

DS-10, 10H, 12 Type Solenoid Valve

Direct acting, small capacity solenoid valves with compact body, simple structure, and orifices designed for a variety of applications.

Depending on orifice diameter, the applicable pressure and flow of this series product are different from those of general purpose solenoid valves.



DS-10, 10H Type



DS-12 Type

FEATURES

- Compact, light weight.
- A variety of models available.

- Simple structure allows easy maintenance works.

SPECIFICATIONS

Operation	Energized open					
Model name	DS-10		DS-10H		DS-12	
Code name	DS10-J □1	DS10-J □2	DS10H-W □		DS12-W □	
	※ S, H, M or L for orifice is required in □.					
Applicable fluid	Water, air & oils* ²		Steam & hot water* ³		Water, steam, air & oils* ²	
Fluid temperature	5~80℃		5~175℃* ³		5~180℃* ³	
Fluid viscosity	50cSt or less					
Orifice Applicable pressure	Orifice		S:4mm	H:5.5mm	M:7mm	L:10mm
	Applicable pressure(MPa)	DS-10,10H Type	0.8 or less	0.4 or less	0.25 or less	0.1 or less
		DS-12 Type	1.0 or less	0.55 or less	0.3 or less	0.13 or less
Leakage allowance	Nil (Confirm at pressure gauge.)				Steam, water & oils: Nil (Confirm at pressure gauge) Air:25mL/min (standard state) or less	
Rated voltage	AC100V 50/60Hz	AC200V 50/60Hz	AC100V 50/60Hz or AC200V 50/60Hz* ⁴			
Insulation	Class B		Class H			
Ambient temperature	5~50℃					
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) Trim(Stainless steel & Synthetic rubber)		Body(Cast bronze) Trim(Stainless steel with Teflon tip)		Body(Cast bronze) Trim(Stainless steel with Teflon tip)	
Installation	Can be installed on both horizontal and vertical piping at any angle between the vertical (When the coil part is placed above) and horizontal.* ⁵					
Valve body pressure test	Hydraulic 2.0MPa					

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

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

* 3. For hot water:Max.100°C.

* 4. For DS-12 Type, special voltage items other than the above specified are upon your request.

* 5. If there is risk of water splashing, please install the product on horizontal pipe uprightly.

* 6. For size selection, please see the diagram in Page 234.

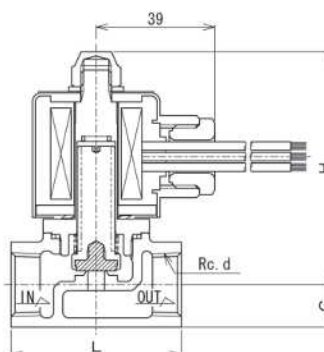
DIMENSIONS

(mm)

Size	d	L	G	H		Cv value				Mass (kg)
				DS-10 Type DS-10H Type	DS-12 Type	Orifice				
						4	5.5	7	10	
10(⅜")	⅜"	50	14	77	83	0.45	0.75	1.1	2	0.6(0.8)
15(½")	½"	56	14	77	83	0.45	0.85	1.3	2.1	0.6(0.8)
20(¾")	¾"	63	17	78	84	0.45	0.85	1.3	2.2	0.7(0.9)

* Figures in () are for DS-12 Type.

CONSTRUCTION



Depending on model, the structure may vary.

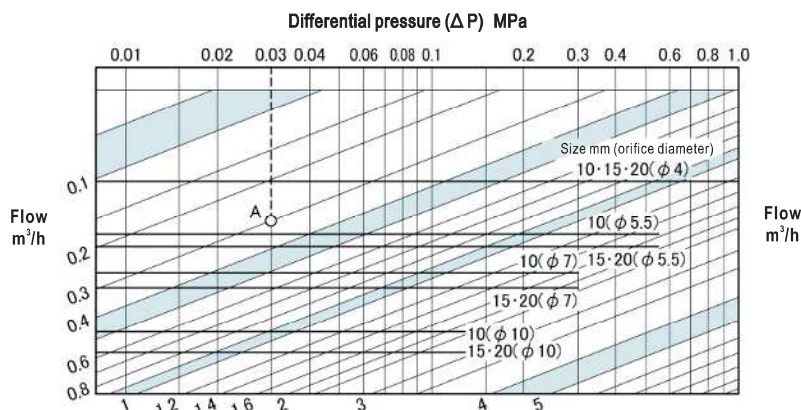
CURRENT VALUES

(A)

Voltage	Model	DS-10 DS-10H	DS-12
AC100V	Rated	0.19	0.25
	Starting	0.57	0.60
AC200V	Rated	0.10	0.13
	Starting	0.29	0.30

DATA/DS-10, 10H, 12 Type Solenoid Valve (for Water, Air, or Steam)

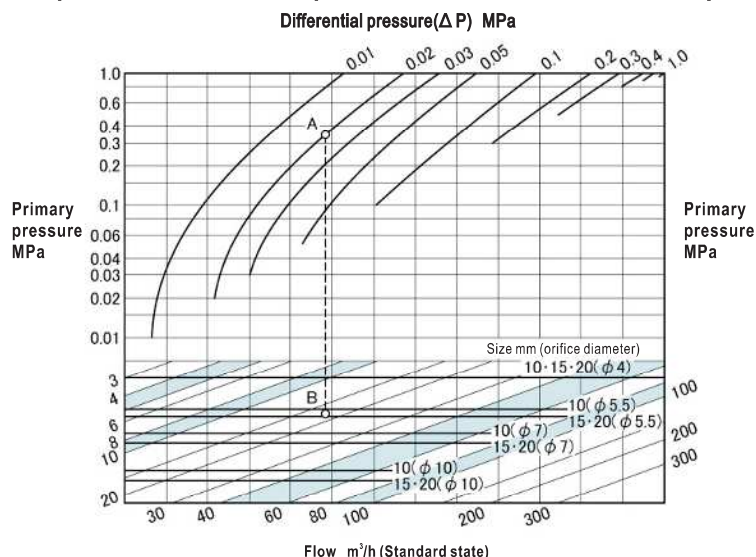
SIZE (ORIFICE SIZE) SELECTION CHART (for Water)



● HOW TO USE THE CHART

Example: Determine the size (orifice diameter) of valve meeting the following conditions:
 Primary pressure: 0.1MPa
 Secondary pressure: 0.07MPa
 Flow of water: 0.3m³/h
 Differential pressure (ΔP) is: $0.1 - 0.07 = 0.03\text{MPa}$.
 Identify intersection point (A) of the 0.03MPa differential pressure line and the 0.3m³/h flow line. Since point A is between the 10/15/20mm (orifice diameter $\phi 4$) and 10mm (orifice diameter $\phi 5.5$) size lines, the larger size, which is 10mm (orifice diameter $\phi 5.5$), is selected.

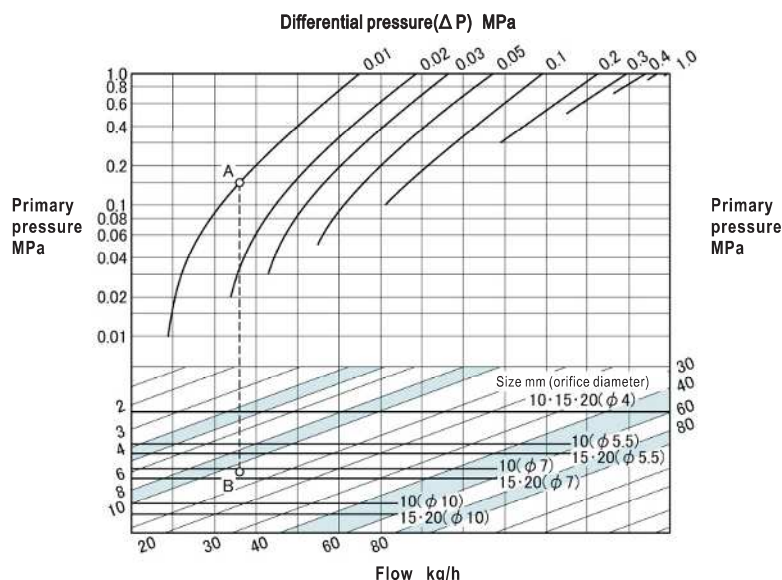
SIZE (ORIFICE SIZE) SELECTION CHART (for Air)



● HOW TO USE THE CHART

Example: Determine the size (orifice diameter) of valve meeting the following conditions:
 Primary pressure: 0.35MPa
 Secondary pressure: 0.33MPa
 Flow of air (20°C): 18m³/h (standard state)
 Differential pressure (ΔP) is: $0.35 - 0.33 = 0.02\text{MPa}$.
 Identify the intersection point (A) of the 0.35MPa primary pressure line and the 0.02MPa differential pressure curve. Draw a vertical line from point A until it intersects with 18m³/h flow line. The intersection point is named B. Since point B is between the 10mm (orifice diameter $\phi 5.5$) and 15/20mm (orifice diameter $\phi 5.5$) size lines, the larger size, which is 15mm (orifice diameter $\phi 5.5$) or 20mm (orifice diameter $\phi 5.5$), is selected.

SIZE (ORIFICE SIZE) SELECTION CHART (for Steam)



● HOW TO USE THE CHART

Example: Determine the size of valve meeting the following conditions:
 Primary pressure: 0.15MPa
 Secondary pressure: 0.14MPa
 Flow of steam (saturated): 11.5kg/h
 Differential pressure (ΔP) is: $0.15 - 0.14 = 0.01\text{MPa}$.
 Identify the intersection point (A) of the 0.15MPa primary pressure line and the 0.01MPa differential pressure curve. Draw a vertical line from point A until it intersects with 11.5kg/h flow line. The intersection point is named B. Since point B is between the 10mm (orifice diameter $\phi 7$) and 15/20mm (orifice diameter $\phi 7$) size lines, the larger size, which is 15mm (orifice diameter $\phi 7$) or 20mm (orifice diameter $\phi 7$), 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>

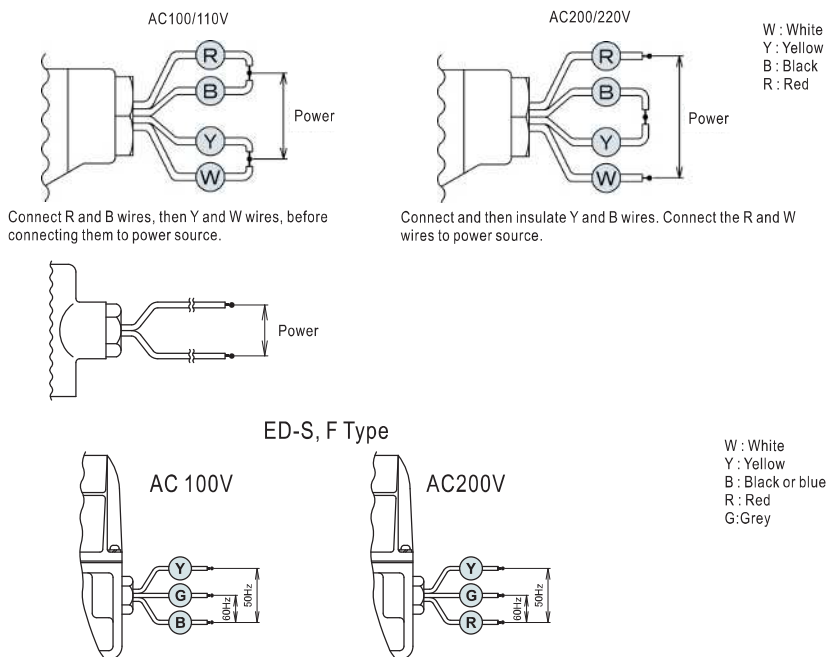
- Connect the 4 lead wires (in different colors) to power source.

<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.



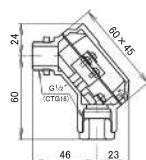
REFERENCE: ABOUT EXPLOSION PREVENTION

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.

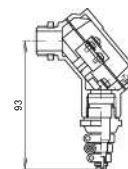
TB-03 TYPE SERIES (for indoor/outdoor, metal body, rainproof)

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

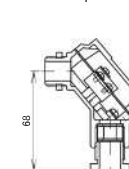
- TB-03 Type (standard model) With gland nut



- TB-03C Type With cap cone

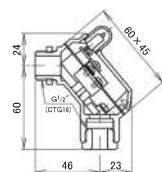


- TB-03F Type With ship-class gland

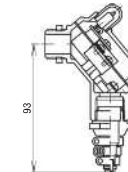


(With indication lamp) Rate power: AC100V or AC200V
Please specify voltage when ordering.

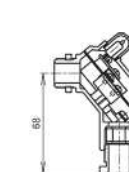
- TB-03L Type With indication lamp



- TB-03LC Type Lamp + cap cone

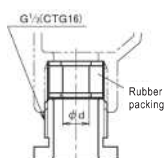


- TB-03LF Type Lamp + ship-class gland



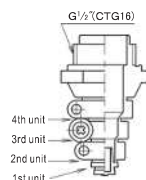
An example of TB-03 installation

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



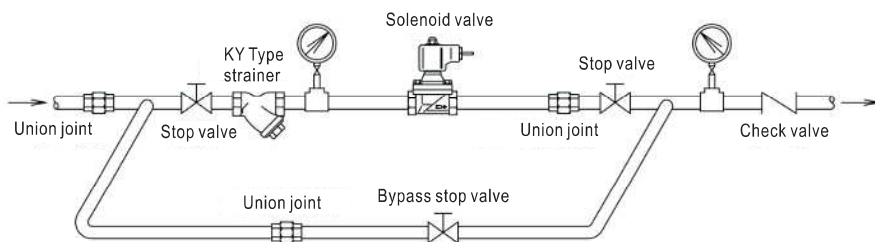
Gland size	d (mm)
15a	9
15b	10
15c	11

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



■ 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. 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.

Fig.2 Installation position

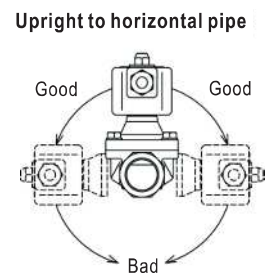


Fig.3: Elevated piping at secondary side

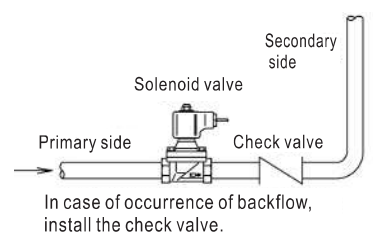


Fig.4 Steam line application

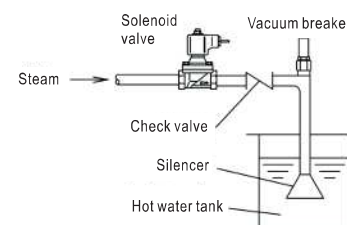
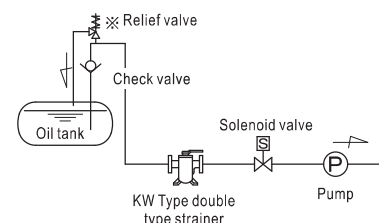


Fig.5 Relief valve installation



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