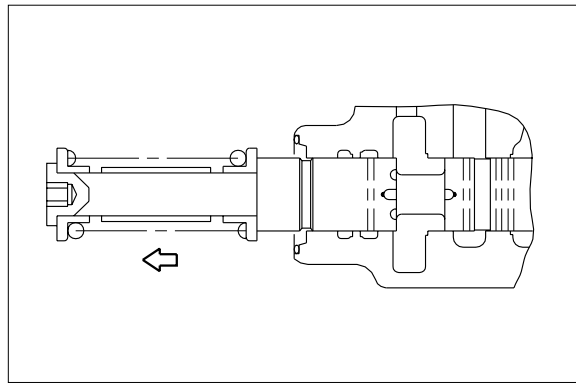


3) OPERATING SECTION OF HYDRAULIC PACK

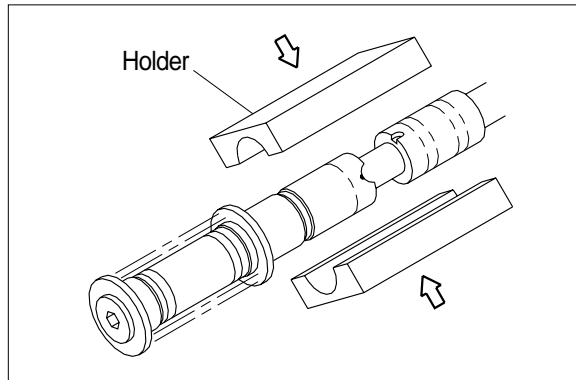
- (1) Loosen socket bolt (1) to remove cover (2).
 ※ Install cover (2) after making sure that O-ring is placed on the edge of the valve hole.



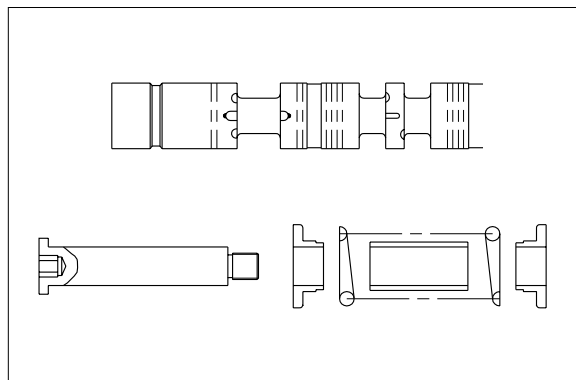
- (2) Pull the plunger out while holding the spring.
 ※ Do not pull it out violently, but draw it out gently while making sure of its contact with HG hole.



- (3) Place the plunger between holders and loosen plunger cap (3) by using a vise.
 • Plunger cap
 Hexagon socket : 10mm
 Tightening torque : 10 kgf · m(72.3 lbf · ft)

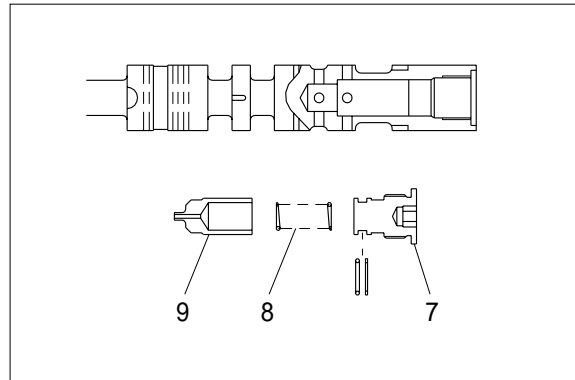


- (4) Remove plunger cap (3), guide (4), sleeve (5) and spring (6) in this order.



- (5) Arm plunger only (Remove check)
 Remove cap (7) and disassemble spring (8) and check (9).

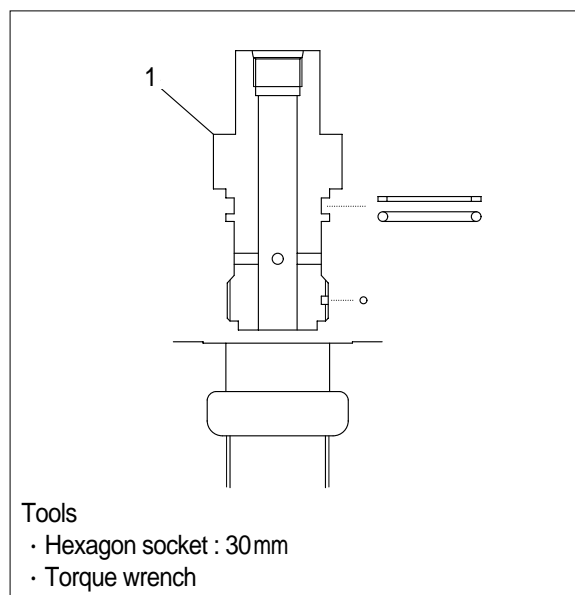
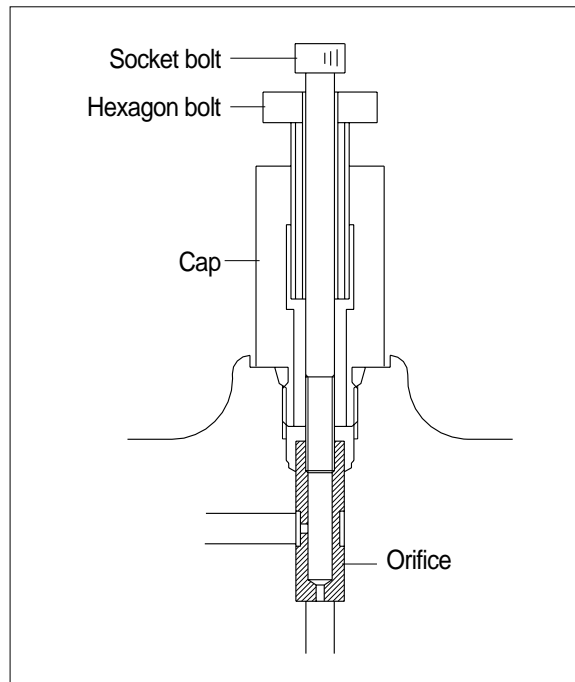
- Plunger cap
- Hexagon socket : 10 mm
 Tightening torque : 10 kgf · m (72.3 lbf · ft)



4) ORIFICE ASSEMBLY

(1) 3 spool side

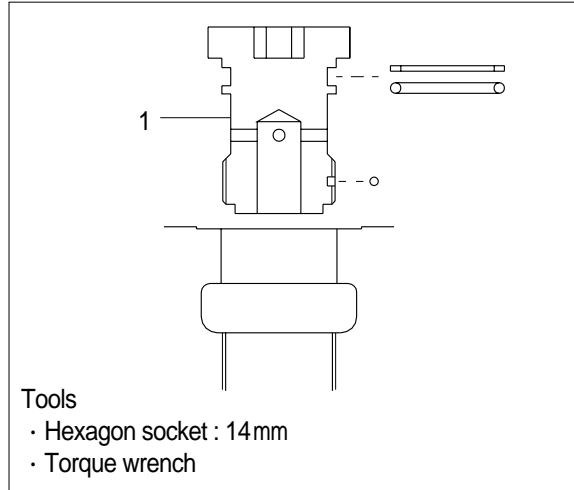
- ① Remove cap (1)
 Tightening torque : 35 kgf · m
 (253.2 lbf · ft)
- ※ Install a suitable jig as shown fig and pull out the orifice by turning the hexagon bolt with holding socket bolt.
 - ※ Assembly
 Fit socket bolt to orifice and insert the orifice by tapping with a hammer.



(2) 4 spool side

① Remove cap(1)

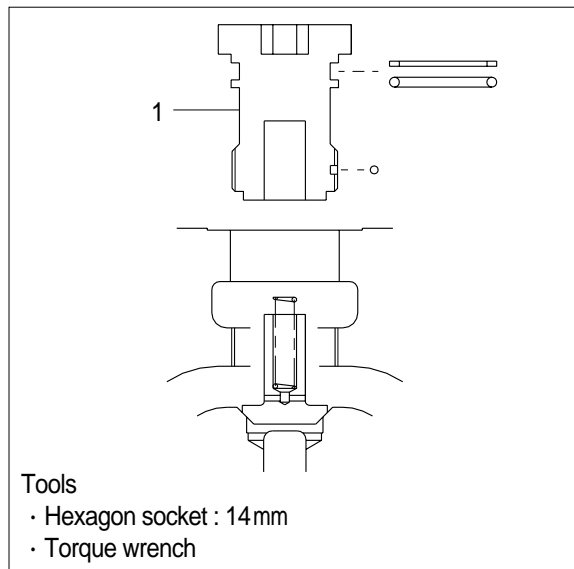
Tightening torque : 35kgf · m
(253.2lbf · ft)



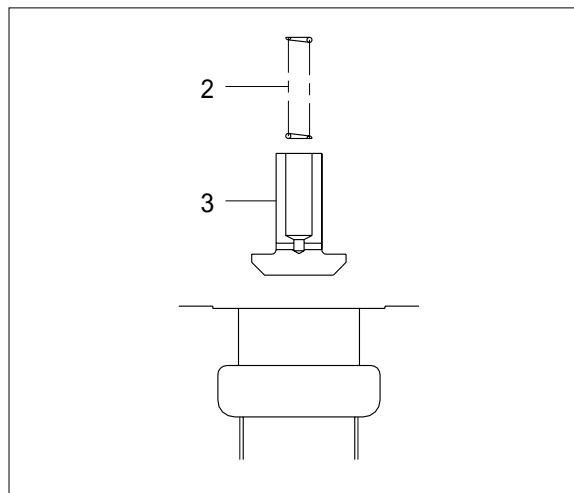
5) CHECK ASSEMBLY

(1) Remove cap(1)

Tightening torque : 35kgf · m
(253.2lbf · ft)



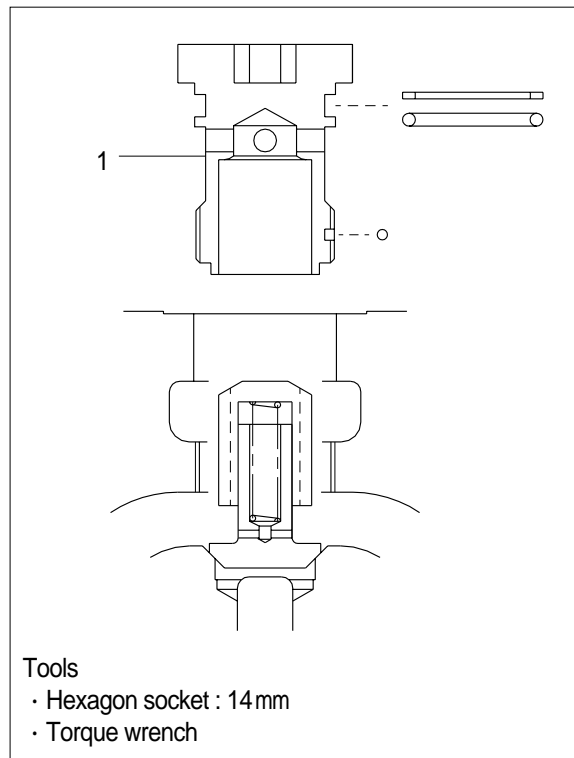
(2) Remove spring (2) and check valve (3).



6) LOAD CHECK ASSEMBLY

(1) Remove cap (1)

Tightening torque : 35 kgf · m
(253.2 lbf · ft)

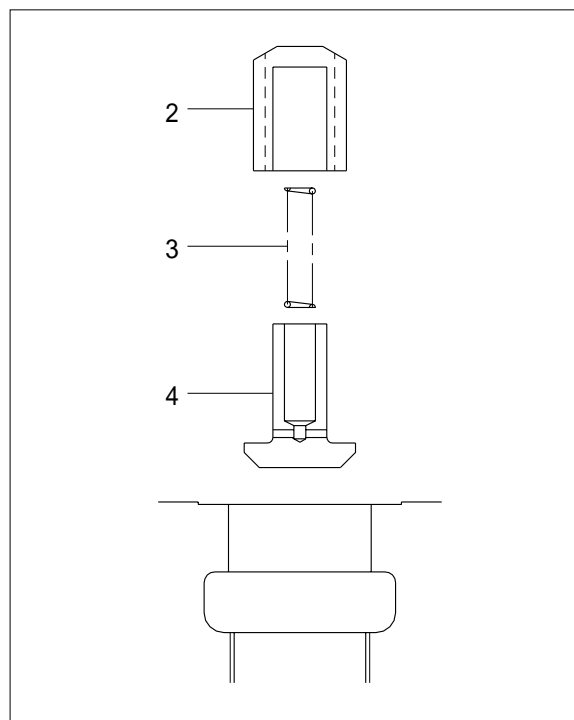


(2) Remove check valve (2), spring (3) and check valve (4).

Make sure that side hole of cap size.

AM : 4- \varnothing 4

BKT, OPT, TR, TL : 4- \varnothing 6

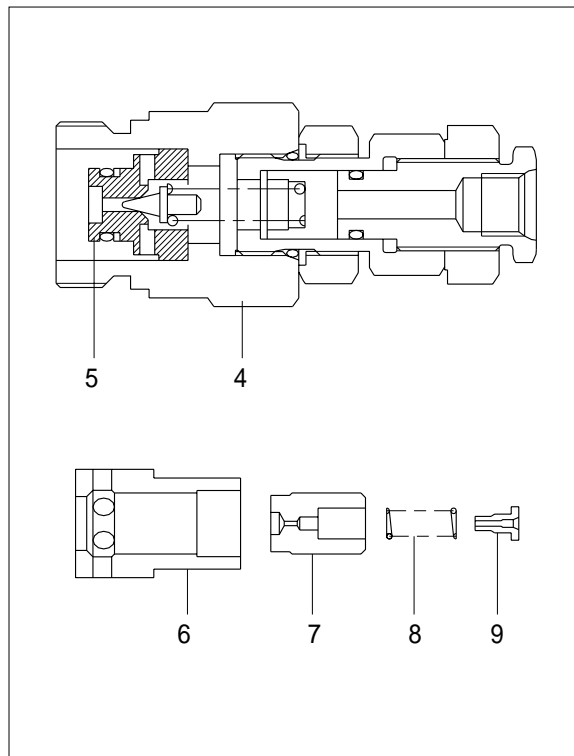
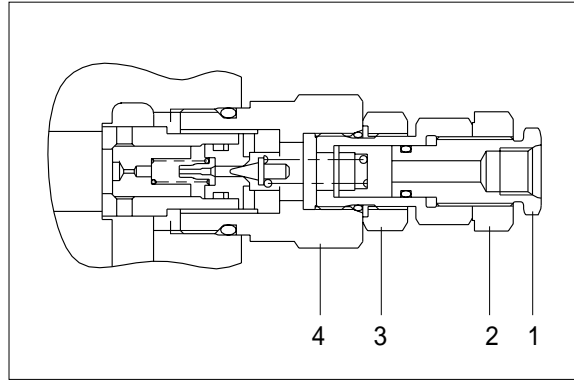


7) MAIN RELIEF ASSEMBLY

Relief assy is assembled into a single block as a cartridge. Do not disassemble the relief assembly as a rule.

- (1) Loosen the hexagon nut(2) with a holding adjust screw(1).
- (2) Loosen the hexagon nut(3) with a holding cap(4)
- (3) Loosen the cap(4) and remove the cartridge.
- (4) Pull out the sleeve(6) and take off the main poppet(7), spring(8) and orifice(9).
 ※ Can't remove the pilot seat(5) from the cap(4), because it was locked at the cap.
- (5) Loosen each screw and remove.

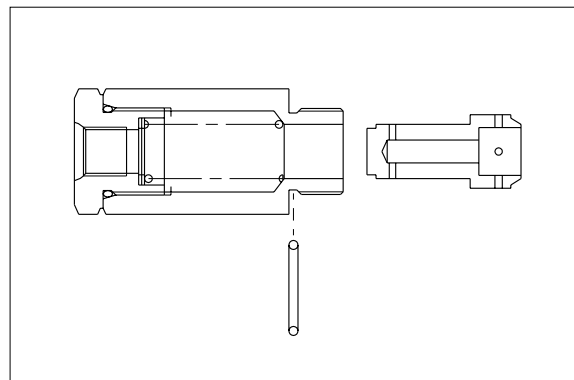
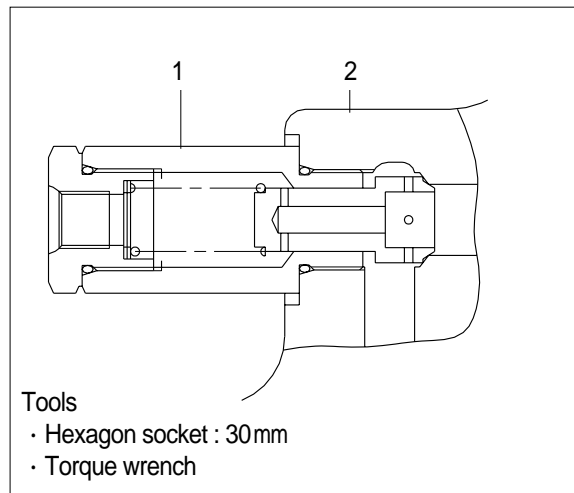
Item No.	Name	Socket
1	Adjust screw	22mm
2	Hexagon nut	30mm
3	Hexagon nut	30mm
4	Cap	41mm



8) FOOT RELIEF ASSEMBLY

- (1) Loosen socket bolt(1) and remove poppet (2).

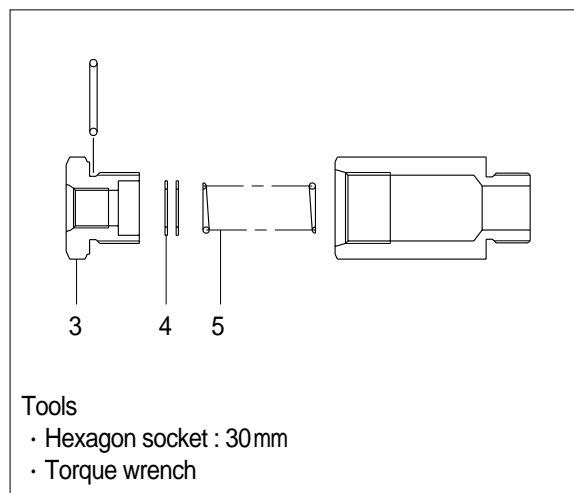
Tightening torque : 6 kgf · m(43.4 lbf · ft)



- (2) Remove cap (3) and take off shim (4) and spring (5).

Tightening torque : 6 kgf · m(43.4 lbf · ft)

※ Make sure adjust shim quantity.

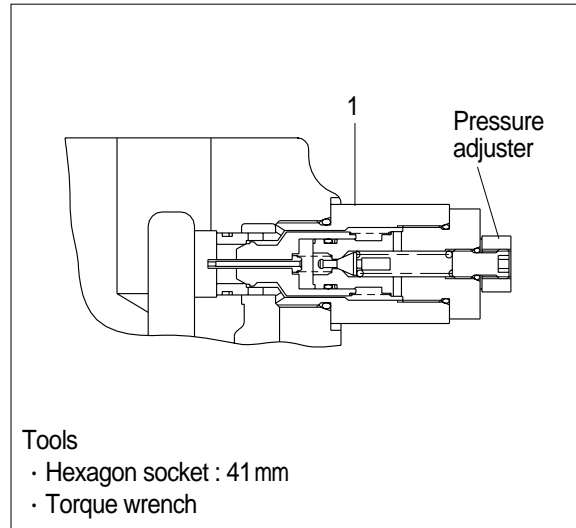


9) OVERLOAD RELIEF ASSEMBLY

Relief assembly is assembled into a single block as a cartridge. Do not disassemble the relief assembly as a rule.

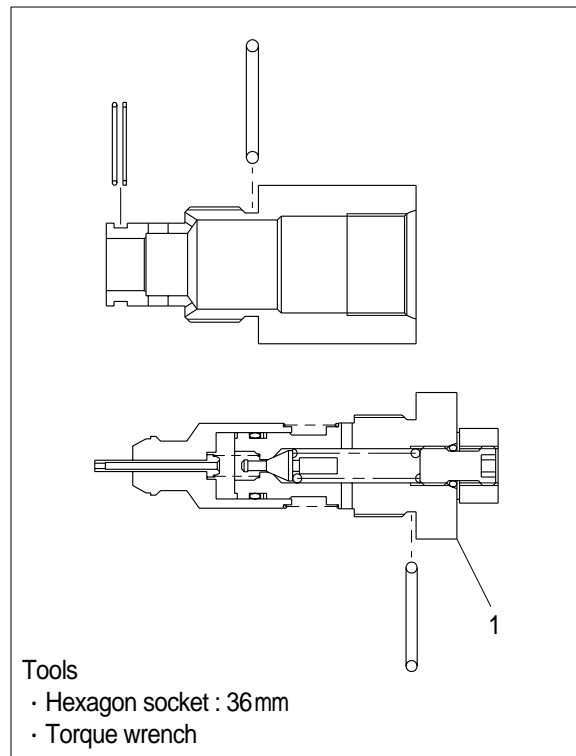
- (1) Loosen the relief sleeve (1) and remove the cartridge.

Tightening torque : 10 kgf · m(72.3bf · ft)

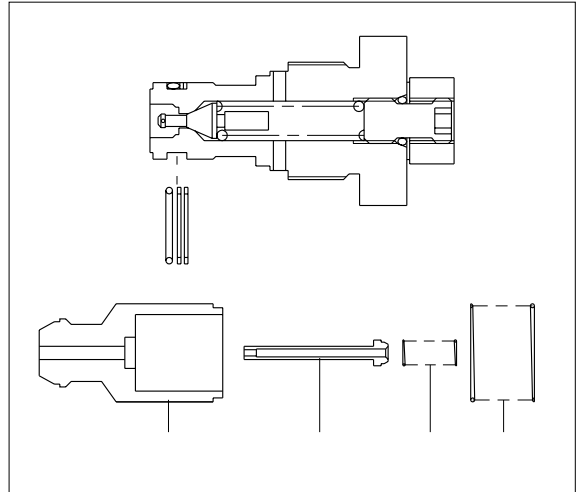


- (2) Loosen the relief seat (2) and remove the subassembly.

Tightening torque : 10 kgf · m(72.3lbf · ft)

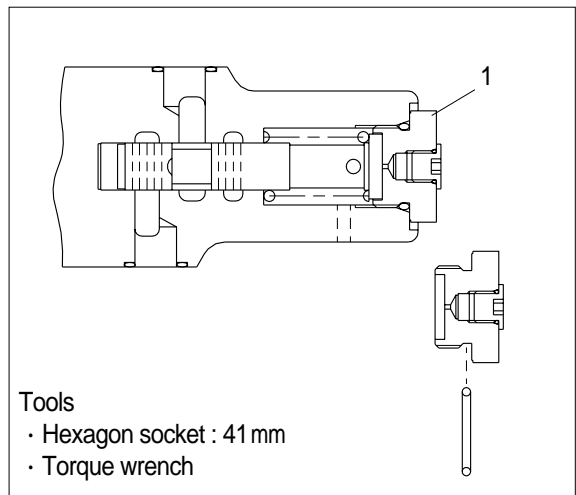


- (3) Remove the poppet (3) and take off piston (4) and spring (5,6).

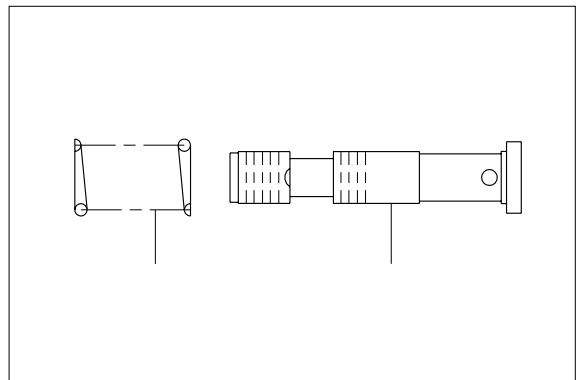


10) TRAVEL STRAIGHT SELECT

- (1) Remove cap (1).
Tightening torque : 10 kgf · m(72.3lbf · ft)



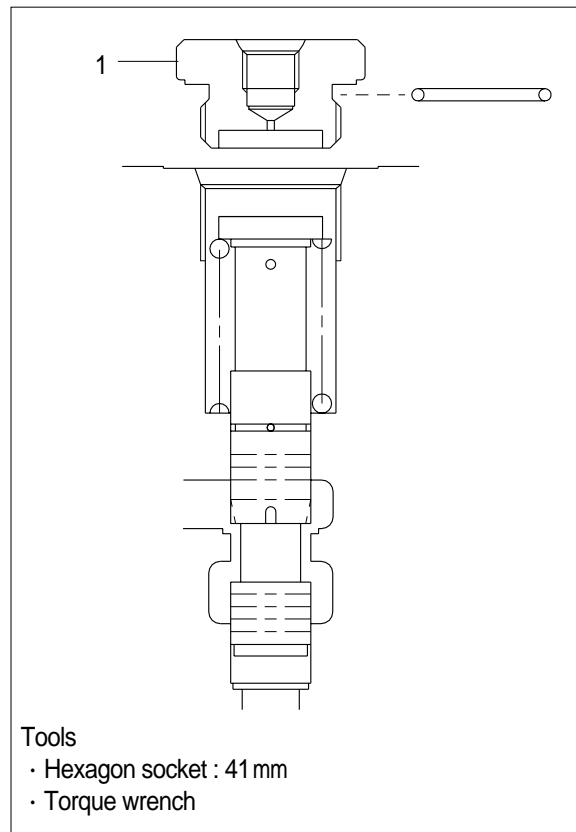
- (2) Remove spool (2) and spring (3).



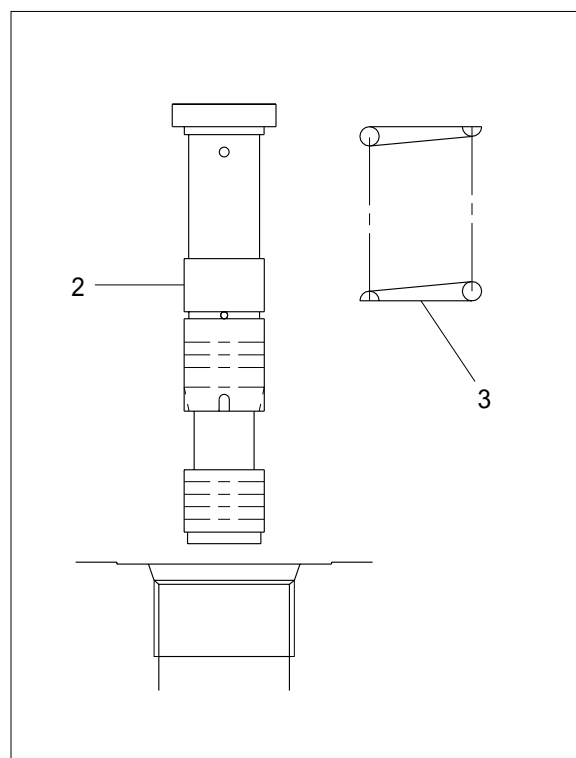
1) CENTER BYPASS VALVE ASSEMBLY

(1) Remove cap (1).

Tightening torque : 10 kgf · m(72.3lbf · ft)

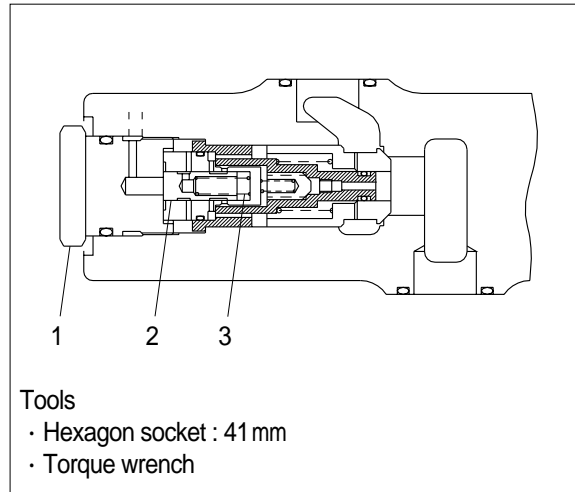


(2) Remove spool (2) and spring (3).

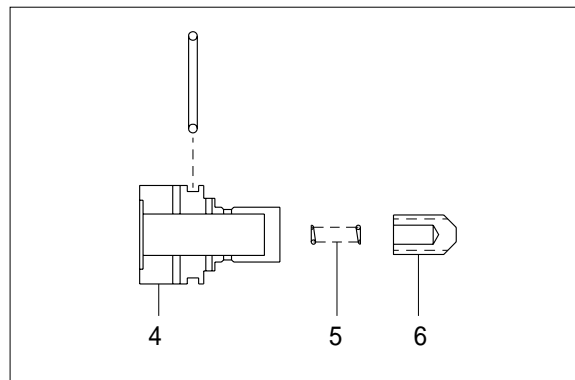


12) LOGIC VALVE ASSEMBLY

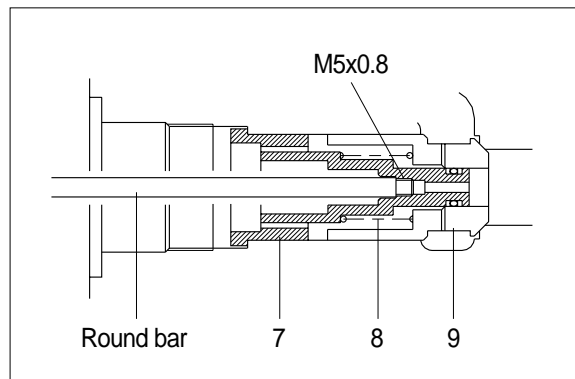
- (1) Remove cap (1).
Take off piston (2) and spring (3).
Tightening torque : 10 kgf · m(72.3lbf · ft)



- (2) Extract sleeve (4) with a magnet or the like.
※ Be careful not to damage the inner hole of sleeve (4).
Take off spring (5) and check valve (6).



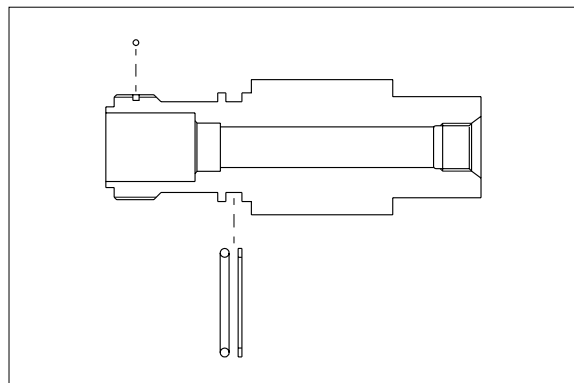
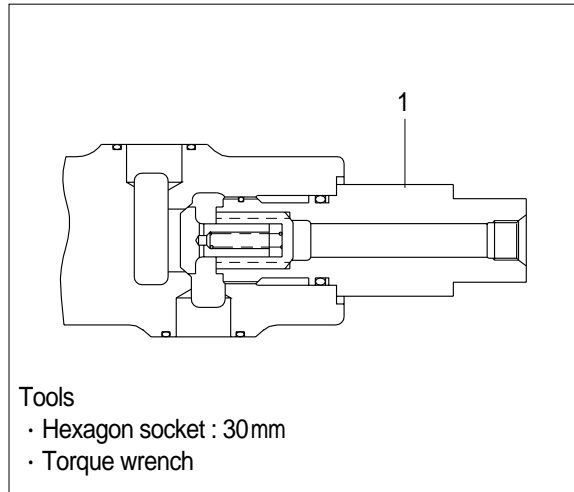
- (3) Pull out the sleeve (7) by threaded round bar.
Take off spring (8) and check (9).



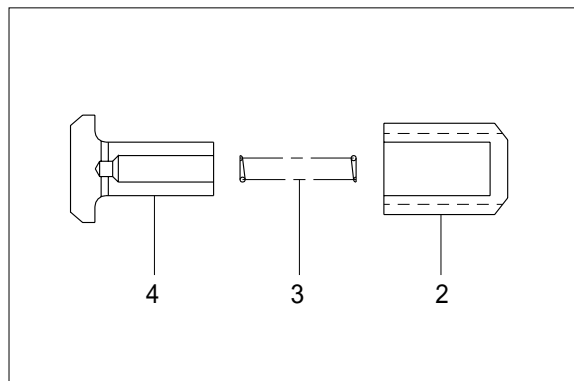
13) ARM REGENERATION

(1) Remove cap (1).

Tightening torque : 35 kgf · m(253.2lbf · ft)



(2) Take off check (2), spring (3) and check (5).



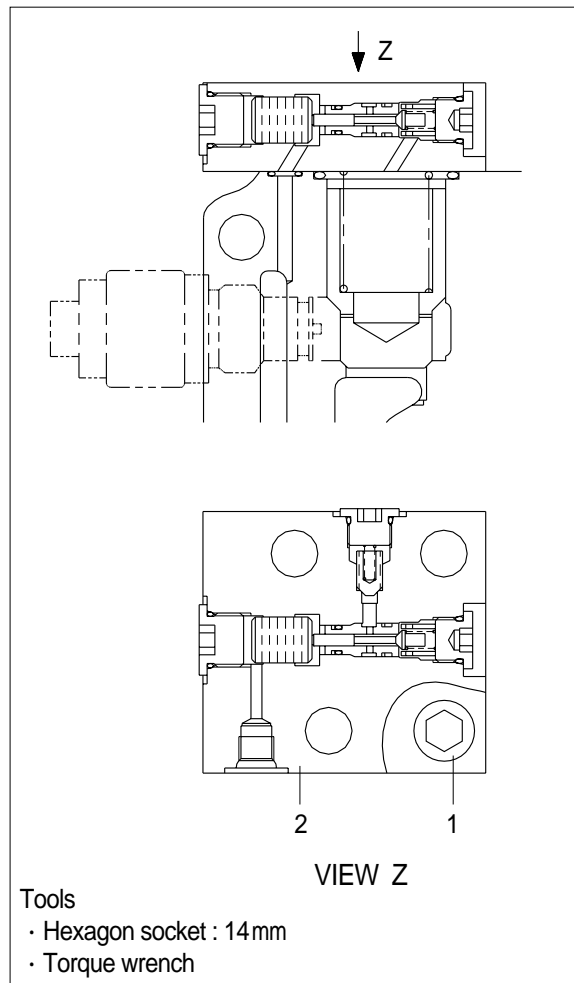
14) BOOM LOAD HOLDING VALVE

(1) Basic unit

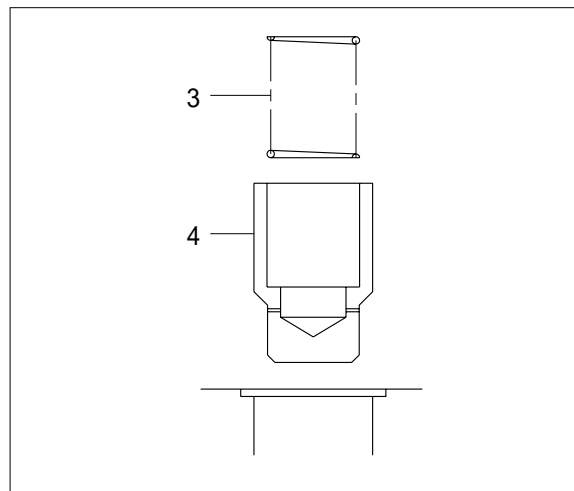
- ① Loosen socket bolt (1) to remove cover assembly (2).

Tightening torque : 25 kgf · m
(180.8 lbf · ft)

- ※ Install cover assembly (2) after making sure that O-ring is placed on the edge of the valve hole.

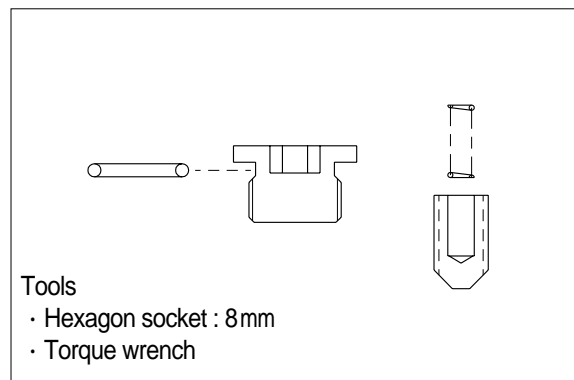
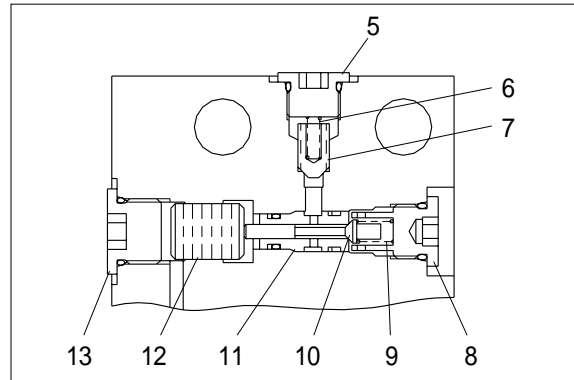


- ② Take off spring (3) and check valve (4).

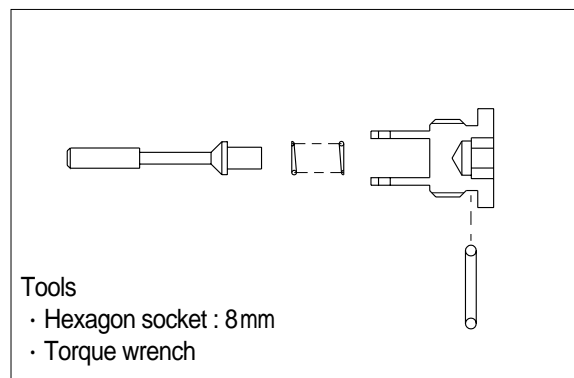


(2) Cover assembly

- ① Remove cap (5).
Take off spring (6) and check valve (7).
Tightening torque : 5 kgf · m(36.2lbf · ft)



- ② Remove cap (8).
Take off spring (9) and poppet (10).
Tightening torque : 5 kgf · m(36.2lbf · ft)



- ③ Remove cap (13) and take off piston (12).
Tightening torque : 6 kgf · m(43.4lbf · ft)
 - ④ Push sleeve (11) out with a rod or the like through the hole of cap (13).
- ※ Be careful not to damage the guideway of the sleeve.

