

# Diaphragm valve True Union diaphragm valve Pneumatic Actuated Type AI 15~50mm

## User's Manual



Thank you for choosing our product.  
This instruction manual contains important information for safe use of our product, so please be sure to read it before handling the product.  
After reading this manual, please be sure to keep it in a place where the user can see it at any time.

**ASAHI YUKIZAI CORPORATION**

[User's Manual] Diaphragm valve/True union diaphragm valve  
Pneumatic actuated Type AI 15~50mm

## -SAFETY PRECAUTIONS-

This instruction manual is written on the assumption that the person who handles our products has a basic knowledge of our products, electrical equipment, machinery, control, etc., and it contains technical terms depending on the handling contents.

Please read this manual carefully and fully understand the contents and observe the safety precautions for proper use.

In this manual, the warning, caution, prohibition, and enforcement are categorized together with the symbol to inform the situation and scale of human injury or property damage.

Failure to observe this precaution may result in unexpected failure or damage. Be sure to observe this precaution.

### <WARNING/CAUTION indications>

 <b>Warning</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>Caution</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

### <Prohibited/Forced display>

 <b>Prohibition</b>	In the handling of the product, it is prohibited to do it in "Do not do it".
 <b>Forcing</b>	In the handling of the product, it is forced by "contents to be carried out without fail".

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## 1. Our product warranty coverage

Unless otherwise stated in the Contract or Specifications, etc., the warranty for the piping material products (hereinafter referred to as "applicable products") such as valves manufactured or sold by us is as follows.

### Applicable to

This warranty applies only when the product is used in Japan. If you intend to use the product overseas, please contact us.

### Warranty Period

The warranty period is one year after delivery.

### Guaranteed range

In the event of failure or malfunction due to our responsibility during the above warranty period, we will replace or repair the product with a substitute free of charge.

Provided, however, that even within the warranty period, the warranty shall not apply to any of the following cases (charged service).

- ▶ When the storage, operating conditions, precautions, etc. described in the specifications, instruction manual, etc. are not adhered to in the construction, installation, handling, maintenance, etc.
- ▶ Defects, such as the design of the customer's equipment or software, caused by other than the target product.
- ▶ The fault is due to modification or secondary processing of the product by something other than us.
- ▶ In the case of a failure which can be deemed to have been avoided if the periodic inspection described in the instruction manual, etc. or the maintenance or replacement of consumable parts has been performed normally.
- ▶ The component is used for purposes other than the product's intended use.
- ▶ Failure or malfunction due to causes that could not be foreseen by our level of science and technology at the time of shipment.
- ▶ The fault is due to an external factor that is not our responsibility, such as natural disaster or disaster.

### Disclaimer

- ▶ The warranty will not cover secondary damage (damage to equipment, loss of opportunity, loss of profit, etc.) or any other damage caused by the failure of our product.
- ▶ Although we strive to improve the quality and reliability of our products, we do not guarantee their integrity. Especially when using this product for equipment that may infringe human life, body or property, take appropriate safety design measures, etc., with full consideration of problems that may normally occur. We assume no responsibility for such use if we have not obtained our consent in advance in writing of specifications, etc.
- ▶ Please observe the product specifications and precautions when using our products. We shall not assume any responsibility for any damage to the customer caused by the customer's negligence. However, this does not apply to damage caused by a defect in our product.

## 2. Safety Instructions

### Unpacking, Transportation and Storage

 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>Serious injury can result.</b></p> <ul style="list-style-type: none"> <li>▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.</li> </ul>

 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not subject the product to impact by throwing, dropping or hitting.</li> <li>▶ Do not scratch or pierce the product with a sharp object such as a knife or hand hook.</li> <li>▶ Do not pile up cardboard boxes forcefully to prevent the load from collapsing.</li> <li>▶ Avoid contact with coal tar, creosote (a wood preservative), white pesticides, insecticides, paints, etc.</li> </ul>
 <b>Forcing</b>	<p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Keep in cardboard until just before piping, and store indoors (at room temperature) away from direct sunlight. Also, avoid storing the product in places of high temperature. (The strength of cardboard packaging decreases when it gets wet. Be very careful when storing and handling it.)</li> <li>▶ After unpacking, make sure that the product is correct and that it meets the specifications.</li> </ul>

## Product Handling

 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>Serious injury can result.</b></p> <ul style="list-style-type: none"> <li>▶ Do not disassemble the actuator.</li> <li>▶ Do not touch moving parts during operation with hands, feet or tools.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ If positive pressure gas is used for our resin piping material, a dangerous condition may occur due to the repulsive force peculiar to compressible fluids even if the pressure is the same as the water pressure. Therefore, be sure to take safety measures for the surrounding area, such as covering the piping with protective materials. If you have any questions, please contact us separately.</li> <li>▶ When conducting a pipe leak test after completion of piping construction, be sure to check with water pressure. Contact us in advance if you are unavoidable to test with a gas.</li> </ul>

 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not step on the valve or place heavy objects on it.</li> <li>▶ Keep away from fire and hot objects.</li> <li>▶ Do not use the product in places where it may be submerged.</li> <li>▶ Do not subject the valve to large vibrations.</li> </ul>

## **Caution**

### **Forcing**

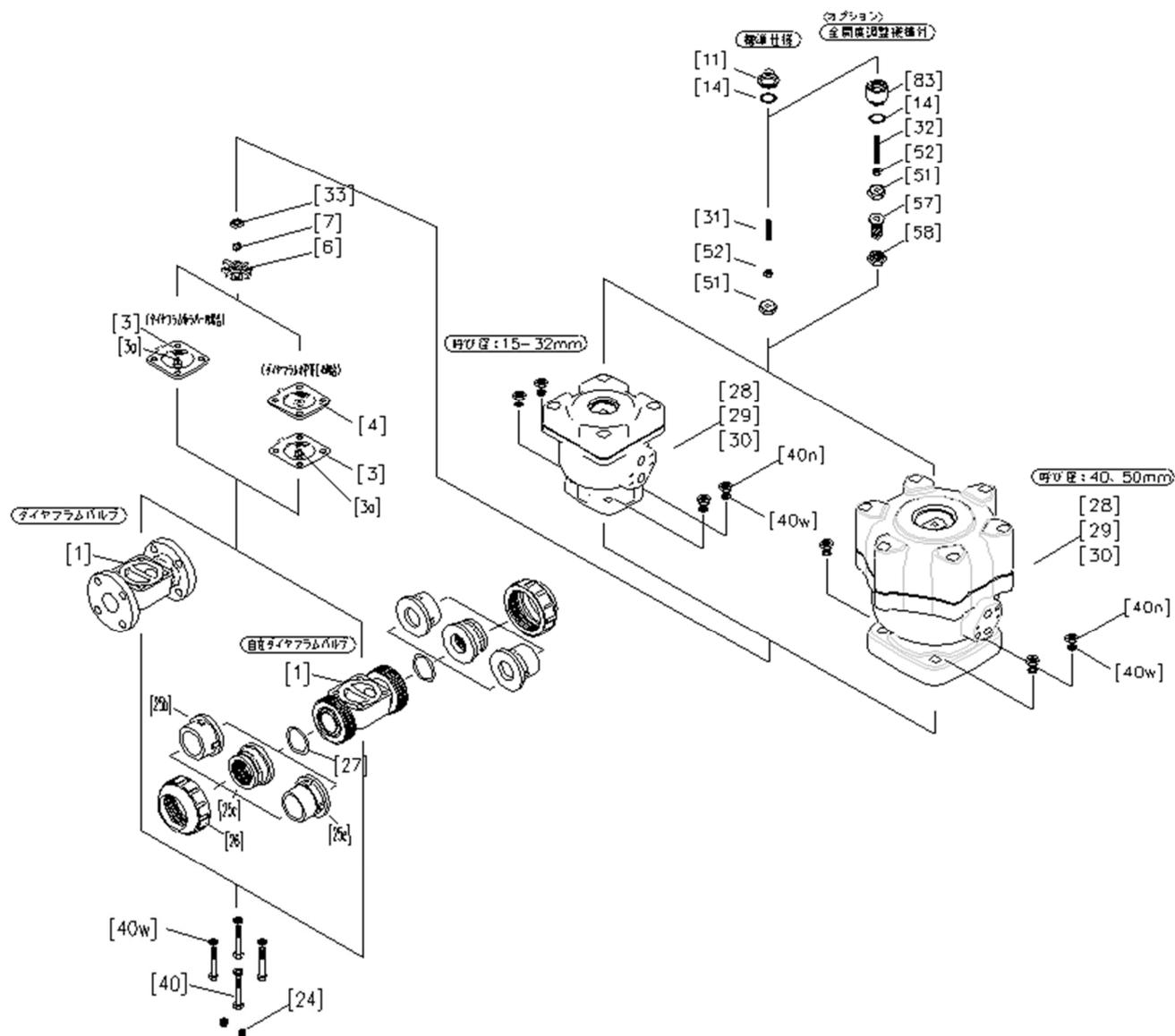
#### **There is a danger of injury.**

- ▶ Use the supplied handle or a tool specified by the manufacturer for manual operation.
- ▶ When performing manual operation, make sure that the actuator is not operated by the motor.
- ▶ Secure sufficient space for maintenance and inspection when piping.

#### **The valve can be damaged, or leak.**

- ▶ Check the voltage on the power supply and nameplate before use.
- ▶ Pay attention to the atmosphere where the valve is installed. Avoid locations where the product is exposed to sea breezes, corrosive gases, chemical liquids, sea water, steam, etc.
- ▶ Keep the pressure and temperature of the fluid within the allowable range. (The maximum allowable pressure includes water hammer pressure.)
- ▶ Use a valve of suitable material for the operating conditions. (Depending on the type of chemical liquid, the parts may be damaged. Contact us in advance for details.)
- ▶ Use fluids containing crystalline material under conditions that do not recrystallize.
- ▶ Avoid any place where the valve is constantly exposed to splashes of water and dust, or direct sunlight, or protect the valve with a cover or the like to cover the entire area.
- ▶ Perform maintenance periodically by referring to "11. Inspection items". Pay particular attention to temperature changes and aging during long-term storage or shutdown or use.
- ▶ If internal leakage occurs when the valve is fully closed, adjust the stopper.
- ▶ When installing a valve, provide an appropriate valve support so that excessive force is not applied to the valve and piping.
- ▶ Always use the product within the indicated product specifications.
- ▶ If you notice an unusual odor, heat, or smoke, immediately turn off the power supply. If any abnormality is found, be sure to consult your dealer or us for inspection.
- ▶ Keep the ambient temperature of the installation location within -10 to 50° C.
- ▶ Avoid locations with volatile gases or poor atmospheres. Provide a cover, etc., to cover the entire area.
- ▶ Use clean, dehumidified and dedusted operating air. However, please consult with us in advance when using high dry air with a dew point of -40° C or less.

### 3. Name of each part



[1]	Body	[25b]	End connector (socket type)	[33]	Compressor pushing plate
[3]	Diaphragm	[25c]	End connector (screw-in type)	[40]	Bolt (No.40)
[3a]	Inserted metal of diaphragm	[25e]	End connector (spigot type)	[40n]	Nut (No.40)
[4]	Cushion	[26]	Union nut	[40w]	Washer (No.40)
[6]	Compressor	[27]	O-ring (No.27)	[51]	Air Stopper
[7]	Joint	[28]	Actuator (Double acting)	[52]	Nut(No.52)
[11]	Gauge cover	[29]	Actuator (reverse action)	[57]	Fitting for travel stop
[14]	O-ring (No.14)	[30]	Actuator (Direct action)	[58]	Nut (No.58)
[21]	Screw	[31]	Indicator rod	[83]	Adapter
[24]	Ensat (insert metal)	[32]	Stopper (with travel stop adjustment mechanism)		

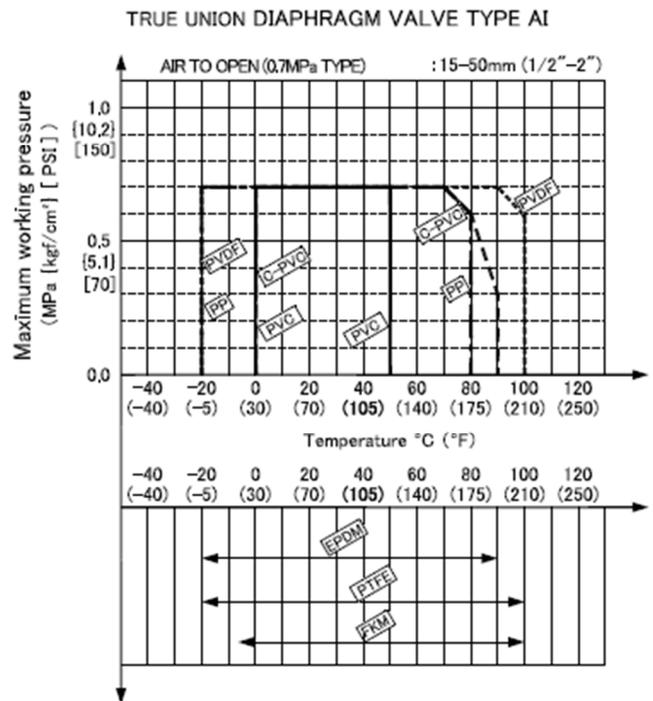
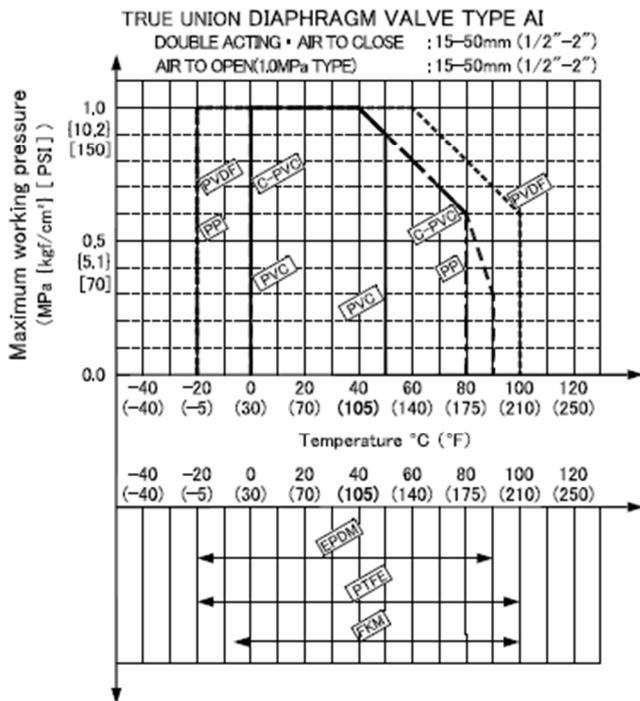
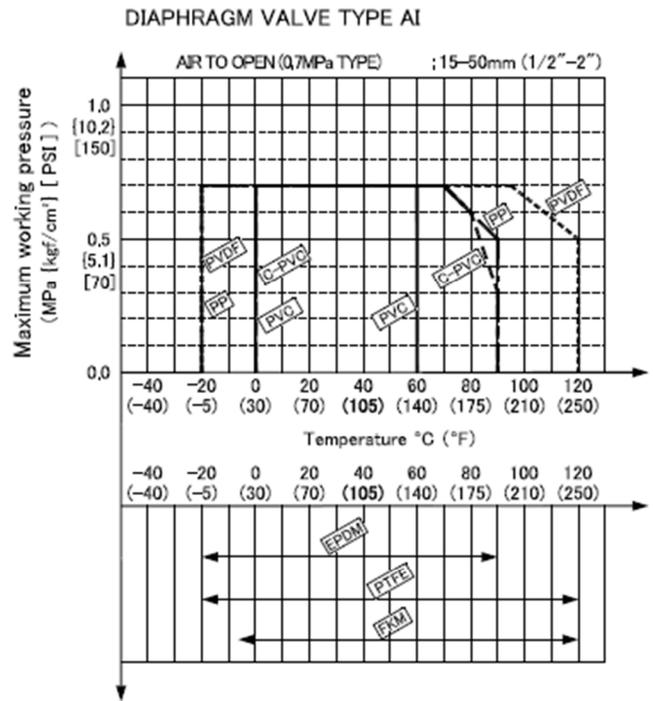
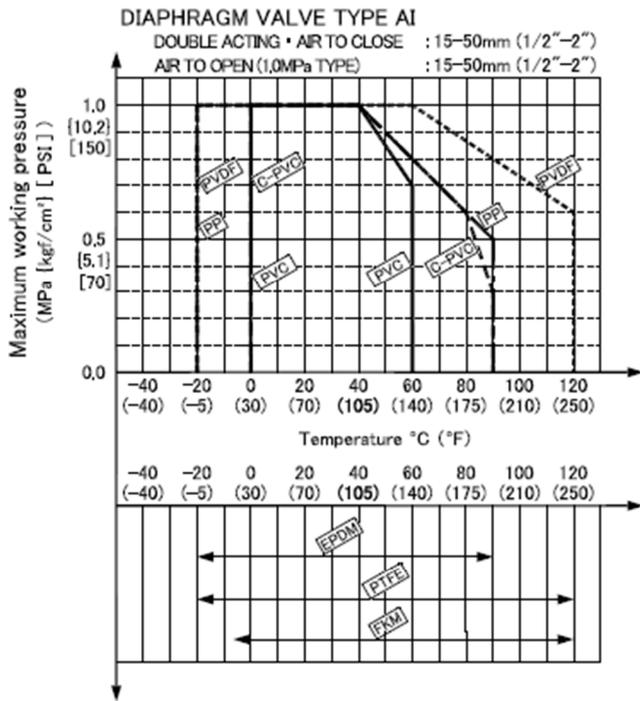
## 4. Product Specifications

### Model number table

ACTUATION	TYPE	ACTUATOR TYPE	ACTION / POWER SOURCE	BODY MATERIAL	SEAL MATERIAL	CONNECTION	STANDARD	SIZE	HIGH PURITY SERIES
A	DA	I	*	*	*	F	*	***	1
A AUTOMATIC VALVE	DA TYPE DA	I TYPE AI	F DOUBLE ACTING (1.0MPa TYPE) G AIR TO OPEN (0.7MPa TYPE) H AIR TO OPEN (1.0MPa TYPE) S AIR TO CLOSE (1.0MPa TYPE)	U PVC C C-PVC P PP F PVDF	E EPDM V FKM T PTFE	F FLANGED	1 JIS 10K D DIN A ANSI	015 15mm 020 20mm 025 25mm 032 32mm 040 40mm 050 50mm	1 LIBRICANT FREE
A	TA	I	*	*	*	F	*	***	1
A AUTOMATIC VALVE	TA TYPE TA	I TYPE AI	F DOUBLE ACTING (1.0MPa TYPE) G AIR TO OPEN (0.7MPa TYPE) H AIR TO OPEN (1.0MPa TYPE) S AIR TO CLOSE (1.0MPa TYPE)	U PVC C C-PVC P PP F PVDF	E EPDM V FKM 1 PTFE+EPDM 2 PTFE+FKM	S SOCKET N THREADED P SPIGOT	1 JIS D DIN A ANSI	015 15mm 020 20mm 025 25mm 032 32mm 040 40mm 050 50mm	1 LIBRICANT FREE

**NOTE** · JIS5K standard is not manufactured.

Relationship between maximum allowable pressure and temperature



**Actuator**

NOMINAL SIZE (mm)		15, 20	25, 32	40	50	
Operating Pressure (MPa)		Double acting Air to close	0.4~0.6			
		Air to open 0.7MPa spec.	0.4~0.6			
		Air to open 1.0MPa spec.	0.5~0.6			
Air consumption NL/ open and close	Operating pressure at 0.4MPa	Double acting	0.89	1.29	4.35	4.80
		Air to close	0.54	0.79	2.63	2.82
		Air to open 0.7MPa spec.	0.35	0.49	1.73	1.98
	Operating pressure at 0.5MPa	Air to open 1.0MPa spec.	0.42	0.59	2.08	2.37
Air supply port size		Double acting Air to open Air to close	Rc 1/4			

## Standard option

Option name	Objectives and specifications	Remarks
Solenoid valve	<ul style="list-style-type: none"> <li>• Controls opening and closing of valves</li> <li>• Possible to retrofit</li> <li>• Dedicated solenoid valve plates are also required for the following products               <ul style="list-style-type: none"> <li>*No return action required</li> <li>*Reverse action 15~50 mm</li> <li>*Direct action 15~50 mm</li> </ul> </li> <li>• A silencer with a throttle valve is provided as standard at the exhaust port.</li> <li>• Built-in bypass valve</li> </ul>	
Filter-regulator	<ul style="list-style-type: none"> <li>• Adjust the pressure of the operation air</li> <li>• Only with solenoid valve can be retrofitted (single mounting is not possible)</li> </ul>	
Speed controller	<ul style="list-style-type: none"> <li>• Adjust the actuator operation time.</li> <li>• Possible to retrofit</li> <li>• Meter-out system</li> </ul>	
Bypass valve	<ul style="list-style-type: none"> <li>• Used for manual operation of return movement</li> <li>• Retrofit possible only without solenoid valve</li> <li>• Built-in speed controller</li> </ul>	
Limit switch box	<ul style="list-style-type: none"> <li>• Detects open/close status of valve</li> </ul>	
Limit switch	<ul style="list-style-type: none"> <li>• Detects open/close status of valve</li> </ul>	
E-P positioner	<ul style="list-style-type: none"> <li>• Control the valve in proportion to the electric signal (4~20mADC)</li> </ul>	
P-P positioner	<ul style="list-style-type: none"> <li>• Control the valve in proportion to the pneumatic signal (0.02~0.1MPa)</li> </ul>	
Manual operating mechanism	<ul style="list-style-type: none"> <li>• Valve can be opened and closed during power loss</li> </ul>	
Full opening adjustment mechanism	<ul style="list-style-type: none"> <li>• Can be set to any opening in the range of 0 to 100%</li> </ul>	
Open/close counter	<ul style="list-style-type: none"> <li>• The number of times the actuator is opened/closed is counted.</li> </ul>	
Metal insert (for bottom stand)	<ul style="list-style-type: none"> <li>• A metal internal thread for supporting a valve</li> </ul>	

**Solenoid valve**

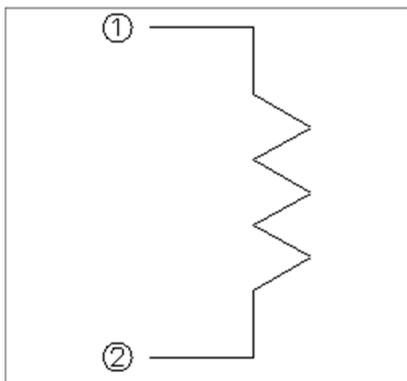
Operation	Nominal size	Model code	Piping port size	Effective area	Power consumption	Additional functions
Double action Reverse action Direct action	15~50 mm	4N3S102K-W□-G31193	Rc 1/4	10mm <sup>2</sup> or higher	AC:6VA DC:5.5W	○Built-in bypass valve ○Installation of silencer with throttle valve (used as speed controller)

4N3S102K-W□-G31193

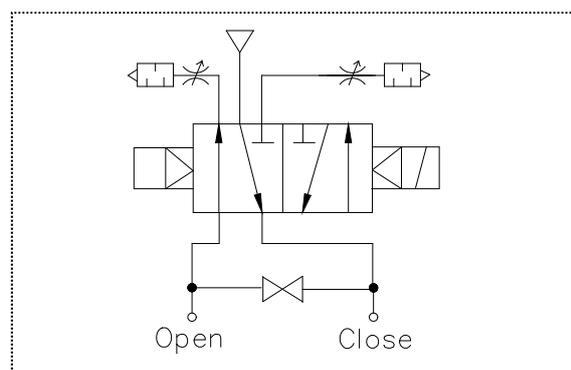
Rated current	Text entry
100VAC 50/60Hz	1
110VAC 50/60Hz	(2)
200VAC 50/60Hz	3
220VAC 50/60Hz	(4)
24VDC	5

※ ( ) Appended text is a special item.

Wiring diagram



JIS symbol



**Limit switch**

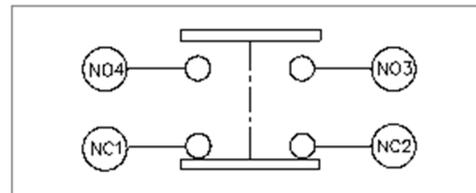
● Limit switch model: For 1LS19-J

Operation	Nominal size	Model code	Protection grade
Return, Reverse, Direct action	15~50 mm	1LS19-J	IP67(IEC529)

Limit switch rating

Rated current (V)	Resistance load (A)	Induction load (A)
125VAC	10	6
250VAC	10	6
115VDC	0.8	0.2
230VDC	0.4	0.1

Internal circuit



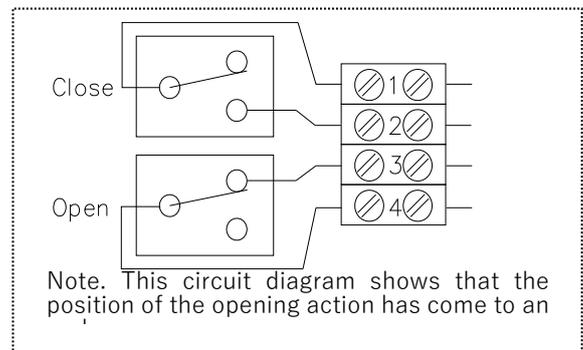
● For limit switch box

Operation	Nominal size	Model code	Protection grade
Return, Reverse, Direct action	15~32 mm	HPCR4MVAZ15	IP65(IEC529)
	40,50 mm	HPCR4MVAZ30	

Limit switch rating

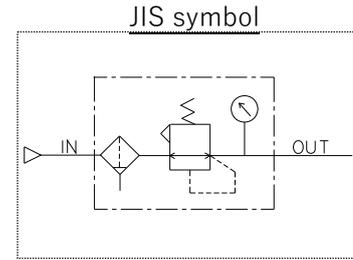
Rated current (V)	Resistance load (A)
250VAC	5.0

Internal circuit



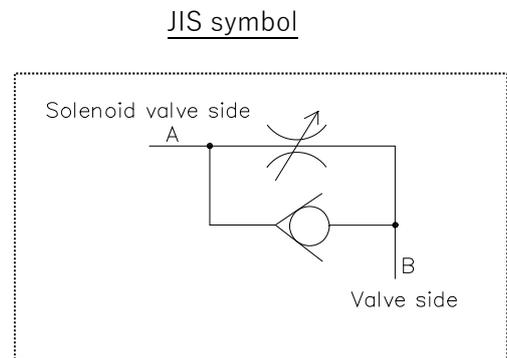
**Filter regulator**

Operation	Nominal size	Model code	Piping port size	Element Filtration rate
Double action Reverse action Direct action	15~50 mm	ARU2-02-8A-G	RC 1/4	5 μm



**Speed controller**

Operation	Nominal size	Model code	Piping port size
Double action Reverse action Direct action	15~50 mm	SC7-08A	RC 1/4



Operation	Effective area(mm <sup>2</sup> )		Needle Revolution speed
	Free flow	Control flow	
Double action Reverse action Direct action	11.0	8.3	8 rotations

## 5. Piping method

### Flanged end

 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>Serious injury can result.</b></p> <ul style="list-style-type: none"> <li>▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.</li> </ul>

 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not overtighten the Union nut.</li> <li>▶ Do not use a pipe wrench to tighten the Union nut.</li> <li>▶ Do not tighten the bolts and nuts for piping to the specified torque values in Table 5-2.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.</li> <li>▶ Wear appropriate protective equipment according to the type of work being performed.</li> </ul> <p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve.</li> <li>▶ Fix the End connector during piping work or disassembly and reassembly.</li> <li>▶ When attaching the valve to the end of the pipe, be sure to attach the Union nut and End connector on the secondary side (downstream side).</li> <li>▶ When connecting to metal piping, do not apply piping stress to the valve.</li> <li>▶ Use a connection flange with a full-face seat.</li> <li>▶ Check that there is no difference in mutual flange standards.</li> <li>▶ Be sure to use a sealing gasket (AV packing) between the flanges and tighten the pipe bolts/nuts to the specified torque values in Table 5-2 "Flange tightening torque." (When other than AV packing, the tightening torque value will change.)</li> <li>▶ Keep the axis misalignment and parallelism of the flange surface below the values shown in Table 5-1 "Axis misalignment and parallelism."</li> <li>▶ Tighten the bolts and nuts for piping diagonally with the specified torque values in Table 5-2.</li> </ul>



## Threaded end

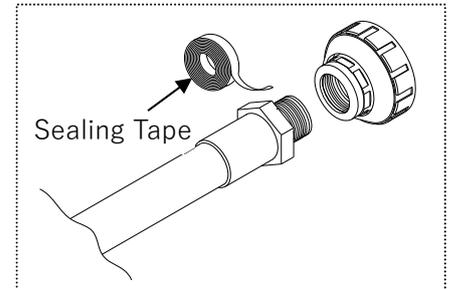
 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>Serious injury can result.</b></p> <ul style="list-style-type: none"> <li>▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.</li> </ul>

 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not overtighten the screws at the joints.</li> <li>▶ Do not overtighten the Union nut.</li> <li>▶ Do not use a pipe wrench to tighten the Union nut.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.</li> <li>▶ Wear appropriate protective equipment according to the type of work being performed.</li> </ul> <p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ The Union nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the End connector before installation.</li> <li>▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve.</li> <li>▶ Fix the End connector during piping work or disassembly and reassembly.</li> <li>▶ When attaching the valve to the end of the pipe, be sure to attach the Union nut and End connector on the secondary side (downstream side).</li> <li>▶ When connecting to metal piping, do not apply piping stress to the valve.</li> <li>▶ Make sure that the screws at the joints are made of resin.</li> <li>▶ Use sealing tape for the sealing material of the screw-in part. If liquid sealant or liquid gasket is used, stress cracking (environmental stress cracking) may occur.</li> </ul>

Preparations : ▶ Sealing tape ▶ Belt wrench ▶ wrench

**[Procedure]**

- 1) Wrap sealing tape around the male thread of the fitting, leaving approximately 3mm at the end.
- 2) Loosen the Union nut [26] with a belt wrench.
- 3) Remove Union nut [26] and End connector [25].
- 4) Remove Union nut [26] and End connector [25].
- 5) Screw on the End connector [25] by 1/2 to 1 turn with a wrench to prevent scratching.
- 6) Check that the O-ring (C) [27] is installed correctly.
- 7) Contact the End connector [25] and the Union nut [26] with the O-ring (C) [27] so that they do not come off.
- 8) Tighten the Union nut [26] by hand until it is tight.
- 9) Screw the Union nut [26] 1/4 to 1/2 turn with a belt wrench to avoid damage.



## Socket end (adhesive)

 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>Serious injury can result.</b></p> <ul style="list-style-type: none"> <li>▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.</li> </ul> <p><b>Fire or an explosion can result.</b></p> <ul style="list-style-type: none"> <li>▶ Ensure adequate ventilation when using adhesives and do not use open flames in the surroundings.</li> </ul>

 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ The adhesive contains volatile solvents, so do not inhale odors directly.</li> </ul> <p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not apply too much adhesive. Excessive adhesive will flow into the valve.</li> <li>▶ Do not strike the pipe when inserting it into the End connector.</li> <li>▶ Do not overtighten the Union nut.</li> <li>▶ Do not use a pipe wrench to tighten the Union nut.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.</li> <li>▶ Wear appropriate protective equipment according to the type of work being performed.</li> <li>▶ If the adhesive adheres to the skin, remove it immediately.</li> <li>▶ If you feel worse or feel unusual when using the adhesive, promptly seek a doctor's diagnosis and take appropriate action.</li> </ul> <p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ The Union nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the End connector before installation.</li> <li>▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve.</li> <li>▶ Fix the End connector during piping work or disassembly and reassembly.</li> <li>▶ When attaching the valve to the end of the pipe, be sure to attach the Union nut and End connector on the secondary side (downstream side).</li> <li>▶ Be careful when constructing under low temperature, as solvent vapor is less likely to evaporate and tends to remain.</li> <li>▶ After piping, open both ends of the pipe and use a blower (low-pressure type) to ventilate to remove the solvent vapor.</li> <li>▶ Use "ASAHI AV Cement" depending on the material.</li> <li>▶ Perform the water flow test after 24 hours or more have elapsed after completion of bonding.</li> </ul>

Preparations	▶ ASAHI AV Cement	▶ Belt Wrench
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**[Procedure]**

- 1) Loosen the Union nut [26] with a belt wrench.
- 2) Remove Union nut [26] and End connector [25].
- 3) Thread the Union nut [26] to the pipe side.
- 4) Wipe off the socket part of the End connector [25] with a waste cloth.
- 5) Apply adhesive evenly to the End connector socket and pipe socket.

 <b>Caution</b>	
 <b>Forcing</b>	<p><b>Damage or leakage may occur.</b></p> <p>▶ Be careful not to apply too much adhesive. (If adhesive enters the valve, it may cause malfunction or internal leakage, or it may cause a solvent crack or damage.)</p>

**Amount of adhesive used (reference)**

NOMINAL SIZE (mm)	15	20	25	32	40	50
Amount used (g)	1.0	1.3	2.0	2.4	3.5	4.8

- 6) After applying the adhesive, quickly insert the pipe into the End connector [25] and hold for at least 60 seconds.

 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>Damage may occur.</b></p> <p>▶ Never strike the tube to insert it, as this may damage it.</p>

- 7) Wipe off any excess adhesive.
- 8) Check that the O-ring (C) [27] is fitted correctly.
- 9) Bring the End connector [25] and the Union nut [26] into contact with the body so that the O-ring (C) [27] does not come off.
- 10) Tighten the Union nut [26] by hand until it is tight.
- 11) Screw the Union nut [26] 1/4 to 1/2 turn with a belt wrench to avoid damage.

## Socket end, Spigot end (welding)

 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>Serious injury can result.</b></p> <ul style="list-style-type: none"> <li>▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.</li> </ul>

 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not overtighten the Union nut.</li> <li>▶ Do not use a pipe wrench to tighten the Union nut.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.</li> <li>▶ Wear appropriate protective equipment according to the type of work being performed.</li> </ul> <p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ The Union nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the End connector before installation.</li> <li>▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve.</li> <li>▶ Fix the End connector during piping work or disassembly and reassembly.</li> <li>▶ When attaching the valve to the end of the pipe, be sure to attach the Union nut and End connector on the secondary side (downstream side).</li> </ul>

Preparations ▶ Belt Wrench ▶ Welding Machine ▶ Welding Machine Operation Manual

**[Procedure]**

- 1) Loosen the Union nut [26] with a belt wrench.
- 2) Remove Union nut [26] and End connector [25].
- 3) Thread the Union nut [26] to the pipe side.
- 4) From here, please refer to the manual of the welding machine.
- 5) After completing the welding, check that the O-ring (C) [27] is installed.
- 6) Contact the End connector [25] and the Union nut [26] with the O-ring (C) [27] so that they do not come off.
- 7) Tighten the Union nut [26] by hand until it is tight.
- 8) Screw the Union nut [26] 1/4 to 1/2 turn with a belt wrench to avoid damage.

**Support of the product**

The mounting (panel) and the piping method

 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not over-tighten when supporting piping with a U-band, etc.</li> <li>▶ When installing a valve in the piping around the pump, do not cause large vibrations in the valve.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.</li> <li>▶ Wear appropriate protective equipment according to the type of work being performed.</li> </ul> <p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not over-tighten when supporting piping with a U-band, etc.</li> <li>▶ When installing the product, make sure that no excessive stress such as tension, compression, bending or impact is applied to the piping or valve, etc.</li> <li>▶ The Union nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the End connector before installation.</li> <li>▶ Fix the End connector during piping work or disassembly and reassembly.</li> <li>▶ Be sure to attach the Union nut and End connector on the secondary side (downstream side) when attaching to the end of the piping line.</li> <li>▶ When connecting a resin valve to metal piping, make sure that no piping stress is applied to the resin valve.</li> <li>▶ Make sure that the screws at the joints are made of resin.</li> <li>▶ Use sealing tape for the thread joints of our resin piping materials.</li> <li>▶ Install it vertically when screwing in the ensat.</li> <li>▶ For detailed handling of the special tool for installation of the entertainment, refer to the instruction manual of the entertainment manufacturer separately.</li> </ul>

Preparations	▶ Wrench	▶ Rubber sheet	▶ U-band (with bolt)
	▶ Bolts, nuts, and washers	▶ Ensat	▶ Ensat mounting special tool

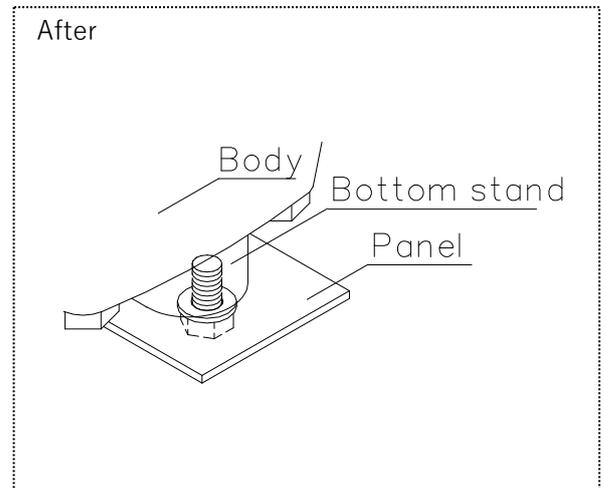
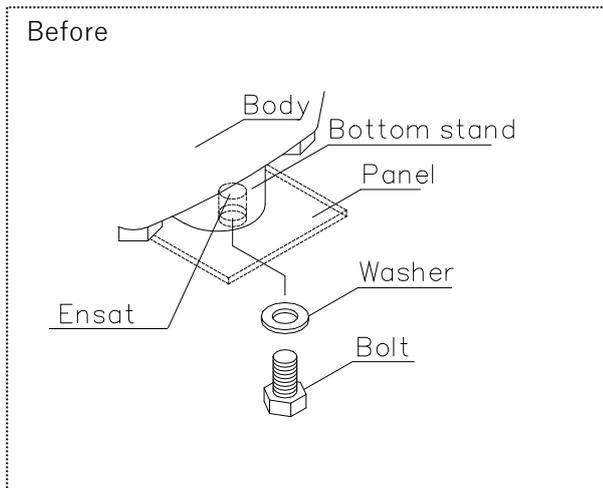
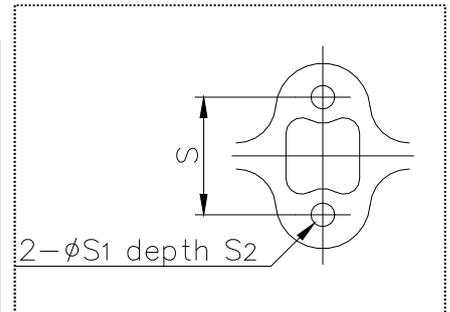
▶ Attach the Ensat to the bottom stand.

**[Procedure]**

1) Screw the Ensat to the bottom stand referring to the instruction manual of the Ensat.

**Table 5-4 Bottom Stand and Ensat Dimensions**

Nominal size	Bottom Stand			Ensats		
	S	S1	S2	Nominal thread	Length	Material
15mm	25	7	12	M5	10	Stainless steel or brass
20mm	25	7	12	M5	10	
25mm	25	7	12	M5	10	
32mm	25	7	12	M5	10	
40mm	45	9	15	M6	14	
50mm	45	9	15	M6	14	



 **Caution**

 <b>Prohibition</b>	<p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not over-tighten when supporting piping with a U-band, etc.</li> <li>▶ When installing a valve in the piping around the pump, do not cause large vibrations in the valve.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.</li> <li>▶ Wear appropriate protective equipment according to the type of work being performed.</li> </ul> <p><b>The valve can be damaged, or leak.</b></p> <ul style="list-style-type: none"> <li>▶ Do not over-tighten when supporting piping with a U-band, etc.</li> <li>▶ When installing the product, make sure that no excessive stress such as tension, compression, bending or impact is applied to the piping or valve, etc.</li> <li>▶ Be sure to attach the Union nut and End connector on the secondary side (downstream side) when attaching to the end of the piping line.</li> <li>▶ When connecting a resin valve to metal piping, make sure that no piping stress is applied to the resin valve.</li> </ul>

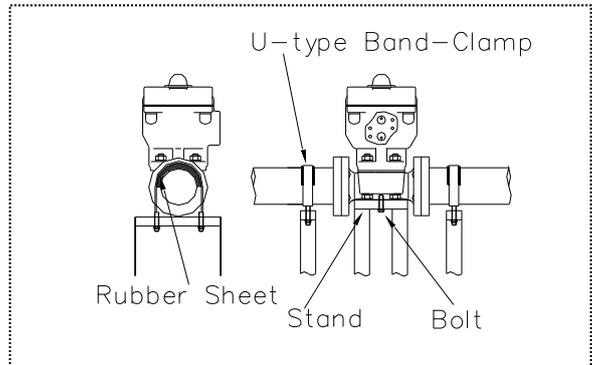
Preparations ▶ Spanner ▶ U-band (with bolt) ▶ Rubber seat

**Horizontal piping**

○When using an entertainment and installing supports

Secure the entertainment section and the frame provided at the bottom of the valve with bolts.

Lay a rubber sheet on the top of the pipe section and secure it with the U-band.

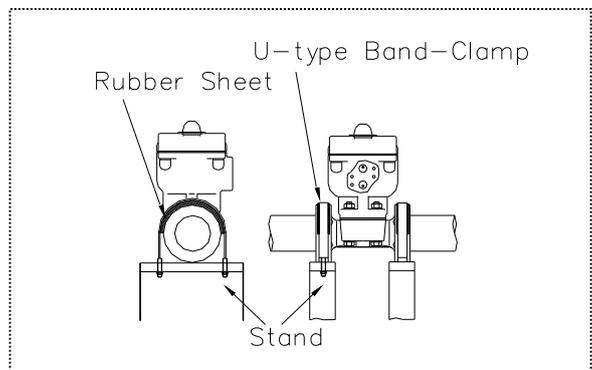


Bolt size

Nominal size	15~32 mm	40, 50 mm
Nominal	M5	M6

○If you do not use an ensat and install a support (with a flange-shaped End connector)

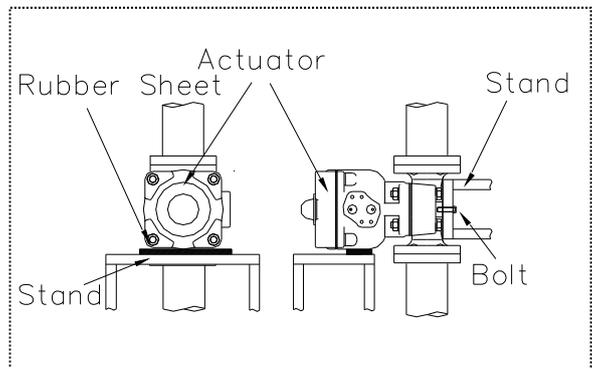
Lay a rubber sheet on the flange part of the valve and secure it with the U-band.



**Vertical piping**

Secure the entertainment section and the frame provided at the bottom of the valve with bolts.

Lay a rubber sheet on the actuator part and support it with the frame.



## 6. Air piping method

Without option or with speed controller

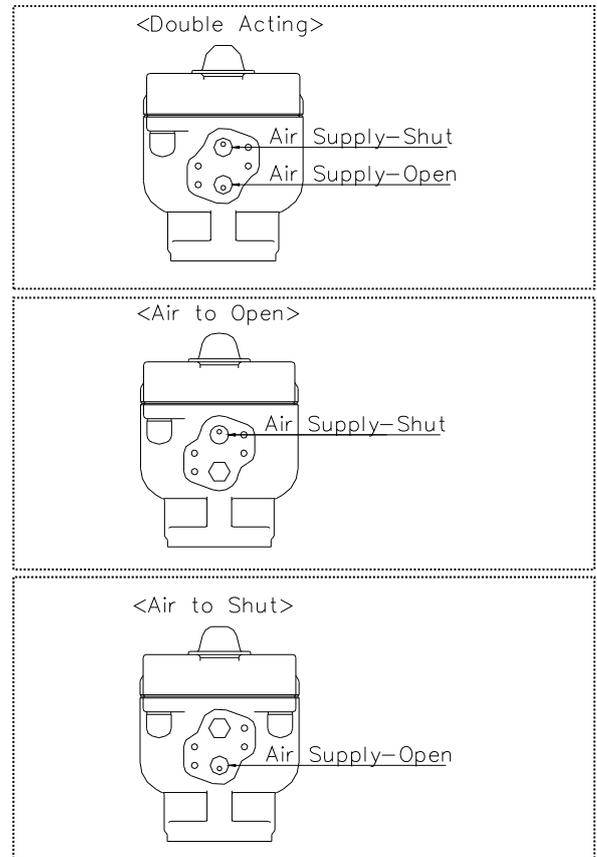
 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Do not remove the protective plug until just before connecting the air piping.</li> </ul>

 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>Damage may occur.</b></p> <ul style="list-style-type: none"> <li>▶ Do not over-tighten the fitting for air piping.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Wear appropriate protective equipment according to the type of work being performed.</li> </ul> <p><b>Otherwise damage or malfunction can result.</b></p> <ul style="list-style-type: none"> <li>▶ Confirm the connection location, air piping size, and screw type from the approval delivery drawing etc. of the product, and then connect the air piping.</li> <li>▶ Use clean, dehumidified and dust-free air. Consult with CKD when using high dry air with a dew point of -40° C or less.</li> <li>▶ When using at an ambient temperature of 5° C or less, remove moisture from the operation air to prevent freezing.</li> <li>▶ When using copper piping for air piping, use one with rust-proof treatment on the inner surface of the pipe.</li> <li>▶ Flush the inside of the air piping thoroughly before connecting the air piping.</li> <li>▶ When connecting the air piping, be careful that foreign matter, such as sealant, does not enter the piping.</li> <li>▶ Be sure to remove burrs from the pipe fittings/threads. (This may cause gargle or air leakage.)</li> </ul>

Preparations	▶ Copper or tube for air piping	▶ Wrench
	▶ Copper or tube fittings	▶ Sealing tape

**[Procedure]**

- 1) Wrap sealing tape around the male thread of the fitting leaving the end 3mm.
- 2) Tighten the fitting to the piping port of the actuator.
- 3) Screw the fitting in one turn with a wrench.
- 4) Install copper or tube for air piping.  
 ※The piping procedure is the same for models with a speed controller.



With solenoid valve and pressure regulator with filter

 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Do not remove the protective plug until just before connecting the air piping.</li> </ul>

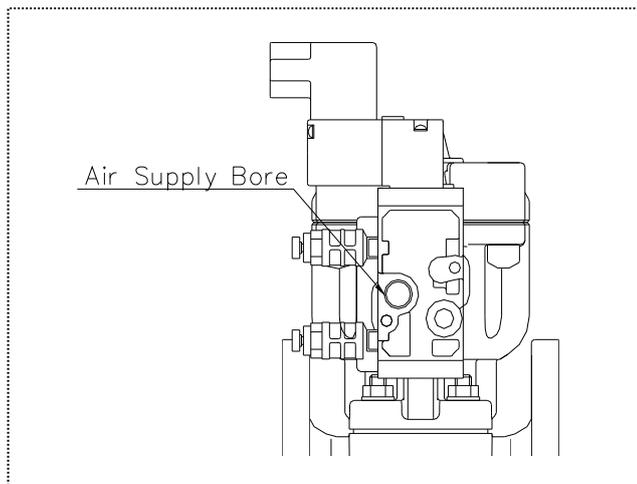
 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>Damage may occur.</b></p> <ul style="list-style-type: none"> <li>▶ Do not over-tighten the fitting for air piping.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Wear appropriate protective equipment according to the type of work being performed.</li> </ul> <p><b>Otherwise damage or malfunction can result.</b></p> <ul style="list-style-type: none"> <li>▶ When using copper piping for air piping, use one with rust-proof treatment on the inner surface of the pipe.</li> <li>▶ Flush the inside of the air piping thoroughly before connecting the air piping.</li> <li>▶ When connecting the air piping, be careful that foreign matter, such as sealant, does not enter the piping.</li> <li>▶ Be sure to remove burrs from the pipe fittings/threads. (This may cause gargle or air leakage.)</li> <li>▶ Do not over-tighten the fitting for air piping.</li> <li>▶ Be sure to lock the adjustment knob of the solenoid valve after adjustment.</li> <li>▶ Regularly drain the drain from the pressure regulator with filter.</li> <li>▶ Set the secondary pressure of the regulator with filter to a setting that meets the equipment specifications. (Otherwise, malfunction or failure may result.)</li> </ul>

Preparations	▶ Copper or tube for air piping	▶ Wrench
	▶ Copper or tube fittings	▶ Sealing tape

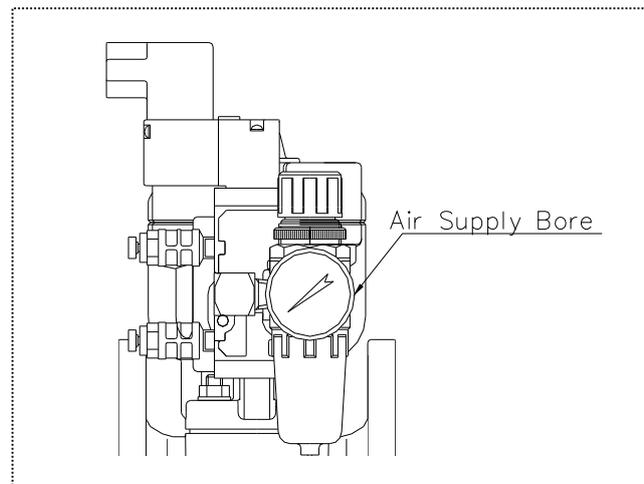
### [Procedure]

- 1) Wrap sealing tape around the male thread of the fitting leaving the end 3mm.
- 2) Tighten the fitting to the air piping port (see Fig. 1 and Fig. 2) with a fitting.
- 3) Screw the fitting in one turn with a wrench.
- 4) Install copper or tube tubes for air piping.

(Fig. 1) With solenoid valve



(Fig. 2) With solenoid valve and pressure regulator with filter



## 7. Wiring method

### Limit switch

 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>There is a risk of electric shock.</b></p> <ul style="list-style-type: none"> <li>▶ Do not perform wiring while the power is on.</li> </ul>

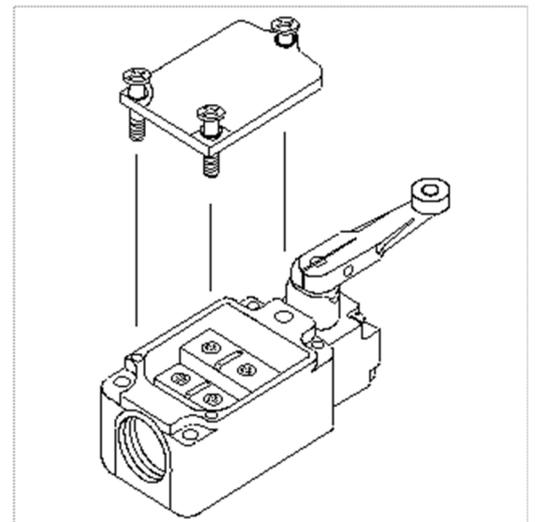
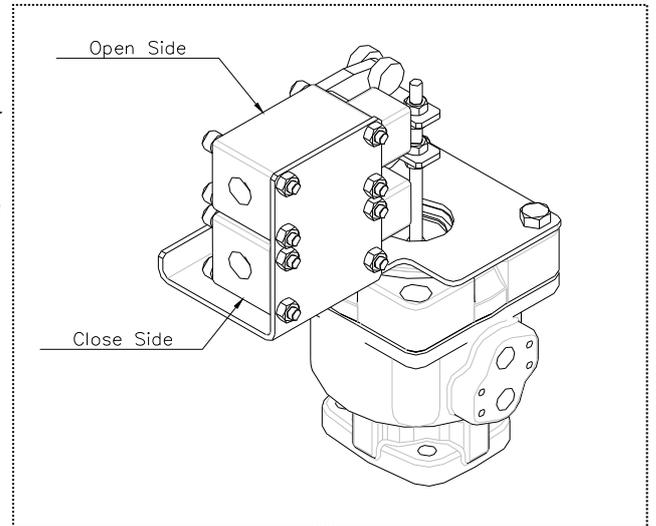
 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>Otherwise failure or malfunction of the machine can result.</b></p> <ul style="list-style-type: none"> <li>▶ If the product is installed outdoors or in a location where there is a possibility of rainwater or moisture intrusion, make sure that rainwater, etc. does not enter through the wiring port.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.</li> <li>▶ Wear appropriate protective equipment according to the type of work being performed.</li> </ul> <p><b>Otherwise failure or malfunction of the machine can result.</b></p> <ul style="list-style-type: none"> <li>▶ Connect the wires using solderless terminals with insulation covering so that they do not come into contact with the cover or housing. (If the crimp terminal comes into contact with the cover, the cover may not close and may cause a ground fault.)</li> <li>▶ Contact CKD when using a limit switch in a 1mA~100mA, 5V~30V.</li> </ul>

<For Limit Switch Model Number (1LS19-J)>

Preparations	▶ Phillips screwdriver ▶ connector (G1/2) ▶ compressed terminal
	▶ Wire stripper ▶ Terminal crimping tool ▶ Piezoelectric knife

### [Procedure]

- 1) Loosen the three screws holding the limit switch cover with a Phillips screwdriver and remove the cover. (The screws are structured so that they do not come off the cover.)
- 2) Pull off the resin protective cap.
- 3) Pass the cable through the connector.
- 4) Strip the sheath from the end of the cable with a wire stripper.
- 5) Use a terminal crimping tool to attach the crimping terminal to the lead wire.
- 6) Use a Phillips screwdriver to connect the terminal screws according to the internal circuit diagram of the limit switch specifications (option).
- 7) Tighten the three screws holding the limit switch cover with a Phillips screwdriver to attach the cover.
- 8) Tighten the cable with the connector.

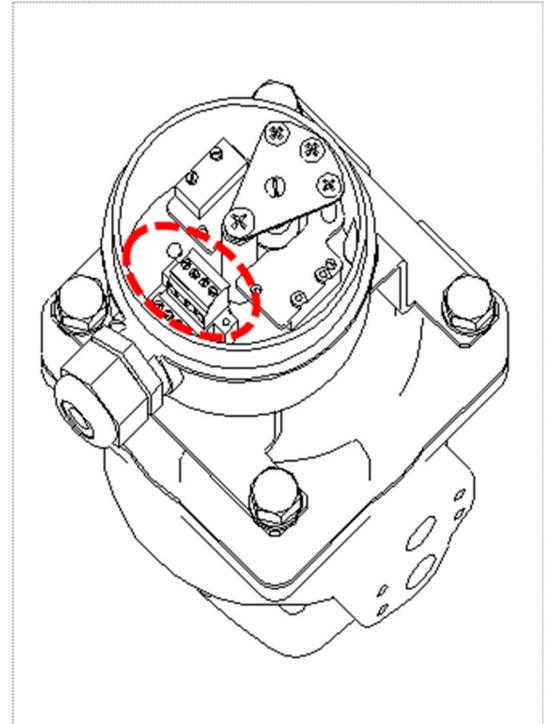


<For limit switch box>

Preparations	▶ Flat-blade screwdriver (precision) ▶ wire stripper (can be substituted with nippers, etc.)
	▶ Electric knife

**[Procedure]**

- 1) Remove the cover of the limit switch box by turning it by hand.
- 2) Remove the connector cap from the wiring port.
- 3) Pull the cable through the previously removed connector cap and into the switch box through the wiring port.
- 4) Strip the sheath from the end of the cable with a wire stripper.
- 5) Insert the end of the cable into the terminal block and fix it with a flathead screwdriver.  
Terminal 1 and 2 are for closed-side detection, and Terminal 3 and 4 are for open-side detection. (dashed circles in the right figure)
- 6) Tighten the connector.  
At this time, confirm that the outer skin of the cable is securely fixed.
- 7) Replace the cover.



## Solenoid valve

 **Warning**
**Prohibition**

**There is a risk of electric shock.**

- ▶ Do not connect or separate lines to the solenoid valves while the power is on.
- ▶ Do not perform any work with wet hands or tools.

 **Caution**
**Forcing**

**There is a danger of injury.**

- ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.
- ▶ Wear appropriate protective equipment according to the type of work being performed.

**Otherwise, the machine may malfunction.**

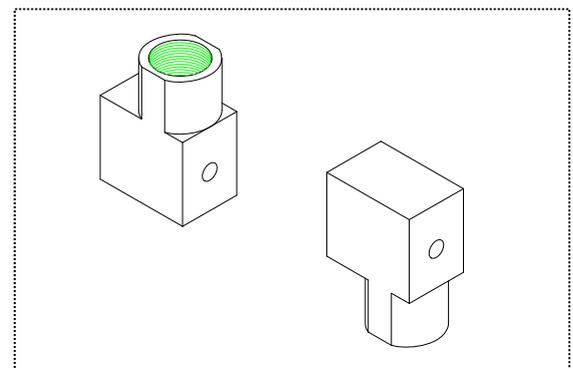
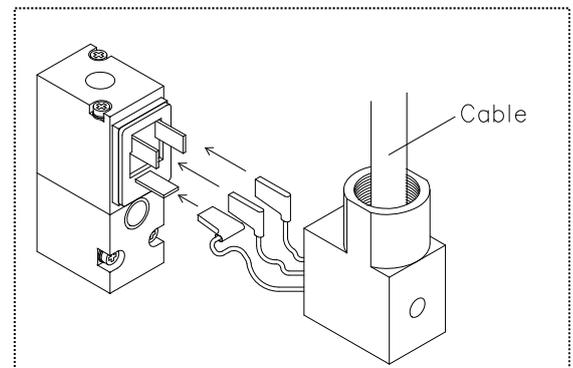
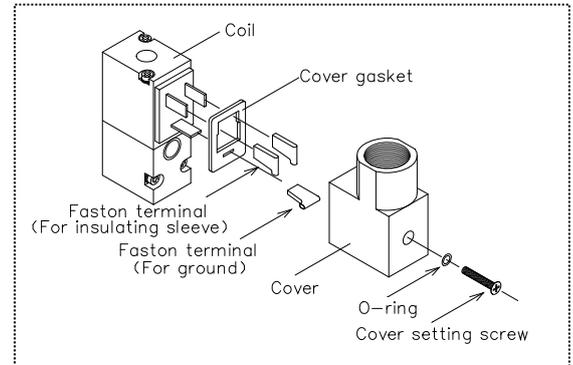
- ▶ Be sure to lock the adjustment knob of the solenoid valve after adjustment.

Preparations	▶ Phillips screwdriver ▶ terminal crimping tool ▶ connector (G1/2)
	▶ Wire Stripper ▶ Electric Knife

As a prerequisite, remove the outer skin of the end of the cable that is drawn into the solenoid valve by using an electric knife for 5cm.

### [Procedure]

- 1) Loosen the cover set screw with a Phillips screwdriver and remove the cover.  
 ※Do not lose the O-ring.  
 (There is a risk of electric leakage or electric shock.)
- 2) Pull out the Faston terminal and insulation cover that are inserted to the coil side terminal.  
 ※The grounding terminal is not provided with an insulating sleeve.
- 3) Pass the cables in the order of the connector and cover.
- 4) Peel off the outer skin of the cable with a wire stripper.
- 5) Pass the lead wire through the insulation cover.
- 6) Use a terminal crimping tool to attach the Faston terminal to the lead wire.
- 7) Insert the Faston terminal into the coil side terminal and put the insulation cover on.
- 8) Attach the cover with the cover set screw.  
 [The cover can be installed with the wiring outlet facing up or down.(Fig. 7-1)]
- 9) Tighten the cable with the connector.



## 8. Commissioning method

### Air Operation

#### Warning



**Forcing**

**Serious injury can result.**

- ▶ Check that the spanner for manual operation is not mated with the upper output shaft of the actuator.

#### Caution



**Prohibition**

**Otherwise, the valve may be damaged, damaged, or inoperative.**

- ▶ Use the product within the indicated product specifications.

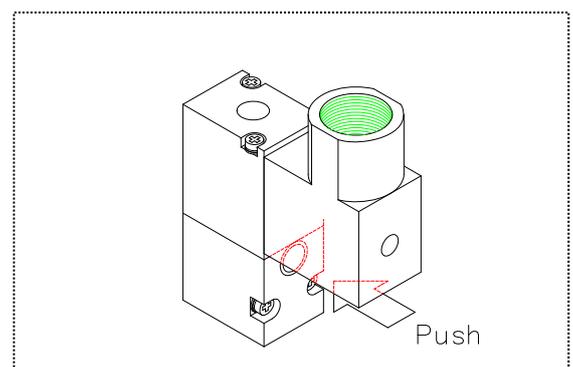
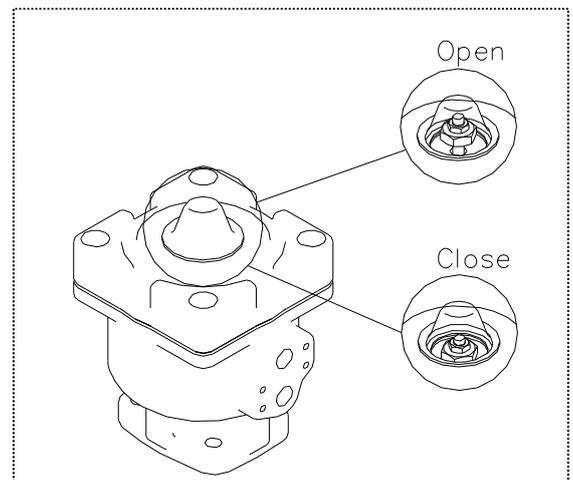
#### [Procedure]

- 1) Supplies air to the air supply port.
- 2) Check that the air supply/shut-off and stopper [51] position are matched.
- 3) Stop the air supply.

<For models with solenoid valve>

#### [Procedure]

- 1) Supplies air to the solenoid valve.
- 2) Check that the operation shown in the table below is achieved by pressing the push button next to the solenoid valve terminal cover with your finger. (See Fig. 8-1.)
- 3) Confirm that the solenoid valve is operated as shown in the table below by energizing or de-energizing.
- 4) Turn off the power to the solenoid valve.



Push button	Power supply	Recovery/Reverse action	Direct action
Press	Energizing	Valve fully open	Valve fully closed
Do not press	De-energizing	Valve fully closed	Valve fully open

## Adjusting the Opening/Closing Speed &lt;Double acting&gt;

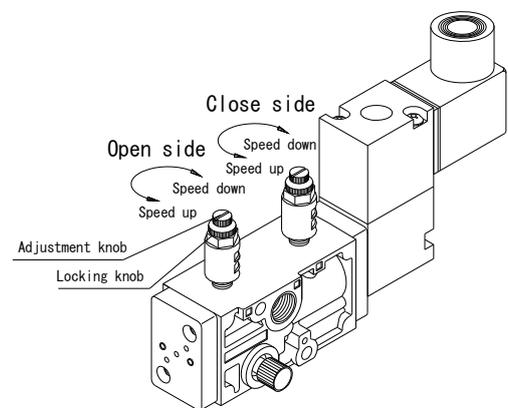
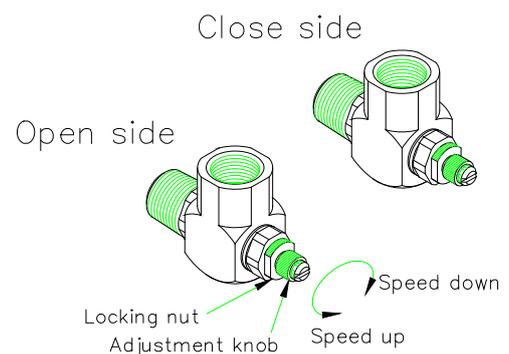
 **Caution**
**Prohibition****Otherwise damage to the solenoid valve or malfunction can result.**

- ▶ Be sure to lock the adjustment knob of the solenoid valve after adjustment.  
(Do not tighten the lock nut with excessive force.)

Preparations ▶ Wrench

**[Procedure]**

- 1) Turn the adjustment knobs of both open and close speed controllers clockwise until they do not turn.  
※Do not turn it too forcibly.  
(risk of damage)
- 2) Supplies air to the solenoid valve.
- 3) Energize the solenoid valve side and turn the adjusting knob of the open-side speed controller counterclockwise little by little.
- 4) Turn off the solenoid valve side and turn the adjusting knob of the closed side speed controller counterclockwise little by little.
- 5) 3), Repeat 4) to set the desired opening/closing speed.
- 6) When the desired speed is achieved, hold the adjustment knob with your finger and rotate the lock nut clockwise with the spanner to secure the adjustment knob.  
※Do not tighten the lock nut with excessive force. (risk of damage)

With a solenoid valveFor models with speed controller

**Opening/Closing Speed Adjustment Method <Air to open, Air to close>**

 <b>Caution</b>	
 <b>Prohibition</b>	<b>Otherwise damage to the solenoid valve or malfunction can result.</b> ▶ Be sure to lock the adjustment knob of the solenoid valve after adjustment. (Do not tighten the lock nut with excessive force.)

Preparations : ► Wrench

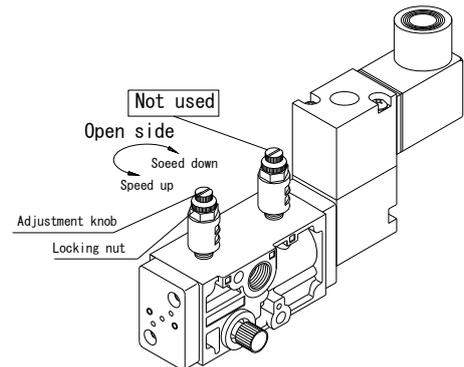
The direction in which the speed can be adjusted differs depending on the operating model.

Actuation type	Speed at which it opened	Speed at which it closes
Reverse action	Cannot adjust	Can be adjusted
Direct action	Can be adjusted	Cannot adjust

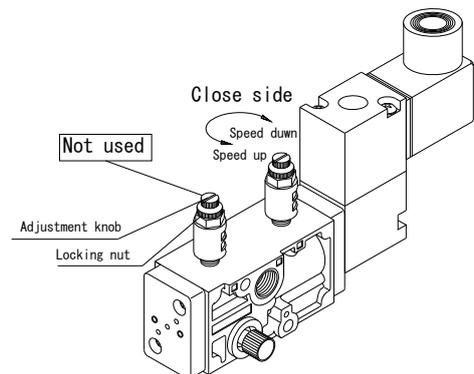
### [Procedure]

- Turn the speed controller adjustment knob clockwise until it does not turn.  
 ※Do not turn it too forcibly.  
 (risk of damage)
- Supplies solenoid valve air.
- After energizing the solenoid valve, turn off the power, and turn the speed controller adjustment knob counterclockwise little by little to set the desired opening/closing speed.
- When the desired speed is achieved, hold the adjustment knob with your finger and rotate the lock nut clockwise with the spanner to secure the adjustment knob.  
 ※Do not tighten the lock nut with excessive force.  
 (risk of damage)

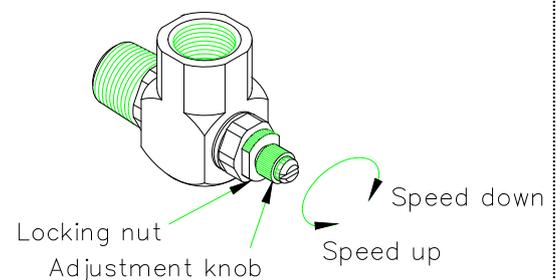
For Air to open type with solenoid valve



For Air to close type with solenoid valve



For Single action type with speed controller



## 9. How to adjust and operate the stopper

### Warning



#### Prohibition

**Serious injury can result.**

- ▶ When operating the actuator with air, never touch the drive section.

### Caution



#### Forcing

**The valve can be damaged, or leak.**

- ▶ If the stopper is loose or internal leakage occurs when the valve is fully closed, the stopper may not be functioning. Adjust the stopper.
- ▶ Tighten the stoppers securely.  
(If the tightening torque of the stoppers is insufficient, the stoppers may become loose.)

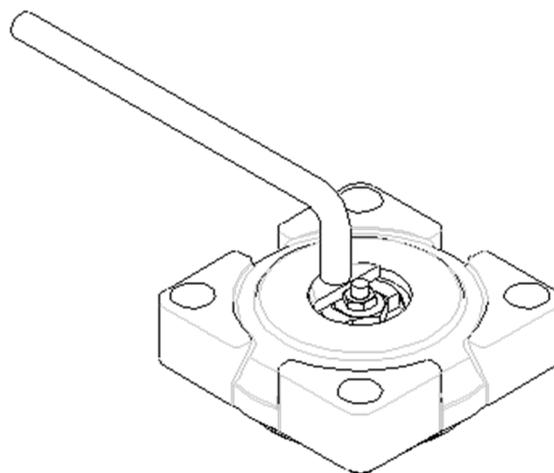
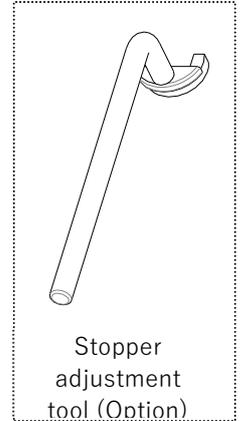
## &lt;How to adjust the stopper&gt;

- Preparations
- ▶ Special tool for adjusting the stopper (optional item) ▶ wrench (10mm, 17mm)
  - ▶ Flat-blade screwdriver ▶ Phillips screwdriver

**[Procedure]**

(For standard specifications)

- 1) Remove gauge cover [11] with a flathead screwdriver.  
(Do not damage the O-ring [14].)
- 2) Fully open the valve by air operation.
- 3) Loosen the nut [52] with a wrench while holding the stopper [51] with a special tool (see right figure) or with a wrench.
- 4) Remove stopper [51] and Nut [52] from indicator rod [31].
- 5) Fully close the valve with air.
- 6) Fit stopper [51] onto indicator rod [31] and tighten by hand until it cannot be turned by hand.
- 7) Turn stopper [51] clockwise with a special tool until the fluid starts to leak slightly.
- 8) Turn the stopper [51] with a special tool 1/4 to 1/2 turn in the counterclockwise direction from the position of step 7.  
(The Indicator rod [31] may rotate together. It is recommended that the operation be performed with the valve fully opened by air operation.)
- 9) Fix the stopper [51] with a special tool and tighten the nut [52] firmly with a wrench.
- 10) Repeat the fully open ⇔ fully closed operation of the valve by air operation to check for fluid leakage.  
(If there is fluid leakage, turn stopper [51] counterclockwise 1/4 turn after steps 2 and 3, and step 9.  
Return and repeat until there is no leakage.)
- 11) Install gauge cover [11].



<Adjustment method on site>

When adjusting the stopper on site, it may be difficult to check the position at which the leak starts minute in step 7.

In that case, please make the adjustment using the following method. (The procedure from step 5 to 10 is performed.)

- 5) Fully close the valve with air.
- 6) Fit stopper [51] onto indicator rod [31] and tighten by hand until it cannot be turned by hand.  
(At this time, it is recommended to draw a mark line to mark the rotation on the stopper [51].)
- 7) Fully open the valve by air operation.
- 8) Using the table below as a guide, rotate the stopper [51] clockwise from the position shown in step 6.

#### Stopper revolution (reference)

Nominal size (mm)	Revolution speed (revolution)								
	Operation	Recovery ※		Reverse action				Direct action ※	
				0.7MPa spec.		1.0MPa spec.			
	Diaphragm	EPDM	PTFE	EPDM	PTFE	EPDM	PTFE	EPDM	PTFE
15		1 1/2	3/4	1/2	1/4	1/2	1/2	1/2	1/2
20		1 1/4	1/2	3/4	0	1/2	1/4	3/4	0
25		1 1/2	1/4	1	0	3/4	0	3/4	0
32		1 1/2	1/4	1	0	3/4	0	3/4	0
40		2 1/2	1 1/4	1 1/2	3/4	1	1/2	1 1/2	1
50		1 3/4	3/4	2	1/4	2	0	1 1/2	1/2

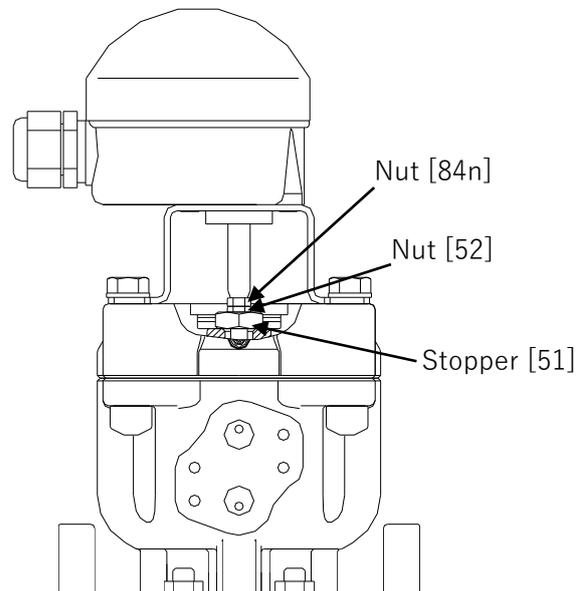
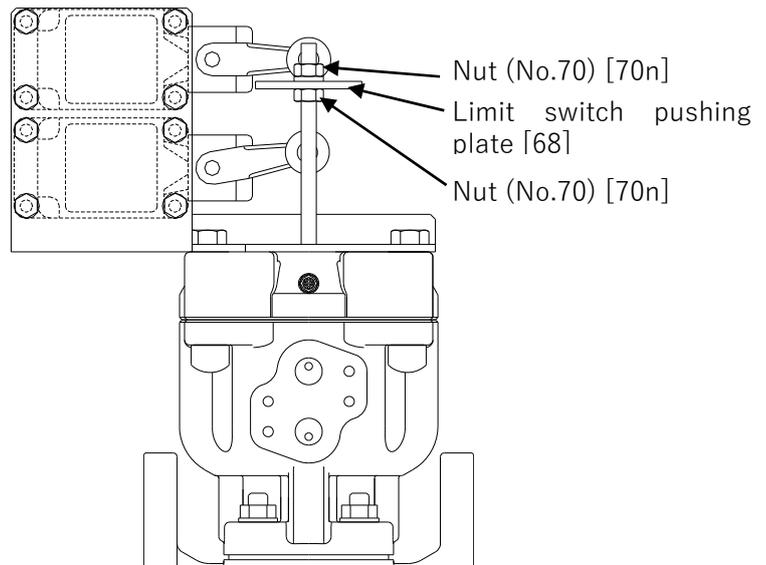
※Set the air operating pressure for the double acting and air to close to 0.4MPa.

- 9) Secure stopper [51] with wrench and tighten nut [52] securely with wrench.
- 10) Repeat the fully open ⇔ fully closed operation of the valve with air, and check that there is no fluid leakage.  
(If there is fluid leakage, turn stopper [51] counterclockwise 1/4 turn after steps 2 and 3, and step 9.  
Return and repeat until there is no leakage.)

**[Procedure]**

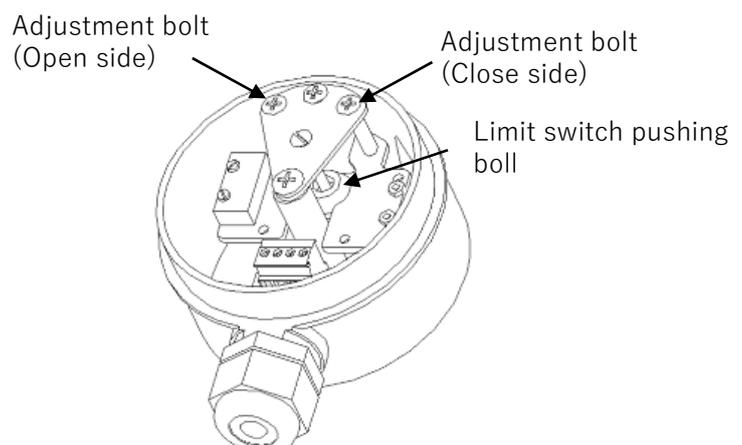
(With limit switch)

- 1) Fully open the valve by air operation.
- 2) Loosen the nut [52] with a wrench while holding the stopper [51] with a special tool or wrench.
- 3) Loosen stopper [51].
- 4) Follow steps 5 to 10 in <How to adjust the stopper> of the standard specifications.
- 5) Fix the lower part of the nut (No.70)[70n] with a wrench, and loosen the upper part of the nut (No.70)[70n] with a wrench.
- 6) Adjust the vertical position of the limit switch retainer [68].
- 7) Fix the lower side of the nut (No.70)[70n] with a wrench, and tighten the upper side of the nut (No.70)[70n] with a wrench.
- 8) Repeat the full open ⇔ full close operation of the valve with air, and check whether the limit switch operates normally.  
※If the limit switch does not operate normally, return to step 5 and perform the adjustment again.

**[Procedure]**

(With limit switch box)

- 1) Fully open the valve by air operation.
- 2) Loosen the nut [84n] with the wrench while holding the nut [52] with the wrench.
- 3) Loosen the nut [52] with a wrench while holding the stopper [51] with a special tool or wrench.
- 4) Loosen stopper [51].
- 5) Follow steps 5 to 10 in <How to adjust the stopper> of the standard specifications.
- 6) Tighten the nut [84n] with a wrench while holding the nut [52] with a wrench.
- 7) Remove the cover of the limit switch box by rotating it counterclockwise.  
※Be careful not to lose O-.



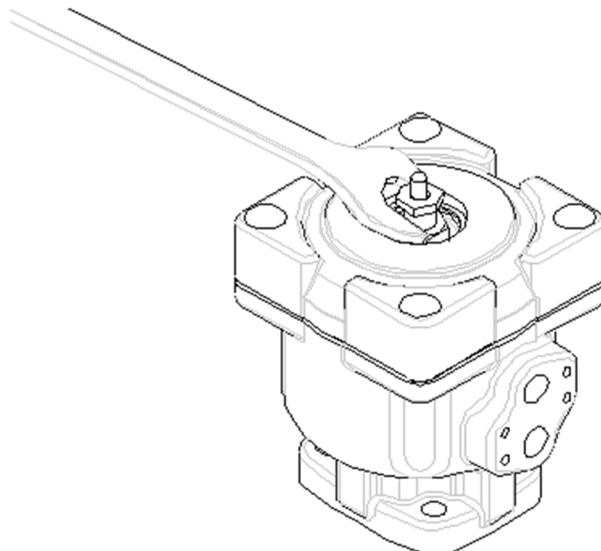
- 8) Rotate the open and close side adjustment bolts to adjust the position of the open and close side limit switches.  
 ※Note that if the limit switch on the closed side is lowered too much, the switch will contact the base and the limit switch on the closed side will always be activated.
- 9) Repeat the full open ⇔ full close of the valve by air operation and check whether the limit switch box operates normally.  
 ※If the limit switch box does not operate normally, return to Step 8 and perform the adjustment again.
- 10) Attach the cover of the limit switch box by rotating it clockwise.

<Full opening adjustment method>

- |              |   |
|--------------|---|
| Preparations | ▶ Screwdriver for wrench ▶ flathead screwdriver               |
|              | ▶ Special tool for stopper adjustment (optional: recommended) |

**[Procedure]**

- 1) Remove the adapter [83] using a flathead screwdriver.  
 ※Do not damage O-ring[14].
- 2) Fully open the valve by air operation.
- 3) Secure stopper [51] with wrench and loosen nut [52] with wrench.
- 4) Turn stopper [51] counterclockwise to remove.
- 5) Fix the opening adjustment base [57] with a wrench, and loosen the nut [58] with a wrench.
- 6) Screw the opening adjustment base [57] onto the actuator until the opening is reached, which is to be adjusted with the wrench this time.
- 7) Fix the opening adjustment base [57] adjusted in step 6 with a wrench, and tighten the nut [58] with a wrench.
- 8) Adjust the stopper referring to steps 5 to 10 of <How to adjust the stopper> in the standard specifications.  
 ※The Indicator rod [31] described in <How to adjust the stopper> is the Indicator rod [32] for the opening adjustment mechanism.
- 9) Attach adapter [83].



## 10. How to disassemble/assemble for parts replacement

If internal leakage (seat leakage) or external leakage occurs when the valve is fully closed, the leakage may be improved by replacing the parts.

If the leak does not improve after replacing the parts, remove and replace the valve according to this item.

 <b>Warning</b>	
 <b>Prohibition</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Do not disassemble the actuator.</li> <li>▶ When operating the actuator with air, never touch the drive section.</li> </ul>
 <b>Forcing</b>	<p><b>There is a danger of injury.</b></p> <ul style="list-style-type: none"> <li>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.</li> <li>▶ When installing piping, be sure to wear the appropriate protective equipment according to the operation details.</li> </ul>

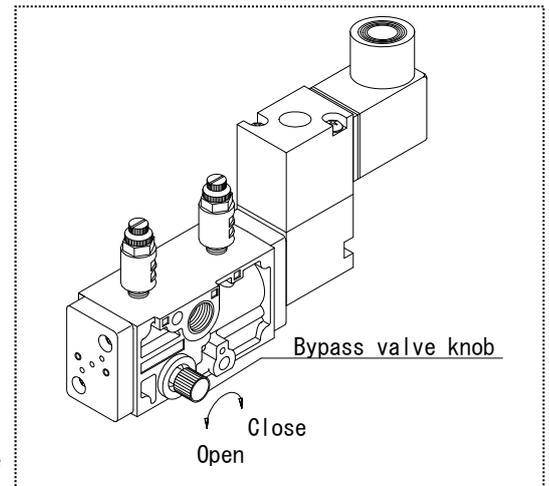
 <b>Caution</b>	
 <b>Prohibition</b>	<p><b>Damage may occur.</b></p> <ul style="list-style-type: none"> <li>▶ When replacing the valve or replacing parts, completely drain the fluid from the piping to reduce the fluid pressure to zero.</li> <li>▶ Do not over tighten the Union nut.</li> <li>▶ Do not use a pipe wrench when tightening the Union nut.</li> </ul>
 <b>Forcing</b>	<p><b>Damage may occur.</b></p> <ul style="list-style-type: none"> <li>▶ Fix the End connector during piping installation or disassembly and reassembly.</li> <li>▶ Be sure to confirm that the Union nut is fully tightened before the water flow test.</li> <li>▶ Tighten the Union nut paying attention to the shaft center misalignment and face-to-face dimension.</li> <li>▶ When connecting a resin valve to metal piping, be careful not to apply piping stress to the resin valve.</li> </ul>

Preparations : ▶ Spanner      ▶ Protective gloves      ▶ Protective glasses

### <Disassembly>

#### [Procedure]

- 1) Completely drain the fluid in the piping.
- 2) Close the main valve of the air. If the valve is equipped with a solenoid valve, open the bypass valve to exhaust air from the actuator.
- 3) Disconnect air piping.  
(Do not remove the air piping for reverse operation)
- 4) Completely loosen the bolts (B) [40] between the body and the actuator. (For reverse operation, if air is put in the actuator and disassembled, the operation can be smoothly performed.)
- 5) Remove actuators [28], [29] and [30].
- 6) Remove the diaphragm [3] by turning it 90° .
- 7) Remove the compressor [6].
- 8) Remove the joint fittings [7].
- 9) Remove the compressor retainer [33].



### <Assembly>

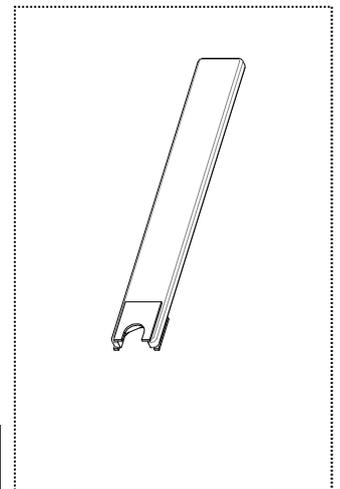
#### [Procedure]

Follow the procedure from **9)** in reverse.

(Refer to **Table 10-1** for the body tightening torque.)

※For Nominal size 15 mm, special tools are available for assembly.

If you need it, please contact us separately.



(Table 10-1) Body tightening torque value

Units: N•m{kgf • cm}

Nominal size Diaphragm	15 mm	20 - 32 mm	40 mm	50 mm
Rubber	3.0 {31}	5.0 {51}	12.0 {122}	15.0 {153}
PTFE	5.0 {51}	8.0 {82}	15.0 {153}	20.0 {204}

## 11. Inspection item

### Caution



#### Forcing

**The valve can be damaged, or leak.**

- ▶ Maintenance should be performed every 3 to 6 months as a guide in order to keep the watch in normal condition and use it for a long time. Pay particular attention to temperature changes and aging during long-term storage or shutdown or use.
- ▶ When removing the valve from the piping when replacing the valve or parts, completely remove the fluid from the piping before starting work.
- ▶ If any trouble is found, take the appropriate action referring to "**12. Cause of malfunction and remedy**"

## Daily inspection

Inspection items and inspection methods	Guideline of judgment	Check point	Treatment method
External leakage (visual inspection)	No leakage	[Flange type] Pipe flange connection	① Retighten the pipe bolts to the specified torque. ② Remove the valve from the pipe and retighten the pipe bolts. (Ref: 5. Piping method [Flange type])
		[Socket type] Adhesive construction section	Remove the valve from the piping and retry the bonding process. (Ref: 5. Piping method [socket type])
		[Screw-in type] Threaded connection	Remove the valve from the piping and screw the valve in again. (Ref: 5. Piping method [Screw-in type])
		Union nut portion of the valve	① Retighten the Union nut ② Remove the valve from the piping, check the O-ring and sealing surface, and replace the defective part. (Ref: 5. Piping method)
		Surface of the entire valve	Remove the valve from the pipe and replace the valve. (Ref: 10.How to disassemble for parts replacement)
Internal leakage (visual and measurement)	No leakage	Leakage to secondary side when valve is fully closed	Remove the valve from the piping and replace the valve or defective part. (Ref: 10.How to disassemble for parts replacement)
		Measured values of flowmeters, pressure gauges, etc.	Remove the valve from the piping and replace the valve or defective part. (Ref: 10.How to disassemble for parts replacement)

**Daily Inspection (continued)**

Inspection items and inspection methods	Guideline of judgment	Check point	Treatment method
Abnormal noise (hearing)	No abnormal noise	Valves and actuators	Remove the valve from the pipe and replace the valve or actuator. (Ref: 10.How to disassemble for parts replacement)
		Piping around the valve	Reconfirm the conditions of use (Ref: 2. Safety Precautions)

**Periodic inspection****●Guideline for the inspection cycle: 3 months**

Inspection items and inspection methods	Guideline of judgment	Check point	Remedy for malfunctions
Vibration (palpation)	No different from other parts	Valves and actuators	Recheck the operating conditions and remove the source of vibration. (Ref: 2. Safety Precautions)
			Remove the valve from the pipe and replace the valve or actuator. (Ref: 10.How to disassemble for parts replacement)
		Piping around the valve	Recheck the operating conditions and remove the source of vibration. (Ref: 2. Safety Precautions)

## Periodic inspection

### ●Guideline of the inspection cycle: 6 months

Inspection items and inspection methods	Guideline of judgment	Check point	Remedy for malfunctions
On the manual handle Operability (touch)	Smooth turning	Manual operation unit	Remove the valve from the pipe and replace the valve or actuator. (Ref: 10.How to disassemble for parts replacement)
Looseness of bolts (visual and palpation)	No Loose	For body + actuator	Retighten the mounting bolts to the specified torque. (Ref: 10.How to disassemble for parts replacement)
		[Flange type] For flange piping	Retighten the pipe bolts to the specified torque. (Ref: 5. Piping method [Flange type])
Water-intrusion (visual inspection)	No intrusion	Inside the actuator	Replace the actuator (Ref: 10.How to disassemble for parts replacement)
Intrusion <sup>※1)</sup> of foreign objects (visual inspection)	No intrusion	Inside the actuator	Replace the actuator (Ref: 10.How to disassemble for parts replacement)
Corrosion Or rust <sup>※1)</sup> (visual inspection)	No corrosion or rust	Appearance of the product and in the actuator	Remove the valve from the pipe and replace the valve or actuator. (Ref: 10.How to disassemble for parts replacement)
Product damage	No scratches, cracks, or deformation	Appearance of the product	Remove the valve from the pipe and replace the valve or actuator. (Ref: 10.How to disassemble for parts replacement)

## 12. Cause of malfunction and remedy

### Caution

#### Forcing

**You may be electrocuted or injured.**

- ▶ If any malfunction is found, immediately stop using the product and take appropriate action.
- ▶ When removing the valve from the piping when replacing the valve or parts, completely remove the fluid from the piping before starting work.
- ▶ Turn off the power before removing the actuator cover.

## CAUSE OF FAILURE AND HOW TO REMEDY (continued)

Failure phenomenon	Possible cause	Measures and measures
Do not turn the crown manually (not turn it).	The valve is already fully open (or fully closed).	Manually rotate in the opposite direction (Ref.: 8. Test run method)
	Air is supplied to the actuator.	Close the air source valve and open the bypass valve.
	Foreign matter caught in valve	Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 10.How to disassemble for parts replacement)
	Piping stress is applied to the valve.	Remove the piping stress
	The torque of the valve has increased due to the effects of the fluid (temperature, components, pressure, etc.)	Reconfirm the conditions of use (Ref: 2. Safety Precautions)
Do not open or close by air operation.	Air is not supplied	Supply air.
	The bypass valve is open.	Close the bypass valve by turning the knob clockwise.
	The speed controller adjustment knob is turned all the way to the right.	Turn the knob to the left (Ref.: 8. Test run method)
	Foreign matter caught in valve	Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 10.How to disassemble for parts replacement)
	Valve torque is increasing due to piping stress.	Remove the piping stress. (Ref: 4. Product Specifications)
	The torque of the valve increases due to the effect of the fluid (temperature, component, pressure).	Check the operating conditions again.

**CAUSE OF FAILURE AND HOW TO REMEDY (continued)**

Failure phenomenon	Possible cause	Measures and measures
Do not open or close by air operation.	Piping stress is applied to the valve.	Remove the piping stress
	The torque of the valve has increased due to the effects of the fluid (temperature, components, pressure, etc.)	Reconfirm the conditions of use (Ref: 2. Safety Precautions)
	The actuator does not move due to external corrosion of the actuator.	Stop using the product immediately and replace the actuator. (Ref: 10.How to disassemble for parts replacement)
Fluid leaks even when fully closed (internal leak)	High fluid pressure	Use below the maximum allowable pressure (Ref: 10.How to disassemble for parts replacement)
	The diaphragm or body is worn or scratched.	Remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 10.How to disassemble for parts replacement)
	Missing parts	Remove the valve from the piping and attach the relevant part or replace the valve. (Ref: 10.How to disassemble for parts replacement)
	Foreign matter caught in valve	Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 10.How to disassemble for parts replacement)
	Piping stress is applied to the valve.	Remove the piping stress (Ref: 10.How to disassemble for parts replacement)

**CAUSE OF FAILURE AND HOW TO REMEDY (continued)**

Failure phenomenon	Possible cause	Measures and measures
Fluid leaks from valve (external leak)	Union nut is loose	Retighten the Union nut (Ref: 5. Piping method)
	O-ring is scratched, worn, melted, or altered	Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 10.How to disassemble for parts replacement)
	Scratches or wear are found on the sliding or fixing surfaces of the O-ring.	Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 10.How to disassemble for parts replacement)
	Valve is cracked or broken	Stop using the product immediately, remove the valve from the piping, and replace the valve. (Ref: 10.How to disassemble for parts replacement)
Actuator is operating but valve is not open or closed	Damaged stem, ball, or fitting	Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 10.How to disassemble for parts replacement)

Failure phenomenon	Possible cause	Measures and measures
The actuator emits a bad smell, heat, or smoke.	Actuator is defective	Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 10.How to disassemble for parts replacement)
	Wrong connection to the terminal block	Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 10.How to disassemble for parts replacement)
	An overcurrent is flowing to the actuator	Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 10.How to disassemble for parts replacement)
	The actuator is affected by lightning.	Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 10.How to disassemble for parts replacement)
Actuator is operating but valve is not open or closed	Damaged stem, diaphragm, or fitting	Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 10. How to disassemble for parts replacement)
Actuator is corroded	The watch is exposed to water, chemical liquids, or other liquids.	Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 10.How to disassemble for parts replacement)
Valve is corroded or deformed	The watch is exposed to water, chemical liquids, or other liquids.	Stop using the product immediately, remove the valve from the piping, and replace the valve. (Ref: 10.How to disassemble for parts replacement)

### 13. Disposal method of residual materials and waste materials

 <b>Warning</b>	
 <b>Forcing</b>	<p><b>Burning produces toxic gases.</b></p> <ul style="list-style-type: none"><li>▶ When disposing of the product or parts, please dispose of them according to the guidelines of each local authority by a professional disposal company.</li></ul>

## Inquiries

Contact the nearest dealer, our sales office, or our web website for inquiries about this product.

### [Instruction Manual]

Diaphragm valve/Universal diaphragm valve

Air AI type

15~50mm

(automatic valve)



<https://www.asahi-yukizai.co.jp/en>

Please note that the content of this manual is subject to change without notice.

**April 2024**

[User's Manual] Diaphragm valve/True union diaphragm valve  
Pneumatic actuated Type AI 15~50mm