RD-14 Type Series Pressure Reducing Valve (for Water, Hot Water, Air or Oils)

Direct operated pressure reducing valve for water, liquids, or air with small or large flow and small range of pressure change.

Ideal for pressure control of roof water tank, water pumping system, or boiler direct linking water supply system for tall/medium height buildings or in industrial applications, for controlling pressure of fuel, lubricants and air.

RD-14W,14H Type

RD-14CN Type

Special order product
(With 2 pressure gauges)

FEATURES

- Pressure balanced structure with small change of set pressure.
- One-way (upper side) dissembling allows easy maintenance.
- RD-14CN Type has nylon coating, which can prevent occurrence of rusty water.

SPECIFICATIONS

Type	Standard	Hot water & oil	Nylon coating
Model name	RD-14W	RD-14H	RD-14CN
Code name	**RD14W-B ☐**	**RD14H-B ☐**	**RD14CN-B ☐**
	※ L, M or H for adjustable secondary pressure is required in ☐.		
Applicable fluid	Water, hot water & air	Oils not corrosive,kerosene,lubricant, heavy oil A & B, & hot water	Water & hot water
Fluid temperature	5~60℃	5~90℃	5~60℃
Fluid viscosity	—	Max. 800cSt	—
Applicable primary pressure	Max. 1.0MPa		
Adjustable secondary pressure	**Size 15~80mm L:0.05~0.35MPa, M(For RD-14CN Type is H):0.3~0.7MPa Size 100~150mm L:0.05~0.35MPa, M(For RD-14CN Type is H):0.3~0.5MPa**		
Maximum reducing rate	10:1		
Minimum pressure differential across the disc	0.05MPa		
Minimum adjustable flow	Water:2~5 L/min Air:5~10m³/h(Standard state)	2~5 L/min	
Leakage allowance	Nil (Confirm at pressure gauge)		
End connection	Flanged JIS 10KRF		
Materials	Body(Cast iron), Trim(Cast bronze), Diaphragm & disc(Synthetic rubber)		
Painting or coating for body	Interior:Epoxy resin	Interior:Rust proof oil	Nylon 11 coating
Valve body pressure test	Hydraulic 1.75MPa		

∗1. Valve with connecting thread (Screwed JIS Rc¼″) for pressure gauge on the side of body and with pressure gauges mounted are available upon request.
∗2. Valves with adjustable secondary pressure in 0.65~0.95MPa for size 80mm or smaller and 0.45~0.8MPa for size 100mm or bigger are available upon your request.
∗3. The size for installation on vertical pipeline is up to 80mm. And there should be a relatively large space for maintenance.
(Valves above 100mm in size should be installed perpendicularly to horizontal pipe.)

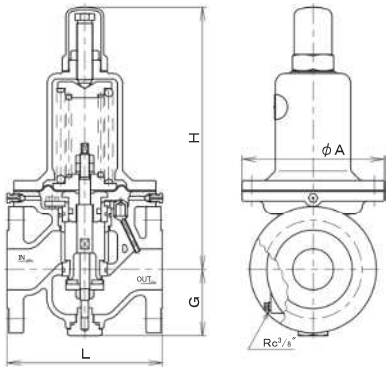
DIMENSIONS

(mm)

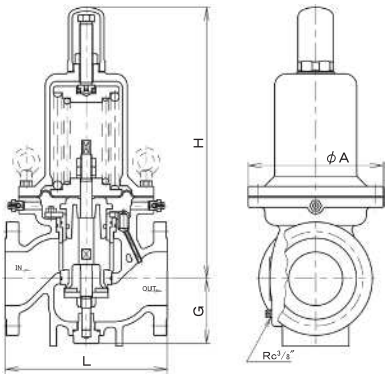
Size	A	L	G	H	Cv value	Mass(kg)
15(½″)	156	142	65	256	1	10
20(¾″)	160	142	65	256	2	10
25(1″)	160	142	65	257	3.5	10.5
32(1¼″)	180	174	76	332	5.5	17
40(1½″)	180	174	76	333	8	17.5
50(2″)	190	174	81	341	14	19
65(2½″)	230	218	95	434	22	37
80(3″)	250	218	100	439	32	40
100(4″)	300	250	125	490	48	67
125(5″)	370	340	150	640	75	112
150(6″)	400	340	165	655	108	150

Flange code JIS 10KRF

CONSTRUCTION



Size:15~80mm

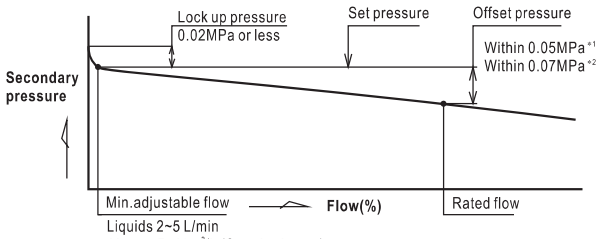


Size:100~150mm

Depending on nominal diameter, the structure of the valve may be different from what is shown in the drawing.

DATA/RD-14 Type Series Pressure Reducing Valve (for Water, Hot Water, Air or Oils)

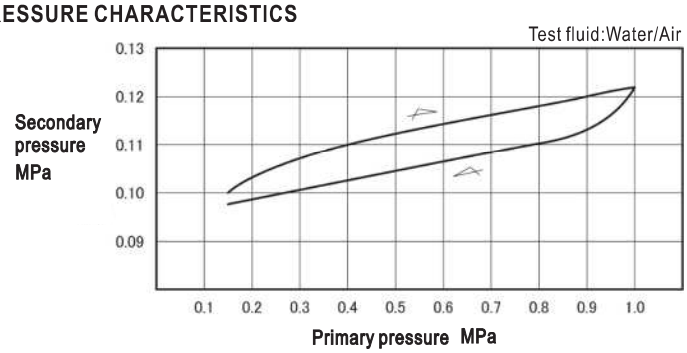
FLOW CHARACTERISTICS



Liquids 2~5 L/min
Air 5~10m³/h (Standard state)

*1.At spring range 0.05~0.35MPa
*2.At spring range 0.3~0.5MPa or 0.3~0.7MPa

PRESSURE CHARACTERISTICS



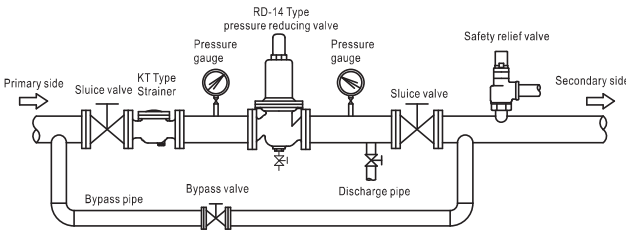
The above chart shows the change of secondary pressure when primary pressure was changed to 0.15MPa, 1.0MPa and 0.15MPa at primary pressure being 0.15MPa and secondary pressure being set at 0.1MPa.

TERMS

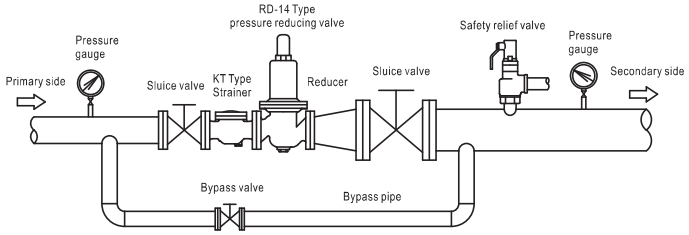
- **Primary pressure:** The inlet pressure of pressure reducing valve or the inlet pressure of piping that is near to pressure reducing valve.
- **Secondary pressure:** The outlet pressure of pressure reducing valve or the outlet pressure of piping that is near to pressure reducing valve.
- **Set pressure:** Secondary pressure at minimum adjustable flow.
- **Offset pressure:** The difference between secondary pressure and setup pressure when primary pressure is kept at a constant level but flow increases gradually from minimal adjustable flow to the rated flow of pressure reducing valve.
- **Lockup pressure:** The increased pressure above setup pressure when the secondary valve of pressure reducing valve is locked up.
- **Minimum adjustable flow:** The minimum flow of pressure reducing valve for maintaining stable flow.
- **Rated flow:** The maximum flow at the specified offset pressure when primary pressure is kept at a constant level.

PIPING EXAMPLE

PIPING ILLUSTRATION (for Liquids)



PIPING ILLUSTRATION (for Air)



POINTS FOR INSTALLATION

❶ There should be some space for dissembling and maintenance. Leave some space, whose height should be h (see the following table) above the center of piping.

TABLE FOR SPACE (mm)

Size (mm)	15	20	25	32	40	50	65	80	100	125	150
h	500	500	500	600	600	600	700	700	800	1000	1000

❷ In the case of liquid application, install straight pipe before and after pressure reducing valve.
The length of straight pipe depends on the piping condition before and after the valve. Basically, it should be 10~20 times of the nominal diameter (min. 500mm).

❸ Install strainer at the primary side of pressure reducing valve.

❹ Considering the pressure rise at failure, safety relief valve is installed at the secondary side of pressure reducing valve. Generally, the capacity of the safety relief valve should be about 10% of the maximum flow of pressure reducing valve. See the following table for the approximate set pressure of safety relief valve.

SET PRESSURE FOR SAFETY RELIEF VALVE (MPa)

Set pressure of pressure reducing valve	Set pressure of safety valve ※2.
0.1or 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 less than 1.0	+0.19
1.0 or more and 1.2 or less	+0.23

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.

❺ In the case of gas application, since the volume may expand after pressure reducing valve, use reducer to enlarge the piping of the secondary side.

❻ In the case of liquid application, install sluice valve at the secondary side (see Piping illustration for liquids) to allow easy maintenance. Particularly in the case of installation in shaft in tall/medium height buildings, a discharge pipe is necessary if wires, electric devices are installed in the same shaft. The discharge pipe can be installed directly on the body of pressure reducing valve.

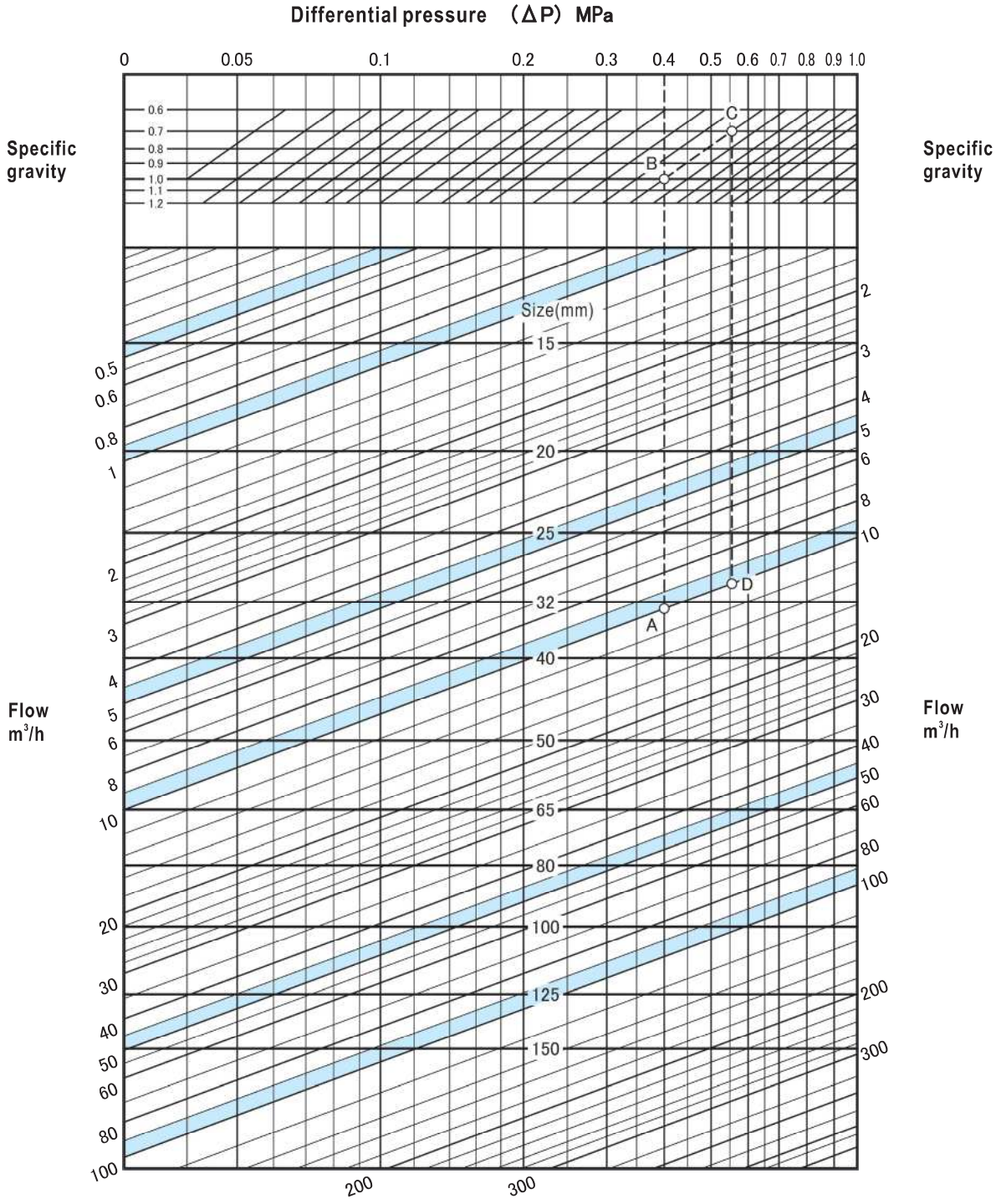
❼ Before installing pressure reducing valve, clean in the piping and remove contaminations such as welding residuals. Most claims related to pressure reducing valve in new piping are caused by contaminations in piping.

❽ For RD-14CN and 14PN Types, thermo-insulation is necessary if the difference of temperature between the valve and ambient air is larger than 40℃.

Note: Also see Points for Installation of Pressure Reducing Valve. (Page 59~60)

RD-14 Type Series Pressure Reducing Valve (for Water)

NOMINAL DIAMETER SELECTION CHART (for Liquids)



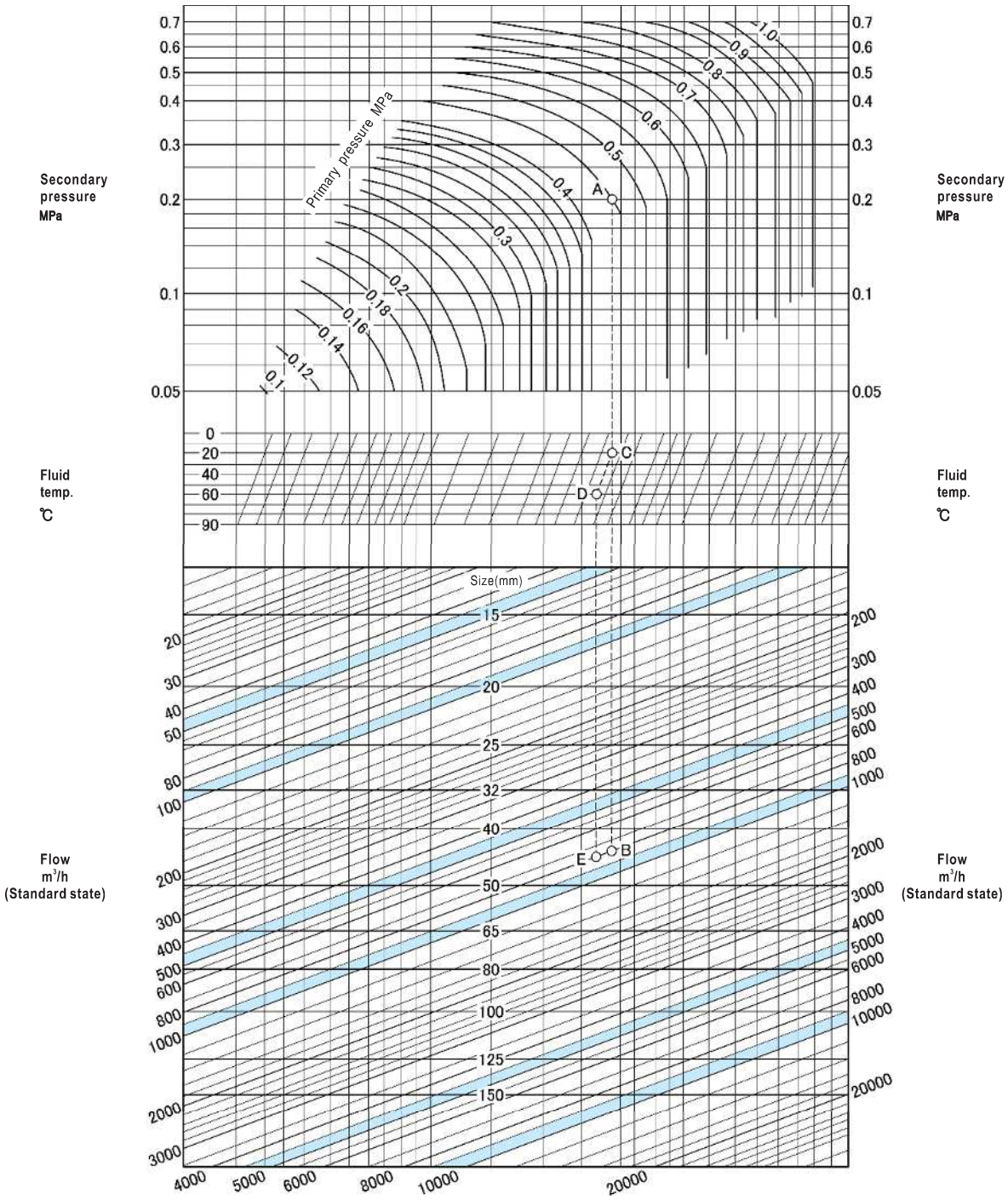
● HOW TO USE THE CHART

Example: Find out the nominal diameter meeting the following conditions:
Primary pressure: 0.5MPa
Secondary pressure: 0.1MPa
Specific gravity: 1 (water)
Flow: 10m³/h
Differential pressure(ΔP): 0.5−0.1=0.4MPa

Find out the intersection point A between the 0.4MPa differential pressure (ΔP) line and the 10m³/h flow line. Since point A is between the lines representing nominal diameter size 32mm and 40mm, the nominal diameter should be the larger one, i.e. size 40mm.

In the case that other conditions remain the same but the specific gravity is 0.7, find out the intersection point B between the 0.4MPa differential pressure (ΔP) line and the 1.0 specific gravity line. Move from point B on the 0.7 specific gravity line parallelly to reach point C. Now draw a vertical line from point C until it intersects with the 10m³/h flow line. The intersection point is named D. Since point D is located between the lines representing nominal diameter size 25mm and 32mm, the nominal diameter should be the larger one, i.e. size 32mm.

NOMINAL DIAMETER SELECTION CHART (for Air)



● HOW TO USE THE CHART

Determine the nominal diameter under the following conditions:
Primary pressure: 0.45MPa
Secondary pressure: 0.2MPa
Temperature: 20℃
Flow (standard state): 800m³/h
Obtain the crossing point A of the curves representing 0.45MPa primary pressure and 0.2MPa secondary pressure.

Draw a vertical line from point A until it intersects with the 800m³/h flow line. The crossing point is named B. Since point B is located between lines representing size 40mm and 50mm, the larger one, which is 50mm, is selected.
Here is another example showing how to determine the nominal diameter when other conditions remain the same but the temperature is 60℃. Draw a vertical line from point A until the line intersects with the 20℃ temperature line. The crossing point is named C. Move the line parallelly until it intersects with the 60℃ temperature line. The crossing point is named D. Draw a vertical line from point D until it intersects with the 800m³/h flow line. The crossing point is named E. Since point E is located between lines representing size 40mm and 50mm, the larger one, which is 50mm, is selected.

DATA/Pressure Reducing Valve (for Water or Liquids)

■ PIPING EXAMPLE

Fig 1. With bypass line

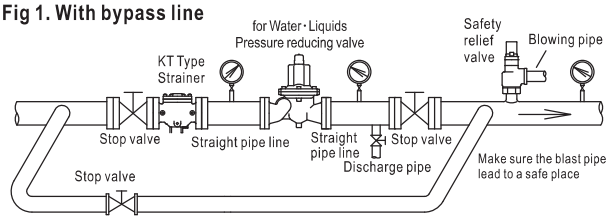


Fig 2. Without bypass line

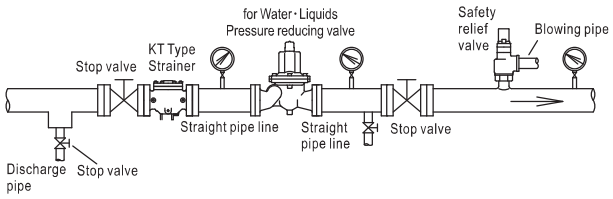
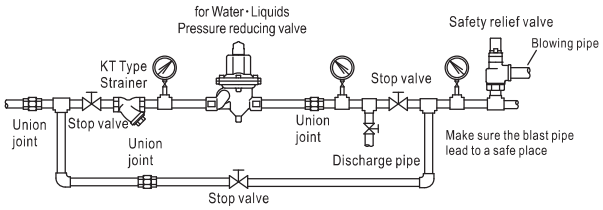


Fig 3. Screwed type connection with bypass line



Note: See Fig.2 for piping with screw type end connection and without bypass pipe.

■ POINTS FOR INSTALLATION

○ Installation of pressure reducing valve and piping

1. If not otherwise specified, the pressure reducing valve should be vertical to horizontal pipe.
   Install safety valve or safety relief valve at secondary side.
   ※ 1. In the case of failure of pressure reducing valve, expansion of fluid due to rise of ambient temperature, or water hammer, the secondary pressure may rise and equipment may be damaged.
   ※ 2. See Tab.1 for set pressure of safety valve or safety relief valve.
   ※ 3. In the case safety valve or safety relief valve is used as an alarm, its nominal diameter should be big enough to allow discharge of 10% maximum flow of pressure reducing valve, which is about the leakage of pressure reducing valve. In very few cases, nominal diameter is selected by discharging amount of maximum flow for pressure reducing valve.(reference value: see Table 2 and Table 3)

■ TABLE1. SET PRESSURE FOR SAFETY RELIEF VALVE (MPa)

Set pressure of pressure reducing valve	Set pressure of safety valve※2.
0.1or 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 less than 1.0	+0.19
1.0 or more and 1.2 or less	+0.23

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 (SL-37V~40FV, 43V, 44V Type).

■ TABLE2. FLOW FOR SAFETY VALVE (Water)

SL-37~40 Type (kg/h)

Set pressure (MPa)	Size					
	15(½″)	20(¾″)	25(1″)	32(1¼″)	40(1½″)	50(2″)
0.05	375	640	930	1720	2690	4380
0.1	531	905	1310	2430	3810	6200
0.2	742	1260	1830	3400	5320	8650
0.3	875	1490	2160	4010	6280	10200
0.4	976	1660	2410	4480	7000	11300
0.5	1070	1820	2650	4910	7690	12400
0.6	1150	1970	2860	5310	8310	13500
0.7	1230	2110	3060	5680	8890	14400
0.8	1310	2240	3250	6030	9440	15300
0.9	1380	2360	3430	6360	9950	16100
1.0	1450	2470	3600	6680	10400	16900

■ TABLE3. FLOW FOR SAFETY VALVE (Air)

SL-37~40 Type (kg/h)

Set pressure (MPa)	Size					
	15(½″)	20(¾″)	25(1″)	32(1¼″)	40(1½″)	50(2″)
0.05	21.7	37	53.8	99.8	156	253
0.1	28.3	48.3	70.2	130	203	331
0.2	41.2	70.2	102	189	296	481
0.3	55.3	94.3	137	254	397	645
0.4	69.5	118	171	318	498	810
0.5	83.6	142	206	383	600	975
0.6	97.7	166	241	448	701	1140
0.7	111	190	276	513	803	1300
0.8	126	214	311	578	904	1470
0.9	140	238	346	643	1000	1630
1.0	154	262	381	708	1100	1790

3. Install strainer at the primary side of pressure reducing valve.
4. For devices that cannot be stopped, install bypass piping (with stop valve) from the primary side to the secondary side of pressure reducing valve (see Fig.1). If bypass piping is not suitable, then install stop valve for blowing which is derived from the main pipe before the primary side of pressure reducing valve, so as to make flushing possible(see Fig.2).
5. Install straight piping, stop valve, and pressure gauge before and after pressure reducing valve.
   In case of screwed type end connections, use union joint for easy maintenance and repair.(see Fig. 3).
6. In the case a solenoid valve (ON/OFF operation) is installed at the secondary side of pressure reducing valve, the solenoid valve should be 1~2m away from pressure reducing valve.

There should also be a 1~2m distance between pressure reducing valves in the case of 2-step pressure reduction. (See Fig.4, Fig.5)

DATA/Pressure Reducing Valve (for Water or Liquids)

Fig.4 Solenoid valve (on/off operation) installation

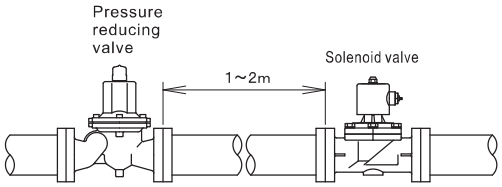
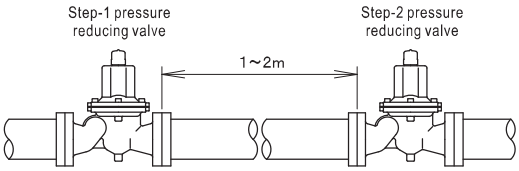


Fig.5 2-Step pressure reduction



7. In water supply system with roof tank in tall/medium height buildings, water hammer may occur if one step or 2 more steps of pressure reducing valves are installed. In such case, install a water hammer preventing device at the primary side of pressure reducing valve. (See Fig.6)
8. Leave some space for dissembling and maintenance.
9. Apply appropriate support to pressure reducing valve to protect from the weight of piping itself, bending force, or vibration.
10. If it is possibility of freezing, perform thermal insulation or discharge the drain.
11. In the case of buried piping, install pressure reducing valve in pit (box).
    The pit should have drainage system to prevent accumulation of rain etc., and thermo-insulation or drainage may be necessary if there is possibility of freezing. (See Fig. 7)

Fig.6 Roof tank in tall/medium height building

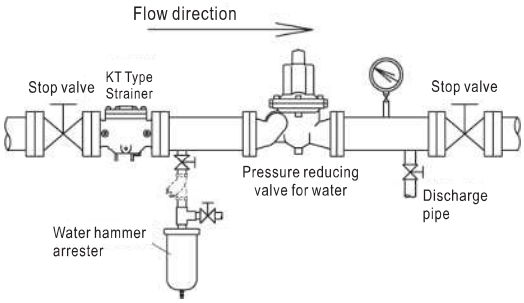
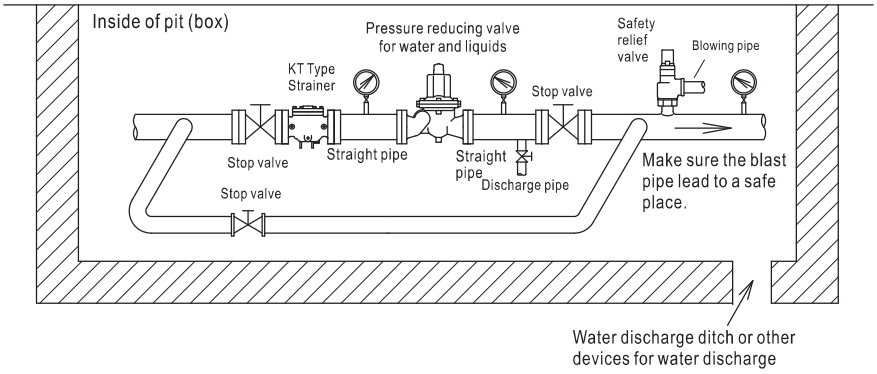


Fig.7 BURIED PIPING



12. In most cases, the secondary pressure is not adjusted when product is delivered.
    Therefore, adjust the secondary pressure to a desired pressure.

※ The secondary pressure of a non-adjusted valve is near to zero.To adjust the secondary pressure, follow the following steps.

※ How to adjust the secondary pressure:

① Close the stop valves at primary and secondary sides.
② Open the blowing stop valve or stop valve in bypass and remove any content inside.Such operation is called flushing and should be carried out sufficiently by spending sufficient time on it.
Take care not to make the secondary pressure rise excessively.
③ Close the blowing stop valve or stop valve of bypass pipe.
④ Make sure there is not any spring load caused by adjusting screw.
⑤ Open the stop valve at primary side gradually.
⑥ Make sure you have adjusted the secondary pressure. Open the stop valve at the secondary side slightly to allow small flow.
⑦ Use the adjusting screw and apply a tiny spring load. Open the secondary stop valve gradually once fluid starts to flow.
⑧ Read the pressure gauge and apply more spring load to make the pressure reach the set pressure.
The secondary pressure rises if you turn the adjusting screw clockwise, and the pressure drops if you turn the screw counterclockwise.
⑨ Once the desired pressure is reached, use the lock nut to lock the adjusting screw.
After the screw is locked, the spring load will not change.

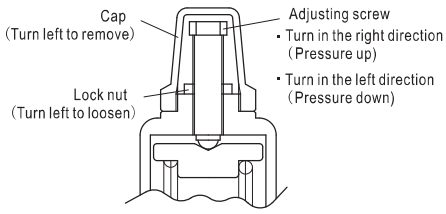



Fig.8 A TYPICAL ADJUSTING METHOD