

CKD

INSTRUCTION MANUAL

COMPACT CYLINDER VALVE
NAB SERIES
GNAB SERIES

- Read this Instruction Manual before using the product.
- In particular, read the safety notes carefully.
- Retain this instruction manual with the product for further consultation whenever necessary.

5th edition

CKD

For safety use

When designing and manufacturing equipment using our products, you are obligated to confirm that the safety of the system operated by the mechanical mechanism of the equipment, the pneumatic control circuit or the water control circuit, and the electrical control that controls these circuits can be ensured, and to manufacture safe equipment.

To use our products safely, it is important to select, use, and handle the products, as well as to maintain and manage them properly.

To ensure the safety of the equipment, be sure to observe all warnings and precautions.

We ask that you confirm that safety can be ensured in your equipment and that you manufacture safe equipment.



WARNING

1. This product is designed and manufactured as equipment and part for general industrial machinery.

Therefore, handling should be performed by persons with sufficient knowledge and experience.

2. Be sure to use the product within the product specifications.

It cannot be used outside of product-specific specifications. Never modify or perform any additional work on the product.

This product is intended for use in general industrial equipment and parts. Therefore, it is not applicable when used outdoors or in the following conditions or environments.

(However, if you consult with us before adopting the product and agree with our product specifications, it is applicable, but please take safety measures to avoid danger in the unlikely event of malfunction.)

[1] Use in applications requiring safety, such as atomic energy, railways, aviation, ships, vehicles, medical machinery, equipment and applications in direct contact with beverages or food, recreational equipment, emergency shutdown circuits, press machines, brake circuits, and safety measures.

[2] Use in applications that are expected to have a significant impact on people and property and require special safety.

3. Be sure to observe all organization safety standards, laws and regulations, etc. related to equipment design, management, etc.

ISO4414, JIS B 8370 (General Rules for Pneumatic Systems)

JFPS2008 (Guidelines for the Selection and Use of Pneumatic Cylinders)

High Pressure Gas Safety Act, Industrial Safety and Health Act and other safety regulations, organization standards, laws and regulations, etc.

4. Do not handle this product or remove any piping or equipment until you are sure of its safety.

[1] Before inspecting or maintaining machines or equipment, be sure to confirm that all systems involving this product are safe.

[2] Even when the operation is stopped, there may be hot or charged parts present, so please be careful.

[3] When inspecting and maintaining equipment, shut off the supply air and supply water as energy sources and the power to the relevant equipment, exhaust any compressed air in the system, and take care to avoid water leaks and electrical leaks.

[4] When starting up or restarting a machine or equipment that uses pneumatic equipment, confirm that the safety of the system, including measures to prevent ejection, is ensured.

5. To prevent accidents, be sure to observe the warnings and precautions on the following pages.

- The precautions shown here are classified into three safety precaution levels: "Danger", "Warning", and "Caution".



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 CAUTION notices may result in injury or damage to equipment or facilities.

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.

All of the above are important information and must be followed.

Warranty notice

● Warranty Period

This product is warranted for one (1) year from the date of delivery to the location specified by the customer.

● Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the above warranty period, CKD will promptly provide a replacement for the faulty product or a part thereof free of charge or repair the faulty product at one of CKD's facilities free of charge.

However, following failures are excluded from this warranty:

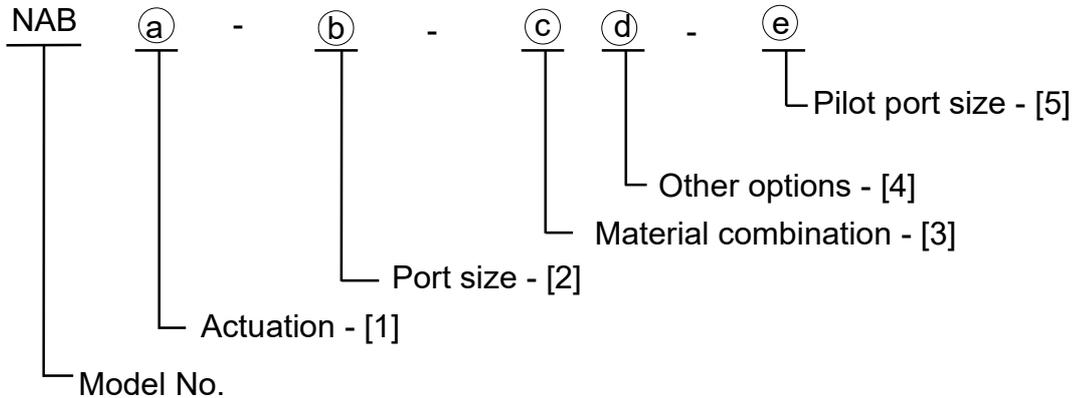
- [1] Handling or use under conditions or environments other than those described in the catalog or specifications.
- [2] Failure not caused by the product.
- [3] When the product is used in a manner other than its intended use.
- [4] Failure caused by modifications/alterations or repairs not carried out by CKD.
- [5] Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- [6] Failure caused by a natural disaster or other disaster that is not our responsibility.

Please note that the warranty here applies to the delivered product alone and excludes any damages caused by defects in the delivered product.

● Confirmation of product compatibility

It is the customer's responsibility to verify compatibility of our products with the system, machines, and equipment used by the customer.

1. How to read model numbers
1.1 Single unit



[1] Actuation

(a)	Actuation
1	Normally closed (NC) type
2	Normally open (NO) type
3	Double action type

[2] Port size

(b)	Port size
8	Rc 1/4
10	Rc 3/8

[3] Material combination

(c)	Material combination		
	Cylinder cover	Body	Seal
02	Polyphenylene sulfide	Brass	Nitrile rubber
B2	Polyphenylene sulfide	Brass	Fluoro rubber
D2	Polyphenylene sulfide	Stainless steel	Nitrile rubber
E2	Polyphenylene sulfide	Stainless steel	Fluoro rubber
No symbol*1	Aluminum die casting	Brass	Nitrile rubber
B	Aluminum die casting	Brass	Fluoro rubber
D	Aluminum die casting	Stainless steel	Nitrile rubber
E	Aluminum die casting	Stainless steel	Fluoro rubber

[4] Other options

(d)	Other options
No symbol	No options
B	With mounting plate

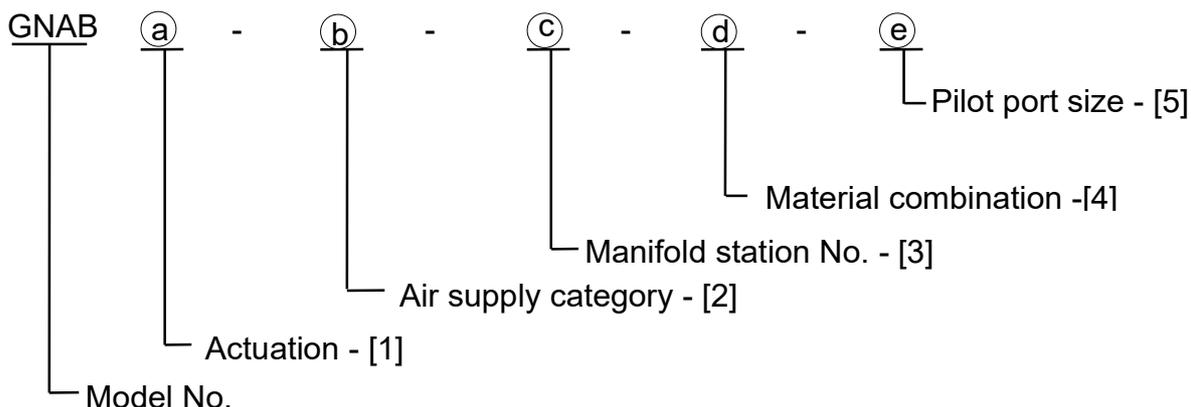
[5] Pilot port size*2

(e)	Pilot port size
C18	φ1.8 push-in fitting for fiber tube
CL18	φ1.8 radial push-in fitting for fiber tube
C4	φ4 push-in fitting
CL4	φ4 radial push-in fitting
C6	φ6 push-in fitting
CL6	φ6 radial push-in fitting

Note 1: If there are other options (d), enter "0" in the "No symbol" field.

Note 2: If (c) is 02, B2, D2, or E2, select (e)

1.2 Manifold



[1] Actuation

(a)	Actuation
1	Normally closed (NC) type
2	Normally open (NO) type
3	Double action type

[2] Air supply category

(b)	Air supply category
1	Common supply type (A port vacuum pump side)
5	Individual supply type (C port vacuum port side)

[3] Manifold station No.

(c)	Manifold station No.
2	2 stations
3	3 stations
4	4 stations
5	5 stations
6	6 stations
7	7 stations
8	8 stations
9	9 stations
10	10 stations
0	Actuator only

[4] Material combination

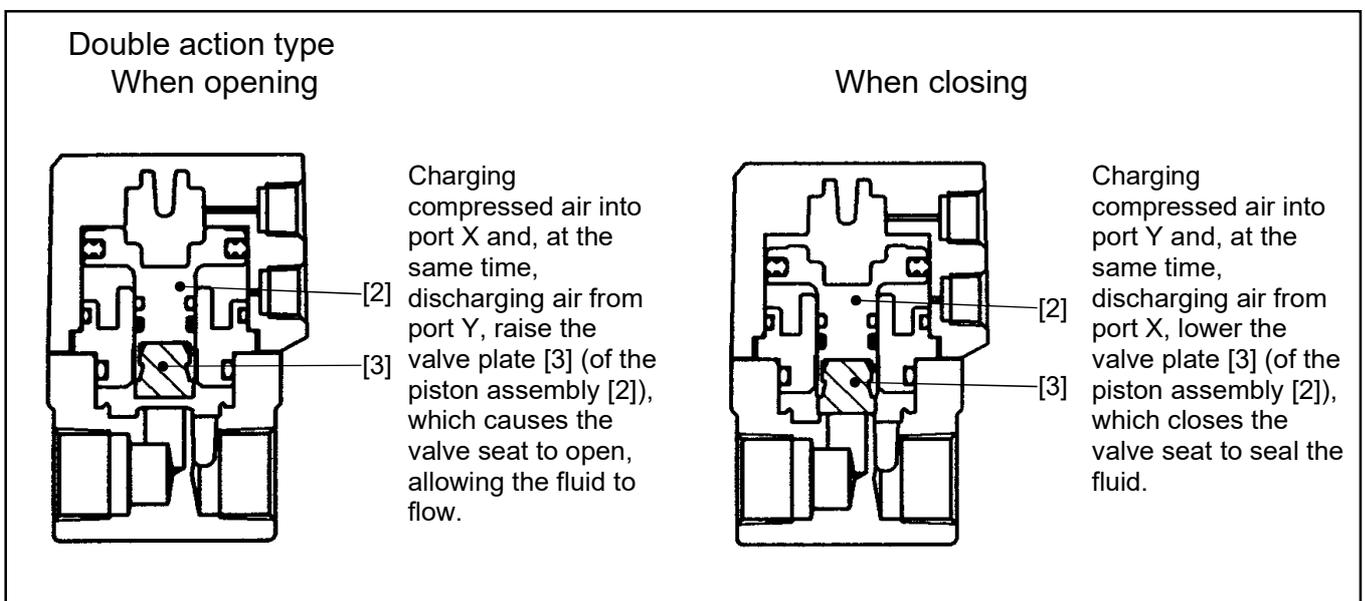
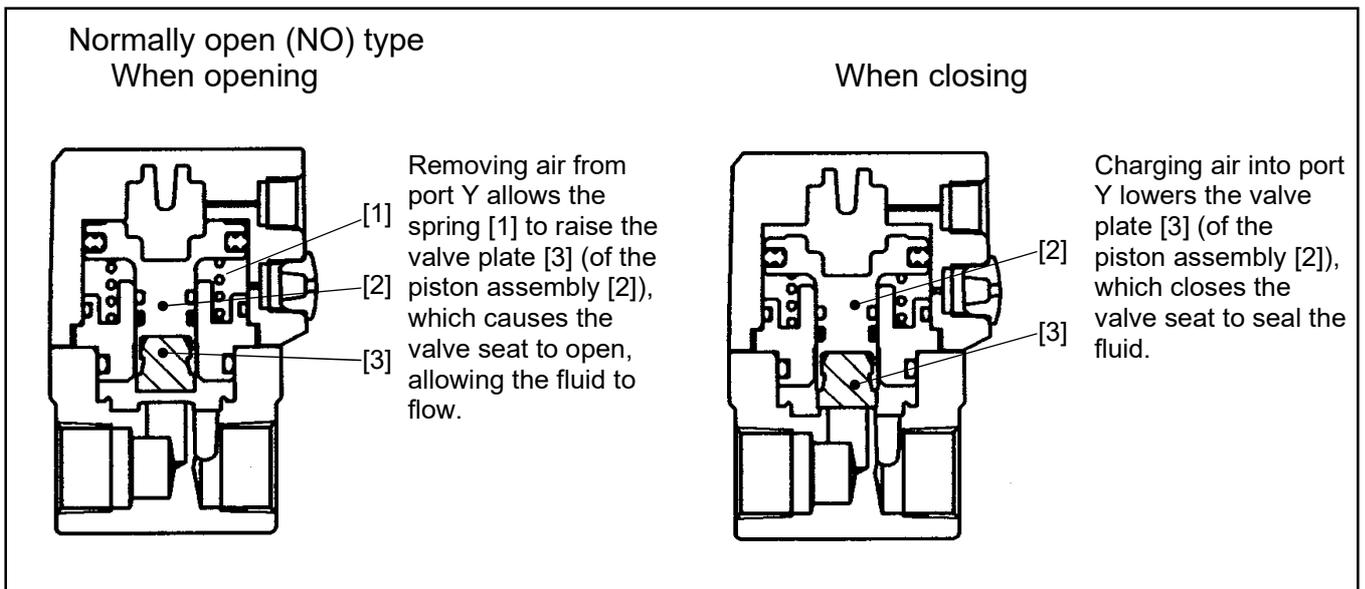
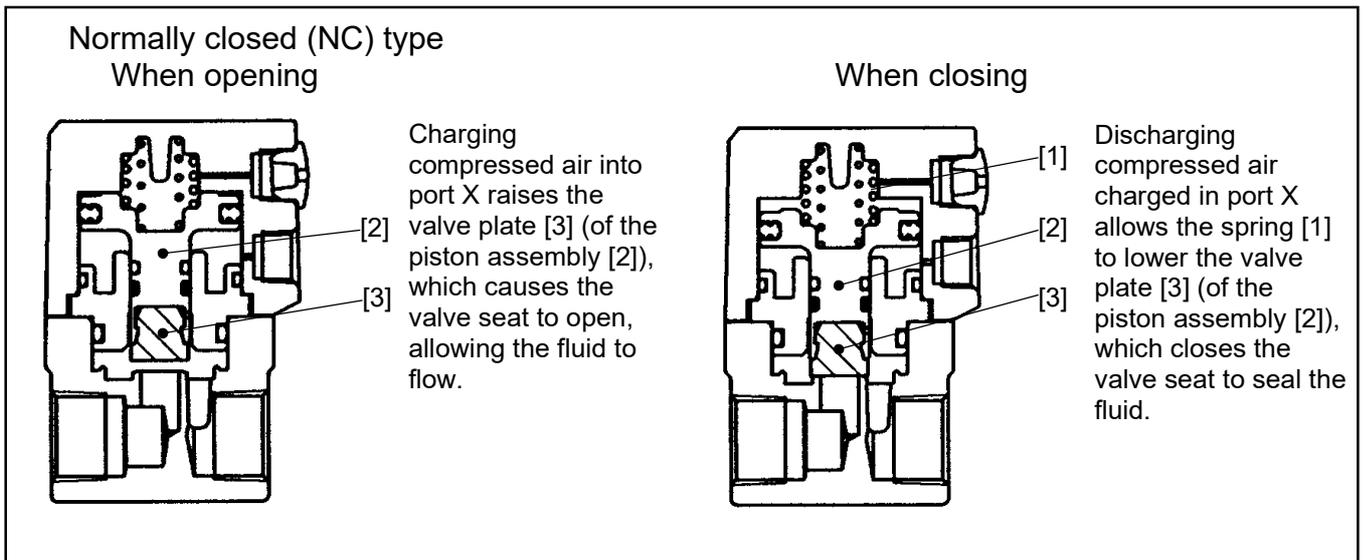
(d)	Material combination			
	Cylinder cover	Sub plate	Body	Seal
02	Polyphenylene sulfide	Brass	Polypropylene	Nitrile rubber
B2	Polyphenylene sulfide	Brass	Polypropylene	Fluoro rubber
D2	Polyphenylene sulfide	Stainless steel	Stainless steel	Nitrile rubber
E2	Polyphenylene sulfide	Stainless steel	Stainless steel	Fluoro rubber
12	Polyphenylene sulfide	Aluminum	Polypropylene	Nitrile rubber
22	Polyphenylene sulfide	Aluminum	Polypropylene	Fluoro rubber
No symbol	Aluminum die casting	Brass	Polypropylene	Nitrile rubber
B	Aluminum die casting	Brass	Polypropylene	Fluoro rubber
D	Aluminum die casting	Stainless steel	Stainless steel	Nitrile rubber
E	Aluminum die casting	Stainless steel	Stainless steel	Fluoro rubber
1	Polyphenylene sulfide	Aluminum	Polypropylene	Nitrile rubber
2	Polyphenylene sulfide	Aluminum	Polypropylene	Fluoro rubber

[5] Pilot port size*1

(e)	Pilot port size
C18	φ1.8 push-in fitting for fiber tube
CL18	φ1.8 radial push-in fitting for fiber tube
C4	φ4 push-in fitting
CL4	φ4 radial push-in fitting
C6	φ6 push-in fitting
CL6	φ6 radial push-in fitting

Note 1: If (d) is 02, B2, D2, or E2, select (e).

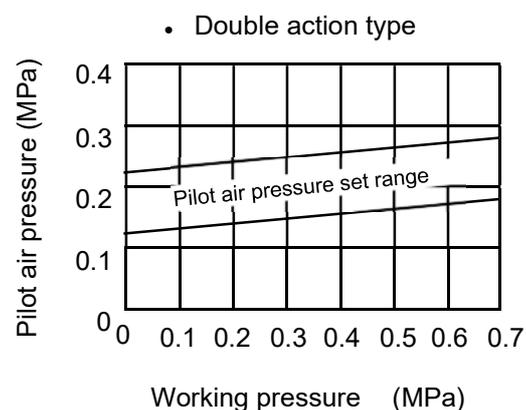
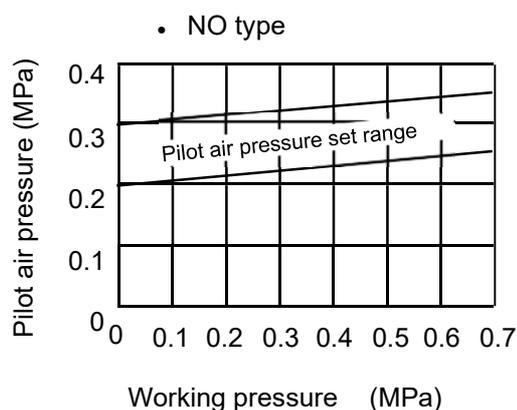
2. Operating explanation



3. Precautions

3-1. Precautions Prior to Operation

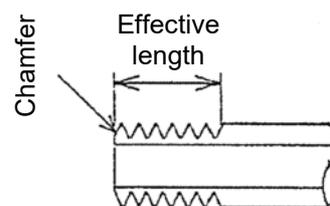
- (1) The working pressure must be within the normal operating range. Use of a pressure outside the specified range may cause malfunction or external leakage. In particular, for NO type and double action type, set the pressure as shown in the graph below. Using the product at a pressure lower than the pilot air pressure setting may result in internal leakage. Using the product at a higher pressure may affect its durability.



- (2) The product is pre-lubricated, so pilot air can be used without refilling. If in any circumstances it should require lubrication, turbine oil class 1 ISO VG32 (#90) or its equivalent must be used. If a large amount of drain water enters the valve, it may cause malfunction. As a countermeasure against drainage problems, perform dehumidification using aftercoolers and dryers, and improve air quality by removing foreign matter and tar with filters. Use filters having an element of 5 μm or less.
- (3) The ambient and fluid temperatures must be within the normal operating range. Take measures to prevent freezing, such as insulating with insulation material, if there is a risk of fluid freezing.
- (4) If dust or foreign matter enters the fluid, or if rust develops inside the piping, it may adhere to the valve seat or sliding parts and cause malfunctions (e.g., operational failure or sealing failure). Therefore, install an appropriate filter on the inlet side of the valve. As a general guideline, use a filter of about 80 to 100 mesh.
- (5) If the main body is likely to be splashed with large amounts of water, oil, etc. or to be exposed to a lot of dust, it must be protected by enclosing it with a panel or cover. For the NC and NO types, especially, the ports without a pilot air supply are opened to release air into the atmosphere. Therefore, care must be taken to prevent water intrusion, etc.
- (6) Even if fluoro-rubber is used as the seal material, the permissible highest temperature is 60°C. Consult with CKD for use in higher temperatures.
- (7) Since the piston rod seal is pre-lubricated with grease, oil-free treatment cannot be applied. When using a special fluid, consult with CKD for grease types.

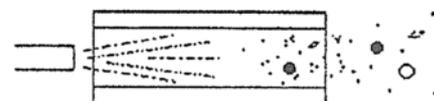
3-2. Piping Precautions

(1) Make sure the gas pipe is screwed in to the effective thread length. Chamfer the tip of the screw by about half a pitch.



(2) Thoroughly flush the pipes before piping to remove any foreign matter, cutting chips, etc.

(Flush the pipes with compressed air at 0.3 MPa or higher to blow out foreign matter for cleaning.)



(3) When connecting piping to the product, pay attention to the amount of sealant used, where it is applied, and where the sealing tape is wrapped to ensure that the sealant, tape, etc. do not enter the piping.



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

(5) The piping must be such that the supply ports on the body and pilot sides are as indicated in the

Operation classification	Supply port on the body side			Supply port on the pilot side
	NAB	GNAB		
		Common supply type	Individual supply type	
NC type	A or B Note	C	A	X
NO type	A or B Note	C	A	Y
Double action type	A or B Note	C	A	X and Y

Note: For the NAB, when both A and B ports are pressurized, connect the continuously pressurized side to port A.

(6) For the NC and NO types, any port to which no pilot pressure will be applied must be left open to the air. If the surrounding area contains a large amount of dust or debris, protect the port by installing a downward-facing silencer or elbow joint. Also, if you do not want the valve to intake or discharge air directly because of its surroundings or dust dispersal problems, install a pipe so that the air is taken in or discharged in locations where it will not cause any problems.

(7) Use three to five-way solenoid valves for pilot control available from CKD.

Recommended solenoid valve (a) For NC and NO types : Three-way valve, AG31-02-1, 3QRA1, etc.
Equivalent to an orifice diameter of 1.5 mm

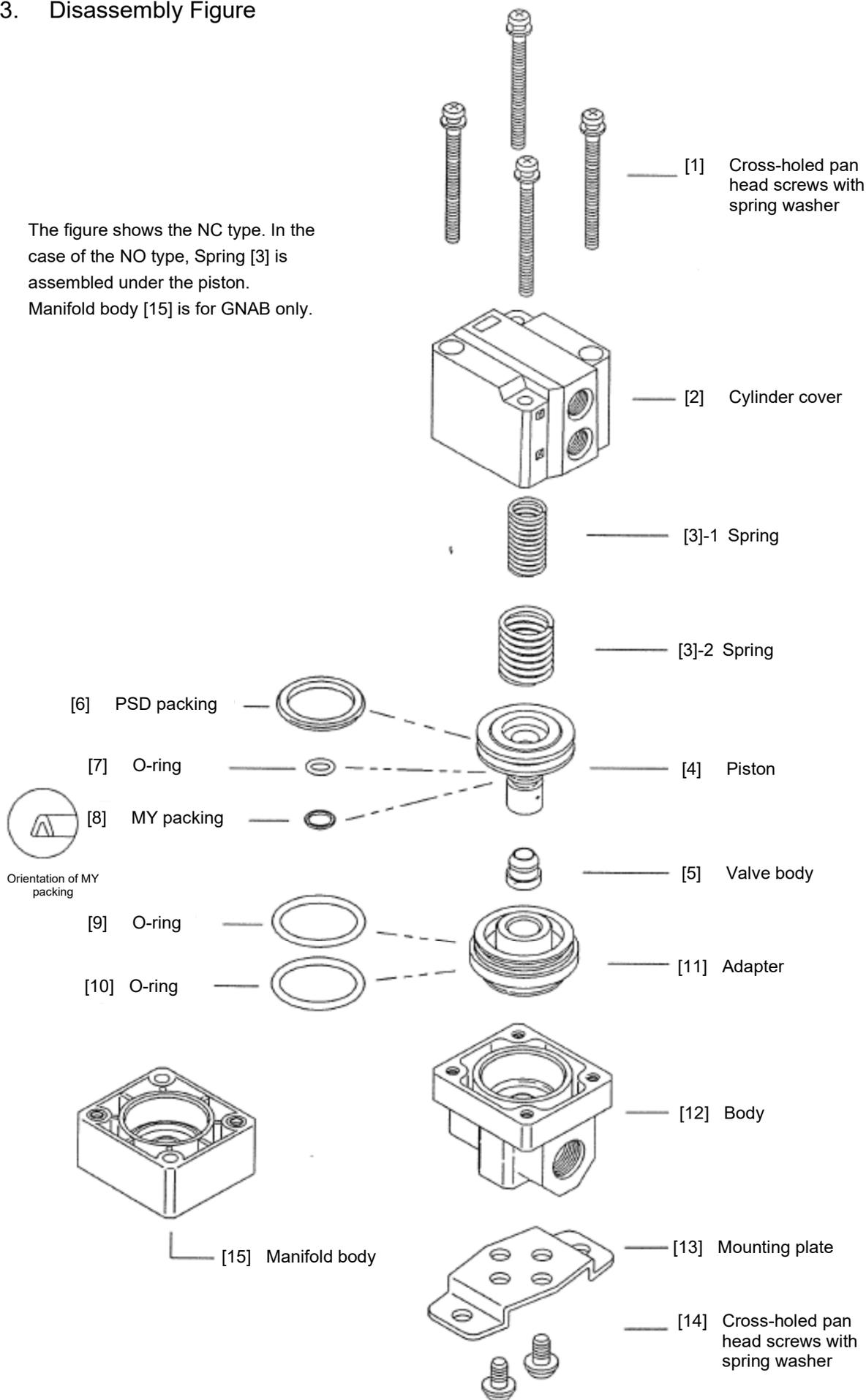
(b) For double action type : Four to five-way valve, 4KA110, 4GA110, etc.
(For details, please refer to the relevant catalogs.)

(8) Any peripheral equipment (tubes and fittings) connected to the pilot control port must be used in accordance with the specifications and intended use of the pilot control solenoid valve.
(For details, please refer to the relevant catalogs.)

(9) After piping, check for leaks at each connection point. Also, introduce the fluid and perform several test runs to ensure that it operates normally.

4-3. Disassembly Figure

1. The figure shows the NC type. In the case of the NO type, Spring [3] is assembled under the piston.
2. Manifold body [15] is for GNAB only.



4-4. Failures and troubleshooting

