Diaphragm valve 15 type
Electric Actuated Type S
125、150 mm

User's Manual

Thank you for choosing our product.
This User's 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 User's 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, User's 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 User's manual, etc. or the maintenance or replacement of consumable parts has been performed normally.
- ▶ The component is used for purposes other than the product's intended use.
- ▶ Failure or malfunction due to causes that could not be foreseen by our level of science and technology at the time of shipment.
- ▶ The fault is due to an external factor that is not our responsibility, such as natural disaster or disaster.

Disclaimer

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

2. Safety Instructions

Unpacking, Transportation and Storage

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

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not subject the product to impact by throwing, dropping or hitting. ▶ Do not scratch or pierce the product with a sharp object such as a knife or hand hook. ▶ Do not pile up cardboard boxes forcefully to prevent the load from collapsing. ▶ Avoid contact with coal tar, creosote (a wood preservative), white pesticides, insecticides, paints, etc. ▶ Do not hang the handle when transporting the valve.
Forcing	**The valve can be damaged, or leak.** ▶ Keep in cardboard until just before piping, and store indoors (at room temperature) away from direct sunlight. Also, avoid storing the product in places of high temperature. (The strength of cardboard packaging decreases when it gets wet. Be very careful when storing and handling it.) ▶ After unpacking, make sure that the product is correct and that it meets the specifications.

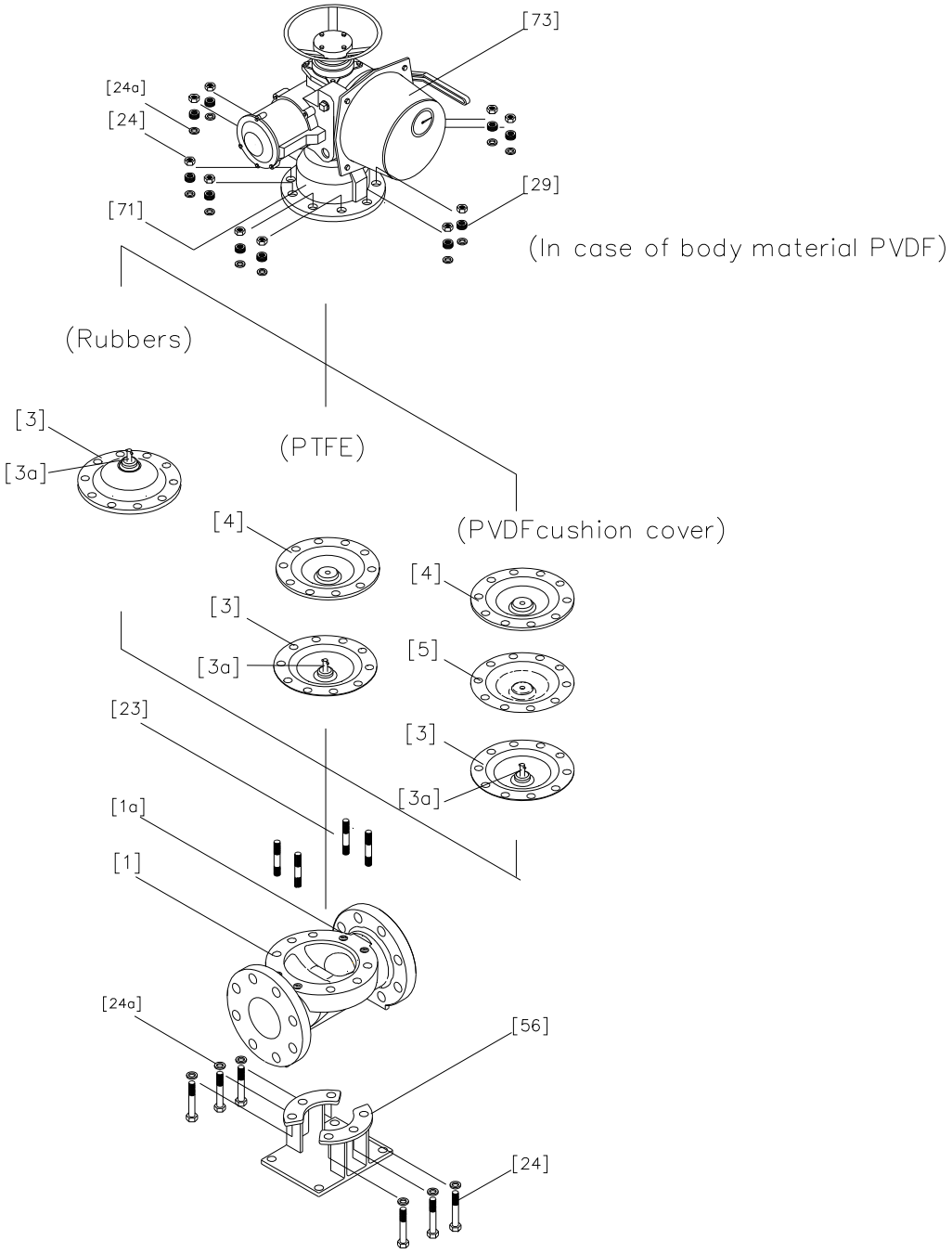
Product Handling

⚠ Warning	
Prohibition	**Serious injury can result.** ▶ Do not disassemble the actuator. ▶ Do not touch moving parts during operation. (Hand or arm may become entangled.)
Forcing	**The valve can be damaged, or leak.** ▶ If positive pressure gas is used for our resin piping material, a dangerous condition may occur due to the repulsive force peculiar to compressible fluids even if the pressure is the same as the water pressure. Therefore, be sure to take safety measures for the surrounding area, such as covering the piping with protective materials. If you have any questions, please contact us separately. ▶ When conducting a pipe leak test after completion of piping construction, be sure to check with water pressure. Contact us in advance if you are unavoidable to test with a gas. ▶ Check the voltage on the power supply and nameplate before use. A different voltage may cause damage or malfunction of the equipment. ▶ Perform manual operation after confirming that the actuator is not operated by the motor.

⚠Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not step on the valve or place heavy objects on it. ▶ Keep away from fire and hot objects. ▶ Do not use the product in places where it may be submerged. ▶ 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. ▶ Do not subject the valve to large vibrations. ▶ Do not leave the actuator in a soil or a water reservoir other than the water resistant type.
Forcing	**There is a danger of injury.** ▶ Secure sufficient space for maintenance and inspection when piping. **The valve can be damaged, or leak.** ▶ Keep the pressure and temperature of the fluid within the allowable range. (The maximum allowable pressure includes water hammer pressure.) ▶ Use a valve of suitable material for the operating conditions. (Depending on the type of chemical liquid, the parts may be damaged. Contact us in advance for details.) ▶ Use fluids containing crystalline material under conditions that do not recrystallize. ▶ Avoid any place where the valve is constantly exposed to splashes of water and dust, or direct sunlight, or protect the valve with a cover or the like to cover the entire area. ▶ Perform maintenance on a regular basis referring to "**11.Inspection items**." Pay particular attention to temperature changes and aging during long-term storage or shutdown or use. ▶ The tightening bolts and nuts of the diaphragm (between the bonnet and body) 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 bonnet tightening torque table (5. Piping method). ▶ Provide appropriate valve support when installing the valve. ▶ Always use the product within the indicated product specifications. ▶ If you notice an unusual odor, heat, or smoke, immediately turn off the power supply. If any abnormality is found, be sure to consult your dealer or us for inspection. ▶ Use the supplied handle for manual operation. ▶ When using in an explosive atmosphere, make sure that the actuator conforms to the explosion-proof specifications. ▶ Keep the ambient temperature of the installation location within-10 to 50°C. ▶ Avoid places with corrosive gases or poor atmospheres, and provide a cover or the like to cover the entire area.

3. Name of each part

125 mm、150 mm



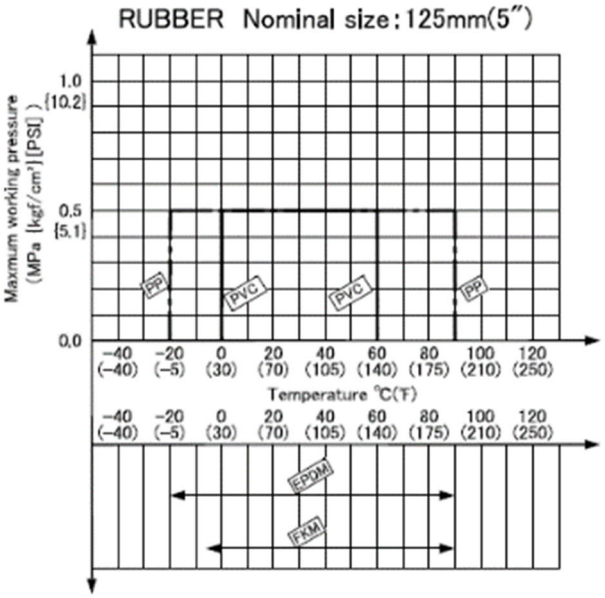
[1]	Body	[5]	Cushion cover	[56]	Stand A)
[1a]	Recessed nut	[23]	Stud bolt and nut	[71]	Bonnet (B)
[3]	Diaphragm	[24]	Bolts and nuts	[73]	Actuator (electric)
[3a]	Inserted metal of diaphragm (A)	[24a]	Washer		
[4]	Cushion	[29]	Disc spring washer (if body is PVDF)		

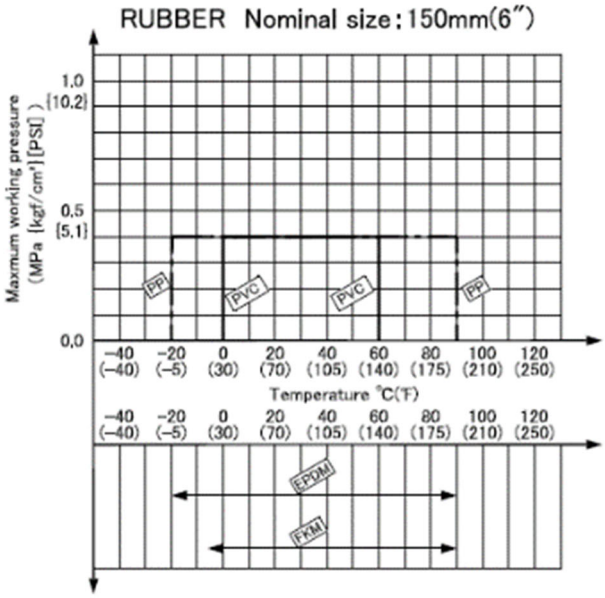
4. Product Specifications

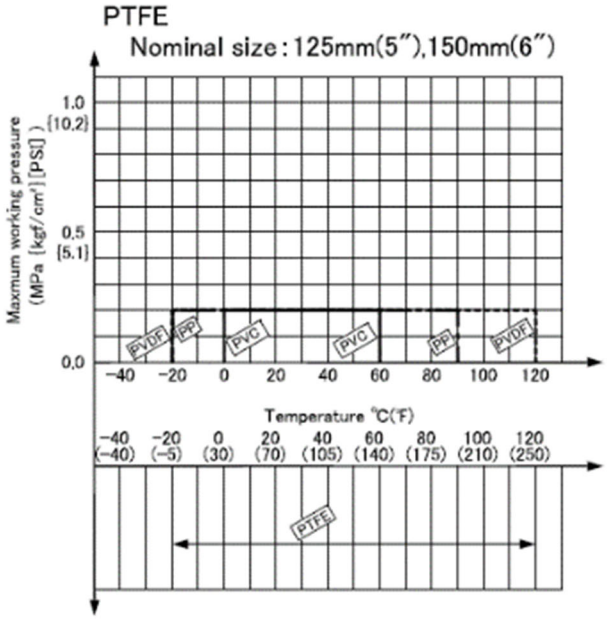
Model number table

ACTUATION	TYPE	ACTUATOR TYPE	ACTION / POWER SOURCE	BODY MATERIAL	SEAL MATERIAL	CONNECTION	STANDARD	SIZE	HIGH PURITY SERIES
A	15	S	*	*	*	F	*	* * *	*
A AUTOMATIC VALVE	15 TYPE 15	S TYPE S	3 Three-Phase 200VAC 4 Three-Phase 400VAC	U PVC P PP F PVDF	E EPDM T PTFE V FKM	F FLANGED	J JIS 10K 5 JIS 5K D DIN A ANSI	125 125mm 150 150mm	1 LIBRICANT FREE

Relationship between maximum allowable pressure and temperature





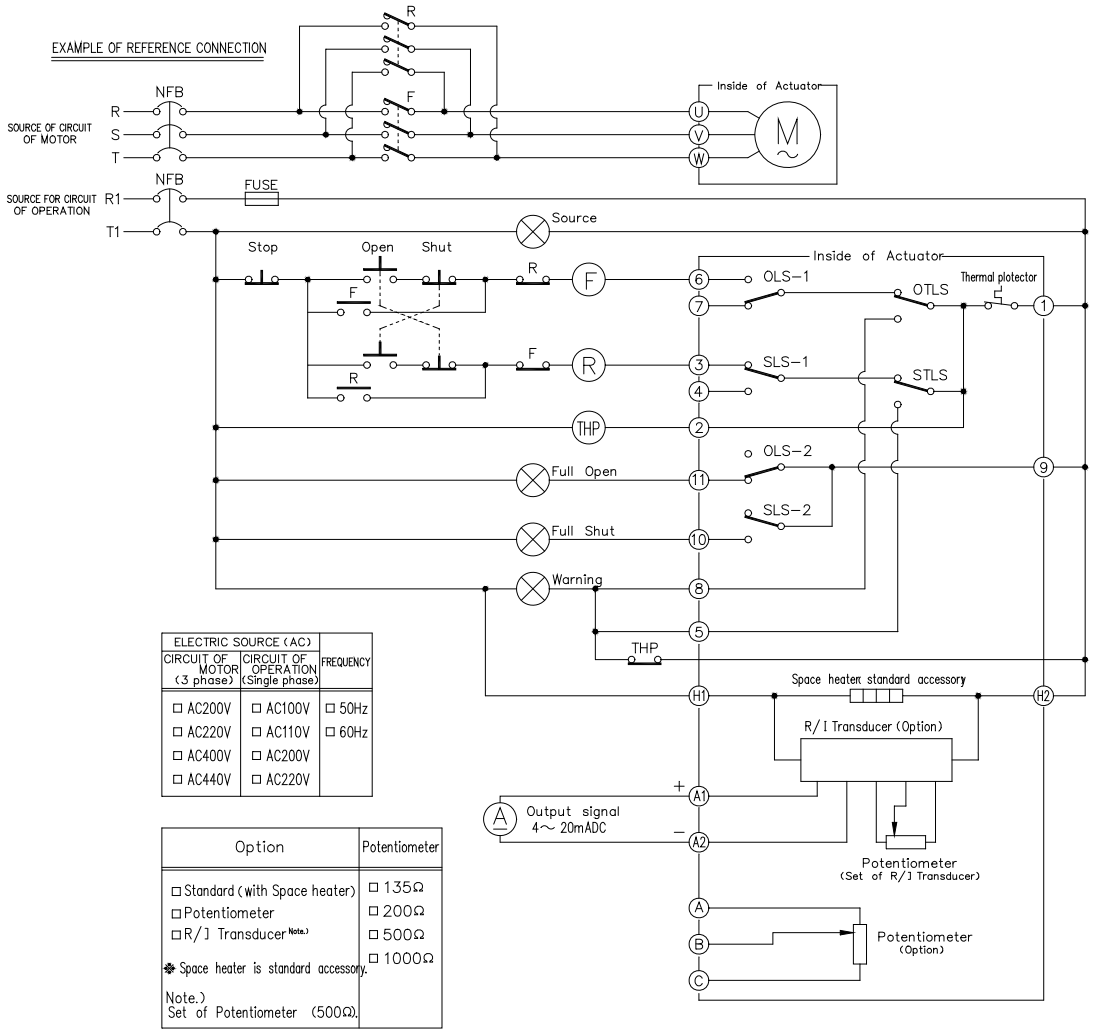


Actuator

Specifications List

Size (mm)		125	150
Actuator model		LTRM-01	LTMD-01
Open/close time (sec)	50Hz	29	54
	60Hz	24	46.5
Degree of protection		IP55	
Motor starting current (A) 50/60Hz	200VAC	8.8 / 8.3	8.0 / 7.4
	400VAC	4.4 / 4.1	4.0 / 3.7
Motor Rated Current (A) 50/60Hz	200VAC	3.0 / 2.4	2.5 / 2.2
	400VAC	1.5 / 1.2	1.3 / 1.1
Manual operation handle revolution		10	
Electricity consumption (Watts) 50 / 60Hz	200VAC	397 / 361	650 / 610
	400VAC	397 / 361	670 / 610
Cable connector Size		2-G1	Operating circuit: 2-G1, motor circuit: G3/4
Motor rated output (W)		400	
Motor insulation type		B Type	
Motor time rating		15 Minute	
Limit switch capacity		250VAC 5A	
Number of motor poles (P)		4	
Space heater rated output (W)		10	
Potentiometer Between 1 and 3 Max. applied voltage (V)	100 Ω	15	
	200 Ω	20	
	500 Ω	30	
	1K Ω	45	

Wiring Diagram

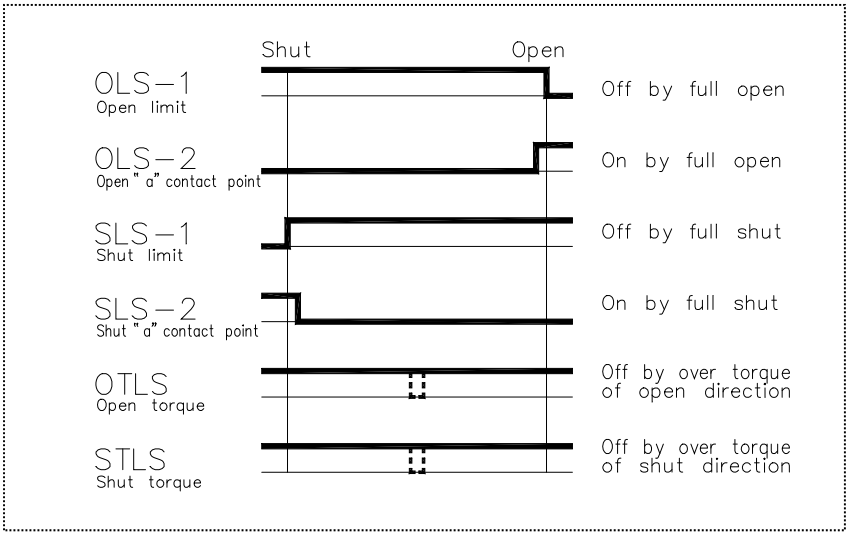


ELECTRIC SOURCE (AC)		
CIRCUIT OF MOTOR (3 phase)	CIRCUIT OF OPERATION (Single phase)	FREQUENCY
□ AC200V	□ AC100V	□ 50Hz
□ AC220V	□ AC110V	□ 60Hz
□ AC400V	□ AC200V	
□ AC440V	□ AC220V	

Option	Potentiometer
□ Standard (with Space heater)	□ 135Ω
□ Potentiometer	□ 200Ω
□ R/I Transducer Note.)	□ 500Ω
❖ Space heater is standard accessory.	□ 1000Ω
Note.) Set of Potentiometer (500Ω).	

NOTE. This circuit diagram shows the position that the opening action has come to an end.

Swing chart



5. Piping method

Warning	
Prohibition	**Serious injury can result.** ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.
Forcing	**Serious injury can result.** ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ When installing piping, be sure to wear the appropriate protective equipment according to the operation details.

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not open or close the valve with dust or other foreign matter in the fluid.
Forcing	**The valve can be damaged, or leak.** ▶ Be careful not to overtighten the pipe support when you remove it with a U band or the like. ▶ When installing the product, make sure that no excessive stress such as tension, compression, bending or impact is applied to the piping or valve, etc. ▶ 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. ▶ Use a connection flange with a full-face seat. ▶ Check that there is no difference in mutual flange standards. ▶ Be sure to use the sealing gaskets (AV packing), 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 packing

[Procedure]

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

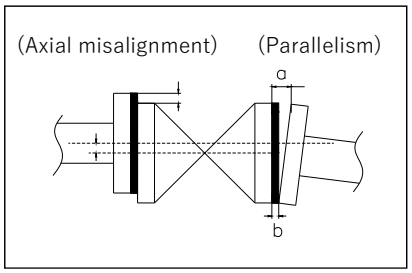
⚠Caution

Forcing

The valve can be damaged, or leak.

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

Size (mm)	Axial misalignment	Parallelism (a-b)
125、150	1.0mm	1.0mm



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

⚠Caution

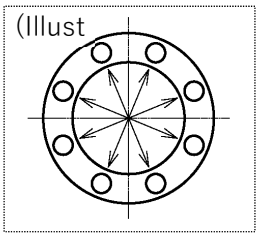
Forcing

The valve can be damaged, or leak.

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

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

Size	125mm	150mm
Torque value	40.0 {408}	40.0 {408}



6. Support installation method

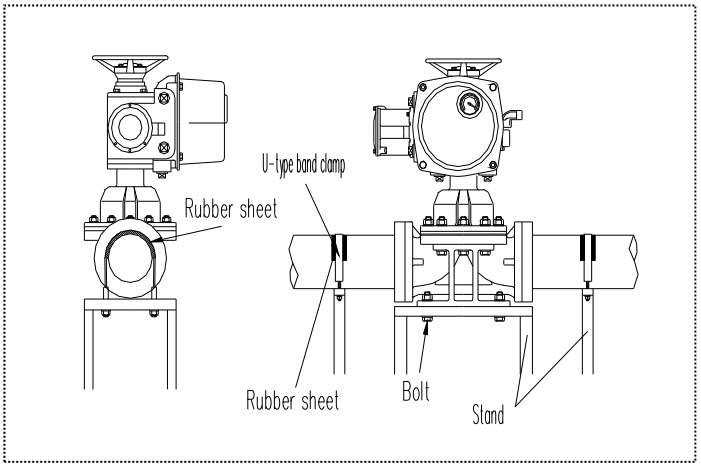
⚠Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not cause large vibrations to the valve by the piping around the pump. (Failure to do so may cause malfunction or damage.)
Forcing	**The valve can be damaged, or leak.** ▶ Install a valve support. (Excessive force is applied to the valve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

Preparations ▶ Spanner ▶ U-band (with bolt) ▶ bolt/nut (M20) ▶ rubber sheet

Horizontal piping

Fix the mounting base [56] and the mount provided on the valve with bolts.

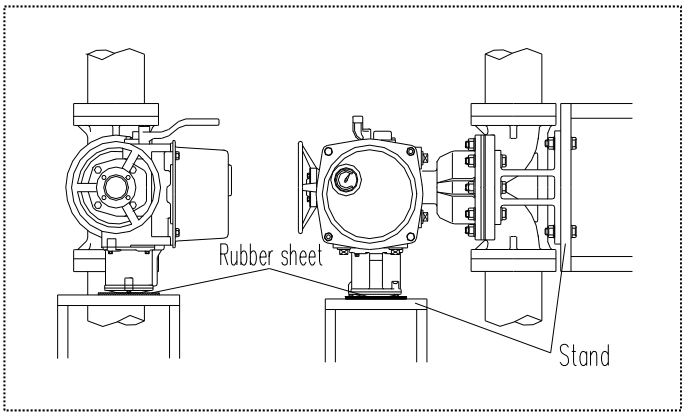
Lay a rubber sheet on the top of the pipe and secure it with the U-band.



Vertical piping

Fix the mounting base [56] and the mount provided on the valve with bolts.

Place a rubber sheet on the actuator and secure it with the frame.



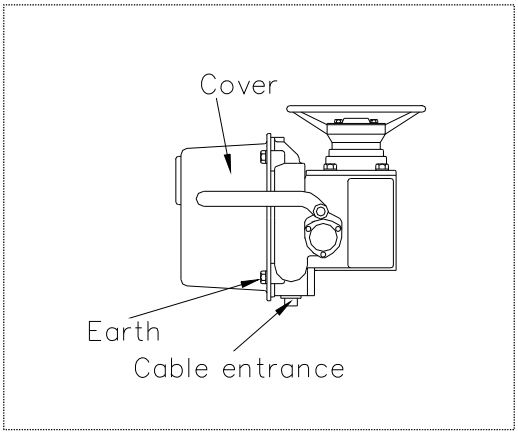
7. Electrical Wiring

Warning	
Prohibition	**Serious injury can result.** ▶ 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	**Failure to do so may cause an electric shock or fire due to electric leakage.** ▶ Be sure to connect the ground wire. (Poor grounding may cause electric shock, fire, etc. due to electric leakage.) **Failure to do so may result in electric shock or damage to the equipment.** ▶ Keep hands free of moisture and oil when adjusting or checking.

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ 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). ▶ 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. ▶ 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.** ▶ Check that there is no insulation defect when performing wiring work. ▶ Securely tighten the covers of each part. (Rainwater, dust, etc. may penetrate and cause malfunction.) ▶ 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.) ▶ 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.) ▶ 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.) ▶ Check the power supply and voltage on the nameplate before use. A different voltage may cause damage or malfunction of the equipment.

Preparations	▶ Phillips screwdriver ▶ wire stopper ▶ Compressed terminal ▶ connector ▶ Electronic Crimping Tool

[Procedure]



1) Loosen the screws holding the actuator cover with a wrench and remove the cover.
2) Remove the lead entry plug with a spanner.
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 15.
※Tighten the screws securely.
(There is a risk of electric leakage or electric shock.)
8) Tighten the connector.
※Tighten the connector securely. (There is a risk of electric leakage or electric shock.)
9) Tighten the screws holding the actuator cover with a wrench to attach the cover.
10) Attach the ground.

8. Commissioning method

⚠ Warning	
Prohibition	**Serious injury can result.** ▶ 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) ▶ Be sure to connect the ground wire. (Poor grounding may cause electric shock, fire, etc. due to electric leakage.) ▶ Never touch the moving parts during operation. (Hand or arm may become entangled.)
Forcing	**Failure to do so may result in electric shock or damage to the equipment.** ▶ Keep hands free of moisture and oil when adjusting or checking. (risk of electric shock or damage to equipment) **Serious injury can result.** ▶ Perform manual operation after confirming that the actuator is not operated by the motor.

⚠ Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ 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.** ▶ Check that there is no insulation defect when performing wiring work. (Danger of damage to wiring) ▶ Securely tighten the covers of each part. (Rainwater, dust, etc. may penetrate and cause malfunction.) ▶ 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.) ▶ The lid is sealed with 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.) ▶ 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.) ▶ If you notice an unusual odor, heat, or smoke, immediately turn off the power supply. (There is a possibility that a fire may occur if you use the watch without feeling any abnormality. If you notice any abnormality, contact your dealer or us for inspection.)

Manual operation

⚠Caution	
Prohibition	**Valves can fail, become damaged, or leak.** ▶ Do not forcibly turn the manual handle (optional item) further from the fully open/closed positions. ▶ LTRM and LTMD are of the auto reset type. The switch lever cannot be returned to the electric side by manual operation. Do not perform manual operation to the motorized side.
Forcing	**The valve can be damaged or leak.** ▶ LTRH is a manual return type. Move the switch lever to the electric position manually.

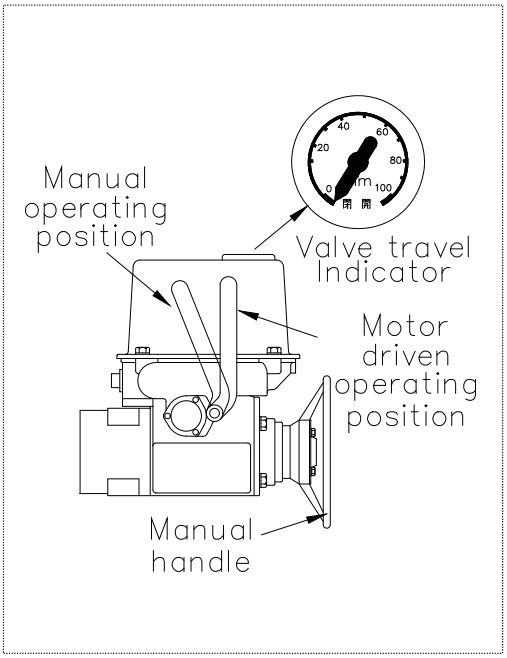
Preparations ▶ Hex key (5mm) or manual hand wheel (optional item)

[Procedure]

1) Set the selector lever to the manual position. If it does not switch smoothly, turn the manual handle to either side and turn the switch lever.
※Do not forcibly turn the manual handle further from fully open "O" and fully closed "S". (It will malfunction.)

2) Turn the manual handle while watching the valve travel meter.
▶ Rotate clockwise → Close direction
▶ Counterclockwise rotation → Open direction

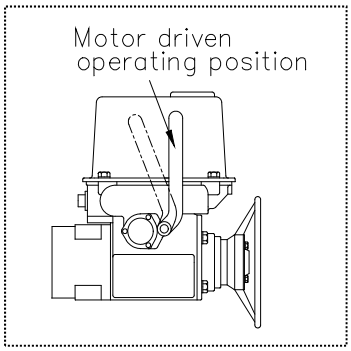
3) Turn on the power and press the OPEN or CLOSE button.
(The switching lever automatically returns to the motorized position)



Electric operation

⚠ Caution	
Prohibition	**The valve can be damaged or leak.** ▶ Do not leave the actuator cover open. (If the terminal is touched, an electric shock will occur.)

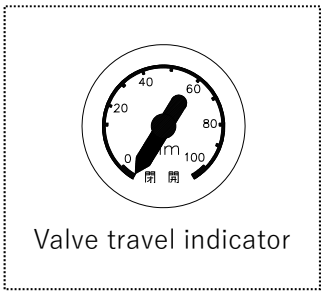
[Procedure]



1) Turn on the power.

2) Operate the OPEN/CLOSE switch to open or close the valve and check that the indicated direction matches the operating direction. If they do not match, check the wiring diagram (see page 13) and perform the operation from 1) again.

3) Fully open "O" or fully closed "S" to turn off the power.



Valve travel indicator

9. How to disassemble/assemble for parts replacement

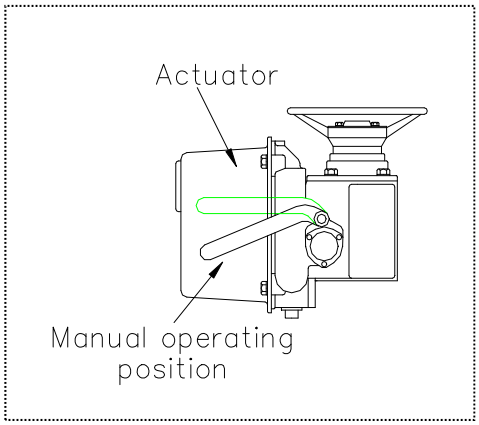
Warning	
Prohibition	**Serious injury can result.** ▶ Do not disassemble the actuator. **Failure to do so may result in electric shock or damage to the equipment.** ▶ Do not connect or separate lines when the power is on. Also, do not touch any other parts on the board or the terminal block wiring part.
Forcing	**There is a danger of injury.** ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ When installing piping, be sure to wear the appropriate protective equipment according to the operation details. **The valve can be damaged, or leak.** ▶ 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.** ▶ Securely tighten the covers of each part. (Rainwater, dust, etc. may penetrate and cause malfunction.) ▶ 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 User's manual. (Failure to do so may cause malfunction or failure.) ▶ 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 ▶ Spanner ▶ Protective gloves ▶ Protective glasses

<Disassembly>

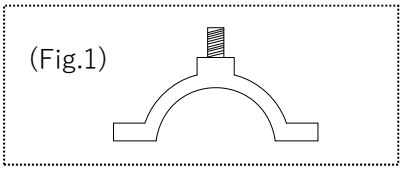
[Procedure]



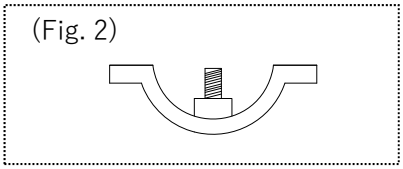
1) Completely drain the fluid in the piping.
2) Fully close the valve by motor or manual operation.
3) Turn off the power.
4) Loosen and remove bolts and nuts [24].
5) Lift out the actuator [73].
6) Remove the diaphragm [3] by turning it counterclockwise.

<Assembly>

[Procedure]



1) Make the diaphragm [3] the shape shown in Fig. 1.
2) Mount the diaphragm [3] by turning it clockwise.
3) Tighten the diaphragm [3] until the screw stops, and then turn it counterclockwise until the direction of the valve seat seal rib and the pressing surface of the compressor match.
4) Make the diaphragm [3] the shape shown in Fig. 2.
5) Turn the manual handle counterclockwise while looking at the gauge to fully open the valve.
6) Place actuator [73] on body [1].
7) Install bolts and nuts [24] and tighten body [1] and bonnet [71]. (Refer to Table 1 for the body tightening torque.)



(Table1) Body tightening torque. Unit: N·m {kgf・cm}

Size / Diaphragm	125mm	150mm
Rubber	45 {459}	45 {459}
PTFE	45 {459}	45 {459}

10. How to adjust the limit switch

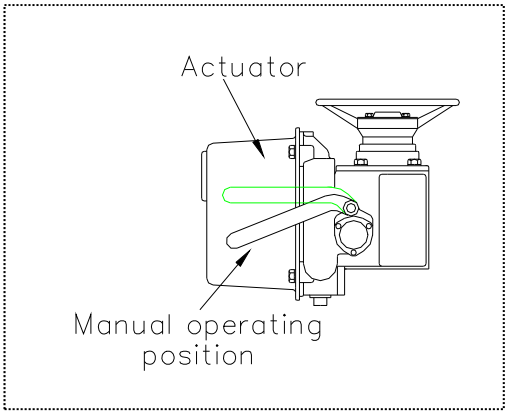
Warning	
Prohibition	**Serious injury can result.** ▶Do not connect or separate lines to the limit switch in the power supply status. (electric shock or sudden start of the machine)

Caution	
Prohibition	**The valve can be damaged or leak.** ▶ Do not leave or use the actuator cover open. (Water or dust may penetrate and cause operation failure.)
Forcing	**The valve can be damaged or leak.** ▶ Contact CKD when using the limit switch in a 1mA～100mA, 5V～30V.

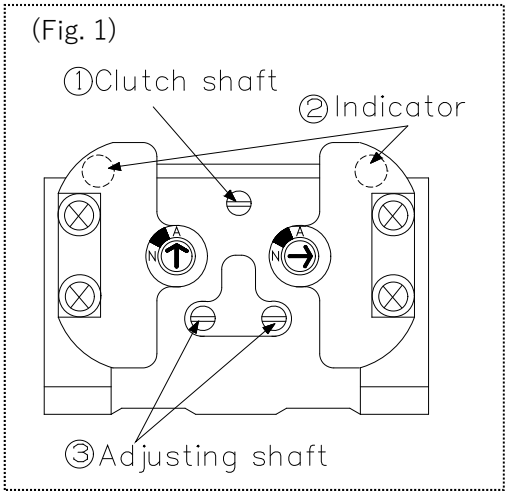
[Procedure]

1) Turn off the power and remove the fluid in the piping completely. Then, loosen the actuator cover with a wrench and remove it.

2) Perform manual operation (refer to page 20) to the opening to be adjusted (fully open or fully closed).



3) Insert the special handle into the clutch shaft and push it in until the clutch shaft is retracted by turning it about 30 degrees.
※Failure to follow this procedure may damage the limit switch mechanism.



4) The switch assigned to the moved opening (check the set opening [2], for example "O" switch when fully open) is settled.

5) Insert the special handle into the reduction shaft [3] (Fig. 1) that is closest to the corresponding switch. Turn the reduction shaft in the direction that the number of turns is less, and find the point where the arrow on the switch changes from N to A or A to N.

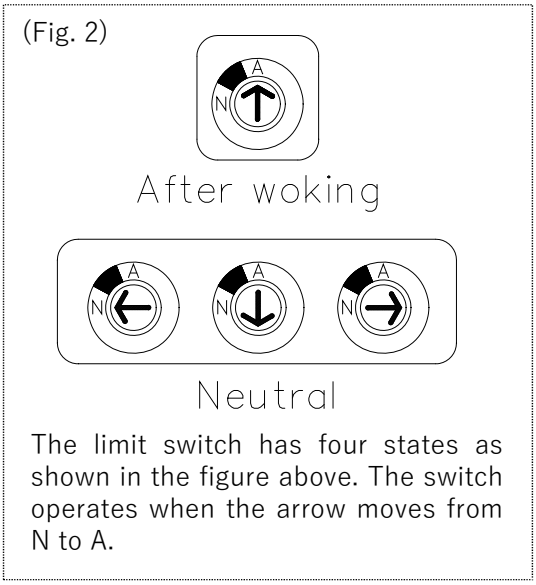
6) Pull out the special handle when the arrow changes from N to A with N.

7) Insert the special handle into the clutch shaft again. Turn the handle to return the clutch shaft to its original position.

8) Check whether the limit switch follows the operation of the valve by manual operation (see page 20).

9) Attach the actuator cover and tighten with a wrench.

10) Fully close the valve with an electric operation (see page 21). Make sure that the opening scale indicates "O."



The limit switch has four states as shown in the figure above. The switch operates when the arrow moves from N to A.

※ If the valve travel is misaligned, close the valve fully, loosen the actuator cover with a wrench, remove the switch cover, pull out the pointer, and move it to the "O" position and push in the pointer.

11. Inspection item

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

Daily inspection

Inspection items and inspection methods	Guideline of judgment	Check point	Treatment method
External leakage (visual inspection)	No leakage	Pipe flange connection Surface of the entire valve	① Retighten the pipe bolts to the specified torque. ② Remove the valve from the pipe and re-tighten the pipe bolts. (Ref: 5. Piping method) Remove the valve from the pipe and replace the valve. (Ref: 9.How to disassemble/assemble for parts replacement)
Internal leakage (visual and measurement)	No leakage	Leakage to secondary side when valve is fully closed	Remove the valve from the piping and replace the valve or defective part. (Ref: 9.How to disassemble/assemble for parts replacement)
		Measured values of flowmeters, pressure gauges, etc.	Remove the valve from the piping and replace the valve or defective part. (Ref: 9.How to disassemble/assemble for parts replacement)
Operation position shift (visual inspection)	No misalignment	Actuator opening display	Remove the actuator cover and adjust the limit switch operating position. (Ref: 10. 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. (Ref: 9.How to disassemble/assemble for parts replacement)
		Piping around the valve	Reconfirm the conditions of use (Ref: 2. Safety Instructions)
Odor ※1) (sniffing)	No odor	Valves and actuators	Remove the valve from the pipe and replace the valve or actuator. (Ref: 9.How to disassemble/assemble 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
Open/close operation 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/assemble for parts replacement)
Vibration (palpation)	No difference from other parts	Valves and actuators	Recheck the operating conditions and remove the source of vibration. (Ref: 2. Safety Instructions)
			Remove the valve from the pipe and replace the valve or actuator. (Ref: 9.How to disassemble/assemble for parts replacement)
		Piping around the valve	Recheck the operating conditions and remove the source of vibration. (Ref: 2. Safety Instructions)

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/assemble for parts replacement)
Looseness of bolts (visual and palpation)	No Loose	For flange piping	Retighten the pipe bolts to the specified torque. (Ref: 5. Piping method)
Water-intrusion ※1) (visual inspection)	No intrusion	Inside the actuator	Replace the actuator (Ref: 9.How to disassemble/assemble for parts replacement)
Intrusion ※1) of foreign objects (visual inspection)	No intrusion	Inside the actuator	Replace the actuator (Ref: 9.How to disassemble/assemble for parts replacement)
Measured ※1) of the isolation resistance (Measurement)	Must be 50 MΩ or more	Inside the actuator	Replace the actuator (Ref: 9.How to disassemble/assemble 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/assemble for parts replacement)
Product damage	No scratches, cracks, or deformation	Appearance of the product	Remove the valve from the pipe and replace the valve or actuator. (Ref: 9.How to disassemble/assemble for parts replacement)

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

12. Cause of malfunction and remedy

Failure phenomenon	Possible cause	Measures and measures
Manual hand wheel does not turn (does not 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	Remove the foreign matter.
	Piping stress is applied to the valve.	Remove the piping stress
	The torque of the valve has increased due to the effects of the fluid (temperature, components, pressure, etc.)	Reconfirm the conditions of use (Ref: 2. Safety Instructions)
Do not open or close with electric operation	The operation panel is turned off.	Turn on the power.
	The cable to the actuator is disconnected.	Check the connection status again. (Ref: 5. Piping method)
	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/assemble for parts replacement)
	Scratches on diaphragm or body	Replace applicable parts (Ref: 9.How to disassemble/assemble for parts replacement)
	Foreign matter caught in valve	Disassemble to remove foreign matter
	Low voltage	Check the voltage
Fluid leaks from valve	Bolt between body and motor bonnet is loose	Tighten to the specified torque. (Ref: 5.Piping method.)
Actuator is operating but valve is not open or closed	Scratches on diaphragm or body	Replace applicable parts (Ref: 9.How to disassemble/assemble for parts replacement)
	Foreign matter caught between diaphragm and body	Disassemble to remove foreign matter
	The diaphragm is damaged.	Replace applicable parts (Ref: 9.How to disassemble/assemble for parts replacement)

CAUSE OF FAILURE AND HOW TO REMEDY (continued)

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. Electrical Wiring)
	The cable or the connection inside the actuator is broken.	Replace the cable or the actuator. (Ref: 9.How to disassemble/assemble for parts replacement)
	Simultaneous switching energizing or incorrect wiring to the terminal block	Stop operation immediately and recheck the connection status. (Ref: 7. Electrical Wiring)
	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/assemble for parts replacement)

CAUSE OF FAILURE AND HOW TO REMEDY (continued)

Failure phenomenon	Possible cause	Measures and measures
Do not open or close with electric operation	Piping stress is applied to the valve.	Remove the piping stress
	The torque of the valve has increased due to the effects of the fluid (temperature, components, pressure, etc.)	Reconfirm the conditions of use (Ref: 2. Safety Instructions)
	The thermal protector is activated.	Stop using the product immediately, and lower the ambient temperature or the opening/closing frequency.
	Water or foreign matter has entered the actuator causing a short circuit.	Stop using the product immediately and replace the actuator. (Ref: 9.How to disassemble/assemble for parts replacement)
	The actuator does not move due to external corrosion of the actuator.	Stop using the product immediately and replace the actuator. (Ref: 9.How to disassemble/assemble for parts replacement)
	The insulation resistance of the actuator has dropped.	Stop operation immediately, check the insulation resistance, and replace the actuator. (Ref: 9.How to disassemble/assemble for parts replacement)
Fluid leaks even when fully closed (internal leak)	High fluid pressure	Use below the maximum allowable pressure (Ref: 9.How to disassemble/assemble for parts replacement)
	The diaphragm or body is worn or scratched.	Remove the valve from the piping, replace the relevant part, or replace the valve. (Ref: 9.How to disassemble/assemble for parts replacement)
	Missing parts	Remove the valve from the piping and attach the relevant part or replace the valve. (Ref: 9.How to disassemble/assemble for parts replacement)
	Foreign matter caught in valve	Remove the valve from the piping, disassemble it, and remove foreign matter. (Ref: 9.How to disassemble/assemble 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)	Valve is cracked or broken	Stop using the product immediately, remove the valve from the piping, and replace the valve. (Ref: 9. How to disassemble/assemble for parts replacement)
Actuator is operating but valve is not open or closed	The diaphragm 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/assemble for parts replacement)
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/assemble 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/assemble 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/assemble for parts replacement)
	The actuator is affected by a lightning strike	Stop using the product immediately, remove the valve from the piping, and replace the actuator. (Ref: 9.How to disassemble/assemble 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/assemble 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/assemble for parts replacement)

13. Disposal method of residual materials and waste materials

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

Inquiries

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

[User's Manual]

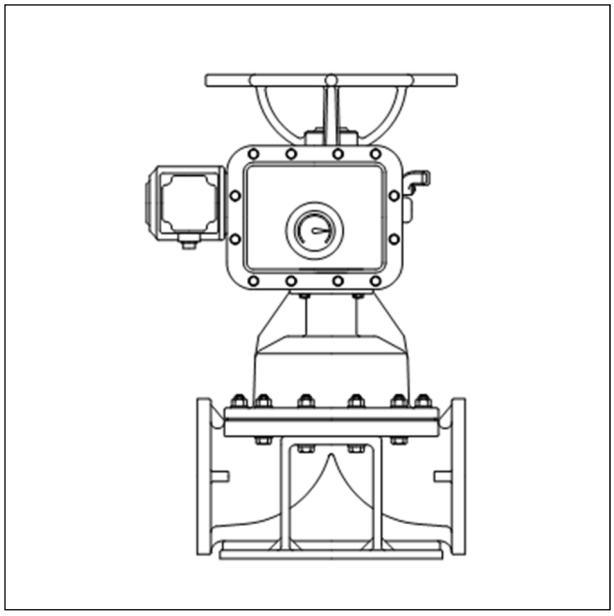
Diaphragm valve Type 15
Electric Actuated Type S
125、150 mm

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

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

Diaphragm Valve Type 72
Electric Actuated Type S
(200, 250 mm)

User's Manual



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

ASAHI YUKIZAI CORPORATION

-SAFETY PRECAUTIONS-

This instruction manual is written on the assumption that the person who handles our products has a basic knowledge of our products, electrical equipment, machinery, control, etc., and it contains technical terms depending on the handling contents.
Please read this manual carefully and fully understand the contents and observe the safety precautions for proper use.

In this manual, the warning, caution, prohibition, and enforcement are categorized together with the symbol to inform the situation and scale of human injury or property damage.
Failure to observe this precaution may result in unexpected failure or damage. Be sure to observe this precaution.

<WARNING/CAUTION indications>

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

<Prohibited/Forced display>

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

Table of contents

1. Our product warranty coverage

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

Applicable to

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

Warranty Period

The warranty period is one year after delivery.

Guaranteed range

In the event of failure or malfunction due to our responsibility during the above warranty period, we will replace or repair the product with a substitute free of charge.
Provided, however, that even within the warranty period, the warranty shall not apply to any of the following cases (charged service).

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

Disclaimer

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

2. Safety Instructions

Unpacking, Transportation and Storage

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

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not subject the product to impact by throwing, dropping or hitting. ▶ Do not scratch or pierce the product with a sharp object such as a knife or hand hook. ▶ Do not pile up cardboard boxes forcefully to prevent the load from collapsing. ▶ Avoid contact with coal tar, creosote (a wood preservative), white pesticides, insecticides, paints, etc. ▶ Do not hang the handle when transporting the valve.
Forcing	**The valve can be damaged, or leak.** ▶ Keep in cardboard until just before piping, and store indoors (at room temperature) away from direct sunlight. Also, avoid storing the product in places of high temperature. (The strength of cardboard packaging decreases when it gets wet. Be very careful when storing and handling it.) ▶ After unpacking, make sure that the product is correct and that it meets the specifications.

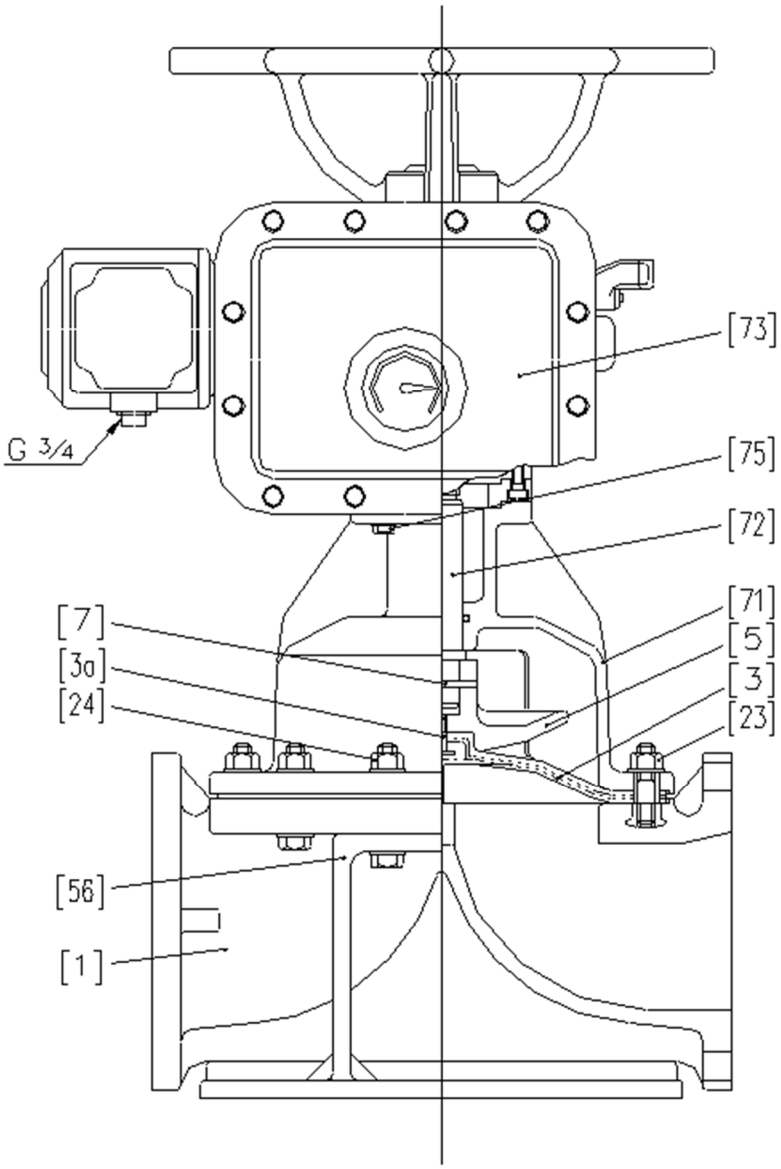
Product Handling

⚠ Warning	
Prohibition	**Serious injury can result.** ▶ Do not disassemble the actuator. ▶ Do not touch moving parts during operation. (Hand or arm may become entangled.)
Forcing	**The valve can be damaged or leak.** ▶ If positive pressure gas is used for our resin piping material, a dangerous condition may occur due to the repulsive force peculiar to compressible fluids even if the pressure is the same as the water pressure. Therefore, be sure to take safety measures for the surrounding area, such as covering the piping with protective materials. If you have any questions, please contact us separately. ▶ When conducting a pipe leak test after completion of piping construction, be sure to check with water pressure. Contact us in advance if you are unavoidable to test with a gas. ▶ Check the voltage on the power supply and nameplate before use. A different voltage may cause damage or malfunction of the equipment. ▶ Perform manual operation after confirming that the actuator is not operated by the motor.

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not step on the valve or place heavy objects on it. ▶ Keep away from fire and hot objects. ▶ Do not use the product in places where it may be submerged. ▶ 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. ▶ Do not subject the valve to large vibrations. ▶ Do not leave the actuator in a soil or a water reservoir other than the water resistant type.
Forcing	**There is a danger of injury.** ▶ Secure sufficient space for maintenance and inspection when piping. **The valve can be damaged, or leak.** ▶ Keep the pressure and temperature of the fluid within the allowable range. (The maximum allowable pressure includes water hammer pressure.) ▶ Use a valve of suitable material for the operating conditions. (Depending on the type of chemical liquid, the parts may be damaged. Contact us in advance for details.) ▶ Use fluids containing crystalline material under conditions that do not recrystallize. ▶ Avoid any place where the valve is constantly exposed to splashes of water and dust, or direct sunlight, or protect the valve with a cover or the like to cover the entire area. ▶「11. 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. ▶ The tightening bolts and nuts of the diaphragm (between the bonnet and body) 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 bonnet tightening torque table (see page 22). ▶ Provide appropriate valve support when installing the valve. ▶ Always use the product within the indicated product specifications. ▶ If you notice an unusual odor, heat, or smoke, immediately turn off the power supply. If any abnormality is found, be sure to consult your dealer or us for inspection. ▶ Use the supplied handle for manual operation. ▶ When using in an explosive atmosphere, make sure that the actuator conforms to the explosion-proof specifications. ▶ Keep the ambient temperature of the installation location within-10 to 50° C. ▶ Avoid places with corrosive gases or poor atmospheres, and provide a cover or the like to cover the entire area.

3. Name of each part

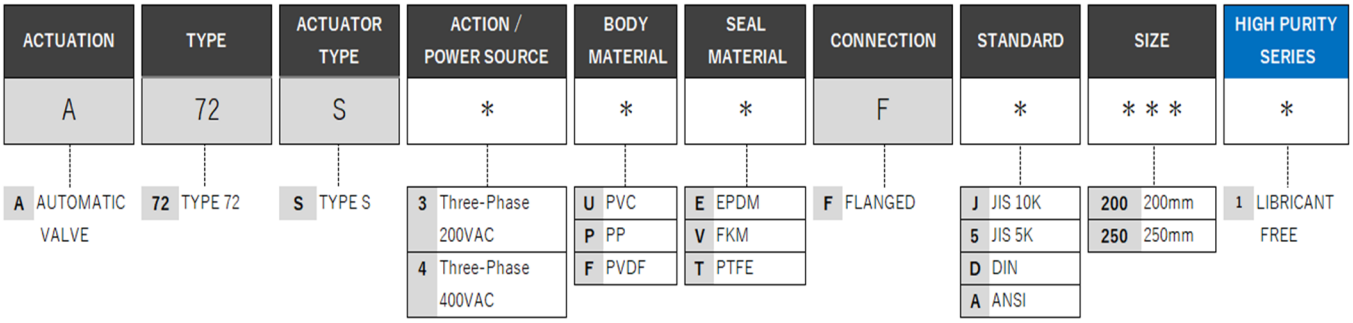
200 mm、250 mm



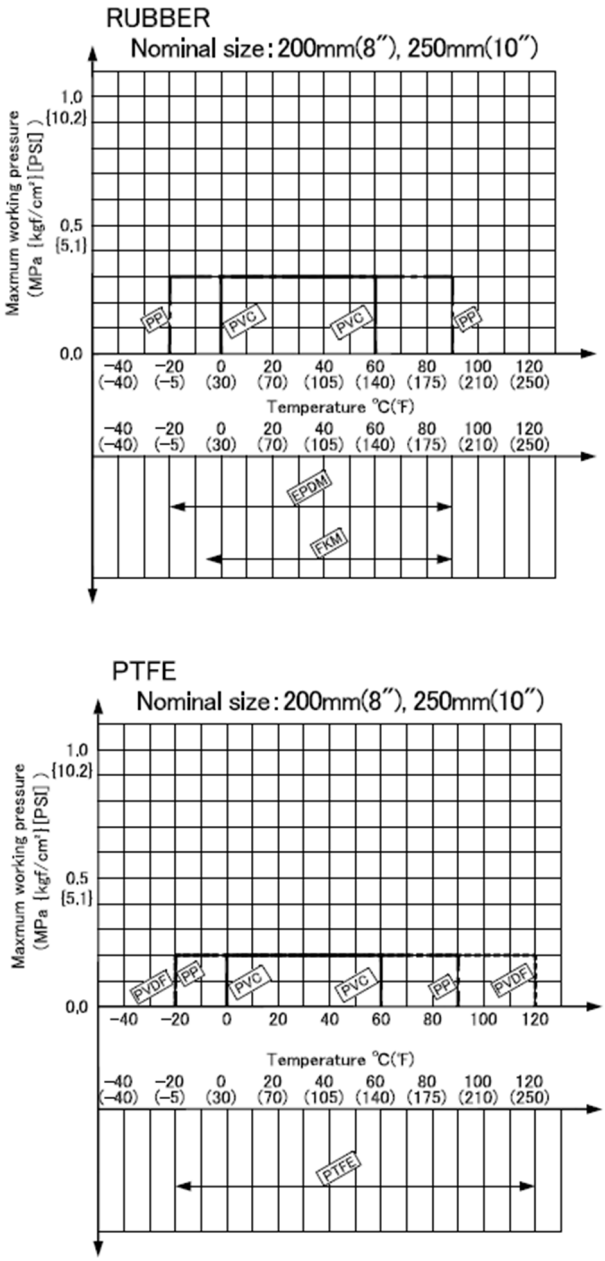
[1]	Body	[24]	Bolt-nut
[3]	Diaphragm	[56]	Stand(A)
[3a]	Inserted metal of diaphragm(A)	[71]	Bonnet(B)
[5]	Compressor	[72]	Stem(B)
[7]	Compressor pin	[73]	Actuator
[23]	Stud bolt-nut	[75]	Bolt(B)

4. Product Specifications

Model number table



Relationship between maximum allowable pressure and temperature

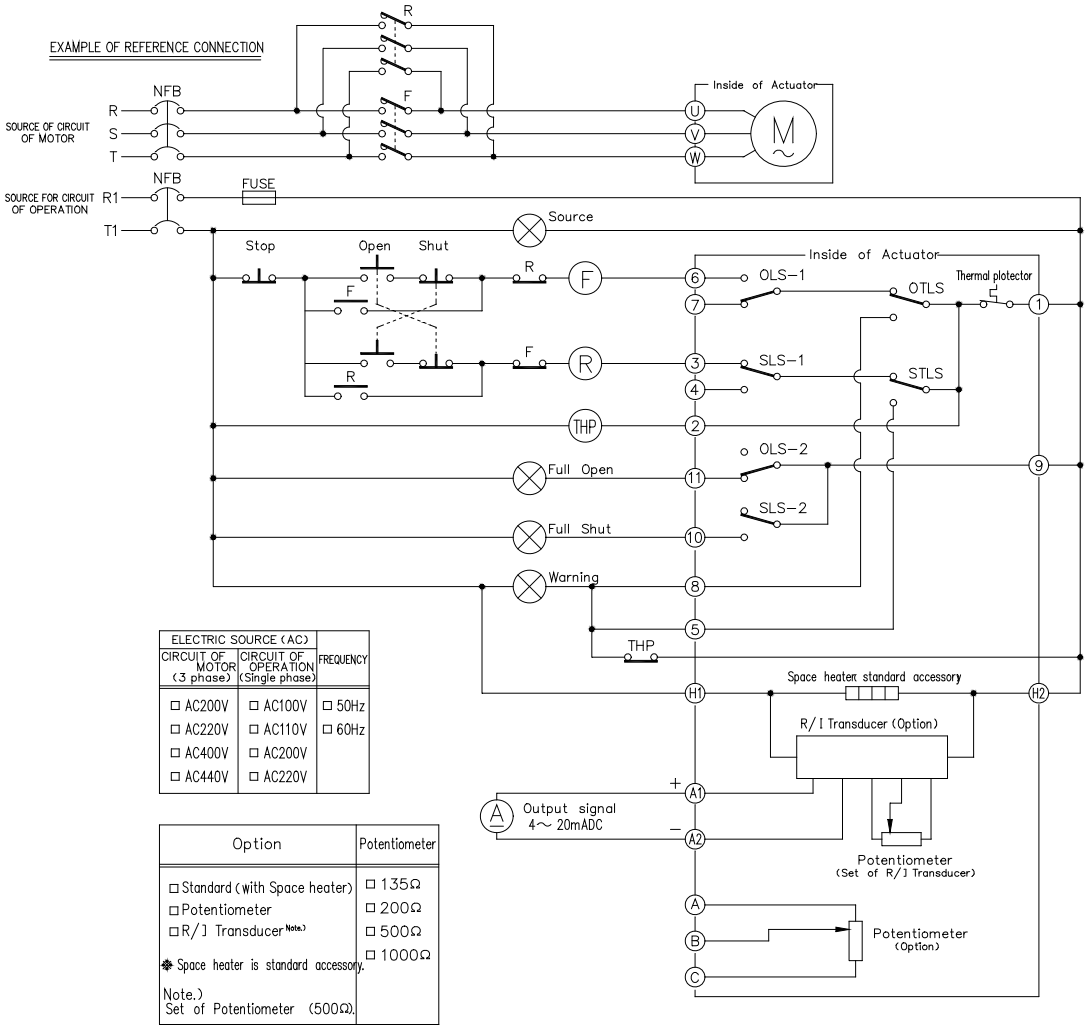


Actuator

Specifications List

Applicable nominal Size (mm)		200	250
Actuator Type		LTMD-01	LTMD-02
Opening and Closing Time (Sec.)	50Hz	75.5	90
	60Hz	63	75
Protection structure		IP55	
Motor starting current (A) 50/60Hz	200VAC	8.0 / 7.4	15.6 / 15.2
	400V AC	4.0 / 3.7	7.8 / 7.6
Motor rated Current (A) 50/60Hz	200VAC	2.5 / 2.2	4.4 / 4.0
	400VAC	1.3 / 1.1	2.2 / 2.0
Number of rotations of manual operating handle		16	18
Size of cable connector		Operating circuit: 2-G1, motor circuit: G3/4	
Motor rated output (W)		400	750
By kind of motor insulation		B Type	
Motor rated time (min.)		15 Minute	
Capacity of limit switch		250VAC 5A	
Motor polar number (P)		4	
Space heater rated output(W)		10	
Potentiometer Ⓐ～Ⓒ Max. applied voltage (V)	100 Ω	15	
	200 Ω	20	
	500 Ω	30	
	1K Ω	45	

Wiring Diagram (LTMD)

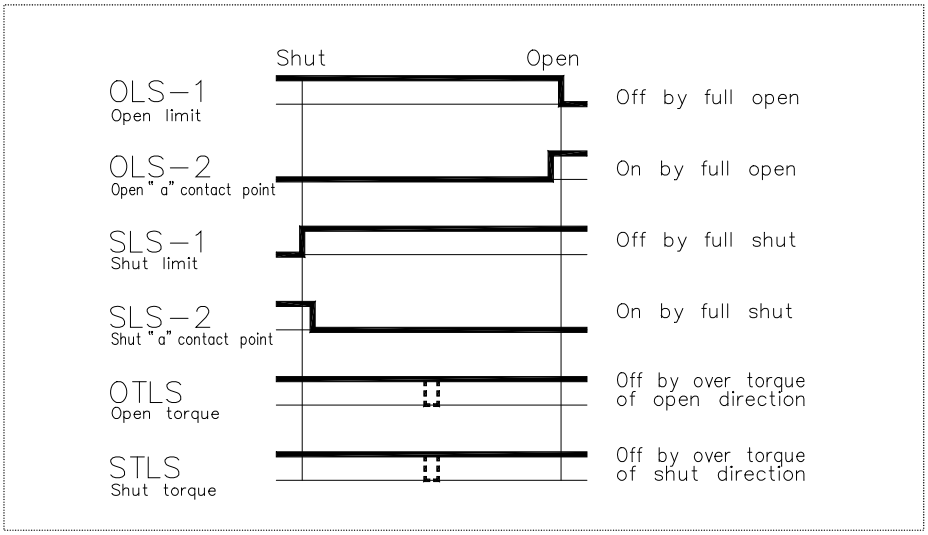


ELECTRIC SOURCE (AC)		
CIRCUIT OF MOTOR (3 phase)	CIRCUIT OF OPERATION (Single phase)	FREQUENCY
□ AC200V	□ AC100V	□ 50Hz
□ AC220V	□ AC110V	□ 60Hz
□ AC400V	□ AC200V	
□ AC440V	□ AC220V	

Option	Potentiometer
□ Standard (with Space heater)	□ 135Ω
□ Potentiometer	□ 200Ω
□ R/I Transducer Note.)	□ 500Ω
※ Space heater is standard accessory.	□ 1000Ω
Note.) Set of Potentiometer (500Ω).	

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

Switching chart



5. Mounting method

⚠ Warning	
Prohibition	**Serious injury can result.** ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.
Forcing	**There is a danger of injury.** ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ When installing piping, be sure to wear the appropriate protective equipment according to the operation details.

⚠ Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not open or close the valve with dust or other foreign matter in the fluid.
Forcing	**The valve can be damaged, or leak.** ▶ Be careful not to overtighten the pipe support when you remove it with a U band or the like. ▶ When installing the product, make sure that no excessive stress such as tension, compression, bending or impact is applied to the piping or valve. ▶ 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. ▶ Use a connection flange with a full-face seat. ▶ Check that there is no difference in mutual flange standards. ▶ 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.

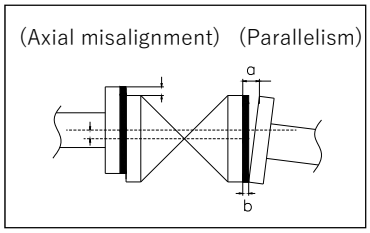
⚠Caution

Forcing

The valve can be damaged, or leak.

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

Size (mm)	Axial Misalignment	Parallelism (A-b)
200、250	1.5mm	1.0mm



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

⚠Caution

Forcing

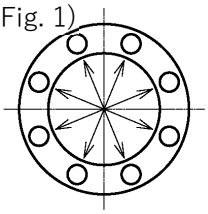
The valve can be damaged, or leak.

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

Specified torque. Unit: N•m {kgf・cm}

Size	200mm	250mm
Torque value	55.0{561}	55.0 {561}

(Fig. 1)



6. Support installation method

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

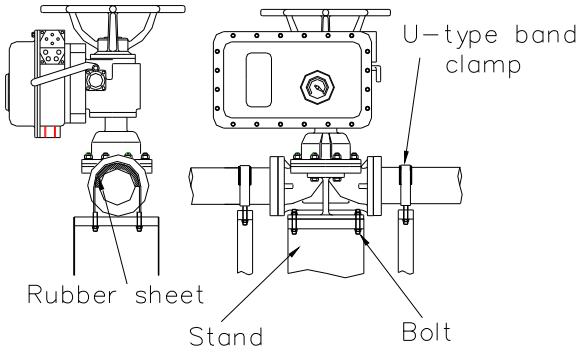
Preparations	▶ Wrench	▶ U-band (with bolt)	▶ Bolts/nuts (M20)
	▶ Rubber sheet		

horizontal piping

Fix the mounting base [56] and the mount provided on the valve with bolts.

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

*The valve above has a positioner.

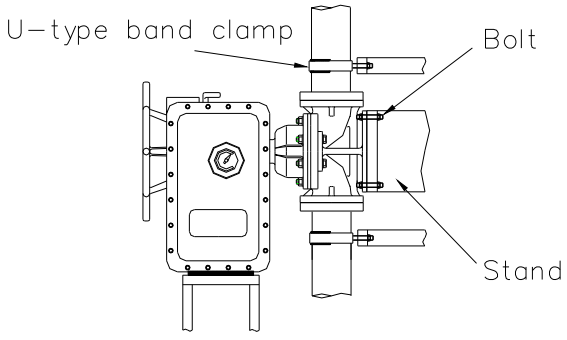


Vertical piping

Fix the mounting base [56] and the mount provided on the valve with bolts.

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

*The valve above has a positioner.



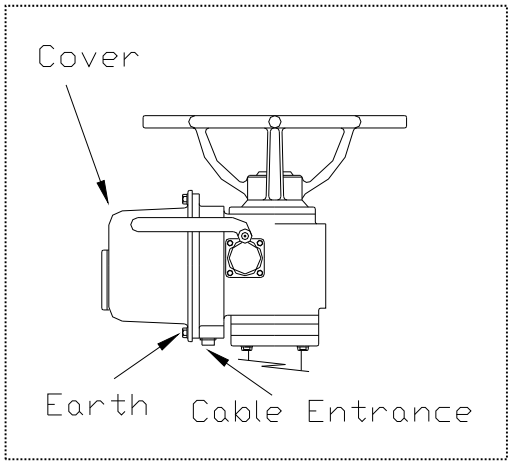
7. Electrical Wiring

Warning	
Prohibition	**Serious injury can result.** ▶ 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.** ▶ Be sure to connect the ground wire. (Poor grounding may cause electric shock, fire, etc. due to electric leakage.) ▶ Keep hands free of moisture and oil when adjusting or checking. (risk of electric shock or damage to equipment)

Caution	
Prohibition	**The valve can be damaged or leak.** ▶ 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). ▶ 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. ▶ 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.** ▶ Check that there is no insulation defect when performing wiring work. (Danger of damage to wiring) ▶ Securely tighten the covers of each part. (Rainwater, dust, etc. may penetrate and cause malfunction.) ▶ 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.) ▶ 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.) ▶ 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.) ▶ Check the power supply and voltage on the nameplate before use. A different voltage may cause damage or malfunction of the equipment.

Preparations	▶ Phillips screwdriver ▶ wire stripper ▶ Crimp terminal ▶ connector ▶ terminal Crimp tool

[Procedure]



1) Loosen the screws holding the actuator cover with a wrench and remove the cover.
2) Remove the lead entry plug with a spanner.
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) Connect the terminal block with a Phillips screwdriver according to page 13.
※Screws should be tightened firmly.
(There is a risk of electric leakage or electric shock.)
8) Tighten the connector.
※Tighten the connector securely.
(There is a risk of electric leakage or electric shock.)
9) Tighten the screws holding the actuator cover with a wrench to attach the cover.
10) Attach the ground.

8. Commissioning method

⚠Warning	
Prohibition	**Serious injury can result.** ▶ 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) ▶ Be sure to connect the ground wire. (Poor grounding may cause electric shock, fire, etc. due to electric leakage.) ▶ Never touch the moving parts during operation. (Hand or arm may become entangled.)
Forcing	**Serious injury can result.** ▶ Keep hands free of moisture and oil when adjusting or checking. (risk of electric shock or damage to equipment) ▶ Perform manual operation after confirming that the actuator is not operated by the motor.

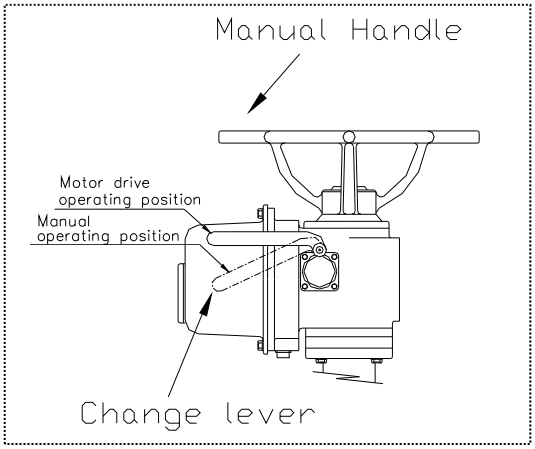
⚠Caution	
Prohibition	**The valve can be damaged or leak.** ▶ Do not connect multiple (two or more) motorized valves in series. In addition, open/close switches (or relay contacts) should be provided for each electric valve. ▶ Do not use the product near high-voltage lines, inverters, or other objects that generate noise or magnetism. (Doing so may cause malfunction or failure.)
Forcing	**The valve can be damaged or leak.** ▶ Check that there is no insulation defect when performing wiring work. (Danger of damage to wiring) ▶ Securely tighten the covers of each part. (Rainwater, dust, etc. may penetrate and cause malfunction.) ▶ 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.) ▶ 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.) ▶ 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.) ▶ If you notice an unusual odor, heat, or smoke, immediately turn off the power supply. (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	**Valves can fail, become damaged, or leak.** ▶ Do not forcibly turn the manual handle (optional item) further from the fully open/closed positions. ▶ LTRM and LTMD are of the auto reset type. The switch lever cannot be returned to the electric side by manual operation. Do not perform manual operation to the motorized side.
Forcing	**The valve can be damaged or leak.** ▶ LTRH is a manual return type. Move the switch lever to the electric position manually.

[Procedure]

1) Set the selector lever to the manual position. If it does not switch smoothly, turn the manual handle to either side and turn the switch lever.
2) Turn the manual handle while watching the valve travel meter.
   ▶ Rotate clockwise → Close direction
   ▶ Counterclockwise rotation → Open direction
3) Turn on the power and press the OPEN or CLOSE button. (The switching lever automatically returns to the motorized position)



Electric operation

⚠ Caution	
Prohibition	**The valve can be damaged or leak.** ▶ Do not leave the actuator cover open. (If the terminal is touched, an electric shock will occur.)

[**Procedure**]

1) Turn on the power.

2) Operate the OPEN/CLOSE switch to open or close the valve and check that the indicated direction matches the operating direction. If they do not match, check the wiring diagram (see page 13) and perform the operation from 1) again.

3) Fully open "O" or fully closed "S" to turn off the power.

9. How to disassemble/assemble parts for replacement

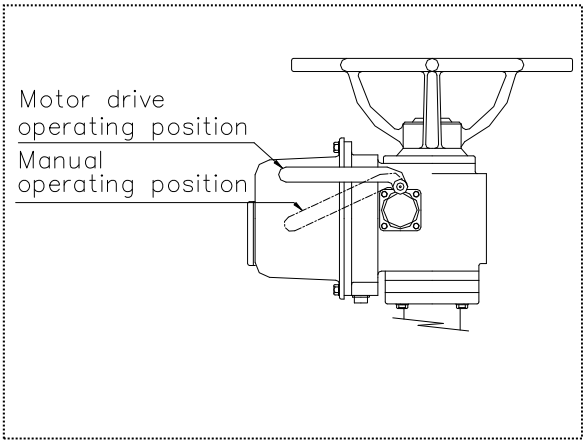
Warning	
Prohibition	**Serious injury can result.** ▶ Do not disassemble the actuator. ▶ Do not connect or separate lines when the power is on. Also, do not touch any other parts on the board or the terminal block wiring part. (risk of electric shock or damage to equipment)
Forcing	**There is a danger of injury.** ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ Wear appropriate protective equipment according to the type of work being performed. **The valve can be damaged, or leak.** ▶ 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.** ▶ Securely tighten the covers of each part. (Rainwater, dust, etc. may penetrate and cause malfunctions.) ▶ 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.) ▶ 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 ▶ Spanner ▶ Protective gloves ▶ Protective glasses

<Disassembly>

[Procedure]

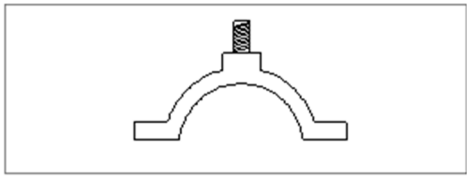


1) Completely drain the fluid in the piping.
2) Fully close the valve by motor or manual operation.
3) Turn off the power.
4) Loosen and remove bolts and nuts [24].
5) Lift out the actuator [73].
6) Remove the diaphragm [3] by turning it counterclockwise.

<Assembly>

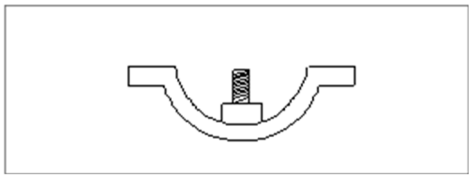
[Procedure]

(Fig. 1)



1) Make the diaphragm [3] the shape shown in Fig. 1.
2) Mount the diaphragm [3] by turning it clockwise.
3) Tighten the diaphragm [3] until it stops, and then turn it counterclockwise until the direction of the valve seat seal rib and the pressing surface of the compressor coincide.
4) Make the diaphragm [3] the shape shown in Fig. 2.
5) Turn the manual handle counterclockwise while looking at the gauge to fully open the valve.
6) Place actuator [73] on body [1].
7) Fit bolts and nuts [24] and tighten body [1] and bonnet [71].

(Fig. 2)



(Table1) Body tightening torque units; N·m {kgf・cm}

Size / Diaphragm	200mm	250mm
Rubber	30.0{306}	30.0{306}
PTFE	30.0{306}	30.0{306}

10. How to adjust the limit switch

Warning	
Prohibition	**Serious injury can result.** Do not connect or separate lines to the ▶ when power is applied. (electric shock or sudden start of the machine)

Caution	
Prohibition	**The valve can be damaged or leak.** ▶ Do not leave or use the actuator cover open. (Water or dust may penetrate and cause operation failure.)
Forcing	**The valve can be damaged or leak.** ▶ Contact CKD when using the limit switch in a 1mA～100mA, 5V～30V.

[**Procedure**]

1) Turn off the power and remove the fluid in the piping completely. Then, loosen the actuator cover with a wrench and remove it.

2) Perform manual operation (refer to page 20) to the opening to be adjusted (fully open or fully closed).

3) Insert the special handle into the clutch shaft and push it in until the clutch shaft is retracted by turning it about 30 degrees.
※Failure to follow this procedure may damage the limit switch mechanism.

4) The switch assigned to the moved opening (check in the settling opening display, for example "O" switch when fully open) is settled.②

5) Insert the special handle into the reduction shaft that is closest to the corresponding switch (Fig. 4). Turn the reduction shaft in the direction that the number of turns is less, and find the point where the arrow on the switch changes from N to A or A to N.③

6) Pull out the special handle when the arrow changes from N to A with N.

7) Insert the special handle into the clutch shaft again, and turn the handle to put the clutch shaft back on.

8) Check whether the limit switch follows the operation of the valve by manual operation (see page 20).

9) Attach the actuator cover and tighten with a wrench.

10) Fully close the valve with an electric operation (see page 20). Make sure that the opening scale indicates "O."

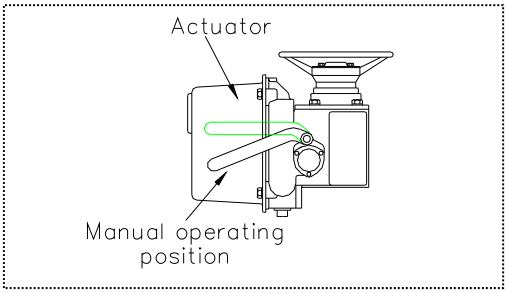
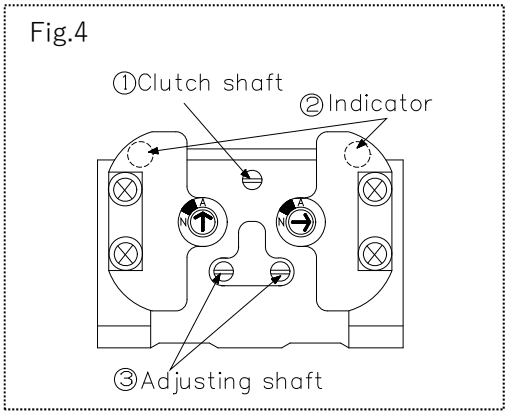
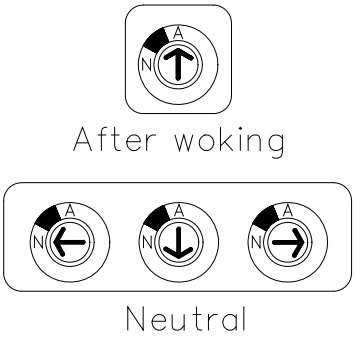


Fig.4





There are four states of limit switch as above. The switch works when the arrow moves [N] to [A].

※If the valve travel is misaligned, close the valve fully, loosen the actuator cover with a wrench, remove the switch cover, pull out the pointer, and move it to the "O" position and push in the pointer.

11. Inspection item

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

Daily inspection

Inspection items and inspection methods	Guideline of judgment	Check point	Treatment method
External leakage (visual inspection)	No leakage	Pipe flange connection	① Retighten the pipe bolts to the specified torque. ② Remove the valve from the pipe and re-tighten the pipe bolts. (Ref: 5. Mounting method [FInaged end])
		Surface of the entire valve	Remove the valve from the pipe and replace the valve. (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. (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. (Ref: 9. How to disassemble for parts replacement)
Misalignment of operating position (visual inspection)	No deviation	Actuator opening display	Remove the actuator cover and adjust the limit switch operating position. (Ref: 10. How to adjust limit switch)
Abnormal noise (hearing)	No abnormal noise	Valves and actuators	Remove the valve from the pipe and replace the valve or actuator. (Ref: 9. How to disassemble for parts replacement)
		Piping around the valve	Reconfirm the conditions of use (Ref: 2. Handling Precautions)
Odor ※1) (sniffing)	No odor	Valves and actuators	Remove the valve from the pipe and replace the valve or actuator. (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 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.

12. Cause of malfunction and remedy

Failure phenomenon	Possible cause	Measures and measures
Manual handwheel does not turn (cannot turn) during manual operation	Already fully open (or fully closed)	Rotate the manual handle in the reverse direction (Ref.: 8. Test run method)
	The power remains supplied in the opposite direction of the handle operation direction.	Turning the power off and then manually operating
	Foreign matter caught in valve	Remove the valve from the piping, disassemble it, and remove foreign matter. REF.:9.How to disassemble for replacement of parts)
Do not open or close with electric operation	The operation panel is turned off.	Turn on the power.
	The cable to the actuator is disconnected.	Check the connection status 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
Of fluid from the valve Leak	Bolt between body and motor bonnet is loose	Tighten to the specified torque. (Ref: 9.How to disassemble for parts replacement)

CAUSE OF FAILURE AND HOW TO REMEDY (continued)

Failure phenomenon	Possible cause	Measures and measures
Although the actuator is operating, the valve Not open or closed	Scratches on diaphragm or body	Replace applicable parts (Ref: 9.How to disassemble for parts replacement)
	Foreign matter caught between diaphragm and body	Disassemble to remove foreign matter (Ref: 9.How to disassemble for parts replacement)
	The diaphragm is damaged.	Replace applicable parts (Ref: 9.How to disassemble for parts replacement)

Failure phenomenon	Possible cause	Measures and measures
The Allen key does not turn (does not turn) during manual operation.	The valve is already fully open (or fully closed).	Rotate the hex wrench in the reverse direction (Ref. 8. 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. (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 (Ref: 2. Handling Precautions)

CAUSE OF FAILURE AND HOW TO REMEDY (continued)

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
Do not open or close with electric operation	Piping stress is applied to the valve.	Remove the piping stress
	The torque of the valve has increased due to the effects of the fluid (temperature, components, pressure, etc.)	Reconfirm the conditions of use (Refer to P2_2. Handling Precautions)
	The thermal protector is activated.	Stop using the product immediately, and lower the ambient temperature or the opening/closing frequency.
	The capacitor is burnt out (punctured).	Stop using the product immediately and replace the actuator. (Ref: 9. How to disassemble for parts replacement)
	Water or foreign matter has entered the actuator causing a short circuit.	Stop using the product immediately and replace the actuator. (Ref: 9. How to disassemble for parts replacement)
	The actuator does not move due to external corrosion of the actuator.	Stop using the product immediately and replace the actuator. (Ref: 9. How to disassemble for parts replacement)
	The insulation resistance of the actuator has dropped.	Stop operation immediately, check the insulation resistance, and replace the actuator. (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)
	Sheet or ball 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)	Valve is cracked or broken	Stop using the product immediately, remove the valve from the piping, and replace the valve. (Ref: 9. How to disassemble for parts replacement)
Actuator is operating but valve is not open or closed	The diaphragm 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)
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)

CAUSE OF FAILURE AND HOW TO REMEDY (continued)

Failure phenomenon	Possible cause	Measures and measures
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)

13. Disposal method of residual materials and waste materials

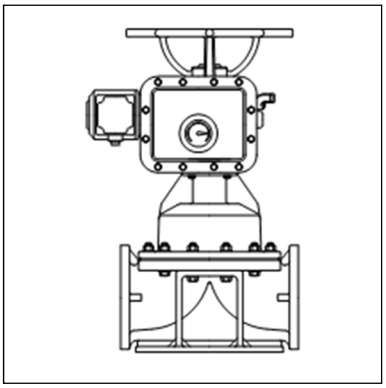
⚠Warning	
Forcing	**When burnt, toxic gas is generated.** ▶ When disposing of the product or parts, please dispose of them according to the guidelines of each local authority by a professional disposal company.

Inquiries

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

[User's Manual]

Diaphragm Valve Type 72
Electric Actuated Type S
(200, 250 mm)



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

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