

RD-40, 41, 41F Type Pressure Reducing Valve (for Steam)

for Food Processing Medical Devices, Laundry Machines and other Steam Equipments/Devices

Compact, light-duty, direct operated type pressure reducing valve, ideal for integration into a variety of equipments for precise steam control.

Most suitable for food processing equipments, kitchen equipments, medical devices, laundry machines, air-conditioning (humidifying) equipments, and other equipments /devices that are required to be rust free.

For high-grade steam lines, a valve with stainless steel body is most suitable.



RD-40, 41 Type



RD-41F Type

FEATURES

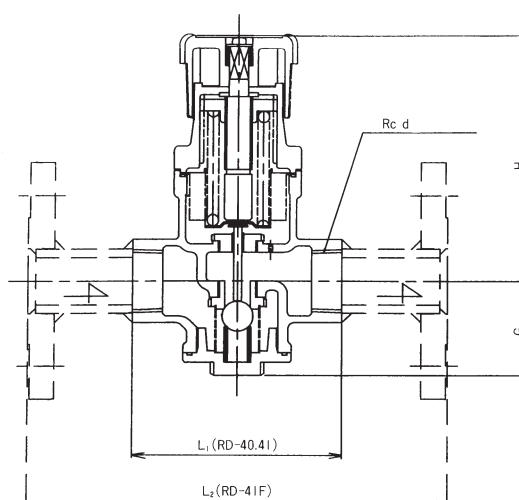
- Ensure large flow (heat) necessary for starting up machines.
- The stainless steel/bronze body and stainless steel disc & seat ensure supply of clean steam.
- Precise adjustment of secondary pressure with manual handle with automatic lock mechanism.
- Stainless steel bellows and embedded strainer (80 mesh) allow high durability.

SPECIFICATIONS

Body material	Cast bronze, Screwed	Stainless steel, Screwed	Stainless steel, Flanged
Model name	RD-40 L/M/H	RD-41 L/M/H	RD-41F L/M/H
Code name	RD40-J □	RD41-D □	RD41F-D □
※L, M or H for adjustable secondary pressure is required in □.			
Applicable fluid	Steam		
Fluid temperature	Max. 220 °C		
Applicable primary pressure	Max. 1.0MPa*		
Adjustable secondary pressure (Color of name plate and spring)	L: 0.02~0.25MPa (Green) M: 0.2~0.4MPa (Blue) H: 0.35~0.8MPa (Red)		
Maximum reducing rate	20:1		
Minimum pressure differential across the disc	0.02MPa		
Lock up pressure	Max. 0.02MPa		
Offset pressure at rated flow	Within set pressure × 0.5 (Adjustable secondary pressure Max. 0.13MPa) Within 0.07MPa (Adjustable secondary pressure over 0.13MPa~0.4MPa) Within 0.12MPa (Adjustable secondary pressure over 0.4MPa~0.8MPa)		
Leakage allowance	Less than 0.05% of rated flow		
End connection	Screwed JIS Rc		Flanged JIS 10KRF
Materials	Body	Cast bronze	Stainless steel
	Trim	Disc & seat (Stainless steel), Bellow (Stainless steel)	
Valve body pressure test		Hydraulic 1.5MPa	

*Applicable primary pressure 1.6MPa is also available upon your request.

CONSTRUCTION



The structure of the flange-type of welded part may be different from what is shown in the drawing.

DIMENSIONS

(mm)

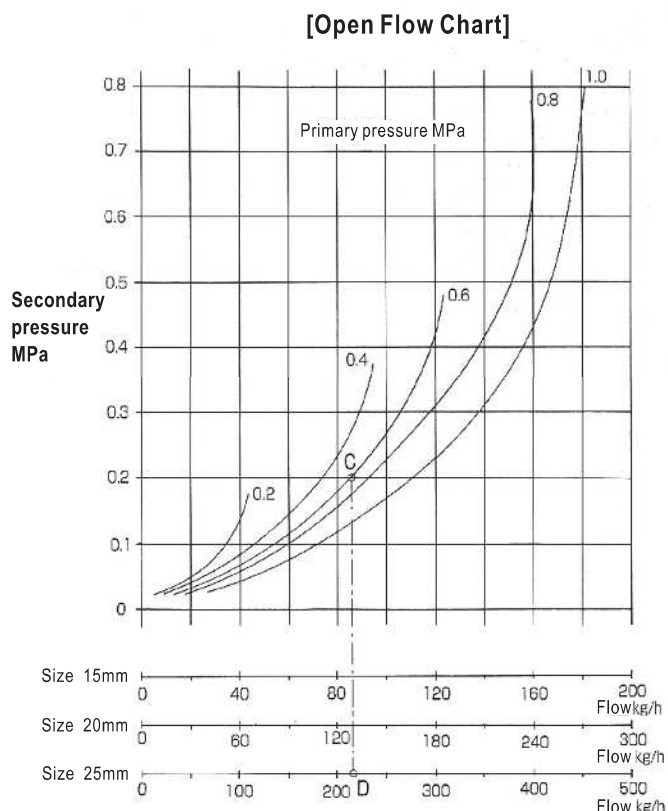
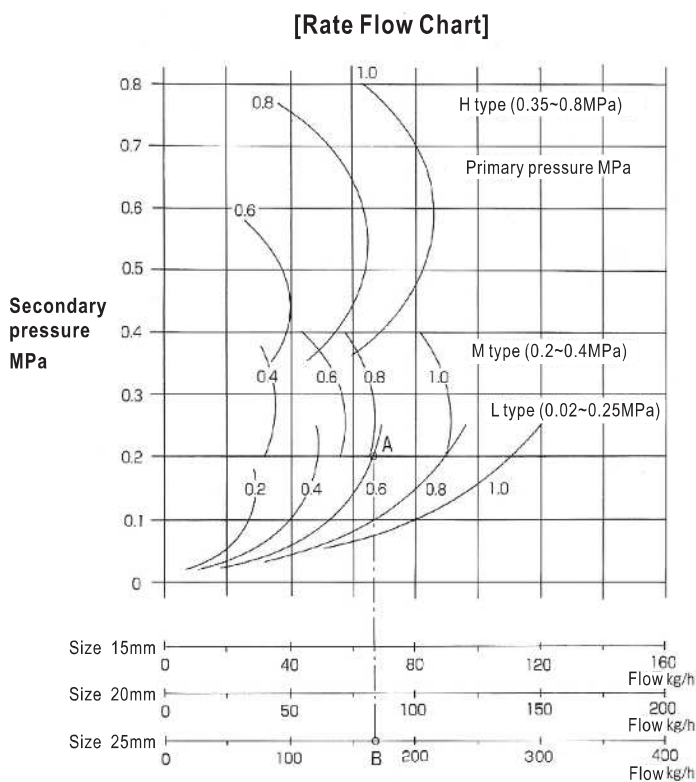
Size	d	L ₁	L ₂	G	H
15(½")	½"	83	186	55	128
20(¾")	¾"	96	190	55	128
25(1")	1"	108	190	55	128

MASS

(kg)

Size	RD-40 Type	RD-41 Type	RD-41F Type
15(½")	1.7	2	3.8
20(¾")	1.7	2	4
25(1")	1.9	2.4	5.5

NOMINAL DIAMETER SELECTION CHART (For saturated steam)



● Offset pressure of rated flow

(MPa)

Set pressure	Offset pressure
0.13 or less	Set pressure × within 0.5
Over 0.13~0.4	Within 0.07
Over 0.4~0.8	Within 0.12

HOW TO USE THE CHART

Example (conditions):

Primary pressure: 0.6MPa
 Secondary pressure: 0.2MPa
 Saturated steam: 100kg/h

Generally, the nominal diameter can be decided using the Rated Flow Chart.

- Find out the intersection point A between primary pressure 0.6MPa and secondary pressure 0.2MPa.
- Draw a vertical line from point A. The line intersects with the flow 100kg/h line. From the intersection point B, we can find the desired nominal diameter, or size, i.e. 25mm.

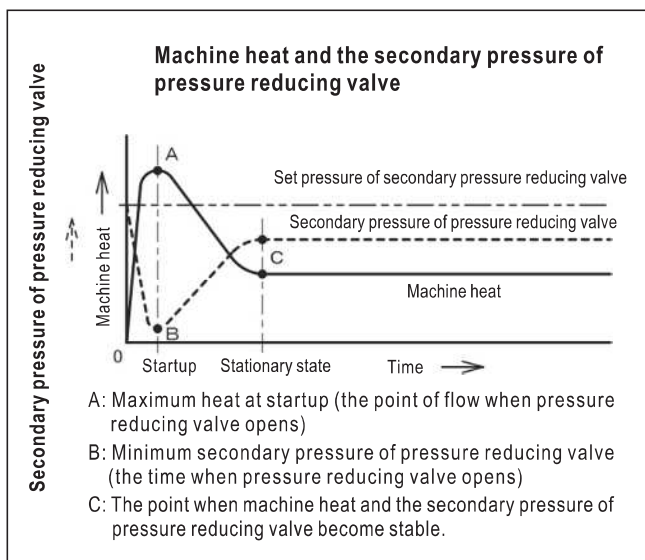
To decide the flow necessary for starting up a machine, use the Open Flow Chart.

- Under the same pressure condition above mentioned, the open flow of size 25mm valve can be determined using intersection points C and D. In this case, the open flow is 215kg/h.

Opening flow

Opening flow is the full opening flow of the stop valve at the secondary side when the diameter of the secondary piping is the same as that of pressure reducing valve.

Note: At opening flow, the secondary pressure reduces significantly.



■ INSTALLATION EXAMPLE

Fig.1 With bypass piping

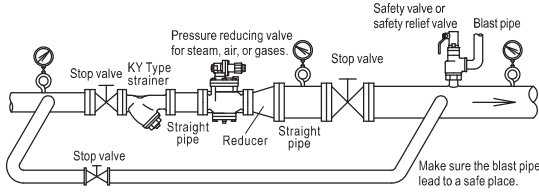
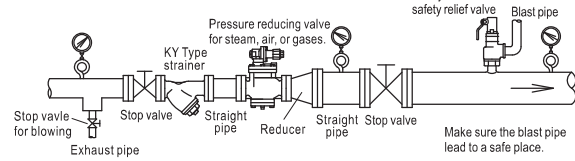


Fig.2 Without bypass piping



■ POINTS FOR INSTALLATION

- Installation of pressure reducing valve and piping.
- 1. Pressure reducing valve should be installed in horizontal pipe vertically.
- 2. Install safety valve or safety relief valve on the secondary side of pressure reducing valve.
 - ※1. Equipment may be damaged due to increase of secondary pressure at the time of failure of pressure reducing valve.
 - ※2. See Table 1 for set pressure of safety valve and 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, safety valve or safety relief valve may allow discharge of maximum flow of pressure reducing valve. (reference value: see Table 2 and Table 3).

TABLE2. FLOW FOR SAFETY RELIEF VALVE (Saturated steam)

SL-37~40 TYPE (kg/h)

Set pressure (MPa)	Size(mm)					
	15(1/2")	20(3/4")	25(1")	32(1 1/4")	40(1 1/2")	50(2")
0.05	13.5	23.1	33.5	62.2	97.4	158
0.1	17.5	29.8	43.4	80.4	125	204
0.2	25.4	43.3	63	116	182	297
0.3	34.2	58.2	84.6	156	245	399
0.4	42	71.6	104	193	302	490
0.5	50.6	86.2	125	232	363	590
0.6	59.2	100	146	271	424	690
0.7	67.7	115	167	310	486	790
0.8	76.3	129	188	350	547	890
0.9	84	143	207	385	602	979
1.0	92.4	157	228	424	663	1070

TABLE1. SET PRESSURE FOR SAFETY RELIEF VALVE

(MPa)

Set pressure of pressure reducing valve	Set pressure of safety valve [※]
0.1 or 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 the above value to set pressure of the 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 type (SL-37V~40FV, 43V, 44V Type).

TABLE3. FLOW FOR SAFETY RELIEF VALVE (Air)

SL-37~40 TYPE (kg/h)

Set pressure (MPa)	Size(mm)					
	15(1/2")	20(3/4")	25(1")	32(1 1/4")	40(1 1/2")	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. If bypass piping is not suitable, then install blowing stop valve, which is derived from the main pipe before the primary side of pressure reducing valve, so as to make flushing possible.
5. Install straight piping, stop valve, and pressure gauge before and after pressure reducing valve.
If end connection of pressure reducing valve is realized using screw, then use union joint to make it easy to fix and remove.
 - ※ The diameter of piping before and after pressure reducing valve should be determined based on the standard velocity of flow of fluid.
Generally, since the nominal diameter of secondary piping of pressure reducing valve for steam and gases is larger than the diameter of pressure reducing valve, it is necessary to use reducer.
6. If you install solenoid valve (on/off operation) or control valve at the secondary side of pressure reducing valve, there should be an interval (L) between such solenoid valve or control valve and pressure reducing valve. The interval (L) should be larger than 2m in the case of solenoid valve. As for control valve, the interval should be larger than 1m if nominal diameter is less than 100mm, and larger than 1.5m if nominal diameter is larger than 125mm (see Fig.3).
7. In the case of 2-step pressure reduction, the interval between 2 valves should be 1~2m (see Fig.4).

Fig.3 INTERVAL BETWEEN PRESSURE REDUCING VALVE AND CONTROL VALVE

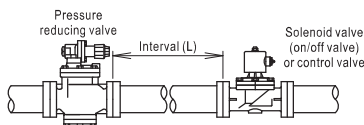
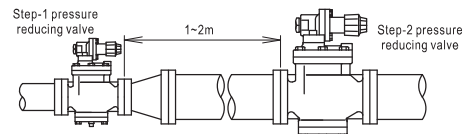


Fig.4 INTERVAL BETWEEN VALVES (2-STEP PRESSURE REDUCTION)



DATA/Pressure Reducing Valve (for Steam or Gases)

8. For pressure reducing valve for steam, "hunting" or vibration may occur if drain accumulates.

To prevent hunting and vibration, it is necessary to prevent drain from entering into the piping or install steam trap at the primary side.

In addition, since pressure reducing valve cannot be closed completely, it is necessary to install steam trap at the secondary side if the amount of steam used is near zero. (See Fig.7)

Fig.5: Proper installation

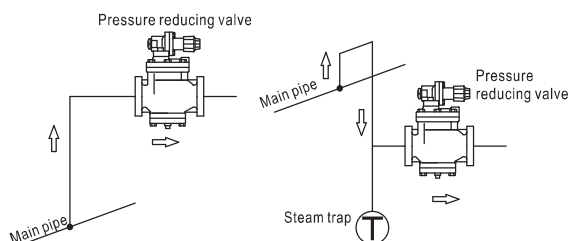


Fig.6: Improper installation

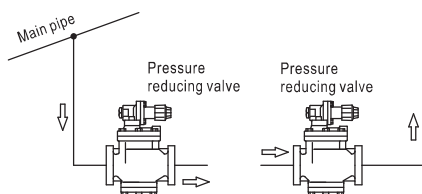
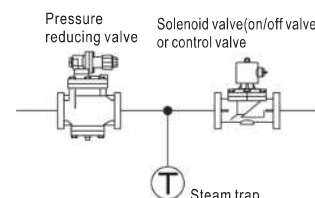


Fig.7: In case of zero steam consumption at secondary side of pressure reducing valve



9. Make sure sufficient space should be left for maintenance.

10. Apply appropriate support to pressure reducing valve to make sure it should not bear the weight of piping, bending force, or vibration directly.

11. If there is possibility of freezing, apply thermal insulation or discharge the drain.

12. The secondary pressure of the valve is not adjusted at delivery. Therefore, you should adjust the secondary pressure to the desired pressure before use.

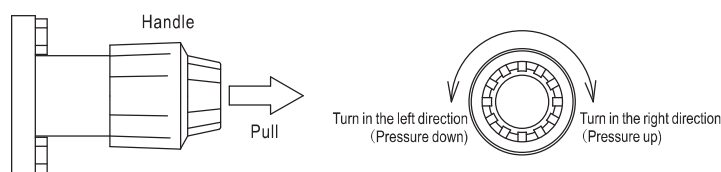
※ The secondary pressure of a non-adjusted valve is near to zero.

※ How to adjust the secondary pressure:

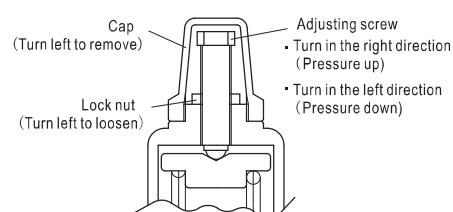
- ① Close the stop valves at primary and secondary sides.
- ② Open the blowing stop valve or stop valve in bypass and remove any content inside. Such operation is called flushing and should be carried out sufficiently by spending sufficient time on it. Take care not to make the secondary pressure rise excessively.
- ③ Close the stop valve in by pass or blowing stop valve completely.
- 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 Apply a small spring load using handle or adjusting screw. Once the fluid starts flowing, open the stop valve at the secondary side gradually.
- ⑧ Read the pressure gauge and apply more spring load to make the pressure reach the set pressure. The pressure rises if you turn the handle or adjusting screw in the right direction and falls if you turn them in the left direction.
- 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.

• ADJUSTING SECONDARY PRESSURE

For RP-6 Type series and RD-40 Type series.



• OTHER PRESSURE REDUCING VALVES



■ DIAMETER OF PIPING BEFORE AND AFTER PRESSURE REDUCING VALVE

The nominal diameter of pressure reducing valve can be determined using relevant graphs made for such purpose. The diameter of piping before and after pressure reducing valve must be determined based on the standard velocity of fluid.

Extremely small diameter or large velocity of fluid may cause large loss of pressure inside the piping and wearing, vibration of the piping. Therefore, it is necessary to consider the standard velocity of fluid when determining the diameter of piping.

● Table of velocity of steam as standard condition.

Item	For steam	Standard velocity (m/s)
Pipeage	Saturated steam (0.2~0.5MPa)	15~20
	Saturated steam (0.5~1.5MPa)	20~30
(Steam engine)	Saturated steam	20~30
	Super heated steam	30~40

● Table of velocity of air as standard condition.

Item	For air	Standard velocity(m/s)
Pipeage	(0.1~0.2MPa)	8~15
	(20~30MPa)	5~7
(Compressor)	Saturated line	10~20
	Low pressure supplyline	20~30
	High pressure supply line	10~15