Diaphragm Valve Type 14
Pneumatic Actuated
Type AP
65～100mm

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

-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>

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

<Prohibited/Forced display>

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

Table of contents

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

⚠ Warning	
Prohibition	**Serious injury can result.** ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.

⚠ Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not subject the product to impact by throwing, dropping or hitting. ▶ Do not scratch or pierce the product with a sharp object such as a knife or hand hook. ▶ Do not pile up cardboard boxes forcefully to prevent the load from collapsing. ▶ Avoid contact with coal tar, creosote (a wood preservative), white pesticides, insecticides, paints, etc.
Forcing	**The valve can be damaged, or leak.** ▶ 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.) ▶ After unpacking, make sure that the product is correct and that it meets the specifications.

Product Handling

⚠ Warning	
Prohibition	**Serious injury can result.** ▶ Do not disassemble the actuator. ▶ Do not touch moving parts during operation with hands, feet or tools.
Forcing	**There is a danger of injury.** ▶ 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. ▶ 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.

⚠ Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not step on the valve or place heavy objects on it. ▶ Keep away from fire and hot objects. ▶ Do not use the product in places where it may be submerged. ▶ Do not subject the valve to large vibrations.

⚠Caution

Forcing

There is a danger of injury.

▶ Secure sufficient space for maintenance and inspection when piping.

The valve can be damaged, or leak.

▶ 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.

▶ 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 the valve is used at an intermediate position, the mark of the ball opening will remain on the seat (PTFE), and sealing performance may temporarily deteriorate when the valve is fully closed. Therefore, it is recommended to use the valve fully open or closed.

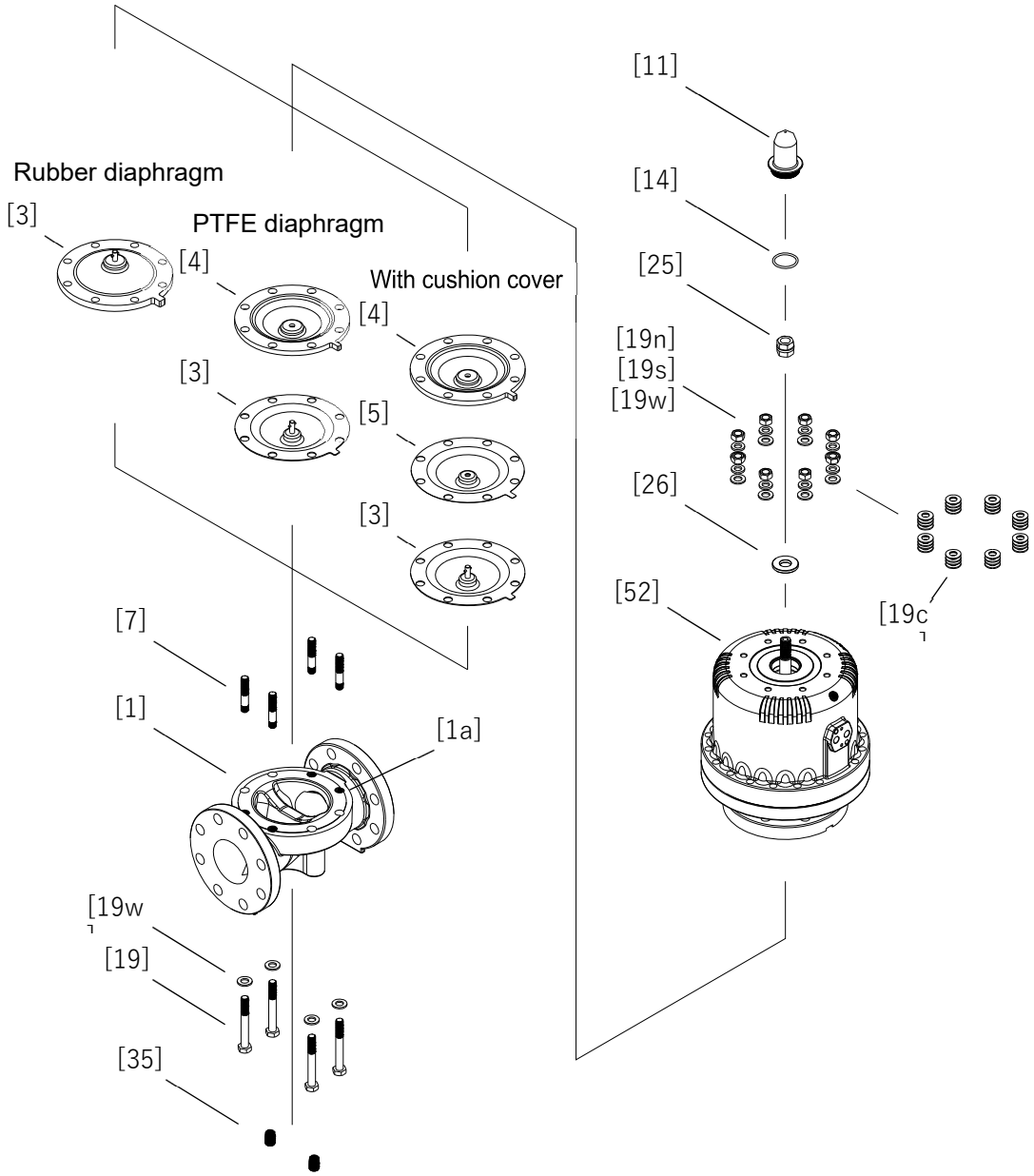
▶ If you notice an unusual odor, heat, or smoke, immediately turn off the power supply. If any abnormality is found, be sure to consult your dealer or us for inspection.

▶ 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 deducted 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	[14]	O-ring	[26]	Stopper base
[1a]	Inserted nut	[19]	Bolt	[35]	ENSAT for body
[3]	Diaphragm	[19c]	Conical spring washer	[52]	Actuator
[4]	Cushion	[19n]	Nut		
[5]	Cushion cover	[19s]	Spring washer		
[7]	Stud bolt	[19w]	Washer		
[11]	Gauge cover	[25]	Stopper		

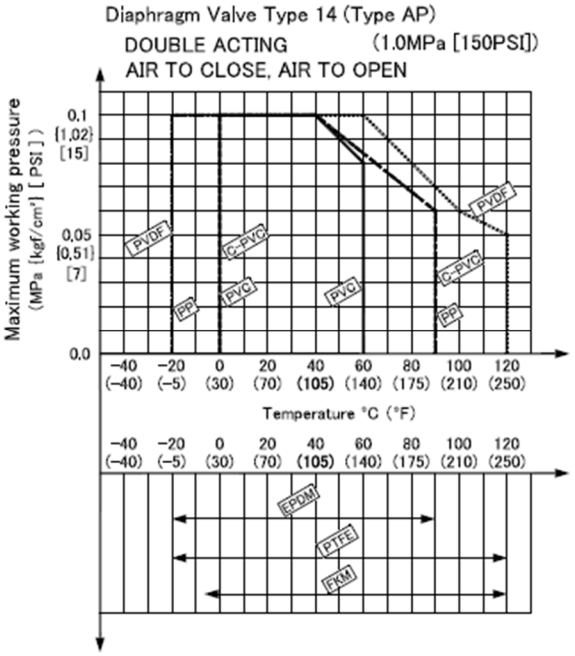
4. Product Specifications

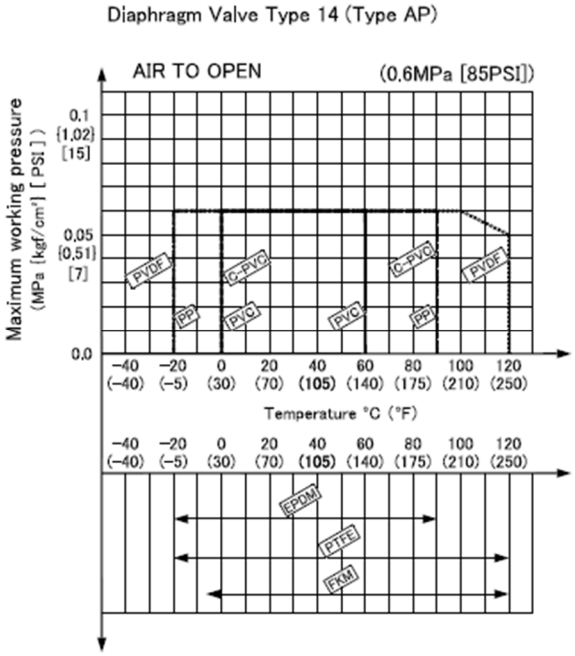
Model number table

ACTUATION	TYPE	ACTUATOR TYPE	ACTION	BODY MATERIAL	SEAL MATERIAL	CONNECTION	STANDARD	SIZE
A	14	P	*	*	*	F	*	* * *
A AUTOMATIC VALVE	14 TYPE 14	P TYPE AP	F DOUBLE ACTING G AIR TO OPEN (0.6MPa TYPE) H AIR TO OPEN (1.0MPa TYPE) S AIR TO CLOSE	U PVC C C-PVC P PP F PVDF	E EPDM V FKM T PTFE	F FLANGED	1 JIS 10K D DIN A ANSI GRINNEL STANDARD J ANSI AV STANDARD	065 65mm 080 80mm 100 100mm

NOTE ・JIS5K standard is not manufactured.

Relationship between maximum allowable pressure and temperature





Actuator

NOMINAL SIZE (mm)		65	80	100
Operating pressure range MPa	Double acting Air to open Air to close	0.4～0.5		
Air consumption NL/ open & close (at 0.4MPa)	Double acting	22.1	23.7	30.4
	Air to open (0.6MPa spec.)	7.4	7.7	10.6
	Air to open (1.0MPa spec.)	7.4	9.3	15.1
	Air to close	7.0	8.3	17.2
Air supply port size	Double acting Air to open Air to close	Rc 1/4		
Operating ambient temperature range ℃	Double acting Air to open Air to close	-10～50		

Standard option

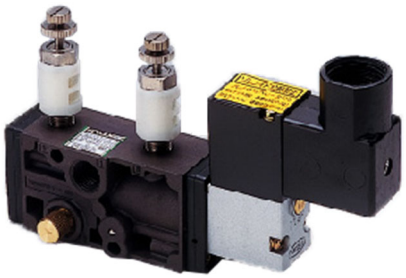
Option name	Objectives and specifications	Remarks
Solenoid valve	・Controls opening and closing of valves ・Possible to retrofit ・Dedicated solenoid valve plates are also required for the following products *Double acting is not required *Air to open: 65 to 100 mm *Air to close: 65 to 100 mm ・A silencer with a throttle valve is provided as standard at the exhaust port. ・Built-in bypass valve	65 to 100mm
Filter-regulator	・Adjust the pressure of the operation air ・Only with solenoid valve can be retrofitted (single mounting is not possible)	65 to 100mm
Speed controller	・Adjust the actuator operation time. ・Possible to retrofit ・Meter-out system	65 to 100mm
Bypass valve	・Used for manual operation of return movement ・Retrofit possible only without solenoid valve ・Built-in speed controller	65 to 100mm
Limit switch box	・Detects open/close status of valve	65 to 100mm
Limit switch	・Detects open/close status of valve	65 to 100mm
E-P positioner	・Control the valve in proportion to the electric signal (4 to 20mADC)	65 to 100mm
P-P positioner	・Control the valve in proportion to the pneumatic signal (0.02 to 0.1MPa)	65 to 100mm
Manual operating mechanism	・Valve can be opened and closed during power loss	65 to 100mm
Full opening adjustment mechanism	・Can be set to any opening in the range of 0 to 100%	65 to 100mm
Open/close counter	・The number of times the actuator is opened/closed is counted.	65 to 100mm

Solenoid Valve

Action	Applicable nominal size (mm)	Model code	Power consumption
Double acting Air to open Air to close	40～200	4N3S102K-W□-G31193	AC:6VA DC:5.5W

Operation	Air supply port size	Perforated cross section	Additional functions
Double acting Air to open Air to close	Rc1/4	10mm^2 and more	▶ Built-in bypass valve ▶ Silencer with throttle valve included (used as speed controller)

4N3S102K-W□-G31193

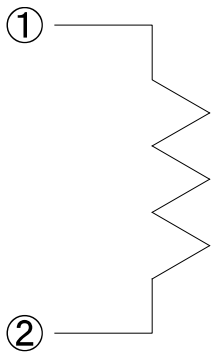


* The photo is an image

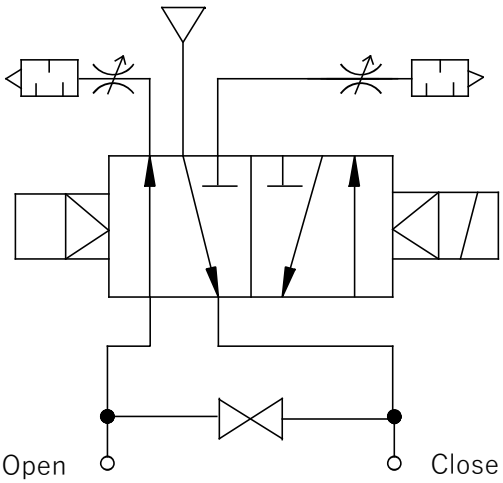
Text entry	Degree of protection
1	100VAC 50/60Hz
(2)	110VAC 50/60Hz
3	200VAC 50/60Hz
(4)	220VAC 50/60Hz
5	24VDC
(6)	48VDC
(7)	100VDC
(8)	125VDC
(9)	110VDC

(　) Appended text is a special item.

Terminal Diagram



JIS symbol



Limit switch

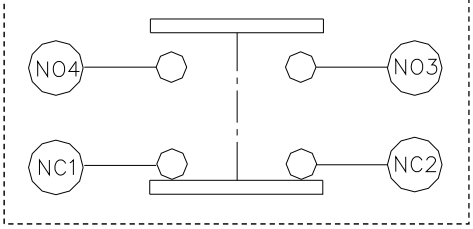
●Limit switch model: For 1LS1-J

Operation	Nominal size	Model code	Protection grade
Return, Reverse, Direct action	65～100mm	1LS1-J	IP67(IEC529)

Limit switch rating

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

Internal circuit



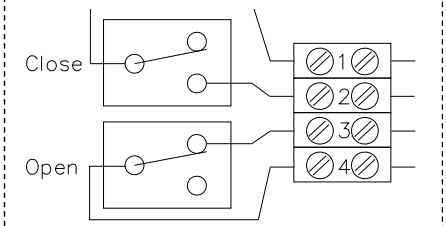
●For limit switch box

Operation	Nominal size	Model code	Protection grade
Double acting Air to open Air to close	65～100mm	HPCR4MVAZ50	IP65(IEC529)

Limit switch rating

Rated current	Resistance load
250VAC	5.0a

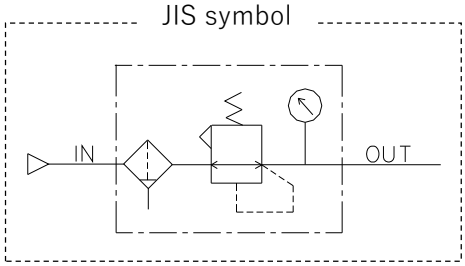
Internal circuit diagram
(Fully open)



Filter regulator

Operation	Nominal size	Model code	Piping port size	Element Filtration rate
Double acting Air to open Air to close	65 to 100mm	ARU2-02-8A-G	Rc 1/4	5μm

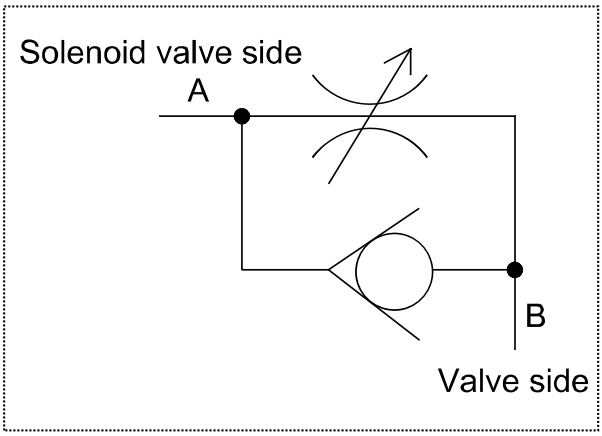
JIS symbol



Speed controller

Operation	Nominal size	Model code	Piping port size
Double acting Air to open Air to close	65 to 100mm	SC7-08A	Rc 1/4

Operation	Effective area(mm^2)		Needle Revolution speed
	Free flow	Control flow	
Double acting Air to open Air to close	11.0	8.3	8 rotations



5. Piping method

Flanged end

Warning	
Prohibition	**Serious injury can result.** ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not tighten the bolts and nuts for piping to the specified torque values in Table 5-2.
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. **The valve can be damaged, or leak.** ▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve. ▶ When connecting to metal piping, do not apply piping stress to the valve. ▶ Use a connection flange with a full-face seat. ▶ Check that there is no difference in mutual flange standards. ▶ 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.) ▶ Keep the axis misalignment and parallelism of the flange surface below the values shown in **Table 5-1** "Axis misalignment and parallelism." ▶ Tighten the bolts and nuts for piping diagonally with the specified torque values in **Table 5-2**.

Preparations ▶ Torque Wrench ▶ AV packing

[Procedure]

1) Set AV packing between the flanges.
2) Insert the washer and bolt from the connecting flange side, insert the washer and nut from the valve side, and tighten temporarily by hand.

⚠Caution

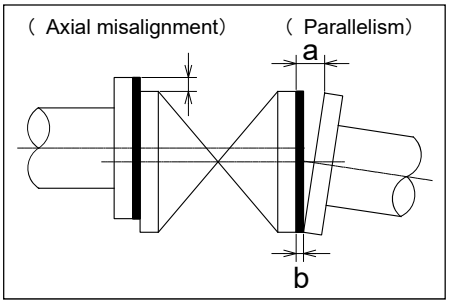
Forcing

Otherwise, stress may be applied to the piping, resulting in damage.

▶ Flange surface parallelism and shaft misalignment should be less than the values shown in the table below.

Table 5-1 Axis misalignment and parallelism

Nominal size	Shaft misalignment	Parallelism (a-b)
65,80mm	1.0mm	0.8mm
100mm	1.0mm	1.0mm



3) Gradually tighten to the specified torque value diagonally with a torque wrench.

⚠Caution

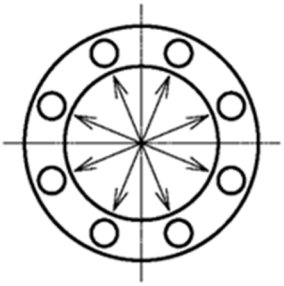
Forcing

Damage or leakage may occur.

▶ Tighten the bolts and nuts of the connection flange diagonally to the specified torque.

Table5-2 Flange Tightening Specified Torque Units: N-m

Nominal size	65mm	80,100mm
PTFE・PVDF (coated)	22.5	30.0
Rubber	22.5	30.0



Support of the product

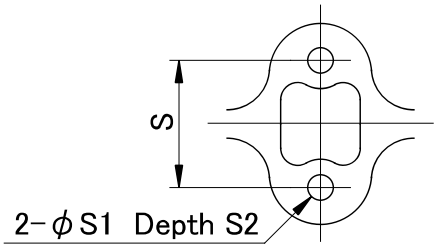
The mounting (panel) and the piping method

⚠Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not over-tighten when supporting piping with a U-band, etc. ▶ When installing a valve in the piping around the pump, do not cause large vibrations in the valve.
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. **The valve can be damaged, or leak.** ▶ Do not over-tighten when supporting piping with a U-band, etc. ▶ When installing the product, make sure that no excessive stress such as tension, compression, bending or impact is applied to the piping or valve. ▶ When connecting a resin valve to metal piping, make sure that no piping stress is applied to the resin valve. ▶ Make sure that the screws at the joints are made of resin. ▶ Use sealing tape for the thread joints of our resin piping materials.

How to fix the bottom stand and frame (panel)

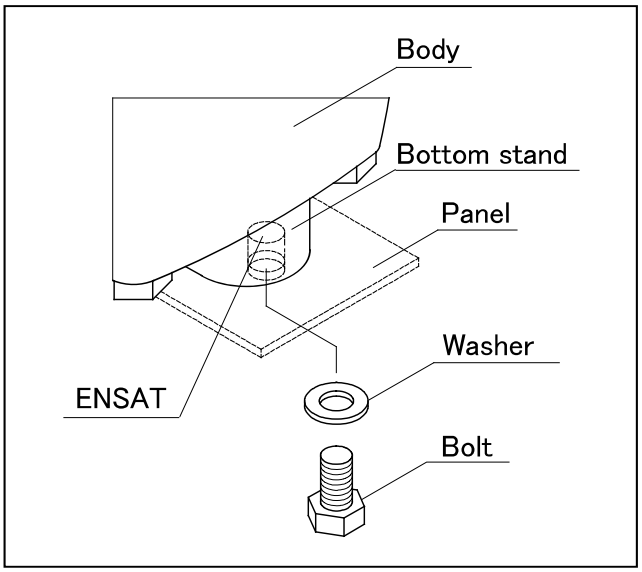
Diaphragm valve 14 type bottom stand

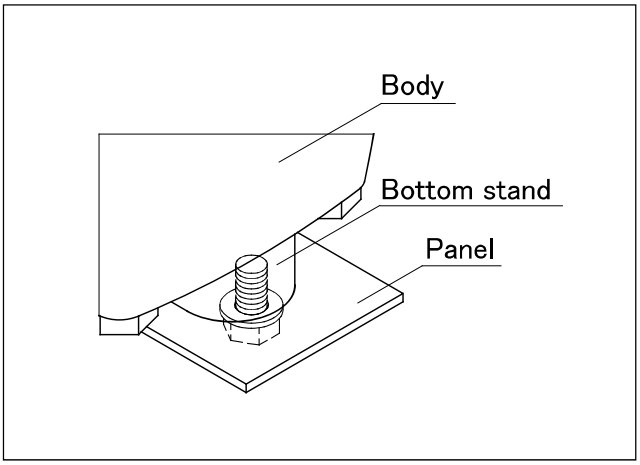
Nominal size	S	S1	S2
65	85	11	20
80	100	15	28
100	120	15	28



How to fix the bottom stand and frame (panel)

Mounting before and after mounting





Appropriate Ensat (Reference)

NOMINAL SIZE (mm)	Nominal thread	Length (mm)	Material
65	M8	15	SUS or brass
80	M12	22	SUS or brass
100	M12	22	SUS or brass

Type AP (65 to 100mm) is standard-equipped with an Ensat when shipped. (without mounting base)

Ensat manufacturer: K.K.V. Corporation

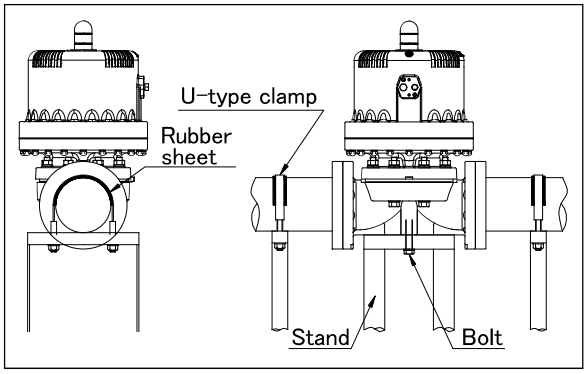
Preparations ▶ Spanner ▶ U-band (with bolt) ▶ Rubber seat

Horizontal piping

○When using an Ensat and installing supports

Secure the Ensat 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.



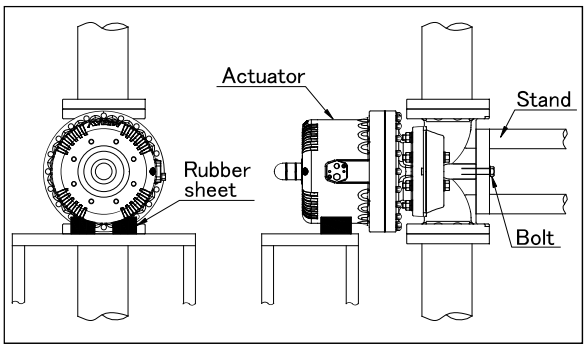
Bolt Size (Ensat)

Nominal size	65mm	80,100mm
Nominal	M8	M12

Vertical piping

Secure the Ensat 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

<1> Without option or with speed controller

Warning	
Prohibition	**There is a danger of injury.** ▶ Do not remove the protective plug until just before connecting the air piping.

Caution	
Prohibition	**Damage may occur.** ▶ Do not over-tighten the fitting for air piping.
Forcing	**There is a danger of injury.** ▶ Wear appropriate protective equipment according to the type of work being performed. **Otherwise damage or malfunction can result.** ▶ 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. ▶ Use clean, dehumidified and dust-free air. Consult with CKD when using high dry air with a dew point of-40° C or less. ▶ When using at an ambient temperature of 5° C or less, remove moisture from the operation air to prevent freezing. ▶ When using copper piping for air piping, use one with rust-proof treatment on the inner surface of the pipe. ▶ Flush the inside of the air piping thoroughly before connecting the air piping. ▶ When connecting the air piping, be careful that foreign matter, such as sealant, does not enter the piping. ▶ Be sure to remove burrs from the pipe fittings/threads. (This may cause gargle or air leakage.)

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

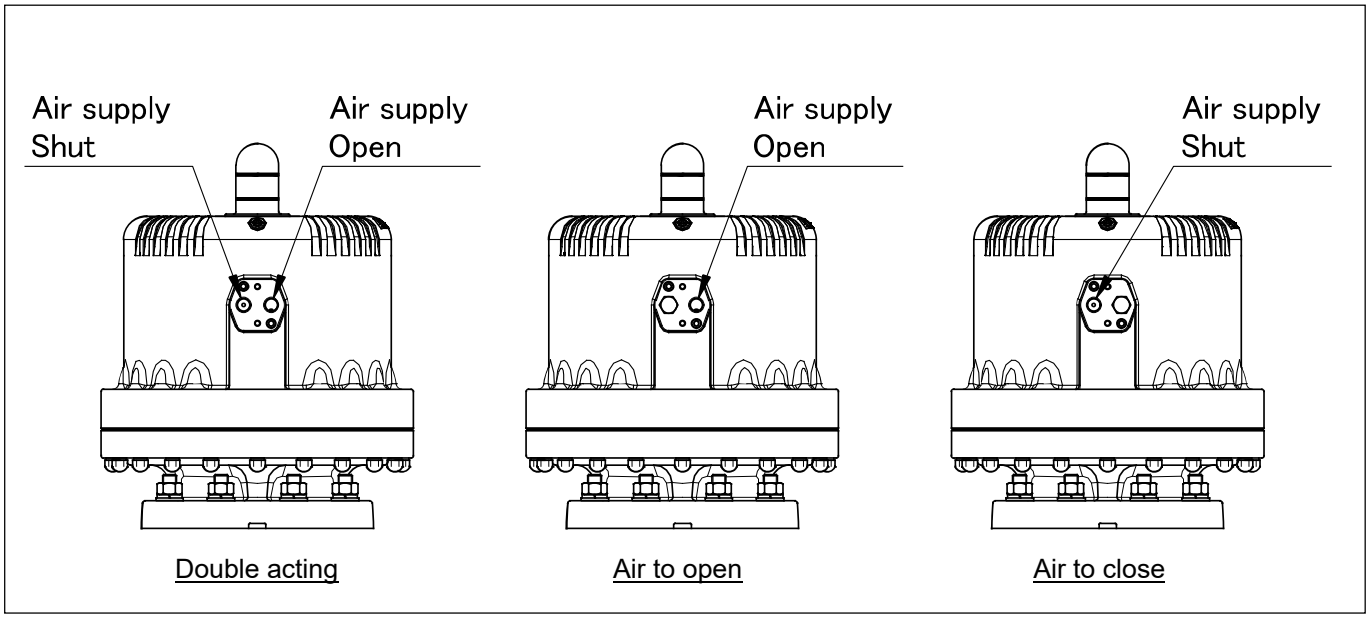
[Procedure]

1) Wrap sealing tape around the male thread of the fitting, leaving approximately 3mm at the end.

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.



※Although the picture shows no speed controller, the piping procedure is the same.

<2> With solenoid valve and filter regulator

⚠Warning	
Prohibition	**There is a danger of injury.** ▶ Do not remove the protective plug until just before connecting the air piping.

⚠Caution	
Prohibition	**Damage may occur.** ▶ Do not over-tighten the fitting for air piping.
Forcing	**There is a danger of injury.** ▶ Wear appropriate protective equipment according to the type of work being performed. **Otherwise damage or malfunction can result.** ▶ When using copper piping for air piping, use one with rust-proof treatment on the inner surface of the pipe. ▶ Flush the inside of the air piping thoroughly before connecting the air piping. ▶ When connecting the air piping, be careful that foreign matter, such as sealant, does not enter the piping. ▶ Be sure to remove burrs from the pipe fittings/threads. (This may cause gargle or air leakage.) ▶ Do not over-tighten the fitting for air piping. ▶ Be sure to lock the adjustment knob of the solenoid valve after adjustment. ▶ Regularly drain the drain from the Filter regulator. ▶ Set the secondary pressure of the Filter regulator to a setting that meets the equipment specifications. (Otherwise, malfunction or failure may result.)

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

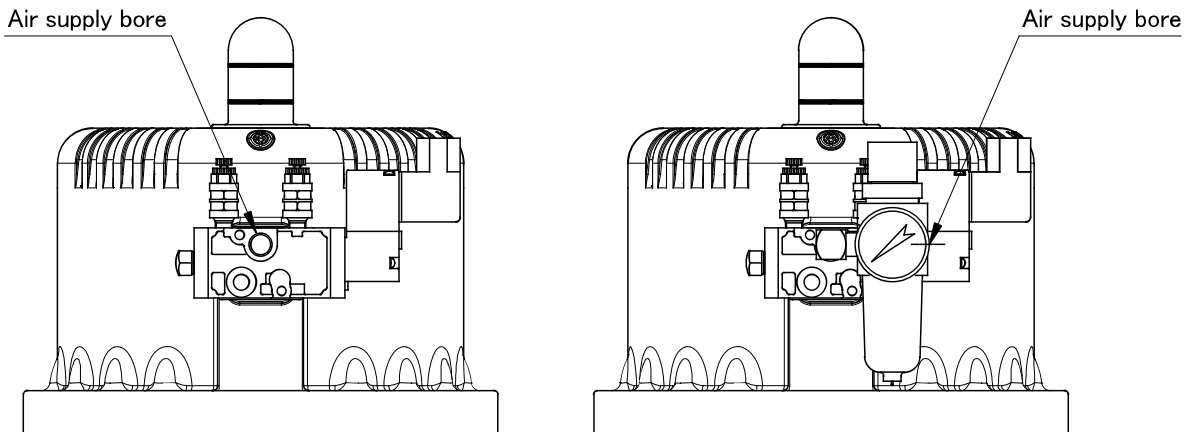
[Procedure]

1) Wrap sealing tape around the male thread of the fitting, leaving approximately 3mm at the end.

2) Tighten the fitting to the air piping port (see the figure below).

3) Screw the fitting in one turn with a wrench.

4) Install copper or tube tubes for air piping.



(with solenoid valve) (with solenoid valve + filter regulator)

7. Wiring method

Limit switch

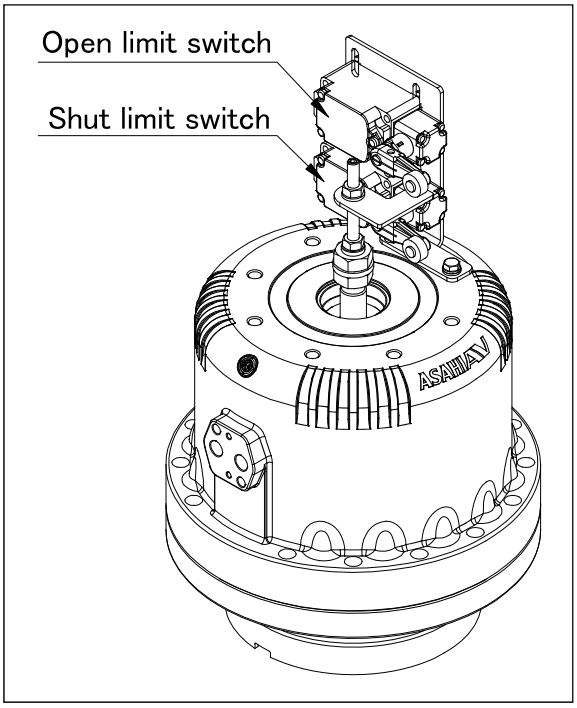
Warning	
Prohibition	**There is a risk of electric shock.** ▶ Do not perform wiring while the power is on.

Caution	
Prohibition	**Otherwise failure or malfunction of the machine can result.** ▶ 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.
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 failure or malfunction of the machine can result.** ▶ 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.) ▶ Contact CKD when using a limit switch in a 1mA～100mA, 5V～30V.

<For Limit Switch Model Number (1LS1-J)>

Preparations	▶ Phillips screwdriver	▶ connector (G1/2)	
	▶ Compressed terminal	▶ wire stripper	▶ Terminal crimping tool

[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.)

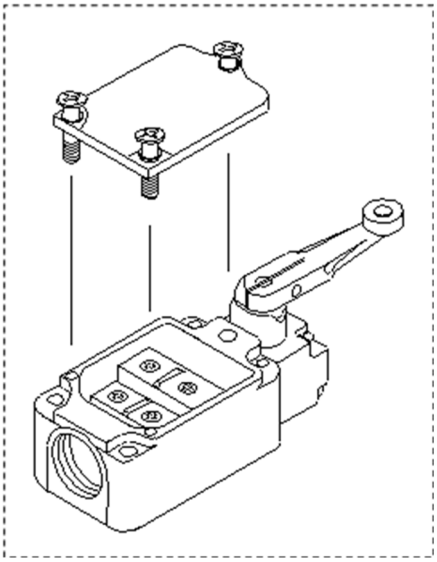
2) Pull off the resin protective cap.

3) Pass the cable through the connector.

4) Peel off the outer skin of the cable with a wire stripper.

5) Use a terminal crimping tool to attach the crimping terminal to the lead wire.

6) Wire the terminal screws with a Phillips screwdriver according to the internal circuit diagram on page 15.
※Tighten the screws securely.



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 a nipper, 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.

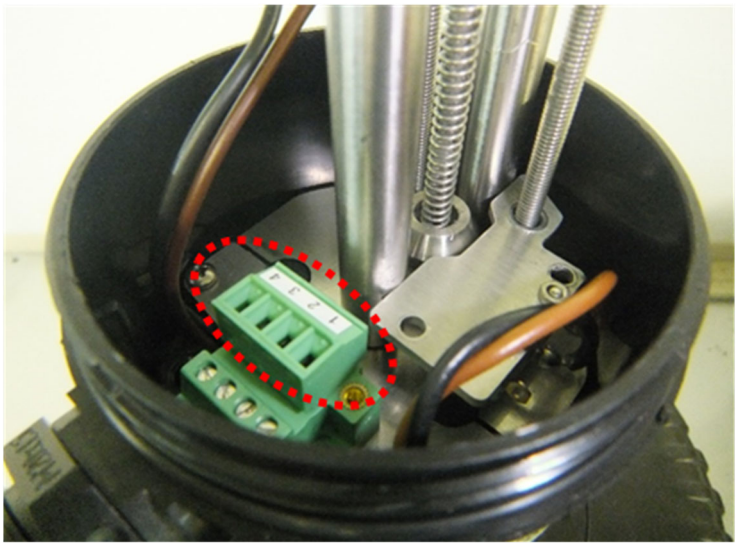
3) Pull the cable through the previously removed connector cap and into the switch box through the wiring port.

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 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

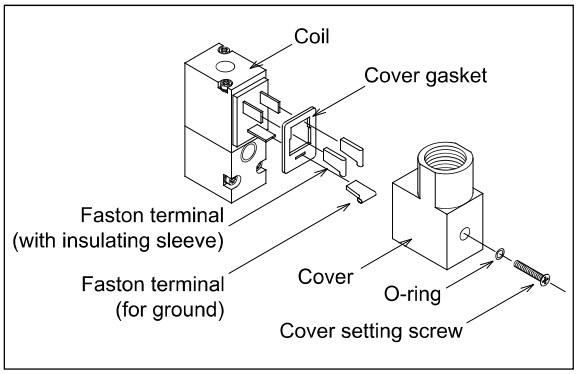
⚠ Warning	
Prohibition	**There is a risk of electric shock.** ▶ Do not connect or separate lines to the solenoid valves while the power is on. ▶ Do not perform any work with wet hands or tools.

⚠ 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 ▶ Wire stripper ▶ Connector (G1/2) ▶ Terminal crimping tool

[Procedure]

1) Loosen the cover setscrew with a Phillips screwdriver and remove the cover.
※Do not lose the O-ring.



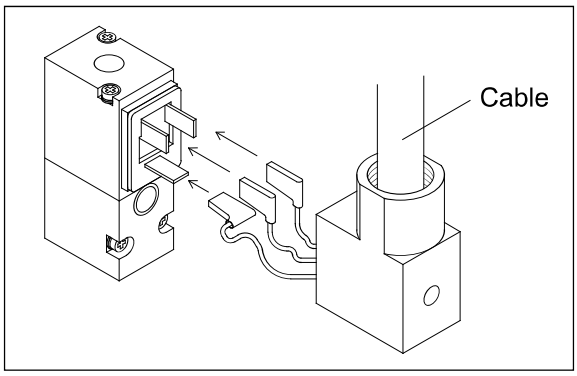
2) Pull out the Faston terminal and insulation cover that are inserted to the coil side terminal.
※The grounding terminal is not provided with an insulating sleeve.

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.

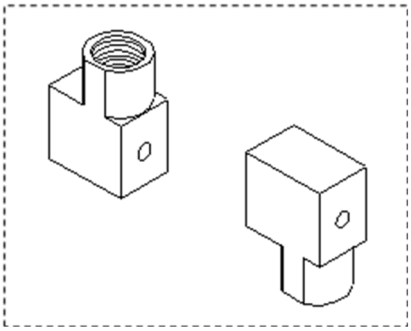
5) Pass the lead wire through the insulation cover.

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 at the top or bottom.]



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.

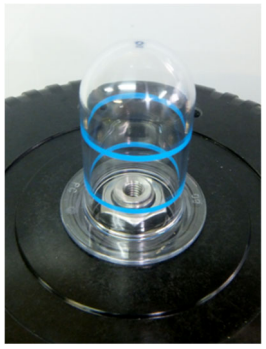
⚠ Caution	
Prohibition	**Otherwise, the valve may be damaged, or inoperative.** ▶ Use the product within the indicated product specifications.

[Procedure]

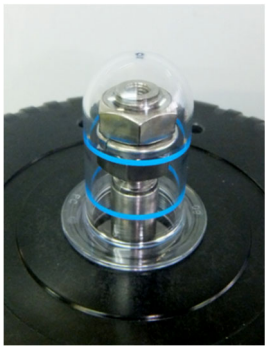
1) Supplies air to the air supply port.

2) Check that the air supply side is aligned with the stopper [14] position.

3) Stop the air supply.



(Full shut)



(Full open)

<For models with solenoid valve>

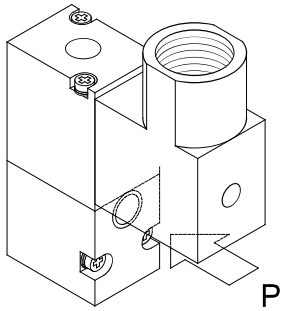
[Procedure]

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.

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 <Double acting>

⚠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.

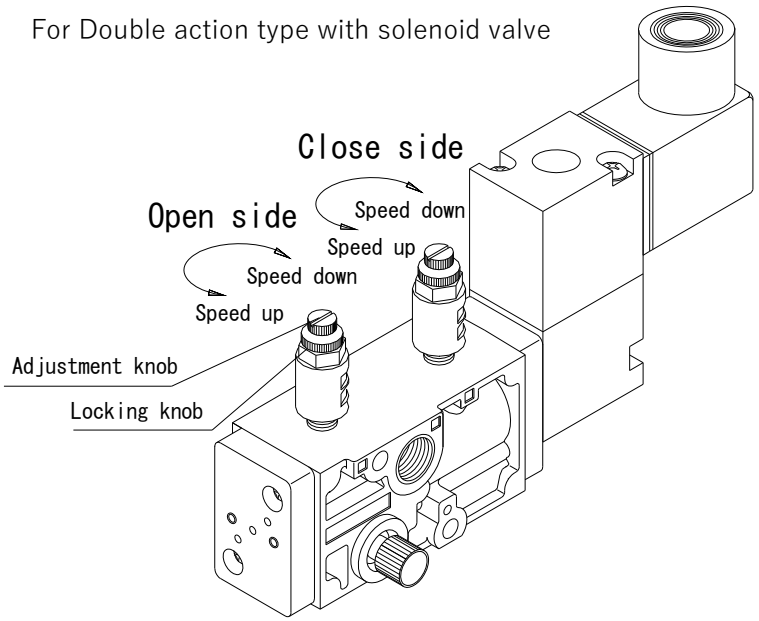
3) Energize the solenoid valve side and turn the adjusting knob of the open-side speed controller counterclockwise little by little.

4) Turn off the solenoid valve side and turn the adjusting knob of the closed side speed controller counterclockwise little by little.

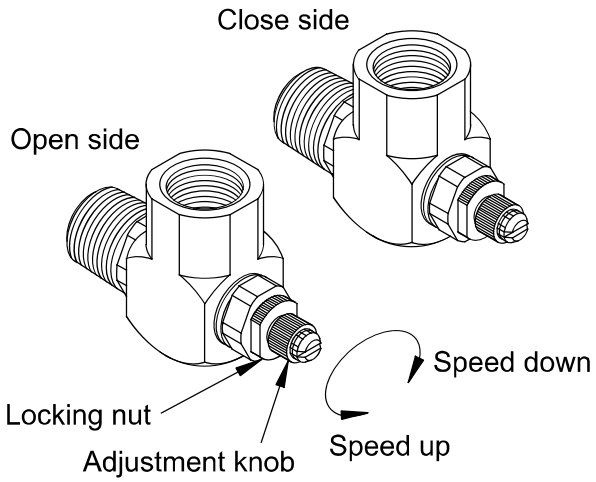
5) 3), Repeat 4) to set the desired opening/closing speed.

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)

For Double action type with solenoid valve



For Double action type with speed controller



Adjusting the Opening/Closing Speed <Air to open and Air to close>

⚠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

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
Air to open	Cannot adjust	Can be adjusted
Air to close	Can be adjusted	Cannot adjust

[Procedure]

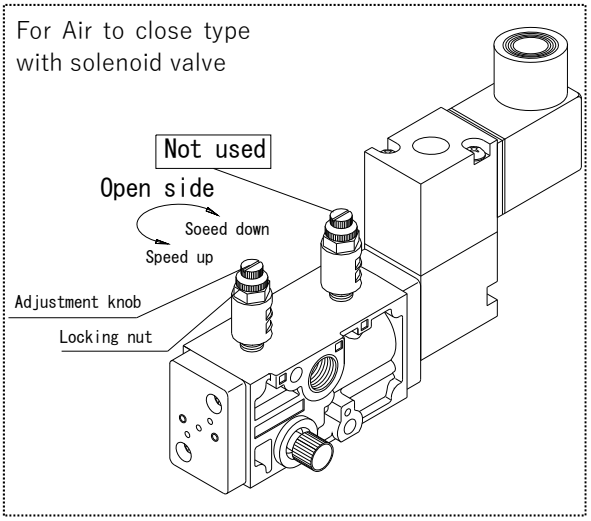
1) Turn the speed controller adjustment knob clockwise until it does not turn.
※Do not turn it too forcibly. (risk of damage)

2) Supplies solenoid valve air.

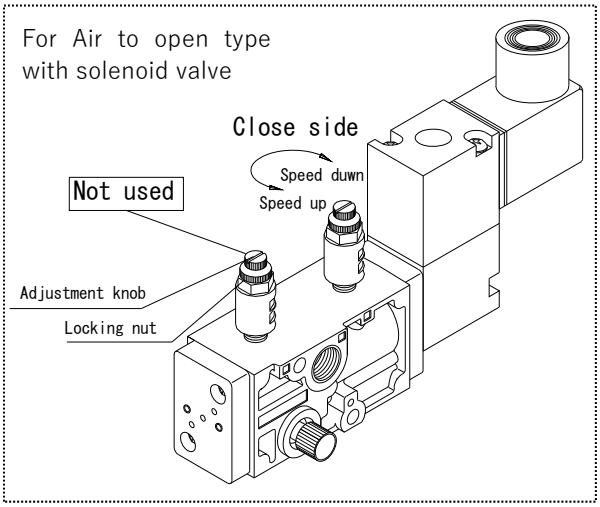
3) After energizing the solenoid valve, turn off the power, and turn the speed controller adjustment knob counterclockwise little by little to set the desired opening/closing speed.

4) 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)

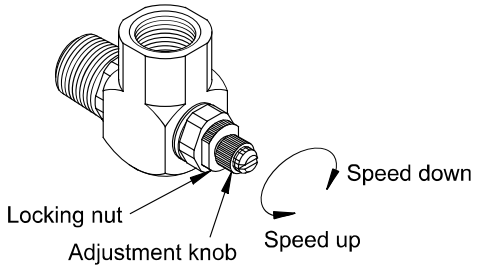
For Air to close type with solenoid valve



For Air to open type with solenoid valve



With speed controller



9. How to adjust 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.)

○Double acting/direct acting

Preparations ▶ Wrench

[Procedure]

1. Removing the stopper

1) Remove gauge cover [11] by rotating it counterclockwise.
2) Fully open the valve by air operation.
3) Loosen the upper lock nut while holding the lower lock nut of the stopper [25] with a spanner.
4) Remove the stopper [25] from the stem.

2. Stopper adjustment

1) Fully close the valve with the air operation pressure shown in the table below.
2) Screw in until the lower lock nut of the stopper [25] contacts the stopper receiver [26]. (hand tight)
3) Fully open the valve by air operation.
4) Fix the lower lock nut of the stopper [25] with a spanner, and tighten the spring washer and the upper lock nut firmly with a mounting spanner.

Nominal size	Air operation pressure when adjusting the stopper	
	Double acting	Air to close
65mm	0.20 MPa	0.30 MPa
80mm	0.30 MPa	0.40 MPa
100mm	0.40 MPa	0.35 MPa

3. Inspection

1) Repeat fully opening ⇔ closing the valve by air operation to check for fluid leakage.
※If there is fluid leakage, the lower locknut of the stopper [25] should be counterclockwise until there is no leakage.
Turn 1/4 turn and perform re-inspection.
2) Mount the gauge cover [11] by rotating it clockwise.
※Use the same procedure to adjust the stopper when a limit switch, positioner, or other option is attached.
After adjusting the stopper, also adjust the option.
When the positioner is attached, make sure to turn OFF the auto control for safety.

○Reverse action

Preparations	▶ Wrench

[Procedure]

1. Removing the stopper

1) Remove gauge cover [11] by rotating it counterclockwise.
2) Fully open the valve by air operation.
3) Loosen the upper lock nut while holding the lower lock nut of the stopper [25] with a spanner.
4) Remove the stopper [25] from the stem.

2. Stopper adjustment

1) Fully close the valve with air.
2) Screw in until the lower lock nut of the stopper [25] contacts the stopper receiver [26]. (hand tight)
3) Fully open the valve by air operation.
4) Fix the lower lock nut of the stopper [25] with a spanner, and tighten the spring washer and the upper lock nut firmly with a mounting spanner.

3. Inspection

1) Repeat fully opening ⇔ closing the valve by air operation to check for fluid leakage.
   ※If there is fluid leakage, the lower locknut of the stopper [25] should be counterclockwise until there is no leakage.
   Turn 1/4 turn and perform re-inspection.
2) Mount the gauge cover [11] by rotating it clockwise.
   ※Use the same procedure to adjust the stopper when a limit switch, positioner, or other option is attached.
   After adjusting the stopper, also adjust the option.
   When the positioner is attached, make sure to turn OFF the auto control for safety.

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.

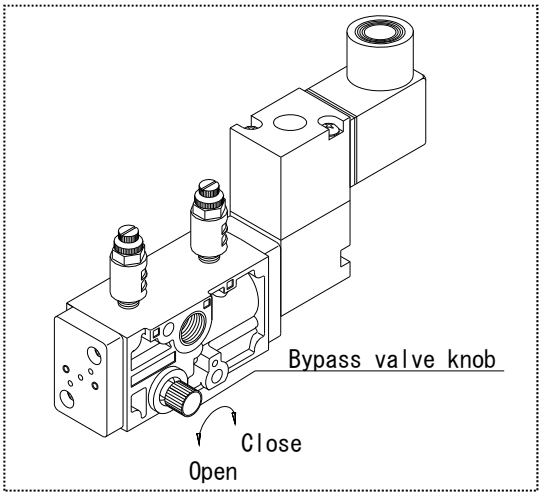
Warning	
Prohibition	**There is a danger of injury.** ▶ Do not disassemble the actuator. ▶ When operating the actuator with air, never touch the drive section.
Forcing	**There is a danger of injury.** ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ Wear appropriate protective equipment for the work details when installing piping.

Caution	
Forcing	**Damage may occur.** ▶ When replacing the valve or replacing parts, completely drain the fluid from the piping to reduce the fluid pressure to zero. ▶ When connecting a resin valve to metal piping, be careful not to apply piping stress to the resin valve.

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) Loosen the bolts and nuts ([7][19]) between the body [1] and the actuator [52] completely with a wrench. (For reverse operation, if air is put in the actuator and disassembled, the operation can be smoothly performed.)
5) Remove the actuator [52] from the body.
6) Remove the diaphragm [3] by turning it 90° .
7) Disconnect air piping.

<**Assembly**>

[**Procedure**]

1) Follow the procedure from **7)** in reverse. (Refer to the table below for the body tightening torque.)

Body tightening torque value Units: N-m

Nominal size / Diaphragm	65mm	80mm	100mm
Rubber	13.0	18.0	35.0
PTFE	15.0	20.0	40.0

11. Inspection item

⚠Caution	
Forcing	**Fluid may leak from the valve or the actuator may fail.** ▶ 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. **You may be electrocuted or injured.** ▶ 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	[Flanged end] Pipe flange connection	① Retighten the pipe bolts to the specified torque. ② Remove the valve from the pipe and re-tighten the pipe bolts. (Ref: 5. Piping method [Flanged end])
		Surface of the entire valve	Remove the valve from the pipe and replace the valve. (Ref: 10. How to disassemble/assemble 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/assemble 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/assemble for parts replacement)
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/assemble for parts replacement)
		Piping around the valve	Reconfirm the conditions of use (Ref: 2. Safety Instructions)

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 difference from other parts	Valves and actuators	Recheck the operating conditions and remove the source of vibration. (Ref: 2. Safety Instructions)
			Remove the valve from the pipe and replace the valve or actuator. (Ref: 10. How to disassemble/assemble for parts replacement)
		Piping around the valve	Recheck the operating conditions and remove the source of vibration. (Ref: 2. Safety Instructions)

●Guideline of the inspection cycle: 6 months

Inspection items and inspection methods	Guideline of judgment	Check point	Remedy for malfunctions
Operability of manual handle (touch)	Rotates smoothly	Manual operation unit	Remove the valve from the pipe and replace the valve or actuator. (Ref: 10. How to disassemble/assemble for parts replacement)
Looseness of bolts (visual and palpation)	No Loose	For body + actuator	Retighten the mounting bolts with the following torque. (Ref: 10. How to disassemble/assemble for parts replacement)
		[Flanged end] For flange piping	Retighten the pipe bolts to the specified torque. (Ref: 5. Piping method [Flanged end])
Water-intrusion (visual inspection)	No intrusion	Inside the actuator	Replace the actuator (Ref: 10. How to disassemble/assemble for parts replacement)
Intrusion of foreign matter (visual inspection)	No intrusion	Inside the actuator	Replace the actuator (Ref: 10. How to disassemble/assemble for parts replacement)
Corrosion or rust (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/assemble 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/assemble 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 malfunction and remedy (continued)

Failure phenomenon	Possible cause	Measures and measures
The Allen key does not turn (does not turn) during manual operation.	The valve is already fully open (or fully closed).	Rotate the hex wrench in the reverse direction (Ref.: 8. Commissioning method)
	The power remains supplied in the opposite direction of the handle operation direction.	Turning the power off and then manually operating
	Foreign matter caught in valve	Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 10. How to disassemble/assemble 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 Instructions)
Do not open or close by air operation.	Air is not supplied	Supply air.
	The solenoid valve voltage is different.	Check the voltage with a tester to obtain the correct voltage. (Ref: 4. Product Specifications)
	Solenoid valve voltage is low	Replace the cable or the actuator. (Ref: 10. How to disassemble/assemble for parts replacement)
	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 any foreign matter. (Ref: 10. How to disassemble/assemble 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 malfunction and 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 thermal protector is activated.	Stop using the product immediately, and lower the ambient temperature or the opening/closing frequency.
	The capacitor is burnt out (punctured).	Stop using the product immediately and replace the actuator. (Ref: 10. How to disassemble/assemble for parts replacement)
	Water or foreign matter has entered the actuator causing a short circuit.	Stop using the product immediately and replace the actuator. (Ref: 10. How to disassemble/assemble for parts replacement)
	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/assemble for parts replacement)
	The insulation resistance of the actuator has dropped.	Stop operation immediately, check the insulation resistance, and replace the actuator. (Ref: 10. How to disassemble/assemble 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/assemble 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/assemble 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/assemble 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/assemble for parts replacement)
	Piping stress is applied to the valve.	Remove the piping stress (Ref: 10. How to disassemble/assemble for parts replacement)

Cause of malfunction and remedy (continued)

Failure phenomenon	Possible cause	Measures and measures
Fluid leaks from valve (external leak)	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/assemble for parts replacement)
Actuator is operating but valve is not open or closed	Damaged stem	Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 10. How to disassemble/assemble for parts replacement)
Actuator is corroded	The watch is exposed to 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/assemble for parts replacement)
Valve is corroded or deformed	The watch is exposed to 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/assemble for parts replacement)

13. Disposal method of residual materials and waste materials

Warning	
Forcing	**When burnt, toxic gas is generated.** ▶ When disposing of the product or parts, please dispose of them according to the guidelines of each local authority by a professional disposal company.

Inquiries

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

[User's Manual]

Diaphragm valve Type 14 Pneumatic actuated Type AP
65～100mm

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

Please note that the content of this manual is subject to change without notice. **March 2024**