

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 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

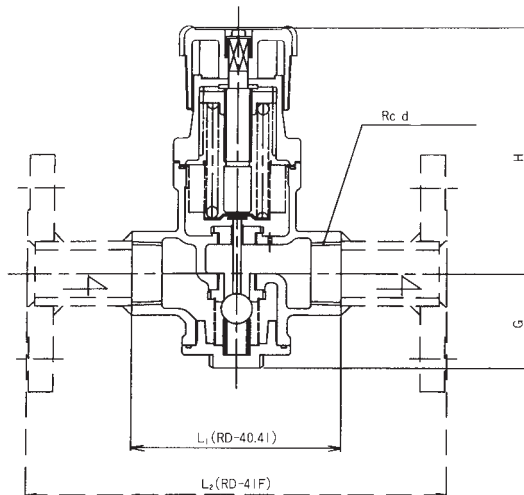
- Ensure large flow (heat) necessary for starting up machines.
- The stainless steel/bronze body and stainless steel disc & seat ensure supply of clean steam.
- Precise adjustment of secondary pressure with manual handle with automatic lock mechanism.
- Stainless steel bellows and embedded strainer (80 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		
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: 0.13MPa~0.4MPa) Within 0.12MPa (Adjustable secondary pressure: 0.4MPa~0.8MPa)		
Leakage allowance	Less than 0.05% of rated flow		
Applicable temperature	Max. 220 °C		
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

Size	d	L ₁	L ₂	G	H
15(1/2")	1/2"	83	186	55	128
20(3/4")	3/4"	96	190	55	128
25(1")	1"	108	190	55	128

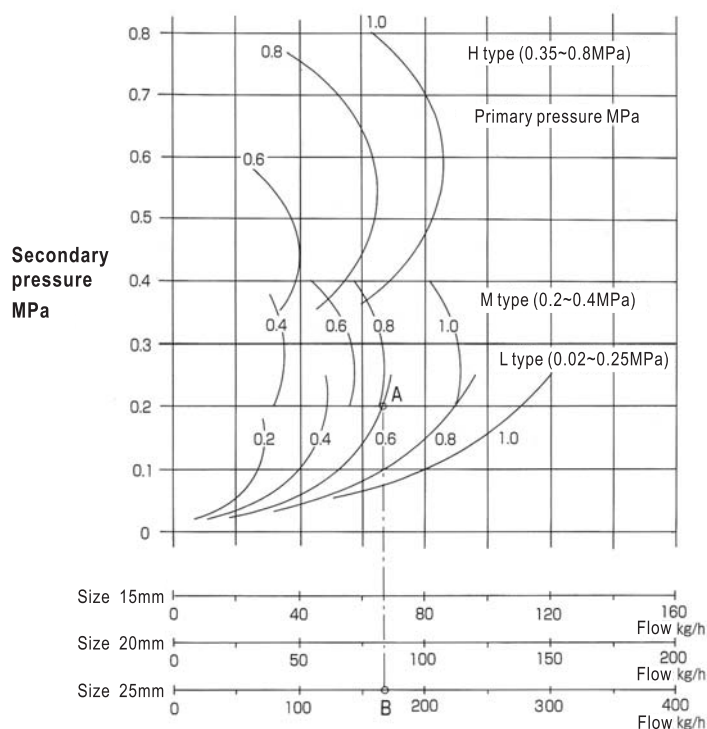
MASS

Size	RD-40 Type	RD-41 Type	RD-41F Type
15(1/2")	1.7	2	3.8
20(3/4")	1.7	2	4
25(1")	1.9	2.4	5.5

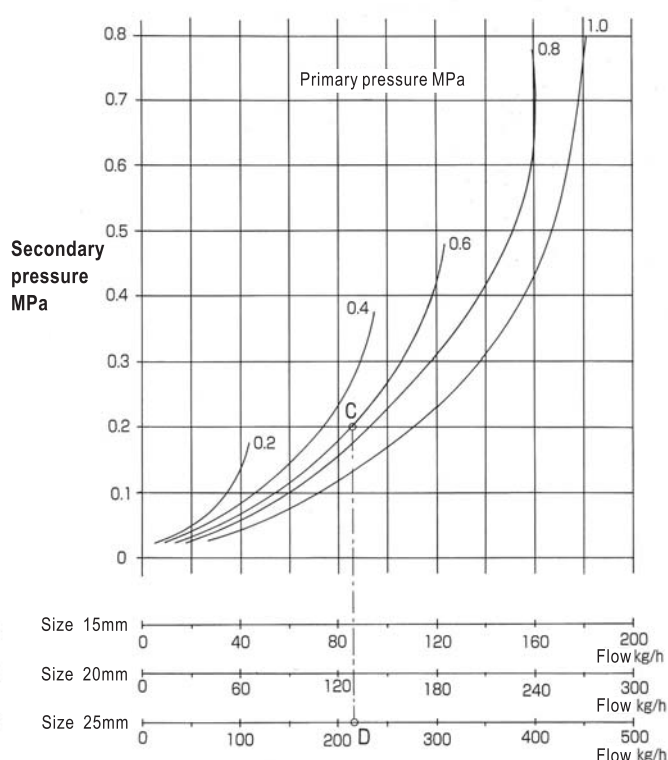
DATA/RD-40, 41, 41F Type Pressure Reducing Valve (for Steam)

NOMINAL DIAMETER SELECTION CHART (For saturated steam)

[Rate Flow Chart]



[Open Flow Chart]



● 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

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.

HOW TO USE THE CHART

Example (conditions):

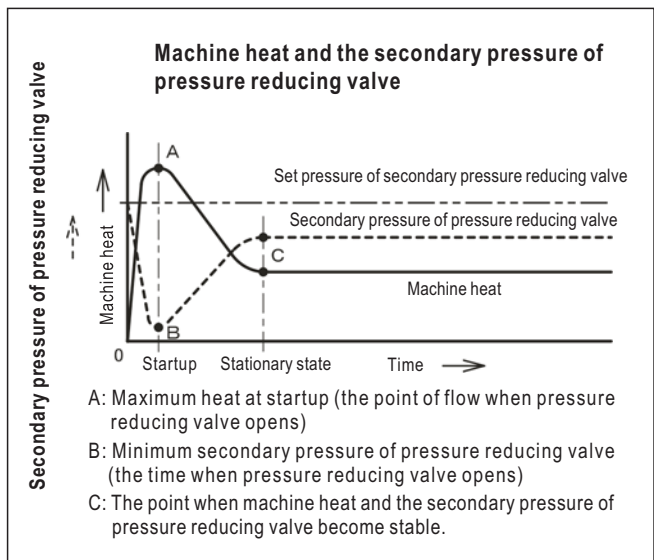
- Primary pressure: 0.6MPa
- Secondary pressure: 0.2MPa
- Saturated steam: 100kg/h

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.



DATA/Pressure Reducing Valve (for Steam or Gases)

■ INSTALLATION EXAMPLE

Fig.1 With bypass piping

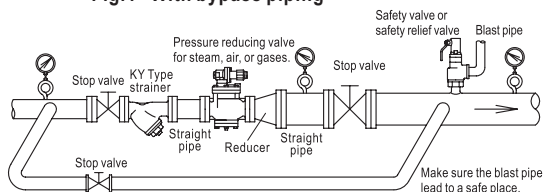
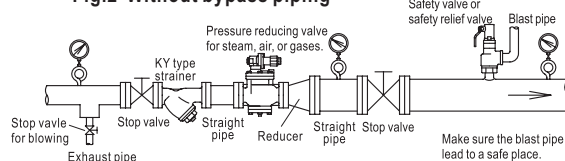


Fig.2 Without bypass piping



■ POINTS FOR INSTALLATION

- Installation of pressure reducing valve and piping.
 1. Pressure reducing valve should be vertical to horizontal piping
 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).

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
Over 0.1 and below 0.4	+ 0.08
0.4 or more and below 0.6	+ 0.12
0.6 or more and below 0.8	+ 0.15
0.8 or more and below 1.0	+ 0.19
1.0 or more and 1.2 or less	+ 0.23

Add the above valve to set pressure of the Pressure Reducing Valve.

TABLE2. FLOW FOR SAFETY RELIEF VALVE (Saturated steam)

SL-37~SL-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	13.4	22.9	33.3	61.8	96.7	157
0.1	17.4	29.7	43.1	80	125	203
0.2	25.3	43.2	62.8	116	182	296
0.3	34.1	58	84.3	156	244	397
0.4	41.9	71.4	103	192	301	489
0.5	50.5	86	125	231	362	589
0.6	59	100	146	271	424	689
0.7	67.6	115	167	310	485	788
0.8	76.1	129	188	349	546	886
0.9	84.7	144	209	388	608	988
1.0	93.2	158	230	428	669	1080

TABLE3. FLOW FOR SAFETY RELIEF VALVE (Air)

SL-37~SL-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	21.8	37.1	53.9	100	156	254
0.1	28.2	48	69.8	129	202	329
0.2	41	69.9	101	188	294	479
0.3	55.1	93.9	136	253	396	643
0.4	69.3	118	171	318	497	808
0.5	83.4	142	206	382	598	972
0.6	97.5	166	241	447	700	1130
0.7	111	190	276	512	801	1300
0.8	125	214	311	577	902	1460
0.9	139	238	346	641	1000	1630
1.0	154	262	381	706	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 gasses 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

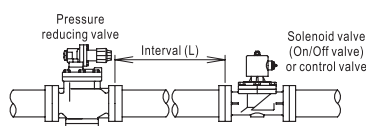
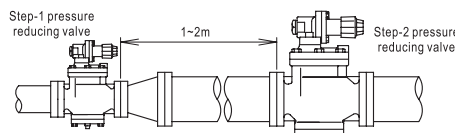


Fig.4 INTERVAL BETWEEN VALVES (2-STEP PRESSURE REDUCTION)



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 stem 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.

Fig.5: Proper installation

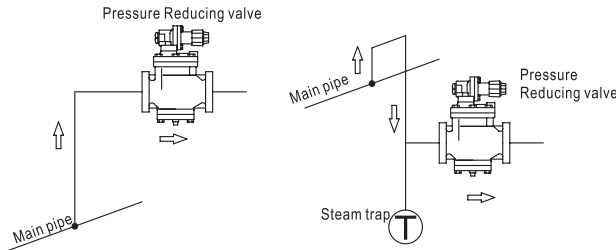
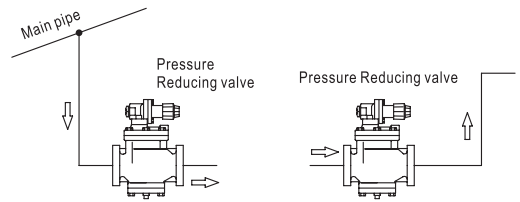


Fig.6: Inproper installation



9. Make sure sufficient space is left for maintenance.

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

11. If you think there is possibility of freezing, insulate 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.

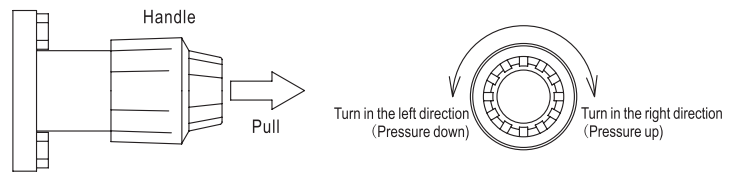
※ The secondary pressure of a non-adjusted valve is near to zero.

※ How to adjust the secondary pressure:

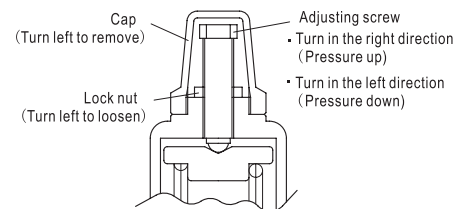
- ① Close the stop valves at primary and secondary sides.
- ② Open the blowing stop valve or stop valve in bypass and remove any content inside. Such operation is called flushing and should be carried out sufficiently by spending sufficient time on it. Take care not to make the secondary pressure rise 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 start flowing, open the stop valve at the secondary side gradually.
- ⑧ Read the pressure gauge and apply more spring load to make the pressure reaching 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 series and RD-40 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 base 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