

WVE-02, 02CN Type Solenoid Valve (for Water)

WVE-02 Type solenoid valve can be used with sensors and timers for automatic control or remote control of sprinkling or cooling equipments.

By adjusting valve opening/closing time, the valve can be used to reduce water hammer.

FEATURES

- The detection range and valve opening/closing time can be adjusted by changing the opening degree of needle according to actual conditions.
- Easy maintenance: The disc, seat and pilot-operating unit can be disassembled, adjusted, repaired or displaced easily.

SPECIFICATIONS

Operation	Energized open		
Model name	WVE-02		WVE-02CN
Code name	WVE02-B	WVE02-L	WVE02CN-B
Applicable fluid	Water & hot water		
Fluid temperature	5~60°C		
Applicable pressure	0.03~1.0MPa		
Min. pressure differential across the disc	0.03MPa		
Rated voltage	Common use: AC100/200V 50/60Hz, AC110/220V 60Hz*2		
Rated current	AC100/110V Rated: 0.2A, Starting: 0.6A, AC200/220V Rated: 0.1A, Starting: 0.3A		
Insulation	Class B (Silicone mold)		
Protection	Dust & drip proof (When used outdoors, also use TB-03 Type terminal box, as rain proof type)		
Ambient temperature	5~60°C		
End connection	Flanged JIS 10KRF		
Materials	Body	Cast iron	Cast iron
	Trim	Disc & Diaphragm (Synthetic rubber), Seat (Cast bronze)	
Main valve painting	Interior: Epoxy resin		Body and cover: Nylon 11 coating
Installation	Install the valve vertically in horizontal piping placing coil part above.		
Valve body pressure test	Hydraulic 2.0MPa		Hydraulic 1.75MPa

* 1. Refer to Page 244 for method of wiring.

* 2. For products suitable for special voltage, please contact our agent in your area.

* 3. For valve size selection, see Page 101.

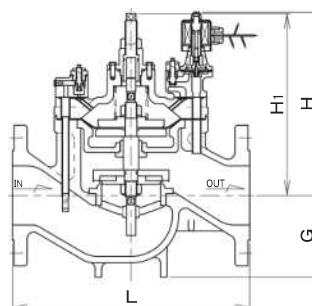
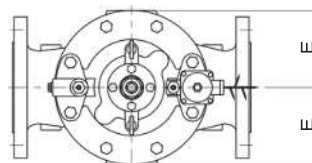
DIMENSIONS (Body: Cast iron)

(mm)

Size	L	G	H	H ₁	E	Cv value	Mass(kg)
80(3")	350	110	286	261	117	90	43
100(4")	400	130	312	300	130	160	60
125(5")	440	140	343	371	145	250	70
150(6")	500	165	376	416	173	360	125
200(8")	600	200	427	522	218	640	200

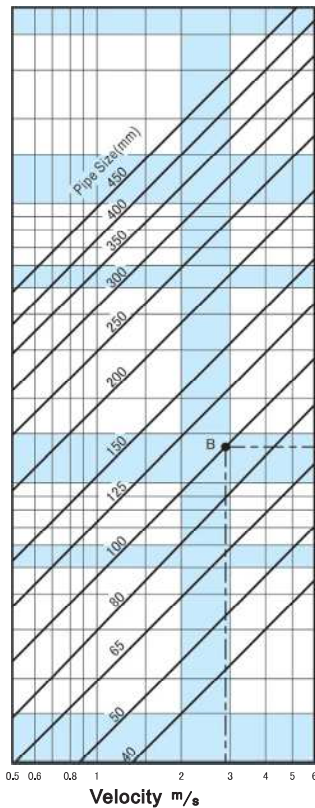
* Contact our local agent for the dimensions of the main valve whose body is made of Ductile cast iron.

CONSTRUCTION

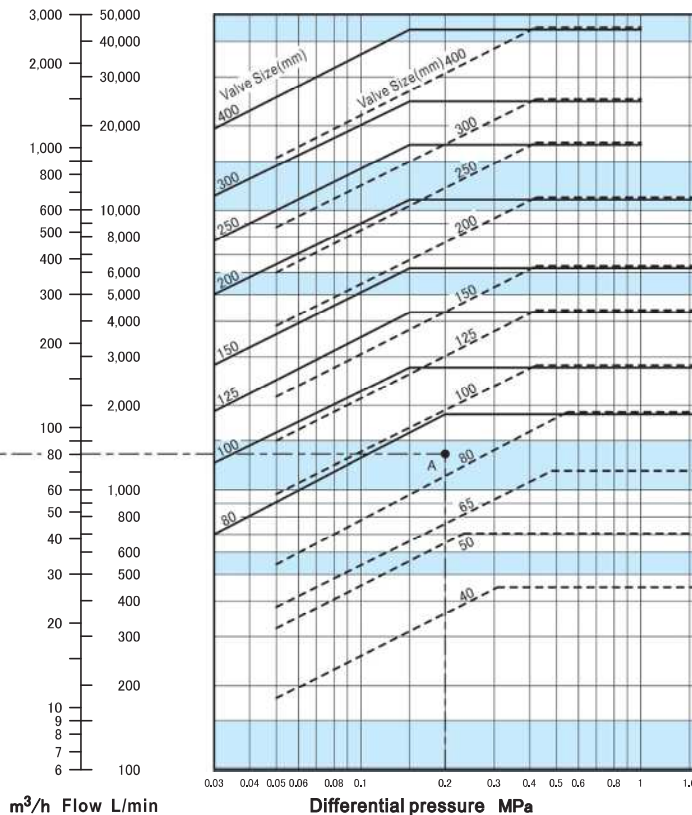


SIZE SELECTION CHART (for Water)

■ VELOCITY RATE LINE CHART



■ SIZE SELECTION CHART



● PRODUCTS WHOSE SIZES CAN BE DETERMINED

----- (dashed line) in the size selection chart

Pressure reducing valve WVR-02 Type, primary pressure regulating valve WVM-02 Type.

● VALVES APPLICABLE TO

———— (solid line) in size selection chart

Solenoid valve WVE-02 Type, level control valve WVL-02 Type

Note 1: In the size selection chart, the horizontal position of the valve size line represents the maximum flow.

Note 2: Use velocity line of less than 3m/s in velocity line chart with obtained pipe size, if not for any special case.

Note 3: Size 40~65mm is for WVR and WVM Types only.

Note 4: For sizes 40, 50mm, in case of the larger differential pressure, please contact our local agent in your area.

● HOW TO USE THE CHART

Example: Select the size of valve for the following conditions:

Primary pressure: 0.5MPa; Secondary pressure: 0.3MPa; Flow: 80m³/h

1. Calculate differential pressure between inlet and outlet of valve: $0.5 - 0.3 = 0.2\text{MPa}$

2. Follow the 80m³/h flow line horizontally until it intersects with the 0.2MPa differential pressure line. The intersection point is named A.

3. Since point A is between the lines representing size 80mm and 100mm, select the larger size, which is size 100mm.

● CONFIRMING PIPE FLOW RATE

1. Assume the pipe and valve are of the same diameter. Follow the 80m³/h flow line horizontally until it intersects with the 100mm size line to obtain cross point B.

2. Draw a vertical line from point B and find out the pipe flow rate 2.8m/s.

3. Since the flow rate is less than 3m/s, the pipe size should be size 100mm. If flow rate is larger than 3m/s, select a larger size to make the flow rate less than 3m/s.

● REFERENCE

■ To select the size for pressure reducing valve or primary pressure regulating valve with considering dynamic water pressure:

For pressure reducing valve, add the largest offset pressure to the secondary pressure. For primary pressure regulating valve, deduct the minimum accumulation from the primary pressure. The size can be determined using the differential pressure between primary side and secondary side of the valve.

● Pressure reducing valve

Find out the maximum offset pressure 0.1MPa from the specifications. The differential pressure is $0.5 - (0.3 + 0.1) = 0.1\text{MPa}$. Use the method described in the example in "HOW TO USE THE CHART" to select the size.

● Primary pressure regulating valve

Find out the minimum accumulation 0.03MPa from specifications. The differential pressure is $(0.5 - 0.03) - 0.3 = 0.17\text{MPa}$. Use the method described in the example in "HOW TO USE THE CHART" to select the size.

DATA/Solenoid Valve

METHOD FOR CONNECTION OF COIL

As shown in relevant specification table, different models of solenoid valves have different rated voltages. When connecting to power, make sure the voltage does not exceed the rated voltage of solenoid valve.

<Common voltage coil>

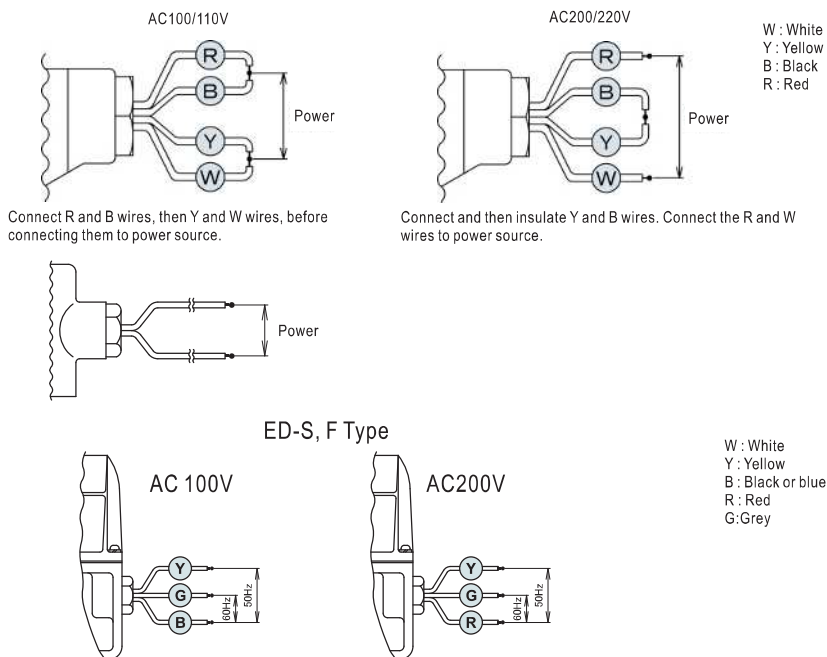
- Connect the 4 lead wires (in different colors) to power source.

<Exclusive/Special voltage coil>

- Connect 2 lead wires to power source.

<Frequency selecting coil>

- There are 3 lead wires on coil. Read the connection method shown on product before connecting to power source. The lead wire left unused should be insulated by using insulating tape.



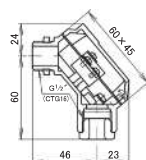
REFERENCE: ABOUT EXPLOSION PREVENTION

Terminal box specially designed for solenoid valve. Can be screwed in with lead wire of solenoid valve and protect power cable and lead wire from being exposed to rain or dust. TB-03 series are for outdoor cables and conduit.

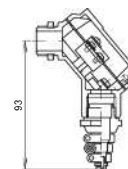
TB-03 TYPE SERIES (for indoor/outdoor, metal body, rainproof)

(Without indication lamp) Rated power: 250V 15A

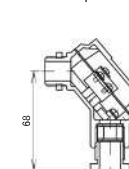
- TB-03 Type (standard model) With gland nut



- TB-03C Type With cap cone

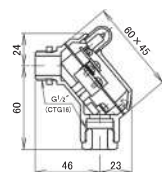


- TB-03F Type With ship-class gland

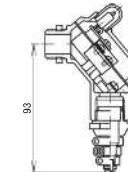


(With indication lamp) Rate power: AC100V or AC200V
Please specify voltage when ordering.

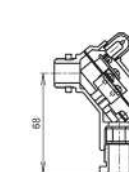
- TB-03L Type With indication lamp



- TB-03LC Type Lamp + cap cone

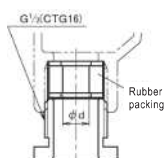


- TB-03LF Type Lamp + ship-class gland



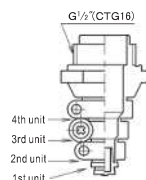
An example of TB-03 installation

SPECIFICATIONS OF GLAND (TB-03F, 03LF Type)



Gland size	d (mm)
15a	9
15b	10
15c	11

SPECIFICATIONS OF CAPCONE PLUG (TB-03C, 03LC Type)



Cut position	Applicable cable diameter(mm)
4th unit	10~12
3rd unit	8~10
2nd unit	6~8
1st unit	4~6

■ Fig.1 Piping example

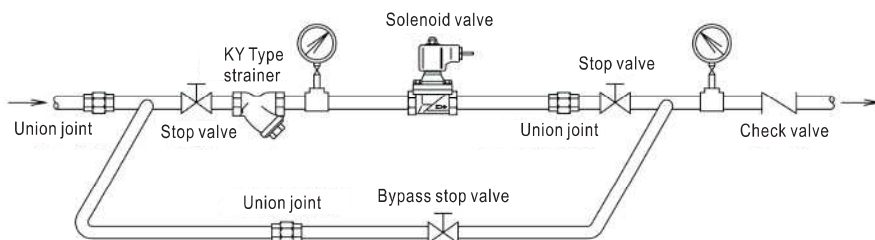


Fig.2 Installation position

Upright to horizontal pipe

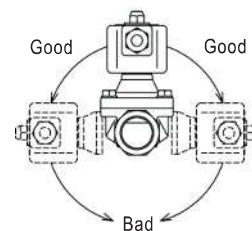


Fig.3: Elevated piping at secondary side

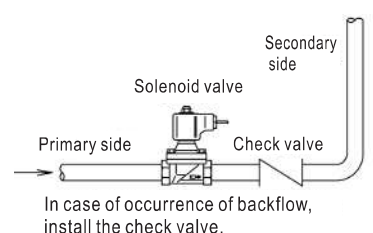


Fig.4 Steam line application

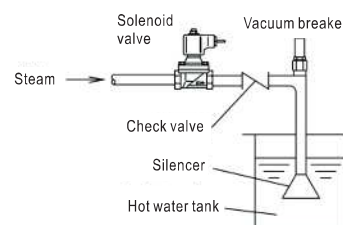
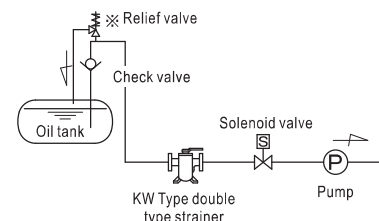


Fig.5 Relief valve installation



※ Install relief valve if pressure rise due to thermal expansion or other factors is anticipated.

■ SELECTION AND INSTALLATION

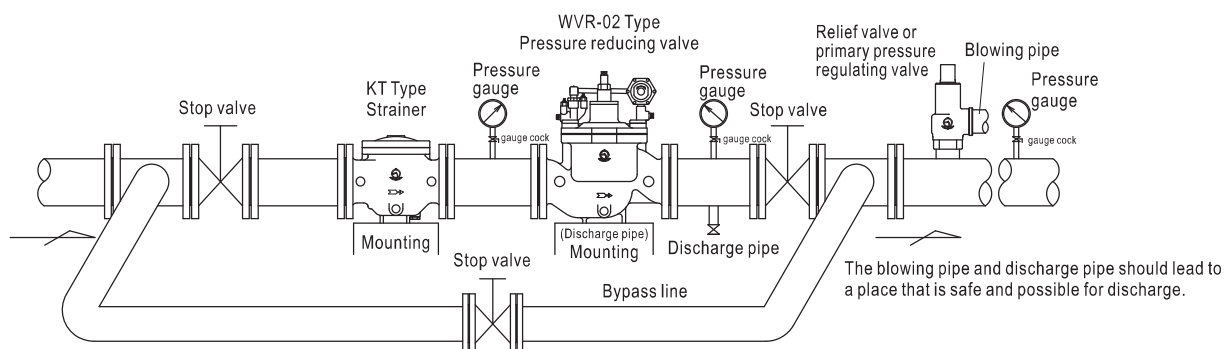
1. Install strainer on the primary side of solenoid valve (see Fig.1).
2. Install a bypass pipe (with stop valve) between the primary and secondary sides of solenoid valve if the operation of equipment cannot be stopped (see Fig.1).
If you do not intend to install bypass pipe, install blowing stop valve, which is branched from the main pipe, right before the stop valve on the primary side of solenoid valve, to allow flushing.
3. The coil should stand upright above horizontal pipe (see Fig.1, 2).
For size 50mm (and below) valve of WS, PS series, the coil can be upright above or at the same level of (and perpendicular to) horizontal pipe. In this case, make sure the pressure differential before and after the valve is larger than 0.03MPa (see Fig.2).
4. Back flow may occur when the secondary pressure is larger than the primary pressure. To prevent back flow, install check valve on the secondary side (see Fig. 3).
5. If the valve is used for steam and the secondary pressure is negative pressure when the valve is closed, install vacuum regulating valve (vacuum breaker) on the secondary side of solenoid valve (see Fig.4).
6. Install steam trap on piping if the valve is used for steam.
7. When used for liquid, the pressure inside the piping may increase due to water hammer which occurs when valve is closed or due to the expansion caused by ambient temperature increase. In this case, it is recommended to install relief valve to protect machine (see Fig.5).
8. Connect coil properly using 0.75mm² above wire. Install fuse to protect electric circuit.
9. Repeated power-on and power-off for a long period may make the surface temperature rise up to about 70°C. Attentions should be paid to avoid burning. (Depending on conditions and models, the temperature rise varies.)
10. Make sure the arrow mark on solenoid valve match with the direction of flow of fluid.
11. Leave some space for disassembling and maintenance.
12. Fix and support piping properly to prevent solenoid valve from being damaged due to weight of piping, excessively large stress, bending force or vibration.
13. Discharge drain or apply thermal insulation if there is risk of freezing.
However, the coil should not be applied with any thermal insulation.

DATA/WV Type Regulating Valve (for Water or Hot water)

PIPING EXAMPLE (horizontal piping with the size of WVR-02 Type pressure reducing valve is 200mm or smaller)

Water supply system using roof tank in tall/medium height buildings

Install water hammer preventing device closely at the primary side of pressure reducing valve if the pressure is reduced by one and more steps.



POINTS FOR INSTALLATION AND USE

BYPASS LINE

It is necessary to install a bypass pipe with stop valve, as shown in the figure above, for test before filling water, air purging, cleaning the inside of pipes, or maintenance.

STRAIGHT PIPE

To ensure stable operation of the valve, install straight pipe before and after the valve. The length of the straight pipe depends on the state before and after piping. However, the length should be approximately 10~20 times the nominal diameter (Minimum 500mm).

PIPING SUPPORT

Install piping support to avoid undesired mechanical impact due to the weight of the piping, weight of fluid, or continuous vibration, stress, or bending force.

STRAINER

Install strainer at the primary side of the valve.

SAFETY DEVICE

Considering the rise of secondary pressure, in some cases, it is necessary to install relief valve or primary pressure regulating valve at the secondary side. See the following table for the approximate set pressure for the relief valve or primary pressure regulating valve. The outlet of the relief valve or primary pressure regulating valve should lead to a drainage that can accept the discharge of the valve.

TABLE OF SET PRESSURE FOR SAFETY RELIEF VALVE AND PRIMARY PRESSURE REGULATING VALVE (MPa)

Set pressure of pressure reducing valve	Set pressure of safety valve ※2
0.1 or less	+0.05 (+0.08)
over 0.1 and less than 0.4	+0.08 (+0.14)
0.4 or more and less than 0.6	+0.12 (+0.2)
0.6 or more and less than 0.8	+0.15 (+0.28)
0.8 or more and 1.0 or less	+0.19

Add above value to set pressure of pressure reducing valve.

※1. The above value is added to the set pressure of pressure-reducing valve.

※2. The values in parentheses are applicable to soft-seated safety relief valve.

THERMO-INSULATION

Cover the valve with insulating material if there is possibility of condensation or freezing. However, no thermo-insulation is to be applied on the coil of pilot-operated solenoid valve.

Note 1: The figure shows an example of WVR-02 Type. The piping for other types of valves are the same. However, for WVM-02 Type, there should be a rising part at the outlet piping. (See the piping example in Page 111)

Note 2: In the case of vertical piping, the piping should be the same as shown in the piping illustration. In addition, the weight of the piping should not be applied on valves, and there should be some space for maintenance purpose.

PRESSURE GAUGE

Install pressure gauge at the primary and secondary sides of the valve, and at locations that can be easily accessed after piping.

LIMITATION ON INSTALLATION LOCATION

In the case solenoid valve, the valve should not be installed at locations where corrosive or explosive gas may accumulate.

DISCHARGE PIPE

To allow easy maintenance, install discharge pipe before the stop valve at the secondary side. In the case of installation inside buildings, discharge pipe is particularly necessary for locations where there are also wires or electric devices installed. The discharge pipe should be led to a drainage that can accommodate the content of stop valves before and after the drainage.

MAINTENANCE SPACE

Leave some space surrounding the valve for maintenance (see the figures below).

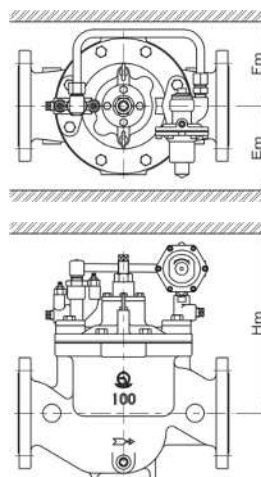


TABLE FOR MAINTENANCE SPACE (mm)

Size	Hm	Em	Fm
40(1½")	550	600	600
50(2")	550	600	600
65(2½")	600	600	600
80(3")	600	600	600
100(4")	800	680	680
125(5")	1000	780	780
150(6")	1200	910	910
200(8")	1400	1060	1060
250(10")	1500	1200	1200
300(12")	1600	1300	1300
400(16")	1800	1400	1400

The figure shows an example for WVR-02 Type. The maintenance space for other types of valves is the same.