

Pressure Control Valve



113

List of Pressure Control Valve

Gas

Liquid

Fluids

Gas

Liquid

Precision Pressure Regulator

MODEL 6600 SERIES

Setting pressure:
Secondary side
0.01-0.6MPa(G)

Max. flow rate:
Gas 10L/min, 20L/min



P117

Gas

Liquid

Pressure Regulator
for Large flow rate

MODEL 6700 SERIES

Setting pressure:
Secondary side
0.01-0.6MPa(G)

Max. flow rate:
Gas 50L/min



P119

Gas

Liquid

Precision Pressure Regulator
for Low pressure

MODEL 6610

Setting pressure:
Secondary side
0.01-0.15MPa(G)

Max. flow rate:
Gas 5L/min



P120

Gas

Liquid

Backpressure Regulator

MODEL 6800 SERIES

Setting pressure:
Primary side
0.01-0.6MPa(G)

Max. flow rate:
Gas 0.8L/min, 1L/min, 10L/min



P121

Gas

Liquid

Cylinder Regulator
with Precision Flow Meter

MODEL 7700 SERIES

Setting pressure:
Secondary side
0.01-0.15MPa(G)

Max. flow rate:
Gas 20L/min



P122

Pressure Control Valve

About Pressure Control Valve

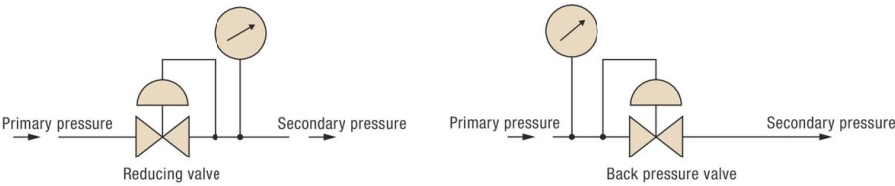
Types of Pressure Control Valves

The pressure control valve controls the pressure constant or reduces the pressure during flow rate control. The pressure control valves generally include reducing valves (pressure regulators) and back pressure valves (back pressure regulators). They are represented by the symbols illustrated below, respectively.

The reducing valve is a regulating valve designed to keep the outlet-side pressure constant against the fluctuating pressure on the supply side. It is normally used in the first stage of the system in many cases.

On the other hand, the back pressure valve is designed to release the primary-side pressure (gas) through the valve to keep it constant when it exceeds the set value.

Since the reducing valve controls the outlet-side pressure, it is used with a pressure gauge attached to the outlet side. Model 6600 comes with a gauge port. In such a case, connect the pressure gauge to this port. The pressure of this port is virtually equivalent to the outlet.



Flow rate characteristics chart

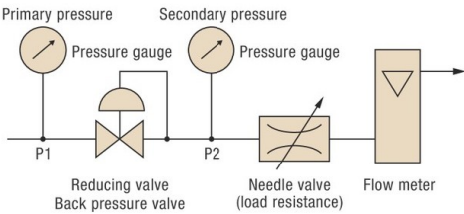
The flow rate characteristics graph of the reducing valve shown in the catalog is measured by the illustrated flow sheet below.

In the example of flow rate characteristics graph, the primary pressure (supply pressure) is 686kPa(G). With the needle valve closed (zero flow rate), the secondary pressure is set by the reducing valve as load resistance in its latter stage. This value becomes zero flow rate in the graph, that is, a left-end value. Next, open the needle valve to run a gas and plot the changing state of the pressure (secondary pressure) set according to a flow rate. The most desired state is that the set pressure does not change depending on the flow rate (change

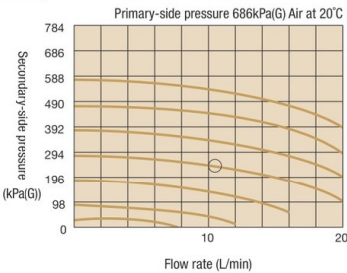
of load resistance). Depending on the characteristics of the reducing valve, however, there is a slight effect up to a certain flow rate, and once reaching a limit, the pressure changes. The range with the least change is the working range of the reducing valve. In the example of flow rate characteristics graph, if the setting pressure is 294kPa(G) when the primary-side pressure is 686kPa(G), the characteristics are favorable at the flow rate below a circle mark (○) in the graph. If the flow rate exceeds 11L/min, however, the pressure characteristics deteriorate. Use at 11L/min or less.

Pressure Control Valve

Flow rate characteristics test flow sheet



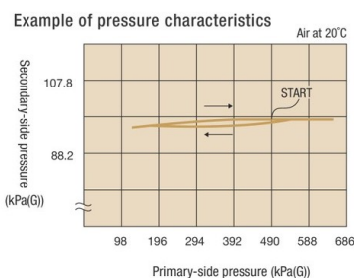
Example of flow rate characteristics



Pressure characteristics chart

In the case of the reducing valve, the figure shows secondary-side pressure fluctuations when the primary-side pressure in the aforementioned flow sheet is changed.

Control characteristics differ slightly between primary pressure increase and decrease. The change status is indicated by arrows.



Principle of the pressure regulator (6600)

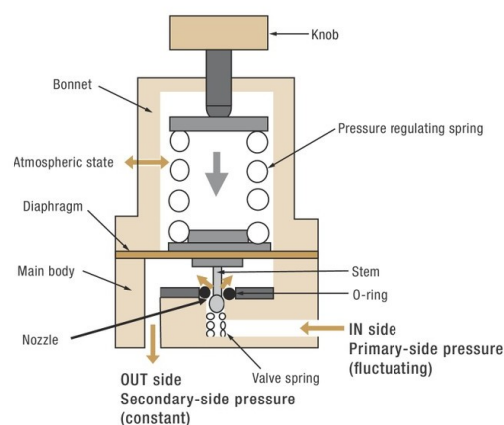
If a knob is turned counterclockwise, a pressure regulating spring is loosened, allowing only the atmospheric pressure to be applied to the diaphragm surface.

When this is done, a stem is pushed up by the gas supplied from the IN side, bringing a ball into contact with an O-ring to seal the nozzle part, thereby blocking a gas flow to the OUT side.

If the knob is turned clockwise, the pressure regulating spring is held down, applying the atmospheric pressure plus the pressure of the pressure regulating spring to the diaphragm surface.

The diaphragm held down by the pressure regulating spring pushes down the stem, opening a path in the nozzle part.

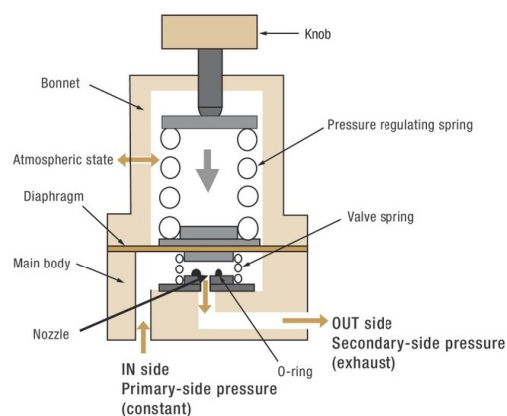
Since the pressure applied to the diaphragm surface is always kept constant by the atmospheric pressure plus the pressure regulating spring inside the bonnet, the secondary-side pressure is kept constant by the stem, even if the primary-side pressure fluctuates.



Principle of the backpressure regulator (6800)

Operation is opposite to the 6600.

The pressure applied to the diaphragm surface is always kept constant by the atmospheric pressure plus the pressure regulating spring inside the bonnet. The pressure is regulated by a valve spring inside the main body so that the primary-side pressure will be kept constant, and the fluctuated pressure is exhausted to the OUT side through the nozzle part to adjust.



Precision Pressure Regulator

MODEL 6600 SERIES



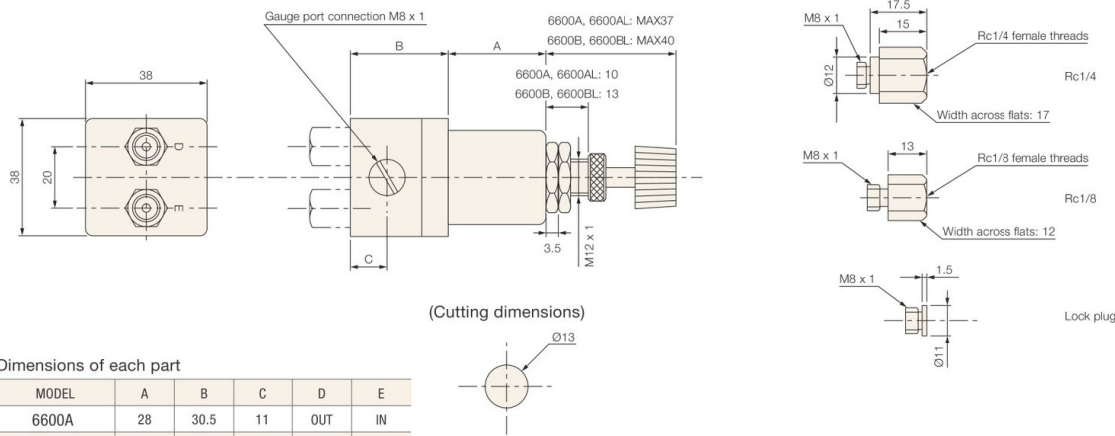
Setting pressure **Gas** Secondary side: 0.01 to 0.6MPa(G)

Max. flow rate **Gas** 10L/min, 20L/min

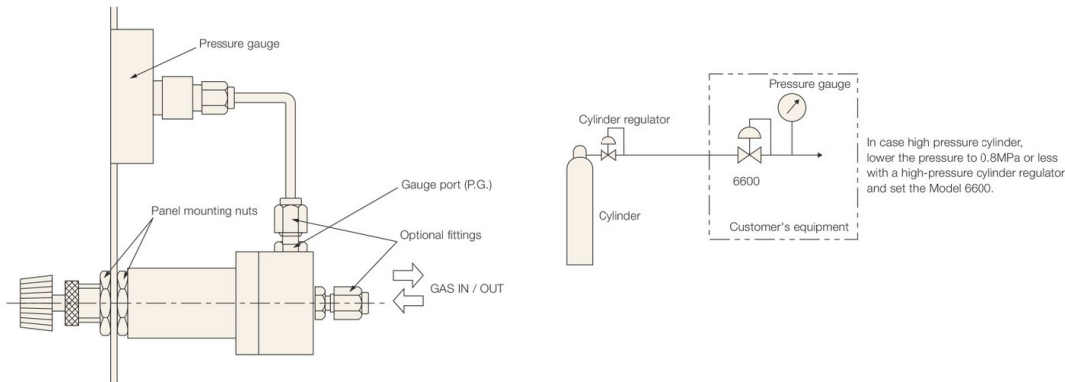
- High controllability of $\pm 1\%$ repeatability against primary- and secondary-side pressure fluctuations
- Optimum inlet and outlet arrangement for mounting to the panel
- Non-bleed design



Dimensions



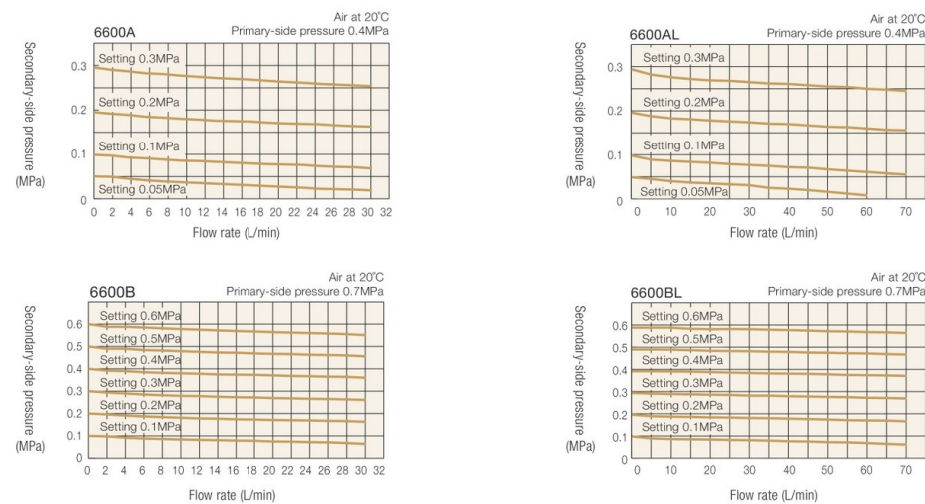
Example of use



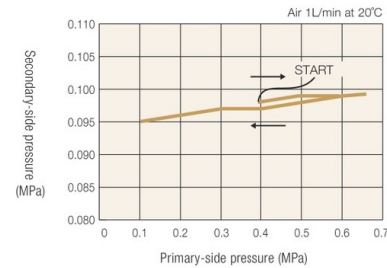
Standard Specifications

MODEL	6600A	6600B	6600AL	6600BL
Primary-side maximum pressure	0.8MPa(G)			
Secondary-side setting pressure	0.01 to 0.3MPa(G)	0.03 to 0.6MPa(G)	0.01 to 0.3MPa(G)	0.03 to 0.6MPa(G)
Max. flow rate	10L/min		20L/min	
Repeatability	Within ±1% of the rated pressure			
Temperature characteristics	Within ±1% / 10°C of the rated pressure			
Minimum operating differential pressure	0.05MPa			
Proof pressure	0.8MPa(G)			
Ambient temperature	5 to 60°C			
Materials of parts in contact with fluid	SS: SUS316, FKM, PCTFE, SUS303, (Hard glass) A: Al, Brass, NBR, POM, SUS316, (Hard glass)			
Connection	Standard: Rc1/4 Option: Rc1/8			
Weight	Approx. 200g			

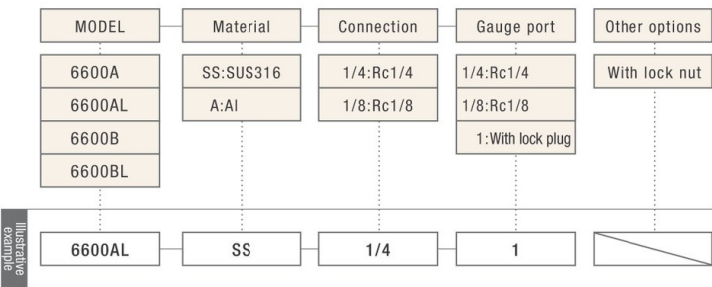
Example of flow rate characteristics



Example of pressure characteristics



Ordering



Pressure Control Valve

Pressure Regulator for Large flow rate

MODEL 6700 SERIES



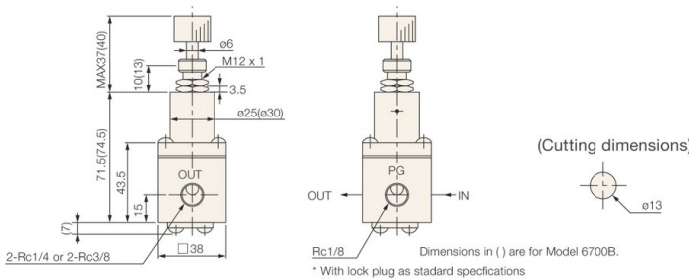
Setting pressure Gas Secondary side: 0.01 to 0.6MPa(G)

Max. flow rate Gas 50L/min

- High controllability of $\pm 1\%$ repeatability against primary- and secondary-side pressure fluctuations
- Non-bleed design



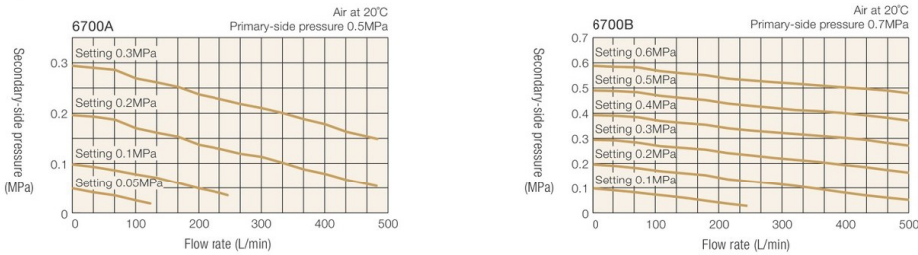
Dimensions



Standard Specifications

MODEL	6700A	6700B
Primary-side maximum pressure	0.9MPa(G)	
Secondary-side setting pressure	0.01 to 0.3MPa(G)	0.05 to 0.6MPa(G)
Max. flow rate	50L/min	
Repeatability	Within $\pm 1\%$ of the rated pressure	
Minimum operating differential pressure	0.05MPa	
Proof pressure	1MPa(G)	
Ambient temperature	5 to 60°C	
Materials of parts in contact with fluid	SS: SUS316, FKM, PCTFE, (SUS304) A: Al, Brass, NBR, POM, SUS316, FKM, (SUS304)	
Connection	Standard: Rc3/8, Option: Rc1/4	
Weight	Approx. 250g	

Example of flow rate characteristics



Ordering

MODEL	Material	Connection
6700A	SS: SUS316	3/8: Rc3/8
6700B	A: Al	1/4: Rc1/4
6700A	SS	3/8

Pressure Control Valve

Precision Pressure Regulator for Low pressure

MODEL 6610



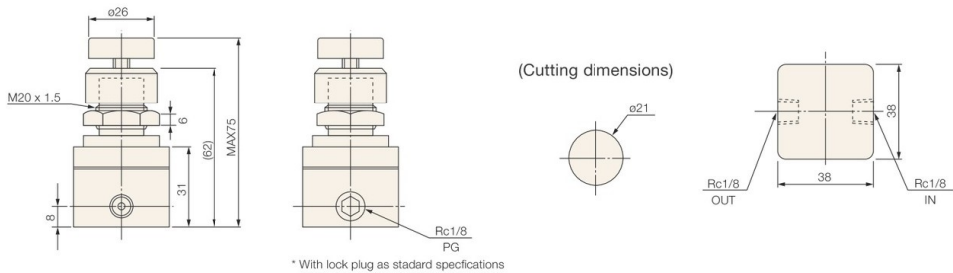
Setting pressure Gas Secondary side: 0.01 to 0.15MPa(G)

Max. flow rate Gas 5L/min

- High controllability of $\pm 1\%$ repeatability against primary- and secondary-side pressure fluctuations
- Grease-less gas contact part
- Non-bleed design
- Structured with lock nut



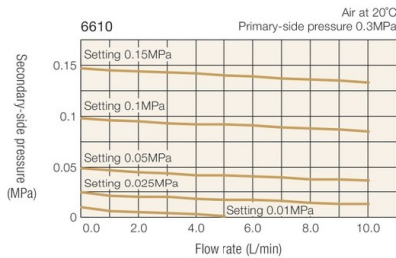
Dimensions



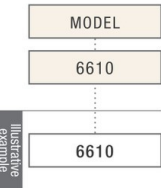
Standard Specifications

MODEL	6610
Primary-side maximum pressure	0.4MPa(G)
Secondary-side setting pressure	0.01 to 0.15MPa(G)
Max. flow rate	5L/min
Repeatability	Within $\pm 1\%$ of the rated pressure
Minimum operating differential pressure	0.1MPa
Proof pressure	0.8MPa(G)
Ambient temperature	5 to 60°C
Materials of parts in contact with fluid	SUS316, FKM, Hard glass, PTFE, PCTFE, SUS304, SUS303
Connection	Rc1/8
Weight	Approx. 350g

Example of flow rate characteristics



Ordering



Pressure Control Valve

Backpressure Regulator

MODEL 6800 SERIES



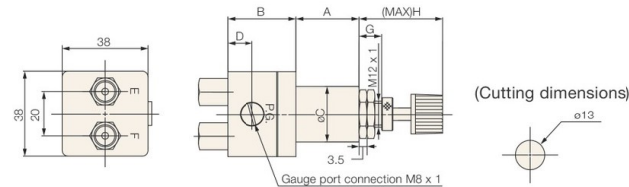
Setting pressure Gas Primary side: 0.01 to 0.6MPa(G)

Max. flow rate Gas 0.8L/min, 1L/min, 10L/min

- Constant primary-side pressure
- Optimum inlet and outlet arrangement for mounting to the panel



Dimensions



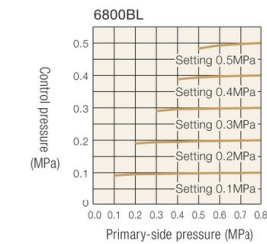
Dimensions of each part

MODEL	A	B	C	D	E	F	G	H
6800A	28	30.5	25	11	IN	OUT	10	37
6800B	31	30.5	30	11	IN	OUT	13	40
6800AL	28	34.5	25	14	OUT	IN	10	37
6800BL	31	34.5	30	14	OUT	IN	13	40

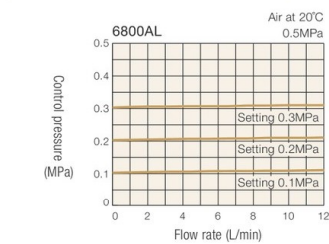
Standard Specifications

MODEL	6800A	6800B	6800AL	6800BL
Primary-side setting pressure	0.01 to 0.3MPa(G)	0.01 to 0.6MPa(G)	0.01 to 0.3MPa(G)	0.01 to 0.6MPa(G)
Maximum exhaust flow	1L/min	0.8L/min	10L/min	
Proof pressure	0.8MPa(G)			
Ambient temperature	5 to 60℃			
Materials of parts in contact with fluid	SS: SUS316, FKM, SUS303 A: Al, Brass, NBR, SUS316			
Connection	Standard: Rc1/4, Option: Rc1/8			
Weight	Approx. 400g			

Example of pressure characteristics



Example of flow rate characteristics



Ordering

MODEL	Material	Connection	Gauge port
6800A	SS: SUS316	1/4: Rc1/4	1/4: Rc1/4
6800AL	A: Al	1/8: Rc1/8	1/8: Rc1/8
6800B			
6800BL			1: With lock plug

6800A	SS	1/4	1
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Cylinder Regulator with Precision Flow Meter

MODEL 7700 SERIES



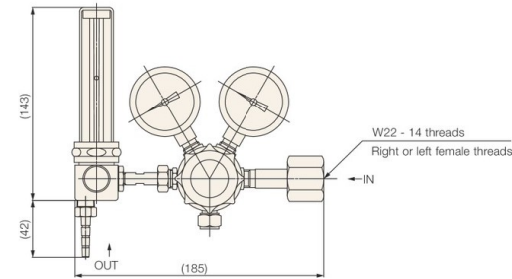
Setting pressure Gas Secondary side: 0.01 to 0.15MPa(G)

Max. flow rate Gas 20L/min

■ Cylinder regulator provided with Model 4400 series



Dimensions

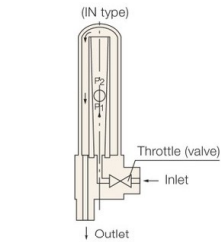


Standard Specifications

Setting pressure range	Max. flow rate	Pressure gauge		Material
		Primary side	Secondary side	
0.02 to 0.15MPa	20L/min	0 to 25MPa(G)	0 to 0.25MPa(G)	Brass
0.01 to 0.06MPa	20L/min	0 to 25MPa(G)	0 to 0.1MPa(G)	SUS316

* The Model 7700 has an exclusive flow meter (Model 4400) attached to a cylinder regulator. Other combinations are also available. Inquire our sales office.
* Depending on the gas type, pressure reducing operation lowers the gas temperature extremely due to the Joule-Thomson effect and deteriorates the regulator's function, disturbing a gas flow.

Flow meter specifications



As illustrated on the left, the flow meter's valve is attached to the inlet side. The scale is manufactured on the premise of a fluid flow in the atmospheric state. If a tank, etc. subjected to resistance or back pressure are located on the downstream side, the following flow rate correction is required.

Actual flow rate = Indicated flow rate value on taper tube $\times \sqrt{\frac{0.1 + \text{secondary side pressure}}{0.1}}$

In case the secondary-side pressure gauge indicates

0.3MPa and the indicated flow rate value is 3L/min, $6\text{L/min} = 3\text{L} \times \sqrt{\frac{0.1 + 0.3}{0.1}}$

is established, and the actual flow rate becomes greater than the indicated flow rate.

Ordering

MODEL	Material	Inlet connection	Outlet connection	Fluid	Working pressure	Max. flow rate
7700	SS: SUS316 B: Brass	R ₂ : W22 - 14 right L ₂ : W22 - 14 left	1/4: Rc1/4 5/16: 5/16 hose nipple			
7700	B	R ₂	1/4	N ₂	0.1MPa	1L/min

Illustrative example

Pressure Control Valve