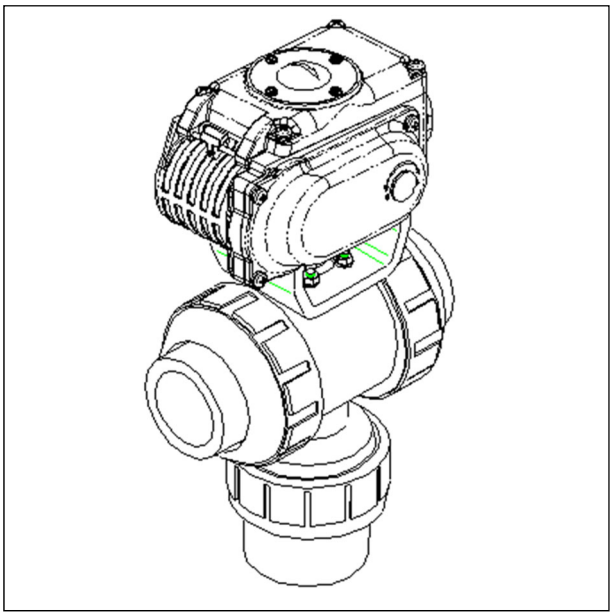
3-way ball valve Type 23
Electric Actuated Type T
15～100mm

User's Manual



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

ASAHI YUKIZAI CORPORATION

-SAFETY PRECAUTIONS-

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

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

<WARNING/CAUTION indications>

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

<Prohibited/Forced display>

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

Table of contents

1. Our product warranty coverage

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

Applicable to

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

Warranty Period

The warranty period is one year after delivery.

Guaranteed range

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

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

Disclaimer

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

2. Safety Instructions

Unpacking, Transportation and Storage

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

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

Product Handling

⚠ Warning	
Prohibition	**Serious injury can result.** ▶ Do not disassemble the actuator. ▶ Do not touch moving parts during operation with hands, feet or tools.
Forcing	**There is a danger of injury.** ▶ If positive pressure gas is used for our resin piping material, a dangerous condition may occur due to the repulsive force peculiar to compressible fluids even if the pressure is the same as the water pressure. Therefore, be sure to take safety measures for the surrounding area, such as covering the piping with protective materials. If you have any questions, please contact us separately. ▶ When conducting a pipe leak test after completion of piping construction, be sure to check with water pressure. Contact us in advance if you are unavoidable to test with a gas.

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

⚠Caution

Forcing

There is a danger of injury.

The valve can be damaged, or leak.

▶ This valve is structurally dead space. Vaporizing fluids such as hydrogen hydroxide (H_2O_2) and soda hypochlorite (NaClO) may vaporize in the dead space and cause an abnormal pressure rise inside the valve. Be very careful. (Gas with abnormal pressure increase due to vaporization is a compressible fluid. Therefore, if a valve should break, fragments will scatter explosively, which is very dangerous.)

There is a danger of injury.

▶ Use the supplied handle or a tool specified by the manufacturer for manual operation.

▶ When performing manual operation, make sure that the actuator is not operated by the motor.

▶ Secure sufficient space for maintenance and inspection when piping.

The valve can be damaged, or leak.

▶ Check the voltage on the power supply and nameplate before use.

▶ Pay attention to the atmosphere where the valve is installed. Avoid locations where the product is exposed to sea breezes, corrosive gases, chemical liquids, sea water, steam, etc.

▶ During operation, the surface temperature of the actuator may rise due to heat generated by internal equipment. Pay attention to the opening/closing frequency so that the temperature does not exceed the allowable range.

▶ 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.

▶ If internal leakage occurs when the valve is fully closed, adjust the stopper.

▶ When installing a valve, provide an appropriate valve support so that excessive force is not applied to the valve and piping.

▶ Always use the product within the indicated product specifications.

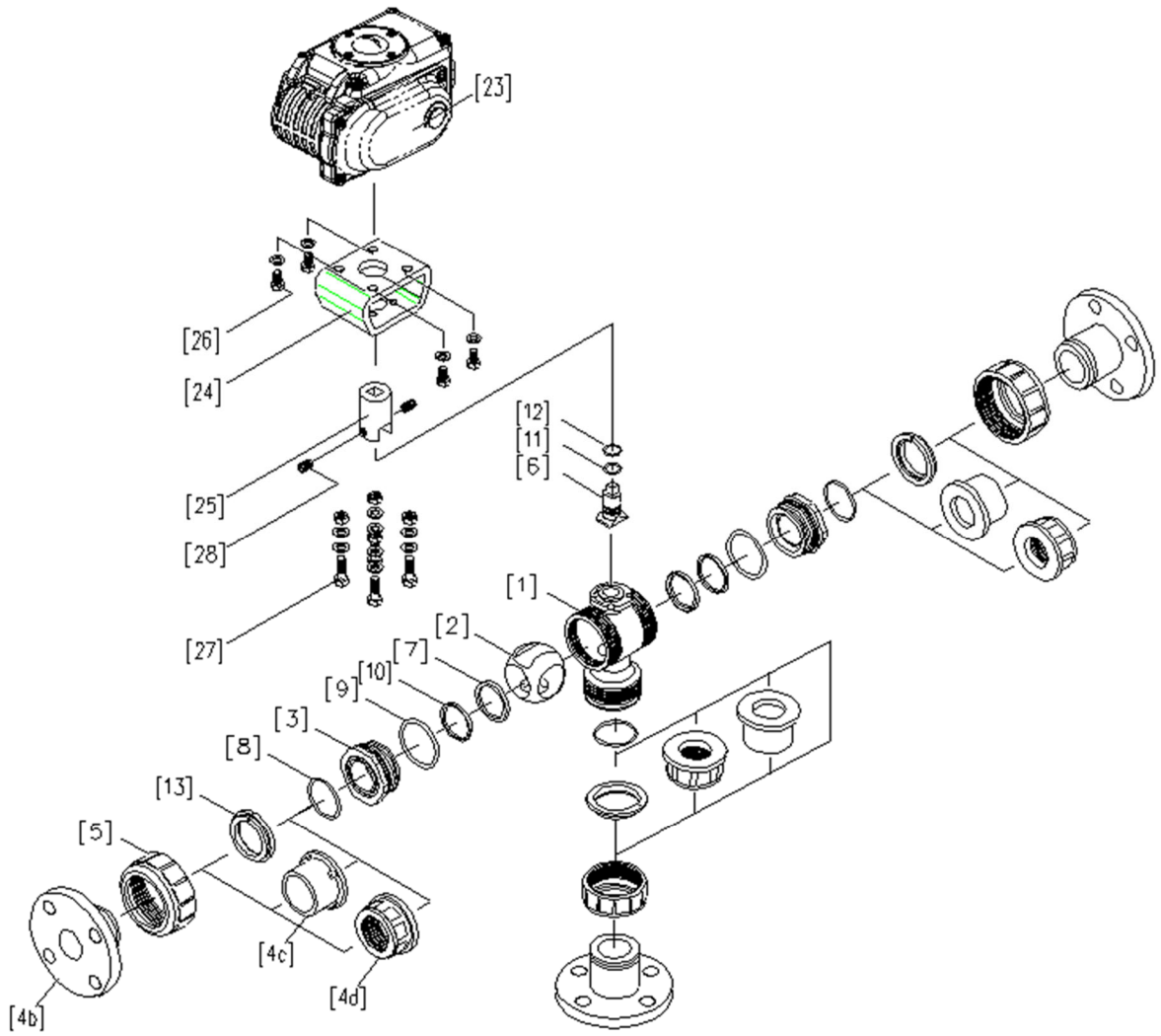
▶ If you notice an unusual odor, heat, or smoke, immediately turn off the power supply. If any abnormality is found, be sure to consult your dealer or us for inspection.

▶ Keep the ambient temperature of the installation location within-10 to 50° C.

▶ Avoid locations with volatile gases or poor atmospheres. Provide a cover, etc., to cover the entire area.

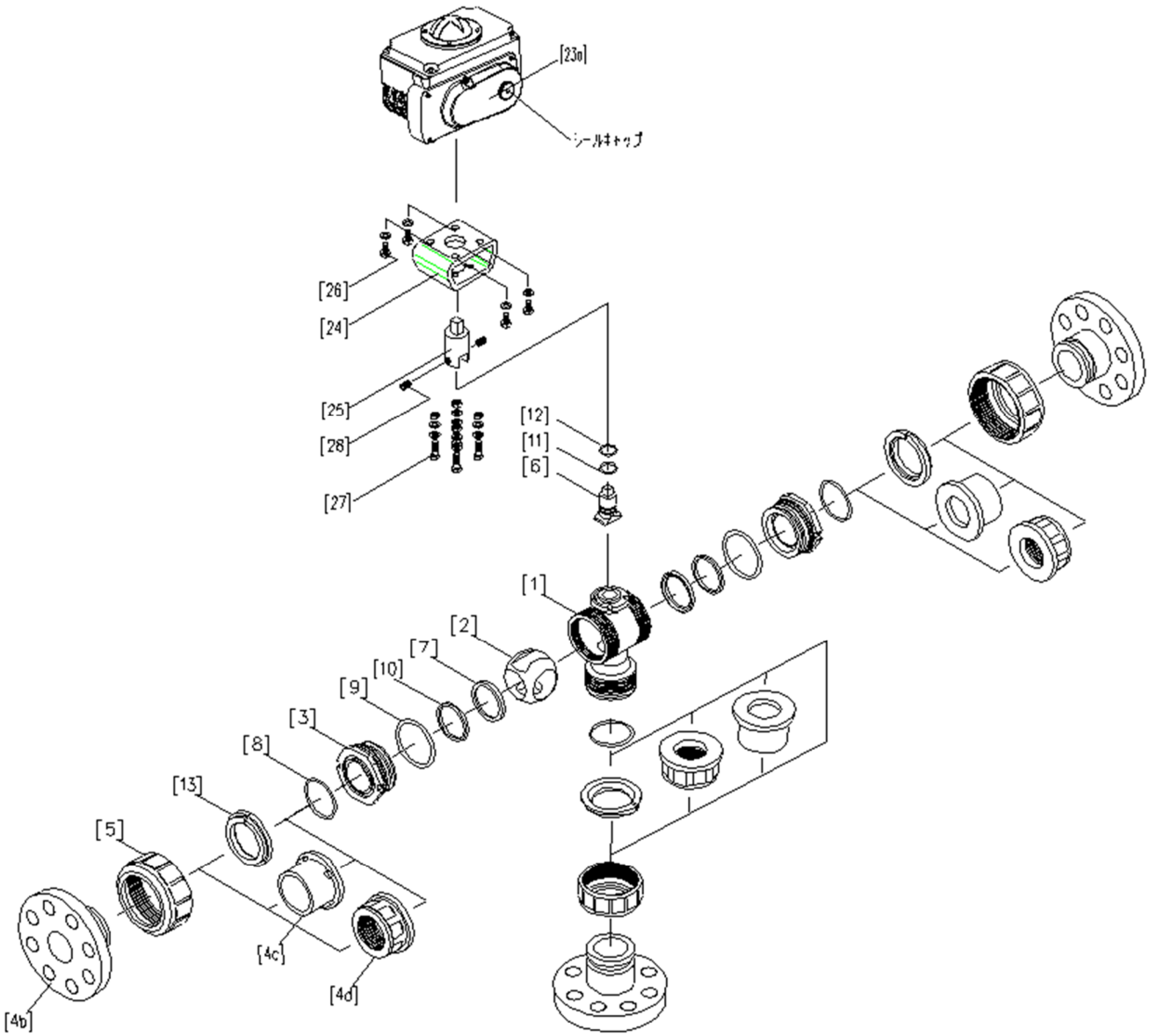
3. Name of each part

15～50mm



[1]	Body	[6]	Stem	[13]	Stop ring
[2]	Ball	[7]	Seat	[23]	Actuator
[3]	Carrier	[8]	O-ring (A)	[24]	Stand
[4b]	End connector (Flange type)	[9]	O-ring (B)	[25]	Joint
[4c]	End connector (socket type)	[10]	Cushion	[26]	Bolt (A)
[4d]	End connector (Threaded type)	[11]	O-ring (D)	[27]	Bolt/nut (B)
[5]	Union nut	[12]	O-ring (E)	[28]	Screw (B)

65～100mm



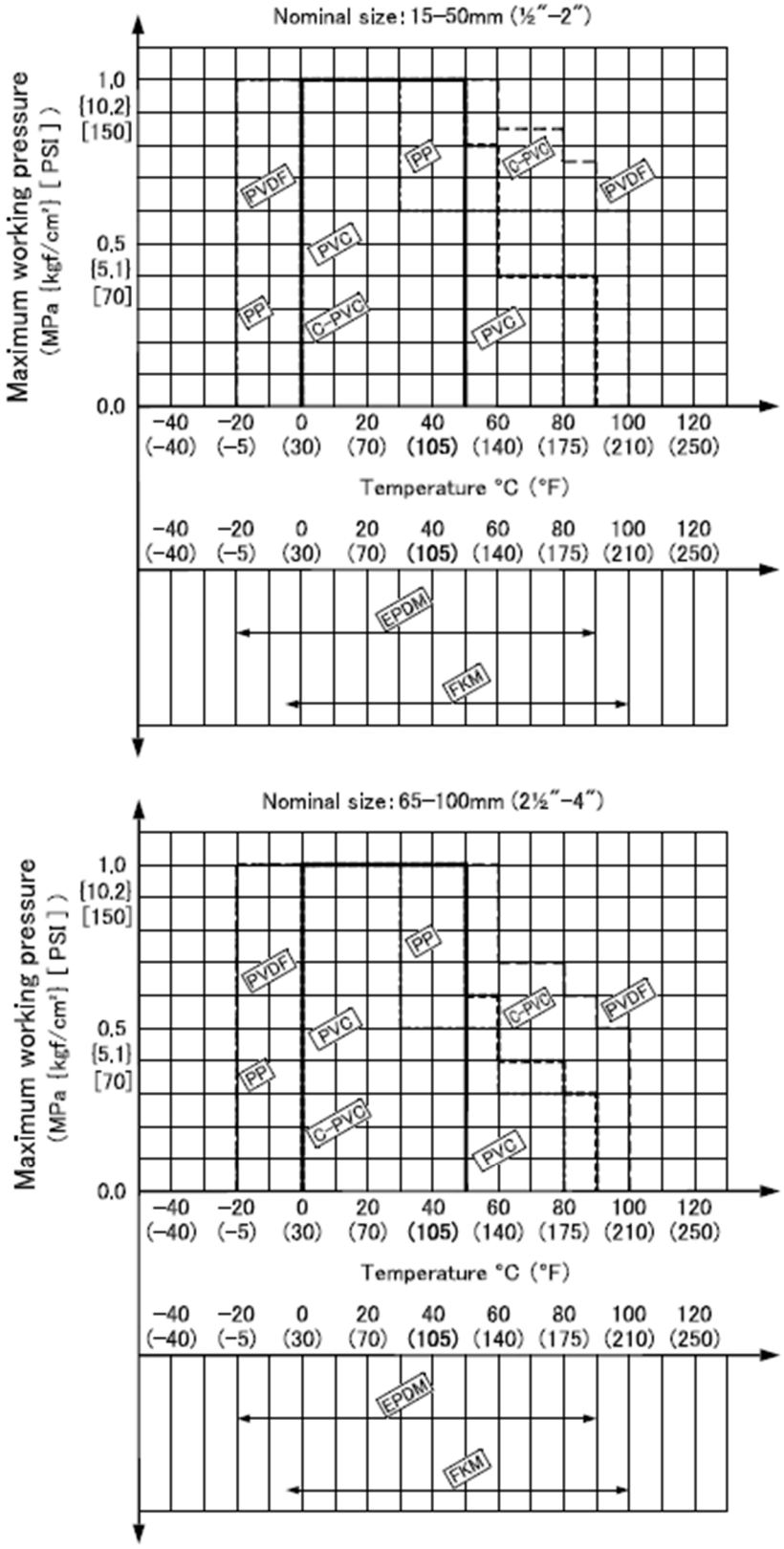
[1]	Body	[7]	Seat	[24]	Stand
[2]	Ball	[8]	O-ring (A)	[25]	Joint
[3]	Carrier	[9]	O-ring (B)	[26]	Bolt (A)
[4b]	End connector (Flange type)	[10]	Cushion	[27]	Bolt/nut (B)
[4c]	End connector (socket type)	[11]	O-ring (D)	[28]	Screw (B)
[4d]	End connector (Threaded type)	[12]	O-ring (E)		
[5]	Union nut	[13]	Stop ring		
[6]	Stem	[23a]	Actuator (for ON・OFF)		

4. Product Specifications

Model number table

ACTUATION	TYPE	OPERATING SYSTEM	OPERATING SYSTEM	BODY MATERIAL	SEAL MATERIAL	CONNECTION	STANDARD	SIZE	SPACE HEATER	HIGH PURITY SERIES
A	23	T	*	*	*	*	*	* * *	OC※	1
A AUTOMATIC	23 TYPE 23	T TYPE T	1 Single-Phase 100VAC 2 Single-Phase 200VAC	U PVC C C-PVC P PP F PVDF	E EPDM V FKM	S SOCKET N THREADED P SPIGOT F FLANGED	J JIS D DIN 1 JIS 10K 5 JIS 5K A ANSI	015 10mm 020 20mm 025 25mm 032 32mm 040 40mm 050 50mm 065 65mm 080 80mm 100 100mm	OC OC * Indicate only for electric tyoe only.	1 LUBRICANT FREE

Relationship between maximum allowable pressure and temperature



Actuator

Applicable nominal diameter (mm)		15～50	65～100
Actuator model		T-00	T-0
Open/close time (sec)	50Hz	10	25
	60Hz	8	20
Degree of protection		Protection class 5 jet-proof type (IP65 equivalent)	Protection class 5 jet-proof type (IP65 equivalent)
Motor starting current (A) 50/60Hz	100VAC	0.80/0.80	1.20/1.20
	110VAC	1.00/1.00	1.40/1.40
	200VAC	0.50/0.50	0.50/0.50
	220VAC	0.70/0.70	0.70/0.70
Motor Rated Current (A) 50/60Hz	100VAC	0.40/0.40	0.50/0.50
	110VAC	0.50/0.50	0.60/0.60
	200VAC	0.25/0.25	0.25/0.25
	220VAC	0.30/0.30	0.30/0.30
Manual operation handle revolution		7.5	6.7
Power consumption (VA)	100VAC	40	50
	110VAC	44	55
	200VAC	50	60
	220VAC	55	66
Cable connector nominal diameter		G1/2	G1/2
Motor rated output (W)		8	8
Number of motor poles (P)		4	4
Motor insulation type		Class E	Class E
Motor rated time (min)		30	30
Limit switch capacitance ※1		250VAC 5A	250VAC 10A
Space heater rated output (W)		2※2	8
Ambient Temp. ※2		-10°C～60°C	-10°C～60°C

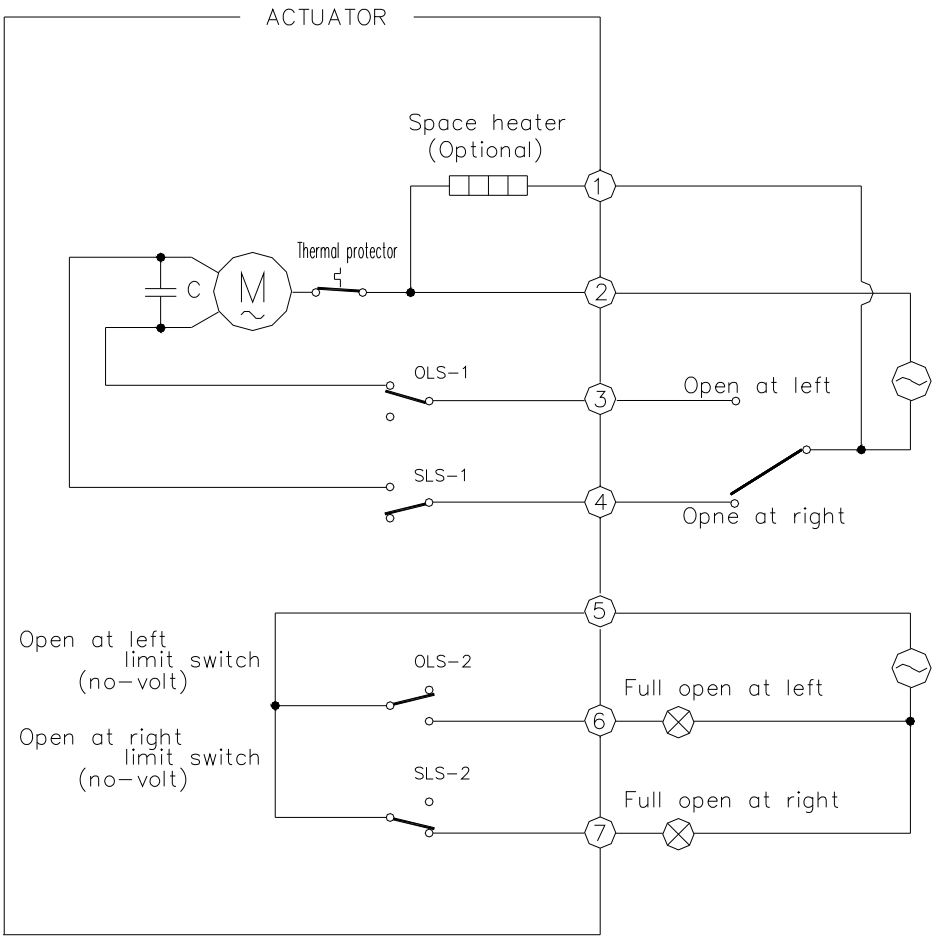
※1 Contact us if the contact rating of the limit switch is less than or equal to (1mA～100mA, 5 to 30V).

※Space heaters for 2 T-00 are optional.

※3 Depending on the type of option, this will change. Contact us for more information.

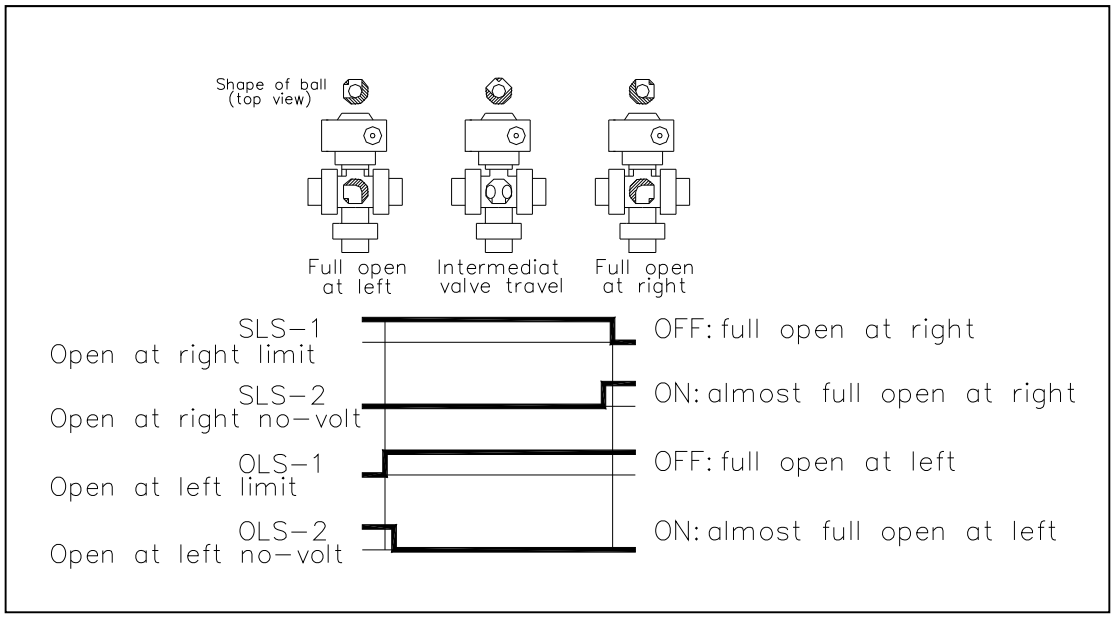
Wiring Diagram (15～50 mm)

・Reference Wiring Example



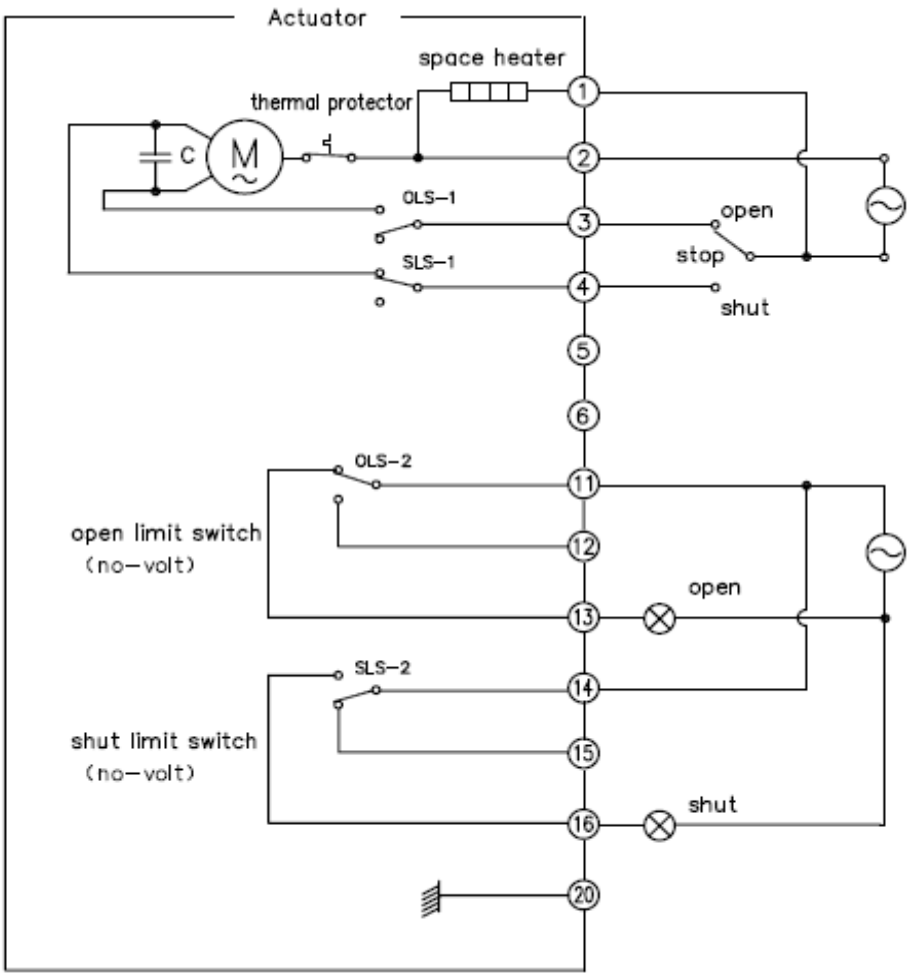
NOTE :The wiring diagram shows when the right full-open operation ends.

Switching chart



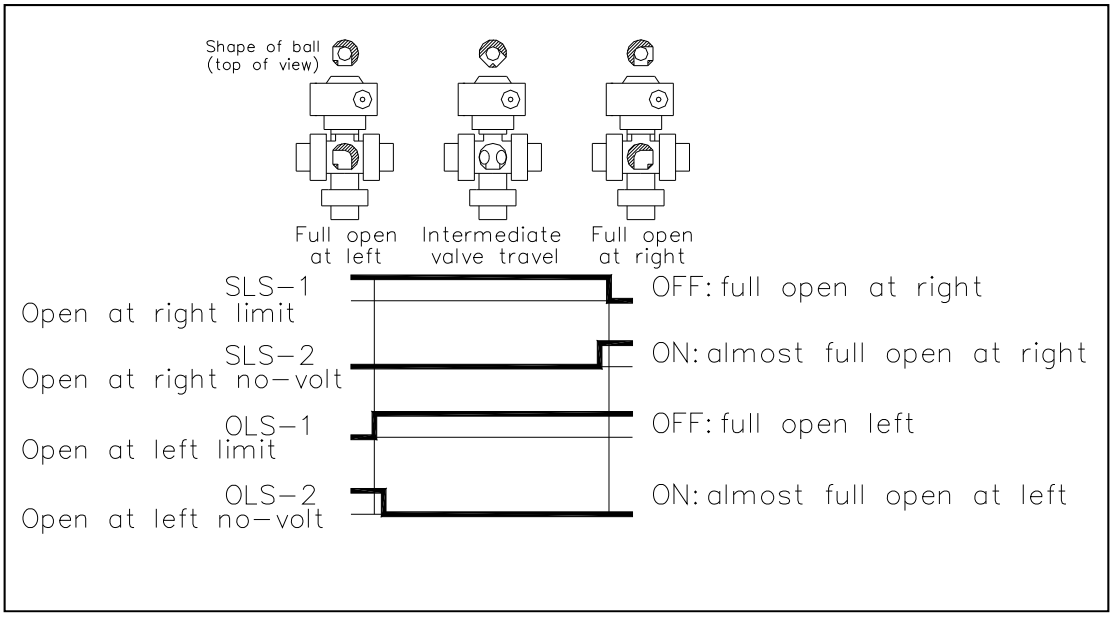
Wiring Diagram (65～100 mm)

・Reference Wiring Example



NOTE :The wiring diagram shows when the right full-open operation ends.

Switching chart



・About parallel wiring

If several (two or more) electrically operated valves are connected in parallel and operated simultaneously with a single open/close switch (or relay contact), current flows as shown by the dotted lines, causing malfunction. In this condition, the actuator may cause chattering and the actuator may fail. Avoid such wiring connections. (See Fig. 4-1.)

Provide an open/close switch (or relay contact) for each unit to ensure correct operation. (See Fig. 4-2.)

Fig 4-1

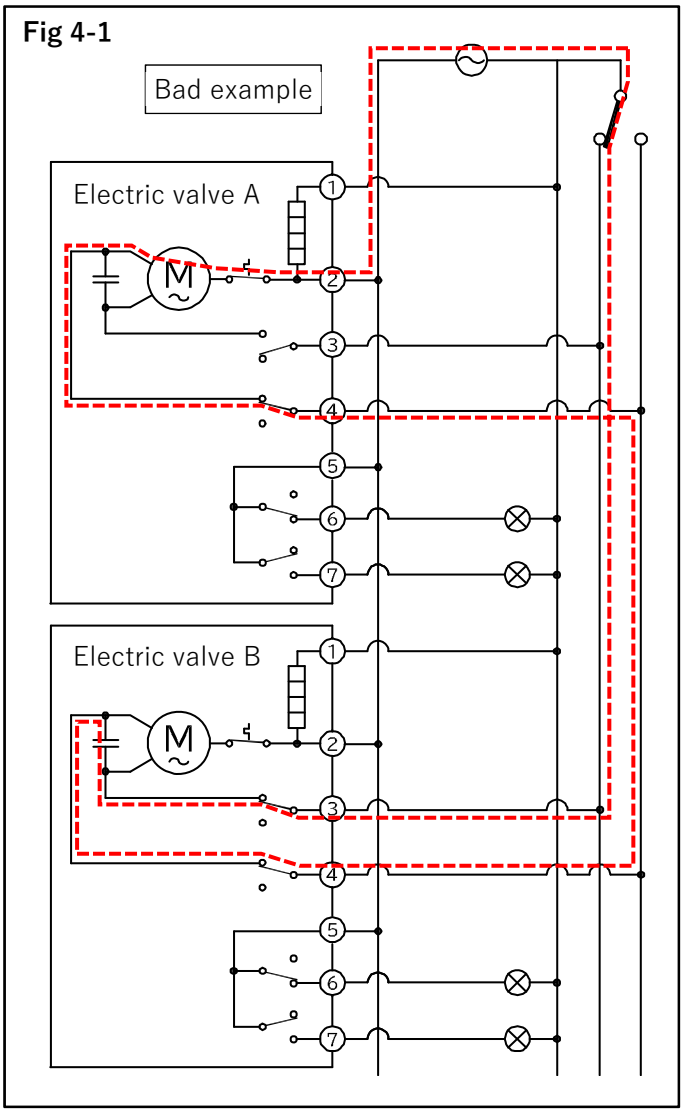
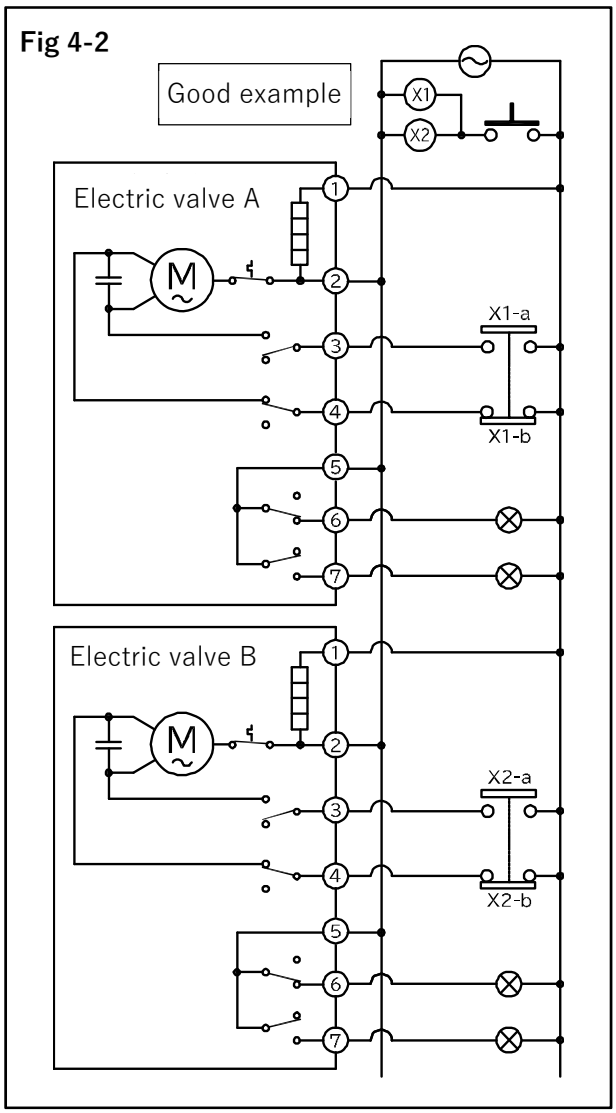


Fig 4-2



Standard option

Option name	Objectives and specifications	Applicable nominal diameter
Space heater	・Control of condensation inside the actuator ・Possible to retrofit	15～50mm (65～100mm is standard-equipped)
Potentiometer	・Outputs the opening of the valve as a resistance value ・Select from 135 Ω or 500 Ω	65～100mm (15～50mm can be used to rank up the actuator.)
Intermediate limit switch	・Detects the intermediate position (one for each opening/closing) ・Without switching voltage limit switch	65～100mm (15～50mm can be used to rank up the actuator.)
Servo unit (E-E Positioner)	・Operates in proportion to DC4～20mA input signal	65～100mm (15～50mm can be used to rank up the actuator.)
Speed controller	・Delay of opening and closing time is possible	65～100mm (15～50mm can be used to rank up the actuator.)
Manual handle	・Valve can be opened and closed during power loss	15～50mm (65～100mm is standard-equipped)
Metal insert (for bottom stand)	・A metal internal thread for supporting a valve	15～50mm

Contact us for combinations of the above options and other special options.

5. Piping method

Flanged end

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

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not overtighten the Union nut. ▶ Do not use a pipe wrench to tighten the Union nut. ▶ Do not tighten the bolts and nuts for piping to the specified torque values in Table 5-2.
Forcing	**There is a danger of injury.** ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ Wear appropriate protective equipment according to the type of work being performed. **The valve can be damaged, or leak.** ▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve. ▶ Fix the End connector during piping work or disassembly and reassembly. ▶ When attaching the valve to the end of the pipe, be sure to attach the Union nut and End connector on the secondary side (downstream side). ▶ When connecting to metal piping, do not apply piping stress to the valve. ▶ Use a connection flange with a full-face seat. ▶ Check that there is no difference in mutual flange standards. ▶ Be sure to use a sealing gasket (AV packing) between the flanges and tighten the pipe bolts/nuts to the specified torque values in Table 5-2 "Flange tightening torque." (When other than AV packing, the tightening torque value will change.) ▶ Keep the axis misalignment and parallelism of the flange surface below the values shown in Table 5-1 "Axis misalignment and parallelism." ▶ Do not tighten the bolts and nuts for piping to the specified torque values in Table 5-2.

Preparations	▶ Torque Wrench ▶ Spanner (or glasses wrench) ▶ AV packing

[Procedure]

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

⚠Caution

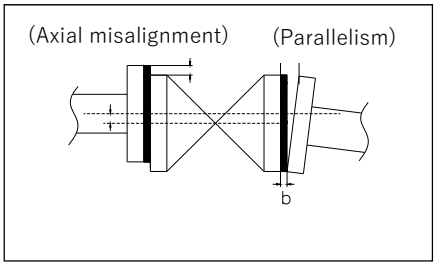
Forcing

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

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

Table 5-1 Axis misalignment and parallelism

Nominal diameter (mm)	Shaft misalignment	Parallelism (a-b)
15～32	1.0mm	0.5mm
40～80	1.0mm	0.8mm
100	1.0mm	1.0mm



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

⚠Caution

Forcing

Doing so may damage, damage, or leak.

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

Fig 1

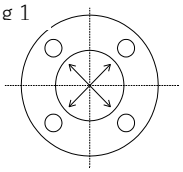


Table5-2 Flange Tightening Specified Torque Units: N-m {kgf-cm}

Size(mm)	15,20	25～40	50, 65	80, 100
PTFE・PVDF (coated)	17.5{179}	20.0{204}	22.5{250}	30.0{306}
Rubber	8.0{82}	20.0{204}	22.5{250}	30.0{306}

○If the Union nut has been removed from the body (even if it has been loosened), attach it using the following method.

1) Check that the O-ring (A) [8] is installed.

2) Contact the End connector [4b] and the Union nut [5] with the O-ring (A) [8] so that they will not come off.

3) Tighten the Union nut [5] by hand until it is tight.

4) Screw the Union nut [5] by 1/4 to 1/2 turn with a belt wrench so as not to damage it.
※Do not over tighten. (risk of damage)

Threaded end

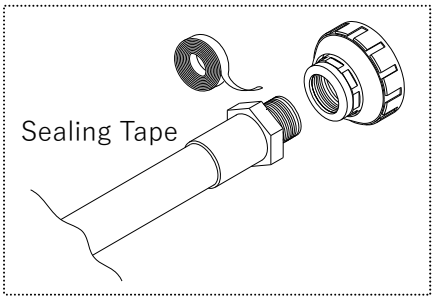
Warning	
Prohibition	**Serious injury can result.** ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load.

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not overtighten the screws at the joints. ▶ Do not overtighten the Union nut. ▶ Do not use a pipe wrench to tighten the Union nut.
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.** ▶ The Union nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the End connector before installation. ▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve. ▶ Fix the End connector during piping work or disassembly and reassembly. ▶ When attaching the valve to the end of the pipe, be sure to attach the Union nut and End connector on the secondary side (downstream side). ▶ When connecting to metal piping, do not apply piping stress to the valve. ▶ Make sure that the screws at the joints are made of resin. ▶ Use sealing tape for the sealing material of the Threaded part. If liquid sealant or liquid gasket is used, stress cracking (environmental stress cracking) may occur.

Preparations	▶ Sealing tape	▶ Wrench	▶ Belt Wrench

[Procedure]

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



2) Loosen the Union nut [5] with a belt wrench.

3) Remove Union nut [5] and End connector [4d].

4) Tighten the male thread of the Joint and the End connector [4d] until they are tight by hand.

5) Screw on the End connector [4d] by 1/2 to 1 turn with a wrench to prevent it from being damaged.

6) Check that the O-ring (A) [8] is installed correctly.

7) Contact the End connector [4d] and Union nut [5] to the body so that the O-ring (A) [8] does not come off.

8) Tighten the Union nut [5] by hand until it is tight.

9) Screw the Union nut [5] 1/4 to 1/2 turn with a belt wrench to avoid damage.

Socket end (adhesive)

Warning	
Prohibition	**Serious injury can result.** ▶ When hanging or slinging a valve, pay sufficient attention to safety, and do not enter under the load. **Fire or an explosion can result.** ▶ Ensure adequate ventilation when using adhesives and do not use open flames around them.

Caution	
Prohibition	**There is a danger of injury.** ▶ The adhesive contains volatile solvents, so do not inhale odors directly. **The valve can be damaged, or leak.** ▶ Do not apply too much adhesive. Excessive adhesive will flow into the valve. ▶ Do not strike the pipe when inserting it into the End connector. ▶ Do not overtighten the Union nut. ▶ Do not use a pipe wrench to tighten the Union nut.
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. ▶ If the adhesive adheres to the skin, remove it immediately. ▶ If you feel worse or feel unusual when using the adhesive, promptly seek a doctor's diagnosis and take appropriate action. **The valve can be damaged, or leak.** ▶ The Union nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the End connector before installation. ▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve. ▶ Fix the End connector during piping work or disassembly and reassembly. ▶ When attaching the valve to the end of the pipe, be sure to attach the Union nut and End connector on the secondary side (downstream side). ▶ Be careful when constructing under low temperature, as solvent vapor is less likely to evaporate and tends to remain. ▶ After piping, open both ends of the pipe and use a blower (low-pressure type) to ventilate to remove the solvent vapor. ▶ Use "ASAHI AV Cement" depending on the material. ▶ Perform the water flow test after 24 hours or more have elapsed after completion of bonding.

Preparations	▶ ASAHI AV Cement	▶ Belt Wrench

[Procedure]

1) Loosen the Union nut [5] with a belt wrench.

2) Remove Union nut [5] and End connector [4c].

3) Pass the Union nut [5] to the pipe side.

4) Wipe off the socket part of the End connector [4c] with a waste cloth.

5) Apply adhesive evenly to the socket of the End connector [4c] and to the pipe socket.
※Do not apply more adhesive than is necessary.
(Solvent crack may occur, resulting in damage.)

Amount of adhesive used (reference)

NOMINAL SIZE (mm)	15	20	25	32	40	50	65	80	100
Amount used (g)	1.0	1.3	2.0	2.4	3.5	4.8	6.9	9.0	13.0

6) After applying the adhesive, quickly insert the pipe into the End connector [4d] and hold for at least 60 seconds.

7) Wipe off any excess adhesive.

8) Check that the O-ring (A) [8] is installed correctly.

9) Contact the End connector [4c] and the Union nut [5] with the O-ring (A) [8] so that they will not come off.

10) Tighten the Union nut [5] by hand until it is tight.

11) Screw the Union nut [5] 1/4 to 1/2 turn with a belt wrench to avoid damage.

Socket type (fusing)

⚠ 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 overtighten the Union nut. ▶ Do not use a pipe wrench to tighten the Union nut.
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.** ▶ The Union nut of this product is lightly tightened to make it easier to loosen. Be sure to remove the End connector before installation. ▶ Install the product so that excessive stress such as tension, compression, bending or impact is not applied to the piping or valve. ▶ Fix the End connector during piping work or disassembly and reassembly. ▶ When attaching the valve to the end of the pipe, be sure to attach the Union nut and End connector on the secondary side (downstream side).

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

[Procedure]

1) Loosen the Union nut [5] with a belt wrench.

2) Remove Union nut [5] and End connector [4c].

3) Pass the Union nut [5] 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 (A) [8] is installed.

6) Contact the End connector [4c] and Union nut [5] to the body so that the O-ring (A) [8] does not come off.

7) Tighten the Union nut [5] by hand until it is tight.

8) Screw the Union nut [5] 1/4 to 1/2 turn with a belt wrench to avoid damage.

Product support

⚠Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not over-tighten when supporting piping with a U-band, etc. ▶ When installing a valve in the piping around the pump, do not cause large vibrations in the valve.
Forcing	**There is a danger of injury.** ▶ Be sure to perform safety inspections of the machine tool and power tool beforehand. ▶ Wear appropriate protective equipment according to the type of work being performed. **The valve can be damaged, or leak.** ▶ Do not over-tighten when supporting piping with a U-band, etc.

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

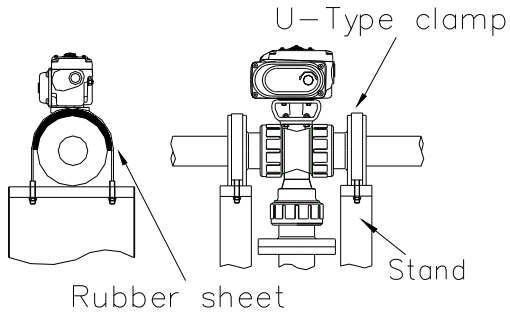
[Procedure]

Horizontal piping

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

On the actuator section when the actuator is on the lower side
Lay the rubber sheet and install the frame.

(Support installation example)

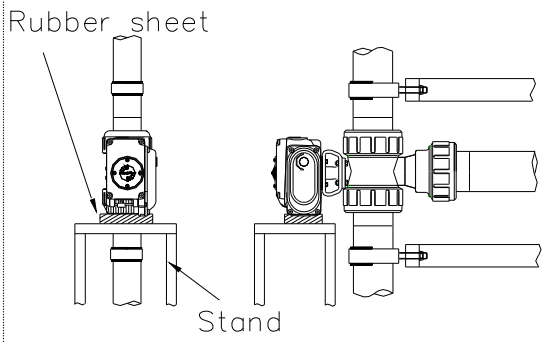


Vertical piping

Place a rubber sheet on the actuator and install the frame.

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

(Support installation example)



6. Electrical Wiring

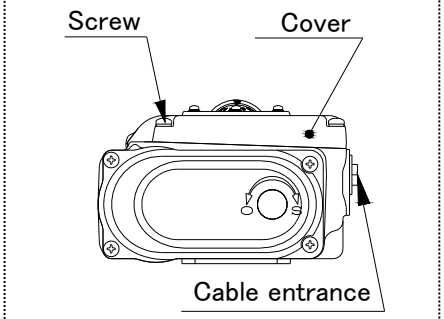
Warning	
Prohibition	**There is a risk of electric shock.** ▶ Do not perform wiring while the power is on. ▶ Do not touch any other parts on the board or the terminal block wiring part. ▶ Do not perform wiring work in an environment where rain water or moisture may splash on the wiring work (e.g. outdoor work in rainy weather). ▶ Do not perform wiring work with wet hands or tools.

Caution	
Prohibition	**Doing so may cause the actuator to fail or malfunction.** ▶ Do not apply a load to the non-voltage limit switch exceeding the contact capacity. For use with small loads (1mA～100mA, 5V～30V), please contact us. ▶ Without wiring multiple (two or more units) in series, provide one open/close switch (or relay contact) at a time. ▶ Do not use the product near high-voltage lines, inverters, or other objects that generate noise or magnetism. ▶ If the actuator is installed outdoors or in a location where rainwater or moisture may enter the actuator, prevent rainwater or the like from entering the actuator through the wiring port of the actuator or the actuator cover.
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. **Doing so may cause the actuator to fail or malfunction.** ▶ Check that the power supply voltage of the actuator matches the power supply voltage to be wired. ▶ Be sure to connect the ground wire. ▶ Perform wiring work when there is no insulation defect. ▶ Wire correctly according to the wiring diagram. ▶ After wiring, make sure that the screws (crimp terminals, etc.) are not tightened or loosened. ▶ Install the cable connector and actuator cover securely.

Preparations	▶ Phillips screwdriver ▶ Wire stripper ▶ Wrench ▶ Crimp terminal ▶ Connector ▶ Terminal crimping tool ▶ Monkey wrench

[Procedure]

1) Loosen the four screws securing the switch cover with a Phillips screwdriver and open the cover. When installing T-00 type in a vertical pipe and wiring, slide the stopper after opening the cover to fix the cover. (Refer to page 00.)



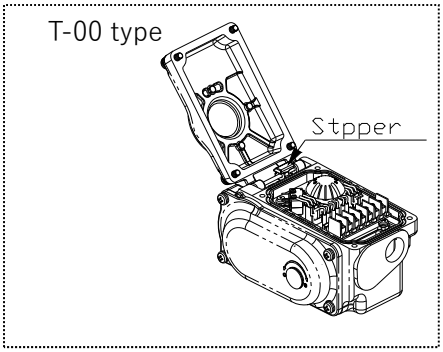
2) Loosen the protective screw on the lead entry with a monkey wrench and remove it.

3) Attach the connector to the lead entry.

4) Pass the cable through the connector.

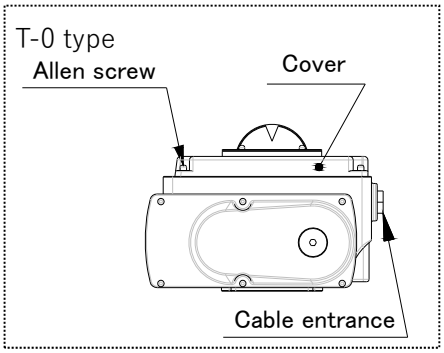
5) Peel off the outer skin of the cable with a wire stripper.

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



7) Connect wires to the terminal block using a Phillips screwdriver according to pages 14 and 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 due to rainwater entering.)



9) For T-00 type, attach a ground to the threaded section on the rear side of the body.

10) Tighten the four screws securing the switch cover with a Phillips screwdriver to attach the cover.

7. Commissioning method

⚠Warning	
Prohibition	**Serious injury can result.** ▶ Never touch any moving parts (valves and actuators) during operation.

⚠Caution	
Prohibition	**You may be electrocuted or injured.** ▶ Do not perform electric operation with the actuator cover open. ▶ Do not perform manual operation while the power is on. ▶ Do not perform electric operation with the manual operation handle attached to the manual operation shaft. **Doing so may damage the actuator.** ▶ Do not turn the manual override further than necessary from the fully open/closed positions.
Forcing	**Doing so may cause the actuator to fail or malfunction.** ▶ 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.

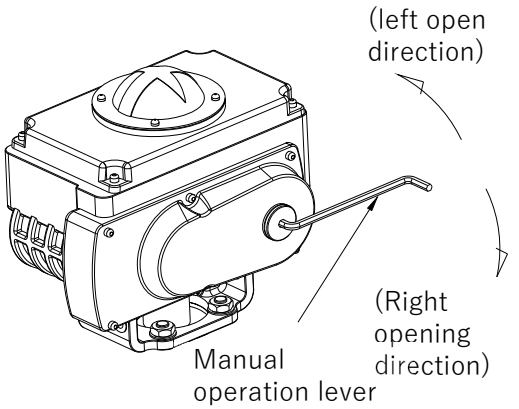
Manual operation

Preparations	▶ Manual operation lever (optional for 15-50mm) or hex key (5mm)

[Procedure]

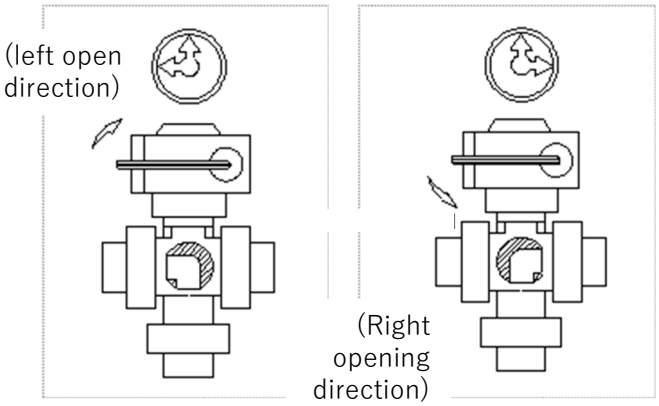
1) Insert the manual operation lever or the hex wrench into the hole in the manual operation shaft of the actuator.

2) Open the valve clockwise ↔ counterclockwise one or two times while looking at the valve travel meter.
Right rotation (clockwise) → right opening direction
Left rotation (counterclockwise) → Left opening direction



※Do not forcibly turn the hex wrench further from the left/right open positions.
(It will malfunction.)

Open left or right to remove the manual or hex wrench from the operating axis.



Electric operation method

⚠Caution	
Prohibition	**Contact with the terminal will result in electric shock.** ▶ Do not leave the actuator cover open. ▶ Make sure that the manual override shaft is not equipped with a hex wrench or manual handle (optional item).

[Procedure]

1) Turn on the power.

2) Open the external selector switch to the left or right to check that the valve display direction matches the operating direction.

3) Fully open left or fully open right to turn off the power.

8. Improvement of internal leakage (seat leakage)

If internal leakage (seat leakage) occurs when the valve is fully closed, tightening the Carrier may improve seat leakage.

If seat leakage does not improve even after retightening the Carrier, replace the valve according to "9. Disassembly/Assembly Method for Replacement of Parts".

Warning	
Forcing	**Serious injury can result.** ▶ A little fluid remains in the valve. Wear protective gloves and eye protection.

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not overtighten the Carrier. ▶ Do not overtighten the Union nut. ▶ Do not use a pipe wrench to tighten the Union nut.

Preparations	▶ Belt Wrench	▶ Protective goggles
	▶ Lever (Lever sold separately)	▶ protective gloves
	▶ Manual operation lever (15～50mm is optional) or hex key (5mm)	

[Procedure]

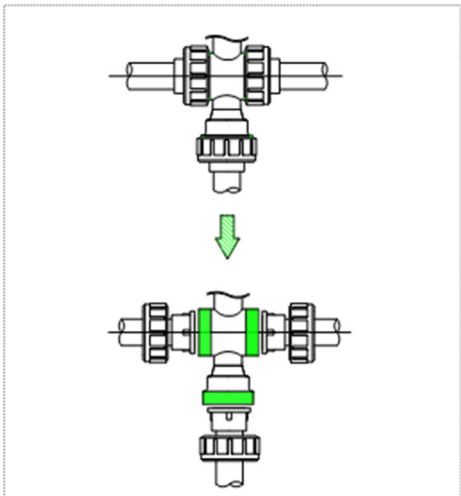
1) Completely drain the fluid in the piping.

2) Turn off the power.

3) Loosen the three Union nuts [5] with a belt wrench.

4) Remove the valve from the piping.

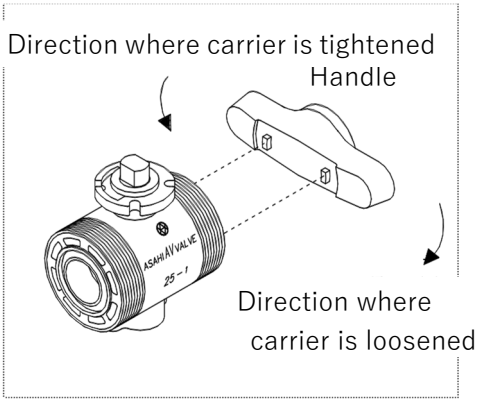
5) Adjust the opening of the ball [2] using an actuator control handle or a hex wrench.
※At right side Carrier [3] adjustment
Fully open leftward toward the trademark (AV mark).
※Left side Carrier [3] adjustment
Fully open to the right in the direction of the trademark (AV mark).
※When adjusting lower Carrier [3]
There is no need to adjust the opening of the ball [2].



6) Mate the protrusion on the top of the manual override handle (optional item) with the recess in the Carrier [3].

7) Adjust clockwise (direction to tighten Carrier [3]) or counterclockwise (direction to loosen Carrier [3]).

8) Replace in the reverse order from 4).



9. How to disassemble/assemble parts for replacement

If internal leakage (seat leakage) or external leakage occurs when the valve is fully closed, the leakage may be improved by replacing the parts.
If the leak does not improve after replacing the parts, remove and replace the valve according to this item.

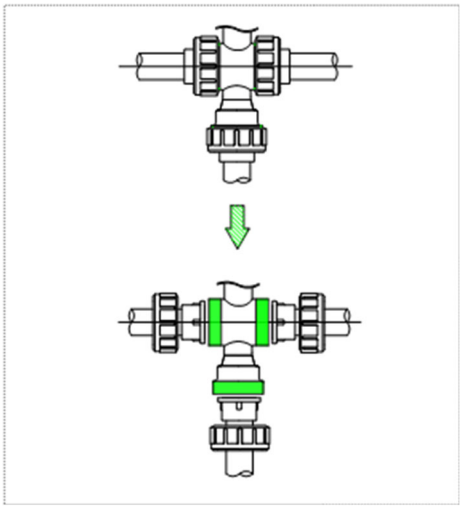
Warning	
Forcing	**Serious injury can result.** ▶ A little fluid remains in the valve. Wear protective gloves and eye protection.

Caution	
Prohibition	**The valve can be damaged, or leak.** ▶ Do not overtighten the Carrier. ▶ Do not overtighten the Union nut. ▶ Do not use a pipe wrench to tighten the Union nut.

Preparations	▶ Belt wrench ▶ wrench ▶ Protective glasses ▶ Protective gloves ▶ Lever (manual lever sold separately) ▶ Manual operation lever (15～50mm is optional) or hex key (5mm)

<**Disassembly**>

[**Procedure**]



1) Completely drain the fluid in the piping.

2) Fully close the valve with the handle for electric operation or actuator operation.

3) Turn off the power.

4) Loosen the three Union nuts [5] with a belt wrench.

5) Remove the valve from the piping.

6) Loosen screws (B) [27] between Stand [24] and body [1] and remove actuator [23] and Stand [24].
※ At this time, remember the opening of the ball [2] towards the trademark (AV marking) and the orientation of the actuator [23]. (Important during assembly)

7) Loosen the bolts (A) [26] between the Stand [24] and the actuator [23], and remove the actuator [23] and the Stand [24].

8) Loosen the screws (B) [28] securing between the stem [6] and Joint [25] with a hex wrench, and remove the Joint [25].

9) Engage the protrusion on the top of the manual override handle (optional item) with the recess in the Carrier [3]. (Refer to reference drawing on page 30.)

10) Loosen the Carrier [3] by turning it counterclockwise when mated.

11) 8) Remove all Carriers [3] in the same way as 9).

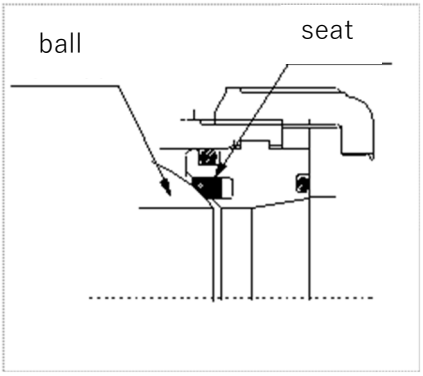
12) Remove the seat [7] by hand so as not to damage it.

13) Push out the ball [2] by hand.

14) Push the stem [6] out from the top flange side to the body side.

<**Assembly**>

[**Procedure**]



1) Assemble in reverse order from 14).
※When assembling, pay attention to the orientation of balls [2] and actuators [23].
※For 11), check the front and back sides of the sheet [7] before mounting.
Recessed side = Ball and mating (see pages 9 and 10)

10. How to adjust the limit switch

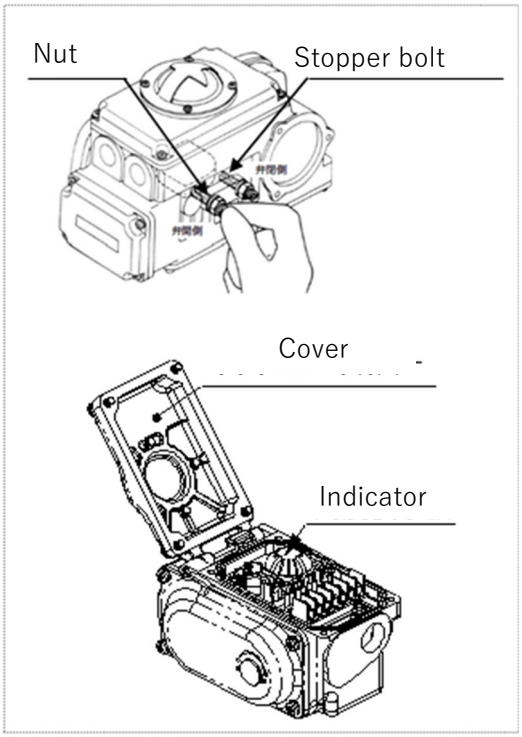
Size 15～50mm

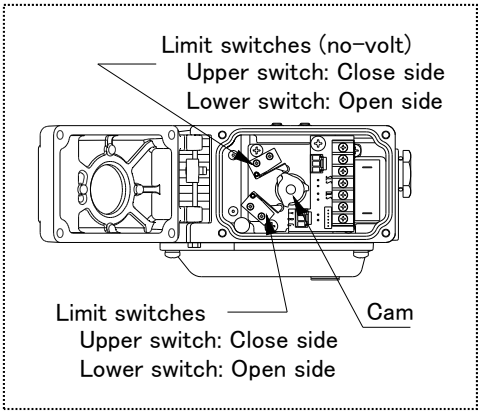
Caution	
Forcing	**Doing so may damage the actuator.** ▶ Before adjusting the limit switch, be sure to loosen the stopper bolt fixing nut and loosen the stopper bolt 4 to 5 turns. (The limit switch and stopper bolt are already adjusted when shipped from the factory.)
-	**The intermediate position of the "T-00" actuator cannot be adjusted structurally.**

Preparations	▶ Phillips screwdriver ▶ Manual operation lever (15～50mm is optional) or hex key (5mm)

[Procedure]

1) Turn off the power and completely drain the fluid from the piping.
2) Open the valve to the right or left using an Allen key or manual handle (optional). Manually operate the valve in the left opening direction (see page 30).
3) Open the actuator cover by loosening it with a Phillips screwdriver and pull out the opening indicator plate upward.
4) Loosen the two screws that secure the cam to the stem using a Phillips screwdriver.
5) Rotate the cam and confirm that the limit switch has clicked and operated in two steps. The cam is divided into two stages; the upper stage is for right opening side and the lower stage is for left opening side.
6) Fix the cam lightly by hand and tighten the two screws with a Phillips screwdriver.
7) Make sure that the valve position is adjusted manually (see page 30). 5) If not, repeat steps 4) and 6).
8) Remove the hex key from the manual override shaft.
9) Attach the opening display plate, attach the switch cover, and tighten with a Phillips screwdriver.
10) Fully open to the right and fully open to the left with an electric operation.
Check that the opening is matched.





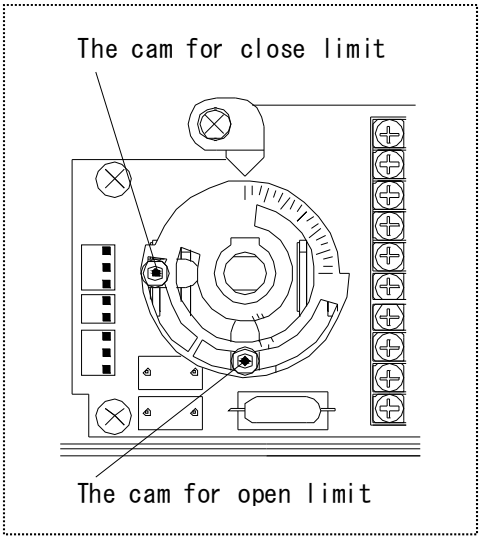
Size 65-100mm

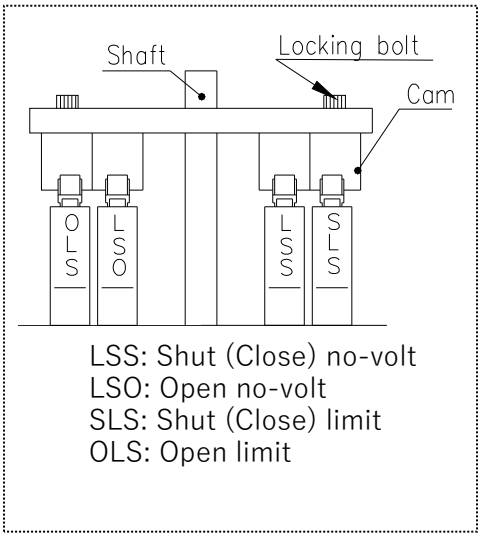
Preparations	▶ Hex key (3mm)	▶ Phillips screwdriver

⚠ Caution	
Forcing	**Doing so may damage the actuator.** ▶ Before adjusting the limit switch, be sure to loosen the stopper bolt fixing nut and loosen the stopper bolt 4 to 5 turns. (The limit switch and stopper bolt are already adjusted when shipped from the factory.)

[Procedure]

1) Turn off the power to the actuator and completely drain the fluid from the piping.
2) Loosen and remove the screws on the actuator cover with a Phillips screwdriver, and then pull the indicator upward.
3) Manual operation is performed to the opening (right full-open or left full-open) to be adjusted by the manual handle. (See page 30.)
4) Loosen the set screw of the cam for the limit switch you want to adjust with a hex wrench.
5) Move the cam by hand in the direction you want to adjust. Check that the limit switch has operated.
6) While lightly supporting the cam by hand, tighten the set screw with an Allen wrench. The position at which these limit switches are kicked is the stop position for fully opening right and fully opening left, and the opening 2% to 3% before is the respective signal output position.
7) After operating the limit cam to kick the left-open limit switch by manual operation (refer to page 30), turn the stopper bolt in the left-open direction by hand, and tighten the nut while 1/4 to 1/2 turn is loosened from the position where rotation is no longer possible.
   In the same way, manually move the limit cam to the position where it kicks the right limit switch, and then adjust the right opening stopper bolt in the same way as the left opening direction. Check that the opening is the one that you want to adjust manually. If the adjustment is insufficient, repeat 3, 4, 5, 6).
8) Attach the actuator cover and tighten with a Phillips screwdriver.
9) Fully open to the right and fully open to the left with an electric operation (see page 30). Check that the opening is matched.





11. Inspection item

⚠Caution	
Forcing	**Fluid may leak from the valve or the actuator may fail.** ▶ Maintenance should be performed every 3 to 6 months as a guide in order to keep the watch in normal condition and use it for a long time. Pay particular attention to temperature changes and aging during long-term storage or shutdown or use. **You may be electrocuted or injured.** ▶ Turn off the power before removing the actuator cover. ▶ 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. Troubleshooting."

Daily inspection

Inspection items and inspection methods	Guideline of judgment	Inspection point	Treatment method
External leakage (visual inspection)	No leakage	[Flange type] Pipe flange connection	① Retighten the pipe bolts to the specified torque. ② Remove the valve from the pipe and re-tighten the pipe bolts. (Ref: 5. Piping method [Flange type])
		[Socket type] Adhesive construction section	Remove the valve from the piping and retry the bonding process. (Ref: 5. Piping method [socket type])
		[Threaded type] Threaded connection	Remove the valve from the piping and screw the valve in again. (Ref: 5. Piping method [Threaded type])
		Top flange of the valve	Remove the valve from the piping and replace the valve or defective part. (Ref: 9.How to disassemble for parts replacement)
		Union nut portion of the valve	① Retighten the Union nut ② Remove the valve from the piping, check the O-ring and sealing surface, and replace the defective part. (Ref: 5. Piping method)
		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)

Daily Inspection (continued)

Inspection items and inspection methods	Guideline of judgment	Inspection 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 for parts replacement)
		Piping around the valve	Reconfirm the conditions of use (Ref: 2.Handling of products with Safety 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	Inspection 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 of products with Safety 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 of products with Safety Precautions)

Periodic inspection

●Guideline of the inspection cycle: 6 months

Inspection items and inspection methods	Guideline of judgment	Inspection point	Remedy for malfunctions
On the manual handle Operability (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 Stand + valve	Retighten the mounting bolts with the following torque. Size 15～32mm: 5 N-m Size 40, 50mm : 6 N-m Size 65, 80mm : 8 N-m Size 100mm : 10 N-m
		For Stand + actuator	Retighten the mounting bolts with the following torque. Size 15～100mm: 8 N-m
		For fixing the actuator cover	Retighten the screws with the following torque Size 15～100mm: 5 N-m
		Terminal block	Retighten the screws with the following torques Size 15～100mm: 1 to 1.5 N-m
		[Flange type] For flange piping	Retighten the pipe bolts to the specified torque. (Ref: 5. Piping method [Flange type])
Water-intrusion ※1) (visual inspection)	No intrusion	Inside the actuator	Replace the actuator (Ref: 9.How to disassemble for parts replacement)
Intrusion of foreign objects ※1) (visual inspection)	No intrusion	Inside the actuator	Replace the actuator (Ref: 9.How to disassemble for parts replacement)
Measured of the isolation resistance ※1) (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. (Ref: 9.How to disassemble for parts replacement)

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

12. Cause of malfunction and remedy

⚠Caution	
Forcing	**You may be electrocuted or injured.** ▶ If any malfunction is found, immediately stop using the product and take appropriate action. ▶ When removing the valve from the piping when replacing the valve or parts, completely remove the fluid from the piping before starting work. ▶ Turn off the power before removing the actuator cover.

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.: 7. 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 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 of products with Safety Precautions)
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: 4. Wiring diagram for actuator specifications in the product 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: 4. Wiring diagram for actuator specifications in the product 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 (Ref: 2.Handling of products with Safety Precautions)
	The thermal protector is activated.	Stop using the product immediately, and lower the ambient temperature or the opening/closing frequency.
	The capacitor is burnt out (punctured).	Stop using the product immediately and replace the actuator. (Ref: 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)
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)
	The Carrier is loose.	Remove the valve from the pipe and tighten the Carrier to adjust the surface pressure.
	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)	Union nut is loose	Retighten the Union nut (Ref: 5. Piping 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: 9.How to disassemble for parts replacement)
Actuator is operating but valve is not open or closed	Damaged stem, ball, or Joint	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)

CAUSE OF FAILURE AND HOW TO REMEDY (continued)

Failure phenomenon	Possible cause	Measures and measures
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)

13. Disposal method of residual materials and waste materials

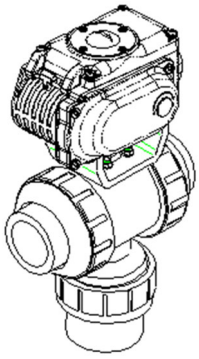
Warning	
Forcing	**When burnt, toxic gas is generated.** ▶ When disposing of the product or parts, please dispose of them according to the guidelines of each local authority by a professional disposal company.

Inquiries

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

[User's Manual]

3-way ball valve Type 23 Double L port Electric actuated Type T
15～100mm



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

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