

Self-operated Pressure Regulators

for special applications



Pressure Reducing Valve Types 2357-1/6 · Valve closes when downstream pressure rises

Excess Pressure Valve Types 2357-2/7 · Valve opens when upstream pressure rises

Application

Pressure regulators for cryogenic gases and liquids as well as other liquids, gases and vapors · Operating pressures up to 50 bar · Set point range 0.2 bar to 40 bar · Temperature range $-200\text{ }^{\circ}\text{C}$ to $+200\text{ }^{\circ}\text{C}$ · Free of oil and grease

TÜV typetested

Industrial gases, such as argon, nitrogen and oxygen, are stored in liquified condition at cryogenic temperatures and at a constant pressure in thermally insulated storage tanks. Suitable pipelines transport the medium to the consumer. The extreme operating conditions (pressures up to 50 bar and temperatures down to $-200\text{ }^{\circ}\text{C}$) require the use of special control valves.

The Types 2357-... Pressure Regulators are especially designed for the use in cryogenic services, but are also suitable for handling gases, liquids and vapors under different operating conditions.

Special features

- Low-maintenance, self-operated P regulators
- Wide set point range and easy set point adjustment
- Rugged design and small overall height
- Free of oil and grease

Versions

The pressure regulators consist of a control valve, an operating diaphragm and a set point adjuster.

Types 2357-1/6 Pressure Reducing Valves · Pressure regulators with globe valve, which maintain the downstream pressure at the adjusted set point. The valve closes when the downstream pressure rises.

Pressure build-up regulator with fail-safe action · For reverse operating direction. The upstream pressure is transmitted to the operating diaphragm. The valve closes when the upstream pressure rises.

Fail-safe action: The plug in the pressure build-up regulator operates as a safety valve and relieves the upstream pressure. The pressure acts on the plug from below. The valve opens to relieve the pressure.

Types 2357-2/7 Excess Pressure Valves · Pressure regulators with angle valve, which maintain the upstream pressure at the adjusted set point. When the upstream pressure rises, the valve opens until the pressure across the valve has assumed the adjusted set point.

Type 2357-2 can additionally be equipped with a non-return valve unit. In thermally insulated storage tanks, the excess pressure is relieved into the consumer pipeline before the safety valve responds.



Fig. 1 · Type 2357-1 Pressure Regulator (Pressure Reducing Valve)



Fig. 2 · Type 2357-2 Pressure Regulator (Excess Pressure Valve)



Fig. 3 · Type 2357-6 Pressure Regulator (Pressure Reducing Valve)

Special versions - Details on request -

Types 2357-6/7 Pressure Regulators

- All wetted parts are electropolished
- Additionally available in nominal size DN 40 with $K_{VS} = 5$

Accessories

Types 2357-1/2: Soldering nipple with linear ball bearing (for connection to 16 mm pipes); sieve 270 μm , sieve 50 μm

Type 2357-2: Non-return unit

Principle of operation

The Types 2357-1/6 Pressure Regulators reduce the pressure in the medium flow direction, i.e. from port (A) to port (B).

The valve is open when relieved of pressure. The pressure downstream of the valve (B) is transmitted to the operating diaphragm (3). The positioning force produced by this pressure moves the valve plug (2) depending on the spring force adjustable at the set point adjuster (10). The valve closes when the pressure downstream of the valve (B) increases.

In reverse operating direction with the medium flowing from port (B) to port (A), the device acts as pressure build-up regulator. The pressure upstream of the valve (B) is transmitted to the operating diaphragm. The valve closes when the upstream pressure increases.

The pressure build-up regulator acts as a safety valve and relieves the pressure when the set point is exceeded by 5 bar. The valve opens when the pressure exceeds the force of the springs situated on top.

In the Types 2357-2/7 Excess Pressure Valves, the medium always flows from port (A) to port (B). The valve is closed when relieved of pressure. The upstream pressure produced at port (A) is internally transmitted to the operating diaphragm (3). The positioning force produced by this pressure opposes the adjustable spring force. When the pressure increases, the valve opens until the pressure has assumed the set point value.

As special version, the excess pressure valve can be additionally equipped with a non-return unit, which prevents the medium from flowing back through the valve.

Installation

- Any desired mounting position,
- Pressure reducing valve: flow direction from port (A) to port (B);
Build-up pressure regulator with fail-safe action: flow direction from port (B) to port (A),
- Type 2357-2 Excess Pressure Valve with non-return unit: the center axis of the regulator must be vertical with port (B) pointing "upward".

Typetesting

The regulator versions for PN 50 are typetested by the German technical surveillance association (TÜV). The test mark is available on request.

Table 1 · Types 2357-... Valve versions and end connections

Type	Design Body style	End connections	
		Inlet	Outlet
2357-1	Pressure reducing valve Globe valve	G 3/4 A Conical joint	
2357-2	Excess pressure valve Angle valve	G 3/4 A Conical joint	G 3/4 Female thread
2357-6	Pressure reducing valve Globe valve	Welding ends $\varnothing 18$ (for pipe DN 15 x 1.5 mm)	
2357-7	Excess pressure valve Angle valve		

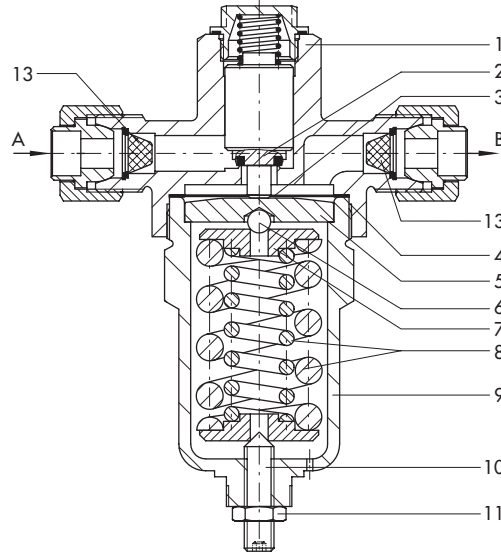


Fig. 4 · Type 2357-1 Pressure Reducing Valve

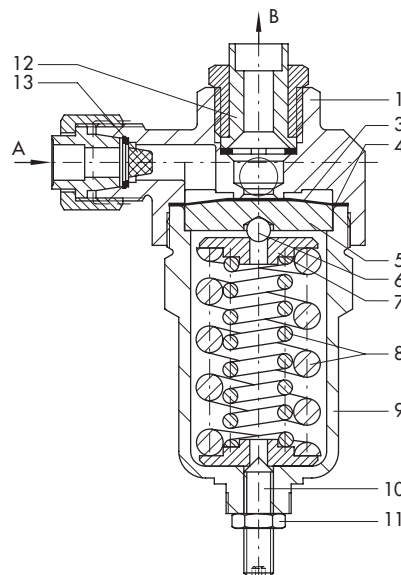


Fig. 5 · Type 2357-2 Excess Pressure Valve

- | | |
|-----------------------|-----------------------|
| 1 Valve body | 8 Springs |
| 2 Plug | 9 Lower part of body |
| 3 Operating diaphragm | 10 Set point adjuster |
| 4 Sealing ring | 11 Lock nut |
| 5 Diaphragm plate | 12 Non-return unit |
| 6 Ball | 13 Strainer |
| 7 Spring plate | |

Application example (schematic drawing)

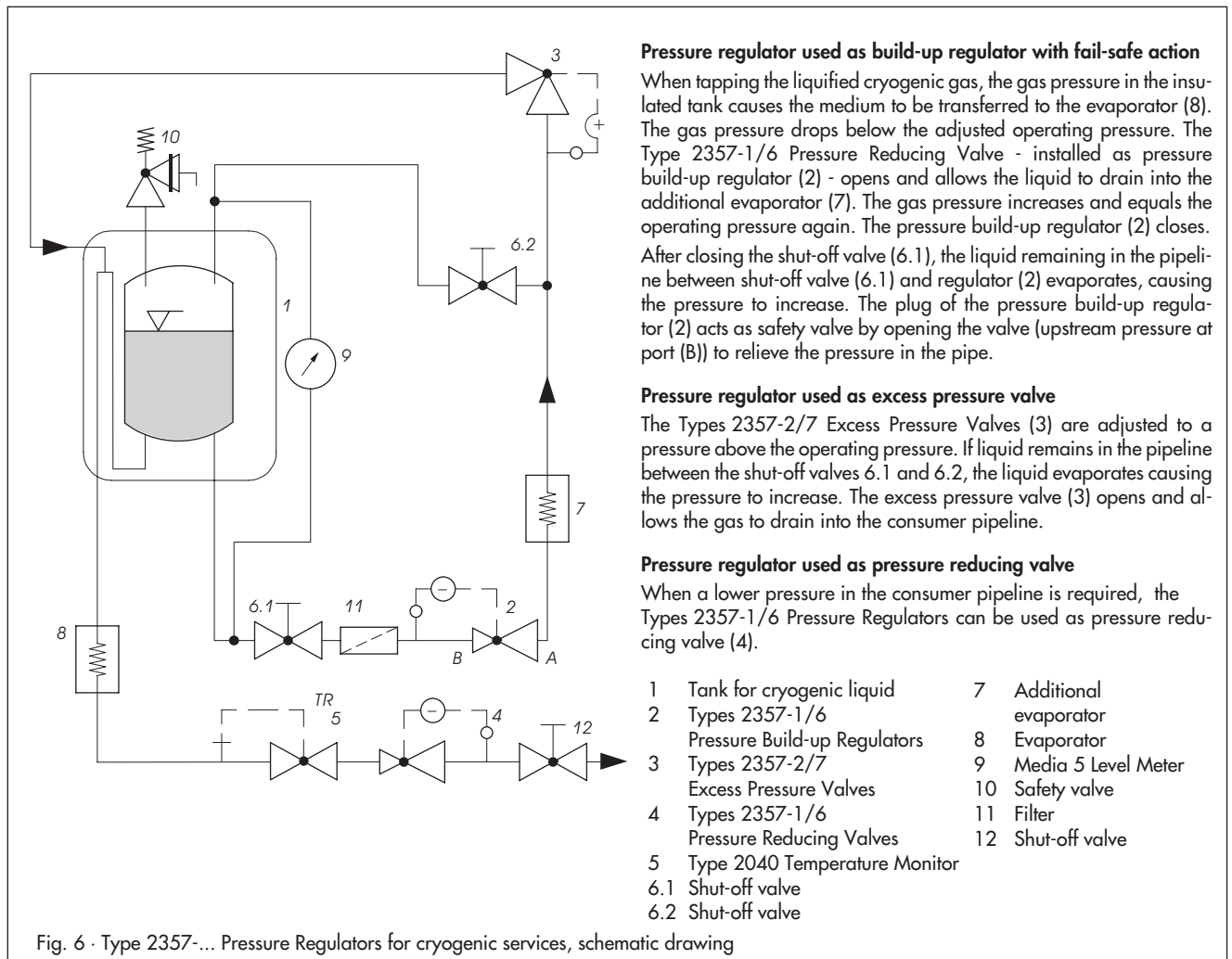


Table 2 · Technical data · All pressures as gauge pressures in bar

Type	2357-1		2357-2		2357-6	2357-7
K_{VS} value	0.25	0.8	1.25	0.4	0.8	1.25
Set point ranges ¹⁾ in bar	1 to 25 10 to 36	1 to 8 5 to 25 8 to 40		1 to 25 10 to 36		1 to 8 5 to 25 8 to 40
Perm. operating pressure	PN 40	PN 50		PN 40		PN 50
Max. perm. diff. pressure Δp	Gases 30 bar · Liquids 6 bar					
Temperature range	-196 °C to +200 °C				-200 °C to +200 °C	

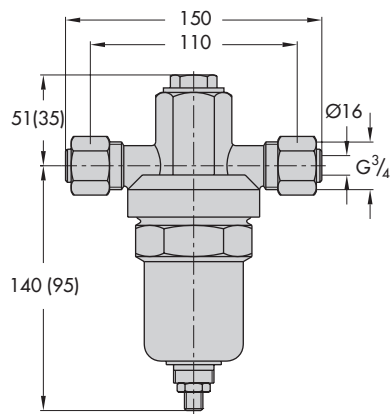
¹⁾ Additional set point ranges on request

Table 3 · Materials · Material no. according to DIN EN

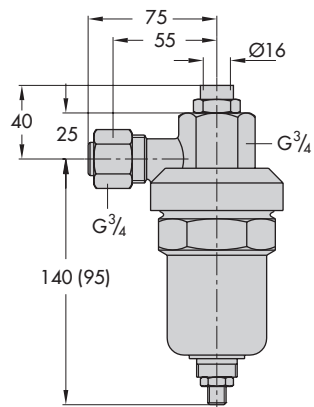
Type	2357-1	2357-2	2357-6	2357-7
Body	GK-CuZn37Pb2 ¹⁾ (CW606N)		1.4306	
Bonnet	GK-CuZn37Pb2 (CW606N)			
Plug	CuZn40Pb2 (CW617N) with PTFE soft seal	–	1.4301	–
Operating diaphragm	CuBe		1.4301	
Set point springs	Stainless steel (1.4310)			
Body gasket	PTFE			

¹⁾ PN 40: CuZn39Pb3 (CW614N)

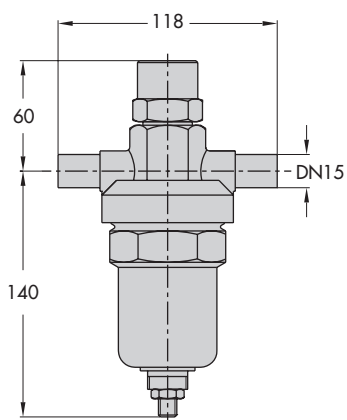
Dimensions and weights



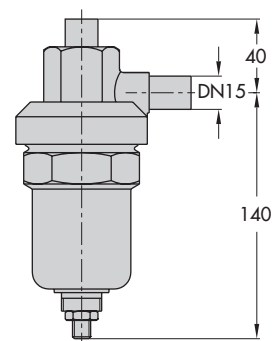
Type 2357-1 Pressure Regulator
Weight: 2.0 (0.9) kg



Type 2357-2 Pressure Regulator
Weight: 1.7 (0.6) kg



Type 2357-6 Pressure Regulator
Weight: 3.0 kg



Type 2357-7 Pressure Regulator
Weight: 2.5 kg

Values in parentheses () apply for regulator versions PN 40

Fig. 7 · Dimensions in mm and weights

Ordering text

Type 2357-1/2/6/7 Pressure Regulator

Set point range ... bar

Optionally, accessories ...

Special version ...

Specifications subject to change without notice.



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