

# MOUNTING AND OPERATING INSTRUCTIONS



## EB 3140 EN

Translation of original instructions



Type 45-1 N



Type 45-3 N

## Type 45-1 N and Type 45-3 N Differential Pressure Regulators Self-operated Pressure Regulators

Edition June 2023

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## 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 ([aftersaleservice@samson.de](mailto:aftersaleservice@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 at [www.samsongroup.com](http://www.samsongroup.com) > **Service & Support** > **Downloads** > **Documentation**.

### **⚠ 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 ► [www.samsongroup.com/reach-en.html](http://www.samsongroup.com/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*

#### **i Note**

*Additional information*

#### **💡 Tip**

*Recommended action*

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### 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.
- 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.

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#### **NOTICE**

*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 (VDE 0165-1).*

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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 · Valve 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.

## Design and principle of operation

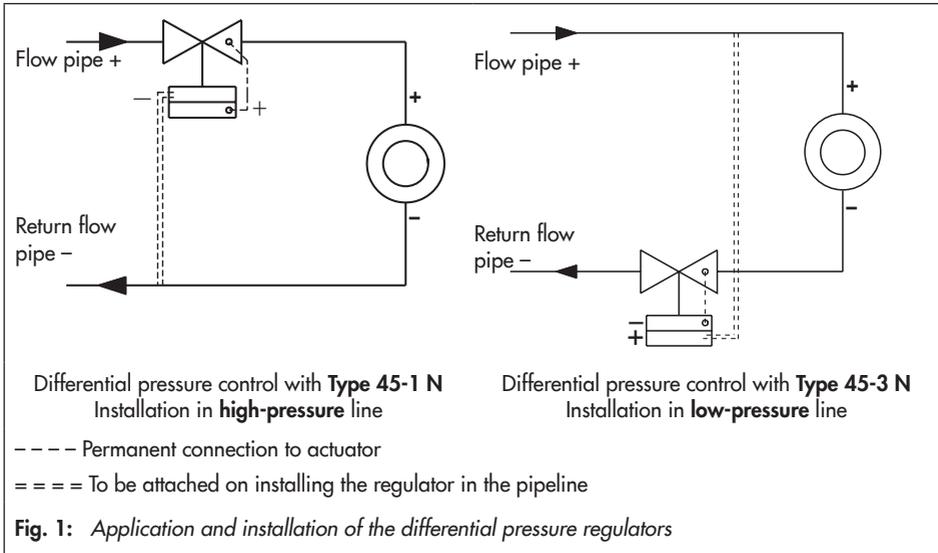
### Type 45-1 N (installation in the flow pipe)

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 pressure upstream of the valve (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).



Legend for Fig. 2

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

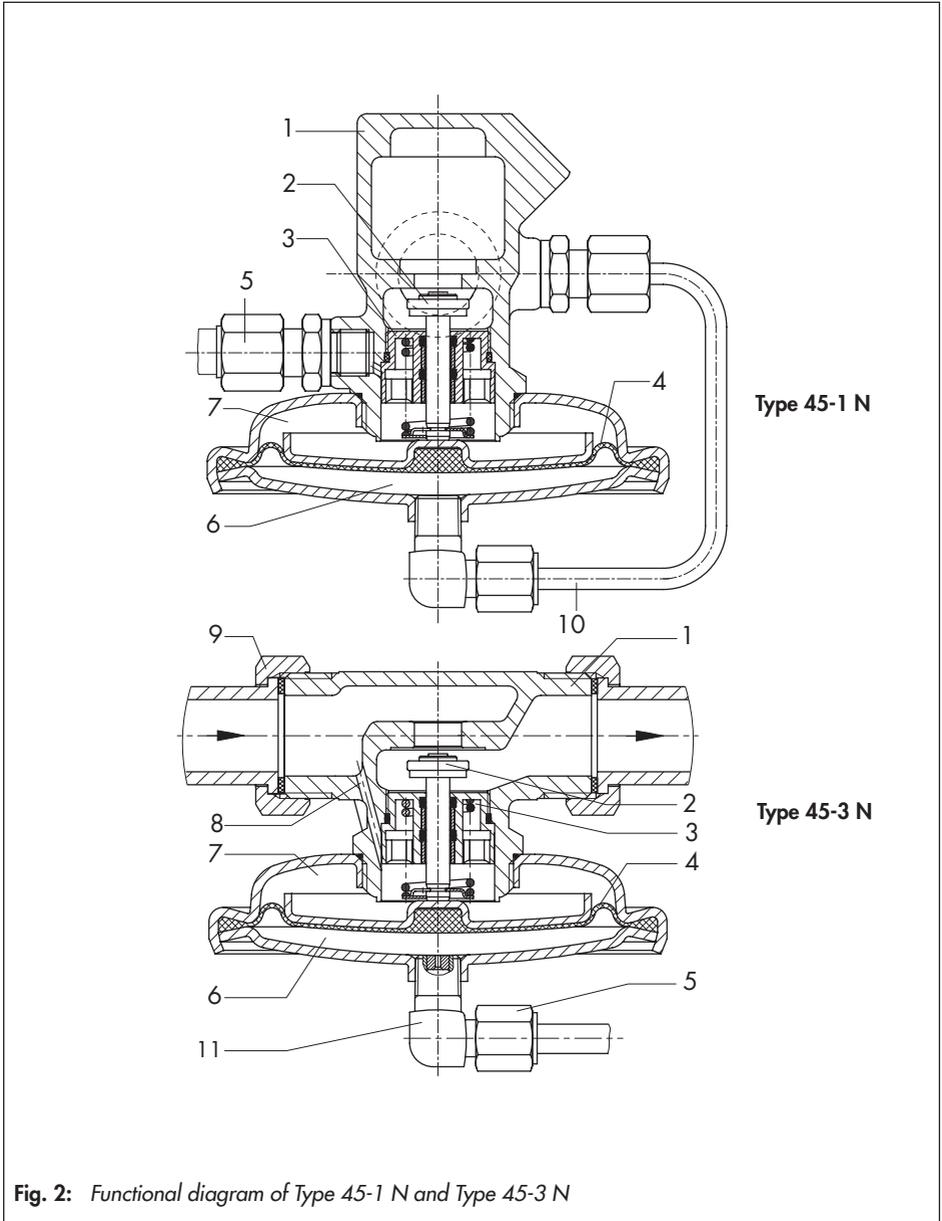
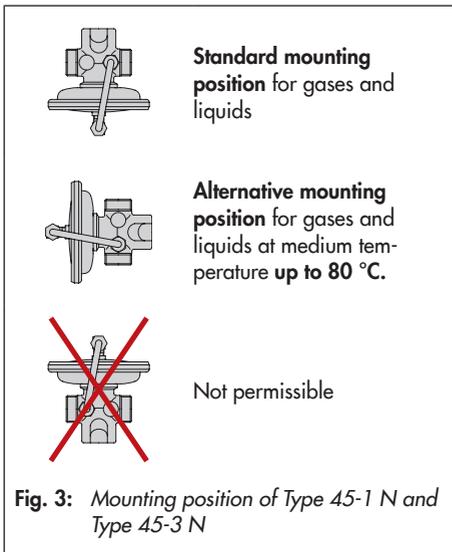


Fig. 2: Functional diagram of Type 45-1 N and Type 45-3 N

## 5 Installation

### Standard mounting position

- Install the regulator in a horizontal pipeline with the diaphragm actuator facing downward (see Fig. 3).
- When the medium temperature is **80 °C or lower**, the regulator can also be installed in vertical pipes (see Fig. 3).



### Installation conditions

- 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 1 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 Strainer

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 downward. Remember to leave enough space to remove the filter element.

## 5.2 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.

### 5.3 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.

### 5.4 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 on site is supplied with the regulator.

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

## 6 Start-up

- Do not start up the regulator until all parts have been mounted.
- Make sure the control lines are open and correctly connected.
- Open the shut-off valves slowly over a time period of several minutes starting from the upstream pressure side. Afterwards, open all the valves on the consumer side (downstream of the regulator).
- Open all the consumers in the plant (minimum drag in the plant) to achieve maximum flow rate.

## 7 After-sales service

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### **⚠ 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.*

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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.

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

#### **E-mail address**

You can reach our after-sales service at [aftersaleservice@samsongroup.com](mailto:aftersaleservice@samsongroup.com).

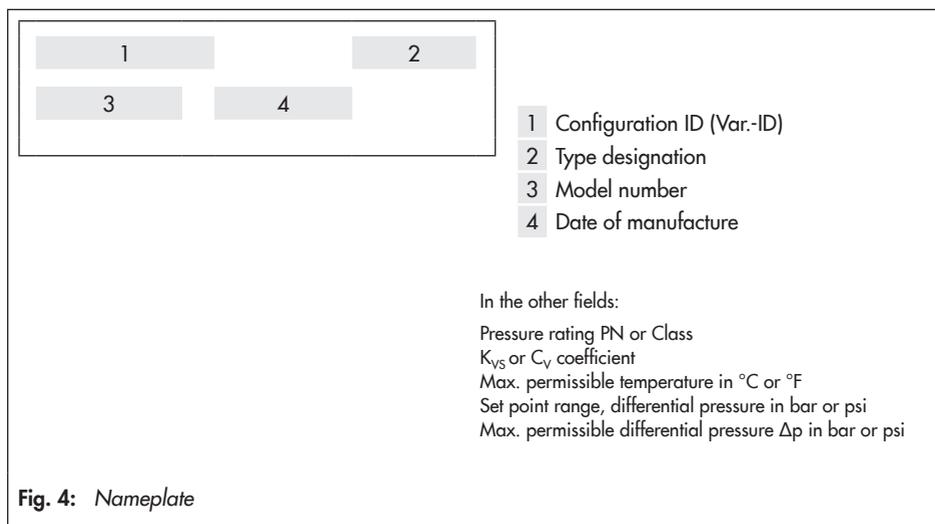
#### **Addresses of SAMSON AG and its subsidiaries**

The addresses of SAMSON, its subsidiaries, representatives and service facilities worldwide can be found on our website (▶ <https://www.samsongroup.com>) or in all SAMSON product catalogs.

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

- 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.)

## 8 Nameplate



## 9 Technical data

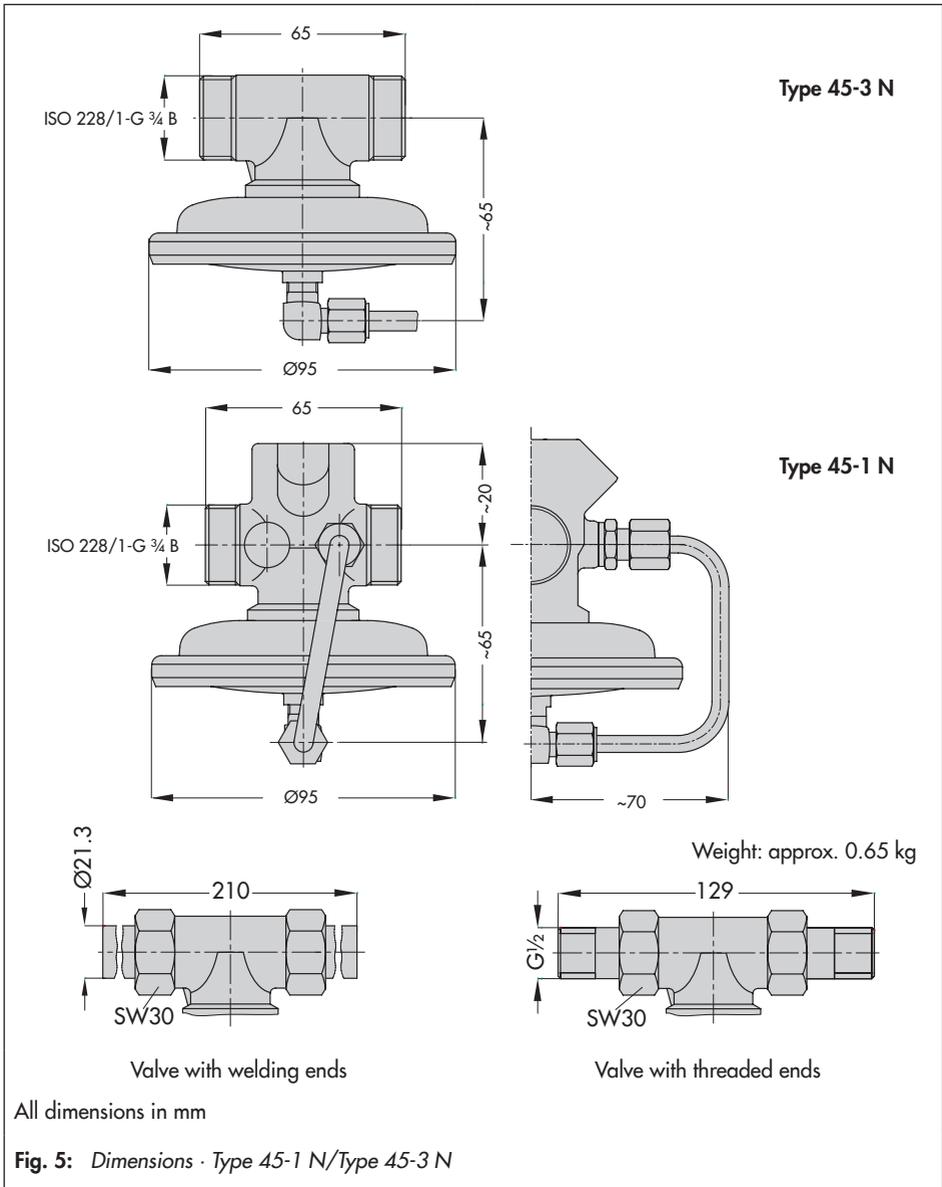
**Table 1:** Technical data · All pressures (gauge)

Valve size	DN 15
Connection	ISO 228/1 - G 3/4 B
Type of connection	Threaded ends G 1/2 · Welding ends
$K_{VS}$ coefficient	2.5
Pressure rating	PN 10
Max. perm. differential pressure $\Delta p$	4 bar
Max. perm. temperature	110 °C
Treated water	
Non-flammable gases	80 °C
Leakage class acc. to IEC 60534-4	Class I ( $\leq 0.05$ % of $K_{VS}$ coefficient)
$x_{FZ}$ value	0.43
Fixed differential pressure set point (optional)	0.15/0.3 bar <sup>1)</sup>

<sup>1)</sup> Other differential pressure set points available on request

## Dimensions

### 10 Dimensions









**EB 3140 EN**



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