

**T 2557-2 EN****Type 2357-2 Excess Pressure Valve**

Self-operated Pressure Regulators for special applications

**Application**

Pressure regulators for cryogenic gases as well as other liquids, gases and vapors · Operating pressures **up to 50 bar** · Set point ranges from **0.2 to 40 bar** · Temperatures from **-196 to +200 °C** · Oxygen clean according to international standards and guidelines

The valve **opens** when the upstream pressure **rises**

Industrial gases (such as argon, nitrogen and oxygen) are stored in a liquefied condition at extremely low temperatures and at a constant pressure in thermally insulated tanks. Pipes transport the medium to the consumer. The extreme operating conditions (pressures up to 50 bar and temperatures down to -196 °C) make it necessary to use special valves.

The Series 2357 Pressure Regulators are especially designed for the conditions in cryogenic service. These regulators can also be used for gases, liquids and vapors under other operating conditions.



**Fig. 1:** Type 2357-2 Pressure Regulator (excess pressure valve)

**Special features**

- Low-maintenance proportional regulators requiring no auxiliary energy
- Wide set point range and convenient set point adjustment
- Rugged design and low overall height
- Cleaned and packed for oxygen service

**Versions**

The pressure regulators consist of a valve body with two ports (marked A and B), internal operating diaphragm and set point adjuster.

**Pressure relief function**

- **Type 2357-2 Excess Pressure Valve**  
Pressure regulator (angle valve). The valve regulates the upstream pressure to the set point adjusted at the set point adjuster. The valve opens when the pressure increases until the set point is reached.  
Type 2357-2 can optionally be equipped with a non-return unit. In thermally insulated tanks, the excess pressure is relieved by feeding the gas into the consumer pipeline.

**Accessories**

For Type 2357-2

- Solder nipple with ball-type bushing (for connection to 16 or 15 mm pipe diameter); filter with 270 µm mesh
- Non-return unit

Further accessories in Data Sheet ► T 2570.

## Principle of operation

The medium always flows through the **Type 2357-2 Excess Pressure Valve** from port A to port B. The valve is closed when no pressure is applied. The pressure at port A is transmitted internally to the operating diaphragm (3). The positioning force produced opposes the adjustable spring force. The valve opens when the pressure increases until the set point is reached.

To discharge small quantities of gas into the atmosphere, the Type 2357-2 Excess Pressure Valve can be used with special accessories. The tank's safety valve does not react when just the gas volume must be discharged due to heat leak.

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

## Installation

Mounting position with the spring housing suspended downward · Other mounting positions on request.

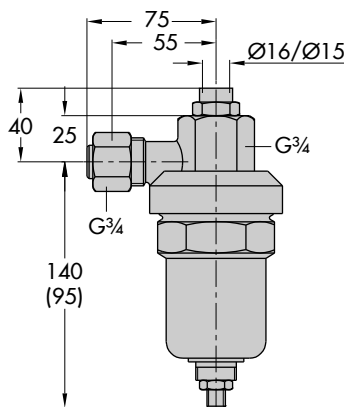
- **Excess pressure valve with non-return unit**  
The center axis of the regulator must be vertical and port B must point upward.

Further information can be found in the Mounting and Operating Instructions ► EB 2557.

## Serial number

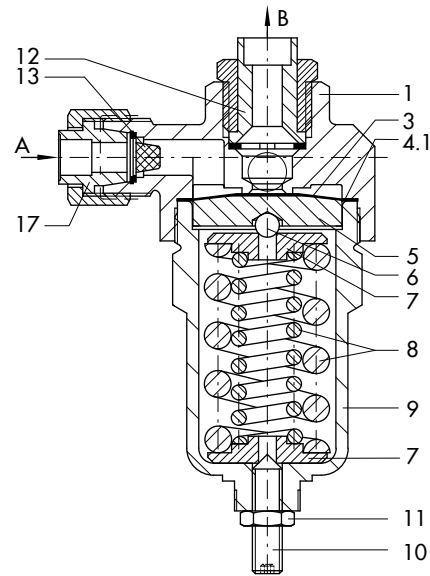
The devices are marked with a serial number on the nameplate. Details on the nameplate are available in the Mounting and Operating Instructions ► EB 2557.

## Dimensions (in mm)



Type 2357-2 Pressure Regulator with solder nipple and non-return unit (accessories) · Weight 1.7 (0.6) kg

Specifications in parentheses  
( ) apply to regulators in PN 40



**Fig. 2:** Type 2357-2 Excess Pressure Valve (PN 50)

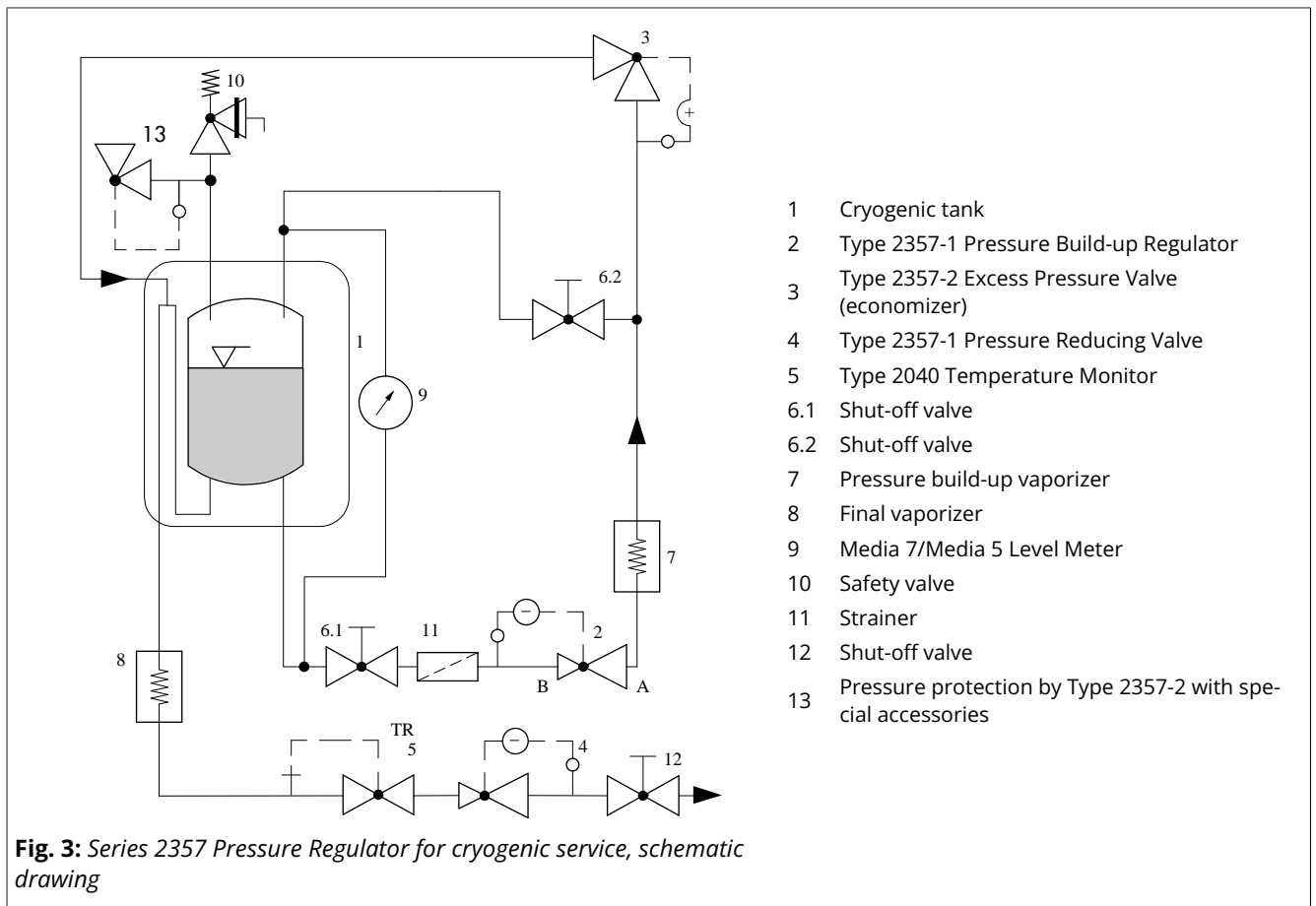
- |     |  |
|-----|--|
| 1   | Valve body   |
| 3   | Operating diaphragm                                |
| 4.1 | Seal (bottom section of the body)                  |
| 5   | Diaphragm plate                                    |
| 6   | Ball   |
| 7   | Spring plate                                       |
| 8   | Set point springs                                  |
| 9   | Bottom section of the body (spring housing)        |
| 10  | Set point adjuster (hex socket, A/F 5)             |
| 11  | Lock nut (A/F 17)                                  |
| 12  | Non-return unit (accessories)                      |
| 13  | Filter   |
| 17  | Solder nipple with ball-type bushing (accessories) |

## Installation example

See Fig. 3

### Pressure regulator functioning as an excess pressure valve (economizer)

The Type 2357-2 Excess Pressure Valve (3) is adjusted to a pressure above the operating pressure. Any liquid trapped between the shut-off valves (6.1 and 6.2) vaporizes, causing the pressure to increase. The excess pressure valve (3) opens, allowing the gas to escape into the consumer pipeline.



- 1 Cryogenic tank
- 2 Type 2357-1 Pressure Build-up Regulator
- 3 Type 2357-2 Excess Pressure Valve (economizer)
- 4 Type 2357-1 Pressure Reducing Valve
- 5 Type 2040 Temperature Monitor
- 6.1 Shut-off valve
- 6.2 Shut-off valve
- 7 Pressure build-up vaporizer
- 8 Final vaporizer
- 9 Media 7/Media 5 Level Meter
- 10 Safety valve
- 11 Strainer
- 12 Shut-off valve
- 13 Pressure protection by Type 2357-2 with special accessories

**Table 1: Technical data · All pressures in bar (gauge)**

Type	2357-2	
Pressure rating	PN 40	PN 50 <sup>2)</sup>
K <sub>V5</sub> coefficient	0.4	1.25
Set point range <sup>1)</sup> in bar	1 to 25 · 10 to 36	0.2 to 2.5 · 1 to 8 · 5 to 25 · 8 to 40
Max. perm. differential pressure Δp	3 bar (> 3 bar only with special accessories; K <sub>V5</sub> coefficient reduced to 0.02)	
Safety function for Type 2357-1	5 bar above the set point	
Temperature range	-196 to +200 °C	
Weight, approx.	3.5 kg	
Conformity	<b>CE</b>	

<sup>1)</sup> Further set point ranges on request

<sup>2)</sup> For oxygen p<sub>max</sub> = 40 bar

**Table 2: Materials · Material numbers according to DIN EN**

Type	2357-2
Body	CC754S-GM (brass) <sup>1)</sup>
Cover	CC754S-GM (brass) <sup>1)</sup>
Operating diaphragm	CuBe
Set point springs	Stainless steel 1.4310
Body gasket	PTFE

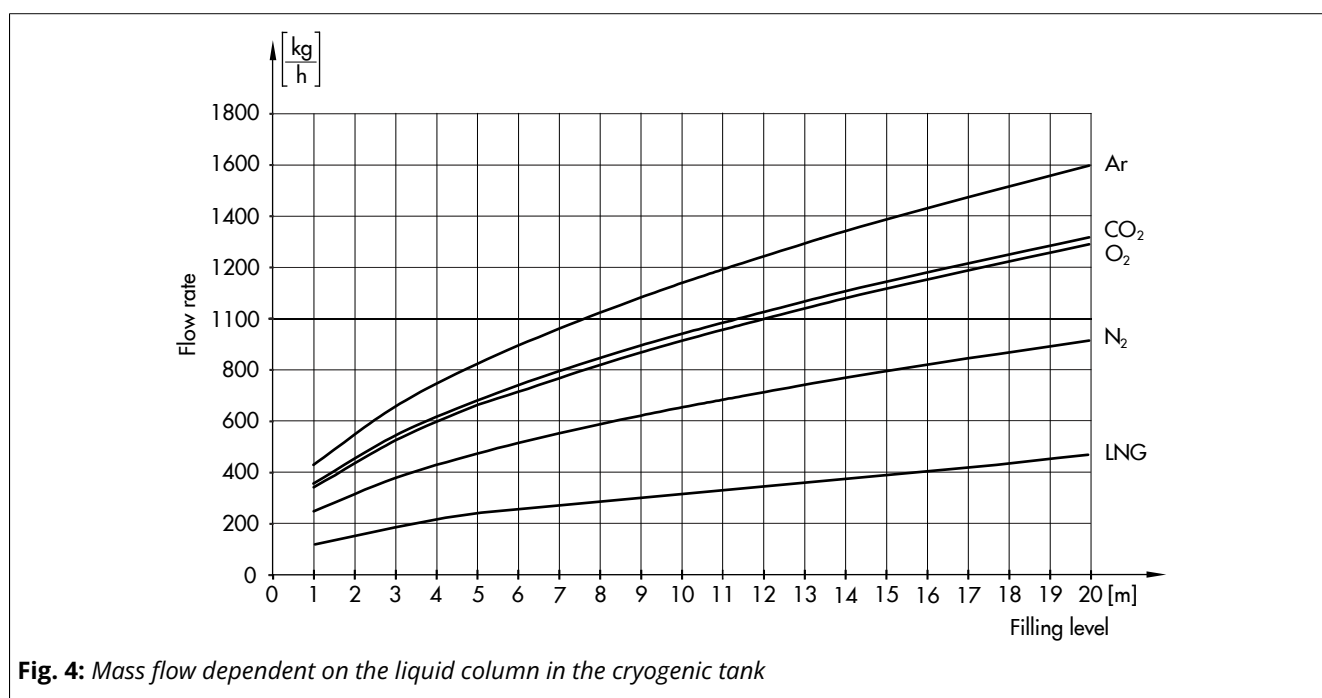
<sup>1)</sup> PN 40: CW617N (brass)

**Table 3:** Type 2357-2 · Valve version and end connections

Design	Version	End connections	
		Inlet	Outlet
Excess pressure valve	Angle valve	G ¾ A (conical joint)	G ¾ (female thread)

**Table 4:** Mass flow of various media dependent on the liquid column in the cryogenic tank

Filling level in m	Process medium				
	N <sub>2</sub>	O <sub>2</sub>	Ar	CO <sub>2</sub>	LNG
	Mass flow rate in kg/h				
1	248	351	427	359	130
3	379	537	653	550	199
5	475	673	819	689	249
7	555	785	956	805	291
9	624	884	1076	906	328
11	687	973	1184	996	361
14	771	1093	1329	1119	405
17	848	1201	1460	1230	445
20	918	1300	1580	1331	482



**Fig. 4:** Mass flow dependent on the liquid column in the cryogenic tank

**Flow capacity of the regulator dependent on the liquid column in the cryogenic tank**

The data in the graph are based on theoretical calculations which do not take factors, such as pressure losses in the pipeline, into account. Therefore, the real flow capacity may deviate from the calculated value.

**Ordering text**

Type 2357-2 Excess Pressure Valve  
 Set point range ... bar  
 Optionally, accessories ...  
 Optionally, special version ...