

Self-operated Pressure Regulators

SAMSON

Pressure Reducing Valve Type 2357-1/-6
Excess Pressure Valve Type 2357-2/-7



*Type 2357-1 Pressure
Reducing Valve*



*Type 2357-6 Pressure
Reducing Valve*



*Type 2357-2 Excess
Pressure Valve*

Mounting and Operating Instructions

EB 2557 EN

Edition April 2011



Contents	Page
1	Design and principle of operation 3
2	Installation 5
2.1	Mounting position 5
2.2	Shut-off valve and pressure gauge 5
3	Operation. 6
3.1	Set point adjustment 6
3.2	Changing the set point range. 7
4	Dimensions in mm and weights 9

General safety instructions



- ▶ *The regulators must be installed, started up and serviced by fully trained and qualified personnel only, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger.*
All safety instructions and warnings in these instructions, particularly those concerning installation, start-up and maintenance, must be observed.
- ▶ *For appropriate operation, make sure that the regulator is only used in applications where the operating pressure and temperatures do not exceed the operating values based on the sizing data submitted in the order.*
- ▶ *Note that the manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.*
Any hazards which could be caused in the regulator by the process medium or operating pressure are to be prevented by means of appropriate measures.
- ▶ *Proper shipping and appropriate storage are assumed.*
- ▶ *The declaration of conformity issued for a valve bearing the CE marking includes information on the applied conformity assessment procedure and will be provided on request.*

1 Design and principle of operation

The pressure regulators maintain the pressure at an adjusted set point and are particularly suitable for cryogenic applications.

Type 2357-1 and **Type 2357-6** Regulators (globe valves)

The regulators act as **pressure reducing valves** when the medium flows from port A to port B. When no pressure is applied, the valve is open.

The pressure downstream of the valve B is transmitted to the operating diaphragm (3). The resulting positioning force moves the valve plug (2) in relation to the spring force, which can be adjusted at the set point adjuster (10). The valve closes as the pressure downstream of the valve B increases.

When the regulators are used as **pressure build-up regulators**, the medium flows from port B to port A. The pressure upstream of the valve (B) is transmitted to the operating diaphragm (3). The valve closes as the pressure upstream of the valve increases and opens as the upstream pressure drops.

The pressure build-up regulator additionally assumes the function of a safety valve, depressurizing the pressurized valve when the set point is exceeded by more than 5 bar. When the pressure has overcome the force of the springs located on top, the valve opens to balance the pressures.

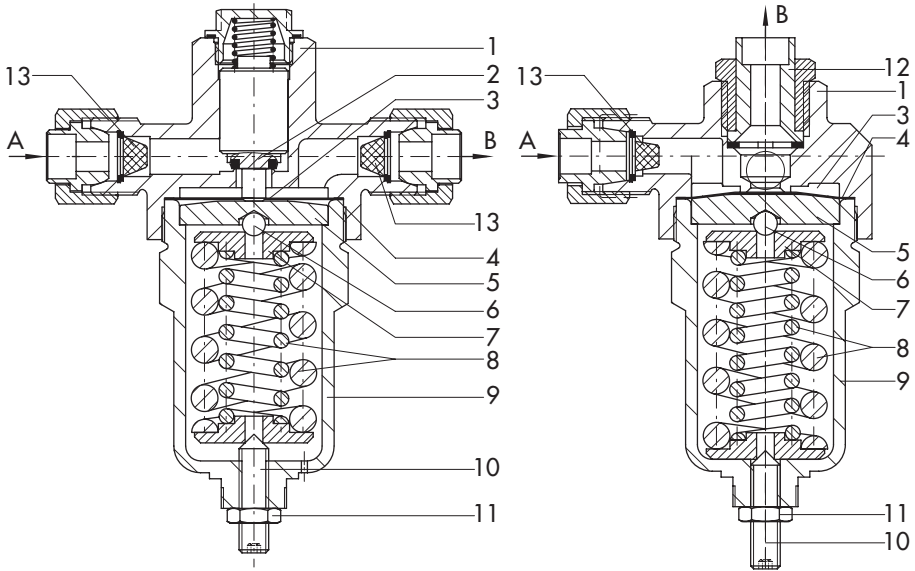
Type 2357-2 and **Type 2357-7** Regulators (angle valves)

The regulators functioning as **excess pressure valves**, the medium always flows from port A to port B. When no pressure is applied, the valve is closed. The pressure at port A acts on the operating diaphragm (3) in the valve body. The resulting force opposes the adjustable spring force. As the pressure increases, the valve **opens** until the set point is reached.

Regulators functioning as excess pressure valves can optionally be equipped with a non-return unit (12) which prevents the medium from flowing back.

EC type examination

An EC type examination according to the Pressure Equipment Directive 97/23/EC, Module B has been performed on the regulator versions for PN 50.



- | | | | |
|---|---------------------|----|-----------------------|
| 1 | Body | 7 | Spring plate |
| 2 | Plug | 8 | Set point spring(s) |
| 3 | Operating diaphragm | 9 | Lower section of body |
| 4 | Gasket | 10 | Set point adjuster |
| 5 | Diaphragm plate | 11 | Lock nut |
| 6 | Ball | 12 | Non-return unit |
| | | 13 | Strainer |

Fig. 1 · Sectional drawings of Type 2357-1/-6 (left) and Type 2357-2/-7 (right)

2 Installation

2.1 Mounting position

The pressure regulator must be installed with the actuator housing hanging downward.



Observe the following directions of flow:

- ▶ **A to B** in pressure reducing valves
- ▶ **B to A** in pressure build-up regulators with safety function
- ▶ **A to B** in excess pressure valves equipped with a non-return unit. Port B must point upward.

The ports are marked.

Note: Make sure that any impurities carried along by the process medium in the connected pipelines do not impair the proper functioning and especially the tight shut-off of the regulator.

2.2 Shut-off valve and pressure gauge

We recommend installing a hand-operated shut-off valve both upstream and downstream of the regulator to be able to shut down the plant for cleaning and maintenance, and when the plant is not used for longer periods of time.

Install a pressure gauge both upstream and downstream of the regulator to monitor the pressures prevailing in the plant.

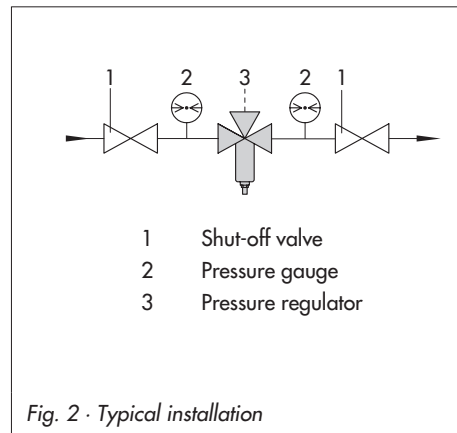


Fig. 2 · Typical installation

3 Operation

3.1 Set point adjustment

The pressure regulator is adjusted at the factory to the set points listed in the table. However, you can change them by turning the set point adjuster (10).

When pressure gauges are installed in the connected pipelines, you can adjust the desired set point directly while monitoring the corresponding pressure gauge.

When no pressure gauge is installed, use the adjustment diagram to adjust the set point.

To increase the set point, turn the set point adjuster into the body, and to decrease the set point, turn the set point adjuster out of the body.

1. Undo the lock nut to allow the set point adjuster to move freely.
2. Determine the difference between the fixed set point (table below) and the required set point. Turn the set point adjuster the required amount of turns as specified in the diagram. Any subsequent change in set point can be also be made by determining the required number of turns using the specifications listed in the table in "Set point change per turn".

3. Secure the setting with the lock nut.

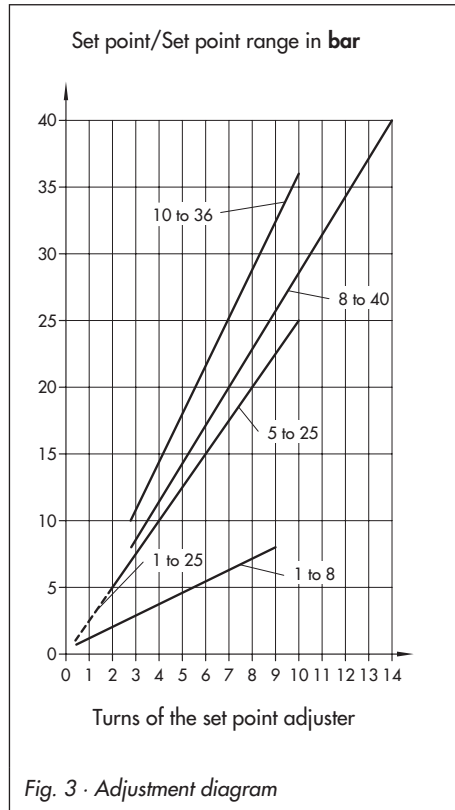


Fig. 3 · Adjustment diagram

Table 1 · Set point adjustment

Nominal pressure	PN 40			PN 50				
Set point range in bar	0.2 to 3	1 to 25	10 to 36	0.2 to 2.5	1 to 8	5 to 25	8 to 40	
Set point adjusted at the factory to approx. ... bar	2357-1	1	12	20	1	3	12	25
	2357-2	1	13	21	1	4	13	26
Set point change per turn in bar	0.4	2.5	3.5	0.4	1	2.5	3.5	

3.2 Changing the set point range

The set point ranges adjusted by the manufacturer can be changed subsequently by exchanging the set point springs (8) and the operating diaphragms (3).

In case of doubt, we recommend you to let SAMSON perform this work for you.

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found on the Internet at www.samson.de, in a SAMSON product catalog or on the back of these mounting and operating instructions.

CAUTION!

Always remove the regulator from the pipe when performing any assembly work. Prior to removing the regulator, relieve the pressure as well as thaw and drain the corresponding section of the plant.

1. Unscrew the lock nut (11). Completely relieve the set point springs (8) of tension by turning the set point adjuster (10) in a counterclockwise direction.
2. Place the lower section of the body (9) into a vise, but do not clamp it. Better: use a box wrench with width across flats = 55 mm. Unscrew the body (1) using an open-end wrench with width across flats = 36 mm and remove all parts from the lower section of the body. Be careful not to damage the operating diaphragms (3).
3. Install set point spring(s) for the required set point range, the spring plates (7), the ball (6) and the diaphragm plate (5) in the lower section of the body.
4. Place the required number of diaphragms (see table of spare parts) onto the diaphragm plate and replace the PTFE gasket (4) of the valve body, if required.
5. Carefully place the body onto the lower section of the body. Then screw the body onto the lower section of the body using a tightening torque of approx. 180 Nm for PN 40 and approx. 250 Nm for PN 50.

Table 2 · Spare parts list with order numbers

Spare parts list		Order no.				
		PN 40		PN 50		
Pos.	Spare part	Set point range in bar				
		1 to 25	10 to 36	1 to 8	5 to 25	8 to 40
3	Number of diaphragms	3	3	3	5	7
	Set of accessories: with 20 diaphragms with 50 diaphragms	1400-7626 1400-7627			1400-7623 1400-7624	
4	Seals, set of accessories: with 20 seals with 50 seals	1400-7630			1400-7628	
		1400-7631			1400-7629	
8	Set point springs	1400-9747	1 to 25 bar	1400-9383	1 to 8 bar	
		1400-9747	10 to 36 bar	1400-7640 1400-7305	5 to 25 bar 8 to 40 bar	
12	Non-return unit for Type 2357-2	1400-5129 (15 mm) or 1400-5139 (16 mm)				
13	Strainer	1400-5136 (270 × 10 ⁻⁶ m mesh size) or 1400-5126 (50 × 10 ⁻⁶ m mesh size)				
	Connecting parts: Soldering nipple with connection nut	1400-5133 (1 × Ø15) 1400-5134 (2 × Ø15) 1400-5138 (1 × Ø16) 1400-5137 (2 × Ø16)				

Note: Accessories and spare parts with order numbers 1400-xxxx are always delivered "free from oil and grease for oxygen service."

4 Dimensions in mm and weights

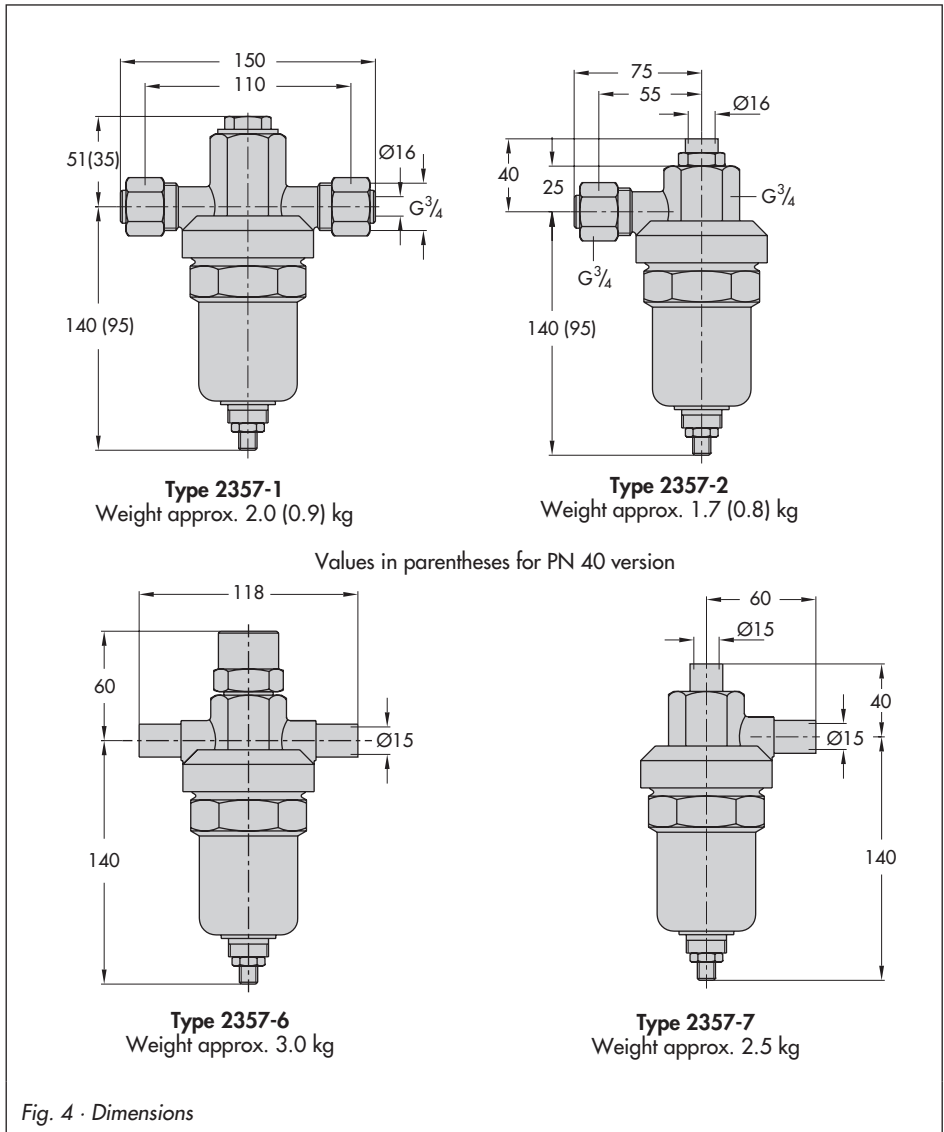


Fig. 4 · Dimensions



SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: <http://www.samson.de>

EB 2557 EN

S/Z 2011-04