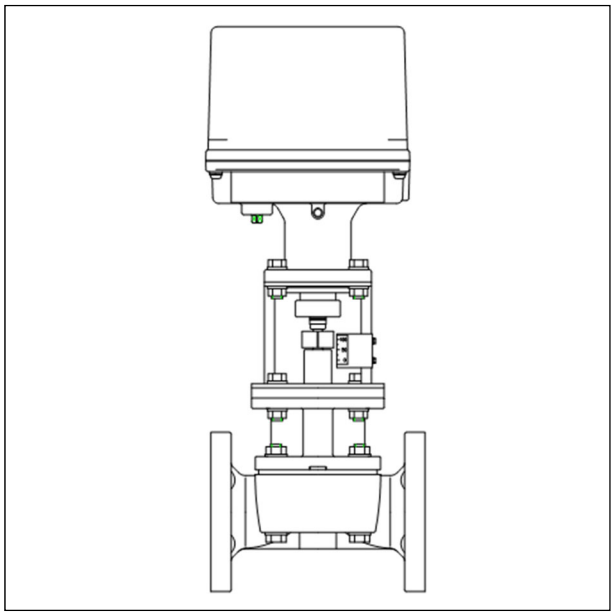
# Diaphragm valve Type 14
# True union diaphragm valve Type 14
# Electric Actuated Type M
# 15-50mm (1/2”-2”)

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

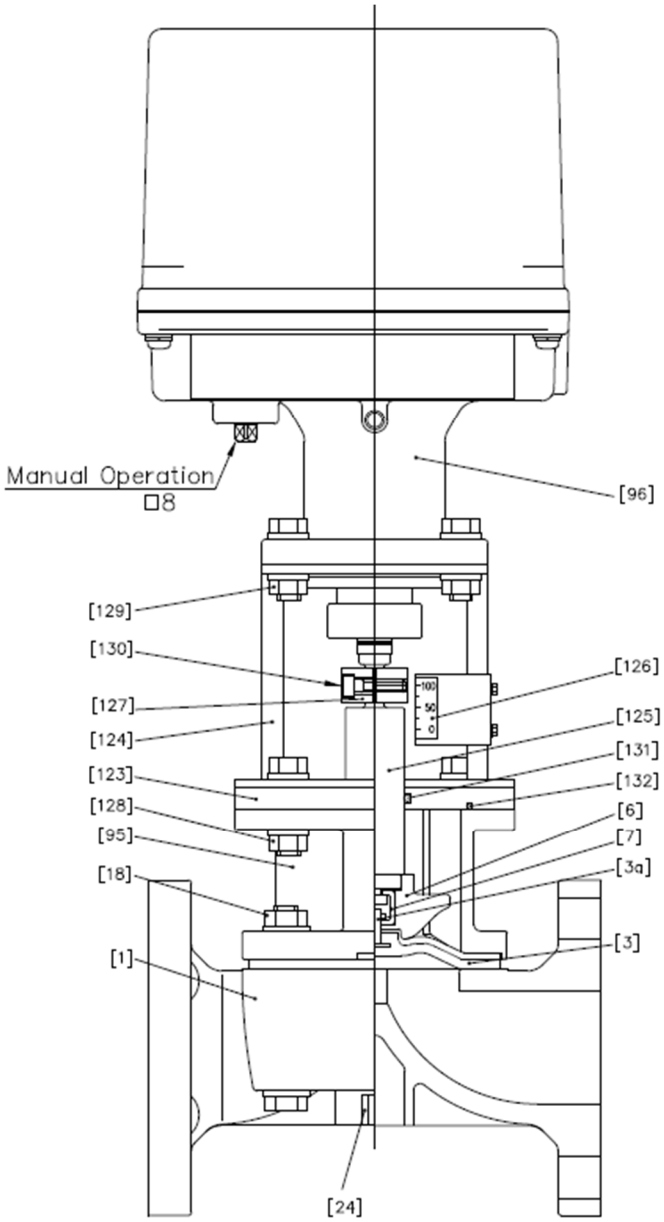
**Product Handling**

| ⚠ Warning | |
|---|---|
| **Prohibition** | **Serious injury can result.**<br>▶ Do not disassemble the actuator.<br>▶ Do not touch moving parts during operation with hands, feet or tools. |
| **Forcing** | **The valve can be damaged, or leak.**<br>▶ 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.<br>▶ 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.<br>▶ Check the voltage on the power supply and nameplate before use. A different voltage may cause damage or malfunction of the equipment.<br>▶ Perform manual operation after confirming that the actuator is not operated by the motor. |

| ⚠Caution | |
|---|---|
| **Prohibition** | **The valve can be damaged, or leak.**<br>▶ Do not step on the valve or place heavy objects on it.<br>▶ Keep away from fire and hot objects.<br>▶ Do not use the product in places where it may be submerged.<br>▶ 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.<br>▶ Do not subject the valve to large vibrations. |
| **Forcing** | **The valve can be damaged, or leak.**<br>▶ Keep the pressure and temperature of the fluid within the allowable range. (The maximum allowable pressure includes water hammer pressure.)<br>▶ Secure sufficient space for maintenance and inspection when piping.<br>▶ 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.)<br>▶ Use fluids containing crystalline material under conditions that do not recrystallize.<br>▶ 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.<br>▶「12. Perform maintenance on a regular basis referring to "Inspection items." Pay particular attention to temperature changes and aging during long-term storage or shutdown or use.<br>▶ The tightening bolts and nuts on the diaphragm may become loose due to changes in temperature or creep during storage or use. After checking, tighten the bolts and nuts diagonally to the values in the Body Tightening Torque Table (see page 27).<br>▶ When installing a valve, provide an appropriate valve support so that excessive force is not applied to the valve and piping.<br>▶ Always use the product within the indicated product specifications.<br>▶ 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.<br>▶ Use the supplied handle or a tool specified by the manufacturer for manual operation.<br>▶ When using in an explosive atmosphere, make sure that the actuator conforms to the explosion-proof specifications.<br>▶ Keep the ambient temperature of the installation site within the range of-10°C to 55°C. |

## 3. Name of each part

**15mm～50mm**



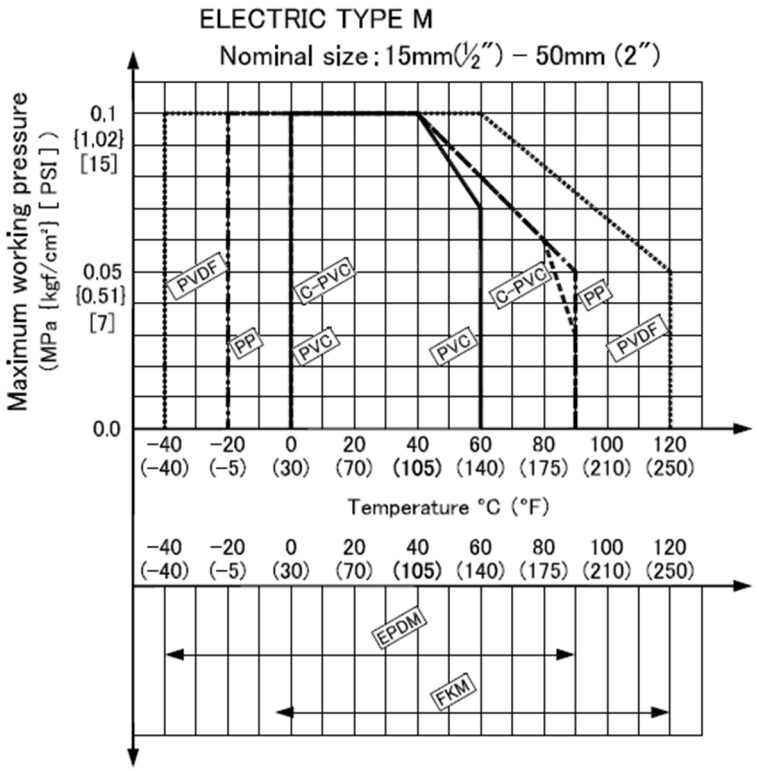

| | | | | | |
|---|---|---|---|---|---|
| [1] | Body | [24] | Ensat (Insert metal ) | [127] | Joint |
| [3] | Diaphragm | [95] | Motor bonnet | [128] | Bolt/nut (E) |
| [3a] | Insert metal of diaphragm | [96] | Actuator (electric) | [129] | Bolt/nut (F) |
| [4] | Cushion | [123] | Spacer (A) | [130] | Bolt (F) |
| [6] | Compressor | [124] | Stand A) | [131] | O-ring (J) |
| [7] | Joint | [125] | Stem (D) | [132] | O-ring (K) |
| [18] | Bolt/nut (A) | [126] | Indicator Seal | | |

## 4. Product Specifications

### Model number table

| ACTUATION | TYPE | ACTUATOR TYPE | ACTION / POWER SOURCE | BODY MATERIAL | SEAL MATERIAL | CONNECTION | STANDARD | SIZE | HIGH PURITY SERIES |
|---|---|---|---|---|---|---|---|---|---|
| A | * * | M | * | * | * | F | * | * * * | 1 |
| A AUTOMATIC VALVE | 14 TYPE 14<br>T1 TRUE UNION TYPE 14 | M TYPE M | 1 Single-Phase 100VAC<br>2 Single-Phase 200VAC<br>D DC24V | U PVC<br>C C-PVC<br>P PP<br>F PVDF | E EPDM<br>V FKM | F FLANGED | 1 JIS 10K<br>D DIN<br>A ANSI GRINNEL STANDARD<br>J ANSI AV STANDARD | 015 15mm<br>020 20mm<br>025 25mm<br>032 32mm<br>040 40mm<br>050 50mm | 1 LIBRICANT FREE |

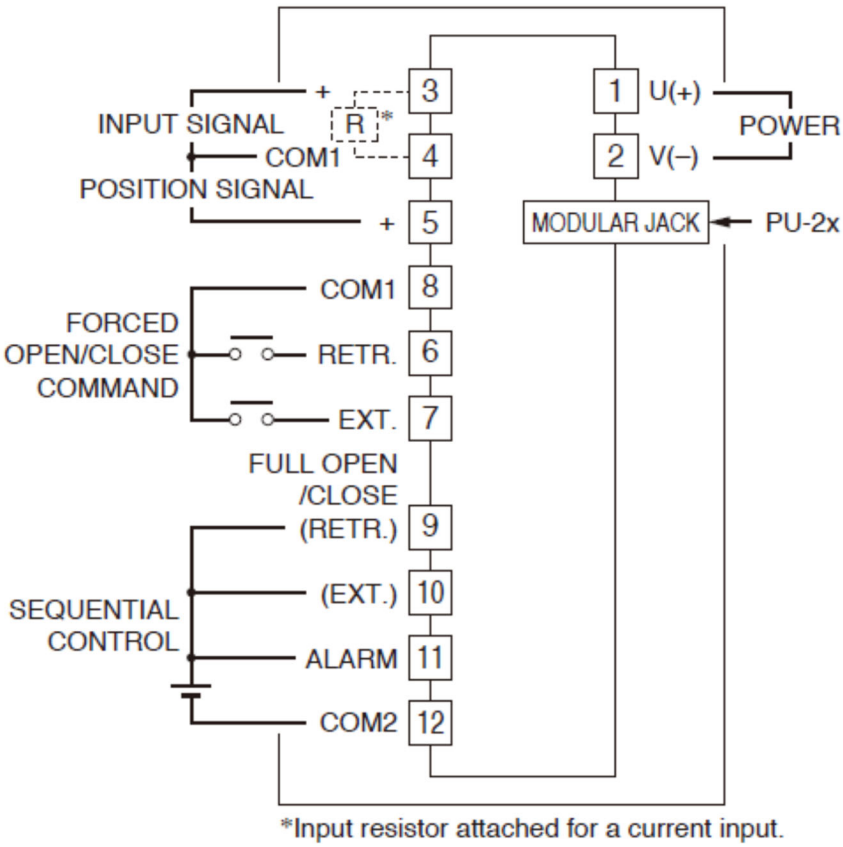
**Relationship between maximum allowable pressure and temperature**



**Actuator**

15～50mm (Actuator model: PSN)

Wiring Diagram




Specifications List

| Applicable Nominal size (mm) | | 15、20 | 25、32 | 40 | 50 |
|---|---|---|---|---|---|
| Actuator model | | PSN1 | | PSN3 | |
| * of open/close times (seconds) | 50Hz,60Hz | 7 | 9 | 21 | 25 |
| Degree of protection | | IP 55 | | | |
| Motor Current (A/PHASE) | | 3.0 | | | |
| Manual operation handle revolution | | 24 | 30 | 50 | 60 |
| Cable connector Nominal size | | 2 - G 1/2 | | | |
| Motor insulation type | | E Type | | | |

Calculated value when * is not loaded. Reference value. The switching time varies depending on the load. Please use this value as a reference.

## 5. Mounting method

### FInaged end

| Warning | |
|---|---|
| Prohibition | **Serious injury can result.**<br>▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.<br>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. |

| Caution | |
|---|---|
| Prohibition | **The valve can be damaged, or leak.**<br>▶ Do not open or close the valve with dust or other foreign matter in the fluid.<br>▶ Be careful not to overtighten the pipe support when you remove it with a U band or the like. |
| Forcing | **There is a danger of injury.**<br>▶ When installing piping, be sure to wear the appropriate protective equipment according to the operation details.<br>**The valve can be damaged, or leak.**<br>▶ When installing the product, make sure that no excessive stress such as tension, compression, bending or impact is applied to the piping or valve.<br>▶ Since foreign matter such as sand may remain in the pipeline even after the valve is installed, open and close the valve after cleaning the inside of the pipe.<br>▶ Use a connection flange with a full-face seat.<br>▶ Check that there is no difference in mutual flange standards.<br>▶ Be sure to use the sealing gaskets (AV gasket), bolts, nuts and washers to tighten them with the specified tightening torques. (The tightening torque will change if the gasket is not a AV gasket.) |

Preparations ▶ Torque Wrench ▶ AV gasket

**[Procedure]**

1) Set AV gasket 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.

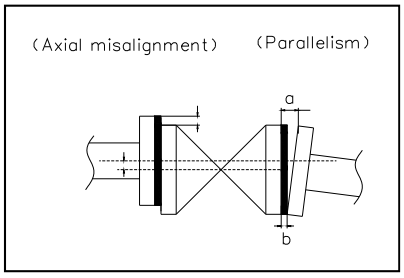
## ⚠Caution

**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.

| Nominal size (mm) | Shaft misalignment | Parallelism (a-b) |
|---|---|---|
| 15～32 | 1.0mm | 0.5mm |
| 40～50 | 1.0mm | 0.8mm |




3) Gradually tighten to the specified torque value diagonally (see Fig. 1) with a torque wrench.

## ⚠Caution

**Forcing**

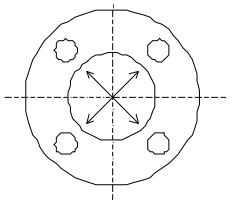
**Damage or leakage may occur.**

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

Specified torque value Units: N•m {kgf・cm}

| Nominal size | 15, 20mm | 25～40mm | 50mm |
|---|---|---|---|
| Torque value | 17.5{179} | 20.0{204} | 22.5{230} |
| Rubber | 8.0{82} | 20.0{204} | 22.5{230} |

(Fig 1)



**Threaded end type**

| ⚠Caution | |
|---|---|
| **Prohibition** | **The valve can be damaged, or leak.**<br>▶ Do not over tighten the cap nut.<br>▶ Do not use a pipe wrench to tighten the cap nut.<br>▶ The cap nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the body cap before installation. |

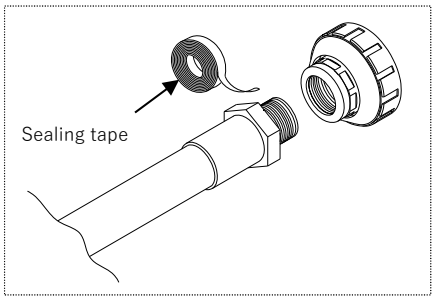
**Threaded end type (made of U-PVC, C-PVC, PP, PVDF)**

| ⚠Caution | |
|---|---|
| **Prohibition** | **The valve can be damaged, or leak.**<br>▶ Do not overtighten the screws at the joints. |
| **Forcing** | **The valve can be damaged, or leak.**<br>▶ Make sure that the screws on the connections are plastic. (Piping with metal screws may damage the body cap.)<br>▶ Use sealing tape for the threaded joints of our resin piping materials. If liquid sealant or liquid gasket is used, stress cracking (environmental stress cracking) may occur. |

Preparations ▶ Sealing tape ▶ Belt wrench ▶ wrench

**[Procedure]**

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




**2)** Loosen the cap nut [26] with a belt wrench.

**3)** Remove cap nut [26] and body cap [25].

**4)** Tighten the male thread of the Joint and the body cap [25] by hand.

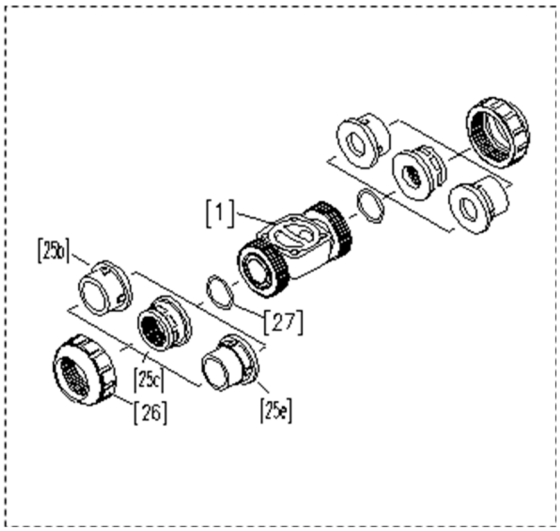
**5)** Screw on the body cap [25] with a wrench 1/2-1 turn to prevent scratching.

**6)** Check that the O-ring (C) [27] is installed correctly.

**7)** Contact the body cap [25] and the cap nut [26] with the O-ring (C) [27] so that they do not come off.

**8)** Tighten the cap nut [26] by hand.

**9)** Screw the cap nut [26] 1/4 to 1/2 turn with a belt wrench to avoid damage.



**Socket end (adhesive)**

| ⚠ Warning | |
|---|---|
| **Prohibition** | **Serious injury can result.**<br>▶ Ensure adequate ventilation when using adhesives, and prohibit the use of open flames and do not inhale odors directly.<br>▶ If the adhesive adheres to the skin, remove it immediately. If you feel worse or feel unusual, promptly seek medical assistance and take appropriate action. |

| ⚠ Caution | |
|---|---|
| **Prohibition** | **The valve can be damaged, or leak.**<br>▶ Do not over tighten the cap nut.<br>▶ Do not use a pipe wrench to tighten the cap nut.<br>▶ The cap nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the body cap before installation.<br>**Serious injury can result.**<br>▶ Care should be taken in construction at low temperatures because solvent vapors are less likely to evaporate and remain.<br>(Solvent cracks may occur and damage) After piping, remove the solvent vapor by opening both ends of the pipe and ventilating with a blower (low-pressure type) or the like. |
| **Forcing** | **The valve can be damaged, or leak.**<br>▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve.<br>▶ Fix the body cap during piping work or disassembly and reassembly.<br>▶ When attaching the valve to the end of the pipe, be sure to attach the cap nut and body cap on the secondary side (downstream side).<br>▶ Use "ASAHI AV Cement" depending on the material.<br>▶ Perform the water flow test at least 24 hours after completion of adhesion. |

Preparations ▶ ASAHI AV Cement ▶ Belt Wrench

**[Procedure]**

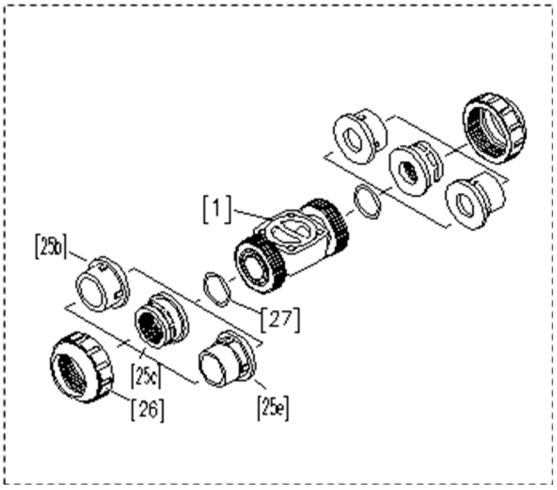
**1)** Loosen the cap nut [26] with a belt wrench.

**2)** Remove cap nut [26] and body cap [25].

**3)** Thread the cap nut [26] to the pipe side.

**4)** Wipe off the socket part of the body cap [25] with a waste cloth.

**5)** Apply adhesive evenly to the socket of the body cap [25] and the pipe insert.
※Do not apply more adhesive than is necessary.
(Solvent crack may occur, resulting in damage.)




Amount of adhesive used (reference)

| DN (mm) | 15 | 20 | 25 | 32 | 40 | 50 |
|---|---|---|---|---|---|---|
| Amount used (g) | 1.0 | 1.3 | 2.0 | 2.4 | 3.5 | 4.8 |

**6)** After applying the adhesive, quickly insert the pipe into the body cap [25] and hold it for at least 60 seconds.

**7)** Wipe off any excess adhesive.

**8)** Check that the O-ring (C) [27] is fitted correctly.

**9)** Bring the body cap [25] and the cap nut [25] into contact with the body side so that the O-ring (C) [27] does not come off.

**10)** Tighten the cap nut [26] by hand.

**11)** Screw the cap nut [26] 1/4 to 1/2 turn with a belt wrench to avoid damage.
※Do not over tighten. (risk of damage)

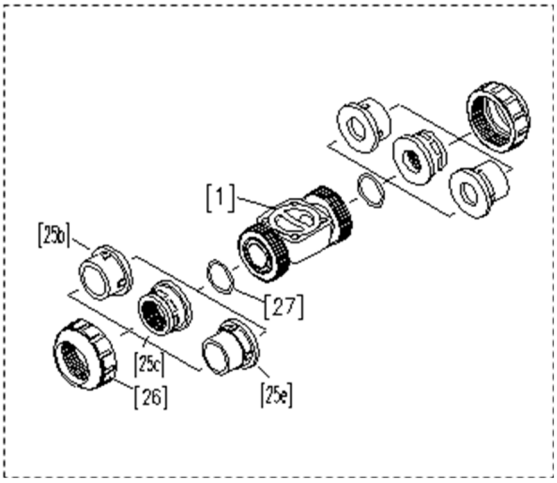
**Socket end, spigot type (fusing)**

| ⚠Caution | |
|---|---|
| **Prohibition** | **The valve can be damaged, or leak.**<br>▶ Do not over tighten the cap nut.<br>▶ Do not use a pipe wrench to tighten the cap nut.<br>▶ The cap nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the body cap before installation. |
| **Forcing** | **The valve can be damaged, or leak.**<br>▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve.<br>▶ Fix the body cap during piping work or disassembly and reassembly.<br>▶ When attaching the valve to the end of the pipe, be sure to attach the cap nut and body cap on the secondary side (downstream side). |

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

**[Procedure]**

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



## 6. Support installation method

| ⚠Caution | |
|---|---|
| Prohibition | **The valve can be damaged, or leak.**<br>▶ Do not cause large vibrations to the valve by the piping around the pump. |
| Forcing | **The valve can be damaged, or leak.**<br>▶ Install a valve support.<br>(Excessive force is applied to the valve body and piping, which may cause damage.) |

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

Horizontal piping

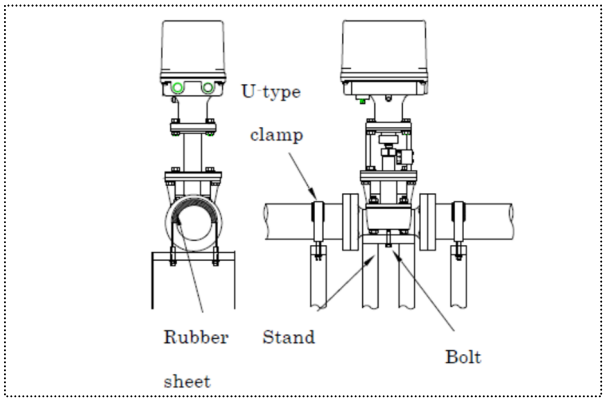
▶ When using an entertainment and installing supports

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

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

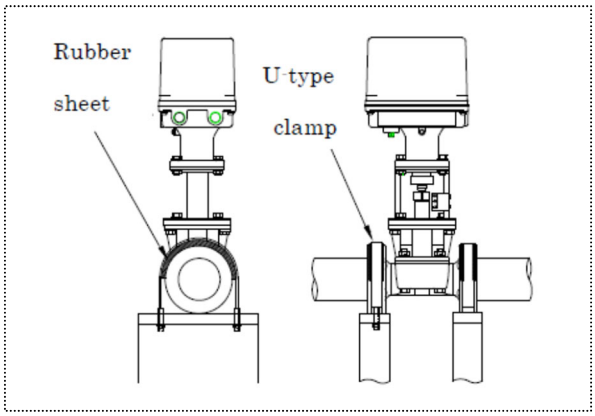
Bolt Size (Ensat)

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




▶ If you do not use an Ensat and install a support (with a flange-shaped body cap)

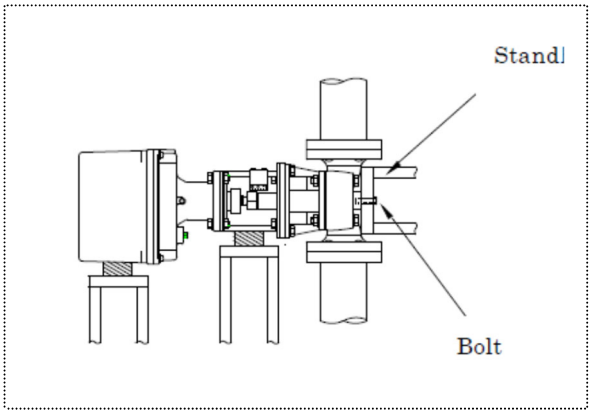
Lay a rubber sheet on the flange part of the valve and secure it with the U-band.




Vertical piping

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

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



## 7. Electrical Wiring

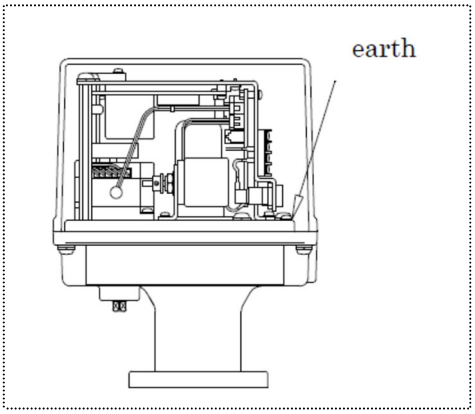
| Warning | |
|---|---|
| Prohibition | **Serious injury can result.**<br>▶ Do not connect or separate lines when the power is on. Also, do not touch any other parts on the board or the terminal block wiring part. (risk of electric shock or damage to equipment) |
| Forcing | **Serious injury can result.**<br>▶ Be sure to connect the ground wire.<br>(Poor grounding may cause electric shock, fire, etc. due to electric leakage.)<br>▶ Keep hands free of moisture and oil when adjusting or checking.<br>(risk of electric shock or damage to equipment) |

| ⚠Caution | |
|---|---|
| Prohibition | **The valve can be damaged, or leak.**<br>▶ Do not apply a load to the non-voltage limit switch exceeding the contact capacity. Also consult with CKD when using this product under a minute load (1mA～100mA, 5V～30V).<br>▶ Do not connect multiple (two or more) motorized valves in series. In addition, open/close switches (or relay contacts) should be provided for each electric valve.<br>▶ Do not use the product near high-voltage lines, inverters, or other objects that generate noise or magnetism. (Doing so may cause malfunction or failure.) |
| Forcing | **The valve can be damaged, or leak.**<br>▶ Check that there is no insulation defect when performing wiring work. (Danger of damage to wiring)<br>▶ Securely tighten the covers of each part. (Rainwater, dust, etc. may penetrate and cause malfunction.)<br>▶ Be sure to connect the wires correctly as shown in the wiring diagram. After wiring, be sure to check that the connection is secure, and then turn on the power. (Failure to do so may cause malfunction or failure.)<br>▶ Each lid part is sealed by an O-ring. When removing and reinstalling the cover, such as when wiring, be sure to confirm that the O-ring is set in place and securely sealed. (If the seal is insufficient, rainwater or other liquid may enter the actuator and cause electric shock or malfunction.)<br>▶ If the actuator is used outdoors or in a location where it will be exposed to rainwater or water drops, make sure that rainwater does not enter the actuator through the wiring port. (Rainwater or other liquid may enter the actuator, causing electric shock or malfunction.)<br>▶ For DC power specifications, the signal line and power line are not isolated. If insulation is required, install an isolator on the signal line.<br>▶ When wiring with a length greater than or equal to the attached cable (excluding the length 1m and terminal box), store the power line and signal line in a separate duct or conduit, or use shielded wires for the signal line. ) |

| | |
|---|---|
| Preparations | ▶ Phillips screwdriver ▶ wire stripper ▶ crimp terminal<br>▶ Connector ▶ terminal crimping tool |

**[Procedure]**

**1)** Loosen the screws fixing the actuator with a Phillips screwdriver and remove the cover.
**2)** Pull off the protective cap on the lead entry.
**3)** Attach the connector to the lead entry.
**4)** Pass the cable through the connector.
**5)** Peel off the outer skin of the cable with a wire stripper.
**6)** Use a terminal crimping tool to attach the crimping terminal to the lead wire.
**7)** Wire the terminal block with a Phillips screwdriver according to page 12.
※Tighten the screws securely. (There is a risk of electric leakage or electric shock.)
**8)** Attach the ground.
**9)** Securely tighten the connectors to prevent electric leakage or shock.
**10)** Tighten the screws securing the actuator cover with an Allen wrench to attach the cover.



## 8. Commissioning method

| Warning | |
|---|---|
| **Prohibition** | **Serious injury can result.**<br>▶ Do not connect or separate lines when the power is on. Also, do not touch any other parts on the board or the terminal block wiring part. (risk of electric shock or damage to equipment)<br>▶ Be sure to connect the ground wire.<br>(Poor grounding may cause electric shock, fire, etc. due to electric leakage.)<br>▶ Never touch the moving parts during operation.<br>(Hand or arm may become entangled.) |
| **Forcing** | **Serious injury can result.**<br>▶ Keep hands free of moisture and oil when adjusting or checking.<br>(risk of electric shock or damage to equipment)<br>▶ Perform manual operation after confirming that the actuator is not operated by the motor. |

| ⚠Caution | |
|---|---|
| Prohibition | **The valve can be damaged, or leak.**<br>▶ Do not connect multiple (two or more) motorized valves in series. In addition, open/close switches (or relay contacts) should be provided for each electric valve.<br>▶ Do not use the product near high-voltage lines, inverters, or other objects that generate noise or magnetism. (Doing so may cause malfunction or failure.) |
| Forcing | **The valve can be damaged, or leak.**<br>▶ Check that there is no insulation defect when performing wiring work.<br>(Danger of damage to wiring)<br>▶ Securely tighten the covers of each part. (Rainwater, dust, etc. may penetrate and cause malfunction.)<br>▶ Be sure to connect the wires correctly as shown in the wiring diagram. After wiring, be sure to check that the connection is secure, and then turn on the power. (Failure to do so may cause malfunction or failure.)<br>▶ Each lid part is sealed by an O-ring. When removing and reinstalling the cover, such as when wiring, be sure to confirm that the O-ring is set in place and securely sealed. (If the seal is insufficient, rainwater or other liquid may enter the actuator and cause electric shock or malfunction.)<br>▶ If the actuator is used outdoors or in a location where it will be exposed to rainwater or water drops, make sure that rainwater does not enter the actuator through the wiring port.<br>(Rainwater or other liquid may enter the actuator, causing electric shock or malfunction.)<br>▶ If you notice an unusual odor, heat, or smoke, immediately turn off the power supply.<br>(There is a possibility that a fire may occur if you use the watch without feeling any abnormality. If you find any abnormality, contact your dealer or us for inspection.) |

**Manual operation**

| ⚠Caution | |
|---|---|
| **Prohibition** | **The valve can be damaged, or leak.**<br>▶ Do not forcibly turn the manual handle further from the fully opened and closed positions.<br>(It will malfunction.) |
| **Forcing** | **The valve can be damaged, or leak.**<br>▶ Turn off the power.<br>(If the power is turned on during manual operation, you may be injured.) |

Preparations ▶ Hex key (8mm)

**[Procedure]**

1) Insert a hex wrench into the manual override shaft at the bottom of the actuator.
2) Slowly turn the hex key with the operating-torque 1.8N m or less.
   Rotate Right (Clockwise) → Open Direction
   Turn counterclockwise → Close
3) Detach the manual handle from the operation shaft by fully opening or closing the valve while looking at the valve travel indicator needle.

**Electric operation method**

| ⚠Caution | |
|---|---|
| **Prohibition** | **Serious injury can result.**<br>▶ Do not leave the actuator cover open.<br>(If the terminal is touched, an electric shock will occur.) |
| **Forcing** | **Serious injury can result.**<br>For Nominal size 15～50mm<br>▶ Make sure that the manual override shaft is not equipped with a hex wrench.<br>(The manual handle may come off and cause an injury.) |

**[Procedure]**

1) Make sure that the valve operates smoothly by opening and closing with the manual handle. Then, set the valve opening to 50% and remove the handle.
2) Turn off the operation power, supply the input signal, and check that the valve operates normally.
3) Fully open or closed to turn off the power.

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

| Warning | |
|---|---|
| Prohibition | **Serious injury can result.**<br>▶ Do not disassemble the actuator.<br>▶ Do not connect or separate lines when the power is on. Also, do not touch any other parts on the board or the terminal block wiring part. (risk of electric shock or damage to equipment)<br>▶ Never loosen the hexagon socket set screw that fixes the position of the potentiometer lever, as it may cause a failure. |
| Forcing | **There is a danger of injury.**<br>▶ Be sure to perform safety inspections of the machine tool and power tool beforehand.<br>▶ When installing piping, be sure to wear the appropriate protective equipment according to the operation details.<br>**Serious injury can result.**<br>▶ Completely drain the fluid in the piping when replacing the valve or replacing parts. If the fluid does not escape, reduce the fluid pressure to zero. |

| Caution | |
|---|---|
| Forcing | **The valve can be damaged, or leak.**<br>▶ Securely tighten the covers of each part. (Rainwater, dust, etc. may penetrate and cause malfunction.)<br>▶ The actuator is adjusted at the factory before shipment. However, if the setting needs to be changed or adjusted, perform the adjustment properly as described in the instruction manual. (Failure to do so may cause malfunction or failure.)<br>▶ Each lid part is sealed by an O-ring. When removing and reinstalling the cover, such as when wiring, be sure to confirm that the O-ring is set in place and securely sealed. (If the seal is insufficient, rainwater or other liquid may enter the actuator and cause electric shock or malfunction.) |

| Preparations | ▶ Wrench ▶ Protective gloves ▶ Protective goggles<br>▶ Hex key (5mm) or manual hand wheel (optional item) |
|---|---|

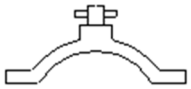
<**Disassembly**>
**[Procedure]**

**1)** Completely drain the fluid in the piping.
**2)** Fully close the valve by motor or manual operation.
**3)** Turn off the power.
**4)** Loosen and remove bolts and nuts (A) [18].
**5)** Remove the body.
**6)** Remove the diaphragm [3] by turning it 90° .

<**Assembly**>
**[Procedure]**

**1)** Make the diaphragm [3] the shape shown in Fig. 1.
**2)** Attach the diaphragm [3] by turning it 90° . Confirm that the pin of the mounting bracket of the diaphragm is completely engaged with the Joint.
**3)** Make the diaphragm [3] the shape shown in Fig. 2.
**4)** Insert hexagon wrench into the hexagon socket of the manual override shaft of the actuator [96].
**5)** Turn the hex wrench to the left (counterclockwise) while looking at the valve travel meter to set it to the fully open position.
**6)** Put the body [1] on the bonnet.
**7)** Install bolts and nuts (A) [18] and tighten the body [1] and bonnet [95].

(Fig 1)



(Fig 2)

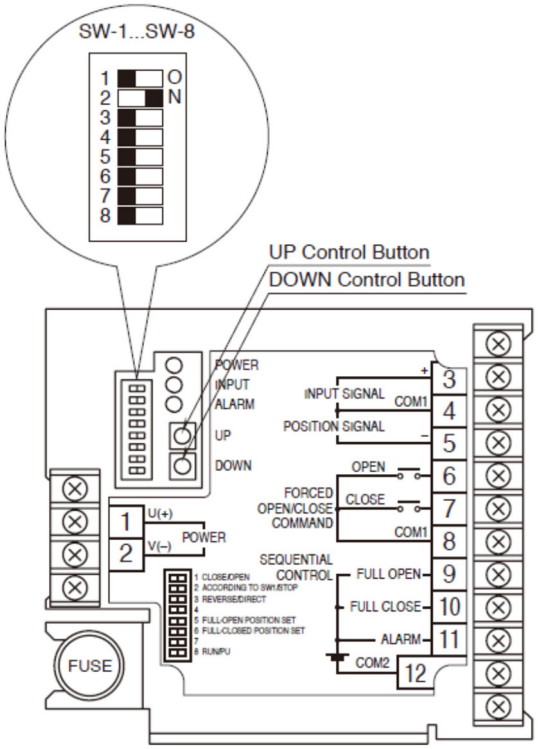
(Table 1) Body tightening torque value　　Units: N•m {kgf・cm}

| Nominal size / Diaphragm | 15, 20mm | 25, 32mm | 40mm | 50mm |
|---|---|---|---|---|
| Rubber | 3.0 {31} | 5.0 {51} | 12.0 {122} | 15.0 {153} |
| PTFE | 5.0 {51} | 8.0 {82} | 15.0 {153} | 20.0 {204} |

## 10. Adjustment method of the electric positioner

Adjust the full-open and full-closed positions by referring to the figure below. Switch the forward/reverse operation and the operation mode when the input signal is abnormally low as necessary.

Nominal size: 15～50mm (Actuator model: PSN)



**Switching to SW 1 and SW-2 when input-signal error drops**

When the input signal falls below DC0.37±0.1V in voltage conversion, it is judged that the input signal is abnormal and the operation at that time can be set.

Position of SW when input-signal error is low

| Operation mode | SW-1 | SW-2 |
|---|---|---|
| Stop | ※1 | ON |
| Fully open | OFF | OFF |
| Fully closed | ON | OFF |

※The setting of SW-1 at stopping is ignored.

**Operation switching (SW-3)**

Direct or reverse operation can be switched by SW-3. Normally set to reverse operation when shipped.

Operation switching

| Operation | SW-3 | Operation |
|---|---|---|
| Direct action | ON | Fully open at 0% input signal |
| Reverse action | OFF | Fully closed at 0% input signal |

※For Direct Action, the travel output signal is DC20～4mA for 0 to 100% input signal.

**Fully open, fully closed position adjustment**

1) Turn ON SW-8.
   The unit enters the local setting mode, and the input signal is ignored.
2) With SW 6 as ON, adjust the fully closed position with UP/DOWN key.
3) Turn OFF SW-6 after adjusting the fully closed position.
   The position of the output-axis when SW-6 changes from ON to OFF is memorized as the fully closed position.
4) With SW-5 as ON, use UP/DOWN to adjust the full-open position.
5) Turn OFF SW-5 after adjusting the fully open position.
   The position of the output-axis when SW-5 changes from ON to OFF is memorized as the fully open position.
6) Turn OFF SW-8.
   The unit enters the RUN mode and operates according to the input signal. Apply the input signal and confirm that the full-open and full-closed positions are as set.

## 11. Actuator output signal

**Output at gate opening**

This signal is 4mA at the fully-closed position set by adjusting the fully-open and fully-closed positions and 20mA at the fully-open position.

The (-) side of this signal is internally connected to the (-) side of the input signal, and is not independently isolated.

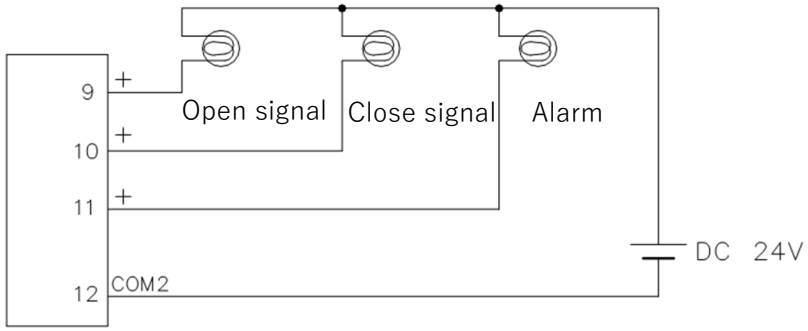
**Full-open/close signal**

This actuator is a transistor open collector output. This signal is output at the position set by the full-open/close signal position adjustment.

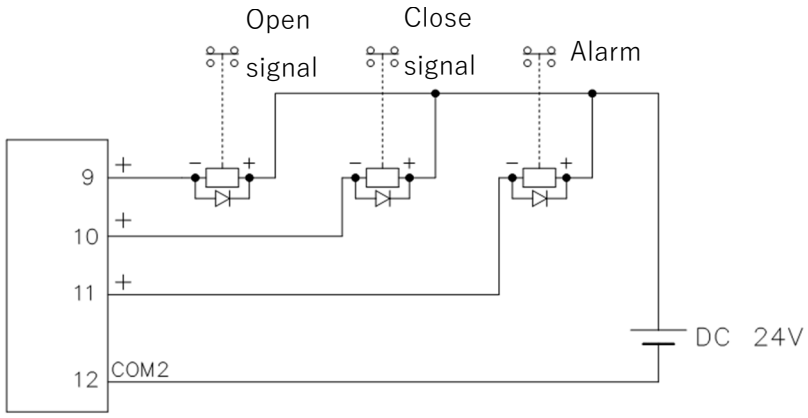
(Refer to the figure below for an example of wiring)

Example of open collector output wiring

When using a lamp
(The light is less than 2W for 24V.)




When relays are used
(relay-excited current is 100mA or less)




**Abnormal alarm signal**

▶ Abnormality detection

When the output shaft does not move due to overload, failure, etc., even though there is a deviation between the input signal and the signal position, the motor is set to the maximum torque and starts up several times repeatedly. If the output shaft still does not move, it is judged to be abnormal, an alarm is output, and the power supply to the motor is stopped. To reset the unit after detecting an error, apply 0% and 100% alternately several times by input signal, or turn OFF the power supply once.

▶ Abnormal temperature rise protection

When the temperature sensor in the unit detects an abnormal temperature rise in the motor, the abnormal alarm blinks until the temperature drops (the abnormal alarm signal repeats ON 0.5 seconds and OFF 0.5 seconds), and the power supply to the motor is stopped. Automatic recovery takes a few minutes, but the higher the ambient temperature, the longer it takes to recover.

| ⚠Caution | |
|---|---|
| **Forcing** | **The valve can be damaged, or leak.**<br>▶ 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.<br>▶ When removing the valve from the piping when replacing the valve or parts, completely remove the fluid from the piping before starting work.<br>▶ If any trouble is found, take the appropriate action referring to "13. 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 | [Flaged end]<br>Pipe flange connection | ① Retighten the pipe bolts to the specified torque.<br>② Remove the valve from the pipe and re-tighten the pipe bolts.<br>(Ref: 5. Mounting method [FInaged end]) |
| | | [Socket end]<br>Adhesive construction section | Remove the valve from the piping and retry the bonding process.<br>(Ref: 5. Mounting [Socket end]) |
| | | [Threaded end type]<br>Threaded connection | Remove the valve from the piping and screw the valve in again.<br>(Ref: 5. Mounting method [Threaded end type]) |
| | | Top flange of the valve | Remove the valve from the piping and replace the valve or defective part.<br>(Ref: 9. How to disassemble for parts replacement) |
| | | Cap nut portion of the valve | ① Retighten the cap nut<br>② Remove the valve from the piping, check the O-ring and sealing surface, and replace the defective part.<br>(Ref: 5. Mounting method ) |
| | | Surface of the entire valve | Remove the valve from the pipe and replace the valve.<br>(Ref: 9. How to disassemble for parts replacement) |
| Internal leakage (visual and measurement) | No leakage | Leakage to secondary side when valve is fully closed | Remove the valve from the piping and replace the valve or defective part.<br>(Ref: 9. How to disassemble for parts replacement) |
| | | Measured values of flowmeters, pressure gauges, etc. | Remove the valve from the piping and replace the valve or defective part.<br>(Ref: 9. How to disassemble for parts replacement) |

| Inspection items and inspection methods | Guideline of judgment | Check point | Treatment method |
|---|---|---|---|
| Misalignment of operating position (visual inspection) | No deviation | Actuator opening display | Remove the actuator cover and adjust the limit switch operating position.<br>(Ref: 15. How to adjust limit switch) |

**Daily Inspection (continued)**

| Inspection items and inspection methods | Guideline of judgment | Check point | Treatment method |
|---|---|---|---|
| Abnormal noise (hearing) | No abnormal noise | Valves and actuators | Remove the valve from the pipe and replace the valve or actuator.<br>(Ref: 9. How to disassemble for parts replacement) |
| | | Piping around the valve | Reconfirm the conditions of use<br>(Ref: 2. Handling Precautions) |
| Odor ※1) (sniffing) | No odor | Valves and actuators | Remove the valve from the pipe and replace the valve or actuator.<br>(Ref: 9. How to disassemble for parts replacement) |

**※1) Failure to do so may result in burnout or fire.**

**Periodic inspection**

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

| Inspection items and inspection methods | Guideline of judgment | Check point | Remedy for malfunctions |
|---|---|---|---|
| Operating time (Measurement) | Error within ±1 second | Actuator opening display | Check the power supply voltage (±10%). (Ref: Actuator nameplate) |
| | | | Remove the valve from the pipe and replace the valve or actuator. (Ref: 9. How to disassemble for parts replacement) |
| Vibration (palpation) | No different from other parts | Valves and actuators | Recheck the operating conditions and remove the source of vibration. (Ref: 2. Handling Precautions) |
| | | | Remove the valve from the pipe and replace the valve or actuator. (Ref: 9. How to disassemble for parts replacement) |
| | | Piping around the valve | Recheck the operating conditions and remove the source of vibration. (Ref: 2. Handling Precautions) |

**Periodic inspection**

**●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: 9. How to disassemble for parts replacement) |
| Looseness of bolts (visual and palpation) | No Loose | For mounting base + valve | Retighten the mounting bolts |
| | | For mounting base + actuator | Retighten the mounting bolts |
| | | For fixing the actuator cover | Retighten the screws |
| | | Terminal block | Retighten the screws |
| | | [Flnaged end] For flange piping | Retighten the pipe bolts to the specified torque. (Ref: 5. Mounting [Flnaged end]) |
| Water-intrusion ※1) (visual inspection) | No intrusion | Inside the actuator | Replace the actuator (Ref: 9. How to disassemble for parts replacement) |
| Intrusion ※1) of foreign objects (visual inspection) | No intrusion | Inside the actuator | Replace the actuator (Ref: 9. How to disassemble for parts replacement) |
| Measured ※1) of the isolation resistance (Measurement) | Must be 50MΩ or more | Inside the actuator | Replace the actuator (Ref: 9. How to disassemble for parts replacement) |
| Corrosion Or rust ※1) (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: 9. How to disassemble for parts replacement) |
| Product damage | No scratches, cracks, or deformation | Appearance of the product | Remove the valve from the pipe and replace the valve or actuator. (Refer to P24_14. Disassembly method for replacing parts) |

**※1) Failure to do so may result in burnout or fire.**

## 13. Cause of malfunction and remedy

| Failure phenomenon | Possible cause | Measures and measures |
|---|---|---|
| Manual hand wheel does not turn (cannot turn) during manual operation | Already fully open (or fully closed) | Turn the hand wheel in the reverse direction. |
| | The power remains supplied in the opposite direction of the handle operation direction. | Turn off the power |
| | Foreign matter caught in valve | Disassemble to remove foreign matter (Ref: 9. How to disassemble for parts replacement) |
| Do not open or close with electric operation | The operation panel is turned off. | Turn on the power. |
| | Power supply voltage drop | Return the power supply voltage to the normal level. |
| | Puncture of the starting capacitor | Replace the capacitor |
| | The cable to the actuator is disconnected. | Check the connection condition again. (Ref: 4. Wiring diagram for actuator specifications) |
| | The power is turned on at the same time. | |
| Fluid leaks even when fully closed | The diaphragm is worn out. | Replace diaphragm (Ref: 9. How to disassemble for parts replacement) |
| | Scratches on diaphragm or body | Replace applicable parts (Ref: 9. How to disassemble for parts replacement) |
| | Foreign matter caught in valve | Disassemble to remove foreign matter (Ref: 9. How to disassemble for parts replacement) |
| | Low voltage | Check the voltage |

| Failure phenomenon | Possible cause | Measures and measures |
|---|---|---|
| Fluid leaks from valve | Bolt between body and motor bonnet is loose | Tighten to the specified torque.<br>(Ref: 9. How to disassemble for parts replacement) |
| | Scratches on diaphragm or body | Replace applicable parts<br>(Ref: 9. How to disassemble for parts replacement) |
| | Foreign matter caught between diaphragm and body | Disassemble to remove foreign matter<br>(Ref: 9. How to disassemble for parts replacement) |
| | <For universal diaphragm valve 14 type><br>Is the cap nut not loose? | (For the universal diaphragm valve 14 type), tighten the cap nut.<br>(Ref: 5. Mounting method) |
| | <For universal diaphragm valve 14 type><br>O The ring (C) is scratched. | (For universal diaphragm valve 14 type) Replace O ring. (C)<br>(Ref: 5. Mounting method) |
| Actuator is operating but valve is not open or closed | Diaphragm or joint Joint damaged | Replace applicable parts<br>(Ref: 9. How to disassemble for parts replacement) |

**CAUSE OF FAILURE AND HOW TO 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<br>(Ref. 11. Test Run) |
| | 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.<br>(Ref: 9. How to disassemble for parts replacement) |
| | Piping stress is applied to the valve. | Remove the piping stress |
| | The torque of the valve has increased due to the effects of the fluid (temperature, components, pressure, etc.) | Reconfirm the conditions of use<br>(Ref: 2. Handling Precautions) |

| Failure phenomenon | Possible cause | Measures and measures |
|---|---|---|
| Do not open or close with electric operation | The power is off. | Check the voltage and turn on the power. |
| | Wiring to the terminal block is disconnected. | Stop operation immediately and recheck the connection status. (Ref: 7. Wiring diagram for actuator specifications) |
| | The cable or the connection inside the actuator is broken. | Replace the cable or the actuator. (Ref: 9. How to disassemble for parts replacement) |
| | Simultaneous switching energizing or incorrect wiring to the terminal block | Stop operation immediately and recheck the connection status. (Ref: 7. Wiring diagram for actuator specifications) |
| | The power supply voltage is different. | Check the voltage with a tester to obtain the correct voltage. |
| | Power supply voltage is low. | Check the voltage with a tester to obtain the correct voltage. |
| | Foreign matter caught in valve | Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 9. How to disassemble for parts replacement) |

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

| Failure phenomenon | Possible cause | Measures and measures |
|---|---|---|
| Fluid leaks even when fully closed (internal leak) | High fluid pressure | Use below the maximum allowable pressure (Ref: 9. How to disassemble for parts replacement) |
| | Diaphragm is worn or scratched | Remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 9. How to disassemble for parts replacement) |
| | Missing parts | Remove the valve from the piping and attach the relevant part or replace the valve. (Ref: 9. How to disassemble for parts replacement) |
| | Foreign matter caught in valve | Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 9. How to disassemble for parts replacement) |
| | Piping stress is applied to the valve. | Remove the piping stress |

| Failure phenomenon | Possible cause | Measures and measures |
|---|---|---|
| Fluid leaks even when fully closed (internal leak) | High fluid pressure | Use below the maximum allowable pressure (Ref: 9. How to disassemble for parts replacement) |
| | Diaphragm is worn or scratched | Remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 9. How to disassemble for parts replacement) |
| | Missing parts | Remove the valve from the piping and attach the relevant part or replace the valve. (Ref: 9. How to disassemble for parts replacement) |
| | Foreign matter caught in valve | Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 9. How to disassemble for parts replacement) |
| | Piping stress is applied to the valve. | Remove the piping stress |

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

| Failure phenomenon | Possible cause | Measures and measures |
|---|---|---|
| Fluid leaks from valve (external leak) | Cap nut is loose | Retighten the cap nut (Ref: 5. Mounting method ) |
| | O-ring is scratched, worn, melted, or altered | Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 9. How to disassemble for parts replacement) |
| | Scratches or wear are found on the sliding or fixing surfaces of the O-ring. | Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 9. How to disassemble for parts replacement) |
| | Valve is cracked or broken | Stop using the product immediately, remove the valve from the piping, and replace the valve. (Ref: 4. How to disassemble for parts replacement) |
| Actuator is operating but valve is not open or closed | The stem or Joint is damaged. | Stop using the product immediately, remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 9. How to disassemble for parts replacement) |

| Failure phenomenon | Possible cause | Measures and measures |
|---|---|---|
| The actuator emits a bad smell, heat, or smoke. | Actuator is defective | Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 9. How to disassemble for parts replacement) |
| | Wrong connection to the terminal block | Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 9. How to disassemble for parts replacement) |
| | An overcurrent is flowing to the actuator | Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 9. How to disassemble for parts replacement) |
| | The actuator is affected by lightning. | Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 9. How to disassemble for parts replacement) |
| Actuator is corroded | The watch is exposed to water, chemical liquids, or other liquids. | Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 9. How to disassemble for parts replacement) |
| Valve is corroded or deformed | The watch is exposed to water, chemical liquids, or other liquids. | Stop using the product immediately, remove the valve from the piping, and replace the valve. (Ref: 9. How to disassemble for parts replacement) |

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

| ⚠ Warning | |
|---|---|
| **Forcing** | **When burnt, toxic gas is generated.**<br>▶ 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

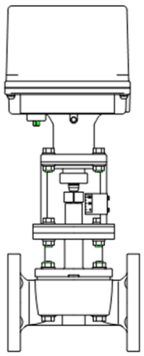
Contact the nearest dealer, our sales office, or our web website for inquiries about this product.

**[User's Manual]**

Diaphragm valve Type 14 Electric actuated Type M

True union diaphragm valve Type 14 Electric actuated Type M

15～50mm



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

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