

PS-12, 12C Type Solenoid Valve (for Steam, Liquids or Air)

for Manufacturing and Building Equipments etc. Piston-type solenoid valve

Piston type, screwed

PS series piston-type screwed solenoid valves for energized open and energized close operation.

FEATURES

- For steam, water, air, and oil.
- Wide range of working pressure: 0~1.0MPa
- Free installation in vertical or horizontal direction (size 10~50mm).
- Energized open or energized close operation.

SPECIFICATIONS

Operation	Energized open	Energized close
Model name	PS-12	PS-12C
Code name	PS12-W	PS12C-W
Applicable fluid	Steam, water, air & oils (Kerosene, light oil, gasoline level)	
Applicable pressure	0~1.0MPa	
Min. pressure differential across the disc	0MPa (0.03MPa for coil installed horizontally.)	
Fluid temperature	5~180°C (For hot water: Max. 100°C)	
Fluid viscosity	20cSt or less	
Leakage allowance	Steam, water & oils: Nil (Confirm at pressure gauge) Air: 50ml/min (standard state) or less (when 0.05~1.0MPa)	
Rated voltage	Common use: AC100/200V 50/60Hz or AC110/220V 60Hz ^{*3}	
Insulation	Class H (Silicone mold)	
Ambient temperature	5~60°C	
Protection	Dust & drip proof (When used outdoors, also use TB-03 Type terminal box, as rain proof type)	
End connection	Screwed JIS Rc	
Materials	Body (Cast bronze), Disc (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. Size 65mm: Install the valve vertically in horizontal piping placing coil part above.	
Valve body pressure	Hydraulic 2.0MPa	

- * 1. Refer to page 231 for Method of Wiring.
* 2. In case complete of shut off is required for air service, or the valve is used for well water, select WS or WF series.
* 3. Special voltage items other than the above specified are available upon your request.
* 4. We also provide PS-12C type, which size is smaller than 25mm and is suitable for applications requiring highly frequent opening/closing.
* 5. Select PS-12Y, 12CY types if humidity is higher than 85%.
* 6. We also provide PS-12R type that is suitable for oil or other fluid with viscosity up to 100cSt (the specifications may vary slightly for sizes smaller than 50mm).

DIMENSIONS AND CURRENT VALUES

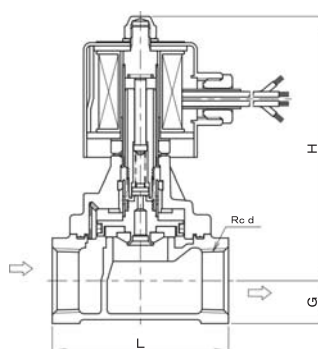
(mm)

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	118(177)	118(177)	130(186)	136(191)	147(201)	150(204)	162(216)	200(252)
Port size	18	18	23	28	32	40	48	60
Cv value	3	4.5	7.5	12	18	23	35	50
Mass(kg)	1.2(1.8)	1.1(1.7)	1.6(2.1)	2.1(2.6)	2.8(3.3)	3.6(4.1)	5.3(5.8)	8.1(8.5)
Current (A)	AC100V	Rated	0.20(0.30)		0.25(0.30)		0.35(0.40)	
		Starting	0.60(1.30)		0.90(1.30)		1.30(1.70)	
	AC200V	Rated	0.10(0.15)		0.13(0.15)		0.18(0.20)	
		Starting	0.30(0.70)		0.45(0.70)		0.65(0.85)	

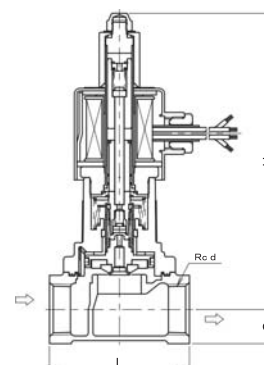
Figures in () are for PS-12C Type

CONSTRUCTION

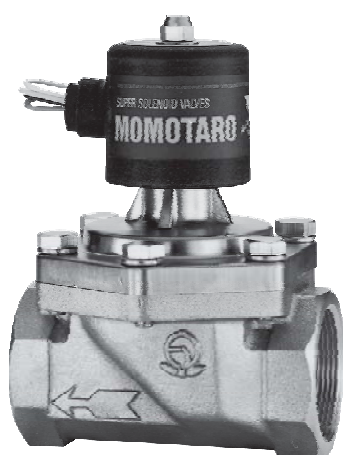
PS-12 Type



PS-12C Type



Note: Depending on size, the structure may vary.



PS-12 Type



PS-12C Type

PF-12, 12C Type Solenoid Valve (for Steam, Liquids or Air)

Piston type, flanged

PF series piston-type flanged solenoid valves for energized open and energized close operation applications.

FEATURES

- For steam, water, air, and oil.
- Wide range of working pressure: 0~1.0MPa.
- Free installation in vertical or horizontal direction (size 15~50mm).
- Energized open or energized close operation.

SPECIFICATIONS

Operation	Energized open	Energized close
Model name	PF-12	PF-12C
Code name	PF12-W* ¹	PF12C-W* ¹
Applicable fluid	Steam, water, air & oils(Kerosene, light oil, gasoline* ⁵ level)	
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.)	
Fluid temperature	5~180°C (For hot water:Max. 100°C)	
Fluid viscosity	20cSt or less	
Leakage allowance	Steam, water & oils:Nil (Confirm at pressure gauge) Air:50ml/min(standard state) or less (when 0.05~1.0MPa)	
Rated voltage	Common use:AC100/200V 50/60Hz or AC110/220V 60Hz* ⁴	
Insulation	Class H (Silicone mold)	
Ambient temperature	5~60°C	
Protection	Dust & drip proof (When used outdoors, also use TB-03 Type terminal box, as rain proof type)	
End connection	Flanged JIS 10KFF	
Materials	Body(Cast bronze, Size 80mm:Cast iron), Disc(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. Size 65 ~ 80mm:Install the valve vertically in horizontal piping placing coil part above.	
Valve body pressure	Hydraulic 2.0MPa	

* 1. Code name for size 80mm are PF12-S and PF12C-S.

* 2. Refer to page 231 for Method of Wiring.

* 3. In case complete of shut off is required for air service, or the valve is used for well water, select WS or WF series.

* 4. Special voltage items other than the above specified are available upon your request

* 5. We also provide PF-12C type, which size is less than 25mm and is suitable for applications requiring highly frequent opening/closing.

* 6. Select PF-12Y, 12CY types if humidity is higher than 85%.

* 7. We also provide PF-12R type that is suitable for oil or other fluid with viscosity up to 100cSt (the specifications may vary slightly for sizes less than 50mm).

* 8. In case of Gasoline use, size 15~65mm only are available.

DIMENSIONS AND CURRENT VALUES

(mm)

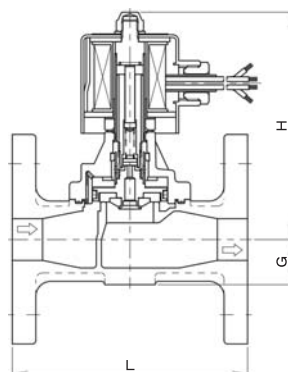
Size	15(1/2")	20(3/4")	25(1")	32(1 1/4")	40(1 1/2")	50(2")	65(2 1/2")	80(3")
L	112	118	140	150	160	190	212	290
G	21	24	27	32	35	41	50	50
H	118(177)	130(186)	136(191)	147(201)	150(204)	162(216)	200(252)	220(272)
Port size	18	23	28	32	40	48	60	73
Cv value	4.5	7.5	12	18	23	35	50	70
Mass(kg)	2.7(3.3)	3.6(4.1)	5.3(5.8)	6.7(7.2)	7.9(8.4)	10.5(11)	15.1(15.5)	26.5(27)
Current (A)	AC100V	Rated	0.20(0.30)	0.25(0.30)	0.35(0.40)	0.60(0.60)	0.60(0.60)	0.60(0.60)
		Starting	0.60(1.30)	0.90(1.30)	1.30(1.70)	2.50(2.50)	2.50(2.50)	2.50(2.50)
	AC200V	Rated	0.10(0.15)	0.13(0.15)	0.18(0.20)	0.30(0.30)	0.30(0.30)	0.30(0.30)
		Starting	0.30(0.70)	0.45(0.70)	0.65(0.85)	1.25(1.25)	1.25(1.25)	1.25(1.25)

Figures in () are for PF-12C Type

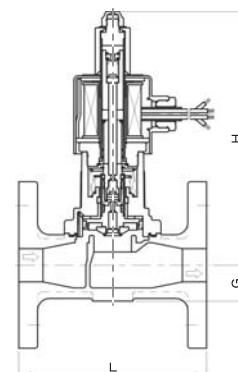
Flange code JIS 10KFF

CONSTRUCTION

PF-12 Type



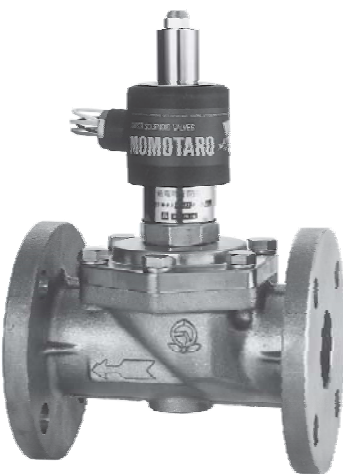
PF-12C Type



Note: Depending on size, the structure may vary.



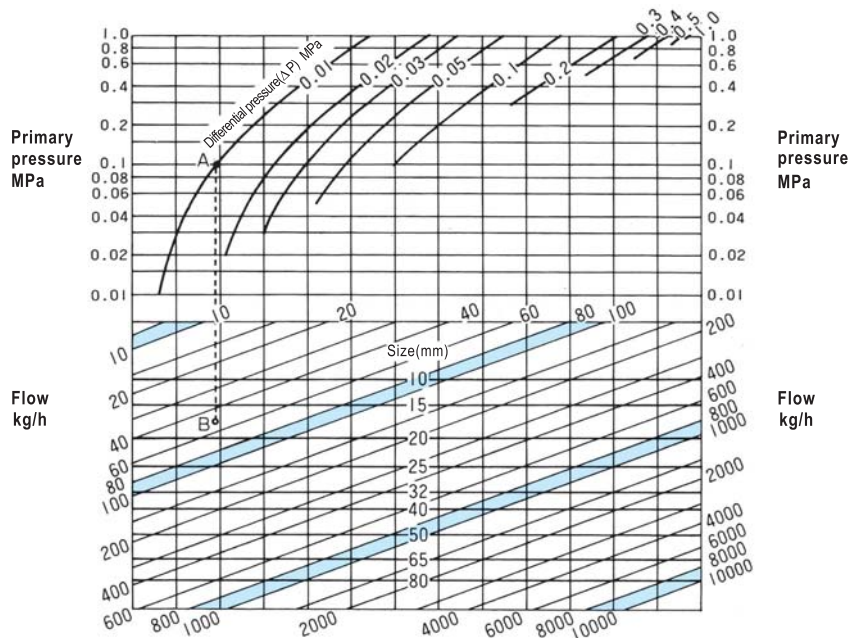
PF-12 Type



PF-12C Type

SIZE SELECTION CHART (for Steam)

Applicable models: PS-12, 12C
PF-12, 12C
PS-15, 15C
PF-15, 15C



● 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

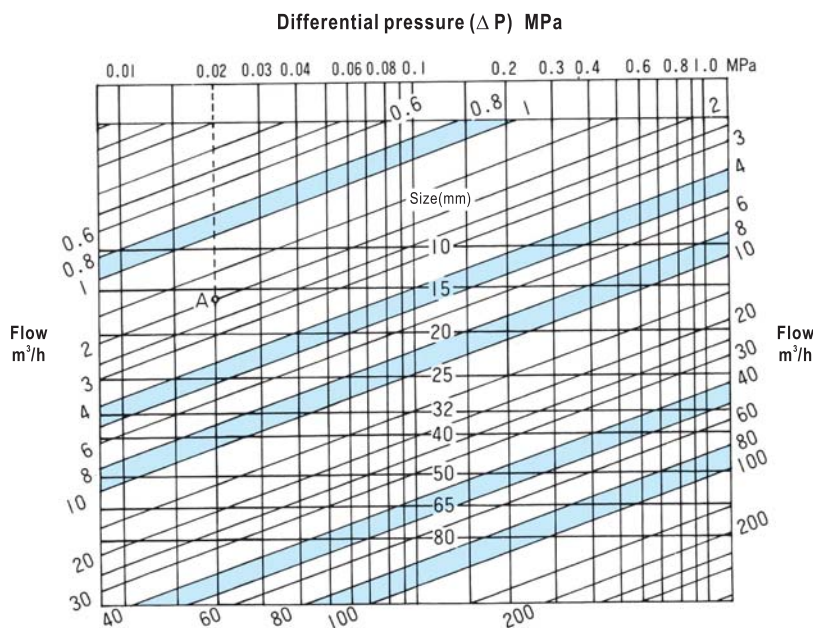
Differential pressure (ΔP) is:

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

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-12, 12C, 12K, 12CK
PF-12, 12C
PS-15, 15C
PF-15, 15C



● 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

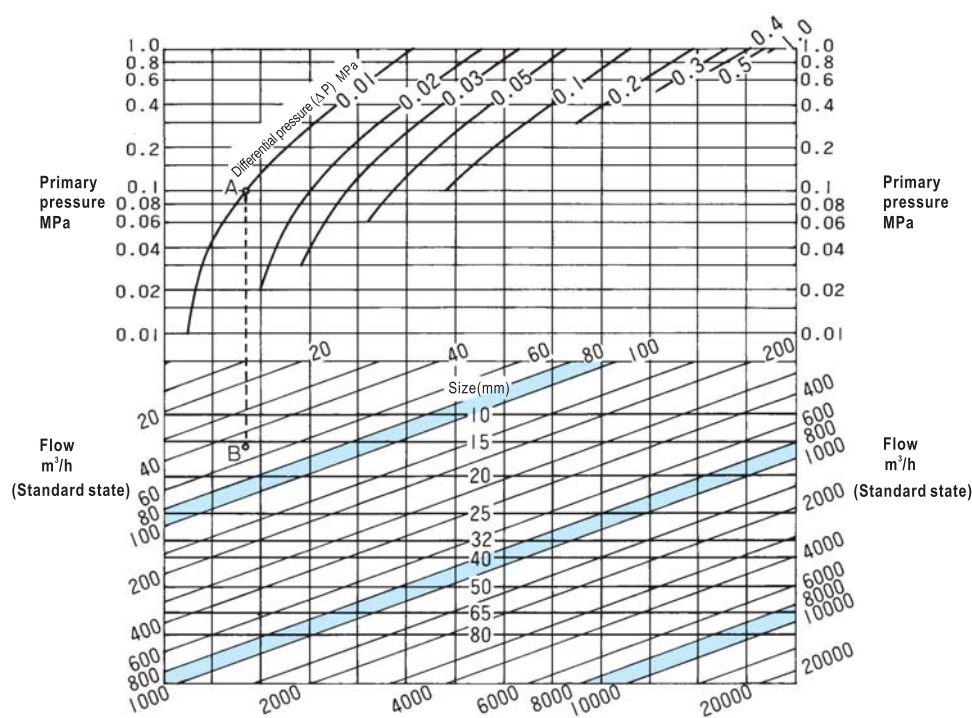
Differential pressure (ΔP): $0.3 - 0.28 = 0.02 \text{ MPa}$.

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.

DATA/PS, PF Type Solenoid Valve (for Air)

SIZE SELECTION CHART (for Air)

Applicable models: PS-12, 12C, 12K, 12CK
PF-12, 12C
PS-15, 15C
PF-15, 15C



● 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.

METHOD FOR CONNECTION OF COIL

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

<Common voltage coil>

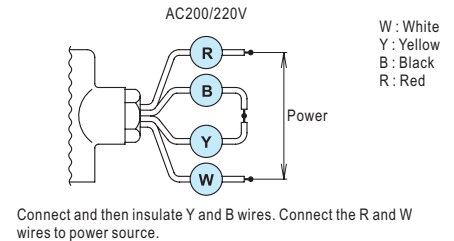
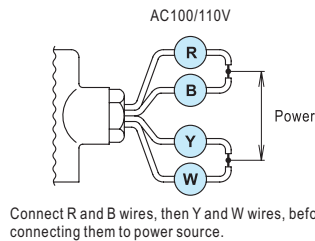
- Connect the 4 lead wires (in different color) to power source.

<Exclusive/Special voltage coil>

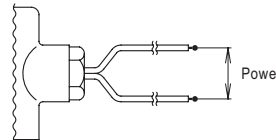
- Connect 2 lead wires to power source.

<Frequency selecting coil>

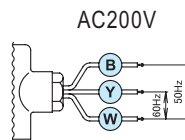
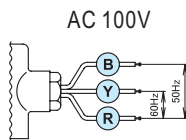
- There are 3 lead wires on coil. Read the connection method shown on product before connecting to power source.
The lead wire that left unused should be insulated using insulating tape.



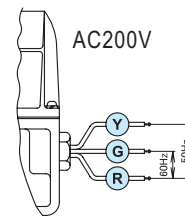
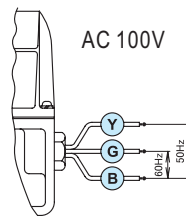
W : White
Y : Yellow
B : Black
R : Red



DS-10, 10H, 12 Type



ED-S, F Type



W : White
Y : Yellow
B : Black
R : Red
G : Grey

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 cable and conduit.

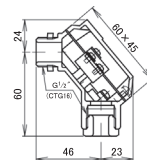


An example of TB-03 installation

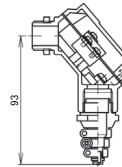
TB-03 TYPE SERIES (for indoor/outdoor, metal body, rainproof)

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

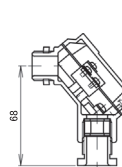
- TB-03 Type (standard model) With gland nut



- TB-03C Type With cap cone

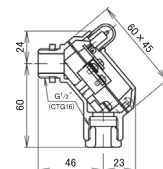


- TB-03F Type With ship-class gland

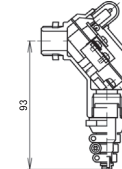


(With indication lamp) Rate power: AC100V or AC200V
Please specify voltage when ordering.

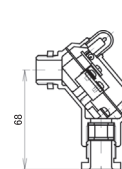
- TB-03L Type With indication lamp



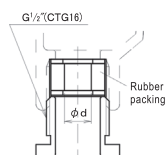
- TB-03LC Type Lamp + cap cone



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

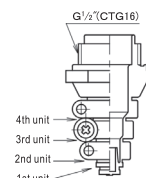


SPECIFICATIONS OF GLAND (TB-03F, 03LF Type)



Gland size	d (mm)	Size of applicable conduit		
		Hard steel conduit	Flexible metal conduit	
15a	9	16	Class 1	Class 2
15b	10		13	10 12
15c	11		15	15 17

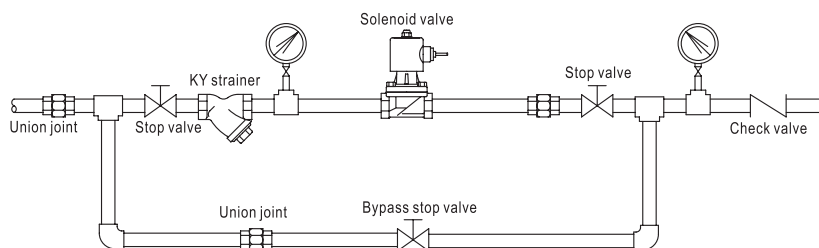
SPECIFICATIONS OF CAPCONE PLUG (TB-03C, 03LC Type)



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

DATA/Solenoid Valve

■ Fig.1 Piping example



■ 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. 1).
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.3).
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 occurred when valve is closed or ambient temperature. In this case, it is recommended to install relief valve to protect machine (see Fig.4).
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 rises up to about 70°C. Cares should be paid to avoid burning. (Depending on conditions and model, 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.

Fig.2 Installation position

Upright to horizontal pipe

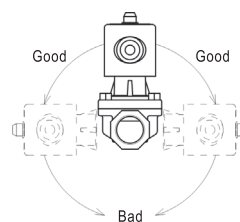


Fig.3 Steam line application

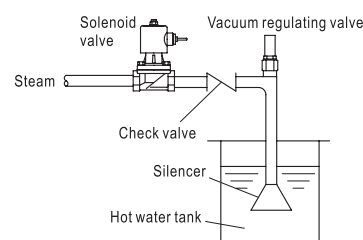
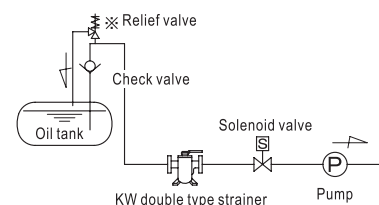


Fig.4 Relief valve installation



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