Self-operated Pressure Regulators

Type 45-1 N · Type 45-3 N
Differential Pressure Regulators

Translation of original instructions

Type 45-1 N

Type 45-3 N

Mounting and Operating Instructions

EB 3140 EN

Edition September 2016

Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

➔ For the safe and proper use of these instructions, read them carefully and keep them for later reference.

➔ If you have any questions about these instructions, contact SAMSON's After-sales Service Department (aftersalesservice@samson.de).

The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website (www.samson.de) > Product documentation. You can enter the document number or type number in the [Find:] field to look for a document.

WARNING!
Damage to health relating to the REACH regulation.
If a SAMSON device contains a substance which is listed as being a substance of very high concern on the candidate list of the REACH regulation, this circumstance is indicated on the SAMSON delivery note.
Information on safe use of the part affected,
see ▶ http://www.samson.de/reach-en.html.

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

1 General safety instructions

– All safety instructions and warnings given in these mounting and operating instructions, particularly those concerning installation, start-up, and maintenance, must be strictly observed.
– The device must 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.
– 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 devices comply with the requirements of the European Pressure Equipment Directive 2014/68/EU. Devices with a CE marking have an EU declaration of conformity, which includes information about the applied conformity assessment procedure. This declaration of conformity can be provided on request.
– To ensure appropriate use, only use the device in applications where the operating pressure and temperatures do not exceed the specifications used for sizing the device 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 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.

Note:
Non-electric valve versions whose bodies are not lined with an insulating material coating do not have their own potential ignition source according to the risk assessment stipulated in EN 13463-1: 2009, section 5.2, even in the rare incident of an operating fault. Therefore, such valve versions do not fall within the scope of Directive 2014/34/EU.
For connection to the equipotential bonding system, observe the requirements specified in section 6.4 of EN 60079-14: 2011 (VDE 0165 Part 1).

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2 Process medium and scope of application

Differential pressure regulator for extended heating systems and industrial applications.

Differential pressure regulators for local heat supply and large heating networks · Nominal size **DN 15** · Differential pressure set point fixed at **0.15** or **0.3 bar** · Suitable for treated water up to **110 °C** and non-flammable gases up to **80 °C**

The valve **closes** when the differential pressure exceeds the adjusted set point.

3 Transportation and storage

The device must be carefully handled, transported, and stored. Protect the regulators against adverse influences, such as dirt, moisture, frost, or high temperatures.

4 Design and principle of operation

See Fig. 2 on page 7.

The differential pressure regulators basically consist of the valve and a closing actuator with an operating diaphragm.

The regulators have a fixed set point due to the set point spring installed in the body.

The differential pressure regulators are designed to maintain a constant differential pressure between the high-pressure and low-pressure lines. The valve closes when the differential pressure rises.

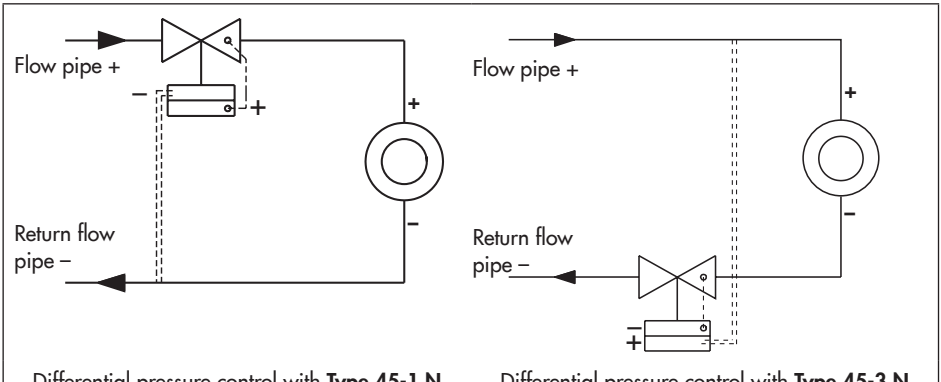
Type 45-1 N (installation in the flow pipe)

The medium flows through the valve in the direction indicated by the arrow. The pressure in the valve outlet (+) is transferred to the high-pressure chamber of the actuator over the attached control line (10) and the low pressure (–) from the return flow pipe is transferred to the low-pressure chamber of the actuator over a control line (5) to be installed on site.

Type 45-3 N (installation in the return flow pipe)

The upstream pressure (low pressure) is transferred to the low-pressure chamber of the actuator through the borehole (8) and the high pressure from the flow pipe is transferred to the high-pressure chamber of the actuator over a control line (5) to be installed on site.

The differential pressure creates a positioning force at the operating diaphragm which moves the valve plug depending on the force of the set point spring (3).



Differential pressure control with **Type 45-1 N** Installation in **high-pressure** line

Differential pressure control with **Type 45-3 N** Installation in **low-pressure** line

– – – – Permanent connection to actuator

= = = = To be attached on installing the regulator in the pipeline

Fig. 1: *Application and installation of the differential pressure regulators*

Legend for Fig. 2

1 Valve body
2 Plug
3 Set point spring
4 Actuator diaphragm
5 External control line
6 Actuator (high-pressure chamber)
7 Actuator (low-pressure chamber)
8 Borehole in the body
9 Connection nut with seal and end connection
10 Control line (attached)
11 Angular screw joint

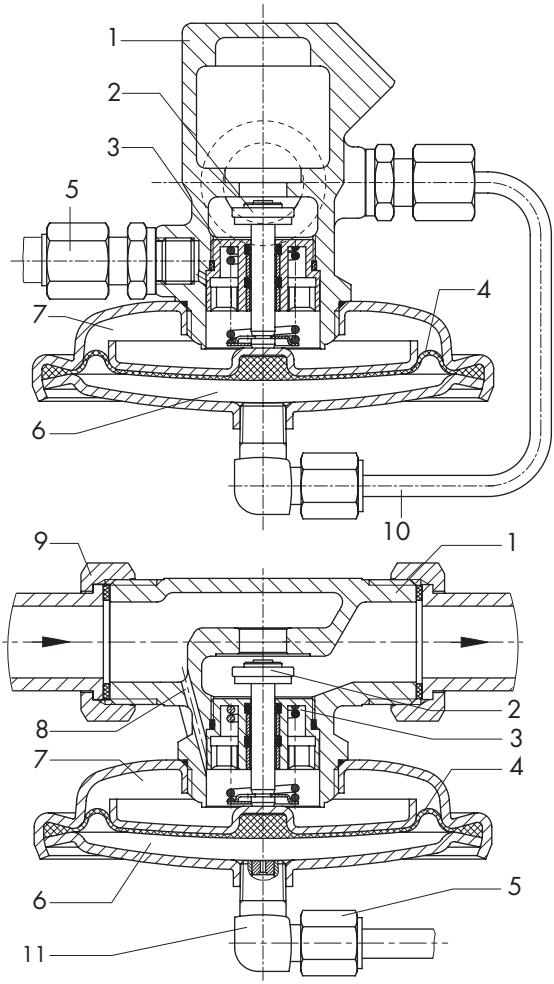


Fig. 2: *Functional diagram of Type 45-1 N and Type 45-3 N*

5 Installation

Install the differential pressure regulator preferably in horizontal pipelines with the actuator suspended downward free of stress. However, other mounting positions are possible (on request).

– Choose a place of installation that allows you to freely access the regulator even after the entire plant has been completed.
– Install a strainer (e.g. SAMSON Type 2 N) upstream of the regulator.
– Flush the pipeline thoroughly before installing the regulator to ensure that any sealing parts, weld spatter, and other impurities carried along by the process medium do not impair the proper functioning of the valve, above all the tight shut-off.
– The direction of flow must match the direction indicated by the arrow on the body.

! ***NOTICE***
Incorrectly installed regulator
The pressure regulator can be damaged.
– *Make sure the regulator is installed free of stress.*
– *Observe permissible mounting position.*

5.1 Control line

See Fig. 2 on page 7.

Type 45-1 N: the regulator is delivered with the control line ready mounted.

Type 45-3 N: a control line with 6 mm pipe diameter must be adapted and mounted on site. See the installation schematics (Fig. 1) for line routing.

An angular screw joint (11) for connecting the control line is supplied with the regulator.

To mount the control line, screw the screw joint clockwise (↻) into the intended hole on the high-pressure chamber (8) and align it. Do not turn the screw joint back again. Otherwise, the connection may start to leak.

5.2 Strainer (filter)

Install the strainer upstream of the regulator. The direction of flow must correspond to the arrow on the body. The filter element must be installed to hang downwards or sideways for applications with steam. Remember to leave enough space to remove the filter element.

5.3 Shut-off valve

Install a hand-operated shut-off valve both upstream of the strainer and at the outlet of the return flow pipe. This allows the plant to be shut down for cleaning and maintenance, and when the plant is not used for longer periods of time.

5.4 Pressure gauges

Install a pressure gauge both upstream and downstream of the regulator to monitor the pressures prevailing in the plant. Install the pressure gauge on the downstream side (return flow, –) behind the downstream pressure tapping point.

6 After-sales service

If the differential pressure deviates considerably from the set point, the seat and plug may leak due to dirt particles or natural wear. In case of a possible defect, check the regulator and replace it, if necessary.

WARNING!
Excessive pressure
Before performing any work on the regulator, depressurize the relevant plant section and, depending on the process medium, drain it as well. Shut off or disconnect the control lines.
High temperatures
When used at high temperatures, allow the plant section to cool down to ambient temperature.
Residual medium
As valves are not free of cavities, remember that residual process medium might still be contained in the valve.

Contact SAMSON's After-sales Service department for support concerning service or repair work or when malfunctions or defects arise.

E-mail

You can reach the After-sales Service Department at aftersalesservice@samson.

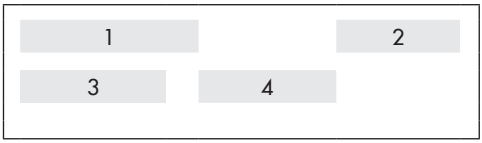
Addresses of SAMSON AG and its subsidiaries

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.

To assist diagnosis and in case of an unclear mounting situation, specify the following details (so far as possible). See section 7:

- Type and nominal size of the valve
- Model number and configuration ID (Var.-ID)
- Upstream pressure p_1 and downstream pressure p_2
- 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.)

7 Nameplate



1 Configuration ID (Var.-ID)
2 Type designation
3 Model number
4 Date of manufacture

In the other fields:

Nominal pressure PN or ANSI Class
K_{VS} or C_V coefficient
Max. permissible temperature in °C or °F
Set point range, differential pressure in bar or psi
Max. permissible differential pressure Δp in bar or psi

Fig. 3: *Nameplate*

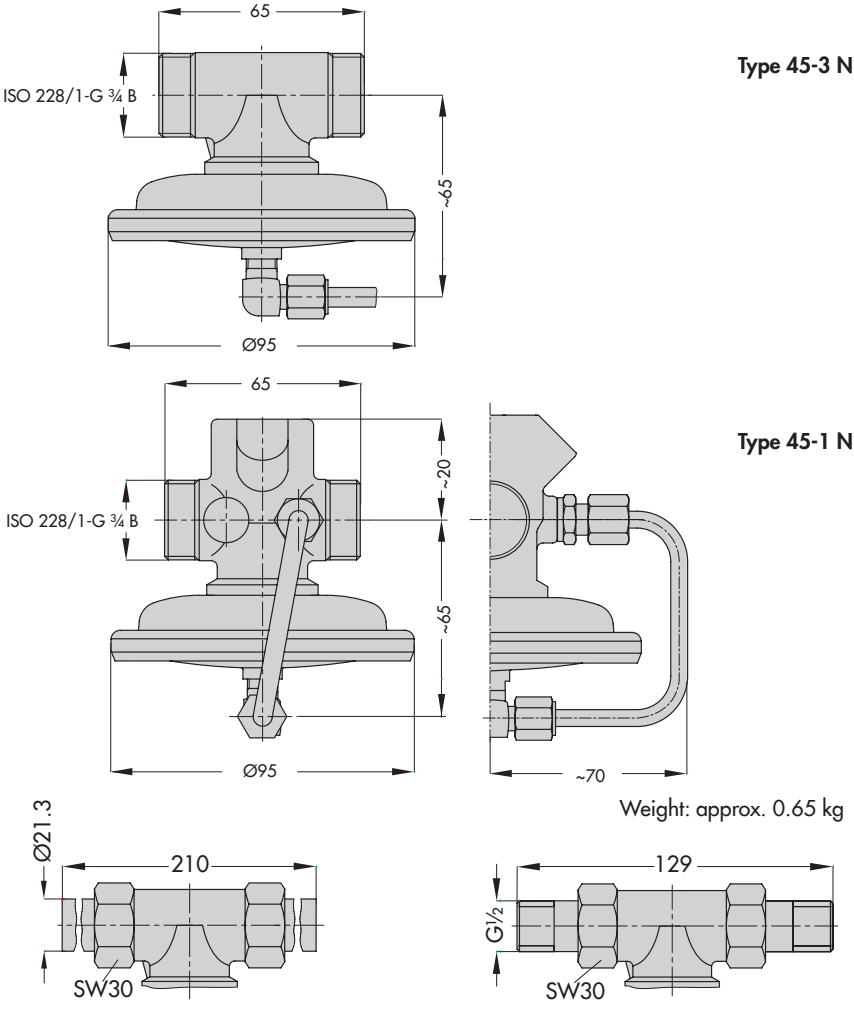
8 Technical data

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

Nominal size	**DN 15**
Connection	ISO 228/1- G ¾ B
Type of connection	Threaded ends G ½ · Welding ends
K_{VS} coefficient	2.5
Nominal pressure	PN 10
Max. perm. differential pressure Δp	4 bar
Max. permissible temperature Treated water Non-flammable gases	 110 °C 80 °C
Leakage class according to IEC 60534-4	Class I (≤0.05 % of K_{VS} coefficient)
x_{FZ} value	0.43
Fixed differential pressure set point (optional)	0.15/0.3 bar[1)]
Compliance	CE · EAC

1) Other differential pressure set points available on request

9 Dimensions



All dimensions in mm

Fig. 4: *Dimensions · Type 45-1 N/Type 45-3 N*

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