

## GROUP 7 RCV LEVER

### 1. REMOVAL AND INSTALL

#### 1) REMOVAL

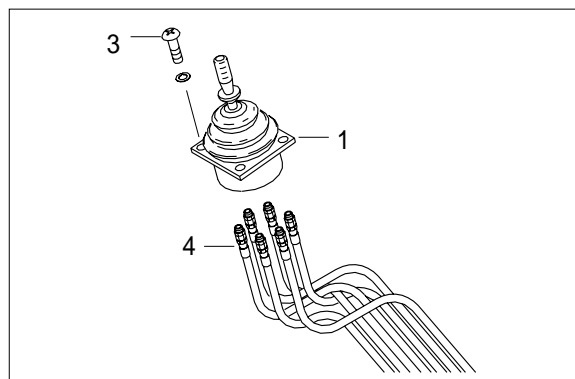
- (1) Lower the work equipment to the ground and stop the engine.
- (2) Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping.
- (3) Loosen the breather slowly to release the pressure inside the hydraulic tank.

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

- (4) Loosen the socket bolt(3).
- (5) Remove the cover of the console box.
- (6) Disconnect pilot line hoses (4).
- (7) Remove the pilot valve assembly(1, 2).

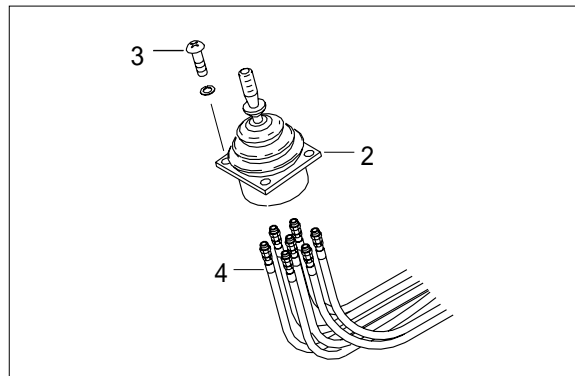
Weight : 2.6kg(57lb) × 2units

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



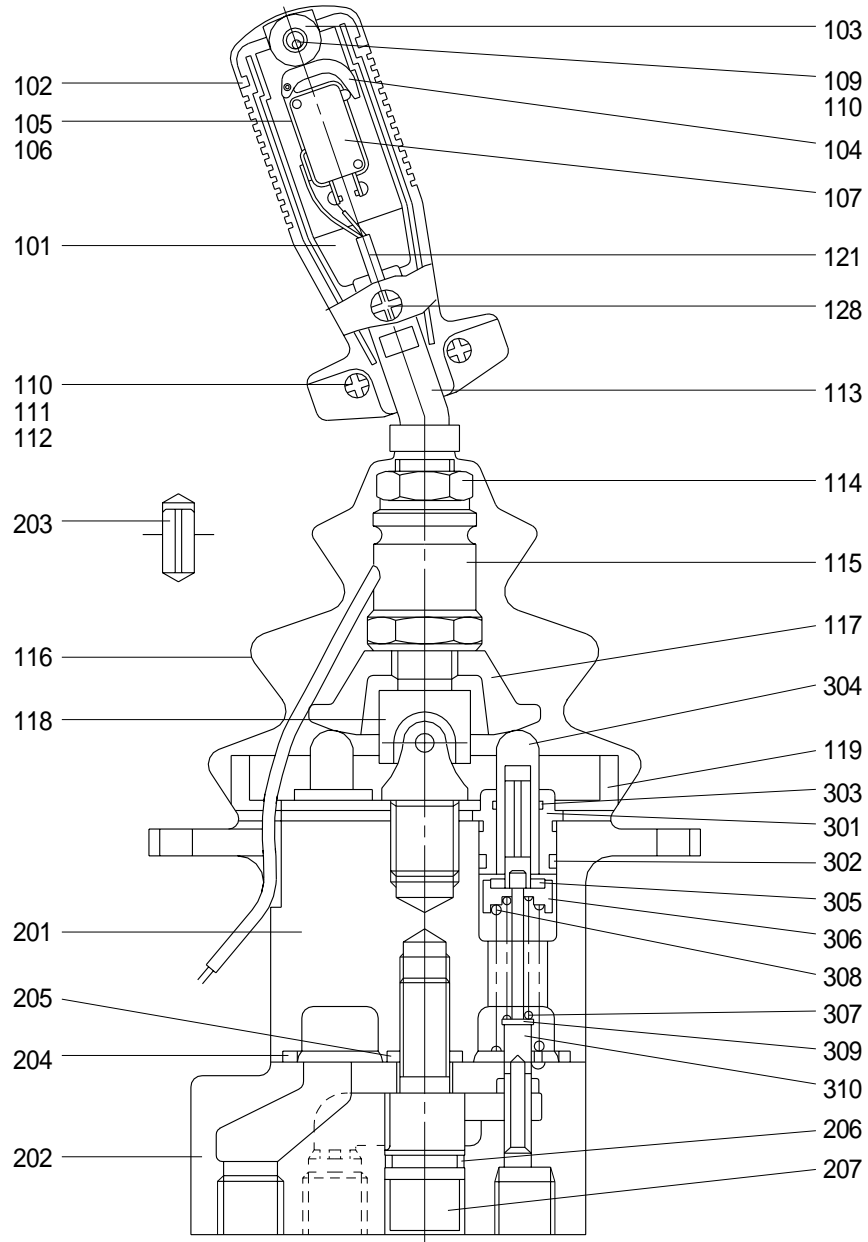
#### 2) INSTALL

- (1) Carry out installation to the reverse order of removal.
- (2) Confirm the hydraulic oil level and check the hydraulic oil leak or not.



## 2. DISASSEMBLY AND ASSEMBLY

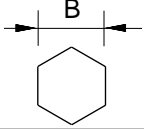
### 1) STRUCTURE



101	Lever(Handle)	115	Nut	206	O-ring
102	Cap	116	Bellows	207	Screw
103	Pusher	117	Switch plate	301	Plunger guide
104	Rocker arm	118	Cardan	302	Seal
105	Spacer	119	Retaining plate	303	Seal
106	Spacer	121	Electrical cable	304	Full plunger
107	Electrical contact	128	Screw	305	Locking Disc
109	Screw	201	Upper housing	306	Spring retainer
110	Nut	202	Lower housing	307	Regulating spring
111	Screw	203	Pin	308	Return spring
112	Washer	204	O-ring	309	Shims
113	Hollow lever	205	O-ring	310	Piston
114	Lock nut				

## 2) TOOLS AND TIGHTENING TORQUE

### (1) Tools

Tool name	Remark	
Allen wrench	6	
Spanner	19	
	24	
( + ) Driver	Length 150	
( - ) Driver	width 4 ~ 5	
Torque wrench	Capable of tightening with the specified torques.	

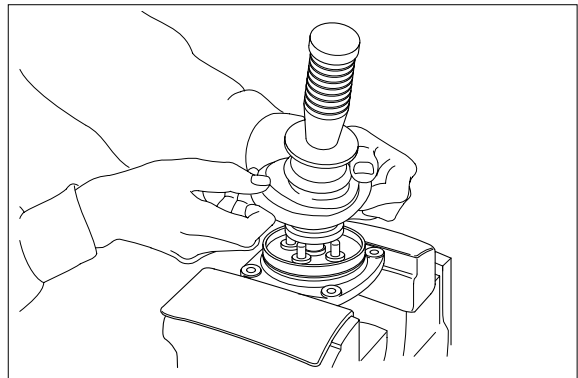
### (2) Tightening torque

Part name	Item	Size	Torque	
			kgf · m	lbf · ft
Lower housing	202	G 1/4	0.37	2.7
Screw	109	M 4	0.05	0.36
Screw	111	M 4	0.05	0.36
Nut	114	M 12	4.2 ± 0.4	30 ± 3
Nut	115	M 12	4.2 ± 0.4	30 ± 3
Cardan	118	M 16	4.2 ± 0.4	30 ± 3
Screw	207	M 12	4.2 ± 0.4	30 ± 3

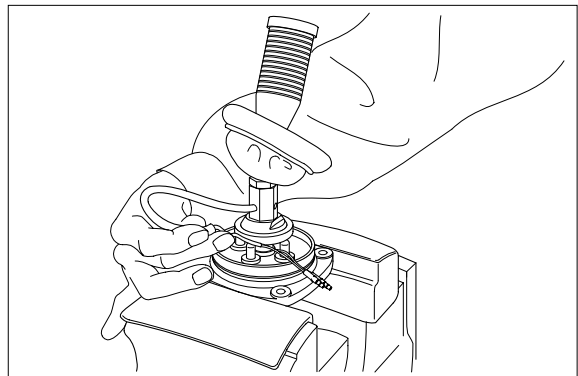
### 3) DISASSEMBLY

- (1) Clean pilot valve with kerosene.
  - ※ Put blind plugs into all ports
- (2) Fix pilot valve in a vise with copper (or lead) sheets.

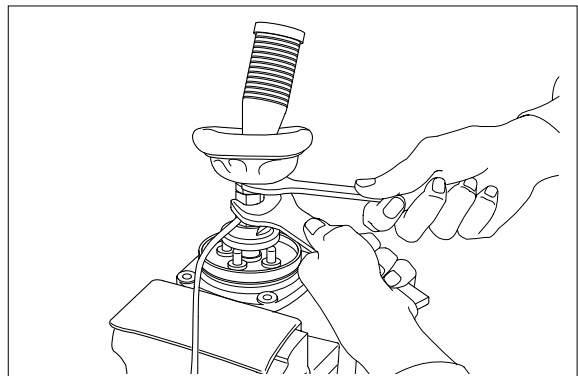
- (3) Remove end of bellows(116) from casing (201) and take it out upwards.



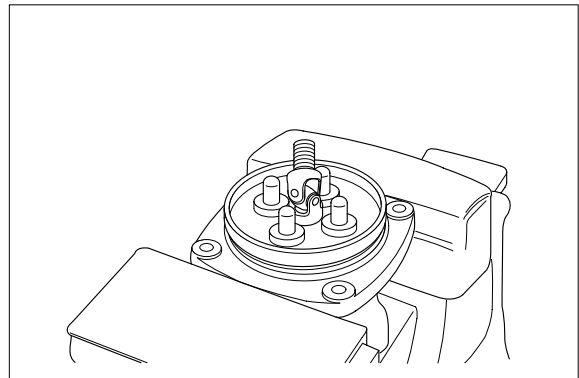
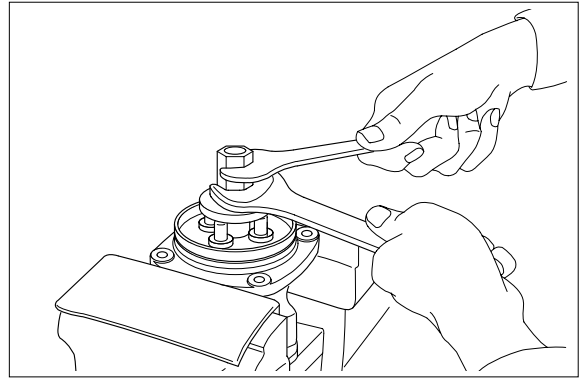
- ※ For valve with switch, remove cord(121) also through hole of casing.



- (4) Loosen lock nut(114) and adjusting nut (115) with spanners on them respectively, and take out handle section as one body.

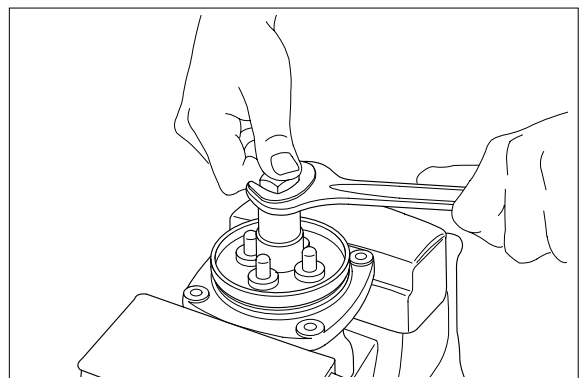
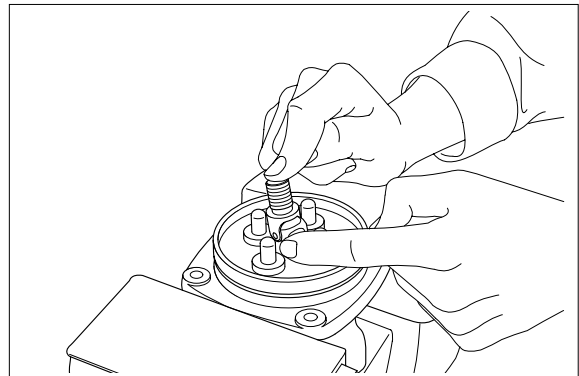


- (5) Loosen adjusting nut(115) and switch plate(117) with spanners on them respectively, and remove them.

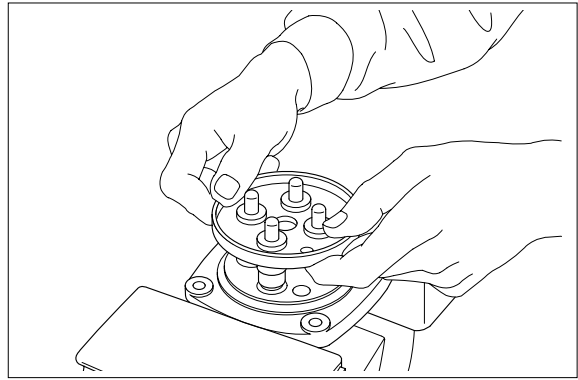


- (6) Turn joint anticlockwise to loosen it, utilizing jig (special tool).

※ When return spring(308) is strong in force, plate(119), plug(301) and push rod(304) will come up on loosening cardan. Pay attention to this.



(7) Remove plate(119).

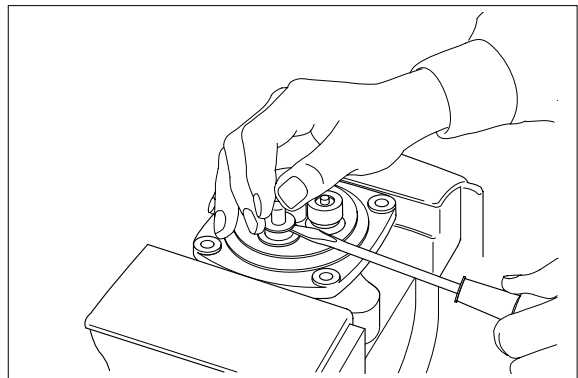


(8) When return spring(308) is weak in force, plunger guide(311) stays in housing because of sliding resistance of O-ring.

※ Take it out with minus screwdriver.

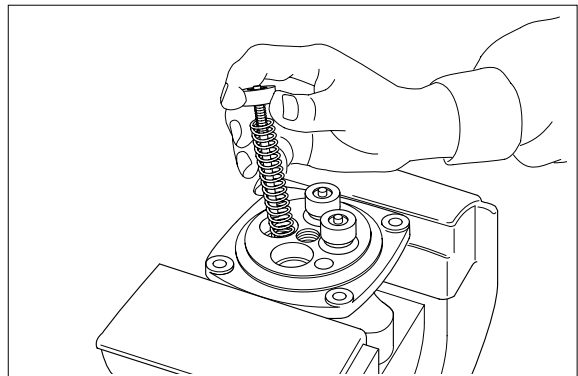
Take it out, utilizing external periphery groove of plunger guide and paying attention not to damage it by partial loading.

※ During taking out, plunger guide may jump up due to return spring(308) force. Pay attention to this.

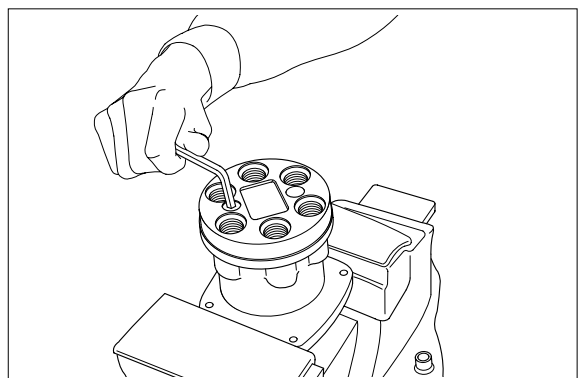


(9) Remove reducing valve subassembly and return spring(308) out of housing.

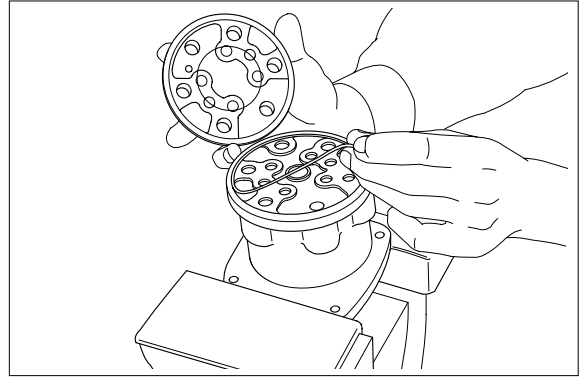
Record relative position of reducing valve subassembly and return springs.



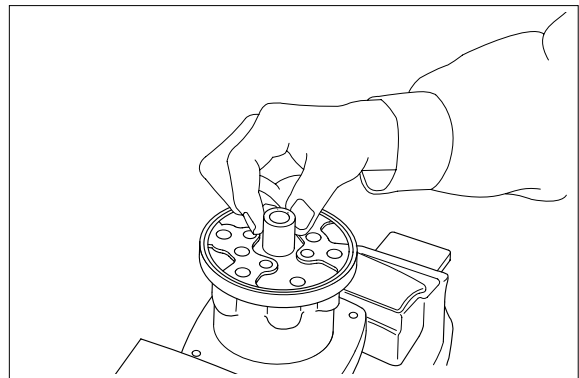
(10) Loosen hexagon socket head cap screws(207) with hexagon socket screw key.



- (11) Disconnect lower housing(202) from upper housing(201) and O-ring(25) out of housing.

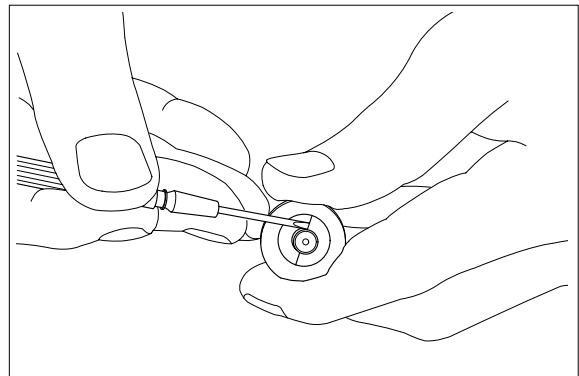


- (12) Remove O-ring(204) from upper housing(201).



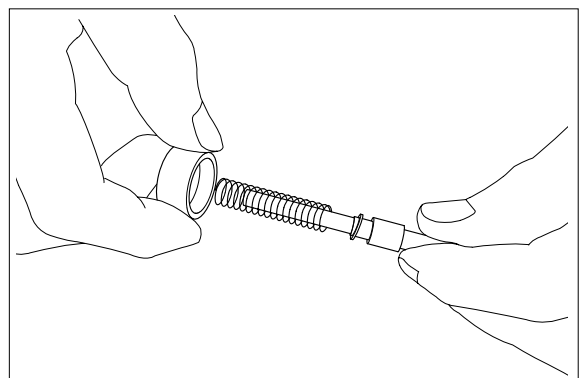
- (13) For disassembling reducing valve section, stand it vertically with piston(310) bottom placed on flat workbench. Push down spring retainer(306) and remove locking disc(305) with tip of small minus screwdriver.

- ※ Pay attention not to damage piston surface.
- ※ Do not push down spring retainer more than 6mm.



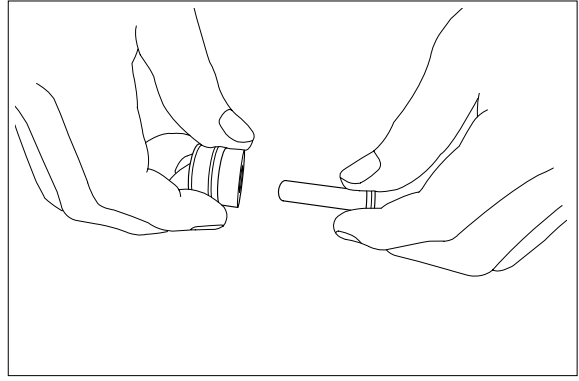
- (14) Separate piston(310), spring retainer(306), spring(307) and shims(309) individually.

- ※ Until being assembled, they should be handled as one subassembly group.

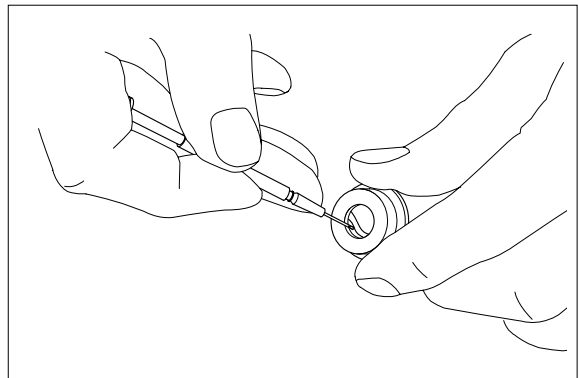
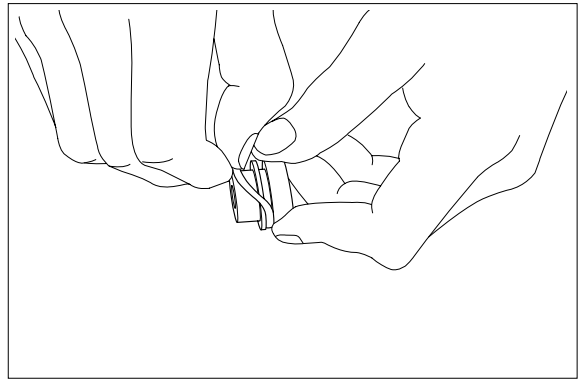




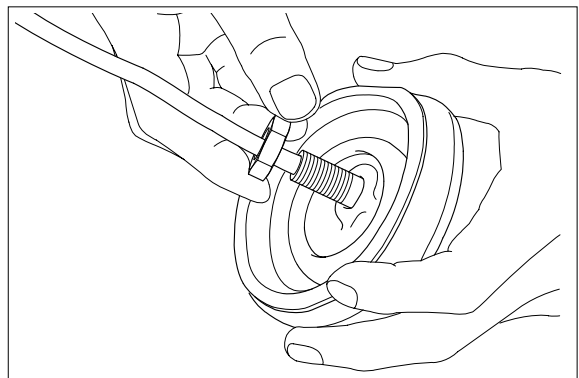
- (15) Take plunger(304) out of plunger guide(301).

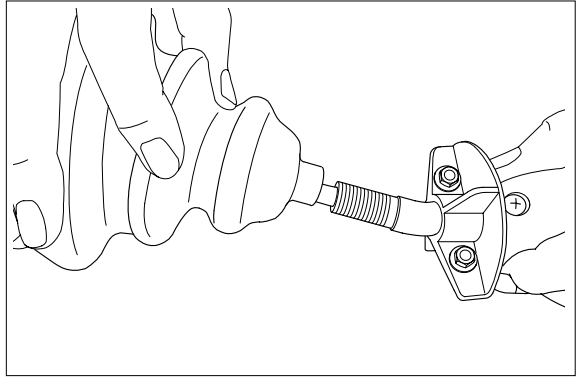


- (16) Remove seal(302) and seal(303) from plunger guide(301).  
Use small minus screwdriver or so on to remove this seal.



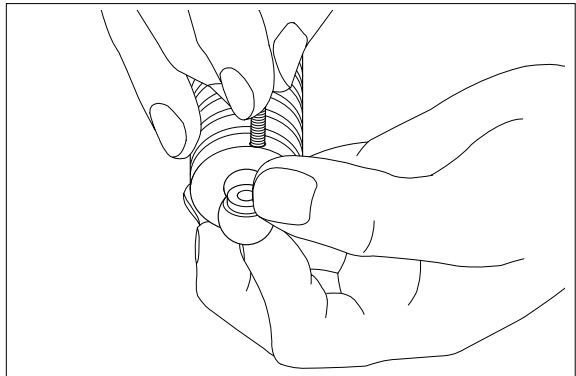
- (17) Remove lock nut(114) and then bellows (116).





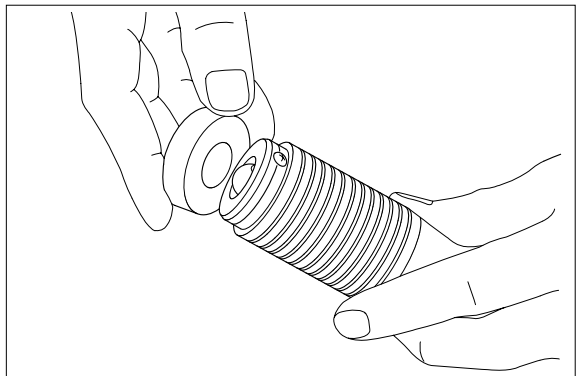
(18) Remove cap(102).

※ For valve without electrical contact, should be removed screw(109), too.

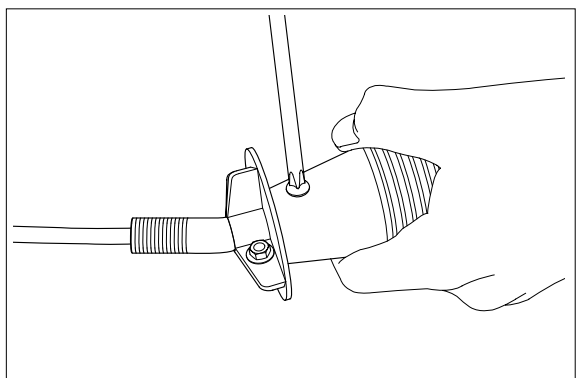


(19) Loosen screw (109) with plus screwdriver and remove it together with nut(110).

※ For valve with 2-point contact, pusher(103) can be taken out.

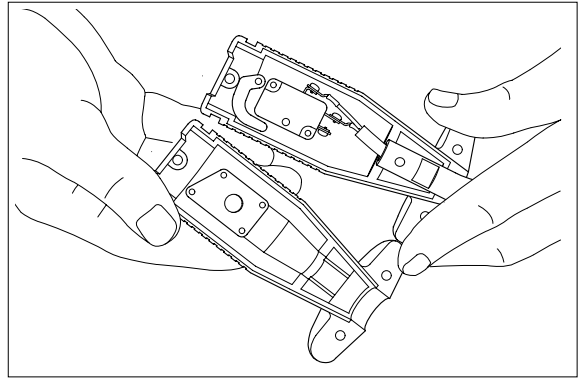


(20) Loosen screws (111, 128) with plus screwdriver and remove screw(128), nut(110) and plain washer(112).



(21) Disassemble lever(101) into two.

- ※ For valve with electrical contact, rocker arm(104), electrical contact(107) and spacer(105, 106) can be taken out.



## (22) 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.

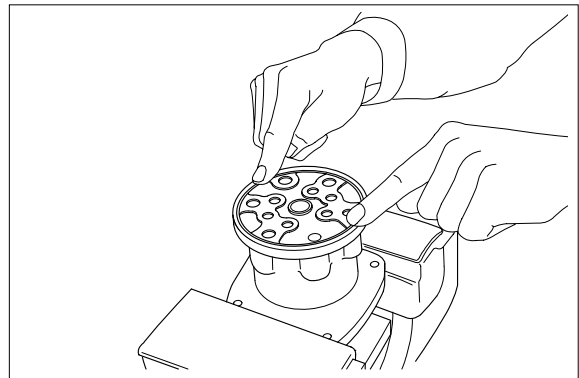
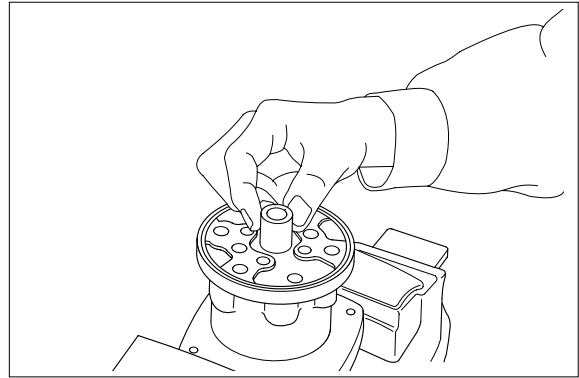
## (23) Rust prevention of parts

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.

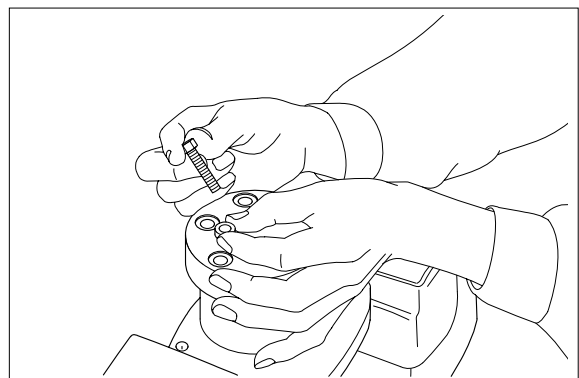
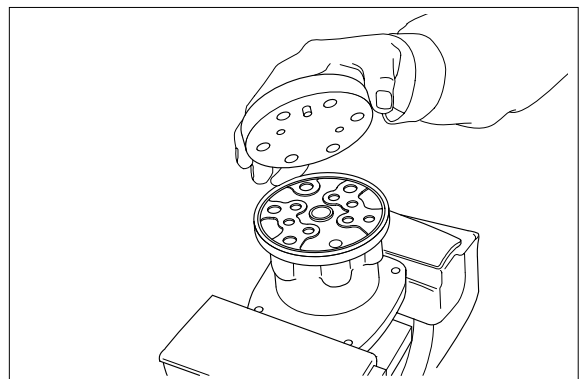
#### 4) ASSEMBLY

- (1) Assemble O-ring(205) into upper housing(201).

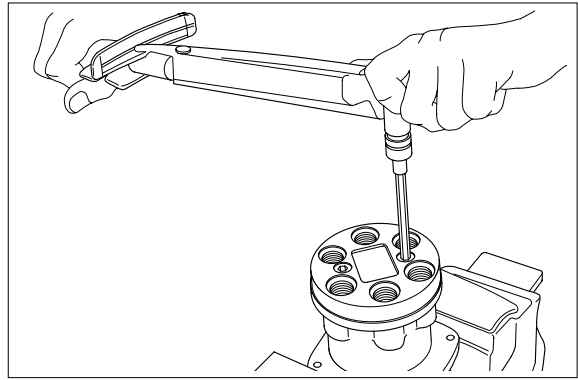


- (2) Fit lower housing(202) to upper housing(201) with hexagon socket head cap screws(207) and O-rings(205, 206).

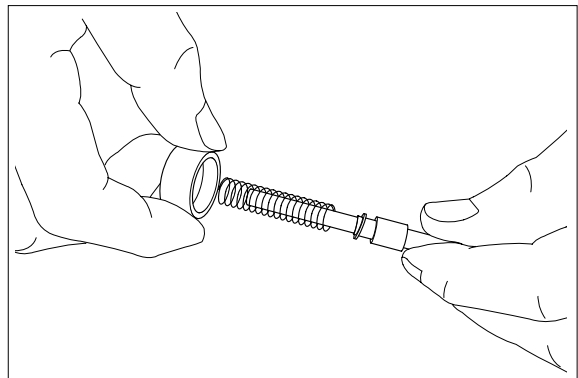
※ Keep such assembling position that spring pin(203) can enter into housing hole.



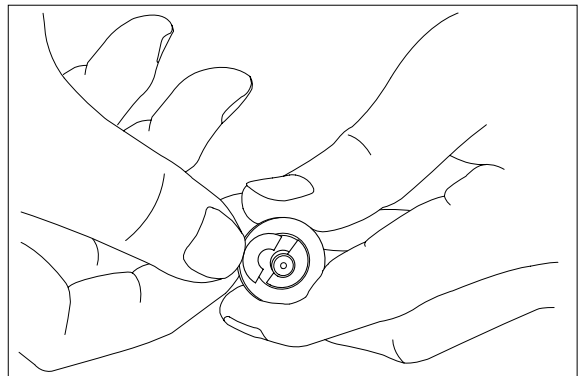
- (3) Tighten hexagon socket head cap screws(207) to the specified torque.  
※ Tighten two bolts alternately and slowly.



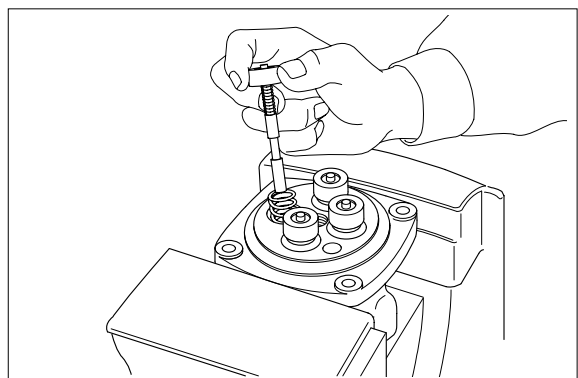
- (4) Put shims(309), spring(307) and spring retainer(306) onto spring(310) in this order.



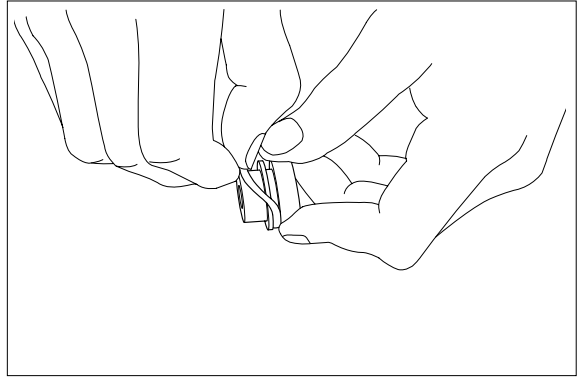
- (5) Stand piston vertically with its bottom placed on flat workbench, and with spring retainer pushed down, put locking disc(305) on spring retainer without piling them on.  
※ Assemble locking disc(305) so that its sharp edge side will be caught by head of piston.  
Do not push down spring retainer more than 6mm.



- (6) Assemble return spring(308) into housing.  
Assemble reducing valve subassembly into housing.  
※ Assemble them to their original positions.

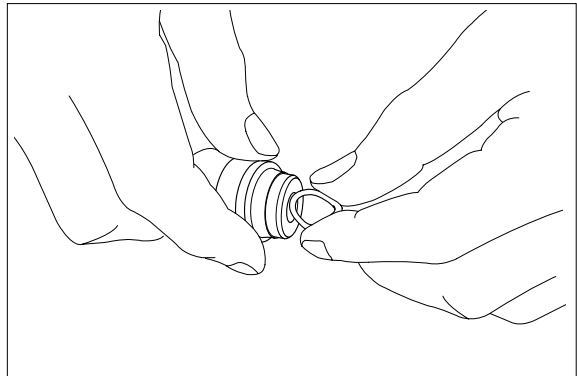


(7) Assemble seal(302) onto plunger guide(301).



(8) Assemble seal(303) to plunger guide(301).

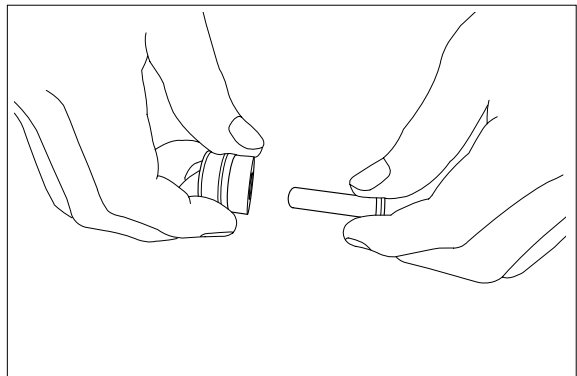
※ Assemble seal in such lip direction as shown below.



(9) Assemble plunger(304) to plunger guide(301).

※ guide(301).

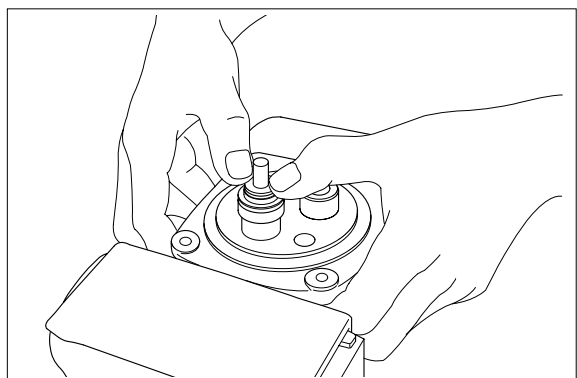
Apply working oil on plunger surface.



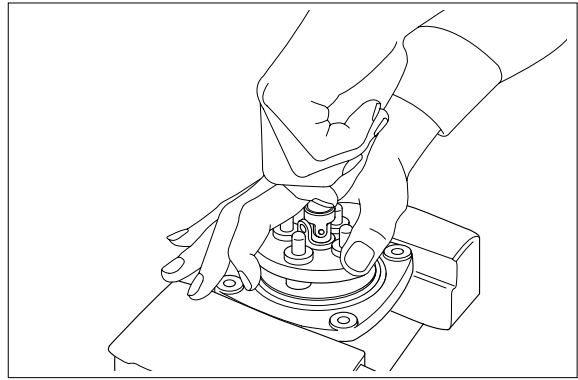
(10)

※ Assemble plunger guide subassembly to housing.

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

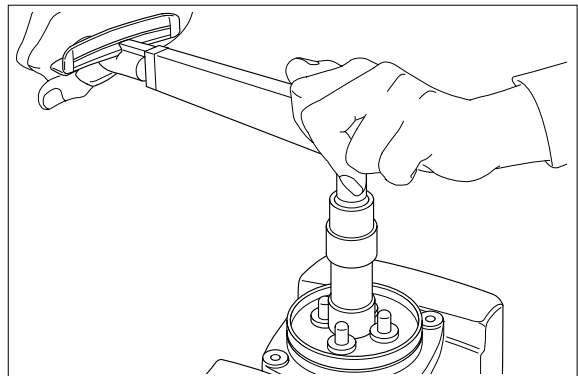


- (11) When return spring is strong in force, assemble 4 sets at the same time, utilizing plate(119), and tighten cardan(118) temporarily.



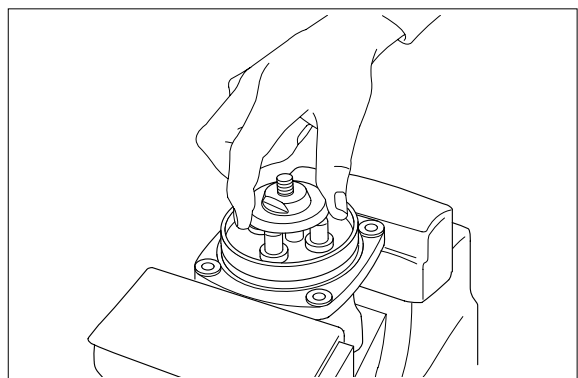
- (12) Fit plate(119).

- (13) Tighten cardan(118) with the specified torque to housing, utilizing jig.



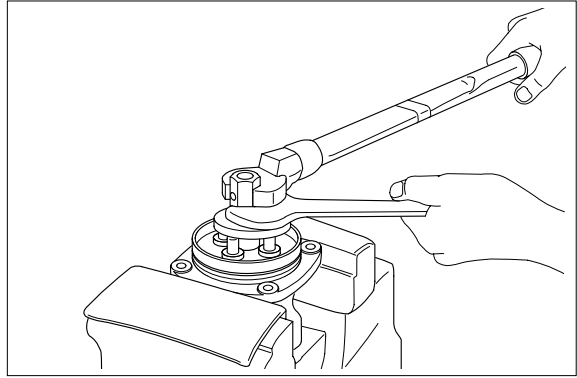
- (14) Assemble switch plate(117) to cardan (118).

- ※ Screw it to position that it contacts with 4 piunger evenly.
- ※ Do not screw it over.

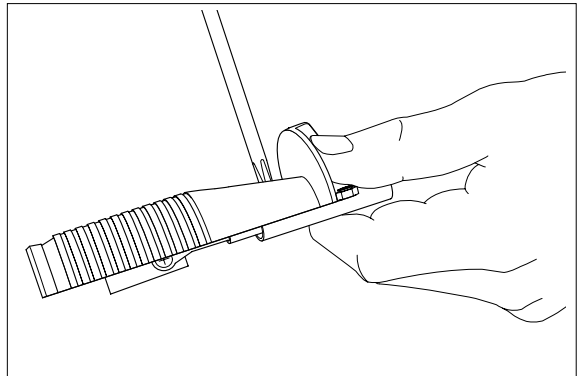


(15) Assemble nut(115), apply spanner to width across flat of switch plate(117) to fix it, and tighten adjusting nut to the specified torque.

※ During tightening, do not change position of switch plate.

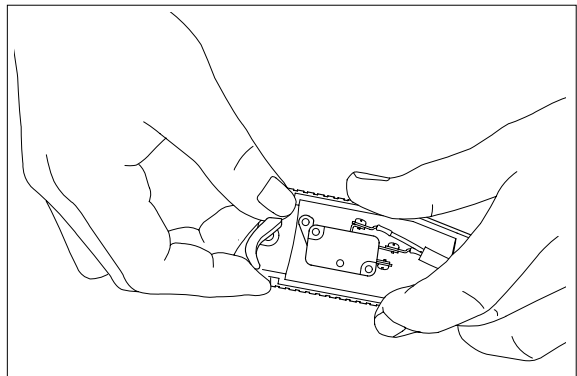


(16) Tighten screw(128) to the specified torque to fix lever and hollow lever.

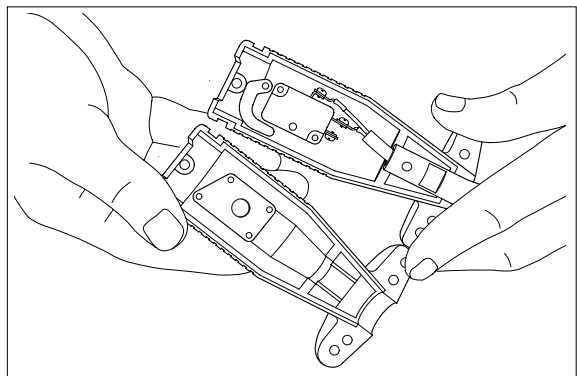


(17) For valve with electrical contact, assemble parts for electrical contact to lever.

※ Pay attention to projections/ depression for assembling on spacers, contact and hollow lever, etc.



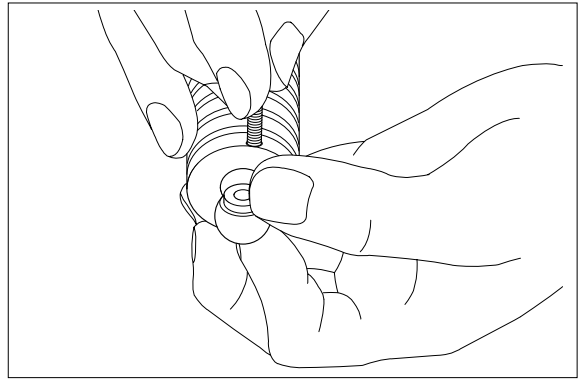
(18) Assemble remaining lever(101).





(19) Tighten screw(109) and nut(110) to their specified torques.

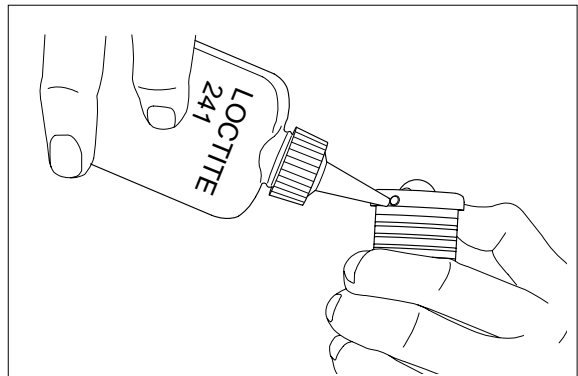
- ※ For valve with contact, assemble pusher (103) in stead of cap and tighten them. In this time confirm that the clearance between pusher and lever(101) is 0.5 to 1.5mm.



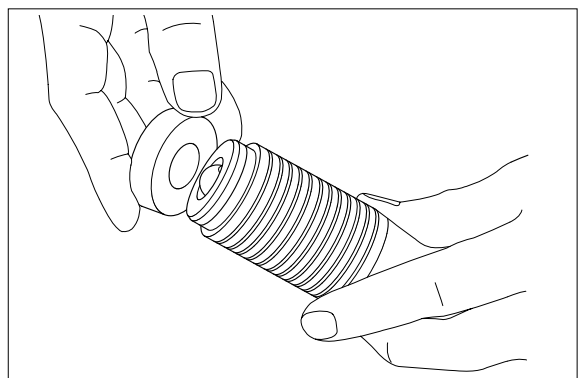
(20) Tighten remaining screws (128) to the specified torque.

(21) Tighten screws(111), plain washers(112) and nuts(110) to the specified torque.

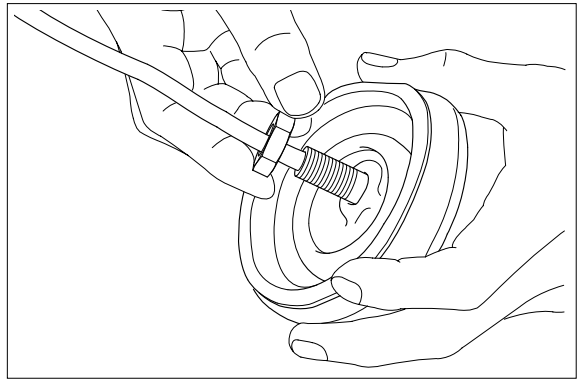
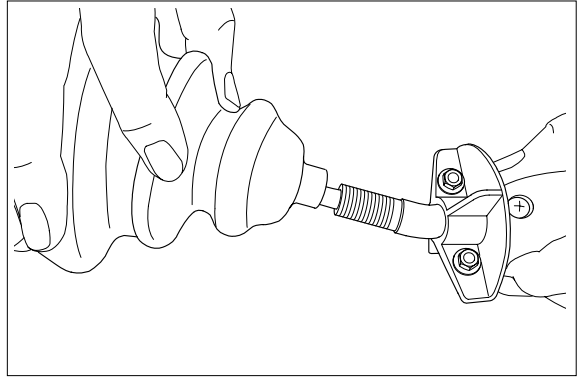
- ※ Apply loctite #241 to threaded sections of screws (111, 109 and 128).



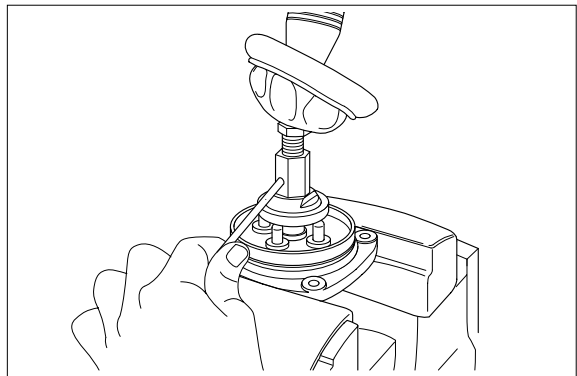
(22) Fit cap(102).



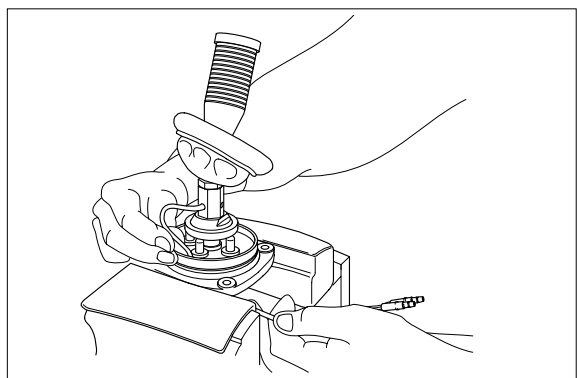
- (23) Fit bellows(116) and lock nut(114), and lever subassembly is assembled completely.



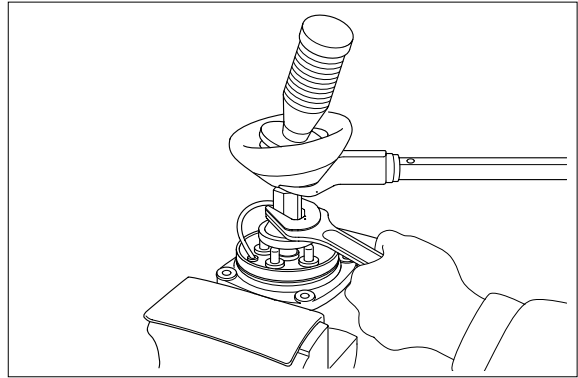
- (24) Pull out cable(121) through adjusting nut hole provided in direction 60° to 120° from casing hole.



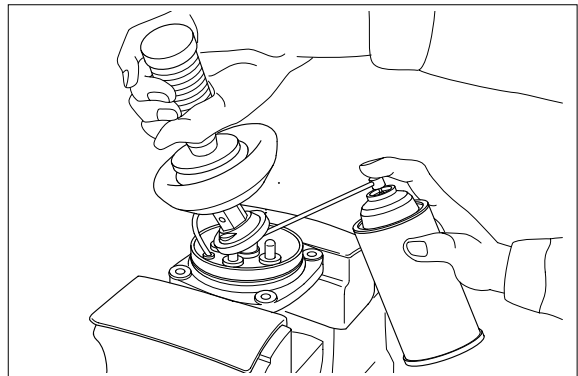
- (25) Assemble rubber bushing to plate and pass cable and tube through it.  
※ Provide margin necessary to operation.



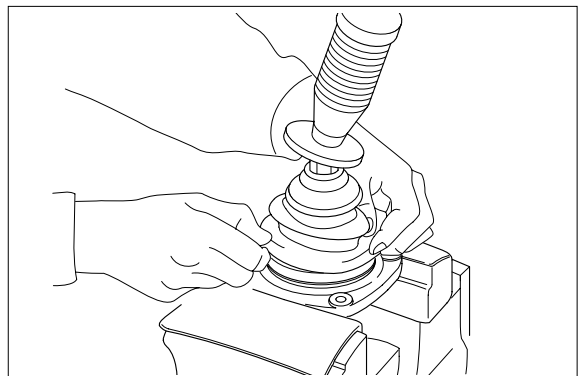
(26) Determine lever direction, tighten lock nut(114) to specified torque to fix lever.



(27) Apply grease to rotating section of cardan and contacting faces of disk and plunger.



(28) Assemble lower end of bellows to housing.



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