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SM-9228-A/2

INSTRUCTION MANUAL

FOR

CYLINDER VALVE

Model NAB※S SERIES

Prior to using the Product, it is essential to read this INSTRUCTION MANUAL, especially the description of safety-use issue.

For quick reference whenever necessary, keep this INSTRUCTION MANUAL in a good manner.

CKD Corporation

FOR SAFETY USE

The Product is to be used by those who has a basic knowledge about material, fluid, piping electricity regarding Control Valves (solenoid valves, motor valves, air operated valves and so on.)

Never use this Product by those who have no knowledge or are not well trained about Control Valves.

Should be any trouble or accident caused by a wrong selection and/or wrong use of the Product even by a person of basic knowledge about Control Valves, we are not responsible therefore.

Since any customer of the Product have a variety of its application, we are not in a position to get all the information on how and where the Product is used. There may be the cases where that the Product may not meet customers' requirement or may cause any trouble or accident, by fluid, piping or other condition that are not within the specifications of the Product.
Under such a circumstance, select with their responsibility the most suitable application and use of the Product according to the customers' requirements.

The Product incorporates a various safety arrangement, however miss-handling of the product may lead to any trouble or accident on customers side. **To avoid any possible trouble, read this INSTRUCTION MANUAL carefully and understand it fully.**

Pay your attention to the items described in this Text, as well as the items indicated below.

⚠ CAUTIONS

- **When energized, heat is generated at coil portion of solenoid valves and motor valves particularly "Class H" coil where may have a high temperature.**

- **There my have electric shock when wire connecting portion of solenoid valves or motor valves are touched. In case of disassembly or inspection, turn off power supply beforehand. Don't touch live portion by wet hands.**

- **Make piping so as not to have leakage and check for no leakage before use, because in case of control valves for high temperature fluid like steam, leakage may cause heat injury.**

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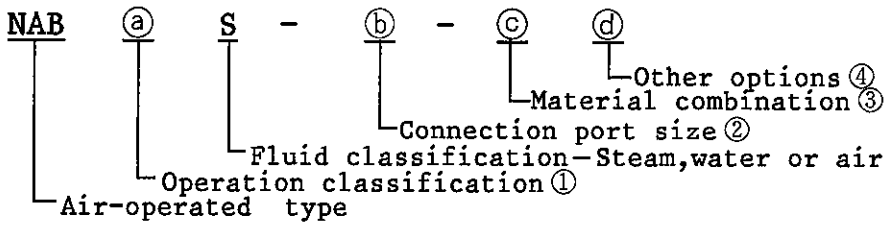
1. METHOD TO SPECIFY THE MODEL



① Operation classification

ⓐ	Operation classification
1	Normally closed type
2	Normally open type
3	Double action type

② Connection port size

ⓑ	Body end connection port size
8A	Rc1/4
10A	Rc3/8
15A	Rc1/2
20A	Rc3/4
25A	Rc1
32A	Rc1 1/4
32F	Flange 32
40A	Rc1 1/2
40F	Flange 40
50A	Rc2
50F	Flange 50

③ Material combination

ⓒ	Material combination	
	Body	Seal
C	Bronze	Ethylene tetrafluoride resin
F	Stainless steel	Ethylene tetrafluoride resin

④ Other options

ⓓ	Other options
No symbol	No option
B	Installing board

NOTE

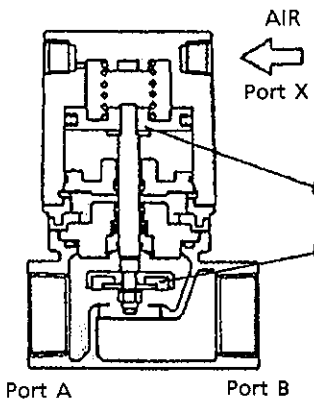
(1) Installing board (B) can be used exclusively for 15A,20A and 25A connecting diameters.

(2) The body for 8A and 10A connecting diameters made of stoinless steel are not manufactred.

2. OPERATING PRINCIPLES

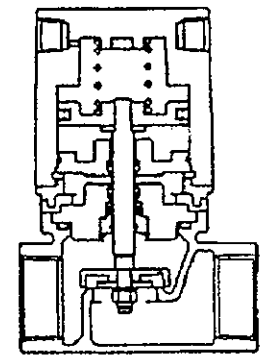
Normally closed type :

When opening:



Charging compressed air into port X raises the main valve plate ③(of the piston assembly②) which causes the valve seat to open, allowing the fluid to flow.

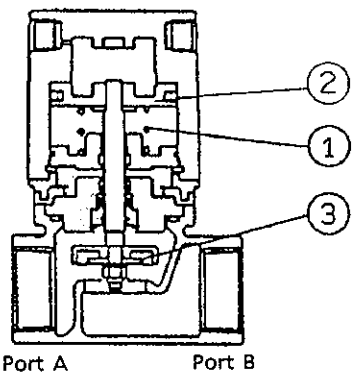
When closing:



Discharging compressed air charged in port X allows the spring ①to lower the main valve plate(of the piston assembly②) which closes the valve seat,sealing the fluid.

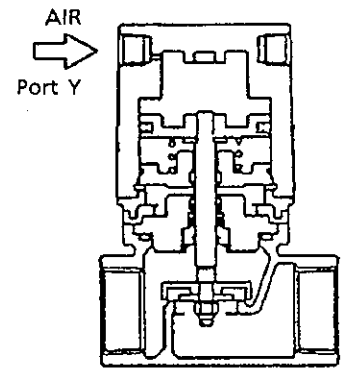
Normally open type :

When opening:



Removing air from port Y allows the spring①to raise the main valve plate③(of the piston assembly②) which causes the valve seat to open, allowing the fluid to flow.

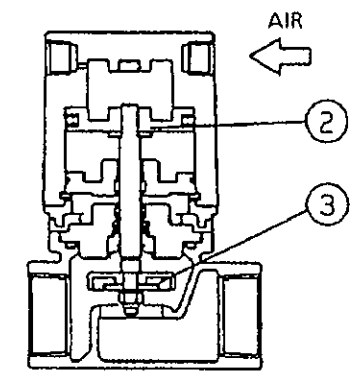
When closing:



Charging air into port Y lowers the main valve plate③(of the piston assembly②) which causes the valve seat to close,sealing the fluid.

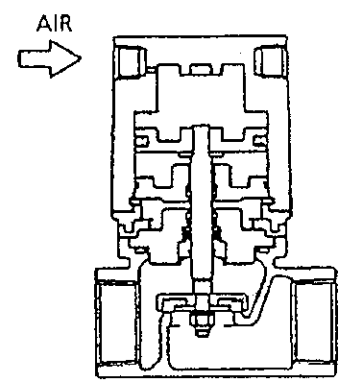
Double action type :

When opening:



Charging compressed air into port X and,at the same time,discharging air from port Y, raises the main vaive plate③(of the piston assembly②)which causes the valve seat to open, allowing the fluid to flow.

When closing:

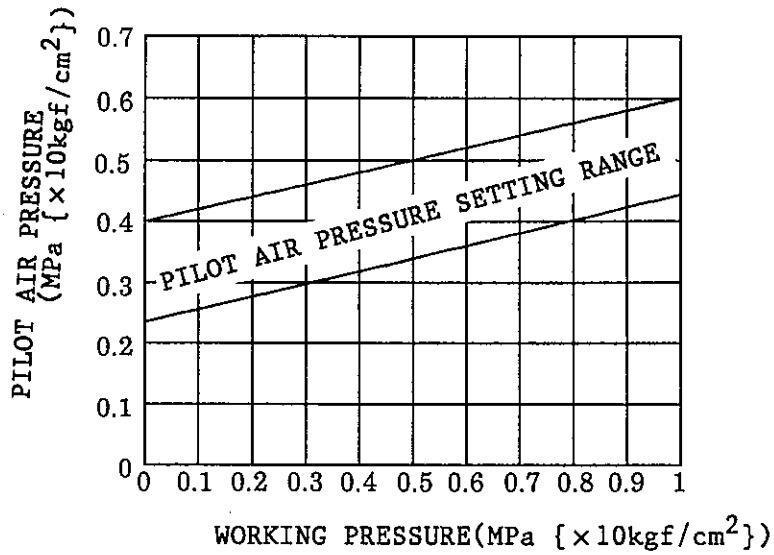


Charging compressed air into port Y and, at the same time, discharging air from port X, lowers the main valve plate③ (of the piston assembly②)which causes the valve saet to close, sealing th fluid.

3.PRECAUTIONS

3-1. Precautions Prior to Operation

(1) The working pressure must be within the normal operating range. If your application exceeds the specified range,poor operation and/or external leakage may result. Particularly with the normally open type or double action type valve,the pilot control pressure must be as graphed below.



(2) Pilot air can be supplied without lubrication. If in any circumstances it should require lubrication,a class 1 ISO VG32 (#90) turbine oil or its equivalent should be used. In this case,use a filter having an element of 5μm or less.

(3) The ambient and fluid temperatures must be within the normal operating range. If conditions exist where frozen fluid might possibly result, insulation must be provided.

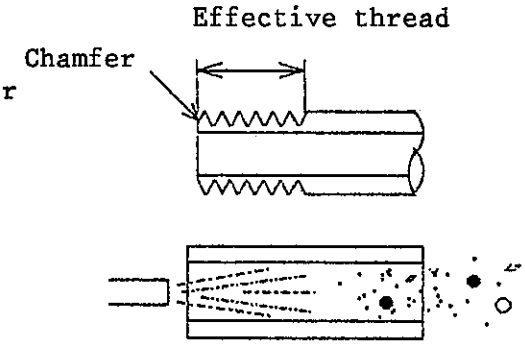
(4) A suitable filter must be mounted at the inlet side of the valve if dust and/or foreign matter might possibly get in,or in cases where rust might possibly result in the piping.
Fluid:Air･･･Filter(element of 5μm)
Fluid:Steam or Water･･･Strainer(60 mesh)

(5) If the main body is subject to being splashed by large amounts of water,oil,etc.,it should be suitably protected,such as by enclosing with a panel or cover.

(6) The normally closed and normally open type valves cannot be used in a position where back pressure is being applied. Select the double action type valve when back pressure is being applied.

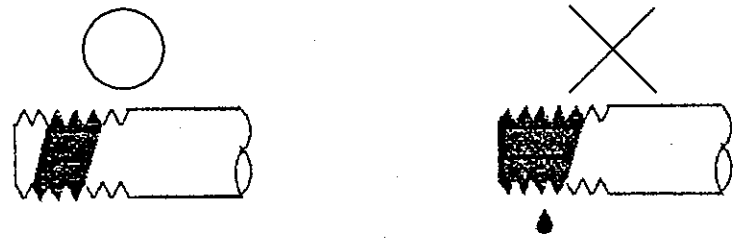
3-2. Piping Precaution

(1) The gas piping should be threaded to cover the effective thread length. Chamfer about a half pitch at the thread's end.



(2) Always blow the piping with air to remove any foreign matter,chips,etc., before connecting.

(3) Avoid getting any selant,sealing tape, etc.,in the piping. The amount of sealant and the location of taping should be suitable and appropriate.



(4) The piping should be provided with a bypass circuit. This facilitates storage and maintenance.

(5) The piping should be such that the supply ports on the body end and pilot control end are as indicated in the table below.

Operation classification	Body end supply port	Pilot control end supply port
Normally closed type	B	X
Normally open type	A	Y
Double action type	A or B	X and Y

Caution : When using a double action type of both ports A and B pressurized, connect the normally pressurized side with the port A.

(6) For the normally closed or normally open type valves,any port to which no pilot pressure will be applied should be left open to the air. Also,it should be appropriately portected from dust,such as by installing a silencer or elbow joint with its opening facing down,if a large amount of dust is present in the ambient air. Also,if you do not want to allow the valve to intake or discharge air directly from its surroundings—in cases where air around the valve is contaminated,or where the scattering of dust in the surrounding atmosphere must be avoided,etc.,the NAB should be provided with piping leading to a place where no such problem is anticipated.

(7) Use the three or four—way solenoid valve for pilot control available from CKD Corporation.
Recommended solenoid valve:
(a)For normally closed and normally open types : AG31—02—1 Multilex valve,1.5 times orifice diameter
(b)For double action type : 4KA110 Selex valve
(For details please refer to the relevant catalogs.)

(8) The peripheral devices(tube,joint,etc)for the related pilot port should be suitable to the specifications and applications of the solenoid valve for pilot control.
(For details please refer to the relevant catalogs.)

(9) When the piping is connected,make sure that no leakage is possible from connections. Also,introduce the fluid and perform several test runs to see that it operates normally.

4 MAINTENANCE AND INSPECTION

4.1 Periodic Inspection

(1) To ensure that the NAB provides an optinal operation perform periodic inspection once or twice year.

(2) Inspection items

(a) No dust and foreign matter is accumulated in the NAB. Also,no highly sticky matter has adhered inside. If any abnormality is detected, disassemble the valve and remove it.
(b) No abnormal wear or bruising is present on the valve seat of the NAB, including the main valve plate. If any abnormality is detected, disassemble the valve and remove it.
(c) The following are repair parts and are to be replaced when abnormality occur.

Repair parts	Nomber of the disassembly figure
PDU−packing	⑦ ⑪
Rod−packing	⑫
Main valve plate	⑯
PSD−packing	㉑
O−ring	⑲ ㉒ ㉓

4.2 Disassembly, Reassembly, Inspection

4.2.1 Disassembly

(1) Before disassembling, be sure to turn off the power and remove the pilot air, fluid, and pressure.

(2) Removing the main valve plate:
Remove the four hexagon socket head bolts①. This splits the NAB into the body⑳and a set of other parts (cylinder cover③, etc.).
Using a spanner, securely hold piston ass'y⑤in place, and undo and remove nut⑱. This allows the main valve plate⑯to be removed.

(3) Extracting the rod packing:
After removing the main valve plate using procedure(2). Remove the adapter⑩and remove the snap ring⑭and remove the rod metal⑬. Then the rod packing⑫can be extract.

(4) Extracting the piston assembly:
After removing the main valve plate using procedure(2). Remove the adapter⑩,and remove the snap ring⑧then extract the rod cover⑥. (Use adequate caution at this time as the spring④used in the normally closed and normally open types may fly outwards.) The piston assembly⑤can now be extracted.

4.2.2 Reassembly

(1) Reverse the assembly procedure. No parts should be left unassembled.

(2) Before housing the piston assembly into the cylinder cover, apply grease inside it.

<Note> The grease recommends the heat proof silicone grease.

(3) Please use caution during assembly as the rod packing ⑫and main valve plate ⑯are made of ethylene tetrafluoride resin and therefore scratch easily.

(4) Tighten the hexagon socket head bolts①according to the next tightening torques. Use caution since the yoke⑨is made of resin and may be damaged if overtightened.

Connection port size	Tightening torques (N·m)
8A~15A	3.3±0.5
20A	7.6±0.5
25A	11.6±1
32~50A	29.4±1

4.2.3 Inspection

(1) Apply a pressure equivalent to that of the fluid used. Check that no interior and exterior leakage occurs from the NAB.

(2) Next,apply the pilot pressure and send an electrical signal to confirm that the valve opens closes normally.

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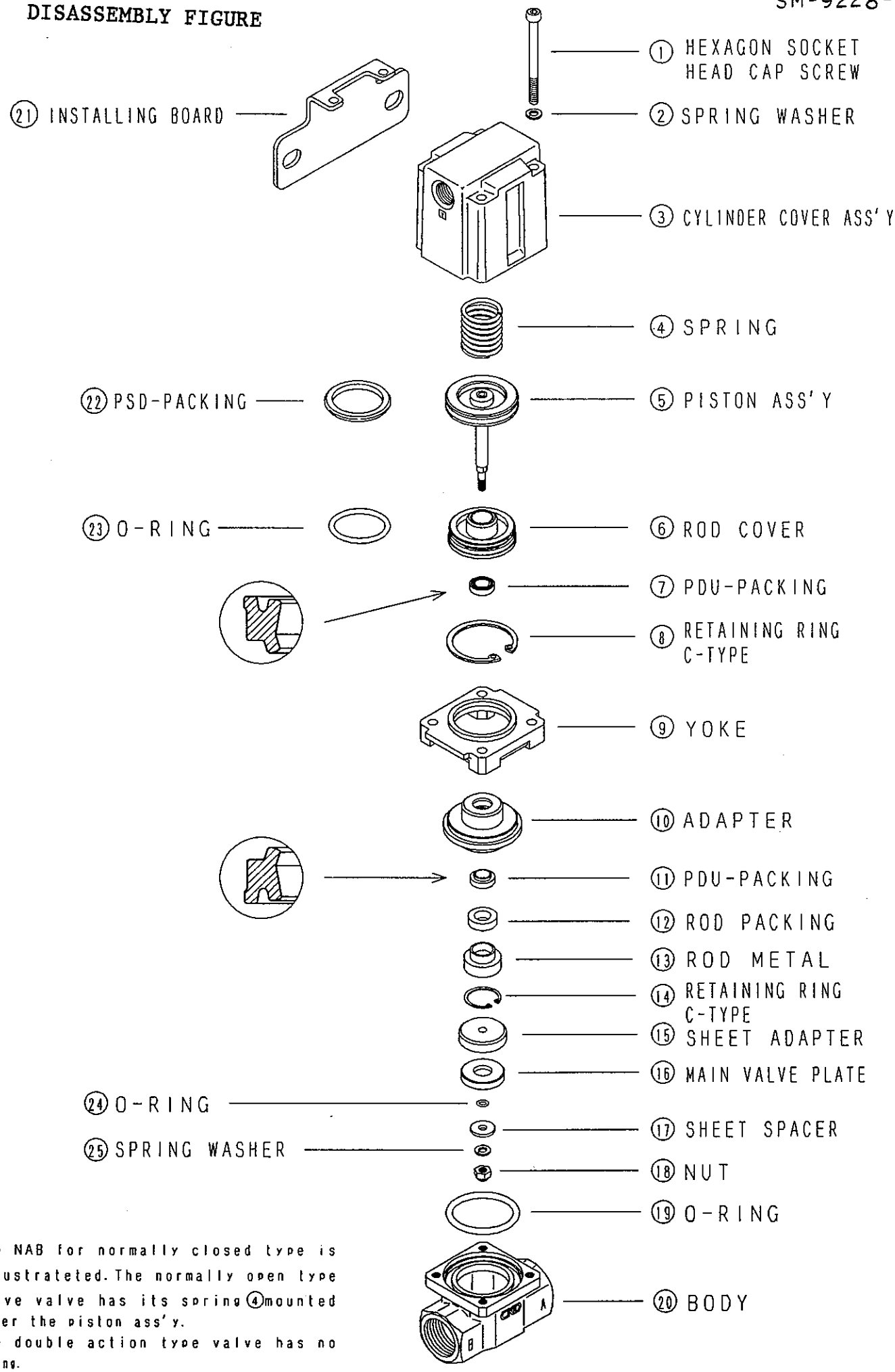
DISASSEMBLY FIGURE



The NAB for normally closed type is illustrateted. The normally open type valve valve has its spring ④ mounted under the piston ass'y.
The double action type valve has no spring.

4.3 Troubleshooting