



**Please read this manual before installation and use.**

**GENERAL**

A plastic ball valve with a mini actuator.  
 Various connections can be selected.  
 (Various materials can be selected.)

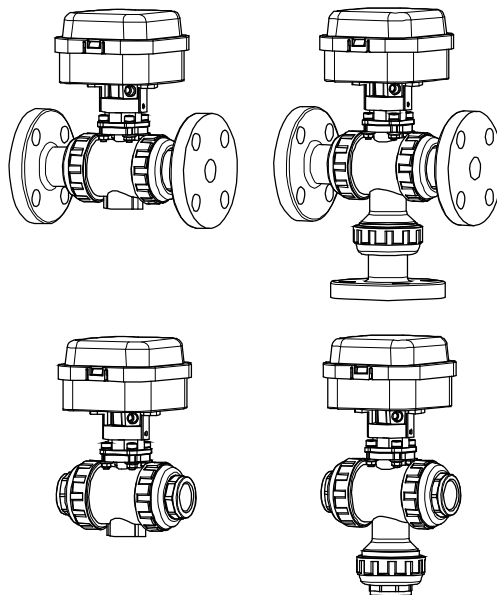
**Actuator**

CM : For AC power

**Valve**

PA type 2-way ball valve

PL type 3-way ball valve



J10K Flanged-end, Threaded End Rc, Socket

**PRODUCT CODE**

PA, PL type	J10K Flanged-end	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	P	P	<input type="checkbox"/>	-	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	-	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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	Threaded End Rc	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	5	P	P	<input type="checkbox"/>	-	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	-	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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	Socket	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	7	P	P	<input type="checkbox"/>	-	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	-	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

(1) Actuator CM1 CM2	(4) Sizing code 0 : Standard 1 : Light 2 : Heavy	(6) Body material P : PVC H : C-PVC R : PVDF Q : PP	(9) Size [mm] ex. 25A → 025
(2) Valve PA PL	(5) Connection 1 : J10K Flanged-end 5 : Threaded End Rc 7 : Socket	(7) Ball material same as body material	(10) Option
(3) Voltage 1 : 100 / 110 V AC 2 : 200 / 220 V AC		(8) Stem seal E : EPDM V : FKM	

**VALVES SPECIFICATIONS**

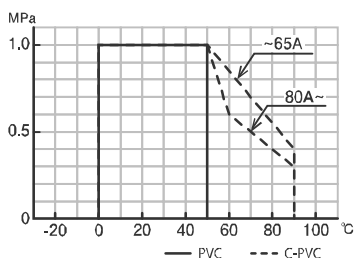
Water 
 Oil 
 Air, Gas 
 Steam 
 Chemicals 
 Sea water 
 Slurry 
 Negative pressure

PA PL type

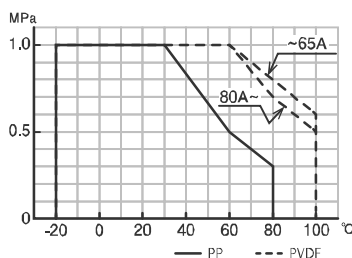
Valve type		PA		PL	
Design		2 way, Full port		3 way, Full port	
Connection		J10K Flanged-end Threaded End Rc	Socket	J10K Flanged-end Threaded End Rc	Socket
Fluid					
Max pressure		1 MPa		1 MPa	
Size [mm]		015 to 032	015 to 025	015 to 025	015 to 025
Material	Body Ball	PVC C-PVC PVDF PP	PVC C-PVC PP	PVC C-PVC PVDF PP	PVC C-PVC PP
	Seat	PTFE		PTFE	
Stem seal	O-ring	EPDM FKM		EPDM FKM	

**PRESSURE & TEMPERATURE RATING (PA)**

Body material: PVC, C-PVC

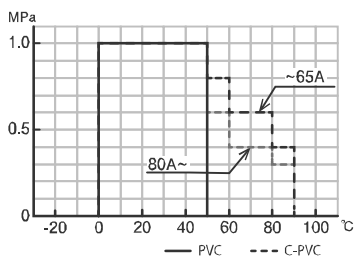


Body material: PVDF, PP

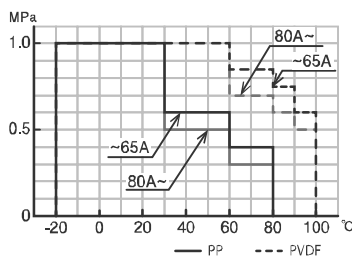


**PRESSURE & TEMPERATURE RATING (PL)**

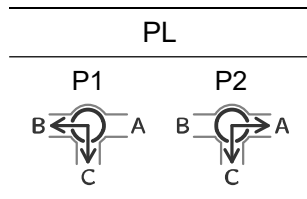
Body material: PVC, C-PVC



Body material: PVDF, PP



**FLOW PATHS (Position① / P1) (Position② / P2)**



Note) When a closed path is exposed to high pressure, it may leak slightly to an open path.

**ELECTRIC ACTUATOR SPECIFICATIONS**

3 way valve: SHUT / Position①, OPEN / Position②

CM1 CM2 type

Actuator type (□:Voltage code)	CM1-030-□	CM1-070-□	CM2-030-□	CM2-070-□
Voltage	100 / 110 V AC ±10 % 50/60 Hz (Code: 1) 200 / 220 V AC ±10 % 50/60 Hz (Code: 2)			
Rated torque [N·m]	3	7	3	7
Operation time [s]	14.5 / 12 (50/60 Hz)	17 / 14 (50/60 Hz)	14.5 / 12 (50/60 Hz)	17 / 14 (50/60 Hz)
Power consumption [VA]	5	13	7	13
Motor	Synchronous motor			
Overload protection	Impedance protect			
Method of operation	Transfer input type		a-contact input type, with built-in relay	
Operation	Power to White → SHUT (SHUT PL is lit.) Power to Red → OPEN (OPEN PL is lit.)		SW is OFF → SHUT (SHUT PL is lit.) SW is ON → OPEN (OPEN PL is lit.)	
Input signal current	Nil		16 mA	
Output signal rating	Resistance load 1 A 250 V AC		Resistance load 0.5 A 120 V AC 0.2 A 250 V AC Micro load 2 mA      Micro load 8 mA	
Duty cycle	50 % 30 min			
Ambient temperature	-20 to 50 °C			
Space heater	0.3 W			
Manual operation	Direct operation (070: with clutch button)			
Enclosure	Equivalent to IP65 (IEC 60529)			
Housing material	Polycarbonate resin (Brack)			
Conduct port	Flexible cable 5 leads 0.5 mm <sup>2</sup> L=500 mm			

**WIRING**

CM1	CM2
<p>• Control switch should be prepared one by one for actuator. Do not operate two or more actuator from one switch. It might malfunction.</p>	<p>• Two or more actuators can be operated with one control switch. • When using control switch with current leakage (more than 1 mA) such as TRIAC or relay with CR, it can cause malfunction.</p>
<p>Note) For manual operation on CM-070, press the clutch button while operating it.</p>	

**INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS****GENERAL OPERATING INSTRUCTIONS****①WARNING**

- Using a positive-pressure gas with our plastic piping may pose a dangerous condition due to the repellent force particular to compressible fluids even when the gas is under similar pressures used for liquids. Therefore, be sure to take the necessary safety precautions such as covering the piping with protective material. For inquiries, please contact us. For conducting a leak test on newly installed piping, be sure to check for leaks under water pressure. If absolutely necessary to use a gas in testing, please consult your nearest service station beforehand.
- Certain liquid such as H<sub>2</sub>O<sub>2</sub>, NaClO, etc may be prone to vaporization (Off-Gassing) which may cause irregular pressure increases, which may destroy the valve.

**②CAUTION**

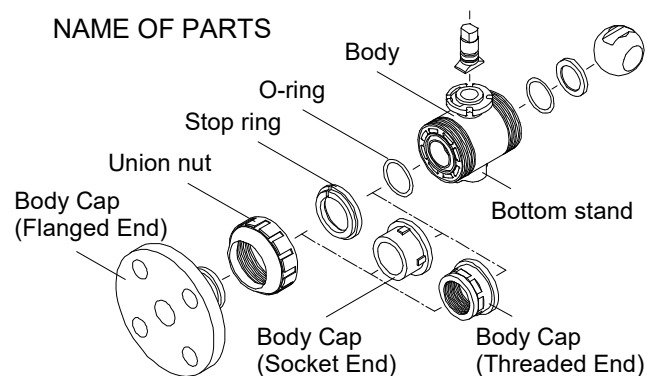
- Do not step on or apply excessive weight on valve. (It can be damaged.)
- Keep the valve away from excessive heat or fire. (It can be damaged, or destroyed.)
- Do not use the valve to fluid containing slurry. (The valve will not operate properly.)
- Always operate the valve within the pressure vs. temperature range. (The valve can be damaged or deformed by operating beyond the allowable range.)
- Allow sufficient space for maintenance and inspection.
- Select a valve material that is compatible with the media. For chemical resistance information, refer to "CHEMICAL RESISTANCE ON ASAHI AV VALVE". (Some chemicals may damage incompatible valve materials.)
- Do not use the valve in conditions where the fluid may have crystallized. (The valve will not operate properly.)
- Keep the valve out of direct sunlight, water and dust. Use cover to shield the valve. (The valve will not operate properly.)
- Perform periodic maintenance. (Leakage may develop due to temperature changes or periods of prolonged storage, rest, or operation.)
- Regarding the ball valve type, we recommend that you use fully open or fully closed. This is because the edge of the ball opening remains on the seat (PTFE) when used at an intermediate opening, so that the sealing performance temporarily deteriorates at the time of full closing.

**UNPACKING AND STORAGE****①WARNING**

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

**②CAUTION**

- This valve is not designed to handle impacts of any kind. Avoid throwing or dropping the valve.
- Avoid scratching the valve with any sharp object.
- Do not over-stack cardboard shipping boxes. Excessively stacked packages may collapse.
- Avoid contact with any coal tar creosote, insecticides, vermicides or paint. (These chemicals may cause damage to the valve.)
- When transporting a valve, do not carry it by the handle.
- Store products in their corrugated cardboard boxes. Avoid exposing products to direct sunlight, and store them indoors (at room temperature). Also avoid storing products in areas with excessive temperatures. (Corrugated cardboard packages become weaker as they become wet with water or other liquid. Take care in storage and handling.)
- After unpacking the products, check that they are defect-free and meet the specifications.



## INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

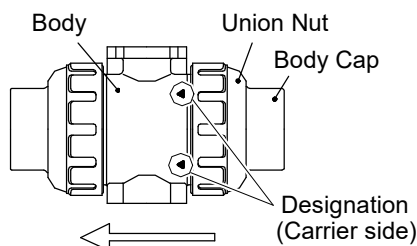
### HOW TO INSTALL A PLASTIC BALL VALVE

#### ①WARNING

- When suspending and supporting a valve, take care and do not stand under a suspended valve.
- Be sure to conduct a safety check on all hand and power tools to be used before beginning work.
- Wear protective gloves and safety goggles as fluid remain in the valve even if the pipeline is empty. (You may be injured.)

#### ②CAUTION

- When installing a pipe support by means of a U-band or something similar, take care not to over-tighten. (Excessive force may damage the pipe.)
- When installing pipes and valves, ensure that they are not subjected to tension, compression, bending, impact, or other excessive stress.
- When installing a piece of equipment at the end of the piping line, be sure to keep the secondary (Downstream) Body Cap and Union Nut installed on the valve.
- When installing Ball Valve, 15 to 50 mm (1/2" to 2") at the end, note the direction of flow.
- Find the mark ◀ molded on the Carrier-side body.
- The mark side is the primary side (upstream side).
- On the secondary (Downstream) side, the Carrier is integral with the valve body.
- This is the preferred method if installation when installing the equipment at the end of the line for safety purposes.



- When installing, disassembling, or reassembling the piping, fix the Body Cap.
- Before a water test, be sure that the Union Nut is tightly fastened.
- Fasten the Union Nut while avoiding the parallelism and axial misalignment of the flange surface.
- When connecting an ASAHI AV Valve to metal piping, take care not to let the pipe stress on the ASAHI AV Valve.
- When screwing in a Metal Insert (Ensat), install it vertically. Refer to the User's Manual for Metal Insert (Ensat) by the Maker.
- When loosening the union nut on the union side, fix the body cap (hold it with your hand) and do work. (If the body cap turns, the union will turn together, resulting in the union and ball separating from the body.) If the union is loosened, retighten the union.
- Take care not to over-tighten the Union Nut. (The valve can be damaged.)
- Do not use the pipe wrench. (The valve can be damaged.)

### FLANGED END

#### ①CAUTION

- Do not use the valve to fluid containing slurry. (The valve will not operate properly.)
- The installed valve must never be opened or closed when foreign matter such as sand is present in the pipeline.
- Use flat faced flanges for connection to AV Valves.
- Ensure that the mating flanges are of the same standards.
- Be sure to use sealing gaskets (AV Gasket), bolts, nuts, and washers and tighten them to specified torques. (When a non-AV gasket is used, a different tightening torque specification should be followed.)

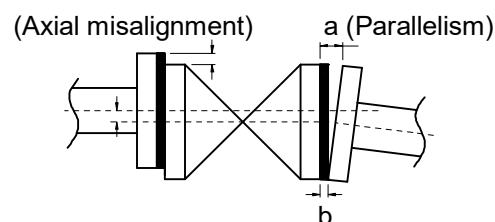
#### Necessary items

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

#### ②PROCEDURE

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

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



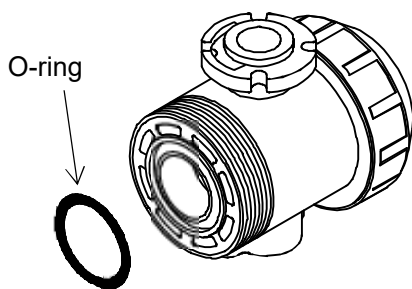
Valve size [mm]	Dimensions [mm]	
	Axial Misalignment	Parallelism (a-b)
015 to 032	1	0.5

- 3) Tighten the bolts and nuts gradually with a torque wrench to the specified torque level in a diagonal manner.
- 4) Tighten it more than 2 turns clockwise with specified torque. Do not tighten above the specified torque value. (The valve can be damaged or leaks.)

Valve size [mm]	Torque [N·m]	
	PTFE coated PVDF coated	Rubber
015 to 020	17.5	8
025 to 032	20	20

**INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS****When the Union Nut is Loosened or Removed**

If the union nut has been removed from the body (or loosened), install it in the following manner.



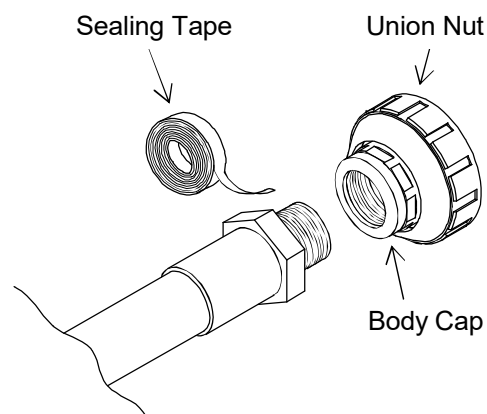
- 1) Make sure that the O-ring is mounted.
- 2) Set the body cap and union nut directly on the body without allowing the O-ring to come off.
- 3) Tighten union nuts on each valve until hand tight.
- 4) Using a strap wrench tighten union nuts uniformly on each side approx 90°-180° turns, 1/4 to 1/2 turns.

**Threaded End****①CAUTION**

- Avoid excessive tightening. (The valve can be damaged.)
  - Make sure that the threaded connections are plastic × plastic. (Metallic thread can cause damage.)
  - Wrap the threaded joints on our plastic piping with sealing tape.
- Using a liquid sealing agent or liquid gasket may cause stress cracks (Environmental Stress Cracking). Our product warranty shall not apply in case of said use, even when said use is unavoidable.

**Necessary items**

Sealing tape	Strap wrench	Spanner wrench
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**②PROCEDURE**

- 1) Wind a sealing tape around the external thread of joint, leaving the end (about 3 mm) free.
- 2) Loosen the union nut with a strap wrench.
- 3) Remove the union nut and the Body Cap.
- 4) Tighten the external thread of the joint and the Body Cap hardly with hand.
- 5) Using a spanner wrench, screw in the Body Cap by turning 180°-360° carefully without damaging it.
- 6) Make sure that the O-ring is mounted.
- 7) Set the body cap and union nut directly on the body without allowing the O-ring to come off.
- 8) Tighten union nuts on each valve until hand tight.
- 9) Using a strap wrench tighten union nuts uniformly on each side approx 90°-180° turns, 1/4 to 1/2 turns.

**INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS****Socket End (PVC, C-PVC)****①WARNING**

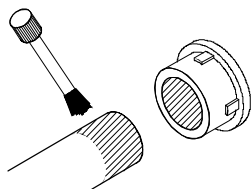
- When using an adhesive, ventilate the space sufficiently, prohibit the use of a fire in the vicinity, and do not inhale adhesive vapors directly.
- If an adhesive gets into contact with your skin, wash it off immediately. If you feel sick or find any anomaly, receive a physician's diagnosis and take appropriate measures promptly.

**②CAUTION**

- Take care in doing work at low temperatures. Solvent vapors are hard to evaporate and are likely to remain. (Solvent cracks may occur, damaging the equipment.) After assembling the piping system, open both ends of the piping and use a fan (of the Low-Voltage Type) or something similar to ventilate the space, thus removing the solvent vapors.
- Use the appropriate Asahi AV cement.
- Conduct a water test at least 24 hours after joining the pipes with an adhesive / cement.

## Necessary items

Adhesive for hard vinyl chloride pipes  
Strap wrench

**③PROCEDURE**

- 1) Loosen the union nut with a strap wrench.
- 2) Remove the union nut and the Body Cap.
- 3) Lead the union nut through the pipe.
- 4) Clean the hub part of the Body Cap by wiping the waste cloth.
- 5) Apply adhesive evenly to the hub part of the Body Cap and the pipe spigot.

Do not apply more adhesive than necessary. (The valve can be damaged due to solvent cracking.)

Valve size [mm]	Adhesive quantity (guideline) [g]
015	1
020	1.3
025	2
032	2.4

- 6) After applying adhesive, insert the pipe quickly to the Body Cap and leave it alone for at least 60 seconds.

Do not under any circumstances try to insert a pipe into another fitting or valve by striking it, which may break the piping.

- 7) Wipe away overflowing adhesive.
- 8) Make sure that O-ring is mounted.
- 9) Set the Body Cap and union nut directly on the body without allowing the O-ring to come off.
- 10) Tighten union nut hardly with hand.
- 11) Using a strap wrench tighten union nuts uniformly on each side approx 90°-180° turns, 1/4 to 1/2 turns.

**Socket End (PP)**

## Necessary items

Strap wrench  
Sleeve welder or automatic welding machine  
User's manual for the above equipment

**PROCEDURE**

- 1) Loosen the union nut with a strap wrench.
- 2) Remove the union nut and the Body Cap.
- 3) Lead the union nut through the pipe.
- 4) For the next step, refer to the user's manual for the sleeve welder or the automatic welding machine.
- 5) After welding, make sure that the O-ring is mounted.
- 6) Set the Body Cap and the union nut directly without allowing the O-ring to come off.
- 7) Tighten union nut hardly with hand.
- 8) Using a strap wrench tighten union nuts uniformly on each side approx 90°-180° turns, 1/4 to 1/2 turns.

**INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS**

**How to install the support for the valve (PA)**

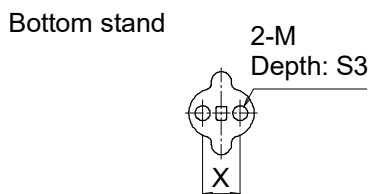
①CAUTION

- Do not allow the piping around the pump to cause significant vibration to the valve. Failure to do so may result in failure or damage.
- Install the valve support. If the valve body and piping are subjected to excessive force, it may cause damage to the valve.

Necessary items		
Wrench	U-band (with bolts)	Rubber sheet

②Attach Inserted metal to the bottom stand.

- When screwing in a Metal Insert (Ensat), install it vertically. Refer to the User's Manual for Metal Insert (Ensat) by the Maker.
- If specifying additional ensat fittings (option: 32), add ensat (off-the-shelf) to the valve. It will be shipped with it installed.



Valve size [mm]	Bottom stand [mm]			Ensat
	X	M	S3	
015 to 025	19	Φ7.3	11	M5 × 10
032	30	Φ9	15	M6 × 14

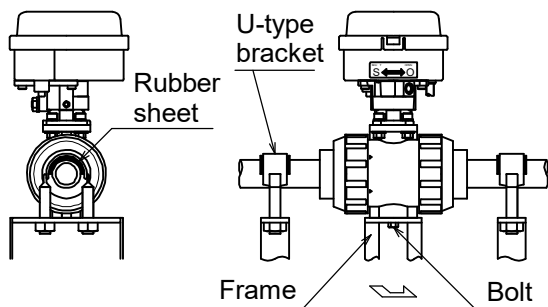
③HORIZONTAL PIPING

- If a bottom stand (ensat) is used and a support is installed, bolt the ensat section and the trestle together.

Valve size [mm]	Bolt size [mm]
015 to 025	M5
032	M6

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

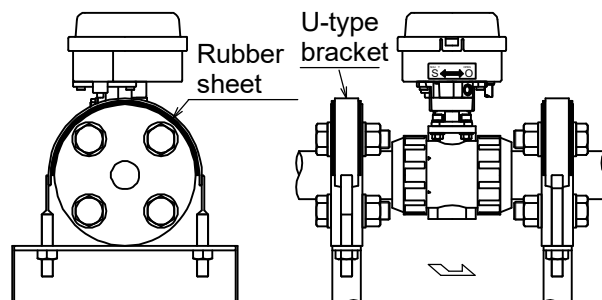
HORIZONTAL PIPING



③HORIZONTAL PIPING (FLANGE TYPE)

If you do not use a bottom stand (ensat) and you are installing a support, you may need to install a support at the valve flange. Lay down a rubber sheet and secure it with a U-band. (Body caps are flanged only.)

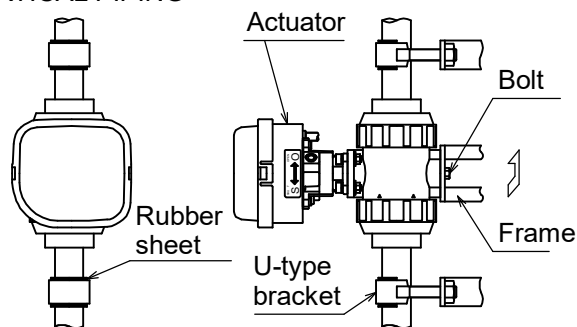
HORIZONTAL PIPING (Flange type)



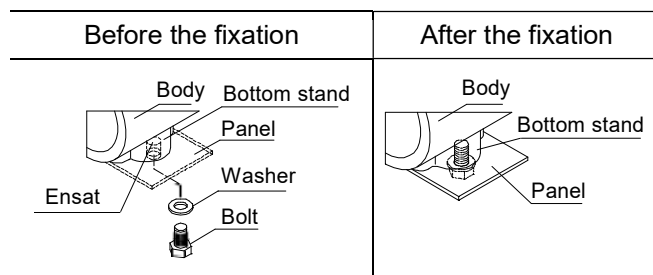
④VERTICAL PIPING

- Bolt the bottom stand (ensat) to the trestle.
- Put a rubber sheet on the top of the pipe and fix it with a U-band.

VERTICAL PIPING



⑤FIXATION OF BOTTOM STAND WITH PANEL





## INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

### INSTALLATION

#### ①PRECAUTIONS

- Flush the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the ball and seats.
- When the flow path is subjected to a high pressure from arrow, it may leak slightly to the low pressure port. (PL)



#### ②ENVIRONMENT

- Do not install in place where corrosive gas is present or where vibration is heavy (0.5 G or more).
- When radiant heat causes the surface temperature of the control unit to exceed 50 °C, provide an appropriate shielding plate.
- If there is a possibility that the fluid and drive part freeze, please take measures to prevent freezing.

#### ③POSITIONING

Should be positioned through 90° upward from horizontal. Provide space around the product to allow manual operation, inspection and replacement work.

Maintenance space for upper part of actuator

CM1	CM2	More than 15 mm
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### WIRING

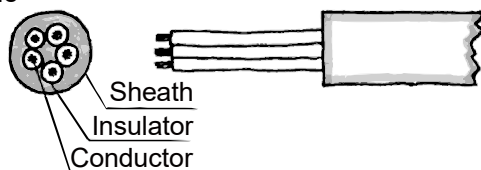
#### ①PRECAUTIONS

When wiring is long distance or handling a weak current signal, it may be affected by induced voltage or noise. In this case, please use countermeasures such as separating it from other power cables.

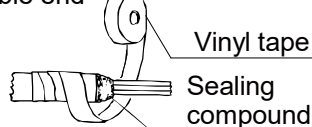
#### ②CONNECTION

- Check the power supply voltage and connect properly as shown in the wiring diagram.
- Even when not using signal wires, please conduct insulation treatment so as not to short circuit.
- When connecting electric wires of flexible cable, please use a waterproof box or waterproof connector.
- When connecting with flexible cable wires, please ensure waterproof treatment at the connection part.
- When not waterproofed, moisture may enter the inside of the actuator from the gap of the insulator inside the sheath and the conductor gap, which may cause malfunction. Completely seal the sheath end and the wire end as shown below.

Flexible cable



Cable end



Crimp the conductor



### CONTROL

#### ①CM1

Control switch should be prepared one by one for actuator. Do not operate two or more actuator from one switch. It might malfunction.

#### ②CM2

- Two or more actuators can be operated with one control switch.
- Using a control switch with a current leakage more than 1 mA such as TRIAC or relay with CR, may cause malfunction.

#### ③USE OF OPEN/SHUT SIGNALS

Use signals within the capacity of output signal rating.

### OPERATION

#### ①TESTING

- Make sure that power supply voltage is correct. Also check operating position, wiring, speed and signals.
- During trial operation, check that valve movement and output signal are correct.

#### ②DUTY CYCLE

- Confirm that the operation frequency is within the specified duty cycle.
- Use beyond the load time rate range will affect product life. Also, it may cause burnout.

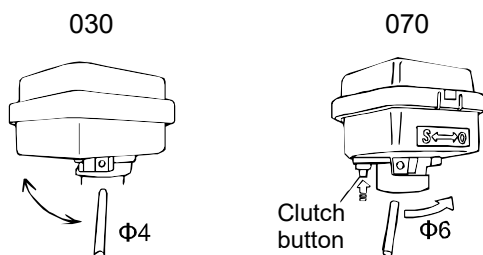
Duty cycle is a value that regulates the opening / closing frequency of the actuator. The meaning of 20 % 15 minutes for Duty cycle is that 3 minutes (20 % of 15 minutes) operation is possible. The calculated value obtained by dividing 3 minutes by the operation time is the number of times of operation within 15 minutes.

#### ③ATTENTION

- Keep power supplied for built-in space heater to prevent condensation inside actuator.
- Do not touch the moving parts of actuator in operation.
- Do not input reverse signal during operation. It reduces product life.
- Never put anything on the actuator or make it into a foothold.

**INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS****MANUAL OPERATION****① PRECAUTIONS**

- Manual operation should be a temporary operation.
- Be sure to turn off the power before manual operation.



- Put an allen wrench or a lever into the hole or drive shaft and turn slowly. For manual operation on CM-070, press the clutch button while operating it.
- Manual lever is optional.
- Do not manually operate with an excessive operating force exceeding the output of the actuator. The connector part may be damaged.

**MAINTENANCE**

- To prevent electric shock, be sure to turn off the power when removing the actuator cover.
- Do the routine maintenance at least once in half a year.

## Inspection items

- Confirm operation of opening and closing.
- Confirm that an actuator is not hot excessively.
- Confirm existence of abnormal noise and vibration during operation.
- Confirm whether screws are loose or not.
- Confirm the fluid temperature or pressure.
- Confirm the leak from valve stem.
- Confirm the bolt tightening torque.

**TROUBLE SHOOTING**

Problem	Cause	Solution
Actuator does not move.	Faulty wiring.	Correct the wiring.
	No voltage is coming.	Check the voltage.
	Incorrect voltage.	When it's burned out by excess voltage, replace the actuator.
	Short the circuit, contact failure.	Review wires and connection.
	Motor is worn out.	Reconsider use conditions.
	Motor is too old.	Replace the actuator.
Operation is unstable.	Switch leakage current is large. CM2	Current leakage should be less than 1 mA.
Stop in the mid position.	<ul style="list-style-type: none"> <li>• Biting of valve seat.</li> <li>• The scale has adhered to the valve ball.</li> </ul>	Remove a foreign object.
	Overload protector runs because of over-torque.	Motor protection circuit returns by the signal of operation of an opposite direction. Turn on the power again.
Leakage from valve body	<ul style="list-style-type: none"> <li>• Valve cap get loose.</li> <li>• Valve body is damaged.</li> </ul>	Replace the valve.
Leakage from valve seat	Seat is worn or damaged.	
Leakage from valve stem	Stem packing is worn or distorted.	

For more information contact  
NIPPON VALVE CONTROLS, INC. for consultation.