MD-35F, 37F Type Primary Pressure Regulating Valve (for Water, Hot water, Air or Oil)

Multi-purpose, Stainless Steel

Durable products for a variety of applications such as drug solution and clean fluid or gas. Sealed structure ensures no leakage of fluid

MD-35F Type

MD-37F Type

FEATURES

- Highly precise adjustment of pressure of large volume fluid.
- Pressure balancing structure eliminates influence on discharge pressure due to change of outlet pressure.
- The product can be dismantled from top to bottom, thus allows easy maintenance.
- Mounting in all orientations.
- Inlet side pressure gauge can be installed on the main body.
- 50% lighter than conventional cast iron products (based on VENN data).

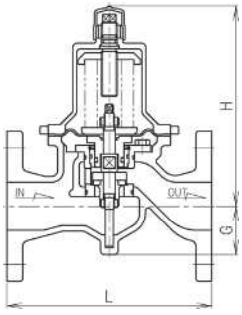
SPECIFICATIONS

Type		Liquid-contacting parts made of stainless steel		Liquid-contacting parts and spring case made of stainless steel
Model name		MD-35F		MD-37F
Code name		**MD35F-D□**		**MD37F-D□**
		※ L (low press.) M(middle press.) or H (high press.) for adjustable primary pressure is required in □.		
Size		25~50(1″~2″)	65~100(2 ½″~4″)	25~50(1″~2″)
Applicable fluid		Water, hot water, oils, non-corrosive liquids, air*1, and inert gases		
Fluid temperature		5~90°C		
Fluid viscosity		Max. 700 cSt		
Adjustable primary pressure		**L:0.05~0.35MPa M:0.3~0.6MPa H:0.6~0.8MPa**	**L:0.05~0.35MPa M:0.3~0.6MPa**	**L:0.05~0.35MPa M:0.3~0.6MPa**
Blowdown pressure		Set pressure × 10% or less (min. within 0.02 MPa)		
Minimum pressure differential across the disc		0.05 MPa		
Leakage allowance		Nil (Confirm at pressure gauge)		
End connection		Flanged JIS 10K FF		
Materials	Body	Stainless steel		
	Trim	Disc&seat(Stainless steel), Diaphragm&disc(Synthetic rubber)		
	Spring case	Cast zinc	Cast iron	Stainless steel
Valve body pressure test		Hydraulic 1.5 MPa		

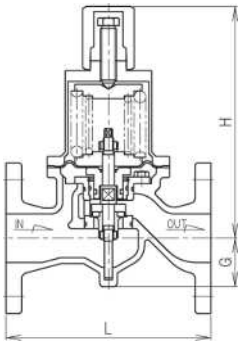
＊1. The rubber parts of the product may deteriorate within relatively short time if the product is used in dry air compression system consisting of oil-free compressor (turbo compressor or displacement compressor (oil-free rotary type)). Please contact our agent in your area if you need to use the product in such system.
＊2. To leave sufficient space for maintenance, please select a product with nominal diameter less than 80mm if the product is to be mounted on vertical pipe. (Product with nominal diameter 100mm should be mounted on horizontal pipe uprightly.)
＊3. Products with pressure gauge at the primary side only are also available. (The maximum scale of pressure meter is set pressure adjustment range L (0.6 MPa), M and H (1.6 MPa).)

CONSTRUCTION

MD-35F Type



MD-37F Type



DIMENSIONS

MD-35F Type

(mm)

Size	L	G	H	Mass(kg)
25(1″)	160	41	141	5.1
32(1 ¼″)	160	50	187	7.2
40(1 ½″)	160	50	187	7.8
50(2″)	210	50	206	12
65(2 ½″)	215	70	280	20
80(3″)	260	70	285	23
100(4″)	300	78	345	36

Flange code JIS 10KFF

MD-37F Type

(mm)

Size	L	G	H	Mass(kg)
25(1″)	160	41	195	6.1
32(1 ¼″)	160	50	245	9.2
40(1 ½″)	160	50	245	9.4
50(2″)	210	50	320	15

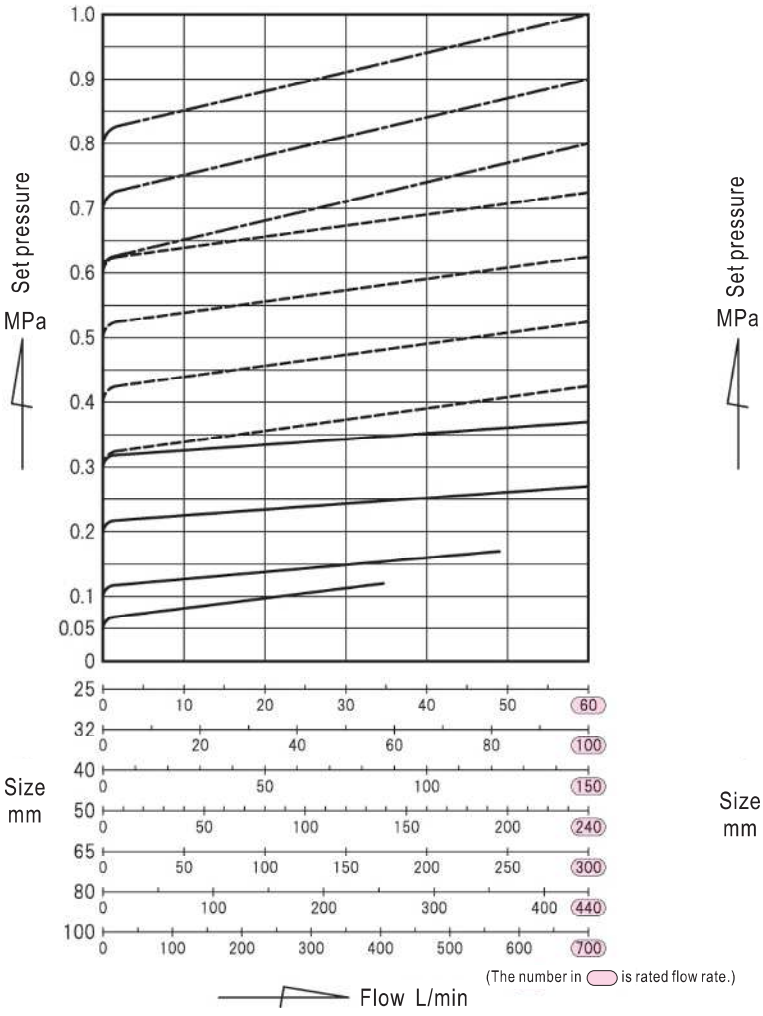
Flange code JIS 10KFF

DATA/MD-35F, 37F Type Primary Pressure Regulating Valve (for Water, Hot water, Air or Oil)

■ FLOW CHARACTERISTICS

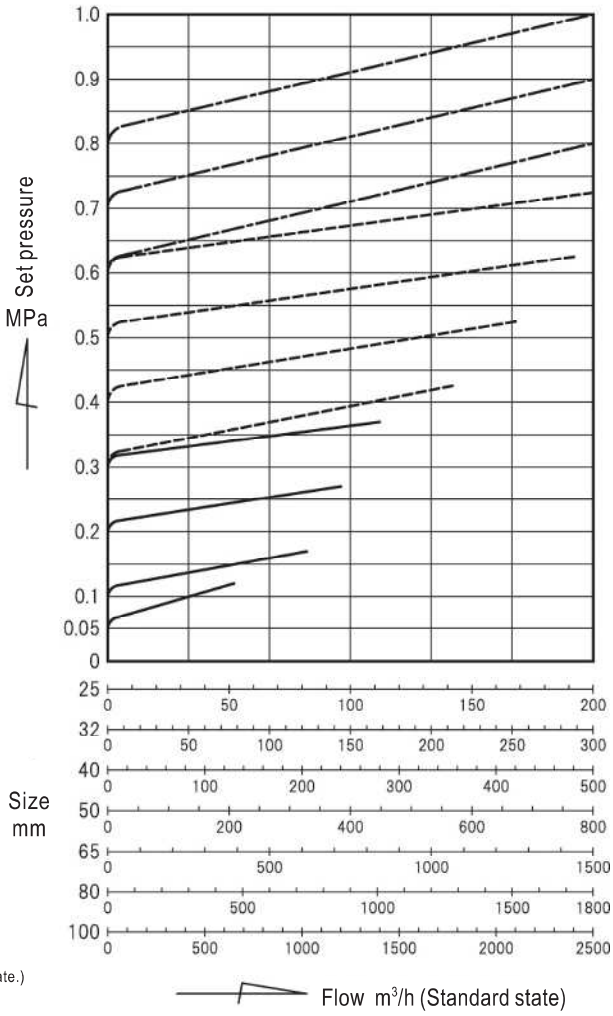
Spring range: H
Spring range: M
Spring range: L

(For Water or Hot water)



(The number in ⬭ is rated flow rate.)

(For Air)



The flow rate of liquid with specific gravity that is different from water should be converted into water flow rate.

$$\text{Converted water flow rate} = \text{Liquid flow rate} \times \sqrt{G}$$

G is the specific gravity of the liquid. (See Page 279.)

The flow rate of gas with specific gravity that is different from air should be converted into air flow rate.

$$\text{Converted air flow rate} = \text{Gas flow rate} \times \sqrt{G}$$

$$= \text{Gas flow rate} \times \sqrt{\frac{M}{28.96}}$$

G is the specific gravity of gas.
M is the molecular weight of gas.
(See Page 279.)

Types of Circuit Valve

■ OVERVIEW

Circuit valves can be divided into three types: Primary pressure regulating valve, Pressure sustaining valve and Differential pressure regulating valve. These valves are used as pressure regulating valves in air conditioning equipments in high buildings.

Primary pressure regulating valve (Direct operated type MD-14 Type)

Used as bypass valve for pump (pump relief valve), Primary pressure regulating valve can respond to change of pump load and discharge excessive pressure and maintain a constant discharge pressure.
Large capacity type WVM-02 Type is also available.

Pressure sustaining valve (Direct operated type MD-20 Type)

This valve can prevent water from falling in return pipe of open circuit for air conditioning system in high buildings that may occur when pump stops.

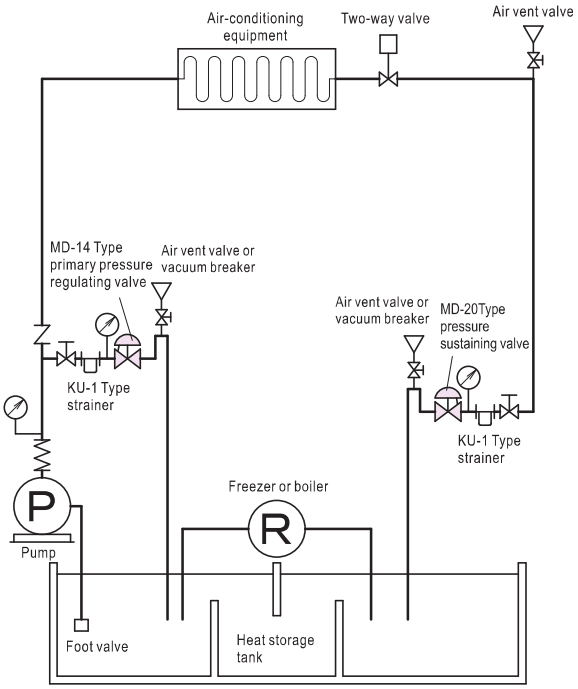
By installing pressure sustaining valve in return pipe, the valve closes immediately after pump stops. This can prevent decrease of water level and accumulation of air, thus can prevent the occurrence of noise and vibration. In addition, the valve can maintain the primary pressure at a constant level and provide stable pressure condition for normal operation of equipments.

Differential pressure regulating valve (Direct operated type FD-2 Type)

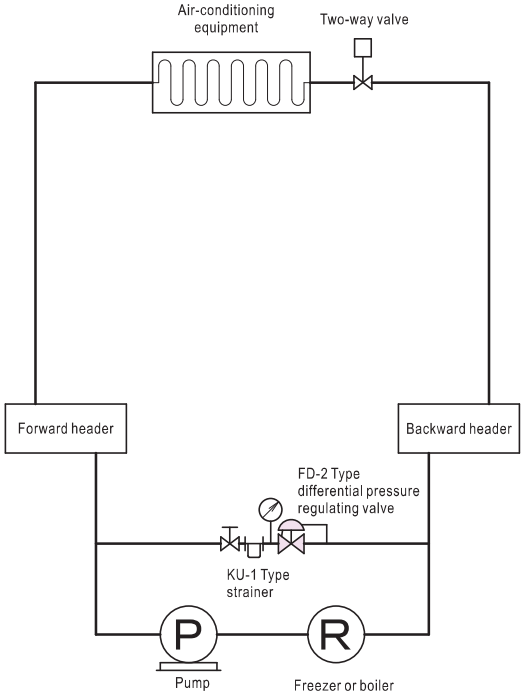
This valve can be used as pump relief valve in closed circuit of air conditioning system in high buildings.

In open circuit, primary pressure regulating valve is used as the relief valve of pump. In closed circuit, however, since it is required to maintain operating at a constant flow, no matter how load changes, differential pressure regulating valve should be used.

Open circuit



Closed circuit

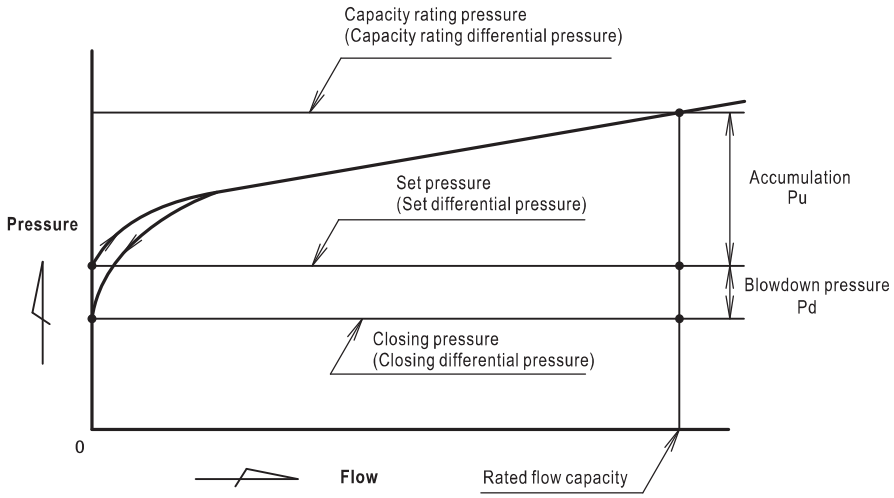


■ TERMS

- Set pressure (set differential pressure): The pressure at inlet side when primary pressure regulating valve and pressure sustaining valve start (differential pressure regulating valve) start to operate and fluid starts to flow (difference of pressure before and after valve).
- Closing pressure (closing differential pressure): The inlet pressure when primary pressure regulating valve and pressure sustaining valve close (differential pressure regulating valve) and fluid stops (difference of pressure before and after valve).
- Blowdown pressure: Difference of set pressure (set differential pressure) and closing pressure (closing differential pressure).
- Accumulation: The pressure exceeding set pressure (set differential pressure) for acquiring desired discharge (in percentage or pressure unit).
- Capacity rating pressure (capacity rating differential pressure): Standard pressure for deciding rated capacity, which is the pressure at inlet side when pressure reaches a required level, higher than set pressure (set differential pressure), and the fluid keeps on flowing (difference of pressure before and after valve).
- Rated discharge capacity: The maximum flow at capacity rating pressure (capacity rating differential pressure).

Note: The words in parenthesis are applicable to Differential pressure regulating valve.

PRESSURE-FLOW CHARACTERISTICS CHART

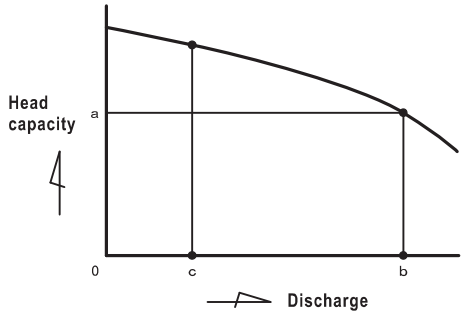


■ CHARACTERISTICS

Operation mode	Model	Accumulation Pu	Blowdown pressure Pd
Direct operating	MD-14W, 14H, 14CN	≦Max. spring regulating range ×15% (≦20%,in case of size 100mm or larger and spring for 0.5MPa.)	≦Set pressure ×10% (Min. 0.02MPa)
	FD-2W, 2H		
	MD-35F, 37F	See Flow Characteristics Chart, Page 103	
	MD-20W, 20H	See Accumulation Chart, Page 109	≦0.04MPa
Pilot operating	WVM-02	≦Set pressure ×10% (Min. 0.03MPa)	Adjusting spring range 0.05~0.35 (0.3)MPa; ≦ set pressure× 20% (Min. 0.03MPa) 0.3~1.0(0.7)MPa and 0.5~1.6MPa; ≦Set pressure ×15%

■ SIZE SELECTION OF PRIMARY PRESSURE REGULATING VALVE

PUMP CHARACTERISTICS CHART



❶ Use the size selection chart to decide the nominal diameter.

❷ When primary pressure and back pressure are not constant, but change within a certain range, use the primary pressure and back pressure that allows for minimum difference between these two pressures to decide the size.

❸ In the case of fluid which viscosity cannot be ignored (e.g. oil), make viscosity correction when deciding size.

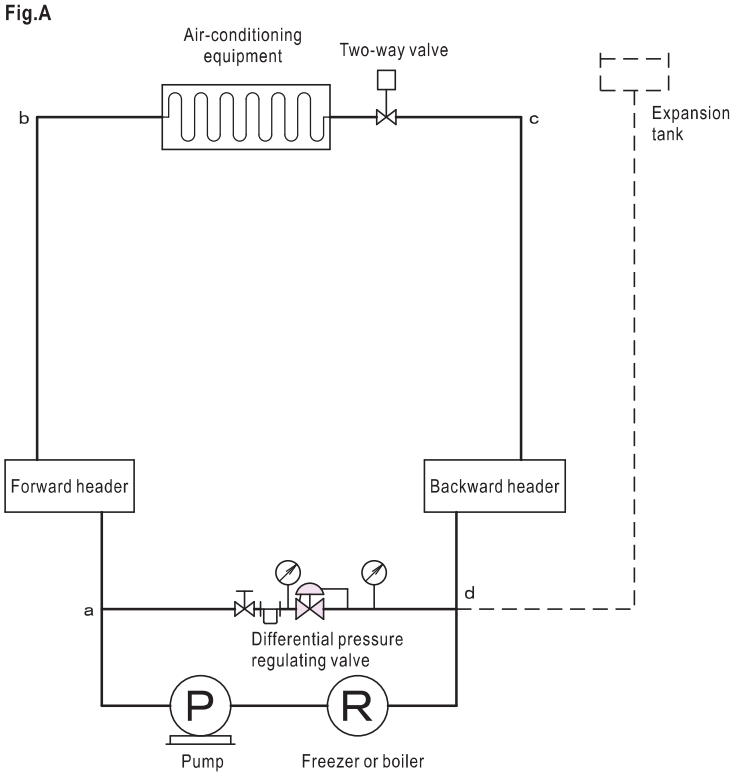
❹ If primary pressure regulating valve is used as pump relief valve, the relief volume can be decided using the following method.

The discharge side of the pump is completely closed: in the pump characteristics chart (on the left), find out the relief volume (b) of head capacity (a) that is equivalent to regulating pressure. In this case, b is the relief volume of primary pressure regulating valve.

The discharge side of the pump is not completely closed: The relief volume of primary pressure regulating valve is the difference of(b-c),as c is the minimum flow at normal operation.

■ SIZE SELECTION OF DIFFERENTIAL PRESSURE REGULATING VALVE

Fig.A



❶ Use the size selection chart in Page 100. If water temperature is higher than 60℃, the size should be large enough to allow additional 10~20% flow.

❷ In Fig.A, the differential pressure before and after valve (ΔP), which is necessary for deciding size, is the total pressure loss between a, b, c, and d.

❸ In stead of differential pressure regulating valve, primary pressure regulating valve can be used if there is expansion tank as shown by dash line in Fig. A. However, the set pressure of spring is different.

For WV Type series, see Page 101.

Key points for installation

■ PIPING EXAMPLE

Fig.1 Primary pressure regulating valve/pressure sustaining valve (with bypass pipe)

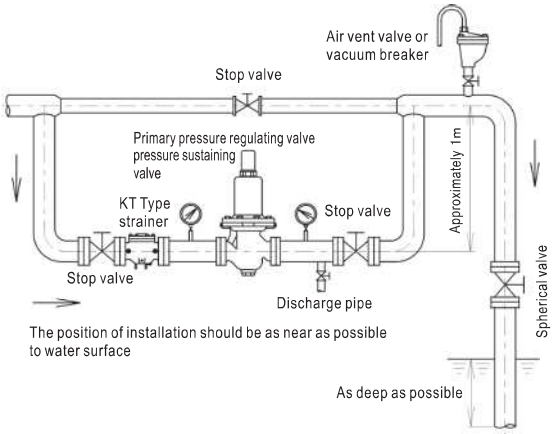


Fig.2 Primary pressure regulating valve/pressure sustaining valve (without bypass pipe)

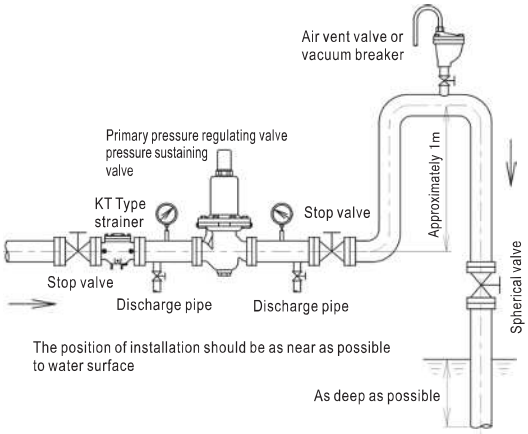


Fig. 3 Differential pressure regulating valve (with bypass pipe)

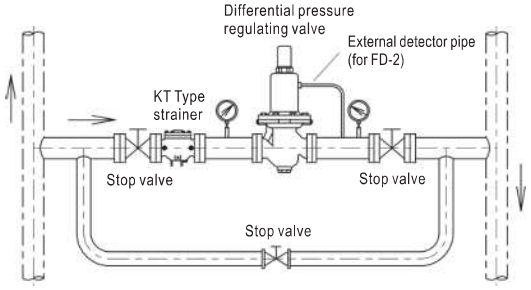
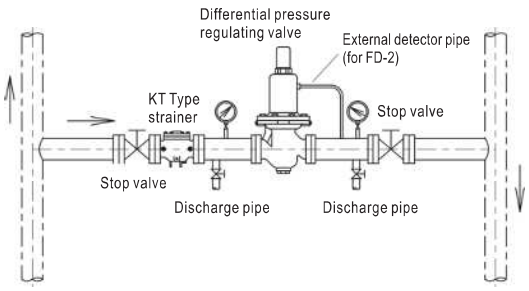


Fig. 4 Differential pressure regulating valve (without bypass pipe)



■ KEY POINTS FOR INSTALLATION

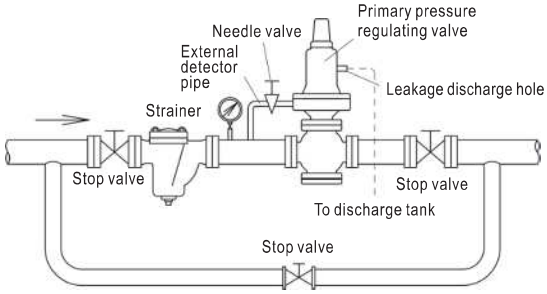
1. If not otherwise specified, primary pressure regulating valve should be installed vertically on the horizontal piping.
2. Install strainer at the primary side of the valve.
3. For equipments which operation cannot be stopped, install bypass piping (with stop valve) between primary and secondary sides (see Fig. 1 and 3). If bypass piping is not installed, install blowing stop valve, which is branched from the main pipe and located immediately before the primary side of the product, to allow flushing (see Fig. 2 and 4).
4. In the case of primary pressure regulating valve and pressure sustaining valve that discharge to open tank, the outlet piping of the valve should have a 1m ascending part and then a descending part and be immerged into water. In addition, the top of the ascending pipe should have air vent valve or vacuum breaker.

   ※By installing ascending pipe, air vent valve or vacuum breaker at the outlet side of the valve, it is able to maintain a stable flow and normal functioning of valve (see Fig. 1 and 2).
5. Install stop valve and pressure gauge.

   The pressure gauge should be installed on the primary side in the case of primary pressure regulating valve and pressure sustaining valve, or primary/secondary side in the case of differential pressure regulating valve (see Fig. 1~4).
6. Depending on model of primary pressure regulating valve, there may be external detector (which can detect pressure using a pipe branched from piping). For such model, connect pressure detecting hole and piping with a pipe and install a needle valve on the pipe (to make it possible to adjust the sensibility of primary pressure regulating valve based on the opening degree of needle valve).

   If there is leakage outlet on spring case, install a pipe that leads to liquid discharge tank (see Fig. 5).

Fig.5 Piping example: Primary pressure regulating valve with external detector



7. Leave some space for dissembling and maintenance.
8. Apply appropriate support to product to make sure it does not bear the weight of piping, bending force, or vibration directly.
9. If you think there is possibility of freezing, insulate or discharge the drain.