

INSTRUCTION MANUAL

PULSE JET VALVE PJVB Series

- Read this Instruction Manual before using the product.
- In particular, read the safety notes carefully.
- Retain this instruction manual with the product for further consultation whenever necessary.

For safety use

When designing and manufacturing equipment using our products, you are obligated to confirm that the safety of the system operated by the mechanical mechanism of the equipment, the pneumatic control circuit or the water control circuit, and the electrical control that controls these circuits can be ensured, and to manufacture safe equipment.

To use our products safely, it is important to select, use, and handle the products, as well as to maintain and manage them properly.

To ensure the safety of the equipment, be sure to observe all warnings and precautions.

We ask that you confirm that safety can be ensured in your equipment and that you manufacture safe equipment.



WARNING

1. **This product is designed and manufactured as equipment and part for general industrial machinery.**
Therefore, handling should be performed by persons with sufficient knowledge and experience.
2. **Be sure to use the product within the product specifications.**
It cannot be used outside of product-specific specifications. Never modify or perform any additional work on the product.
This product is intended for use in general industrial equipment and parts. Therefore, it is not applicable when used outdoors or in the following conditions or environments.
(However, if you consult with us before adopting the product and agree with our product specifications, it is applicable, but please take safety measures to avoid danger in the unlikely event of malfunction.)
[1] Industries and equipment such as nuclear power, railways, aviation, marine vessels, vehicles, and medical devices; equipment or applications that come into direct contact with beverages or food; and applications where safety is critical, including amusement equipment, emergency shut-off circuits, press machines, brake circuits, and safety devices.
[2] Applications that are expected to have a significant impact on people and property and require special safety.
3. **Be sure to observe all organization safety standards, laws and regulations, etc. related to equipment design, management, etc.**
ISO4414, JIS B 8370 (General Rules for Pneumatic Systems)
JFPS2008 (Guidelines for the Selection and Use of Pneumatic Cylinders)
High Pressure Gas Safety Act, Industrial Safety and Health Act and other safety regulations, organization standards, laws and regulations, etc.
4. **Do not handle this product or remove any piping or equipment until you are sure of its safety.**
[1] Before inspecting or maintaining machines or equipment, be sure to confirm that all systems involving this product are safe.
[2] Even when the operation is stopped, there may still be hot or charged parts present, so please be careful.
[3] When inspecting or maintaining equipment, shut off the supply air and supply water as energy sources and the power to the relevant equipment, exhaust any compressed air in the system, and take care to avoid water leaks and electrical leaks.
[4] When starting up or restarting a machine or equipment that uses pneumatic equipment, confirm that the safety of the system, including measures to prevent ejection, is ensured.
5. **To prevent accidents, be sure to observe the warnings and precautions on the following pages.**

■ The precautions shown here are classified into three safety precaution levels: "DANGER," "WARNING," and "CAUTION."



DANGER : Indicates a limited situation where improper handling is expected to create a dangerous condition that could result in death or serious injury, and where the danger is considered to be urgent (meaning it is highly immediate).



WARNING : Indicates a potentially hazardous situation that, if handled improperly, could result in death or serious injury to the user.



CAUTION : Indicates a potentially hazardous situation that, if handled improperly, could result in injury to the user or only damage to property.

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.

All of the above are important information and must be followed.

Warranty notice

- **Warranty Period**

This product is warranted for one (1) year from the date of delivery to the location specified by the customer.

- **Warranty coverage**

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.

However, following failures are excluded from this warranty:

- [1] Failure caused by handling or use under conditions or environments other than those described in the catalog or specifications.
- [2] Failure not caused by the product.
- [3] Failure caused by use other than the intended purpose of the product.
- [4] Failure caused by modifications/alterations or repairs not carried out by CKD.
- [5] Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- [6] Failure due to causes beyond our control, such as natural disasters or other calamities.

Please note that the warranty here applies to the delivered product alone and excludes any damages caused by defects in the delivered product.

- **Confirmation of product compatibility**

It is the customer's responsibility to verify compatibility of our products with the system, machines, and equipment used by the customer.

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1. Unpacking

	<p>CAUTION</p> <p>Do not remove the packaging bag until just before piping. If the packaging bag is removed before ready to begin piping, foreign matter may enter the product from the piping ports and cause a failure or malfunction.</p>
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- (1) Make sure that the model code indicated on the product nameplate matches the product that you have ordered.
- (2) Make sure that the rated voltage matches.
- (3) Check the appearance for any damage.
- (4) To prevent foreign matter from entering the valve, keep the product in its individual packaging box when storing it, and remove it from the box when piping.

2. Installation

	<p>WARNING</p> <p>For use outside the specified specifications or for special applications, consult with us regarding the specifications.</p>
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2.1 Environment

	<p>WARNING</p> <ol style="list-style-type: none"> a) Do not pour water, cutting oil, or similar substances directly onto the product. <ul style="list-style-type: none"> • Pouring water or cutting oil directly onto the pilot solenoid valve may cause the coil to burn. b) Coils generate heat. <ul style="list-style-type: none"> • When the product is installed in a control panel or energized for long hours, ensure adequate ventilation and heat dissipation. Otherwise, it will reach a high temperature. c) Do not use the product in corrosive or solvent environments. d) Do not use the product in humid environments because temperature changes may cause condensation. e) Do not use the product in explosive gas atmospheres. f) Use the product in an environment where it is not exposed to radiant heat.
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- (1) For use in cold climates, take appropriate anti-freezing measures.
- (2) This product can be used both outdoors and indoors.

When the product is used outdoors, select the appropriate metal fittings for the wire outlet ports according to the environment in which it will be used.
- (3) The protective structure is equivalent to IP64. However, the wire extraction port is not protected. Use waterproof fittings. To install the cover, fit it until it hits the sub-plate and secure the catch clip. If the fit is stopped in the middle, the performance of the protective structure cannot be maintained.
- (4) When the product is used in an environment affected by salt damage, take measures against salt damage, such as painting.

2.2 Installation

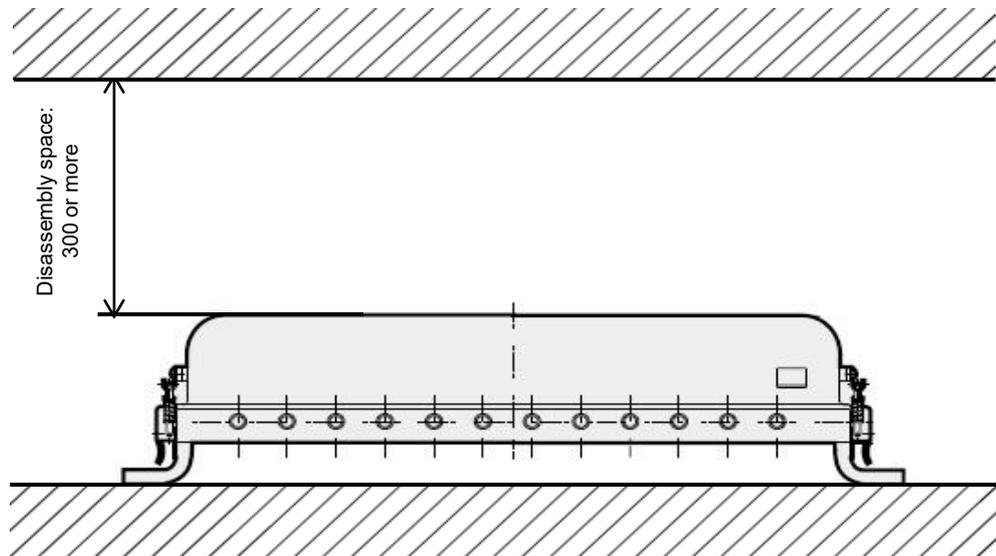
2.2.1 Installation

	<p>CAUTION</p> <ol style="list-style-type: none"> a) Please read the instruction manual carefully and understand the contents before installing the product. b) When handling or installing the product, be sure to grasp the sub-plate. c) After installation, check for piping leaks and confirm correct installation.
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- (1) The product must be installed with the cover facing up.
- (2) The product cannot be used at a vibration of 42.2 m/s² or higher. Do not install the product in such a place.

2.2.2 Maintenance space

- Ensure there is enough space for safe operations during maintenance and troubleshooting. (See Fig. 2-1.)



(Fig. 2-1)

2.3 Piping method



CAUTION

- When tightening or re-tightening piping, fix the product in place.
- Fix and support the piping so that the weight and vibration of the piping is not applied directly to the valve.
- When connecting the piping, tighten it with the recommended torque (see Table 2-4).

- Cleaning of piping materials
 - Before piping, flush with air at 0.3 MPa or higher to remove dust, metal powder, rust, sealing tape, and other foreign matter.
- Removal of foreign matter
 - Dust, foreign matter, etc., in the fluid can cause malfunction or leaks. Install a filter of 5 μm or less on the primary side of the valve.
 - Rust, etc. in the piping can cause malfunctions and leaks.
- Fluid flow direction
 - Perform the piping so that the operating port of the pulse jet valve is aligned with the IN port indicated on the product.

(4) Sealant

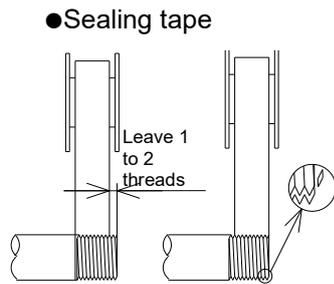
- When using sealant, take sufficient care not to allow it to enter the piping and to prevent external leakage.
- When applying the sealing tape to the screw, ensure that one or two threads of the screw remain exposed at the end.

(Fig. 2-2)

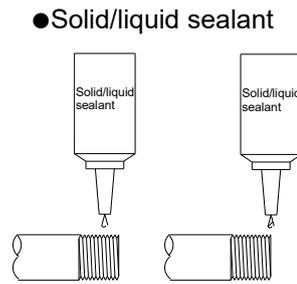
- Even when using liquid sealant, do not apply too much. Ensure that one or two threads of the screw remain exposed at the end.

(Fig. 2-3)

- Do not apply sealant to the female thread side of the product.



(Fig. 2-2)



(Fig. 2-3)

(5) Tightening

- Refer to Table 2-4 for tightening torque when piping.

Table 2-4 Recommended piping tightening torque

Nominal diameter of piping	Recommended piping tightening torque
Rc 1/8	7 to 9 N·m
Rc 1/4	12 to 14 N·m

(6) Lubrication/non-lubrication type

- This product can be used without lubrication, so a lubricator is not required.

2.4 Wiring method

 <p>CAUTION</p>	<p>a) Remove the cover before operation. Place the cover in a spot where it won't fall and where workers won't step on it.</p> <p>b) Be sure to wire the power supply securely, as incorrect wiring may cause accidents such as a short-circuit.</p> <p>c) If the product is repeatedly energized and de-energized over an extended period of time, the coil surface of the solenoid valve section may become hot. Please note that direct contact may cause burns.</p>
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(1) Intermittent rating

The solenoid valve is intermittently rated. Refer to "7.2 Product specifications" for the duty ratio.

(2) Leakage current limitation

- When operating a solenoid valve with a programmable controller or similar device, make sure the output leakage current meets the values listed in the table below. Failure to do so may cause malfunction.

Our step controller OMC2 series meets these specifications.

Rated voltage	AC100 V	AC200 V	DV24 V	DC12 V
Allowable leakage current	6 mA or less	3 mA or less	1 mA or less	2 mA or less

- (3) Solenoid polarity
 - This valve has no (+) or (-) polarity, even though the rated voltage is DC. In addition, it is equipped with a lamp surge killer, but it has no polarity.
- (4) Wiring
 - Wire to the terminal block. There are two COM terminals on the terminal block. Since they are connected to the circuit board internally, connect the COM line to either terminal. The terminals V1 to V12 correspond in order from the left of the solenoid valve (with the IN port in front). The screw size of the terminal block is M4.
- (5) After wiring, place the cover attached to the terminal block.
- (6) Use a power supply within $\pm 10\%$ of the rated voltage.
- (7) The wire exit has G1 threads. Thin steel piping is not possible.

3. Pre-operation (post-installation) check

3.1 Appearance check

 WARNING	Stop the flow of the fluid. (Close the main valve.) Vent the fluid in the valve. Turn off the power.
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- (1) Make sure that the product is securely fastened to the piping by pressing it by hand.
- (2) Make sure that the bolts and other threaded parts securing the product are not loose.

3.2 Leakage check

- (1) Keep the fluid pressurized and check for leaks at the connections.
 It is recommended to check leakage by supplying compressed air (0.3 to 0.5 MPa), applying soap solution, and checking if bubbles are generated.

3-3. Electrical check

 WARNING	Turn off the power. Check with caution to avoid electric shock.
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- (1) Check the insulation resistance.
 Measure the insulation resistance of the sub-plate and terminal block.
 100 M Ω or more by DC1000 V megger.
- (2) Check the power supply voltage.
 The voltage must fluctuate within a range of $\pm 10\%$ of the rated voltage.
- (3) Wiring method
 Use fuses or other circuit breakers to protect electrical equipment.
 Use approximately 0.5 mm² wire for wiring as a guide.

4. Instructions for proper use

4.1 Precautions for use

 WARNING	<ul style="list-style-type: none"> a) This product cannot be used as an emergency shutoff valve. <ul style="list-style-type: none"> • It is not designed to be an emergency shutoff or safety assurance valve. If this product is used in such a system, use it after taking other measures to ensure safety. b) Take necessary measures in advance to prevent any adverse effects on people or objects in the event of a malfunction of this product. c) Working fluid <ul style="list-style-type: none"> • Do not use fluids other than those listed in the Specifications field. • Check the compatibility with the fluid to be used before use using the control fluid checklist in the catalog. d) This product cannot be used in explosion-proof atmospheres. <ul style="list-style-type: none"> • If it is used in an explosion-proof atmosphere, select one from the explosion-proof solenoid valve series.
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 CAUTION	<ul style="list-style-type: none"> a) Accidents can occur if there is a risk of the wire cable catching the worker's feet. Protect wire cables with conduit piping and other materials. b) Install a silencer on the OUT port if the pilot air exhaust may cause a disturbance due to noise.
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- (1) Do not place objects weighing more than 1 kgf on the product, nor use it as a scaffold.
- (2) The voltage must fluctuate within a range of $\pm 10\%$ of the rated voltage.
- (3) Set the energization time based on the dust collector's collection efficiency.
The responsiveness depends on the inner diameter and length of the tubing connecting the pulse jet valve and this product. We recommend tubing with an inner diameter of 4 mm or 6 mm and a length of 1 m or less. We also recommend that the length of the tubes be the same.
- (4) If the product has not been used for seven days or longer, perform a trial run before the start of the work.
- (5) When drain accumulates in the air filter, drain it periodically.
- (6) When the air filter's filter element is black and dirty, tar is adhering to it. Replace the filter element periodically.
- (7) If you notice any abnormality, refer to "6. Troubleshooting."

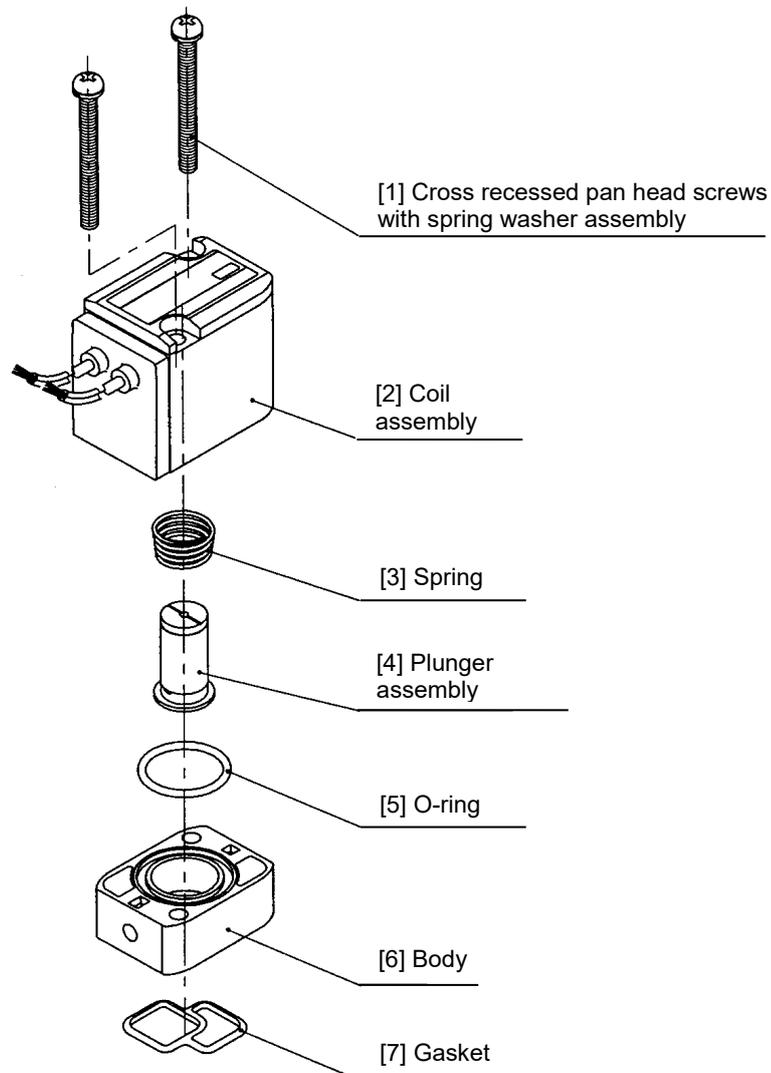
4.2 Disassembly and assembly procedure

4.2.1 Disassembly procedure

**CAUTION**

- a) Turn off the power. Disassembling the product while it is still switched on may cause the coil assembly to burn out.
- b) Stop the flow of fluid.
- c) Exhaust the fluid in the valve (in the header tank) and confirm that the pressure is 0 MPa.
- d) Remove the cover before operation. Place the cover in a spot where it won't fall and where workers won't step on it.

- (1) Be sure to turn off the power and release the fluid and pressure before disassembling.
- (2) Disassembly of solenoid valve (GFAB31-X0930, X0931, X1763)
Disconnect the leads from the terminal block before disassembling. Loosening the cross recessed pan head screws with spring washer assembly will allow the coil assembly, outer spring, plunger assembly, O-ring, body and gasket to be removed.
- (3) The coil assembly is not washable to protect the charging section. In case of AC voltage, the plunger assembly is coated with oil. So wipe off any foreign objects only.
Do not use organic solvents, as these may cause rubber and resin parts to swell and deteriorate. (See Fig. 4-2 Exploded View.)



(Fig. 4-2) Exploded View of Pilot Solenoid Valve

4.2.2 Reassembly procedure

- (1) Reassembly must be done in reverse order, ensuring all components are properly installed.
- (2) Tighten the cross recessed pan head screws with spring washer assembly evenly with a tightening torque specified in the table below.

Screw size	Appropriate tightening torque
M4	1.1 to 1.8 N·m

(See Fig. 4-2 Exploded View.)

- (3) Tie the lead wires to the original position on the terminal block. Tightening torque is the same as above.

 CAUTION	(1) Be sure to wire the power supply securely, as incorrect wiring may cause accidents such as a short-circuit.
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- (4) To install the cover, fit it until it hits the sub-plate and secure the catch clip.
If the fit is stopped in the middle, the performance of the protective structure cannot be maintained.

5. Maintenance

5.1 Maintenance and inspection

- (1) To operate the product in its optimal operating state, carry out the periodic inspection normally once every six months.
- (2) Refer to "3. Check before use" for inspection details.

5.2 Service parts

- (1) Solenoid valve (Model: GFAB31-X0930, X0931, X1763)
Replace them when abnormalities such as leakage, delayed operation, failure to open, or insulation deterioration are observed during use.
As a general guideline, they should be replaced after 10 million operating cycles. (If dry air or nitrogen gas is used, they should be replaced after one million cycles.)

6. Troubleshooting

If the product does not operate as intended, inspect it according to the table below.

Failure condition	Cause	Countermeasure
The valve does not open. Specified flow rate cannot be obtained.	Miswiring	Check both the valve side and the control side according to the wiring diagram.
	Different voltage	Match the coil voltage with the power supply voltage.
	The power is out.	Identify the cause of the breaker trip, address it, and restore power. Or, check for controller malfunctions.
	High pressure	Set the pressure to its working range.
The valve is not closed. There is leakage.	Contamination of foreign matter	Remove foreign matter inside the solenoid valve.
	Power is not turned off.	Check for controller malfunctions.
	Leak current	Replace the leakage current of the controller with one within the range specified in (1) Leakage current limitation on page 6.
	Reverse connection	Check the wiring and correct it.

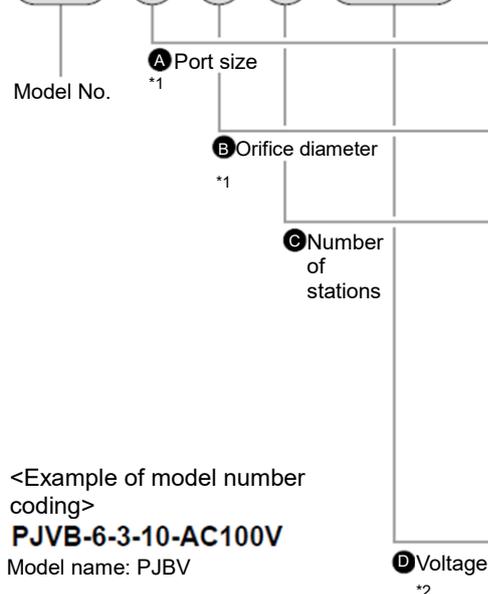
*If you have any other questions or concerns, contact our sales office or distributor.

7. Product specifications and model number coding

7.1 Model number coding

MODEL NUMBER CODING

PJVB - **6** - **3** - **10** - **AC100V**



<Example of model number coding>

PJVB-6-3-10-AC100V

Model name: PJVB

- A** Port size : Rc1/8
- B** Orifice diameter : $\phi 3$
- C** Number of stations : 10-station
- D** Voltage : AC100V(50/60Hz) · AC110V(60Hz)

Code	Description	
A Port size		
6	Rc 1/8	
8	Rc 1/4	
B Orifice diameter		
3	$\phi 3$	
5	$\phi 5$	
C Number of stations		Mass (kg)
2	2-station	4.1
3	3-station	4.3
4	4-station	4.5
5	5-station	4.7
6	6-station	4.9
7	7-station	5.1
8	8-station	5.3
9	9-station	5.5
10	10-station	5.7
11	11-station	5.9
12	12-station	6.1
D Voltage		
AC100V	AC100V(50/60Hz) · AC110V(60Hz)	
AC200V	AC200V(50/60Hz) · AC220V(60Hz)	

*1: When the orifice diameter is 5 mm, port size R1/8 (Section 6, **A**) cannot be manufactured.

*2: Please contact us for other voltages. The DC voltage is selectable only for $\phi 3$ orifice types, which are available by custom order.

*3: The model with a surge killer is made to order.

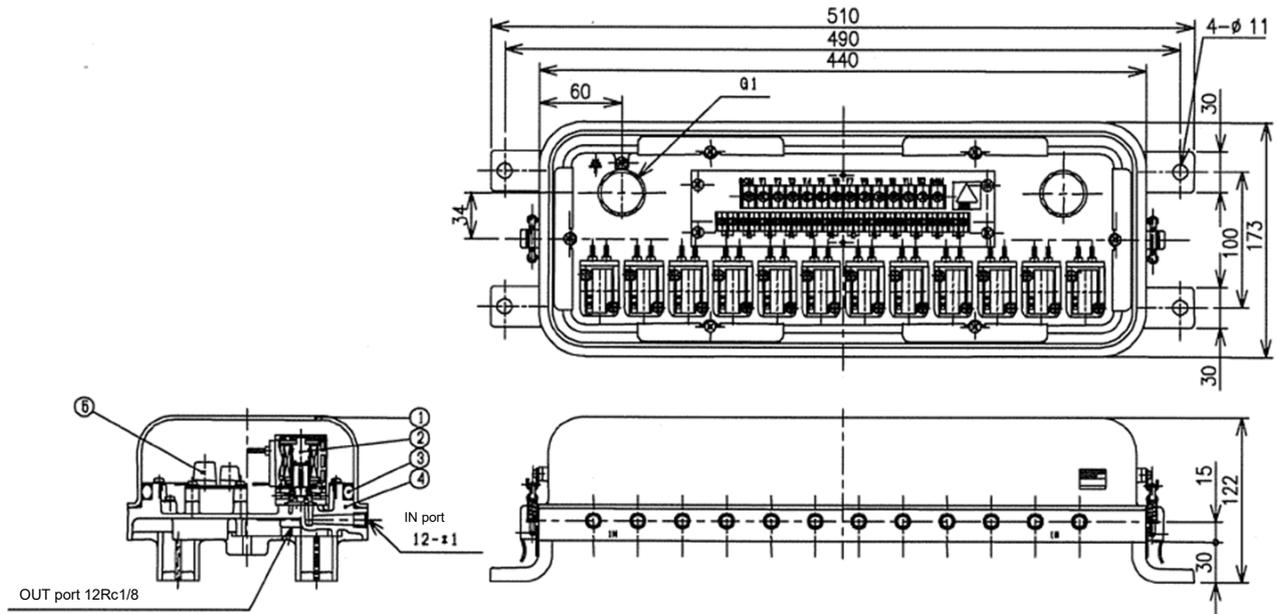
7.2 Product specifications

Specifications

Item	PJVB-6 and 8-3	PJVB-8-5	
Working fluid	Air (no corrosive gases is included)		
Working pressure MPa	0 to 0.7		
Pressure resistance (by water pressure) MPa	1.1		
Fluid temperature °C	-10 to 60 (no freezing)		
Ambient temperature °C	-10 to 60		
Atmosphere	Locations free of corrosive or explosive gases		
Valve structure	Direct-acting poppet structure (open when energized)		
Port size	Rc1/8, Rc1/4	Rc1/4	
Orifice diameter mm	3	5	
Rated value	Intermittent rating (ON: 1 sec. or less, OFF: 1 sec. or more)	Intermittent rating (ON: 1 sec. or less, OFF: 10 sec. or more)	
Box specifications			
Case material	Aluminum		
Hole for conduit	G1		
Mounting orientation	Sub-plate shall face down		
Degree of protection	Equivalent to IP64		
Approximate size mm	140×510×105(length×width× height/for 2 to 12 solenoid valve stations)		
Electrical specifications			
Rated voltage	AC100 V (50/60 Hz) and 110 V (60 Hz), AC200 V (50/60 Hz) and 220 V (60 Hz)		
Voltage fluctuation range	-10 to +10% of rated voltage		
Apparent power (VA)	During holding	7.5 (50 Hz), 5.5 (60 Hz)	21.3 (50 Hz), 13.4 (60 Hz)
	During starting	20 (50 Hz), 17 (60 Hz)	40.6 (50 Hz), 33.0 (60 Hz)
Power consumption W	4.0 (50 Hz), 3.4 (60 Hz)		9.8 (50 Hz), 6.6 (60 Hz)
Heat-resistance class	Class 130 (B)		

8. Internal structure drawing

8.1 Inside the operation box



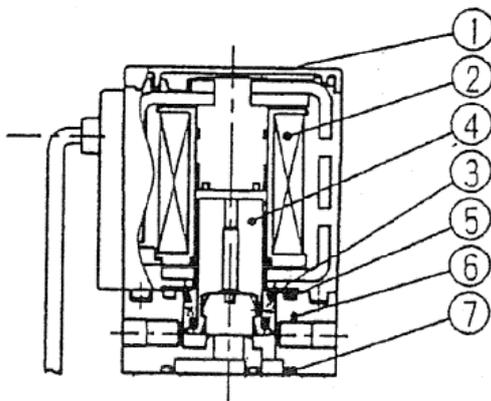
*1 IN port size

Model	Port size
PJVB-6	Rc1/8
PJVB-8	Rc1/4

Parts List

Part No.	Part name	Quantity
[1]	Cover	1
[2]	Solenoid valves	2 to 12
[3]	O-ring	1
[4]	Sub-plate	1
[5]	Terminal block set	1

8.2 Solenoid valve (GFAB31-X0930, X0931, X1763)



Parts List

Part No.	Part name	Quantity
[1]	Cross recessed pan head screws with spring washer assembly	1
[2]	Coil assembly	1
[3]	Spring	1
[4]	Plunger assembly	1
[5]	O-ring	1
[6]	Body	1
[7]	Gasket	1