CKD

SM-213922-A

INSTRUCTION MANUAL

SLOW START VALVE

V3301

V3321

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

For Safety Use

To use this product safety, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, read this operation manual carefully for proper operation.

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠ DANGER : Failure to pay attention to DANGER notices may cause a situation that results in a fatality or serious injury and that requires urgent addressing.

⚠ WARNING : Failure to pay attention to WARNING notices may result in a fatality or serious injury.

⚠ CAUTION : Failure to pay attention to WARNING notices may result in injury or damage to equipment or facilities.

※1) ISO 4414 :Pneumatic fluid power・・・Recommendations for the application of equipment to transmission and control systems.

※2) JIS B 8370:General rule for pneumatic systems

I N D E X

SLOW START VALVES
V3301/V3321
Manual No. SM-213922-A

1. UNPACKING

(1) Make sure that the model on the nameplate of the product you have received is matched with the product model you have ordered. (At this time, note that externally attached optional units are not stated on the product nameplate.)

(2) Make sure that the appearance of the product is not damaged.

(3) Carefully store the product so that no external and/or internal accessories are lost.

(4) Always store the product with the sealing plug attached to prevent foreign matter from entering the valve. (Remove the sealing plug before starting the piping work.)

2. INSTALLATION

2.1 Installation conditions

(1) Always operate the product under the operating temperature conditions shown below.

(2) Always mount the air filter on the P (1) port of the valve to prevent dust or water from entering.

(3) Install this product in a place where foreign matter, such as welding spatter or casting sand does not scatter onto the valve directly.

(4) Install this product in a place where it is not exposed to the rain, water, and direct sunlight.

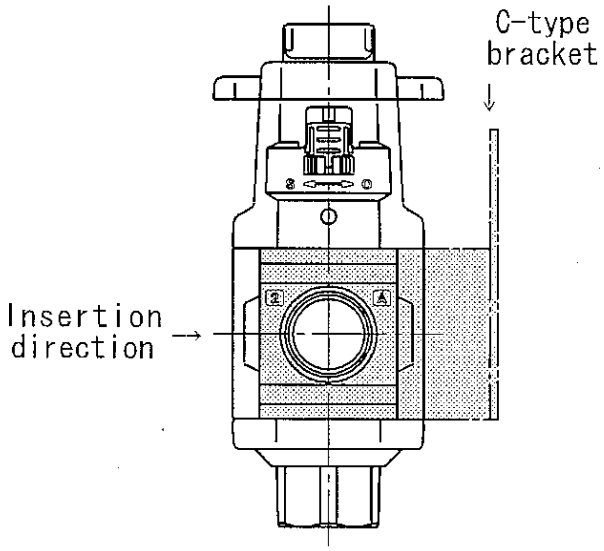
(5) Do not operate this product in a corrosive atmosphere.

2.2 Installation procedures

(1) Mount the C-type bracket on the installation surface.

(2) As illustrated in the Fig. shown to the right, make the concave part of the valve matched with the convex part of the C-type bracket, and then press-fit them into the valve.

(3) Screw the joint into the valve.



2.3 Check items after installation

(1) Checking of manual unit

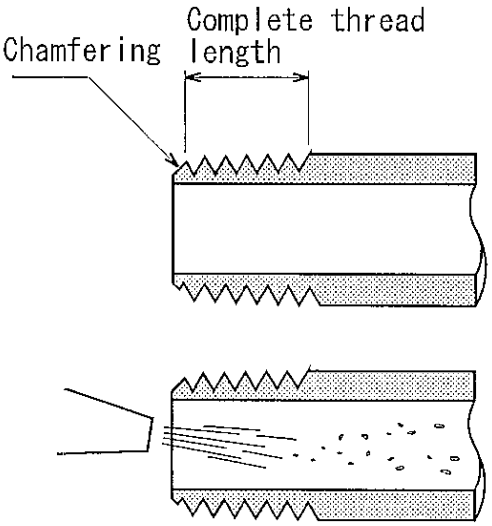
⚠ WARNING	Check that the manual unit of the valve is put in the exhaust state. If the manual unit is put in the air supply state, the cylinder or other unit may function accidentally when the primary pressure is supplied, causing a severe personal injury.

(2) Checking of piping orientation

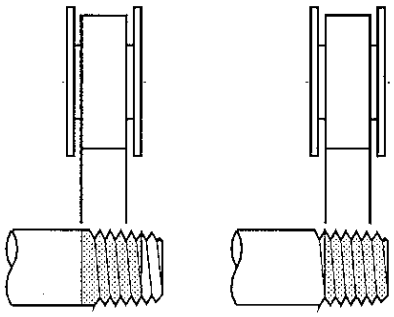
⚠ WARNING	Check that the valve is connected with proper piping orientation. If the manual unit is put in the air supply state, the cylinder or other unit may function accidentally when the primary pressure is supplied, causing a severe personal injury.

2.4 Piping

(1) Bafore connecting pipes, flush the interiors of the tubes, solenoid valves, and connected devices to remove foreign matter.
(2) Install the Residual pressure release valve so as the arrow mark on the name plate of the valve matches the air flow direction.
(3) Carefully avoid selecting Residual pressure release valve with connecting port diameter smaller than that of system air pipings.
(4) There is no restriction as to configuration of its mounting.
(5) Refrain applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.
(6) Ensure to install air filter at IN side of Residual pressure release valve so as to keep dust particles or water drops from penetrating to the system.

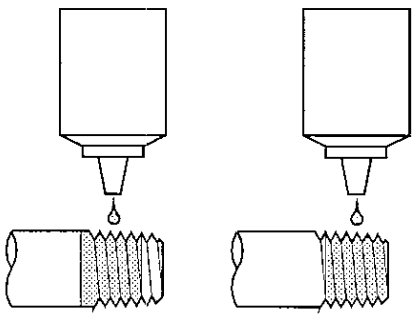


●Seal Tape



(Right) (Fales)

●Sealant (Paste or liquid)



(Right) (Fales)

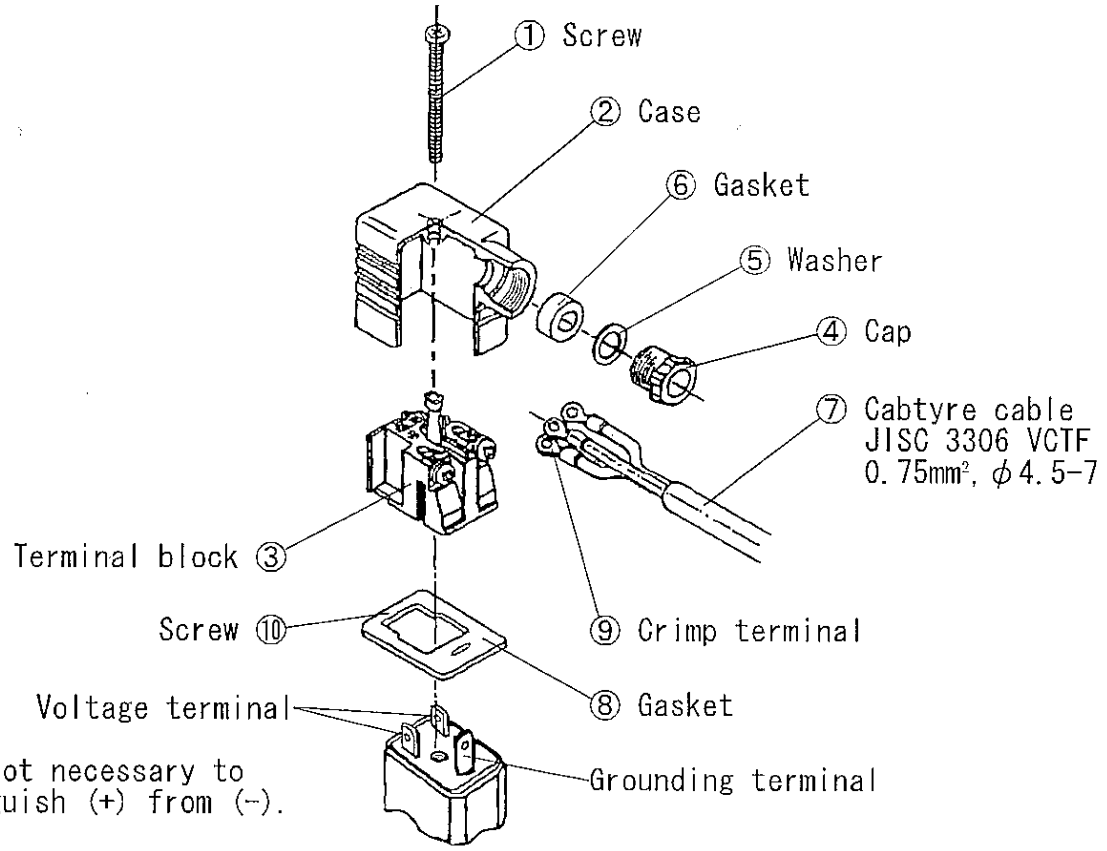
2.5 Wiring procedures

Follow the steps (1)-(3) below to carry out the wiring while referring to the Fig. below.

(1) Pass the cap ④, washer ⑤, and gasket ⑥ through the cabtyre cable ⑦ in that order, and insert the cabtyre cable into the case ②.

(2) When using the crimp terminal, cut the cabtyre cable ⑦ by an appropriate length as shown in the Fig. and crimp the crimp terminal ⑨ at its top.

(3) Remove the screw ⑩ from the terminal block ③, pass the crimp terminal ⑨ though it (when using Y-terminal, loosen the screw and put it on the terminal block), and then tighten the screw ⑩ again.
At this time, tighten the screw with an appropriate tightening torque of 0.5 N·m (±15%).



Note:
It is not necessary to distinguish (+) from (-).

Remarks

(a) It is possible to carry out the wiring work with bare wires.
In this case, loosen the screw ⑩, put the lead wire in the metal fitting, and tighten the screw again.

(b) Take out the terminal block ③ from the case ②, turn it 180 degrees, and then push it into the case ② again. This makes it possible to change the cord take-out orientation.

(c) The following crimp terminals can be used.

Nichifu Tanshi Kogyo		Fuji Tanshi Kogyo		Nihon Acchyaku Tanshi	
O-terminal	Y-terminal	O-terminal	Y-terminal	O-terminal	Y-terminal
0.3-3 1.25-3 1.25-3S	0.3-3 1.25Y-3 1.25Y-3.5	1.25-3	1.25-YAS3 1.25-YAS3.5	0.5-3 1.25-3	1.25-B3A 1.25-C3A

When using a terminal made by other manufacturer, select a terminal equivalent to that listed above.

3. OPERATION

3.1 Working Condition

(1) Check for set presuure

Use the unit in the pressure range of 0.2 to 1.0 MPa.

(2) Check for the minimum operation pressure of cylinder

If the minimum opration pressure in the cylinder installation state for popping prevention is less than approx. 50% of the primary pressure, the popping preventive effect will be able to be expected.

(3) Pressure rise time adjustment

Before operating the equipment after installing this valve, be sure to adjust the pressure rise time.

(4) Selection of padlock

For the manual valve type, the manual overraide can be locked in the exhaust state; it is, however, neccessary to select D size 3.8 to 5.8 mm for the padlock used.

(5) Measures for exhaust

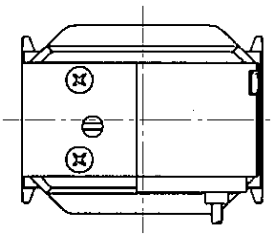
Connect a silencer and exhaust filter or the like to exhaust port 3 for added safety and damping effect.

3.2 Manual Override Operating Method

(1) V3301 manual operation

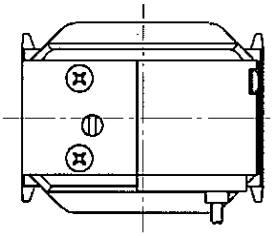
Supply operation:
Turn the maual butto 90 degrees clockwise with a screwdriver.

Supply state



Exhaust operation:
Turn the manual button 90 degrees counterclockwise with a screw-driver.

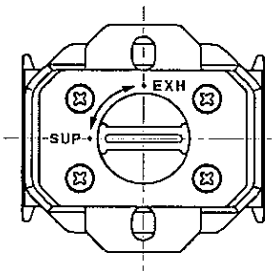
Exhaust state



(2) V3321 manual operation

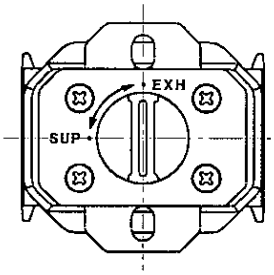
Supply operation:
Turn the manual knob 90 degrees counterlockwise.

Supply state



Exhaust operation:
Turn the manual knob 90 degrees clockwise.

Exhaust state



3.3 Pressure rise time adjusting procedures

(1) Push up the slide key to unlock the adjusting nut.

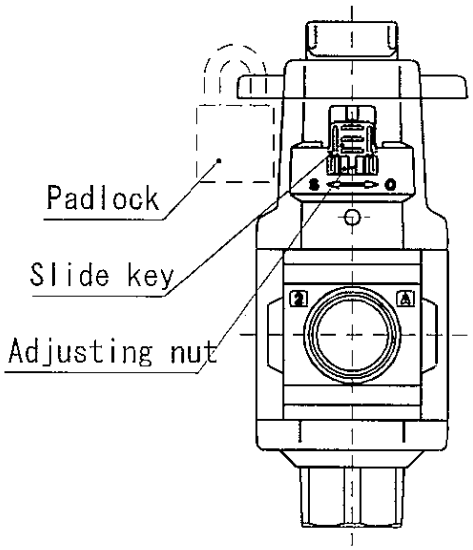
(2) Turn ON the operation signal. After checking the cylinder operation speed and pressure rise time, turn OFF the operation signal.

(3) Turn the adjusting nut while referring to the following description to adjust the pressure rise time.

(4) Make the key groove on the adjusting nut matched with the projection on the slide key.

(5) Push down the slide key to lock the adjusting nut.

(6) Check that the operation signal is OFF.



4. OPERATING PRINCIPLE

When the power is supplied to the solenoid valve or the manual unit is set to "SUP", this slow-start valve is turned ON.

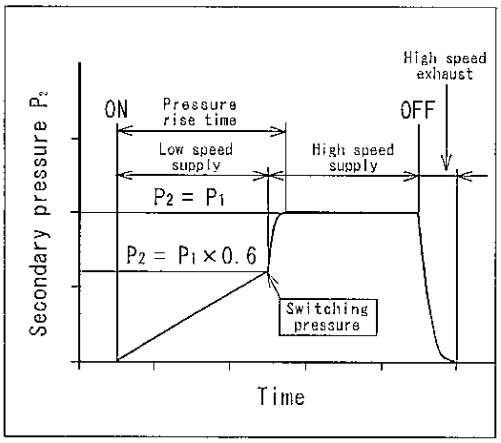
On the contrary, when the power to the solenoid valve is turned OFF or the manual unit is changed to "EXH" this slow-start valve is turned OFF.

(1) First, when the main body is turned ON, the low-speed air supply route is opened. The compressed air starts flowing into the secondary side and the secondary pressure rises gradually.
At this time, since operable cylinders in the equipment are operated at a low speed, the cylinder-projecting symptom does not occur.
(Air supply port is opened by half. 10% or less of full open of air supply port)

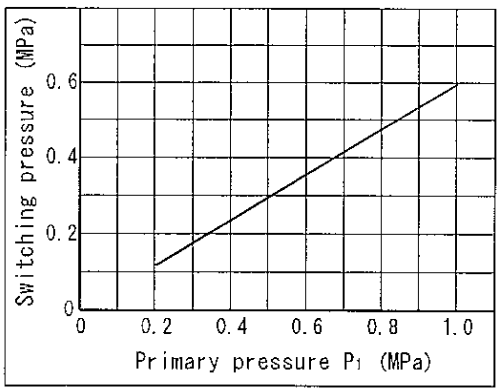
(2) Next, if the secondary pressure exceeds 60% of the primary pressure, the high-speed air supply route is opened. The secondary pressure rises rapidly and becomes the same level as the primary pressure.
(Air supply port is opened fully.)

(3) When the main body is turned OFF, the operation enters the high-speed exhaust mode, in which the residual pressure is discharged completely from the equipment.
(Exhaust port is opened fully.)

Operating characteristics



Switching pressure



5. MAINTENANCE

5.1 Periodic inspection

following inspection 1 t0 2 times per year.

(1) Check for pilot solenoid valve beat sound

Where a large sound like a buzzer is produced, replace this valve: the pilot solenoid valve is exhausted. (AC type)

(2) Check for popping phenomena

In the presence of popping phenomena in secondary side cylinder, re-adjust the pressure rise time.

Where the secondary side circuit was modified in particular, do not forget to do this.

(3) Check for loose mounting screws

Ensure that the silencer and terminal box mounting screws are not loose.

(4) Check for leakage from exhaust port

In the presence of 0.2 1it./min or more leaking, replace the seal parts.

(5) Check for delay in exhaust time

If the exhaust time is abnormally long, check the silencer for clogging and the main valve part for grease shortage.

5.2 Parts Replacement

Prior to disassembly, be sure to stop compressed air, and ensure that no pressure is applied to the piping and this valve.

For this purpose, prepare phillips screwdriver #2, hexagonal wrench 3 mm and pliers.

(1) V3301 solenoid valve replacement (Refer to Fig.1.)

Using phillips screwdriver #2, remove terminal box ① and solenoid valve ③, and after replacing O-ring ④ and solenoid valve ③, assemble the new ones.

(2) V3301 seal parts replacement (Refer to Fig.1.)

First, loosen hex. head bolt ⑬ with the hexagonal wrench 3 mm to detach cover ⑤ and bottom cover ⑫, and pull out cylinder ass'y ⑧ from cover ⑤ with the pliers.

Next, after wiping stains from the seal surface of cover ⑤, body ⑩ and bottom cover ⑫, apply grease completely.

Finally, replace cover gasket ⑥, piston ass'y ⑦, cylinder ass'y ⑧, spool ass'y ⑨ and O-ring ⑪ with new ones, and grease up the packing & gasket and cylinder ass'y ⑧ packing sliding surface before reassembly.

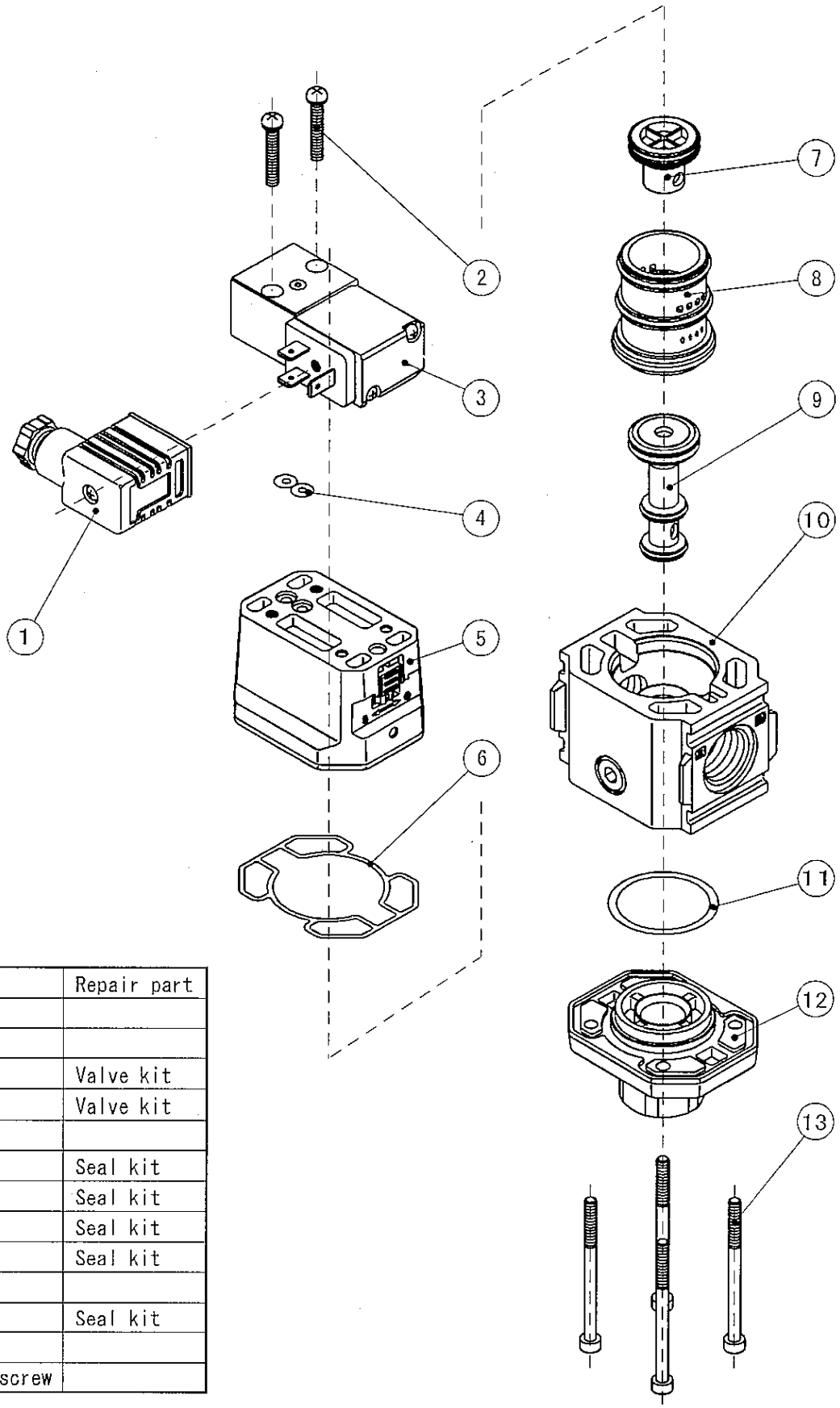
(3) V3321 seal parts replacement (Refer to Fig. 2.)

First, using phillips screwdriver #2, loosen round-head screw ① t-0 detach slide packing ⑥ from slide valve ⑤.

Next, using the hexagonal wrench 3 mm, loosen hex. head bolt ⑮ to detach cover ⑦ and bottom cover ⑭, and pull out cylinder ass'y ⑩ from cover ⑦, body ⑫ and bottom cover ⑭ before greasing-up.

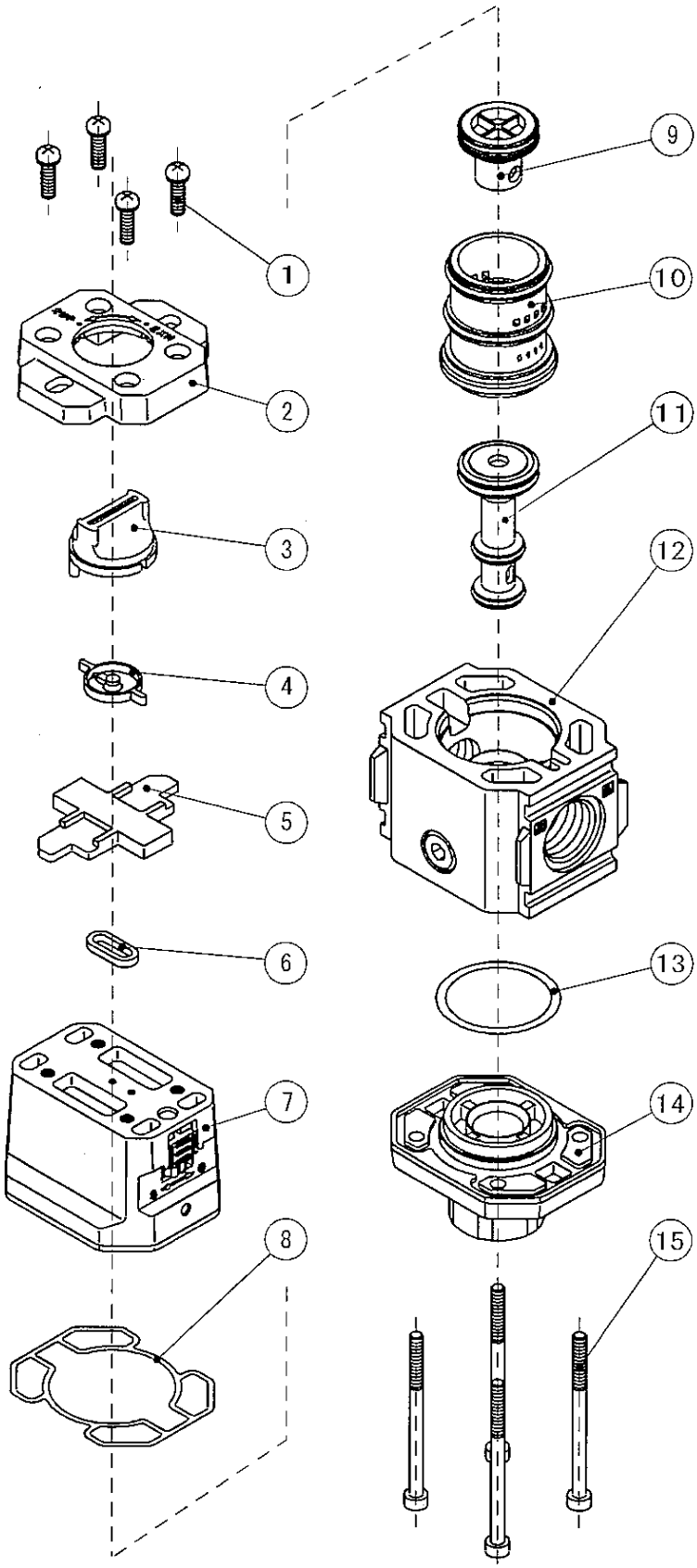
Finally, replace slide packing ⑥. cover gasket ⑧, piston ass'y ⑨, cylinder ass'y ⑩, spool ass'y ⑪ and O-ring ⑬ with new ones, and grease up the packing & gasket and cylinder ass'y ⑩ packing sliding surface before reassembly.

Figure 1. V3301



No.	Part name	Repair part
1	Terminal box	
2	Machine screw	
3	Pilot valve	Valve kit
4	O-ring	Valve kit
5	Cover	
6	Cover gasket	Seal kit
7	Piston ass'y	Seal kit
8	Cylinder ass'y	Seal kit
9	Spool ass'y	Seal kit
10	Body	
11	O-ring	Seal kit
12	Bottom cover	
13	Hex.soc.hd.cap screw	

Figure 1. V3321



No.	Part name	Repair part
1	Machine screw	
2	Cap	
3	Switching knob	
4	Detent ring	
5	Slide valve	
6	Slide packing	Seal kit
7	Cover	
8	Cover gasket	Seal kit
9	Piston ass'y	Seal kit
10	Cylinder ass'y	Seal kit
11	Spool ass'y	Seal kit
12	Body	
13	O-ring	Seal kit
14	Bottom cover	
15	Hex.soc.hd.cap screw	

6. HOW TO ORDER & PRODUCT SPECIFICATIONS

6.1 How to order

V3301 - 08 - ⓐ ⓑ ⓒ - 1 - B

ⓐ ⓑ ⓒ ⓓ ⓔ

ⓐ Port size	
Code	Discription
Port1(P)・Port2(A)	
08	Rc1/4
10	Rc3/8
15	Rc1/2

ⓑ Manual Override	
Code	Discription
No mark	Non locking
M1	Locking

ⓒ Electrical connection	
Code	Discription
No mark	Flying lead
S	Flying lead+surge protection
B	DIN plug
LS	DIN plug+LED+surge protection

ⓓ Rated voltage	
Code	Discription
1	AC100V 50/60Hz
2	AC200V 50/60Hz
3	DC24V
4	DC12V
5	AC110V 50/60Hz
6	AC220V 50/60Hz

ⓔ Option	
Code	Discription
B	Bracket
G49P	Pressure gauge
S	Silencer

V3321 - 08 - B

ⓐ ⓑ

ⓐ Port size	
Code	Discription
Port1(P)・Port2(A)	
08	Rc1/4
10	Rc3/8
15	Rc1/2

ⓑ Option	
Code	Discription
B	Bracket
G49P	Pressure gauge
S	Silencer

6.2 Product specifications

Common specifications		V3301 ／V3321		
Operating method		Pilot type		
Media		Compressed air		
Working pressure range	MPa	0.2～1.0		
Proof pressure	MPa	1.5		
Operating temperature range	℃	5～60		
Thread size	Port 1(P) & Port 2(A)	Rc 1/4	Rc 3/8	Rc 1/2
	Port 3(R)	Rc 3/8		
	Gauge port	Rc 1/4		
Section area mm2	Low speed supply	6		
	High speed supply	40	64	76
	High speed exhaust	50	74	78
Switching pressure	MPa	$P_1 \times 0.6$ minimum		
Response time	sec	0.2 maximum		
Lubrication		Not required		
Mass	g	V3301 : 635 V3321 : 515		

Electrical specifications		V3301		
Rated voltage	V	AC100V(50/60Hz)	AC200V(50/60Hz)	DC24V
Inrush current	mA	76／58	38 ／30	92
Holding current	mA	38 ／29	19 ／15	
Power consumption	W	2.2 ／1.7	2.2 ／1.7	2.2
Temperature rise	K	40 maximum		
Voltage fluctuation		±10%		
Insulation class		B		
Electrical connection		Grommet and lead wire / DIN plug		