

# RD-37 ~38F Type Pressure Reducing Valve (for Water, Hot Water, Air or Medical Fluid)

Pressure reducing valves for water, with stainless steel body and disc & seat made of stainless steel. High controllability, reliability, corrosion resistance. Suitable for applications in plants.

## FEATURES

- Stainless steel spring and spring case. Suitable for medicinal solution.
- Low noise design.
- No water leakage even if the diaphragm is broken.
- Flexible installation<sup>#2</sup>.
- Allows direct installation of pressure gauge on the body (only for the secondary side).

## SPECIFICATIONS

| Type                                             | For pressure of less than 1.0MPa                                                                           |                  | For pressure of less than 1.6MPa |                  |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------|----------------------------------|------------------|
| Model name                                       | RD-37 L/H                                                                                                  | RD-37F L/H       | RD-38 L/H                        | RD-38F L/H       |
| Code name                                        | RD37-D □                                                                                                   | RD37F-D □        | RD38-D □                         | RD38F-D □        |
|                                                  | ※ L (low press.) or H (high press.) for adjustable secondary pressure is required in □.                    |                  |                                  |                  |
| Size                                             | 15~40(½"~1½")                                                                                              | 25~50(1"~2")     | 15~40(½"~1½")                    | 25~50(1"~2")     |
| End connection                                   | Screwed JIS Rc                                                                                             | Flanged JIS10KFF | Screwed JIS Rc                   | Flanged JIS16KFF |
| Applicable primary pressure                      | Max. 1.0MPa                                                                                                |                  | Max. 1.6MPa                      |                  |
| Applicable fluid                                 | Water, hot water, air,<br>inert gases & medical fluid                                                      |                  | Water, hot water & medical fluid |                  |
| Fluid temperature                                | 5~90℃                                                                                                      |                  |                                  |                  |
| Adjustable secondary pressure                    | L:0.05~0.35MPa, H:0.3~0.7MPa                                                                               |                  |                                  |                  |
| Maximum reducing rate                            | 10:1                                                                                                       |                  |                                  |                  |
| Minimum pressure differential<br>across the disc | 0.05MPa                                                                                                    |                  |                                  |                  |
| Leakage allowance                                | Nil(Confirm at pressure gauge)                                                                             |                  |                                  |                  |
| Materials                                        | Body(Stainless steel), Trims(Stainless steel)<br>Diaphragm(Synthetic rubber), Spring case(Stainless steel) |                  |                                  |                  |
| Valve body pressure test                         | Hydraulic 1.75MPa                                                                                          |                  | Hydraulic 2.4MPa                 |                  |

\*1. Valves with pressure gauge are also available upon your request.

\*2. In case of installation on the vertical pipeline, make sure to apply large space for maintenance.

\*3. RD-37 and 37F Types with Max. 130℃ for cleaning steam in temporary use at beverage industry, etc. are available upon your request.

## DIMENSIONS (RD-37, 38 Type)

(mm)

| Size    | d   | L   | G  | H   | A   | Mass(kg) |
|---------|-----|-----|----|-----|-----|----------|
| 15(½")  | ½"  | 130 | 41 | 194 | 100 | 3.4      |
| 20(¾")  | ¾"  | 130 | 41 | 194 | 100 | 3.4      |
| 25(1")  | 1"  | 130 | 41 | 195 | 100 | 3.7      |
| 32(1¼") | 1¼" | 150 | 50 | 245 | 116 | 6.4      |
| 40(1½") | 1½" | 150 | 50 | 245 | 116 | 6.4      |

## DIMENSIONS(RD-37F, 38F Type)

(mm)

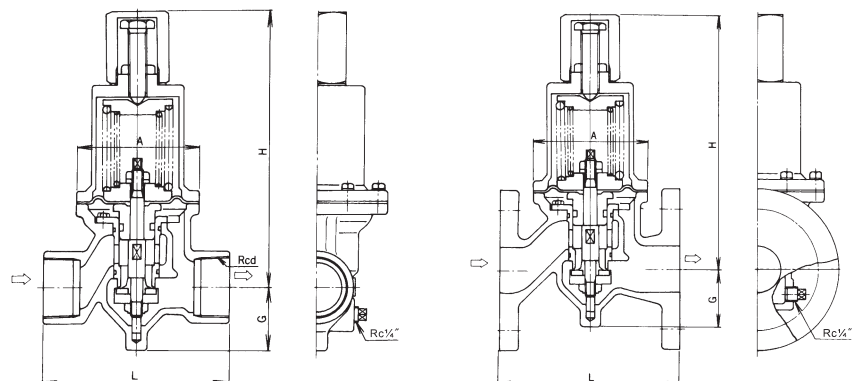
| Size    | L   | G  | H   | A   | Mass(kg) |
|---------|-----|----|-----|-----|----------|
| 25(1")  | 160 | 41 | 195 | 100 | 6.1      |
| 32(1¼") | 160 | 50 | 245 | 116 | 9.2      |
| 40(1½") | 160 | 50 | 245 | 116 | 9.4      |
| 50(2")  | 210 | 50 | 320 | 142 | 15       |

Flange code JIS 10(16)KFF

## CONSTRUCTION

RD-37, 38 Type

RD-37F, 38F Type



※ The structure of the valve may be different depending on sizes.



Screw type



Flange type

# DATA/RD-31N ~ 38F Type Pressure Reducing Valve (for Water, Hot Water, Air or Liquids)

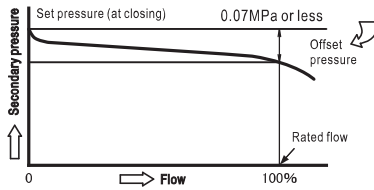
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PRESSURE REDUCING VALVES (FOR WATER, HOT WATER, AIR OR LIQUIDS)

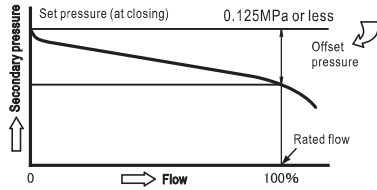
## ■ OFFSET PRESSURE CHARACTERISTICS

Offset pressure: The difference between secondary pressure and set pressure when flow increases from zero to rated flow but the primary pressure maintains the same.  
(For details, see Flow Characteristics)

Spring range [L]: 0.05~0.35MPa



Spring range [H]: Size ≤100mm: 0.3~0.7MPa  
Size 125mm, 150mm: 0.3~0.5MPa



## ■ RATED FLOW (Water and Liquids)

Pressure differential across the disc: More than 0.15MPa

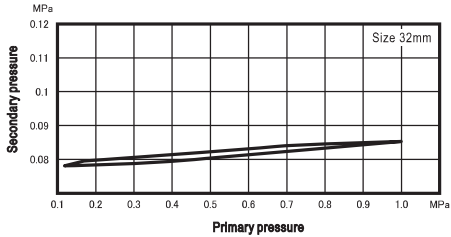
| Size(mm)          | 15 | 20 | 25 | 32  | 40  | 50  | 65  | 80  | 100 | 125  | 150  |
|-------------------|----|----|----|-----|-----|-----|-----|-----|-----|------|------|
| Rated flow(L/min) | 20 | 40 | 60 | 100 | 150 | 240 | 300 | 440 | 700 | 1200 | 1800 |

In case that pressure difference is less than 0.15MPa, the rated flow will be calculated by  $\text{rated flow} \times \sqrt{\frac{\Delta P}{0.15}}$

## ■ PRESSURE CHARACTERISTICS

Pressure characteristics show the change of the secondary pressure when flow remains the same but the primary pressure changes. In the figure on the right, the secondary pressure is set to be 0.1MPa when flow is 0 and the primary pressure is 0.6MPa. It shows the change of the secondary pressure when the flow is 10% rated flow and the primary pressure changes from 0.6~1.0~0.6MPa.

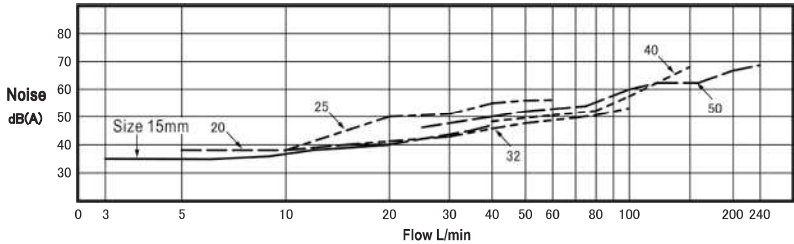
Change of the Secondary pressure =  $\frac{\text{Set pressure} \times 10\% \text{ or less}}{\text{(minimum 0.02MPa)}}$



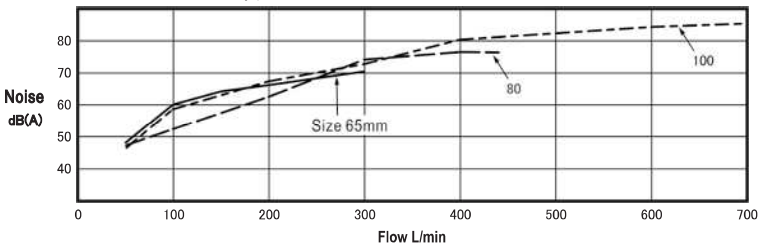
## ■ NOISE CHARACTERISTICS

Noise characteristics show the noise at each different flow when the secondary pressure is set and the primary pressure maintains the same.

Size 15~50mm: Primary pressure 0.6MPa  
Secondary pressure 0.2MPa



Size 65~100mm: Primary pressure 0.6MPa  
Secondary pressure 0.2MPa



## ■ POINTS FOR INSTALLATION

- Install the bypass line.
- Use a globe valve for the stop valve on the bypass line.
- Install straight pipe before and after pressure reducing valve.  
The length of straight pipe depends on the state of pipe before and after valve. The length should be at least 10~20 times of nominal diameter (Minimum 500mm).
- Install pressure gauge at both the primary and secondary sides.
- Install safety relief valve at the secondary side.
  - ① If not otherwise specified, the diameter of the safety relief valve should allow to blow out about 10% of the rated flow of pressure reducing valve.
  - ② Set pressure table for safety relief valve is as follows.

## ■ SET PRESSURE FOR TABLE SAFETY RELIEF VALVE

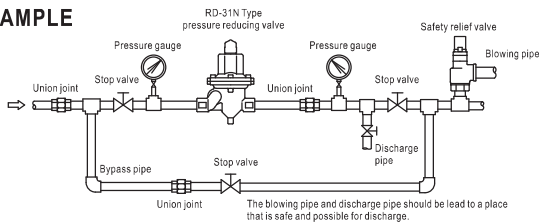
(MPa)

| 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)                  |

※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.

Add the above value to set pressure of pressure reducing valve.

## ■ PIPING EXAMPLE



Note: In the case of RD-33FN~38F type series pressure reducing valves without embedded strainer, it is necessary to install strainer at the primary side.

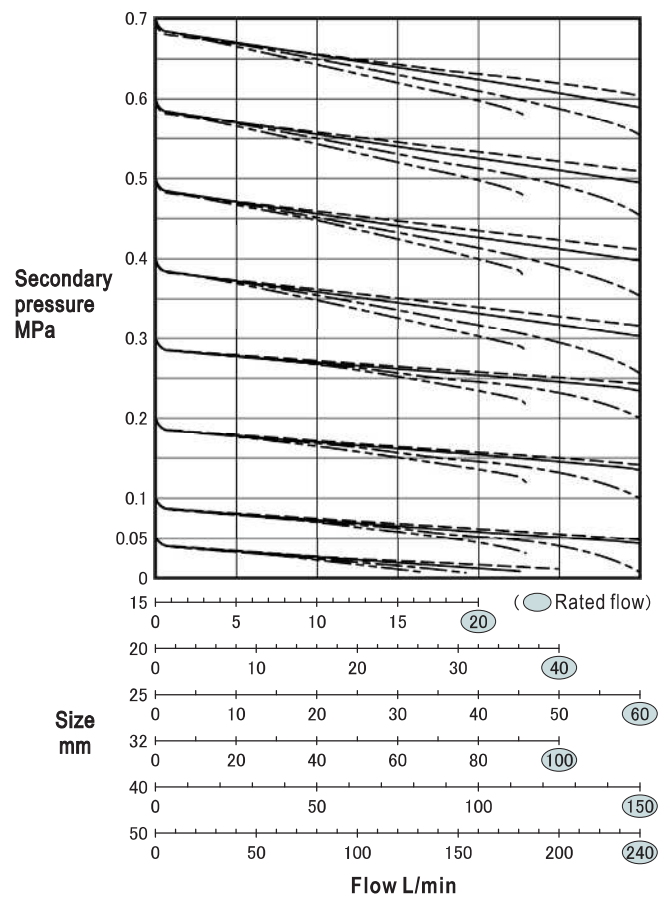
# DATA/RD-31N ~ 38F Type Pressure Reducing Valve (for Water, Hot Water, or Liquids)

## ■ FLOW CHARACTERISTICS (for Liquids)

### ● Size 15~50mm

Primary pressure ( $P_1$ ) MPa

- $P_1=1.0\sim1.6\text{MPa}$   
(0.5MPa if the set pressure is 0.05MPa)
  - $P_1=P_2+0.2\text{MPa}$
  - · —  $P_1=P_2+0.1\text{MPa}$
  - $P_1=P_2+0.05\text{MPa}$
- $P_2$ : secondary set pressure (MPa)

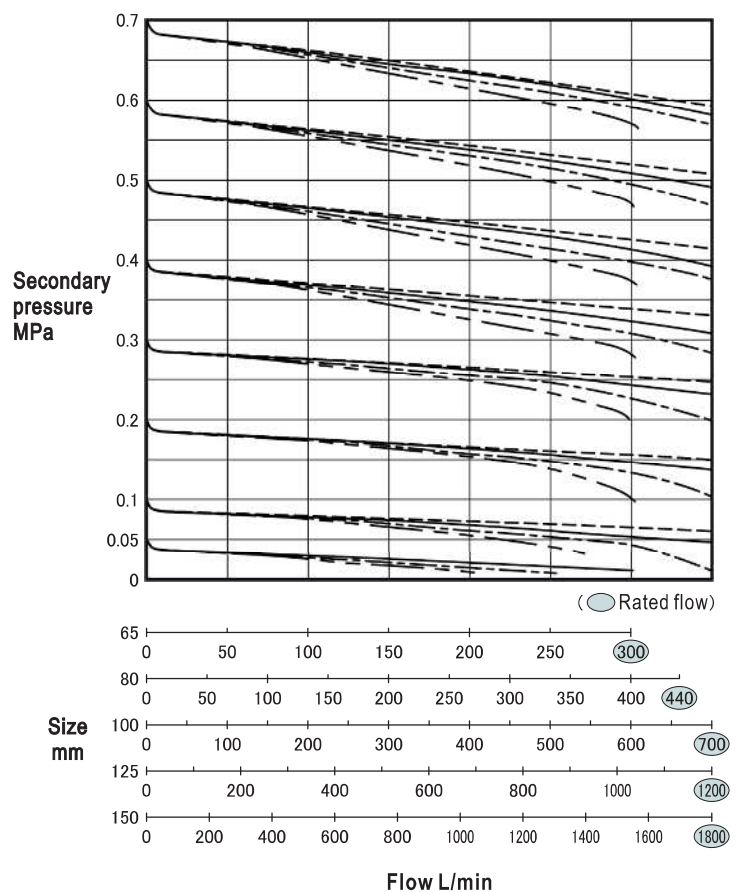


### ● Size 65~150mm

Primary pressure ( $P_1$ ) MPa

- $P_1=1.0\sim1.6\text{MPa}$   
(0.5MPa if the set pressure is 0.05MPa)
  - $P_1=P_2+0.2\text{MPa}$
  - · —  $P_1=P_2+0.1\text{MPa}$
  - $P_1=P_2+0.05\text{MPa}$
- $P_2$ : secondary set pressure (MPa)

Note: In the case of nominal diameter 125mm, 150mm, the secondary set pressure is Max. 0.5MPa.



# DATA/RD-31N ~ 38F Type Pressure Reducing Valve (for Air or Gases)

## ■ FLOW CHARACTERISTICS (for air and inert gases)

Applicable model: RD-31N, RD-31FN Size 15~50mm

RD-35, RD-35F

RD-37, RD-37F

Primary pressure

- set pressure + 0.3MPa or larger
- · — · — set pressure + 0.2MPa
- · — · — set pressure + 0.1MPa
- set pressure + 0.05MPa

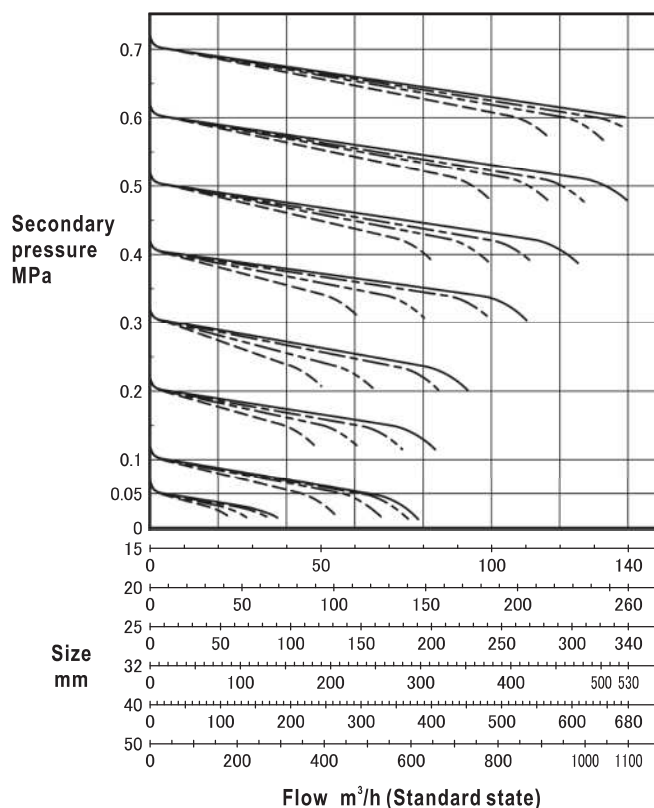
- The flow characteristics are based on air (standard state).
- For gases with specific gravity G, convert the flow into the flow of air.

$$\text{Converted flow} = \text{flow of gas} \times \sqrt{G}$$

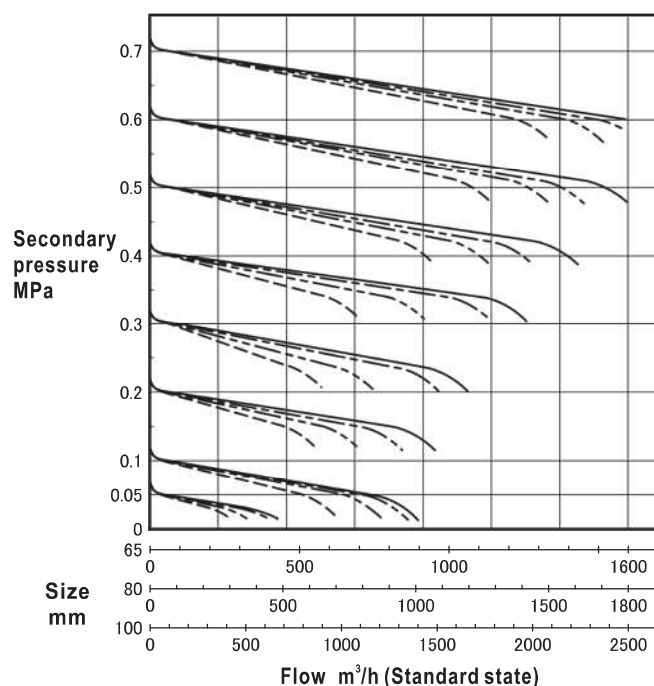
$$= \text{flow of gas} \times \sqrt{\frac{M}{28.96}}$$

G: specific gravity (air=1)  
M: molecular weight of gas.

(M: See Page 279 for molecular weight of gas)



Applicable model: RD-33FN, RD-35F Size 65~100mm



Primary pressure

- set pressure + 0.3MPa or larger
- · — · — set pressure + 0.2MPa
- · — · — set pressure + 0.1MPa
- set pressure + 0.05MPa

# DATA/Pressure Reducing Valve (for Water or Liquids)

## PIPING EXAMPLE

Fig 1. With bypass line

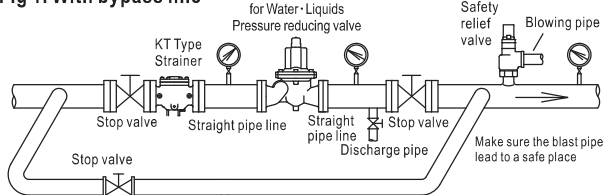


Fig 3. Screwed type connection with bypass line

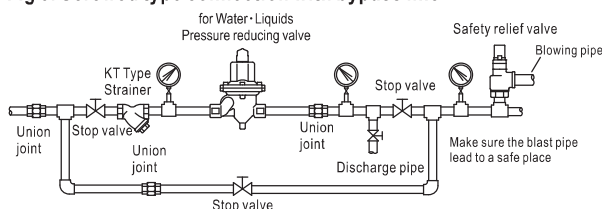
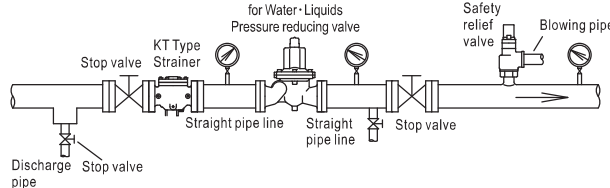


Fig 2. Without bypass line



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

- 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)

■ TABLE2. FLOW FOR SAFETY VALVE (Water)

SL-37~40 Type (kg/h)

| Set pressure (MPa) | Size     |          |        |            |            |        |
|--------------------|----------|----------|--------|------------|------------|--------|
|                    | 15(1/2") | 20(3/4") | 25(1") | 32(1 1/4") | 40(1 1/2") | 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  |

■ TABLE1. SET PRESSURE FOR SAFETY RELIEF VALVE

(MPa)

| Set pressure of pressure reducing valve | Set pressure of safety valve <sup>※1</sup> |
|-----------------------------------------|--------------------------------------------|
| 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 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).

■ TABLE3. FLOW FOR SAFETY VALVE (Air)

SL-37~40 Type (kg/h)

| Set pressure (MPa) | Size     |          |        |            |            |        |
|--------------------|----------|----------|--------|------------|------------|--------|
|                    | 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   |

- Install strainer at the primary side of pressure reducing valve.
  - 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).
  - 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).
  - 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

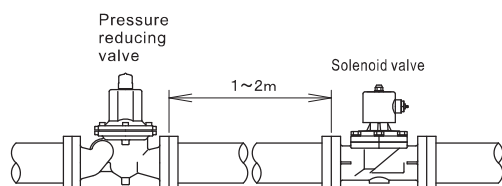
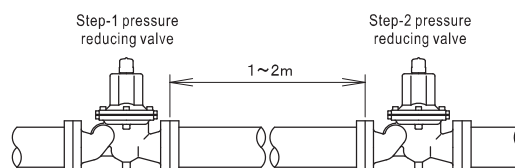


Fig.5 2-Step pressure reduction



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 disassembling 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

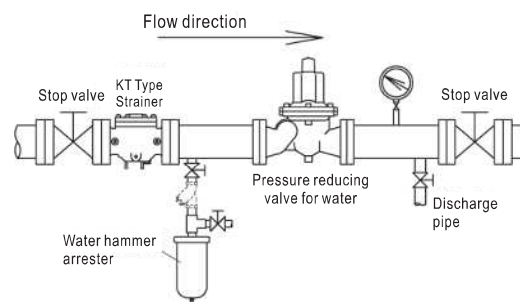
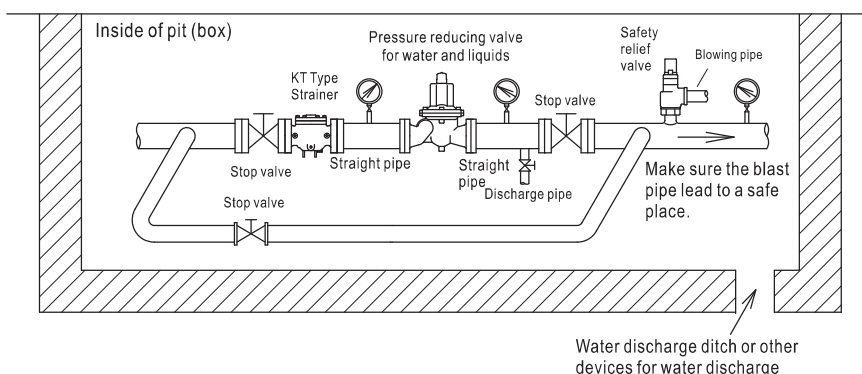


Fig.7 BURIED PIPING



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

