Serial No.	H-A039-E-9

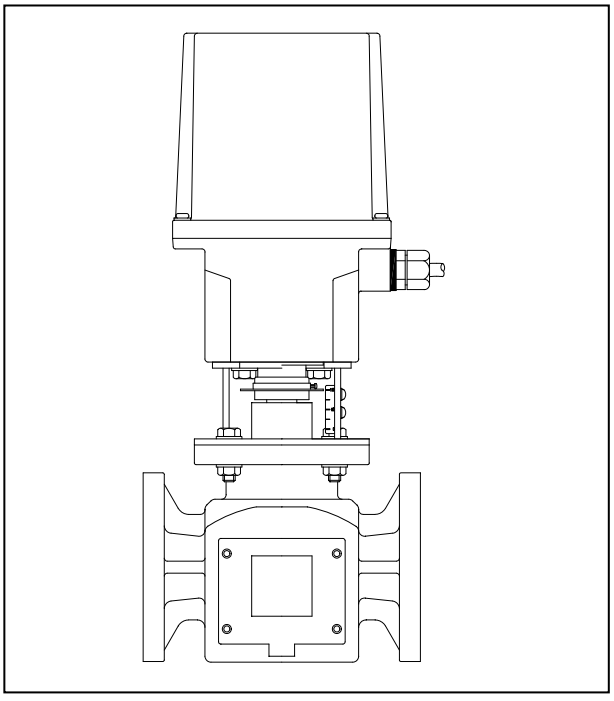
Control Valves

Electric Actuated Type M

Nominal Size: 15, 25mm (1/2", 1")
Body Material: U-PVC, PVDF

Nominal Size: 50, 80, 100mm (2", 3", 4")
Body Material: U-PVC

User's Manual



Contents

ASAHI YUKIZAI CORPORATION

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 an improper voltage may cause equipment damage or malfunction.

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.)
- While in operation, the actuator may rise in surface temperature. This is due to heat-up of the inner equipment and is not a sign of a breakdown. However, exceeding the permissible temperature may cause a breakdown.

- 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 regular maintenance. (Leakage may develop due to temperature changes or periods of 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.)
- 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 -5 °C and 55 °C.

(3) General instructions for transportation, unpacking and storage

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

- 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.

Other Remarks

Nominal Size: 15, 25mm (1/2", 1")

1) Wiring

As for AC100V, wiring up a cable for positioner and a cable for power supply in a pipe together and in case that the cable for power supply is longer than 1.5m, which is the original size, it may not be operated properly because of the induction. Use a shield wire for the cable of positioner or wire it up in another pipe to protect from induction.
As for DC24V, if the cable of power supply is longer, wire it up as the same procedure as above.

2) Rock Protective Circuit

The rock protective circuit stops supplying to the motor in 5 seconds when adjusted or overloaded due to foreign matter.
Turn off the power supply or input signals 4mA and 20mA alternately to reset it.
When the rock stops repeatedly, overload can be considerable because of foreign matter in the valve for the reason. Check the valve and remove the foreign matter.

3) Electric Limiter

An electric limiter is in the valve, which protect rocking when the input signal becomes 4mA or less, or 20mA or more. Thus, the valve stops closing at the point, 3.8mA even when the input signal is decreased to 3.8mA or less and stops opening at the point, 20.2mA even when the input signal is increased to 20.2mA or more.

4) Timer Function

DC motor is used in the actuator. When DC motor starts or stops, the current becomes 3~5 times as much as the rated current. Thus, the motor, which opens and closes frequently, is heated and the brush becomes worn. The timer function in the actuator gives the motor intervals (about 0.5~3 seconds which is changeable) between it stops and starts again to prevent the motor from being heated.

5) Protective Fuse

The fuse function protects from the hunting and repeating the rock. The resistance value is 1-1.5Ω.

6) Installation Places

- Indoors or outdoor that has no direct sunlight, with the atmosphere temperature of -5 - +55℃.
- The place where the humidity is 90%RH or less and the dew won't be congealed.

Nominal Size: 50, 80, 100mm

1) Error Detection

When the position signal is deviated from the input signal but the output stem is stuck due to overload or certain malfunction, the PSN repeats starting the motor at the maximum torque for several times. If the stem is still stuck after that, the PSN outputs an alarm signal (LED turned ON) and stops power supply to the motor.
In order to reset the PSN, apply several times 0% and 100% input signals in turn, or turn off and on the power supply.
In case the alarm is off frequently, check for foreign obstacles in the valve, inappropriate adjustments, or re-tightened gland packing or other possible causes of the overload.

2) Electric Limiter

An electric limiter is in the valve, which protect rocking when the input signal becomes 4mA or less, or 20mA or more. Thus, the valve stops closing at the point, 3.8mA even when the input signal is decreased to 3.8mA or less and stops opening at the point, 20.2mA even when the input signal is increased to 20.2mA or more.

3) Timer Function

This unit is equipped with a timer protecting from the motor from overheating. The timer prevents the motor from restarting for a certain interval once the motor has been stopped within dead band.
When the high temperature protection is activated in a high temperature ambient, adjust the timer to a long interval.

4) Protective Fuse

A fuse is incorporated for protection against over current in the control PCB and motor.
If the power LED does not turn on with the power supplied to the actuator, check the fuse status.
If a replaced fuse is blown quickly, it is possible that the control PCB and/or motor are damaged. Consult near Asahi dealer.

5) Installation Places

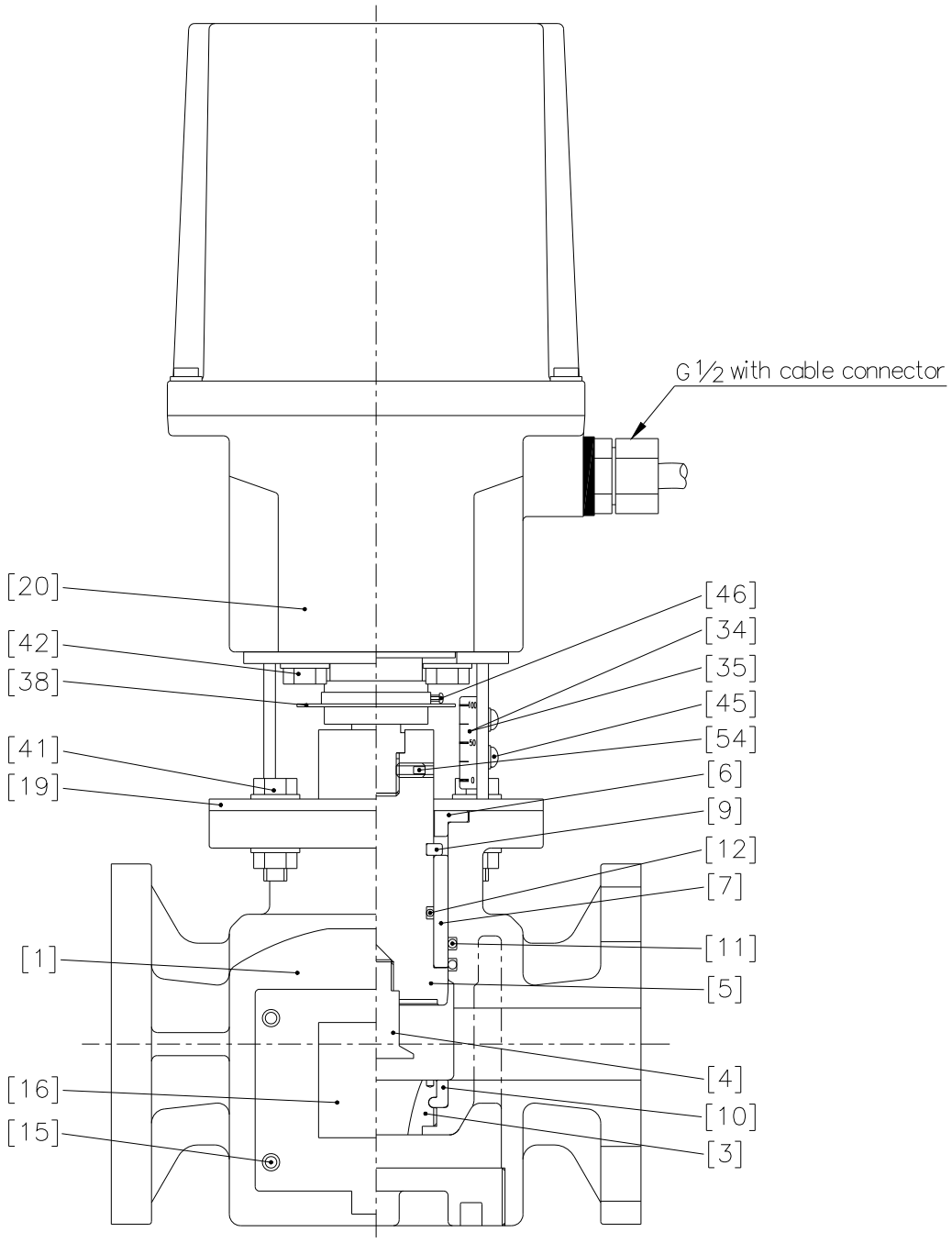
- Indoors or outdoor that has no direct sunlight, with the atmosphere temperature of -5 - +55℃.
- The place where the humidity is 90%RH or less and the dew won't be congealed.

6) Wiring

Do not install signal wires and power supply wires together in a pipe because it may cause a malfunction due to inductive noises. If they must be installed together, use shielded cables.

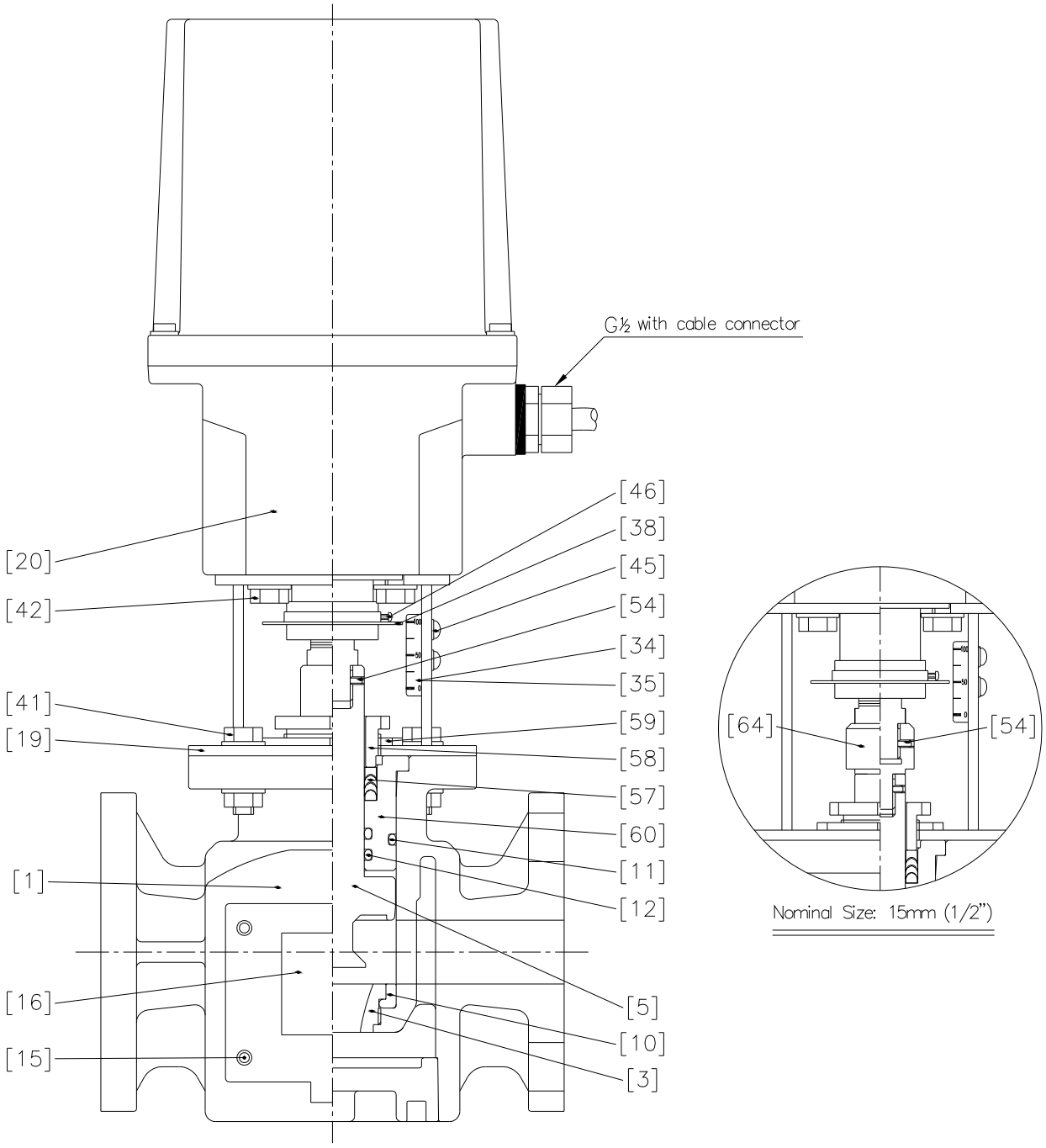
(4) Name of parts

Nominal size 15, 25mm (1/2", 1") / Body Material: U-PVC



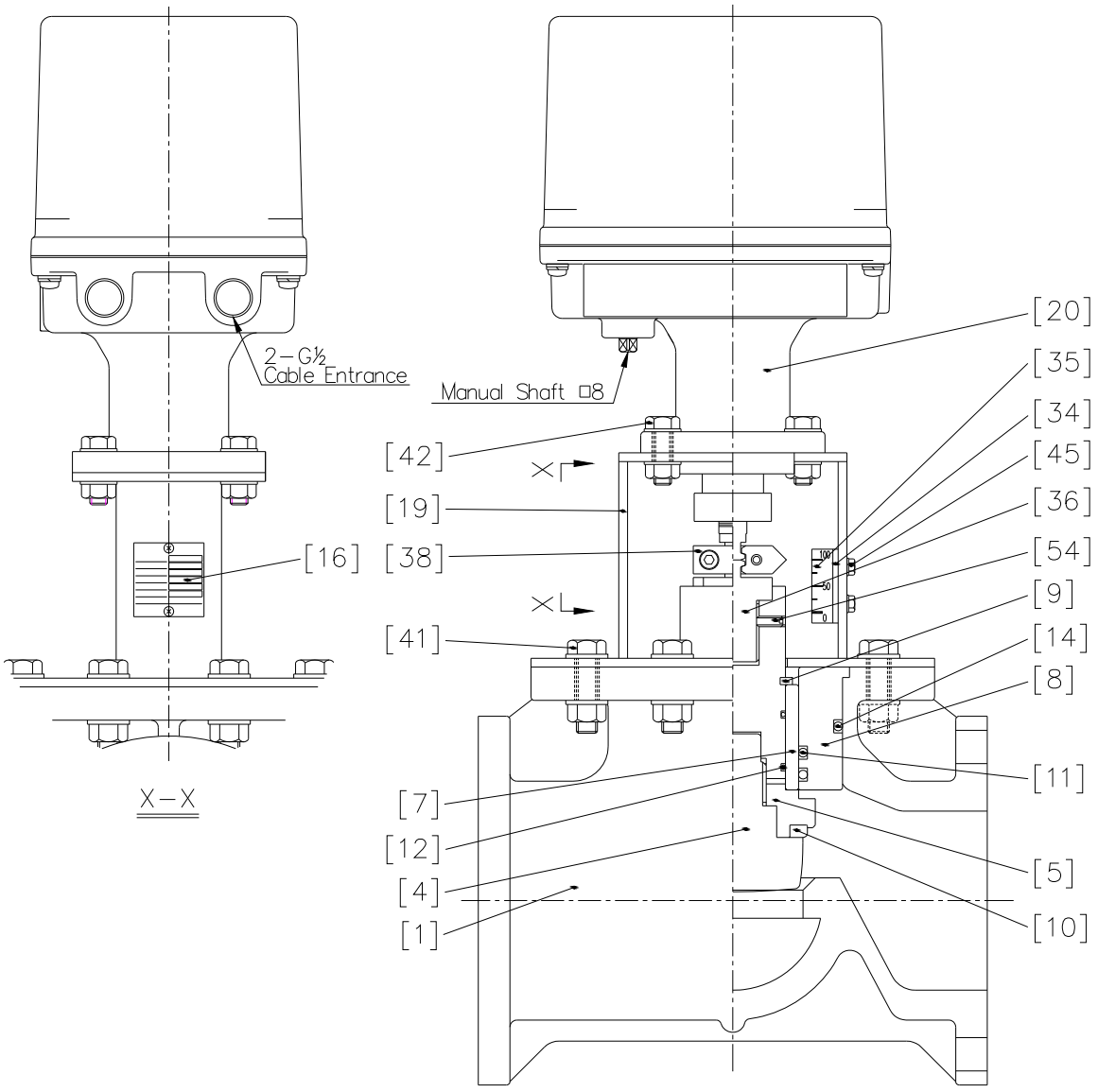
No.	Description	No.	Description	No.	Description
[1]	Body	[11]	O-ring (A)	[38]	Indicator
[3]	Orifice	[12]	O-ring (B)	[41]	Bolt･Nut (A)
[4]	Plug	[15]	Helically Coiled Inserts	[42]	Bolt (A)
[5]	Piston (A)	[16]	Name Plate	[45]	Bolt･Nut (E)
[6]	Piston Holder	[19]	Stand	[46]	Screw (A)
[7]	Bush	[20]	Actuator	[54]	Screw (B)
[9]	Stop Ring	[34]	Indicator Plate		
[10]	Seat	[35]	Indicator Seal		

Nominal Size: 15, 25mm (1/2", 1") / Body Material: PVDF



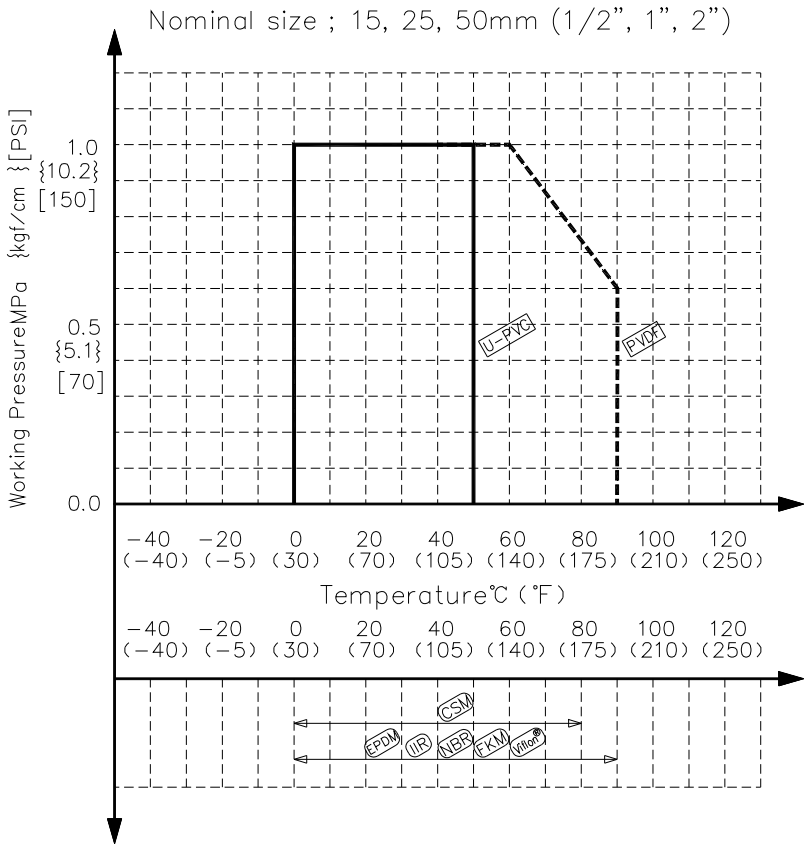
No.	Description	No.	Description	No.	Description
[1]	Body	[19]	Stand	[46]	Screw (A)
[3]	Orifice	[20]	Actuator	[54]	Screw (B)
[5]	Piston (A)	[34]	Indicator Plate	[57]	V-Packing
[10]	Seat	[35]	Indicator Seal	[58]	Packing Holder
[11]	O-ring (A)	[38]	Indicator	[59]	Stopper (A)
[12]	O-ring (B)	[41]	Bolt･Nut (A)	[60]	Piston Guide
[15]	Helically Coiled Inserts	[42]	Bolt (A)	[64]	Joint
[16]	Name Plate	[45]	Bolt･Nut (E)		

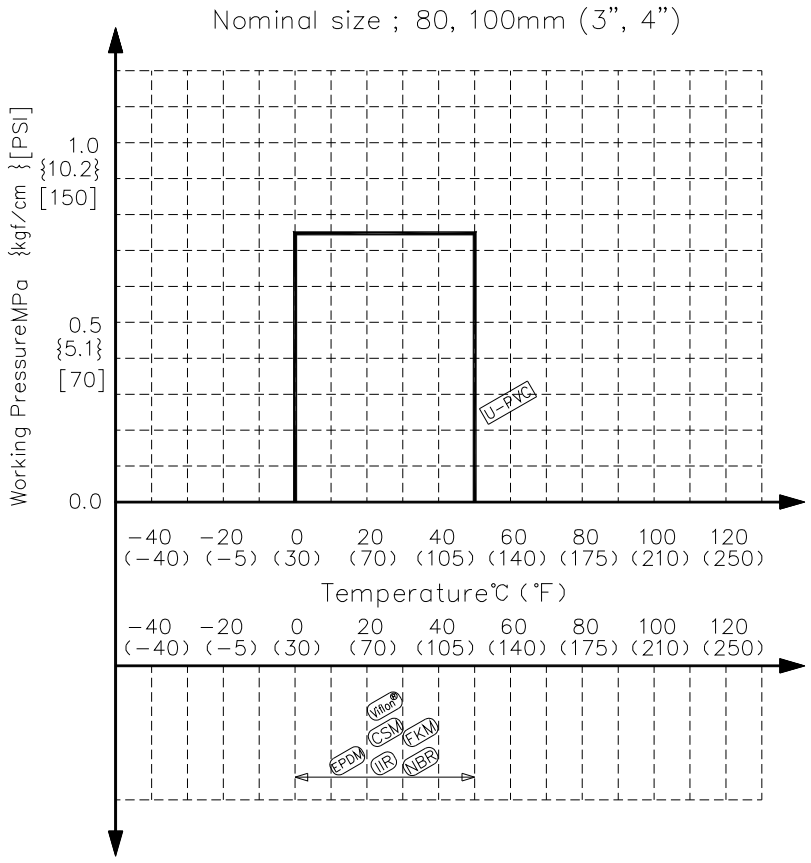
Nominal size; 50, 80, 100mm (2”, 3”, 4”) / Body Material: U-PVC



No.	Description	No.	Description	No.	Description
[1]	Body	[11]	O-Ring (A)	[35]	Indicator Seal
[4]	Plug	[12]	O-Ring (B)	[36]	Coupling
[5]	Piston (A)	[14]	O-Ring (D)	[38]	Indicator
[7]	Bush	[16]	Name Plate	[41]	Bolt･Nut (A)
[8]	Bush Guide	[19]	Stand	[42]	Bolt･Nut (B)
[9]	Stop Ring	[20]	Actuator	[45]	Bolt･Nut (E)
[10]	Seat	[34]	Indicator Plate	[54]	Screw (B)

(5) Working pressure vs. temperature





(6) Specification of valve

Nom. Size	15mm (1/2")	25mm (1")	50mm (2")	80mm (3")	100mm (4")
Type	Single seated control valve electric actuated type				
Type of connection	Flange type JIS B 2238 (JIS10K)				
Kind	Standard control type Minute control type	Standard control type			
Shut off pressure (MPa{kgf/cm^2})	7				
Flow characteristic	Equal % or linear		Equal %		
Inherent range ability	Standard control type 50:1 Minute control type 50:1	50:1			

The principle of the actuator action

The control plate of the actuator operates the motor when the operation signal and the signal from the sensor are given. When the signal for closing the valve fully (the operation signal DC4mA) is input, the actuator pushes the seal spring even after the valve is closed fully and stops at the seal pressure.

(7) Specification of actuator

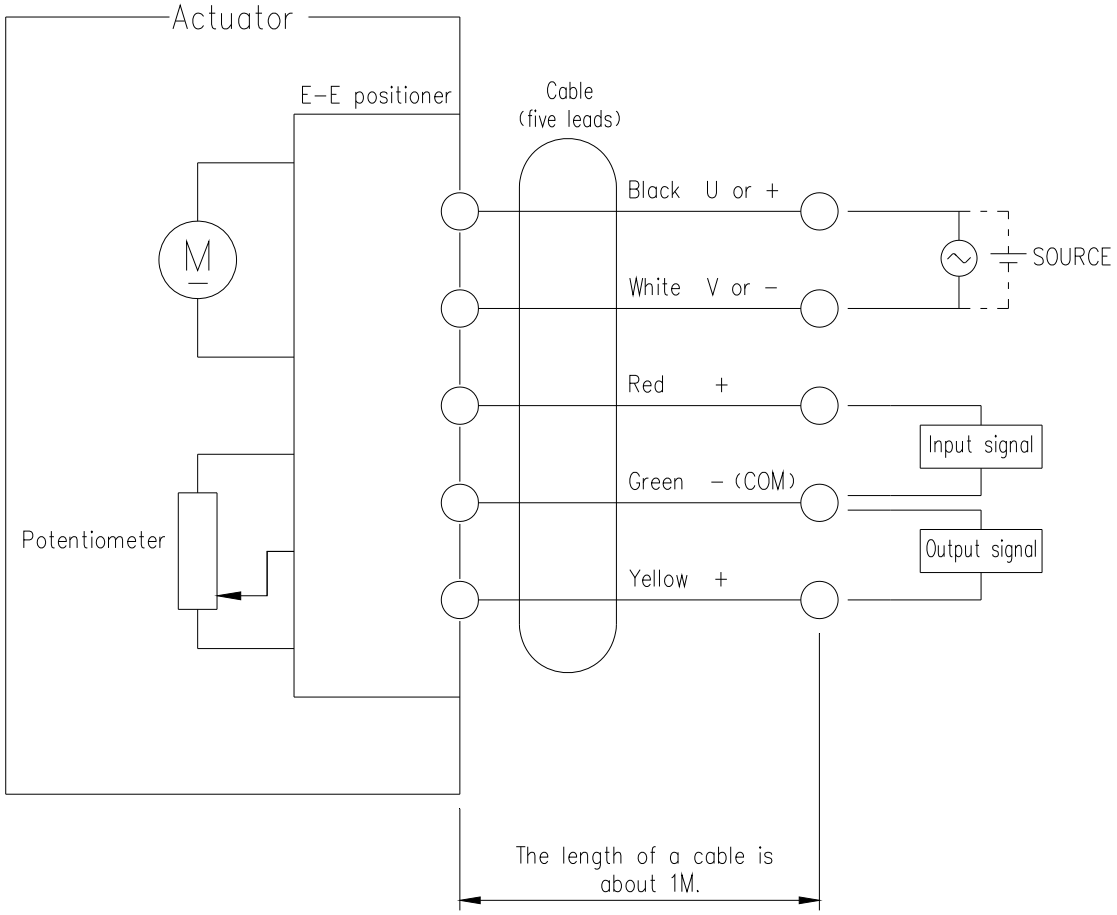
List of Specifications

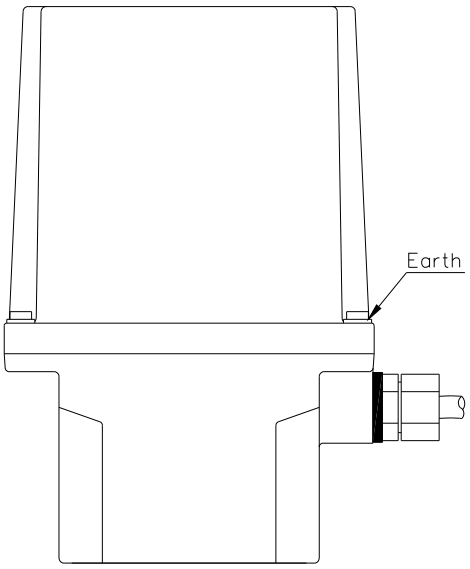
Adaptive Nominal Size (mm)		15mm (1/2")	25mm (1")	50mm (2")	80mm (3")	100mm (4")
Actuator Type		MSP-6		PSN1		PSN3
Opening and Closing Time (Sec.)		10 - 35		18 - 21	20 - 22	28 - 32
protection structure		Outdoor water proof type (IP55)				
Power Consumption	AC 100 - 120V	Approx. 25VA		Approx. 240VA		
	AC 200 - 240V	Approx. 25VA		Approx. 240VA		
	DC 24V±10%	Approx. 0.6A		Approx. 3A		
Nominal diameter of cable connector		G1/2		G1/2 x 2		
By kind of motor insulation		E kind				
Motor rated time (min.)		continuation				

Wiring diagram

Nominal size 15, 25mm (1/2”-1”)

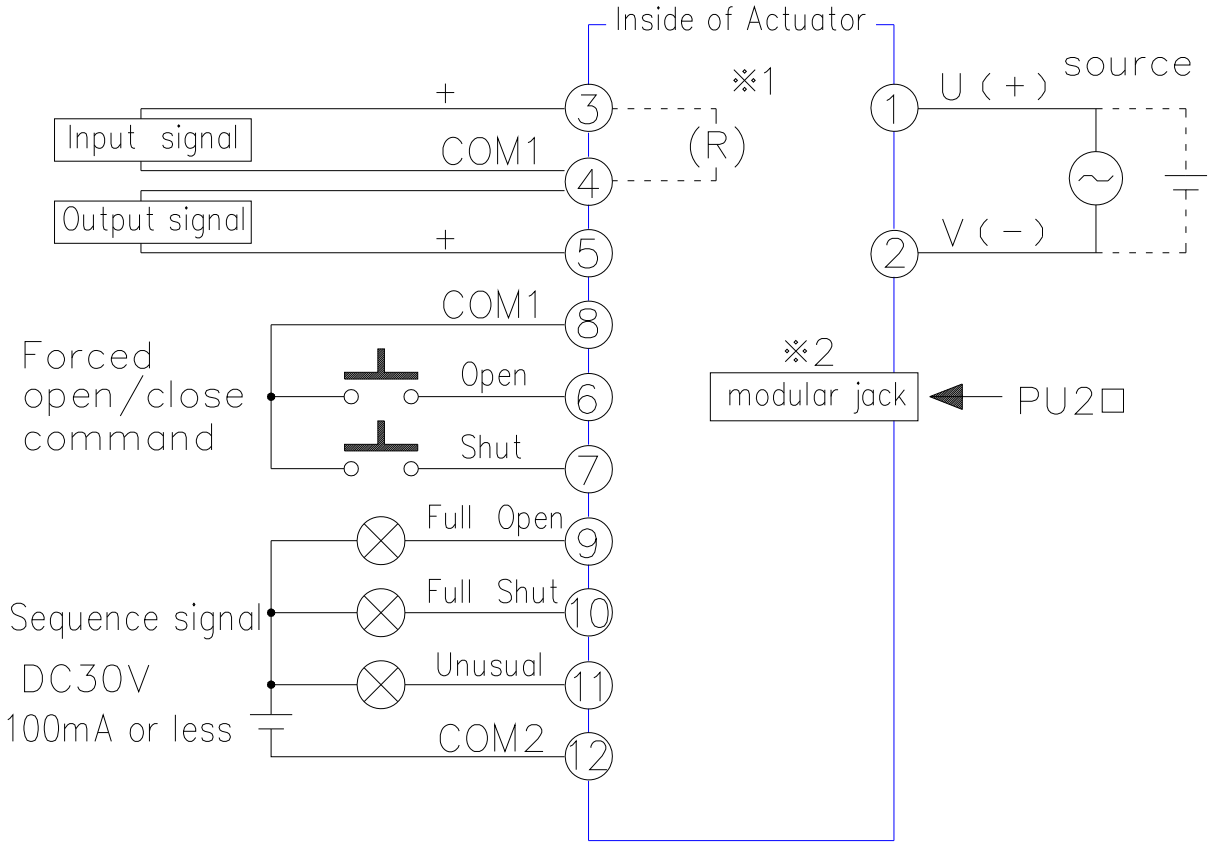
Voltage (Single Phase)	Frequency	Input Signal	Output Signal
☐ AC 100V ☐ AC 200V ☐ DC 24V	☐ 50Hz ☐ 60Hz	☐ DC 4~20mA ☐ DC 1~5V	☐ DC 1~5V





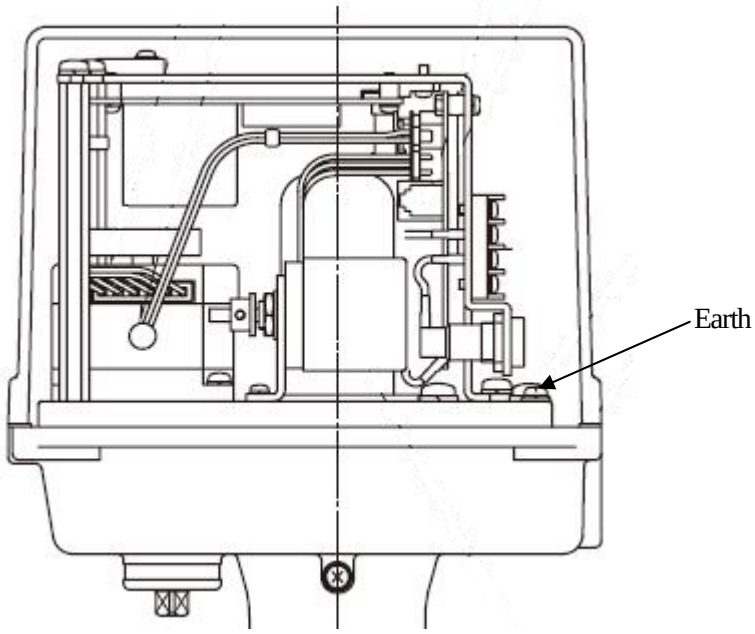
Nominal size 50, 80, 100mm (2", 3", 4")

Voltage (Single Phase)	Frequency	Input Signal	Output Signal
☐ AC 100~120V ☐ AC 200~240V ☐ DC 24V	☐ 50Hz ☐ 60Hz	☐ DC 4~20mA ☐ DC 1~5V	☐ DC 4~20mA



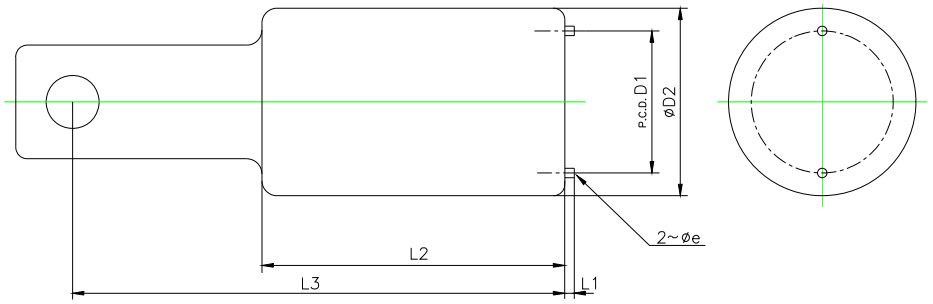
※1 Input resistor attached for a current input.

※2 A modular jack is not usually used.



(8) Specification of tool

Orifice removal tool

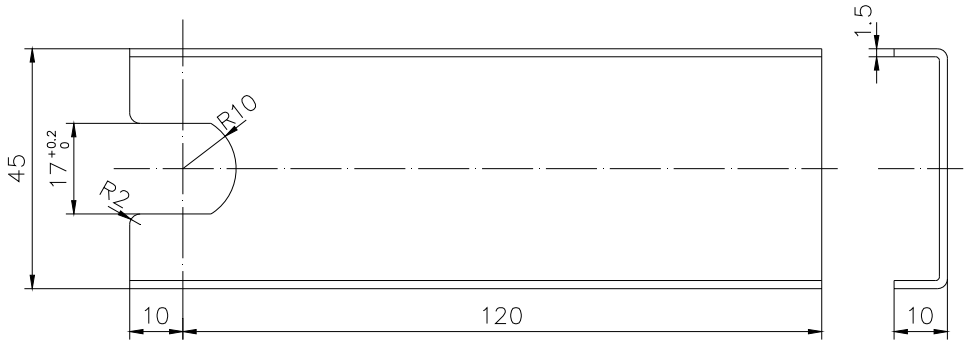


Dimension table

Nominal size		D_1	D_2	L_1	L_2	L_3	e
15mm	1/2"	23.5 mm	35.5 mm	2.5 mm	60 mm	115 mm	2.5 mm
25mm	1"	37.5 mm	49.5 mm	2.5 mm	80 mm	125 mm	2.5 mm

Specialized spanner for the actuator shaft

(Only required for actuator type MSP6)



(9) 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.)

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 stress.
- Before a water test, be sure that the Flange is tightly fastened.
- Fasten the Flange while avoiding the parallelism and axial misalignment of the flange surface.
- When connecting an ASAHI AV Valve to metal piping, take care not to let the pipe stress on the ASAHI AV Valve.
- 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.)

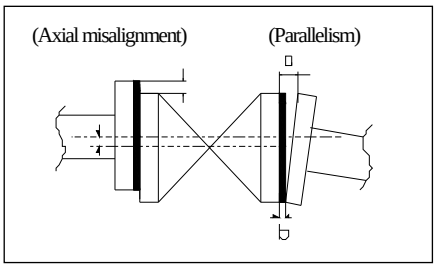
Procedure

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

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)
15 mm (1/2”)	1.0mm (0.04”)	0.5mm (0.02”)
25-80 mm (1”-3”)	1.0mm (0.04”)	0.8mm (0.03”)
100 mm (4”)	1.0mm (0.04”)	1.0mm (0.04”)

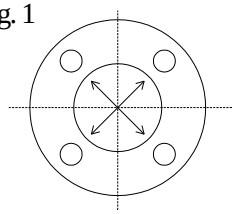


3) Using a torque wrench, tighten the bolts and nuts gradually to the specified torque in a diagonal manner (Refer to fig.1).
* Avoid excessive tightening. (The valve can be damaged.)

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

Nom. Size	15 mm (1/2")	25 mm (1")	50 mm (2")	80, 100 mm (3", 4")
PTFE·PVDF coated	17.5 {179} [155]	20.0 {204} [177]	22.5 {230} [230]	30.0 {306} [266]
Rubber	8.0 {82} [71]	20.0 {204} [177]	22.5 {230} [230]	30.0 {306} [266]

Fig. 1



(10) Support setting procedure

Caution

- Do not subject the valve to pump vibrations. (The valve may be damaged.)
- 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.)
- Valves must be supported. (The valve may be damaged by the weight of the actuator if it is unsupported.)

Necessary items

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

Level installation

Set the stand under the valve.

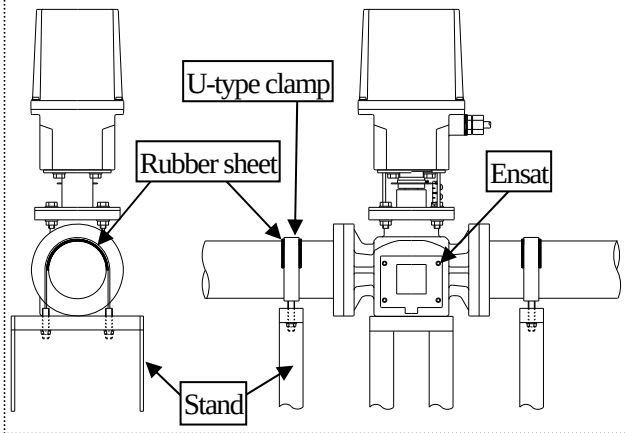
Only for nominal size 15, 25mm (1/2", 1"), the Ensat which is equipped to the body enables the valve to fix to the stand. Refer to the chart below.

Dimension of Ensat

Nominal Size	15, 25mm (1/2", 1")
Ensat	M6

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

Level installation



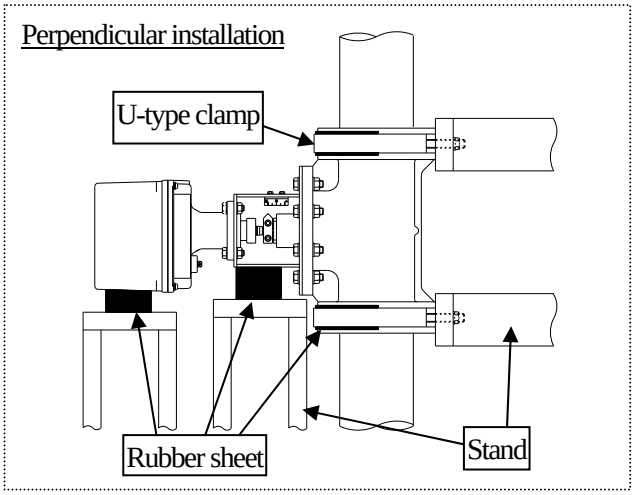
Perpendicular installation

Set the stand under the actuator and the actuator stand.

Only for nominal size 15, 25mm (1/2", 1"), the Ensat which is equipped to the body enables the valve to fix to the stand. Refer to the chart above.

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

Perpendicular installation



(11) 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.)
- 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.)

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 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.)

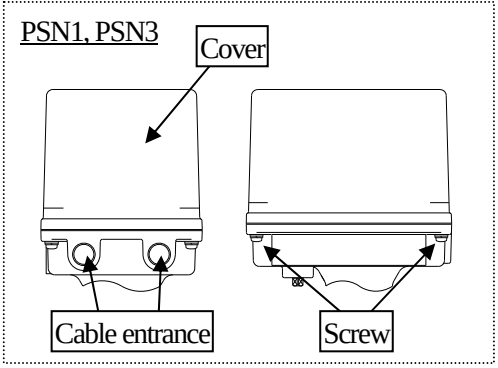
Necessary items

- Screwdriver (+)
- Wire Stripper
- Crimp-Style Terminal
- Technical Crimping Tool

In case of MSP6, connect the wire to the accessory wire of actuator in accordance with the wiring diagram (page 10).
In case of PSN1 and PSN3, connect the wire to the actuator in accordance with the following procedure.

Procedure

1) Loosen the screw with a screwdriver (+) and remove the cover from the actuator.
2) Remove the plug for cable entrance with a spanner wrench.
3) Draw a cable through the connector.
4) Strip the cable with a wire stripper.
5) Install a crimp-style terminal on the lead wire with a terminal-crimping tool.



6) Connect the terminal board with a screwdriver (+) in accordance with the wiring diagram (page 11).
(If not, electric shorts or shocks may occur.)
7) Tighten the connector.
(If not, electric shorts or shocks may occur.)
8) Tighten above screws with a screwdriver (+) to fix and install the cover of the actuator.
9) Connect the earth wire to a good ground.

(12) 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.)
- Do not operate the manual override while the actuator is energized.

- 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.)

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.)
- Each cover part is sealed with an O-ring. When laying wiring or in any similar cases, where the cover is detached and reattached, ensure that the O-ring is installed in a 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 water drops, protect the wire port of the actuator against ingress of rainwater and something similar. (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, heat-up, or smoking, turn off the power supply immediately. (Continued use despite an abnormality present may result in a fire. If you detect any abnormality, be sure to consult the dealership where you bought the product or our service station nearest your premises, asking them about inspection.)

Manual operating procedure

Nominal size: 50, 80, 100mm (2”, 3”, 4”) only

Necessary items

- Spanner wrench (8mm)

Procedure

1) Attach the spanner wrench to the manual shaft of the actuator.
2) Turn the spanner wrench within the operating torque (1.8N･m).
(Do not turn the handle excessively to right or left while open/close positions. (It may damage the product)

Right turn (clockwise)	→	Open direction
Left turn (counterclockwise)	→	Close direction

3) Detach the spanner wrench from the manual shaft of the actuator.

Motor-driven operating procedure

- Do not leave the cover removed from the actuator.
(Coming into contact with a terminal in this state can give you an electric shock.)
- Check to ensure that the spanner is not applied to the end of the manual operation shaft.
(If not, the hexagon wrench will be flown by the rotation of the manual operation shaft, and this may injure you)

Procedure

1) If the spanner wrench is attached to the manual shaft of the actuator, detach it (only for PSN1, PSN3).
2) Turn on the power source.
3) Input the signal and check to ensure that the valve indicating direction and the operating direction agree with each other.
4) Shut down the power source.

(13) Adjusting of actuator

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.)
- Do not operate the manual override while the actuator is energized.
- 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.)

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.)
- Each cover part is sealed with an O-ring. When laying wiring or in any similar cases, where the cover is detached and reattached, ensure that the O-ring is installed in a 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 water drops, protect the wire port of the actuator against ingress of rainwater and something similar. (Failure to take such a precaution may cause the actuator to be penetrated by rainwater or something similar, resulting in electric shock or breakdown.)

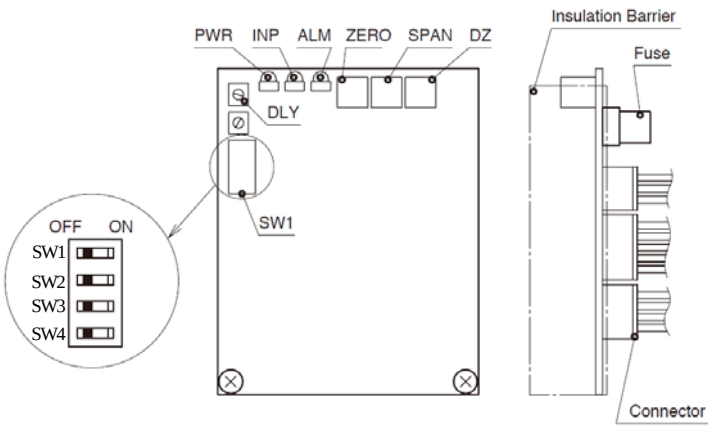
Necessary items

- Current generative machine (DC4-20mA)
- Small screwdriver for adjusting the volume

Actuators are adjusted on their shipment. Although they are not required to adjust again, if it is necessary to change the travel indicator, or to disassemble or assemble the valve, adjust the actuator as below.

Nominal size 15, 25mm (1/2", 1")

In this explanation, while the output shaft reaches the most lower limit (by inputing signal of 4mA) is called Open type operations. For the shut type operation, adjust the signal value found in [ ] mark. The function of switches and indication lights are explained below.



ZERO: Zero Adjustment
SPAN: Span Adjustment
DZ: Dead-band Adjustment
DLY: Restarting Timer
SW1: Stop/ Extend/ Retract Switch (Operation at abnormally low input)
SW2: Stop/ Extend/ Retract Switch (Operation at abnormally low input)
SW3: Direct/ Reverse Action
SW4: It is not used.
PWR: Power Indicator (Green with power supplied.)
INP: Input Indicator (Green with input supplied.)
ALM: Status Indicator (Red flashes in 2 sec. intervals,
flashes in 0.5 sec. intervals with mechanical look detected.)

1) **Operation at abnormal Low Input**

The actuator action is factory set to "Extend" at abnormally low input. (When the input signal goes down to DC 1.5mA or below, the actuator goes to the abnormal low input operation.) For changing the setting, use the DIP switch on the control PCB. Refer to table below.

Operation at Abnormally Low Input

Operation	Switch 1	Switch 2
Stop	※1	ON
Exten	OFF	OFF
Retract	ON	OFF

※1 Whatever setting for switch 1 is disregarded for "Stop" mode.

2) **Direct/ Reverse Action**

The actuator action is factory set to "Reverse". For changing setting, use the DIP switch on the PCB. Refer to table below.

Direct/ Reverse Action

Action	Switch 3	Explanation
Direct	ON	Output stem is retracted with an input decrease.
Reverse	OFF	Output stem is extended with an input decrease.

3) **Adjustment of Zero/ Span**

Adjust the zero/ span at first, the seal spring next, and the sensibility finally.

1. Turn the volume of the zero right (clockwise) fully, and the volume of the span left (counterclockwise) fully.
2. Input the signal 4mA [20mA] and turn on the power source, then adjust the volume of the zero to the full-closed position required.
3. Input the signal 20mA [4mA] and turn the volume of the span right (clockwise) and adjust the position of the required stroke.
4. Input the signal 4mA [20mA] again, if the required position to close fully can not be found, repeat the item 2) & 3). (The stroke can be changed (the maximum 25%), if the volume of the zero is turned.)

4) **Adjustment of Seal Spring**

Adjust the zero/ span at first, the seal spring next, and the sensibility finally.

In the full closed position, the seal pressure is adjusted by pushing the output shaft in about 1mm when 4mA [20mA] given with the volume of the zero.

Type	Spring Pushing Volume	Seal Pressure
MSP6-☐4 (for nominal size 15mm (1/2"))	1mm	120kgf
MSP6-☐6 (for nominal size 25mm (1"))	1mm	180kgf

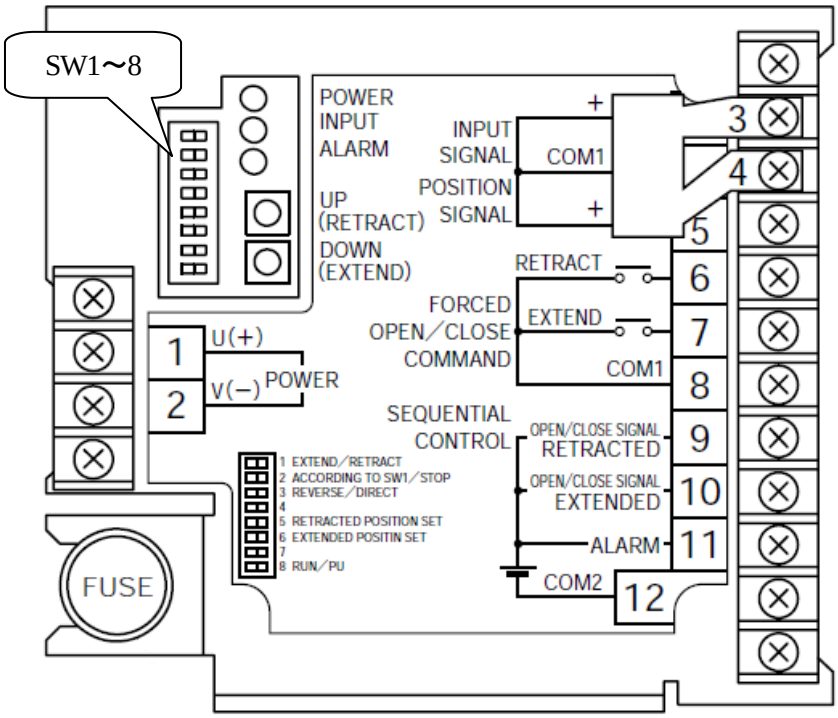
5) **Adjustment of Sensibility (Adjustment of DZ Volume)**

Adjust the zero/ span at first, the seal spring next, and the sensibility finally.

Change the input signal, and if the motor keeps turning over (hunting) and does not stop, turn the DZ volume right (clockwise) to make the span bigger.

Nominal size 50, 80, 100mm (2", 3", 4")

In this explanation, while the output shaft reaches the most lower limit (by inputing signal of 4mA) is called Open type operations. For the shut type operation, adjust the signal value found in [ ] mark. The function of switches and indication lights are explained below.



Power: Power LED (Green light turns on when applied.)

INPUT: Input LED (Green light turns on when applied.)

ALARM: Alarm LED (Red light turns on with alarm)

UP: UP Control Button

DOWN: Down Control Button

SW1: Operation at abnormally Low Input

SW2: Operation at abnormally Low Input

SW3: Direct/ Reverse Action

SW4: It is not used.

SW5: Full Open Position Set

SW6: Full Close Position Set

SW7: It is not used.

SW8: Local Calibration mode

(When the switch is ON, the input signal is disregarded.)

1) **Operation at Abnormally Low Input**

The actuator action is factory set to "Stop" at abnormally low input. (When the input signal goes down to DC 1.5mA or below, the actuator goes to the abnormal low input operation.) For changing the setting, use the DIP switch on the control PCB. Refer to table below.

Operation at Abnormally Low Input

Operation	Switch 1	Switch 2
Stop	※1	ON
Exten	OFF	OFF
Retract	ON	OFF

※1 Whatever setting for switch 1 is disregarded for "Stop" mode.

2) **Direct/ Reverse Action**

The actuator action is factory set to "Reverse". For changing setting, use the DIP switch on the PCB. Refer to table below.

Direct/ Reverse Action

Action	Switch 3	Explanation
Direct	ON	Output stem is retracted with an input decrease.
Reverse	OFF	Output stem is extended with an input decrease.

3) **Adjustment of Full Open/ Full Close Position**

While adjusting of full open/ full close position, go to the local calibration mode beforehand.

1. Turn ON the switch 8 in order to put the actuator in the local calibration mode. (The input signal is disregarded.)
2. Turn ON the switch 5 in order to put the actuator in the adjustment mode of the full open position.
3. Adjust the full open position pushing UP/ DOWN control buttons.
4. When the output shaft reaches a desired position, turn OFF the switch 5.
   (The position is memorized as the full open position.)
5. Turn ON the switch 6 in order to put the actuator in the adjustment mode of the full close position.
6. Adjust the full close position pushing UP/ DOWN cotrol buttons.
7. When the output shaft reaches a desired position, turn OFF the switch 6.
   (The position is memorized as the full close position.)
8. Turn OFF the switch 8 in order to put the actuator in the run mode.
   (When turning OFF the switch 8, output shaft moves in accordance with the input signals.)
9. Apply input signals and confirm the full open/ close positions.
   (The optimum full close position is where the valve can full close at the input signal 4mA [20mA], and the fluid begins to leak at the input signal 4.4mA [19.6mA])

(14) 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.)

- 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 change or replace valve parts under line pressure.

Caution
- Ensure all covers are tightly fastened prior to operation. (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.)

Nominal size: 15, 25mm (1/2", 1") / Body material: U-PVC, PVDF

Necessary items
- Protective gloves
- Safety goggles
- Spanner wrench
- Allen wrench
- Marker pen
- Orifice removal tool
- Screwdriver (-) (only required for PVDF made products)
- Specialized spanner for the actuator shaft

<Disassembly>

Procedure

1) Completely discharge fluid from pipe.
2) Open the control valve by half and remove the electric wiring.
   *Turn off the power source and then shut off the signal.
3) Loosen and remove the bolt･nut of coupled flange.
4) Remove the valve from pipe.
5) Put a mark between the actuator [20] and body [1] with a marker pen.
4) Remove the four pairs of bolt-nut [41] connected the actuator [20] and the body [1].
5) Lift the actuator [20] with stand [19] up and remove it from the body [1]
   *Lift the actuator [20] up gently and perpendicularly. (Parts may be scratched.)
6) Loosen the screw (B) [54].
7) Turn the piston (A) [5] counterclockwise and remove it without damaging it.
8) Loosen the coupled bolt･nut [42] of the actuator [20] and stand [19] and remove them.

Body material: U-PVC

9) Remove the stop ring [9] from the piston (A) [5].
10) Pull the bush [7] out of the piston (A) [5].
   *The plug [4] can not be removed because it is screwed in the piston (A) [5] after adhered.
   (If removed by force, the valve may be damaged.)
11) Loosen the orifice [3] with an orifice removal tool and remove it.

Body material: PVDF

9) Pull the piston guide [60] out of the piston (A) [5].
10) Loosen the stopper [59] and the packing holder [58] and remove them from the stand [19].
11) Loosen the orifice [3] with an orifice removal tool and remove it.

<Assembly>

Procedure

1) Before starting assembly, silicone grease (fluorine grease is suitable for the chlorine fluid) should be spread on the sliding surfaces and sealing parts, for instance, body [1], piston (A) [5], bush [7] (body material: U-PVC), piston guide [60] (body material: PVDF) and each O-rings.
2) Carry out the assembly work in the reverse procedure from item 11).
*When tightening the bolt･nut [41], tighten them lightly, and open and close the valve a few times. Make sure that there isn't any problem, then tighten them up completely.

Nominal size: 50, 80, 100mm (2", 3", 4") / Body material: U-PVC

Necessary items

- Protective gloves
- Safety goggles
- Spanner wrench
- Allen wrench
- Marker pen

<Disassembly>

Procedure

1) Completely discharge fluid from pipes.
2) Open the control valve by half and remove the electric wiring.
*Turn off the power source and then shut off the signal.
3) Loosen and remove the bolt･nut of coupled flange.
4) Remove the valve from pipe.
5) Put a mark between the actuator [20] and body [1] with a marker pen.
6) Remove the four pairs of bolt-nut [41] connected the actuator [20] and the body [1].
7) Lift the actuator [20] with stand [19] up and remove it from the body [1]
*Lift the actuator [20] up gently and perpendicularly. (Parts may be scratched.)
8) Loosen the bolt of the indicator [38] fixed the coupling [36] and the actuator shaft
9) Loosen the screw (B) [54].
10) Turn the coupling [36] counterclockwise and remove it from the piston (A) [5].
11) Pull the bush guide [8] out of the piston (A) [5].
12) Remove the stop ring [9] from the piston (A) [5].
13) Pull the bush [7] out of the piston (A) [5].
*Plug [4] can not be removed because it is screwed in the piston (A) [5] after adhered.
(If removed by force, the valve may be damaged.)

<Assembly>

Procedure

1) Before starting assembly, silicone grease (fluorine grease is suitable for the chlorine fluid) should be spread on the sliding surface and sealing parts, for instance, body [1], piston (A) [5], bush [7], bush guide [8], each O-rings.
2) Carry out the assembly work in the reverse procedure from item 13).
*When tightening the bolt･nut [41], tighten them lightly, and open and close the valve a few times. Make sure that there isn't any problem, then tighten them up completely.

(15) Countermeasures to avoid leakage (only for body material PVDF)

Warning - Be sure to conduct a regular replacement of damaged parts for permanent measures. (The structure of tightening the 'Packing Holder' is for emergency measures against the leakage from the slide piston.)

Caution - Do not tighten the stopper and the packing holder excessively. (Can damage the products)

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

Necessary items

● Protective gloves ● Safety goggles ● Screwdriver (-)

Procedure

1) Turn the stopper [59] counterclockwise by using a screwdriver.
2) Tighten the packing holder [58] clockwise by using a screwdriver properly.
3) Fix the packing holder [58] and tighten the stopper [59] clockwise.

(16) Inspection items

Caution - Perform regular 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, corrosion. - Tightening condition of respective threaded portions. (Loose or not) - Existence of abnormality in opening and closing operating sounds. - Smooth operation of manual handle. * 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.
Positioner	- Existence of scratches, cracks, deformation, discoloring and rust. - Tightening condition of respective threaded portions. (Loose or not) - Existence of air leakage from the air piping.

(17) Troubleshooting

Problem	Cause	Treatment
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 wiring is wrong.	Check the connection.
	The cable is disconnected or a part of the wiring has not done.	
Fluid leaks from the valve to the outside.	The O-ring is changed in quality or damaged.	Check the material and replace it.
	The PTFE bush is damaged.	Replace the PTFE bush.
The valve does not seal completely when it is closed fully.	Foreign matter is in the valve.	Remove the foreign matter.
	The valve is not closed fully.	Adjust the stroke.
	The seat is changed in quality or damaged.	Replace the seat.

(18) 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.)

Control Valves
Electric Actuated Type M

[Automatic Valve]

ASAHI YUKIZAI CORPORATION

Distributor

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

Information in this manual is subject to change without notice. 2016.4