

# PF-22, 22C Type Solenoid Valve (for Steam, Liquids or Air)

Piston type, flanged

SSS&amp;AAS Used\*

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

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

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



PF-22 Type  
(Size 15~25mm)



PF-22 Type  
(Size 32~80mm)



PF-22C Type  
(Size 15~25mm)



PF-22C Type  
(Size 32~80mm)

## FEATURES

- Three times more durable than conventional VENN products. (Size 50mm and lower products)
- Wide range of applicable pressure: 0~1.0 MPa.

- Install in horizontal or vertical pipe. (size 50mm or smaller).
- The coil is coated with heat-resistant thermosetting resin (size 25mm and lower products).

## SPECIFICATIONS

| Operation                                  | Energized open                                                                                                                                                                                                                                                   | Energized close       |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Model name                                 | PF-22* <sup>1</sup>                                                                                                                                                                                                                                              | PF-22C* <sup>1</sup>  |
| Code name                                  | PF22-W* <sup>1</sup>                                                                                                                                                                                                                                             | PF22C-W* <sup>1</sup> |
| Applicable fluid                           | Steam, water, air & oils (Kerosene, diesel oil level)* <sup>3</sup>                                                                                                                                                                                              |                       |
| Fluid temperature                          | 5~180°C (For hot water: Max. 100°C)                                                                                                                                                                                                                              |                       |
| Fluid viscosity                            | 20cSt or less                                                                                                                                                                                                                                                    |                       |
| Applicable pressure                        | 0~1.0MPa (0.05~1.0MPa for size 80mm.)                                                                                                                                                                                                                            |                       |
| Min. pressure differential across the disc | 0MPa (0.03MPa for coil installed horizontally. 0.05MPa for size 80mm.)                                                                                                                                                                                           |                       |
| Leakage allowance                          | Steam, water & oils: Nil (Confirm at pressure gauge)<br>Air: 50mL/min (standard state) or less (when 0.05~1.0MPa)                                                                                                                                                |                       |
| Rated voltage                              | Common use: AC100/200V 50/60Hz or AC110/220V 60Hz* <sup>6</sup>                                                                                                                                                                                                  |                       |
| Insulation                                 | Class H                                                                                                                                                                                                                                                          |                       |
| Ambient temperature                        | 5~60°C                                                                                                                                                                                                                                                           |                       |
| Protection                                 | Dustproof, splash proof, for indoor use* <sup>7</sup><br>(When used outdoors, also use TB-03 Type terminal box, as rain proof type* <sup>8</sup> )                                                                                                               |                       |
| End connection                             | Flanged JIS 10KFF                                                                                                                                                                                                                                                |                       |
| Materials                                  | Body (Cast bronze, Size 80mm: Cast iron),<br>Disc (Size 10~50mm: Brass with Teflon tip, Size 65~80mm: Stainless steel with Teflon tip)                                                                                                                           |                       |
| 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.<br>Size 65~80mm: Install the valve vertically in horizontal piping placing coil part above. |                       |
| Valve body pressure                        | Hydraulic 2.0MPa                                                                                                                                                                                                                                                 |                       |

- \* 1. Size 65~80mm products are PF-12, 12C Types, whose code names are PF12-W, PF12C-W (65A), PF12-S, PF12C-S (80A) respectively (with different shape and specifications of coil).  
 \* 2. Refer to Page 244 for method of wiring.  
 \* 3. If there is any regulation for fuel gas or diesel oil, confirm the body material according to the regulation.  
 \* 4. Size 32mm or larger products and those suitable for special voltage have different shape and dimensions of the coil.  
 \* 5. Please select WF Type series if you need air tightness or use the product with well or river water.  
 \* 6. For products suitable for special voltage, please contact us. (Products for such purpose have coils with different shape and dimensions.)  
 \* 7. Size 32mm and larger products are dustproof and drip-proof type.  
 \* 8. Products with TB-03 Type terminal box are rain-proof type. Products with TB-03C Type terminal box are splash-proof type (size 25mm and smaller) or rain-proof type (size 32mm or larger).  
 \* 9. In environment with humidity higher than 85%, please use PF-22Y, 22CY Types if the required size is 32~50mm or PF-12Y, 12CY Types if the required size is 65~80mm.  
 (Please contact our agent in your area for products with size below 25mm.)  
 \* 10. In case of high viscosity (100cSt or larger), Please contact our agent in your area.  
 \* 11. Products with manual operating device are also available. (Size 50mm or smaller)

## DIMENSIONS AND CURRENT VALUES

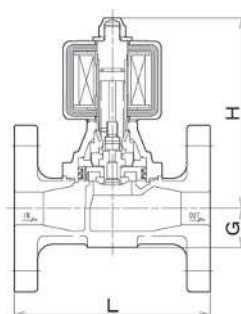
|             |        | (mm)     |            |          |            |            |            |             |            |
|-------------|--------|----------|------------|----------|------------|------------|------------|-------------|------------|
| Size        |        | 15(1/2") | 20(3/4")   | 25(1")   | 32(1 1/4") | 40(1 1/2") | 50(2")     | 65(2 1/2")* | 80(3")*    |
| L           |        | 112      | 118        | 140      | 150        | 160        | 190        | 212         | 290        |
| G           |        | 21       | 24         | 27       | 32         | 35         | 41         | 50          | 50         |
| H           |        | 102(174) | 115(178)   | 120(183) | 150(199)   | 153(202)   | 165(214)   | 200(252)    | 220(272)   |
| Port size   |        | 18       | 23         | 28       | 32         | 40         | 48         | 60          | 73         |
| Cv value    |        | 4.5      | 7.5        | 12       | 18         | 23         | 35         | 50          | 70         |
| Mass (kg)   |        | 2.6(3)   | 3.4(3.8)   | 5.2(5.6) | 7(7.5)     | 8.3(8.8)   | 10.6(11.1) | 15.1(15.5)  | 26.5(27)   |
| Current (A) | AC100V | Rated    | 0.21(0.30) |          | 0.30(0.30) |            | 0.42(0.43) |             | 0.60(0.60) |
|             |        | Starting | 0.70(1.35) |          | 1.25(1.35) |            | 1.62(1.71) |             | 2.50(2.50) |
|             | AC200V | Rated    | 0.10(0.15) |          | 0.15(0.15) |            | 0.18(0.22) |             | 0.30(0.30) |
|             |        | Starting | 0.35(0.70) |          | 0.63(0.70) |            | 0.80(0.85) |             | 1.25(1.25) |

\* Size 65~80mm products are PF-12, 12C Types, whose code names are PF12-W, PF12C-W (65A), PF12-S, PF12C-S (80A) respectively. (The shape and specifications of coils in these products are different from other products.)

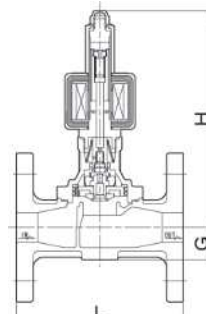
Figures in ( ) are for energized close type.  
 Flange code JIS 10KFF

## CONSTRUCTION

PF-22 Type



PF-22C Type

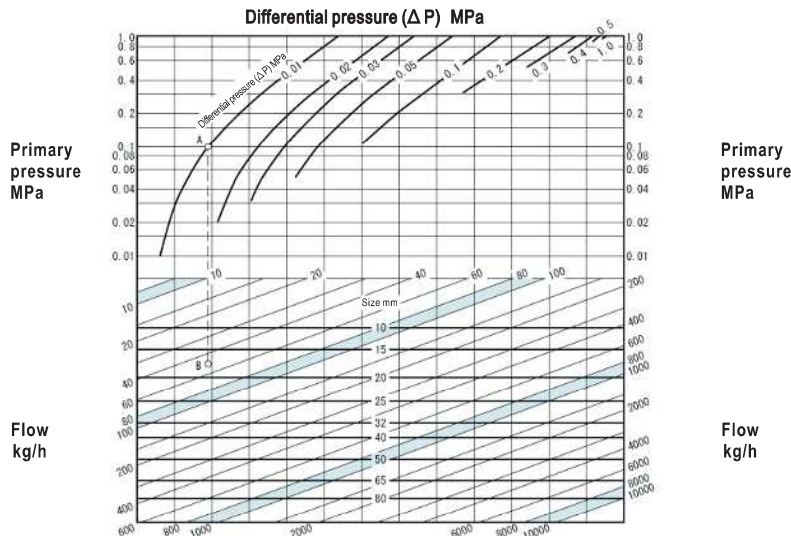


Note:  
 Depending on size, the structure may vary.  
 Depending on size, the structure may vary. (Size 32mm or larger products have different coil structure.)  
 The face-to-face dimensions are the same as those of old models PF-12 and PF-12C Types.

# DATA/PS, PF Type Solenoid Valve (for Steam, Water or Air)

## SIZE SELECTION CHART (for Steam)

Applicable models: PS-22, 22C / PF-22, 22C  
PS-25, 25C / PF-25, 25C



Note: Size 65mm applies to PS/PF-12, 12C types. Size 80mm applies to PF-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 steam (saturated): 50kg/h

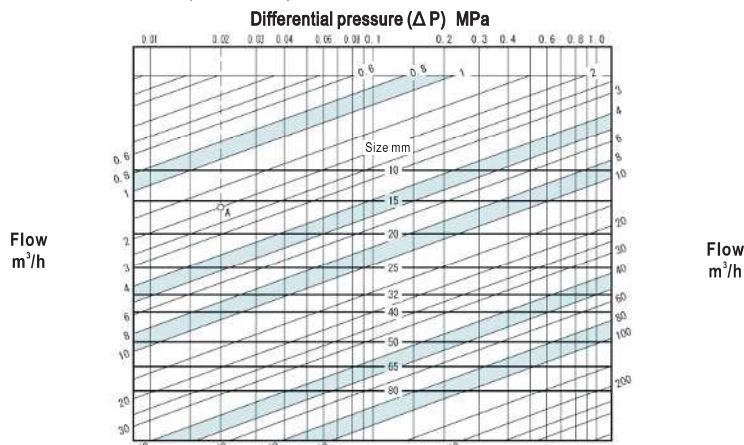
Differential pressure ( $\Delta P$ ) is:

$$0.1 - 0.09 = 0.01 \text{ MPa}$$

Identify intersection point (A) of the 0.1MPa primary pressure line and the 0.01MPa differential pressure differential curve. Draw a vertical line from point A until it intersects with the 50kg/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.

## SIZE SELECTION CHART (for Water)

Applicable models: PS-22, 22C, 22K, 22CK  
PF-22, 22C  
PS-25, 25C / PF-25, 25C



Note: Size 65mm applies to PS/PF-12, 12C types. Size 80mm applies to PF-12, 12C types.

### ● HOW TO USE THE CHART

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

Primary pressure: 0.3MPa

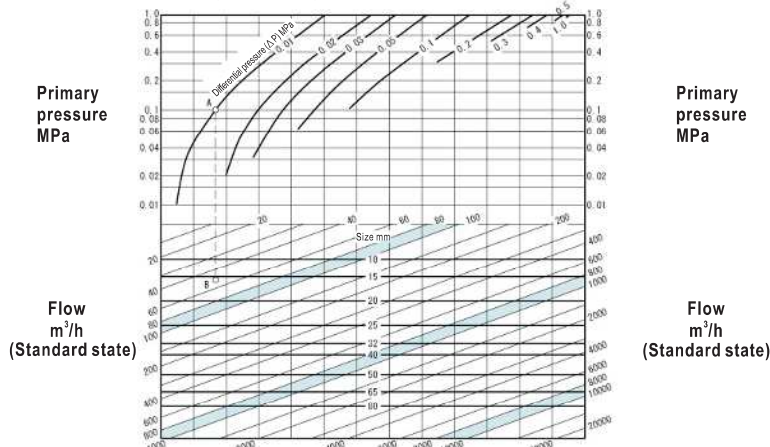
Secondary pressure: 0.28MPa

Flow of water: 2m³/h

Differential pressure ( $\Delta P$ ):  $0.3 - 0.28 = 0.02 \text{ MPa}$ . Find out the intersection point (A) between the 0.02MPa differential pressure ( $\Delta P$ ) 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: PS-22, 22C, 22K, 22CK  
PF-22, 22C  
PS-25, 25C / PF-25, 25C



Note: Size 65mm applies to PS/PF-12, 12C types. Size 80mm applies to PF-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 ( $\Delta P$ ) is:  $0.1 - 0.09 = 0.01 \text{ MPa}$ . 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>

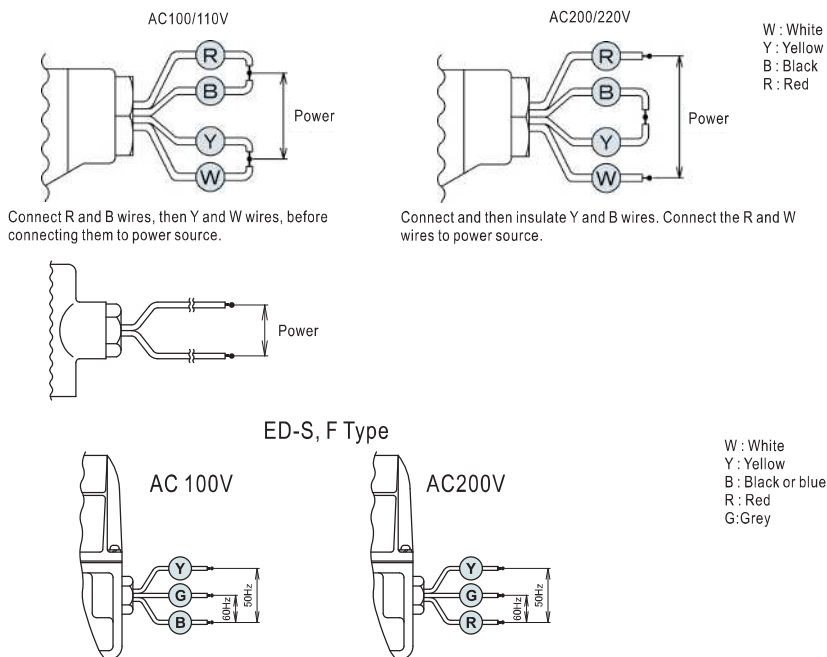
- Connect the 4 lead wires (in different colors) to power source.

### <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.



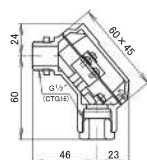
## REFERENCE: ABOUT EXPLOSION PREVENTION

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.

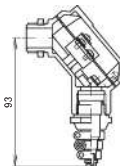
### TB-03 TYPE SERIES (for indoor/outdoor, metal body, rainproof)

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

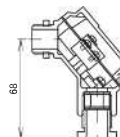
- TB-03 Type (standard model) With gland nut



- TB-03C Type With cap cone

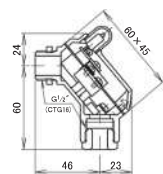


- TB-03F Type With ship-class gland

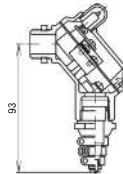


(With indication lamp) Rate power: AC100V or AC200V  
Please specify voltage when ordering.

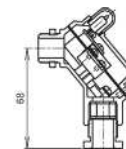
- TB-03L Type With indication lamp



- TB-03LC Type Lamp + cap cone

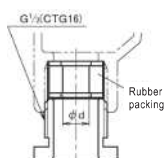


- TB-03LF Type Lamp + ship-class gland



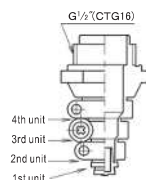
An example of TB-03 installation

### 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

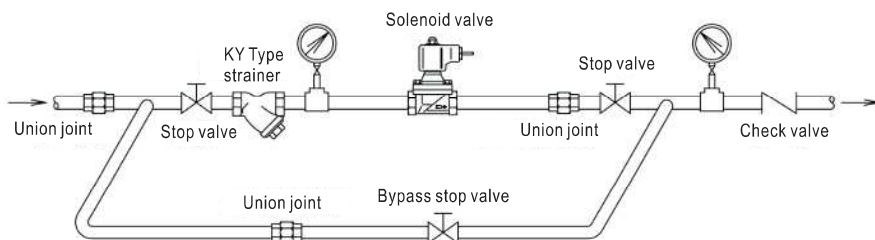


Fig.2 Installation position

Upright to horizontal pipe

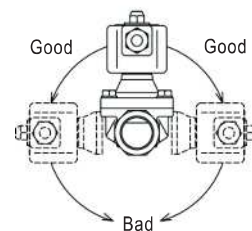


Fig.3: Elevated piping at secondary side

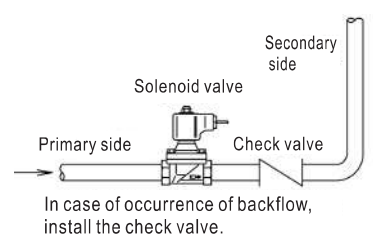


Fig.4 Steam line application

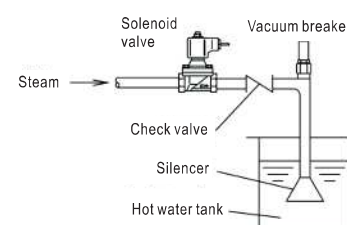
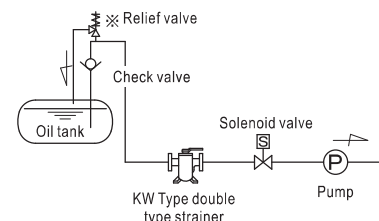


Fig.5 Relief valve installation



※ 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 0.75mm<sup>2</sup> 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. Attention 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.