

WS-22, 22C Type Solenoid Valve (for Liquids or Gases)

for Manufacturing and Building Equipments etc. Diaphragm Type

Diaphragm type, screwed

SSS&AAS Used*

※ Contact-free swinging mechanism (AAS※2) with special shape spring (SSS※1).
※1. Special Shape Spring ※2. Anti Abrasion System

The WS-22 Type series screwed solenoid valves (Momotaro II) inherit features of the conventional WS-12 Type series products.

To make replacement easy, the face-to-face dimensions of the new series are exactly the same as those of WS-12 Type products. There are some changes though, for improving durability, energy-saving performance, and compliance with RoHS directives (products with nominal diameter less than 50mm) and other environmental standards.

FEATURES

- Three times durable than conventional VENN products (with nominal diameter less than 50mm).
- For liquid and gases.
- Applicable pressure range 0~1.0 MPa.
- Equipped with water hammer reducing component.
- Install in horizontal or vertical pipe (for products with nominal diameter less than 50mm).
- Coil is coated with thermosetting resin that is heat resistant. (with nominal diameter less than 50mm)

SPECIFICATIONS

Operation	Energized open	Energized close
Model name	WS-22*	WS-22C*
Code name	WS22-F*	WS22C-F*
Applicable fluid	Water, air, inert gases* ³ & oils(Kerosene, diesel oil level)* ⁴	
Fluid temperature	5~60°C	
Fluid viscosity	20cSt or less	
Applicable pressure	0~1.0MPa	
Min. pressure differential across the disc	0MPa (0.03MPa for coil installed horizontally.)	
Leakage allowance	Nil (Confirm at pressure gauge. For gases, when 0.02~1.0MPa)	
Rated voltage	Common use:AC100/200V 50/60Hz or AC110/220V 60Hz* ⁵	
Insulation	Class B	
Ambient temperature	5~60°C	
Protection	Dustproof, splash proof, for indoor use* ⁶ . (When used outdoors, also use TB-03 Type terminal box, as rain proof type* ⁷ .)	
End connection	Screwed JIS Rc	
Materials	Body(Cast bronze), Diaphragm(Synthetic rubber)	
Installation	Size 50mm or smaller: Can be installed on both horizontal and vertical piping at any angle between the vertical (when the coil part is placed above) and horizontal. Size 65mm: Install the valve vertically in horizontal piping placing coil part above.	
Valve body pressure	Hydraulic 2.0MPa	

* 1. Size 65mm products are WS-12 and 12C Types whose code names are WS12-F and WS12C-F respectively (Coil shape and specifications are different).

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

* 3. Do not use in fuel gases line.

* 4. If there is any regulation for fuel oils or diesel oil, confirm the body materials according to the regulation.

* 5. For products applicable to special voltage, please contact our agent in your area. (The shape and specifications of suitable products are different.)

* 6. Size 65mm products are dust-proof and drip-proof type.

* 7. Products with TB-03 Type terminal box are rain-proof type. Products with TB-03C Type terminal box are splash-proof (size 50mm or smaller) and rain-proof type (size 65mm).

* 8. We also provide WS-22S Type (size 50mm or smaller), which can reduce the click sound of electromagnet.

* 9. Please contact our agent in your area if the humidity of the place at where the product is used is higher than 85%.

DIMENSIONS AND CURRENT VALUES

(mm)

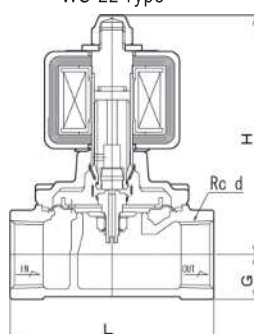
Size	10(3/8")	15(1/2")	20(3/4")	25(1")	32(1 1/4")	40(1 1/2")	50(2")	65(2 1/2")*
d	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"
L	63	63	80	90	106	118	140	160
G	15	15	18	22	27	30	37	45
H	92(168)	92(168)	94(169)	100(175)	138(203)	141(206)	153(218)	201(252)
Port size	18	18	23	28	32	40	48	60
Cv value	3	4	7	10	17	20	30	50
Mass(kg)	1(1.4)	1(1.4)	1.1(1.5)	1.6(2)	2.6(3)	3.5(3.9)	5.1(5.5)	8.2(8.6)
Current (A)	AC100V	Rated	0.21(0.35)		0.35(0.35)		0.60(0.60)	
		Starting	0.70(1.30)		1.55(1.30)		2.50(2.50)	
	AC200V	Rated	0.10(0.18)		0.18(0.18)		0.30(0.30)	
		Starting	0.35(0.65)		0.78(0.65)		1.25(1.25)	

* Size 65mm products are WS-12, 12C Types whose code names are WS12-F and WS12C-F respectively. (The shape and specifications of coil are different.)

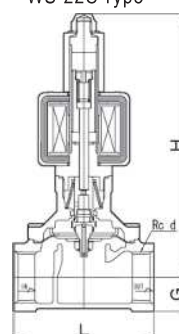
Figures in () are for energized close type.

CONSTRUCTION

WS-22 Type



WS-22C Type



Note:
Depending on size, the structure may vary.
Face-to-face dimensions are the same as those of old models WS-12 and 12C Types.



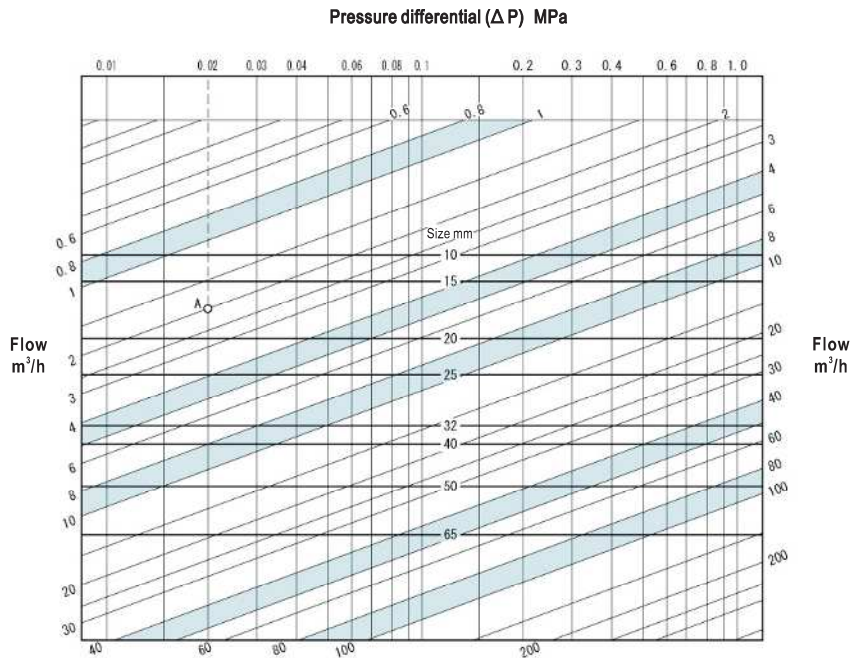
WS-22 Type



WS-22C Type

SIZE SELECTION CHART (for Water)

Applicable models: WS-22, 22C, 22K, 22CK
WF-22, 22C, 22K, 22CK
WS-25, 25C
WF-25, 25C



Note: Size 65mm is applicable to WS-12, 12C and WF-12, 12C types.

● HOW TO USE THE CHART

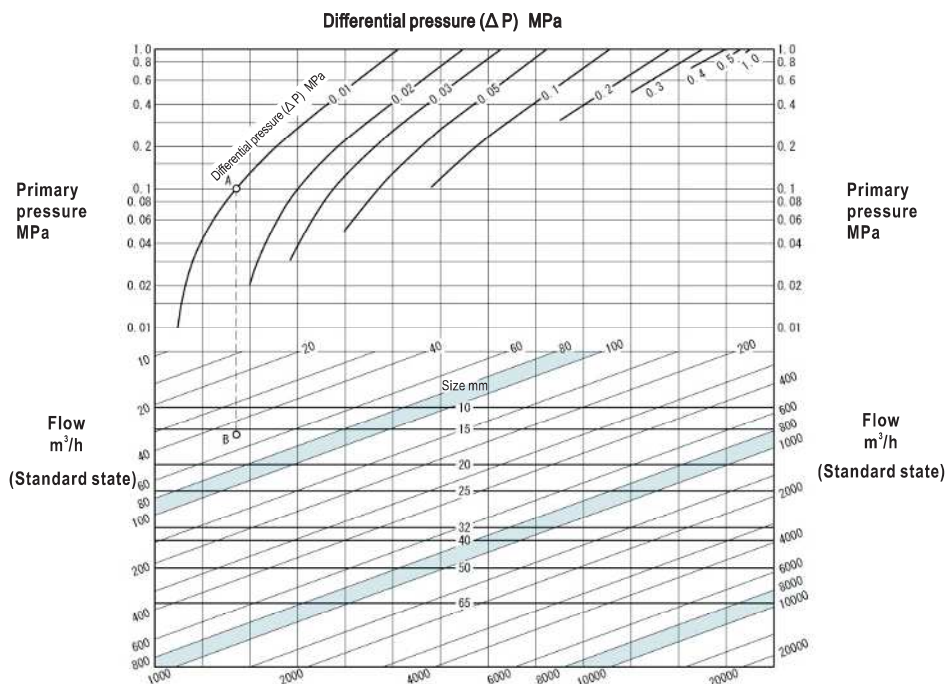
Example: Determine the size of valve meeting the following conditions:

Primary pressure: 0.3MPa
Secondary pressure: 0.28MPa
Flow of water: 2m³/h

Differential pressure (ΔP): 0.3–0.28=0.02MPa.
Find out the intersection point A between the 0.02MPa differential pressure (ΔP) line and the 2m³/h flow line. Since point A is between the lines representing nominal diameter 15mm and 20mm, the nominal diameter should be the larger one, i.e. 20mm.

SIZE SELECTION CHART (for Air)

Applicable models: WS-22, 22C, 22K, 22CK
WF-22, 22C, 22K, 22CK
WS-25, 25C
WF-25, 25C



Note: Size 65mm is applicable to WS-12, 12C and WF-12, 12C types.

● HOW TO USE THE CHART

Example: Determine the size of valve meeting the following conditions:

Primary pressure: 0.1MPa
Secondary pressure: 0.09MPa
Flow of air (at 20°C): 50m³/h (standard state)

Differential pressure (ΔP) is: 0.1–0.09=0.01MPa.
Identify intersection point (A) of the 0.1MPa primary pressure line and the 0.01MPa Differential pressure curve. Draw a vertical line from point A until it intersects with the 50m³/h flow line. The intersection point is named B. Since point B is between the 15mm and 20mm size lines, the larger size, which is 20mm, is selected.

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>

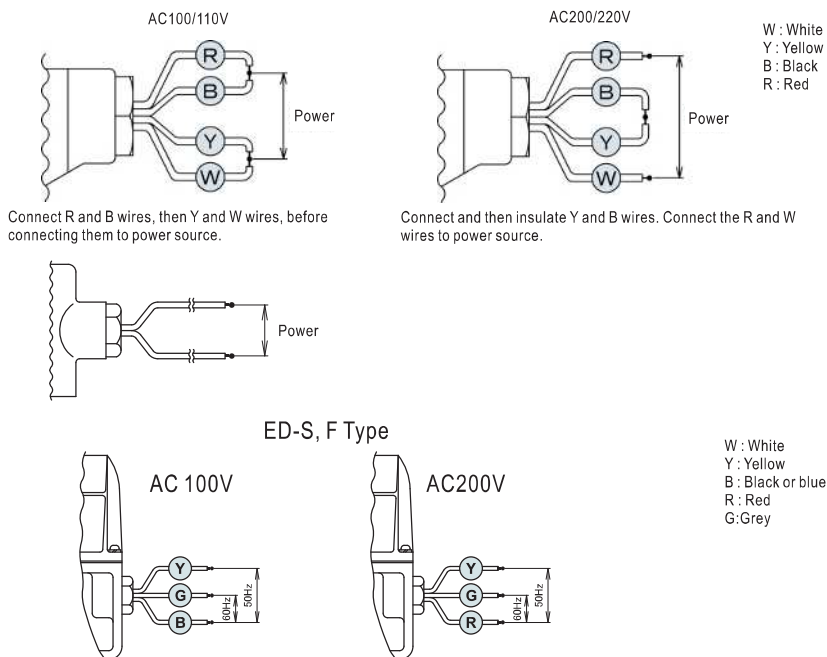
- Connect the 4 lead wires (in different colors) to power source.

<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.



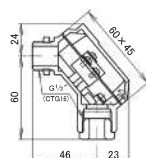
REFERENCE: ABOUT EXPLOSION PREVENTION

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.

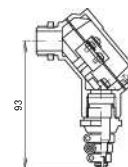
TB-03 TYPE SERIES (for indoor/outdoor, metal body, rainproof)

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

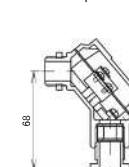
- TB-03 Type (standard model) With gland nut



- TB-03C Type With cap cone

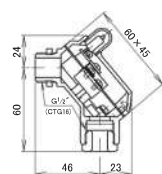


- TB-03F Type With ship-class gland

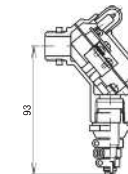


(With indication lamp) Rate power: AC100V or AC200V
Please specify voltage when ordering.

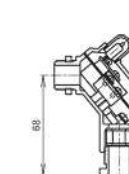
- TB-03L Type With indication lamp



- TB-03LC Type Lamp + cap cone

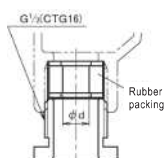


- TB-03LF Type Lamp + ship-class gland



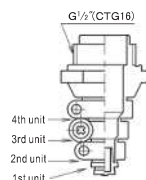
An example of TB-03 installation

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

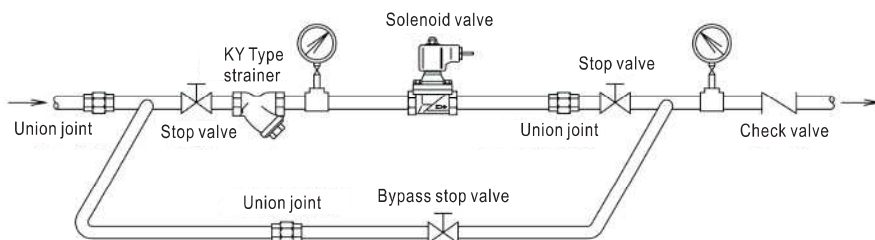


Fig.2 Installation position

Upright to horizontal pipe

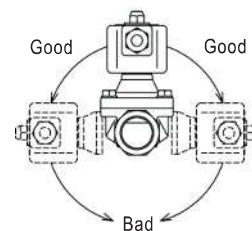


Fig.3: Elevated piping at secondary side

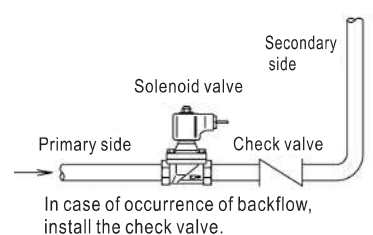


Fig.4 Steam line application

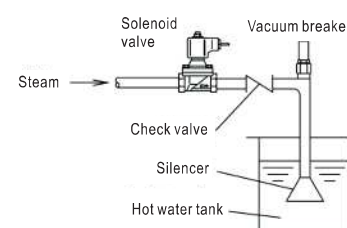
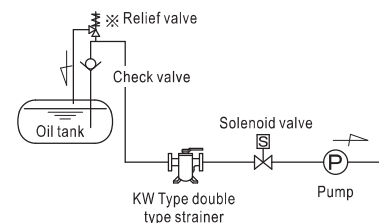


Fig.5 Relief valve installation



■ 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.