

Self-operated Pressure Regulators



Type 2357-11 Pressure Build-up Regulator

Type 2357-21 Excess Pressure Valve



Type 2357-11 Pressure Build-up Regulator/Type 2357-21 Excess Pressure Valve

Mounting and Operating Instructions

EB 2560 EN

Edition August 2014



Definition of signal words



DANGER!

Hazardous situations which, if not avoided, will result in death or serious injury



WARNING!

Hazardous situations which, if not avoided, could result in death or serious injury



NOTICE

Property damage message or malfunction



Note:

Additional information



Tip:

Recommended action

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1 General safety instructions

- The regulators are to be mounted, started up or serviced by fully trained and qualified personnel only; the accepted industry codes and practices are to be observed. Make sure employees or third persons are not exposed to any danger.
- All safety instructions and warnings given in these mounting and operating instructions, particularly those concerning installation, start-up and maintenance, must be strictly observed.
- According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
- The regulators comply with the requirements of the European Pressure Equipment Directive 97/23/EC. The declaration of conformity issued for a regulator bearing the CE marking includes information on the applied conformity assessment procedure. The declaration of conformity is available on request.
- To ensure appropriate use, only use the regulator in applications where the operating pressure and temperatures do not exceed the specifications used for sizing the regulator at the ordering stage.
- The manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.
- Any hazards that could be caused in the pressure regulator by the process medium, operating pressure or by moving parts are to be prevented by taking appropriate precautions.
- Proper transport, storage, installation, operation and maintenance are assumed.

2 Process medium and scope of application

Pressure regulators for cryogenic gases and liquids as well as other liquids, gases and vapors. Operating pressures up to 63 bar, with set points from 1 to 40 bar. Temperature range from -200 to +200 °C. Oxygen clean according to international standards and guidelines.

The regulators are designed to keep the pressure constant to the adjusted set point, especially in cryogenic plants.

**WARNING!**

Risk of injury and property damage due to high pressure in the plant!

A suitable overpressure protection must be installed on site in the plant section.

2.1 Transportation and storage

The regulators must be carefully handled, transported and stored. Protect the regulators against adverse influences, such as dust, dirt or moisture before they are installed.

In the delivered state, the pressure regulators are packed to be free of oil and grease for oxygen service. To avoid contamination, do not open the packaging until immediately before installation.

3 Design and principle of operation

See Fig. 1 on page 7.

Ports A and B are marked on the valve body.

Type 2357-11 Pressure Build-up Regulator

Functioning as a Type 2357-11 Pressure Build-up Regulator (Fig. 1) with direction of flow from port B to port A, the pressure upstream of the valve (port B) is transmitted to the operating diaphragm. The valve closes when the upstream pressure increases and opens when the upstream pressure decreases.

The pressure build-up regulator operates as a safety valve and relieves the pressure chamber of pressure when the pressure exceeds the set point by 5 bar. After overcoming the force of the top plug spring (16), the valve opens to equalize the pressures.

The valve is open when no pressure is applied. The pressure upstream of the valve (port B) is transmitted to the operating diaphragm (3). The positioning force produced moves the valve plug (2) depending on the spring force adjustable at the set point adjuster (10). The valve closes when the pressure upstream of the valve (port B) increases.

Type 2357-11 Pressure Reducing Valve

The process medium flows from port A to port B when the Type 2357-11 Pressure Regulator is used as a pressure reducing valve.

The valve is open when no pressure is applied. The pressure downstream of the valve (port B) is transmitted to the operating diaphragm (3). The positioning force produced

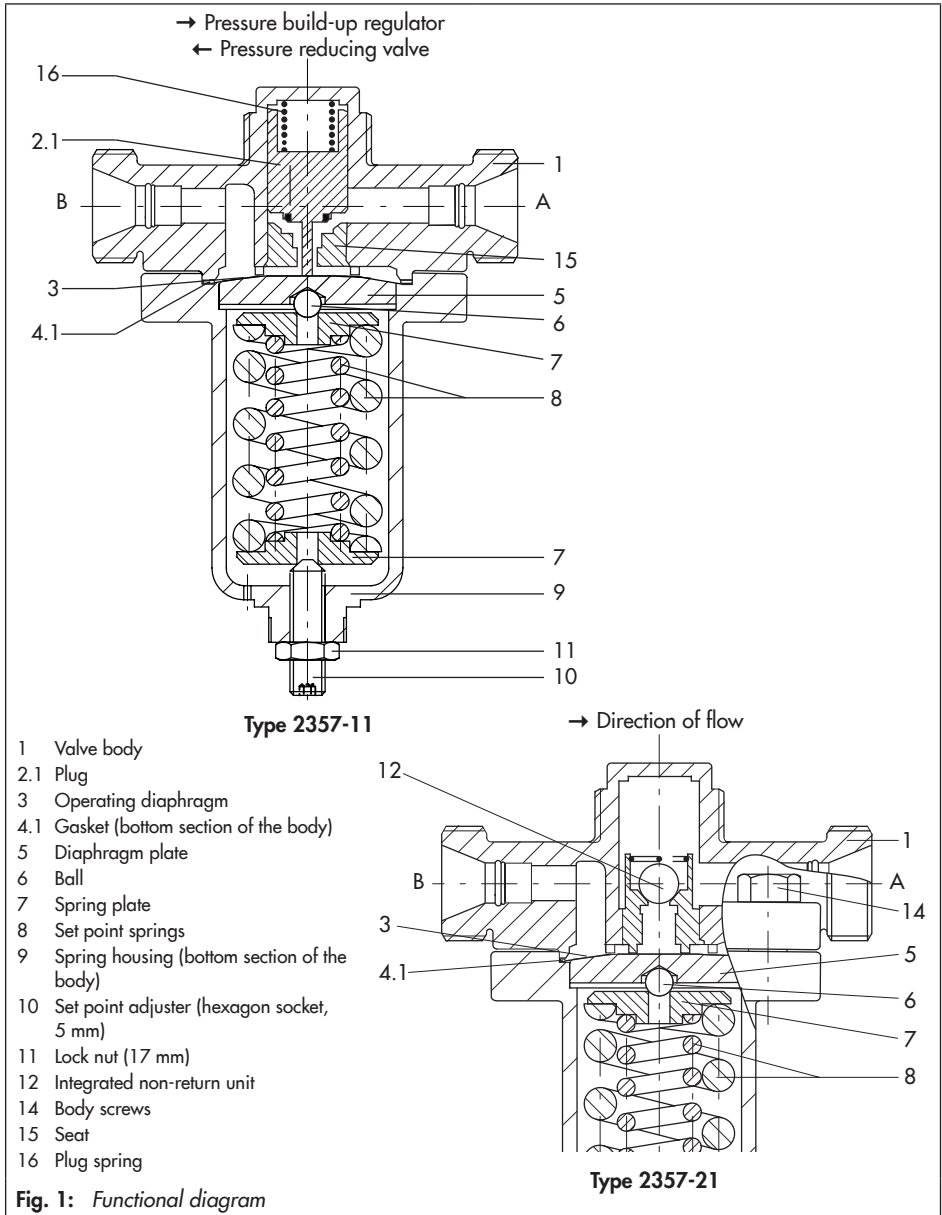
moves the valve plug (2.1) depending on the spring force adjustable at the set point adjuster (10). The valve closes when the pressure downstream of the valve (port B) rises.

Type 2357-21 Excess Pressure Valve

The medium flows through the Type 2357-21 Excess Pressure Valve (Fig. 3) from port B to port A. The valve is closed when no pressure is applied. The pressure at port B 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. The integrated non-return unit 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 regulators.



4 Installation

In the delivered state, the regulators are packed to be free of oil and grease for oxygen service.



WARNING!

Use of oil and grease in oxygen atmospheres!

Risk of explosion!

Make sure that the regulator is absolutely clean and free of oil and grease on installing it.

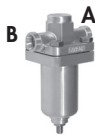
Flush and clean the pipeline thoroughly before installing the regulator.

- Make sure the regulator is installed free of stress.
- Install a strainer upstream of the regulator.

Otherwise, impurities in the pipeline may impair the proper functioning of the valve, above all the tight shut-off.

4.1 Mounting position

Install the pressure regulator with the actuator housing suspended downward in horizontal pipelines. Observe the flow direction.



Type 2357-11 Pressure Build-up Regulator with safety function

- Direction of flow from port **B** to port **A**

Type 2357-11 Pressure Reducing Valve

- Direction of flow from port **A** to port **B**

Type 2357-21 Excess Pressure Valve with non-return unit

- Direction of flow from port **B** to port **A**
The ports are marked.

Required spare parts and accessories are listed in Data Sheet ► T 2570 EN.

4.2 Shut-off valve

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

Install a pressure gauge at a suitable point to monitor the pressures prevailing in the plant.

5 Operation

See Fig. 1 on page 7.

5.1 Start-up

First start up the regulator after mounting all parts.

5.2 Set point adjustment

Every pressure regulator is delivered with the set point listed in Table 1 already adjusted.

Turn the set point adjuster (10) using Allen key (size 5 mm) to change the default set point.

Provided a pressure gauge has been installed at a suitable point in the plant, the required set point can be directly adjusted

while monitoring the pressure reading at the gauge.

When a pressure gauge is not installed, adjust the set point using the adjustment diagram Fig. 2.

To increase the set point, turn the set point adjuster into the body (↻) and out of the body (↺) to reduce it.

! **NOTICE!**
Set point adjuster screwed too tight! The regulator is blocked and the medium flow through it is restricted. Pressure regulation is no longer possible! Only screw the set point adjuster up to the point where the spring tension can still be felt!

How to proceed:

1. Loosen the lock nut (11, size 17 mm) to allow the set point adjuster to move freely.
2. Determine the difference between the fixed set point (Table 1) and the required set point. Turn the set point adjuster (10) the required amount of turns as specified in Fig. 2 on page 10.

Based on the default setting, any subsequent change to the set point can be also be made by determining the required number of turns using the specifications listed in Table 1.

3. Lock the setting with the lock nut (11).

5.2.1 Changing the set point range

The default set point ranges can be adapted to your specific requirements. Contact SAMSON (see section 7) for further details.

Table 1: Set point adjustment (default)

Set point range		1 to 8 bar	5 to 25 bar	8 to 40 bar
Set point adjusted at the factory (approx.)	2357-11	3 bar	12 bar	25 bar
	2357-21	4 bar	13 bar	26 bar
Set point change per turn		1 bar	2.5 bar	3.5 bar

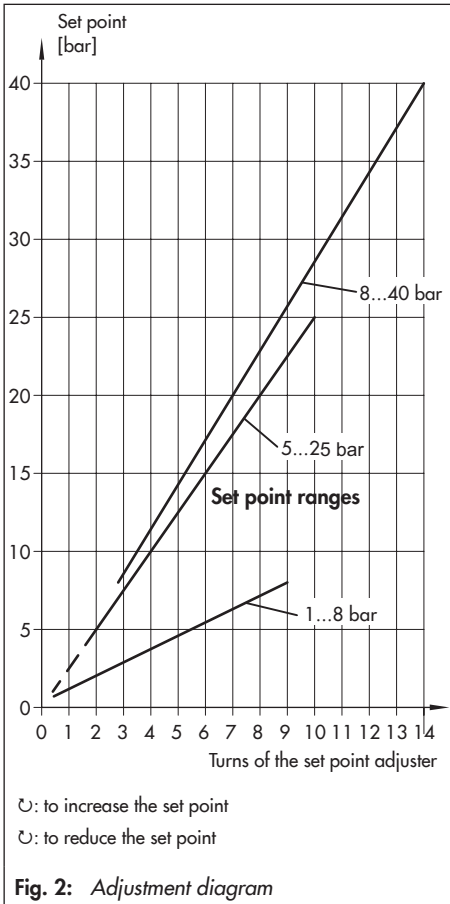


Fig. 2: Adjustment diagram

5.3 Decommissioning

Close first the shut-off valve on the upstream side of the valve and then on the downstream side of the valve.

6 Maintenance

The regulators do not require any maintenance. Nevertheless, they are subject to natural wear, particularly at the seat, plug and operating diaphragm.

Depending on the operating conditions, check the regulator at regular intervals to avoid possible malfunctions.



WARNING!

Process medium can escape uncontrolled on dismantling the regulator. Risk of cold burns!

Allow the regulator to defrost before depressurizing and draining it and remove it from the pipeline.

If faults or malfunctions cannot be remedied, contact SAMSON (see section 7).

6.1 Exchanging the seat and plug

See Fig. 1 on page 7.

1. Loosen the lock nut (11) and turn the set point adjuster (10) counterclockwise ⤵ to fully relieve the internal set point springs (8).
2. Unscrew the body screws (14) using an open-end wrench (size 19 mm). Lift off the valve body (1).
3. Unscrew the seat (15) using a seat wrench (size 30 mm socket). Remove the plug (2.1).

4. Insert the plug spring (16) into the new plug (Type 2357-11 only). Tighten the seat using a seat wrench and a tightening torque of 20 Nm. Use a suitable high-performance lubricant (e.g. Gleitmo 595, SAMSON order no. 8150-0116).
 5. Check the PTFE gasket (4.1) and replace it, if necessary.
 6. Carefully mount the valve body (1) and fasten it onto the bottom section of the body (9) (tightening torque 25 Nm).
6. Carefully mount the valve body (1) and fasten it onto the spring housing (9) using the body screws (14) (tightening torque 25 Nm).

6.2 Exchanging the non-return unit

See Fig. 1 on page 7.

1. Loosen the lock nut (11) and turn the set point adjuster (10) counterclockwise \cup to fully relieve the internal set point springs (8).
2. Unscrew the body screws (14) using an open-end wrench (size 19 mm). Lift off the valve body (1).
3. Unscrew the integrated non-return unit (12) using a seat wrench (30 mm size socket) and lift off the valve body (1).
4. Check the ball and seating surface. If necessary, replace the entire non-return unit. Mount the non-return unit using a seat wrench (tightening torque 20 Nm). Use a suitable high-performance lubricant (e.g. Gleitmo 595, SAMSON order no. 8150-0116).
5. Check the PTFE gasket (4.1) and replace it, if necessary.

7 Customer service

If malfunctions or defects occur, contact the SAMSON After-sales Service Department for support.

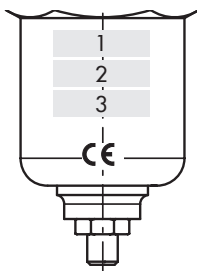
The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found on the SAMSON website (► www.samson.de), in all SAMSON product catalogs or on the back of these Mounting and Operating Instructions.

Please send your inquiries to: service@samson.de

To assist diagnosis and in case of an unclear mounting situation, specify the following details (see section 8):

- Type designation and K_{VS} coefficient
- Model number with index
- Upstream and downstream pressure
- Temperature and process medium
- Min. and max. flow rate
- Is a strainer installed?
- Installation drawing showing the exact location of the regulator and all the additionally installed components (shut-off valves, pressure gauge, etc.)

8 Nameplate

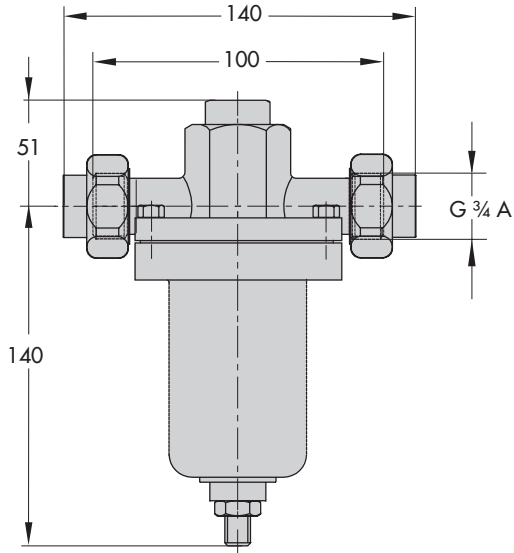


Details on lower section of body

- | | |
|---|-------------------------------------|
| 1 | Set point range/date of manufacture |
| 2 | Type designation with index |
| 3 | Customer-specific details |
| | CE compliance |

Fig. 3: Nameplate details

9 Dimensions and weights



Type 2357-11 Pressure Regulator/Type 2357-21 Excess Pressure Valve with welding ends
(accessories)

Weight: approx. 4 kg

All dimensions in mm

Fig. 4: Dimensions and weights

10 Technical data

Type	2357-11	2357-21
K_{VS} coefficient	0.8	1.25
Set point ranges ¹⁾ in bar	1 to 8 · 5 to 25 · 8 to 40	
Max. perm.operating pressure p_{max}	63 bar ²⁾	
Safety function for Type 2357-11	5 bar above the set point	
Max. perm. differential pressure Δp_{max}	Types 2357-11 Pressure Reducing Valves: Gases 30 bar Liquids 6 bar Type 2357-21 Excess Pressure Valve: 3 bar (>3 bar only with special accessories)	
Temperature range	-200 to +200 °C	

1) Further set point ranges on request

2) For oxygen $p_{max} = 40$ bar



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2014-09-16 · English