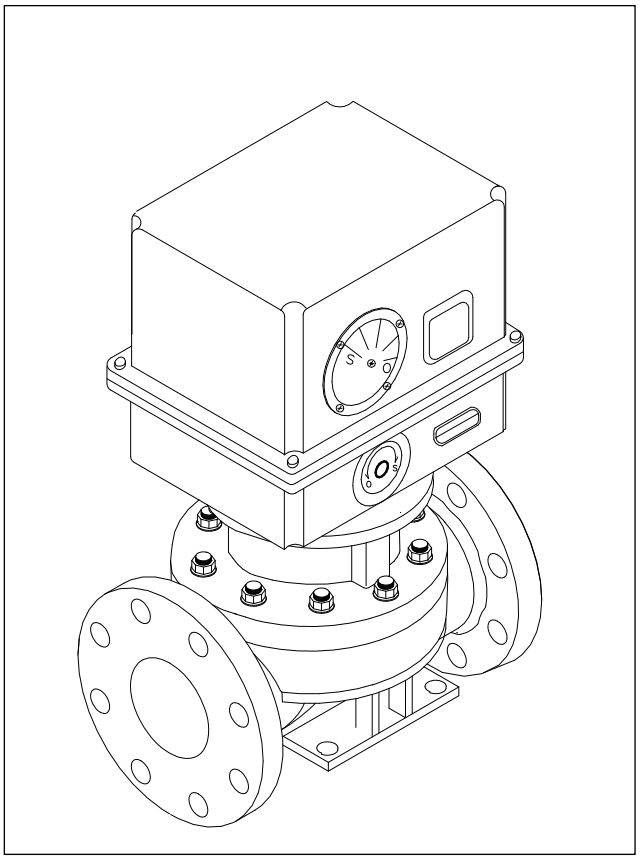
Serial No.	H-A016-E-5

Diaphragm Valve Type 15
Electric Actuated Type H
125, 150mm

User's Manual



Contents

ASAHI *AV* VALVES

This user's guide contains information important to the proper installation, maintenance and safe use of an ASAHI AV Product. Please store this manual in an easily accessible location.

<Warning & Caution Signs>

 Warning	This symbol reminds the user to take caution due to the potential for serious injury or death.
 Caution	This symbol reminds the user to take caution due to the potential for damage to the valve if used in such a manner.

<Prohibited & Mandatory Action Signs>

	Prohibited: When operating the valve, this symbol indicates an action that should not be taken.
	Mandatory action: When operating the valve, this symbol indicates mandatory actions that must be adhered to.

(1) Be sure to read the following warranty clauses of our product

- Always observe the specifications of and the precautions and instructions on using our product.
- We always strive to improve product quality and reliability, but cannot guarantee perfection. Therefore, should you intend to use this product with any equipment or machinery that may pose the risk of serious or even fatal injury, or property damage, ensure an appropriate safety design or take other measures with sufficient consideration given to possible problems. We shall assume no responsibility for any inconvenience stemming from any action on your part without our written consent in the form of specifications or other documented approval.
- The related technical documents, operation manuals, and other documentation prescribe precautions on selecting, constructing, installing, operating, maintaining, and servicing our products. For details, consult with our nearest distributor or agent.
- Our product warranty extends for one and a half years after the product is shipped from our factory or one year after the product is installed, whichever comes first. Any product abnormality that occurs during the warranty period or which is reported to us will be investigated immediately to identify its cause. Should our product be deemed defective, we shall assume the responsibility to repair or replace it free of charge.
- Any repair or replacement needed after the warranty period ends shall be charged to the customer.
- The warranty does not cover the following cases:
  (1) Using our product under any condition not covered by our defined scope of warranty.
  (2) Failure to observe our defined precautions or instructions regarding the construction, installation, handling, maintenance, or servicing of our product.
  (3) Any inconvenience caused by any product other than ours.
  (4) Remodeling or otherwise modifying our product by anyone other than us.
  (5) Using any part of our product for anything other than the intended use of the product.
  (6) Any abnormality that occurs due to a natural disaster, accident, or other incident not stemming from something inside our product.

(2) General operating instructions


Warning

- Do not disassemble or remodel the actuator.

- Keep hands and other extremities away from moving parts under all circumstances. (Any such practice may get your hand, arm, or other part of your body caught.)
- Using a positive-pressure gas with our plastic piping may pose a dangerous condition due to the repellent force particular to compressible fluids even when the gas is under similar pressures used for liquids. Therefore, be sure to take the necessary safety precautions such as covering the piping with protective material. For inquiries, please contact us. For conducting a leak test on newly installed piping, be sure to check for leaks under water pressure. If absolutely necessary to use a gas in testing, please consult your nearest service station beforehand.
- Before using the product, check the operating power supply and the voltage specification on the nameplate. Using a wrong voltage may cause equipment damage or malfunction.
- Before manual operation, ensure that the actuator is not activated by the motor.


Caution

- Do not step on or apply excessive weight on valve. (It can be damaged.)
- Do not use AV valves in a place where they may become submerged in water.
- Do not apply a great impact or vibration to the actuator. (Any such practice may result in breakdown.)
- Do not use the valve in conditions where the fluid may have crystallized. (The valve will not operate properly.)

- Keep the valve away from excessive heat or fire. (It can be damaged, or destroyed.)
- Avoid locations with corrosive gas or otherwise bad atmospheres. Install a cover or something similar that covers the entire area.
- Always operate the valve within the pressure vs. temperature range. (The valve can be damaged or deformed by operating beyond the allowable range.)
- Allow sufficient space for maintenance and inspection.
- Select a valve material that is compatible with the media. For chemical resistance information, refer to “CHEMICAL RESISTANCE ON ASAHI AV VALVE”. (Some chemicals may damage incompatible valve materials.)
- Keep the valve out of direct sunlight, water and dust. Use cover to shield the valve. (The valve will not operate properly.)
- Perform periodic maintenance. (Leakage may develop due to temperature changes or changes with time during prolonged storage, rest, or operation.)
- When installing a valve, provide an appropriate support. (Lack of such a support may cause the valve and piping to be overstrained, resulting in damage or other defect.)
- In the case of malodor, overheating, or smoking, turn off the power supply immediately. (Continued use despite an abnormality present may result in a fire. If you detect any abnormalities, be sure to consult the dealership where you bought the product or our service station nearest your premises and ask them to perform an inspection.)
- For manual operation, be sure to use the handle furnished with the product by the manufacturer.
- When using the product in explosive atmosphere, ensure that the actuator complies with the explosion-proof specifications required for that area.
- Keep the ambient temperature of the installed location within the range -10°C and 50°C.

(3) General instructions for transportation, unpacking and storage

Warning

- When suspending and supporting a valve, take care and do not stand under a suspended valve.

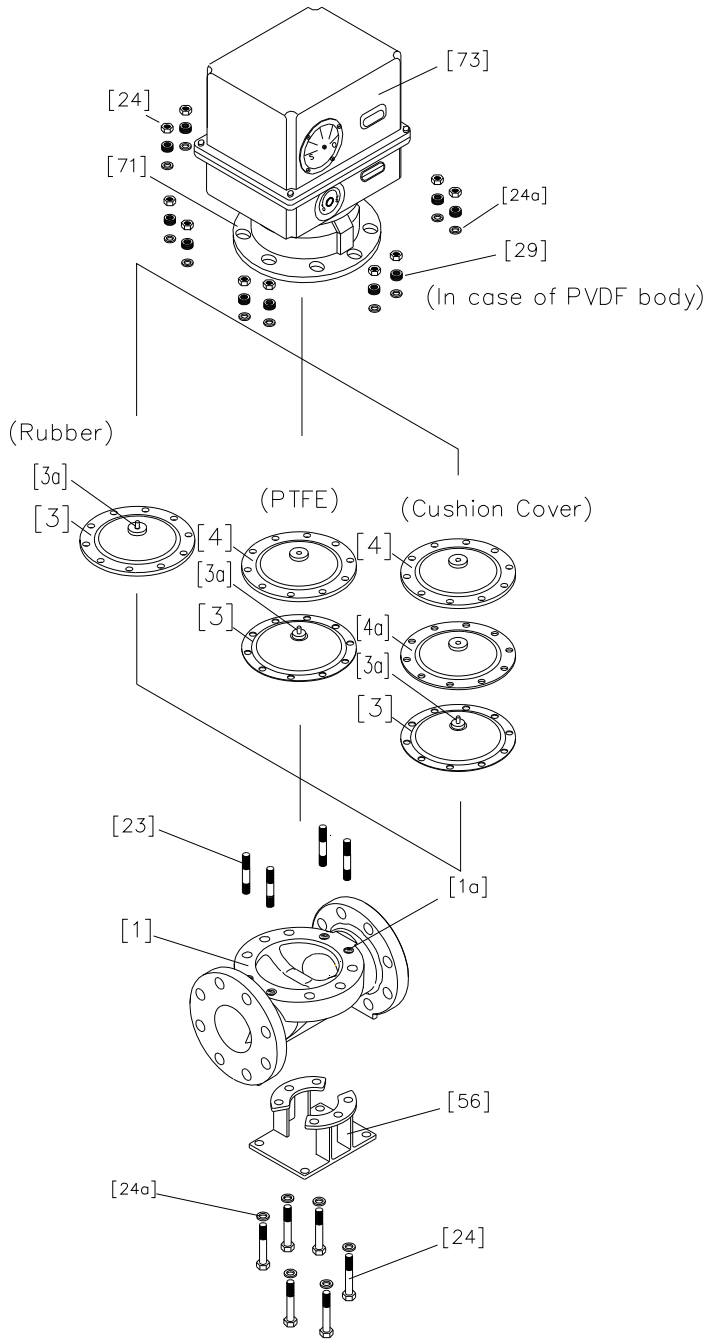
Caution

- This valve is not designed to handle impacts of any kind. Avoid throwing or dropping the valve.
- Avoid scratching the valve with any sharp object.
- Do not over-stack cardboard shipping boxes. Excessively stacked packages may collapse.
- Avoid contact with any coal tar creosote, insecticides, vermicides or paint.
  (The force of swelling may damage the valve.)
- When transporting a valve, do not carry it by the handle.

- Store products in their corrugated cardboard boxes. Avoid exposing products to direct sunlight, and store them indoors (at room temperature). Also avoid storing products in areas with excessive temperatures. (Corrugated cardboard packages become weaker as they become wet with water or other liquid. Take care in storage and handling.)
- After unpacking the products, check that they are defect-free and meet the specifications.

(4) Name of parts

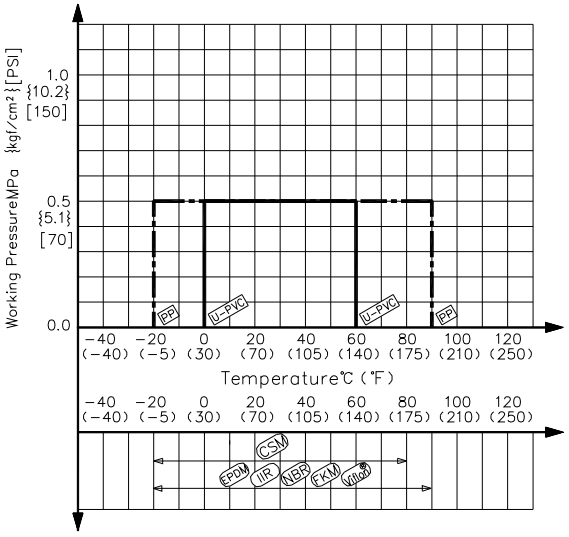
Nominal size 125, 150mm (5", 6")



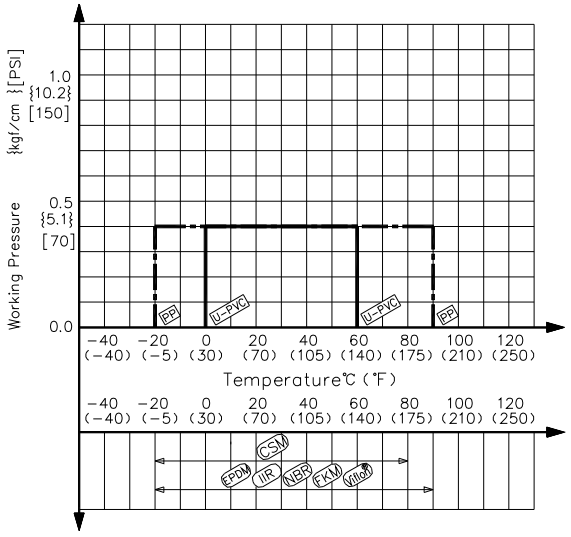
No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
[1]	Body	[5]	Cushion cover	[56]	Stand(A)
[1a]	Inserted nut	[23]	Inserted bolt-nut	[71]	Bonnet(B)
[3]	Diaphragm	[24]	Bolt-nut	[73]	Actuator(motor)
[3a]	Inserted metal of diaphragm(A)	[24a]	Washer		
[4]	Cushion	[29]	Spring washer (In case that the body is PVDF.)		

(5) Working pressure vs. temperature

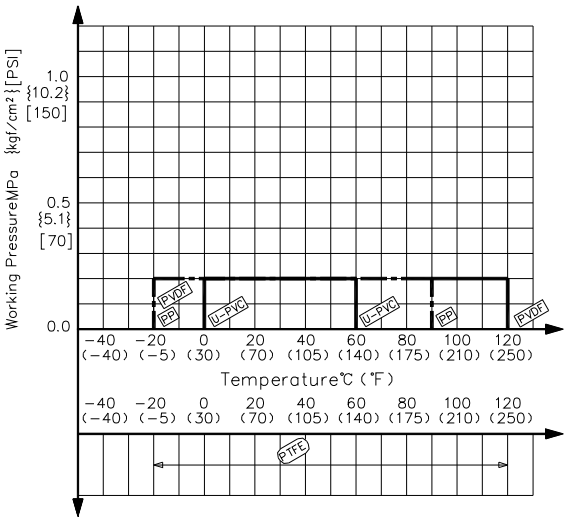
Rubber Nominal size : 125mm



Rubber Nominal size : 150mm



PTFE Nominal size : 125, 150mm

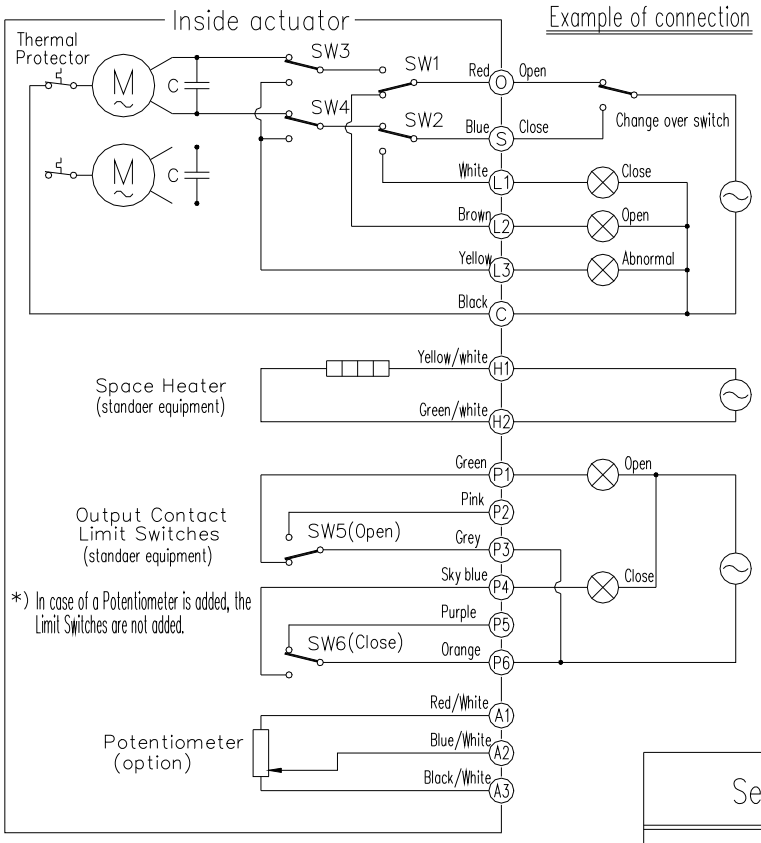


(6) Specifications of actuator

List of Specifications

Adaptive Nominal Size; mm(inch)		125mm (5”)	150mm (6”)
Actuator Type		ED-30H	
Opening and Closing Time (Sec.)	50Hz	48	
	60Hz	40	
protection structure		JIS C 0920 Water proof type	
Motor starting current (A) 50/60Hz	AC200V	5.0 / 4.8	
	AC400V	2.5 / 2.4	
Motor rated current (A) 50/60Hz	AC200V	3.0 / 3.0	
	AC400V	1.5 /1.5	
Number of rotations of manual operating handle		128	
Watt consumption (W) 50/60Hz	AC200V	285	
	AC400V	285	
Nominal diameter of cable connector		4-G3/4	
Motor rated output (W)		140	
By kind of motor insulation		E kind	
Motor rated time (min.)		30	
Capacity of limit switch		AC250V 10A	
Space heater rated output(W)		1kΩ 10W	
Maximum impressed voltage between potentiometers(V)		DC8	

Wiring diaphragm

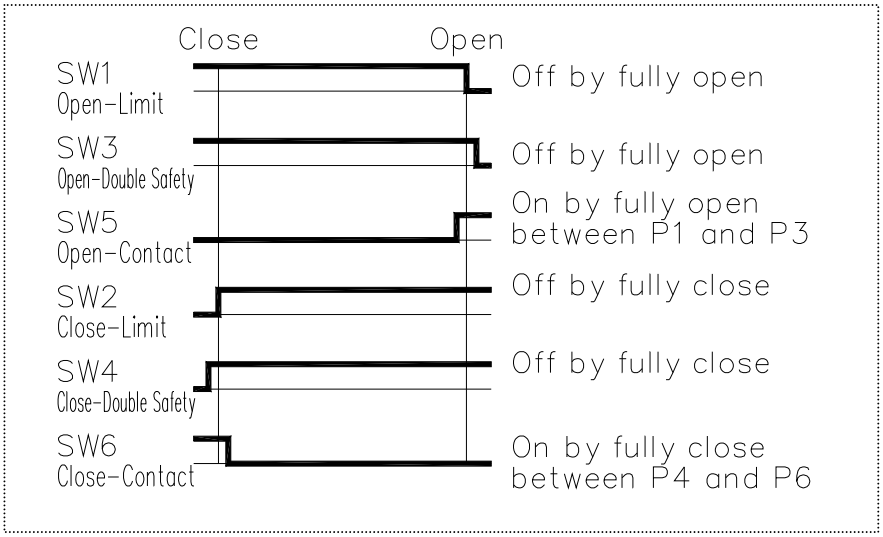


Power Source (Single-phase)	Frequency
☐ AC 100V ☐ AC 110V (Spcialty) ☐ AC 200V ☐ AC 220V (Spcialty)	☐ 50 Hz ☐ 60 Hz

Note: The circuit diagram shows the position that the opening rotation has come to the end of travel.

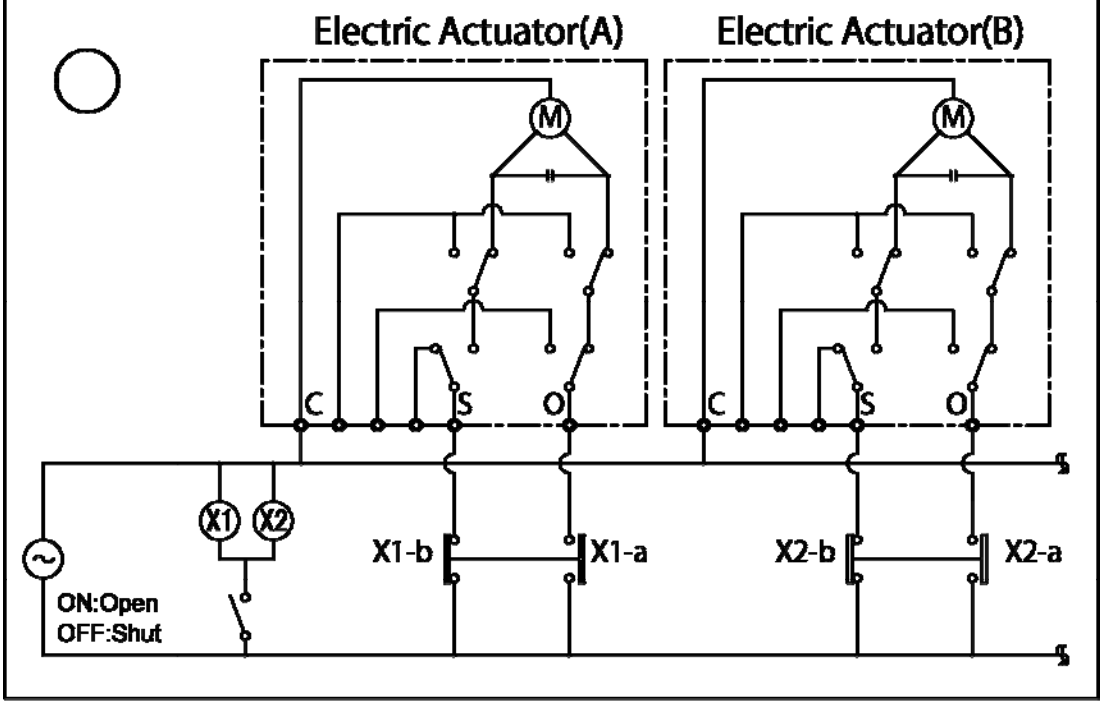
Selection of options	Potentiometer Resistance value
☐ Standard *1) 〈Space Heater , Output Contact Limit Switches〉 ☐ Potentiometer *2) *1) Space Heater and output Contact Limit Switches are set as standard. *2) In case of a Potentiometer is added, the Limit Switches are not added.	☐ 500Ω ☐ 1k Ω ☐ 2kΩ ☐ 5kΩ ☐ 10kΩ

Switching chart

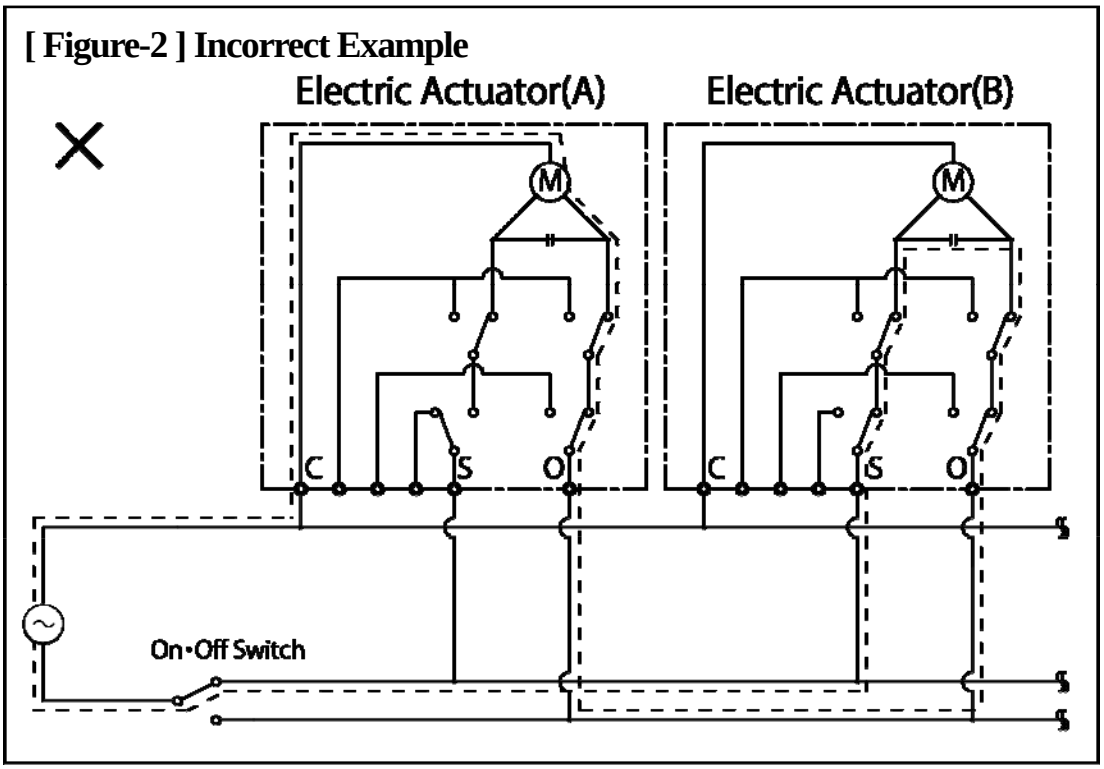


Do not use electrical connections that enable simultaneous operation of multiple electric actuated valves arranged in parallel using one on/off switch (or contact relay) (See Figure-2).
Provide on/off switches (or contact relays) for each valve (See Figure-1).

[Figure-1] Correct Example



[Figure-2] Incorrect Example



(7) Installation procedure

Warning

- When suspending and supporting a valve, take care and do not stand under a suspended valve.

- Be sure to conduct a safety check on all hand and power tools to be used before beginning work.
- Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty. (You may be injured.)
- Do not use the valve to fluid containing slurry. (The valve will not operate properly.)

Caution

- When installing a pipe support by means of a U-band or something similar, take care not to over-tighten. (Excessive force may damage the pipe.)
- When installing pipes and valves, ensure that they are not subjected to tension, compression, bending, impact, or other excessive.
- The installed valve must never be opened or closed when foreign matter such as sand is present in the pipeline.
- Use flat faced flanges for connection to AV Valves.
- Ensure that the mating flanges are of the same standards.
- Be sure to use sealing gaskets (AV Gasket), bolts, nuts, and washers and tighten them to specified torques. (When a non-AV gasket is used, a different tightening torque specification should be followed.)

Necessary items

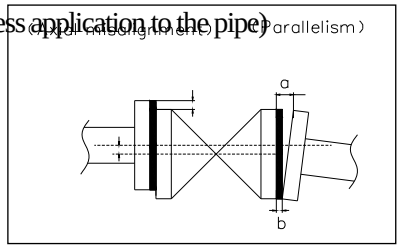
- Torque wrench
- Spanner wrench
- AV gasket
- Bolt, Nut, Washer (For many flanges specification)

Procedure

1) Set the AV gasket between the flanges.
2) Insert washers and bolts from the pipe side, insert washers and nuts from the valve side, then temporarily tighten them by hand.

Caution

- The parallelism and axial misalignment of the flange surface should be under the values shown in the following table to prevent damage the valve.
(A failure to observe them can cause destruction due to stress application to the pipe.)



Unit: mm,(inch)

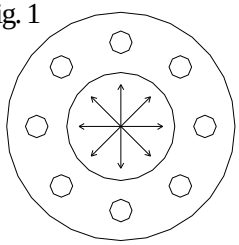
Nom. Size	Axial Misalignment	Parallelism (a-b)
125, 150 mm (5”, 6”)	1.0 (0.04”)	1.0 (0.04”)

3) Tighten the bolts and nuts gradually with a torque wrench to the specified torque level in a diagonal manner. (Refer to fig.1.)

Caution

- Tighten the bolts and nuts gradually with a torque wrench to the specified torque level in a diagonal manner.
  * Avoid excessive tightening. (The valve can be damaged.)

Fig. 1



Recommended torque value Unit: N·m{kgf·cm}[lb·inch]

Nom. Size	125 mm (5")	150 mm (6")
Torque value	40.0 {408} [355]	45.0 {459} [400]

(8) Support setting procedure

Caution

- Set valve support on the valve.
- When installing a pipe support by means of a U-band or something similar, take care not to fasten it too much. (Excessive tension may damage it.)

Necessary items

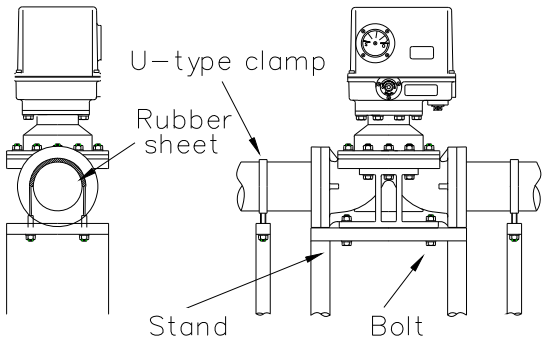
- Spanner wrench
- U-type clamp (with bolt)
- Rubber sheet

* Do not subject valve pump vibrations. (The valve may be damaged.)

Level installation

Fix the valve stand [56] and the support stand with bolts.

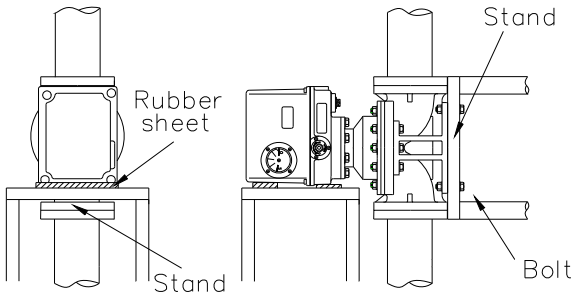
Spread the rubber sheet on the pipe and secure pipe with U-type clamp.



Perpendicular installation

Fix the valve stand [56] and the support stand with bolts.

Spread the rubber sheet under the actuator, and support with the support stand.



(9) Electric wiring procedure

Warning

- Do not touch any parts on actuator circuit board or terminal clock or connect or disconnect wires while the actuator is energized. (Any such practice may result in an electric shock or equipment damage.)
- Keep hands and other extremities away from moving parts under all circumstances. (Any such practice may get your hand, arm, or other part of your body caught.)
- Be sure to establish a ground. (A defective ground may result in an electrical shock, fire, or other incident.)
- At the time of adjustment or inspection, ensure that your hands are free of water and oil. (Any such substance on your hands may result in an electric shock or equipment damage.)
- Do not operate the manual override while the actuator is energized.

Caution

- Do not exceed the rated capacity of limit switch contacts. If you wish to apply very small loads (1-100 mA, 5-30 V), consult our service station nearest to you.
- Do not connect two or more motor-driven valves in series. Also, install a switch (or a relay contact) for each motor-driven valve.
- Do not use the product near high-voltage wire, inverter, or any other equipment that produces electrical noise or magnetism. (The presence of such nearby may cause malfunction or breakdown.)
- Check the integrity of wiring insulation before connecting to the actuator. (Failure to observe this precaution may result in wire damage.)
- Ensure all covers are tightly fastened prior to operation. (Insufficient fastening may allow rainwater, dust, or dirt to come in, resulting in breakdown.)
- When connecting wires, be sure to observe the connection diagram and make the connections correctly. Moreover, after wiring, ensure that the connections are securely made before turning on the power. (Failure to take this precaution may cause malfunction or breakdown.)
- Each cover part is sealed with an O-ring. When laying wiring or in similar cases, where the cover is removed and replaced, ensure that the O-ring is installed in the specified location and securely sealed. (Insufficient sealing may cause the actuator to be penetrated by rainwater or other foreign matter, resulting in electric shock or breakdown.)
- If you wish to use the product outdoors or in any other location exposed to rainwater or other forms of moisture, protect the wiring conduit of the actuator against ingress of rainwater and all other wetness. (Failure to take such a precaution may cause the actuator to be penetrated by rainwater or something similar, resulting in electric shock or breakdown.)
- In the case of malodor, overheating, or smoking, turn off the power supply immediately. (Continued use despite an abnormality present may result in a fire. If you detect any abnormalities, be sure to consult the dealership where you bought the product or our service station nearest your premises and ask them to perform an inspection.)

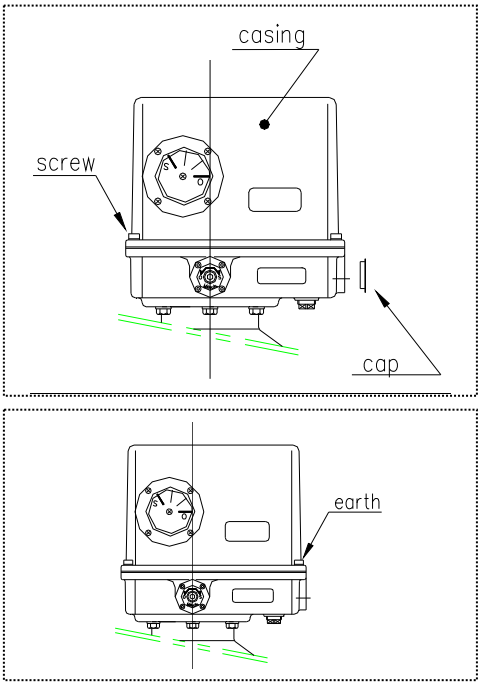
Necessary items

- Screwdriver (+)
- Crimp-style terminal
- Terminal crimping tool
- Wire stripper
- Connector
- Allen wrench (6mm)

* Check supply voltage indicated on the actuator and make sure it is the same as the voltage applied, before completing the wiring.
(Wiring at different voltages will cause problems in the AV valve.)

Procedure

1) Loosen the four screws with an Allen wrench and remove the cover from the actuator.
2) Remove the plug of cable entrance with a spanner wrench.
3) Install the connector into the cable entrance.
4) Draw a cable through the connector.
5) Strip the cable with a wire stripper.
6) Install a Crimp-style terminal on the lead wire with a terminal crimping tool.
7) Connect the terminal board with a screwdriver in accordance page 7.
   *Tighten the screws. (Short circuit or shocks may occur.)
8) Tighten the connector.
   (Short circuit or shocks may occur.)
9) Tighten above four screws with a screwdriver to fix and install the cover of the actuator.
10) Connect the earth wire to a good ground.



(10) Operating procedure

Warning

- Do not touch any parts on actuator circuit board or terminal block or connect or disconnect wires while the actuator is energized. (Any such practice may result in an electric shock or equipment damage.)
- Keep hands and other extremities away from moving parts under all circumstances.
  (Any such practice may get your hand, arm, or other part of your body caught.)
- Be sure to establish a ground. (A defective ground may result in an electrical shock, fire, or other incident.)
- At the time of adjustment or inspection, ensure that your hands are free of water and oil.
  (Any such substance on your hands may result in an electric shock or equipment damage.)
- Before manual operation, ensure that the actuator is not activated by the motor.

Caution

- Do not connect two or more motor-driven valves in series. Also, install a switch (or a relay contact) for each motor-driven valve.
- Do not use the product near a high-voltage wire, inverter or other equipment that produces electrical noise or magnetism. (The presence of such nearby may cause malfunction or breakdown.)
- Check the integrity of wiring insulation before connecting to the actuator.
  (Failure to observe this precaution may result in wire damage.)
- Ensure all covers are tightly fastened prior to operation.
  (Insufficient fastening may allow rainwater, dust, or dirt to come in, resulting in breakdown.)
- When connecting wires, be sure to observe the connection diagram and make the connections correctly. Moreover, after wiring, ensure that the connections are securely made before turning on the power.
  (Failure to take this precaution may cause malfunction or breakdown.)

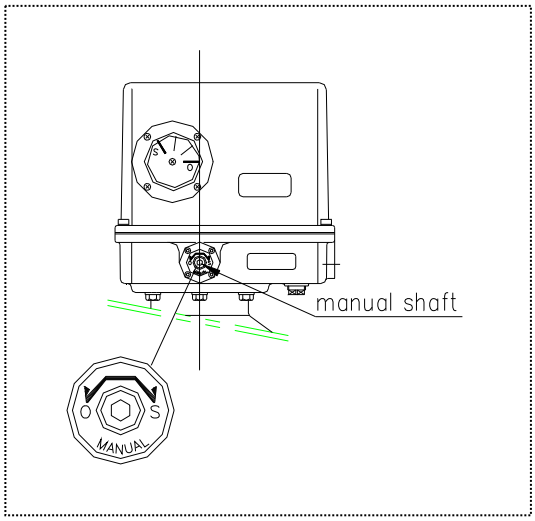
Manual Operating Procedure

Caution - Turn off the power source.
(If the power source is turned on during the manual operation, you may be injured.)

Necessary items
- Allen wrench (6mm) or lever handle (option)

Procedure

1) Insert an Allen wrench or the manual handle (Option) in the hexagon hole of the manual operation shaft on the actuator.
2) Turn the manual handle while watching the valve travel indicator.
   Right turn (clock wise) → Shut direction
   Left turn (counter clock wise) → Open direction
   * Do not turn the handle forcibly at the right and left full operating positions.
   (Trouble will develop.)
3) In the state of the full open or shut, remove the Allen wrench or the manual handle (Option) from the operation shaft.



Motor-Driven Operating Procedure

Caution - Do not leave the terminal board cover and the limit switch cover as they are removed from the actuator.
(Coming into contact with a terminal in this state can give you an electric shock.)
Check to ensure that the hexagon or the manual handle is not applied to the end of the manual operation shaft. (If not, the Allen wrench will be flown by the rotation of the manual operation shaft, and injury may occur)

Procedure

1) Turn on the power source.
2) Set the external switch to “Open” or “Shut”, and check to ensure that the valve indicating direction and the operating direction agree with each other.
3) Turn off the power source in the state of full open or shut.

(11) Disassembling method for replacing parts

Warning
- Do not disassemble or remodel the actuator.
- Do not touch any parts on actuator circuit board or terminal clock or connect or disconnect wires while the actuator is energized. (Any such practice may result in an electric shock or equipment damage.)
- Do not change or replace valve parts under line pressure.
- Be sure to conduct a safety check on all hand and power tools to be used before beginning work.
- Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty. (You may be injured.)

Caution
- Fasten the cover in each cover-equipped part. (Insufficient fastening may allow rainwater, dust, or dirt to come in, resulting in breakdown.)
- The actuator has been adjusted at the factory. If reconfiguration or adjustment is needed, do so correctly according to the relevant operation manual. (Failure to observe this instruction may cause malfunction or breakdown.)
- Each cover part is sealed with an O-ring. When laying wiring or in similar cases, where the cover is removed and replaced, ensure that the O-ring is installed in the specified location and securely sealed. (Insufficient sealing may cause the actuator to be penetrated by rainwater or other foreign matter, resulting in electric shock or breakdown.)

Necessary items
- Spanner wrench
- Allen wrench(6mm) or lever handle (option)
- Protective gloves
- Safety goggles

<Disassembly>

Procedure

1) Completely discharge fluid from pipes.
2) Fully shut the valve by the motor-driven operation or manual operation.
3) Turn off the power source.
4) Loosen the bolt-nut [24] and remove it.
5) Lift the actuator [73] up and remove it.
6) Turn the diaphragm [3] left (counter clockwise) and remove it.

<Assembly>

Procedure

Shape the diaphragm [3] into (fig.1).

1) Turn the diaphragm [3] right (clockwise) to install.
2) Shape the diaphragm [3] into (fig.2). (In case that the diaphragm is PTFE.)
3) Insert an Allen wrench or the manual handle (option) in the hexagon hole of the manual operation shaft on the actuator [73].
4) Turn the Allen wrench or the manual handle (option) left (count clockwise) to open the valve fully, while watching the valve travel indicator.
5) Install the actuator [73] on the body [1].
6) Set the Blot-nut [24] and tighten the body [1] and the bonnet [71]. (As to the body tightening torque, refer to Table 1.)

Fig.1

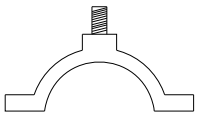


Fig.2

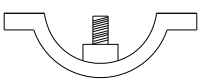


Table 1. Body tightening torque value Unit: N·m{kgf·cm}

Diaphragm material \ Nom. Size	125 mm (5”)	150 mm (6”)
Rubber	20.0{204}	25.0{255}
PTFE	22.0{224}	25.0{255}

(12) Adjustment limit switch

Warning - Shut down the power on the equipment before connecting wires. There are risks of electrical shock depending on the level of operating voltage.

Caution - Be sure that the cover is put on during operation.

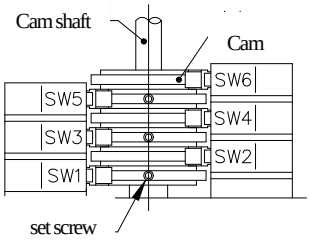
- If you plan to operate limit switches at 1mA-100mA or 5-30V, consult your nearest Asahi dealer.

Necessary items

- Allen wrench (6mm) or lever handle (option)
- Screwdriver (+)
- Allen wrench (1.5mm) (for set screw of cam)

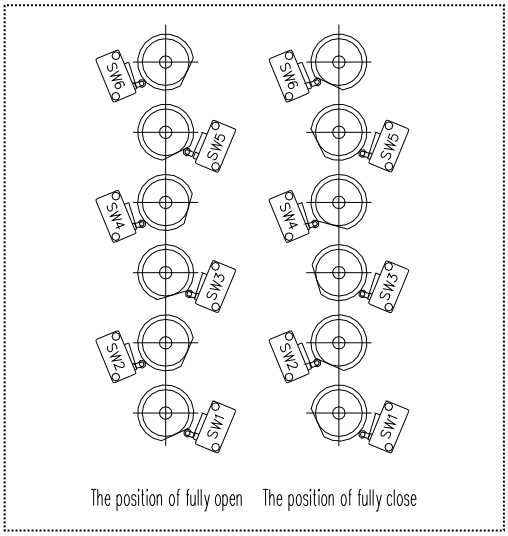
Procedure

1) Turn off the power source.
2) Completely discharge fluid from pipes.
3) Loosen screws with an Allen wrench, and remove the cover of the actuator.
4) Manually operate (refer to page 11) the valve at the valve travel (open or close) adjusted with a spanner wrench.
5) Loosen the set screw of cam with a hexagon wrench.
6) Slowly transfer fully open or close side cam with an Allen wrench in the direction where this cam should be adjusted.
7) Check to ensure that the limit switch works.
8) Tighten the set screw to fix cam by hand.
9) Check to see whether the valve travel is adjusted by manual operation. (Refer to page 11)
10) When the valve travel is not adjusted, repeat items 4) to 7).
    * Adjust Close or Open side safety limit switch so that the manual operation can be operated one turn slower than the operation position of Closing or Opening limit switch.
    (The valve may be damaged or operated improperly.)
11) Remove the Allen wrench or the manual handle (option) from the manual operation shaft.
12) Tighten the screws of the cover with an Allen wrench.
13) Fully open or close the valve by motor-driven operation. (Refer to page 11)



SW6: Closing no-volt limit switch
SW5: Opening no-volt limit switch
SW4: Close side safety limit switch
SW3: Open side safety limit switch
SW2: Closing limit switch
SW1: Opening limit switch

14) Check to ensure that travel indicator shows correct position of fully open or close.
*When the travel indicator shows incorrect position, loosen and remove the cover of the actuator with an Allen wrench, and loosen the travel indicator with a screwdriver (+) to indicate the full open position or the full closed position, then repeat 10) to 12)



(13) Inspection items

Caution - Perform periodic maintenance. (Leakage may develop due to temperature changes or over periods of prolonged storage, rest or operation.)

Portion to be inspected	Inspection item
Actuator	- Existence of rust, peeling of paint, and dirt of inspection hole of valve travel indicator. - Tightening condition of respective threaded portions. (Loose or not) - Existence of rust and corrosion around the limit switch, and existence of internal disconnection. - Existence of rust and corrosion of terminal board, and existence of disconnection. - Existence of abnormality in opening and closing operating sounds. *It is unnecessary to supply oil to this actuator.
Valve	- Existence of scratches, cracks, deformation, and discoloring. - Existence of leakage from the valve to the outside. - Existence of leakage when the valve is closed fully at right or left. - Tightening condition of bolt (A) (loose or not.)

(14) Troubleshooting

Problem	Cause	Treatment
The handle is not (can't be) turned when the valve is operated manually.	The valve has already been opened (closed) fully.	Turn the handle in the reverse direction.
	The valve is kept under power in the direction reverse to the handle operating direction.	Turn off the power source.
	Foreign matter is in the valve.	Disassemble the valve to remove foreign matter. (Refer to page 13)
The valve does not operate by motor-driven operations	The power source of the control panel is turned off.	Turn on the power source.
	The actuator is disconnected.	Check the connection again. (Refer to page 7)
	Open and close are power simultaneously.	
Fluid leaks from the valve even when the valve is closed fully.	The diaphragm is worn.	Replace the diaphragm with a new one. (Refer to page 13)
	The diaphragm or the body is scratched.	Replace scratched parts with new ones. (Refer to page 13)
	There is foreign matter between the diaphragm and the body.	Disassemble valve to remove foreign matter. (Refer to page 13)
	The voltage is low.	Check the voltage.
Fluid leaks from the valve.	The bolt between the body and actuator is loose.	Tighten the bolt to the specified torque. (Refer to page 13)
The actuator operates, but the valve does not open or close.	The diaphragm or the body is scratched.	Replace scratched parts with new one. (Refer to page 13)
	There is foreign matter between the diaphragm and the body.	Disassemble valve to remove foreign matter. (Refer to page 13)
	The diaphragm or the joint metal fitting is broken.	Replace broken parts. (Refer to page 13)

(15)Handling of residual and waste materials

- Make sure to consult a waste treatment dealer for recommendations on the proper disposal of plastic valves. (Poisonous gas is generated when the valve is burned improperly.)

Diaphragm Valve Type 15
Electric Actuated Type H

[Automatic Valve]

ASAHI *AV* VALVES

Distributor

Asahi Organic Chemicals Industry's homepage http://www.asahi-yukizai.co.jp/en/

Information in this manual is subject to change without notice. 2014.10