**Self-operated Regulators**

# Type 46-5 and Type 46-6
# Differential Pressure and Flow Limiters

Translation of original instructions

Type 46-5

Type 46-6

## Mounting and Operating Instructions

## EB 3130 EN

Edition July 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 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 a EC declaration of conformity, which includes information about the applied conformity assessment procedure. This EC 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.

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***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: 2014 (VDE 0165 Part 1).*

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## 2 Process medium and scope of application

Differential pressure and flow rate limitation for district heating systems with indirect connection, extended piping systems and industrial applications · Valve DN 15 to 50 · PN 16/25
Suitable for liquids [1] up to 150 °C and gases up to 80 °C
The valve closes when the differential pressure rises. The flow rate is limited.

[1] The materials in the regulator are also resistant to high concentrations of glycol. Nevertheless, glycol reacts when it comes into contact with metals and causes acids to form. We cannot prevent this reaction. Therefore, it must be prevented by using suitable inhibitors.

## 3 Transportation and storage

The regulator must be carefully handled, transported and stored. Protect the regulator against adverse influences, such as dirt, moisture or frost, during storage and transportation.

When regulators are too heavy to be lifted by hand, fasten the lifting sling at a suitable place on the valve body support on the valve.

## 4 Design and principle of operation

*See Fig. 1 on page 6 and Fig. 3 on page 7.*

The regulators basically consist of a valve (1) with restriction (1.2) and balanced plug (3) as well as a closing actuator with an operating diaphragm (6.1). In Type 46-5, the springs (5) integrated into the valve determine the set point. Whereas, in Type 46-6, the set point can be adjusted by the set point springs (8) on the actuator.

The regulators are used to limit the differential pressure and flow rate to the adjusted set points. The valve closes when the differential pressure (flow rate) increases. The medium flows through the valve in the direction indicated by the arrow on the valve body. The flow rate and differential pressure are determined by the area released by the valve plug (3) and the restriction (1.2). The high pressure is transmitted to the operating diaphragm (6.1) in the actuator over an externally routed control line (11). The pressure downstream of the restriction (1.2) is transmitted through a hole in the plug to the low-pressure side of the operating diaphragm. The resulting differential pressure creates a positioning force at the diaphragm which moves the plug depending on the force of the valve spring (5) or set point springs (8). The maximum flow rate (flow limitation) is adjusted at the restriction (1.2) using the set point screw (17). The cross-section of the valve is changed in such a way that the differential pressure and the differential pressure created at the restriction are identical when the required

maximum flow rate exists. An overload protection (excess pressure limiter) (6.4) in the actuator protects the seat and plug from overload during exceptional operating conditions that could lead to valve or plant damage.

Legend for Fig. 1 and Fig. 2

| | |
|---|---|
| 1 | Valve body |
| 1.1 | Connection nut with seal and welding end |
| 1.2 | Restriction |
| 2 | Seat |
| 3 | Guide nipple with plug section |
| 4 | Plug stem |
| 5 | Springs |
| 6 | Actuator |
| 6.1 | Operating diaphragm |
| 6.2 | Actuator stem |
| 6.3 | Nut |
| 6.4 | Internal excess pressure limiter (overload protection) |
| 7 | Distance ring |
| 8 | Set point springs |
| 9 | Spring plate |
| 10 | Set point adjuster for differential pressure |
| 11 | Control line (high pressure) |
| 15 | Screws |
| 16 | Lock nut |
| 17 | Set point screw for flow rate (hexagon socket screw SW 4) |
| 18 | Cap |
| 19 | Handwheel |
| 20 | Spindle |
| 21 | Support |

**Type 46-5** · Flanged valve body

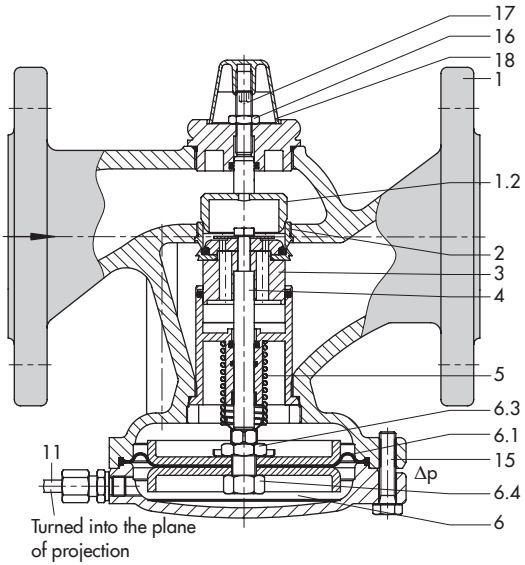



**Fig. 1:** *Functional diagram of Type 46-5 and Type 46-6 with flanged valve body*

**Table 1:** *Tightening torques in Nm*

| Position | DN | Nm |
|---|---|---|
| Guide nipple (3) | 15 to 25 | 70 |
| | 32 to 50 | 110 |
| Screws (15) | 15 to 32 | 8 |
| | 40 to 50 | 18 |

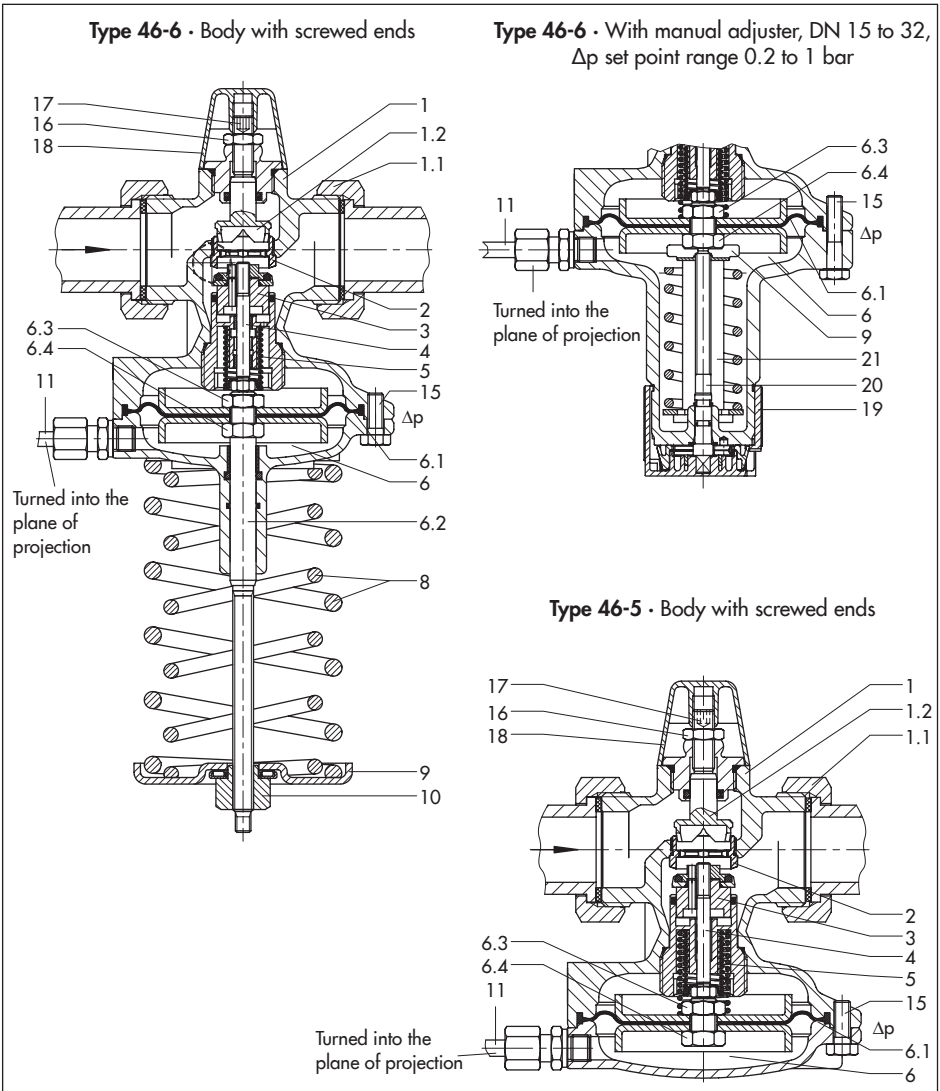



**Fig. 2:** *Functional diagram of Type 46-5 and Type 46-6 with body with screwed ends*

# 5 Installation

## 5.1 Mounting position

*See Fig. 1 on page 6 and Fig. 2 on page 7.*

The regulators are mainly installed in the low-pressure line, e.g. return flow pipe of the plant.

In district heating plants, the regulators must be installed in the return flow pipes only (see Fig. 3).

**Standard installation** · Install the regulators in horizontal pipelines with the actuator facing down.

The regulator in nominal sizes DN 15 to 25 can also be installed in vertical pipes.

The following generally applies:

- 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 NI) upstream of the regulator (see section 5.2).
- The direction of flow must match the direction indicated by the arrow on the body.
- Connect external control lines at the side of the main pipe (see Fig. 4)

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

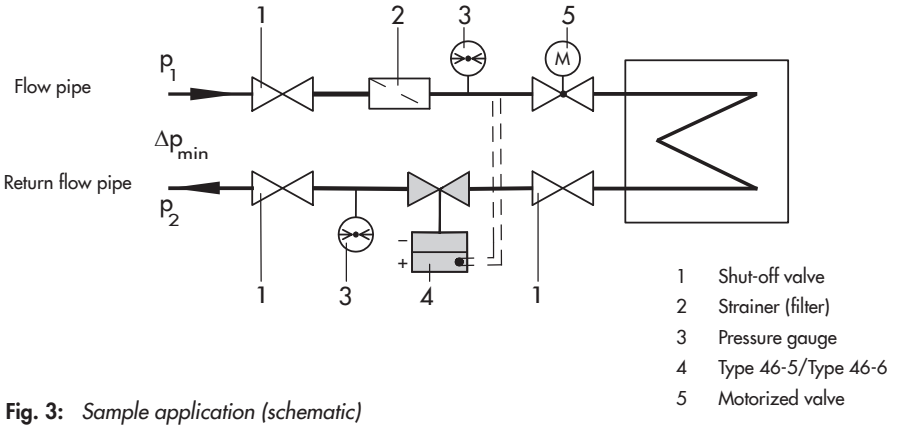



**Fig. 3:** *Sample application (schematic)*

! ***NOTICE***
*Possible malfunction and damage due to adverse effects of weather conditions (temperature, humidity). Do not install the regulator outdoors or in rooms prone to frost. If such a location cannot be avoided, protect the regulator against freezing up if the process medium flowing through the valve can freeze up. Either heat the regulator or remove it from the plant and completely drain the residual medium.*

## 5.2 Strainer (filter)

A strainer installed upstream in the flow pipe holds back any dirt or other foreign particles. For example, the SAMSON Type 1 NI Strainer is suitable (▶ T 1010).

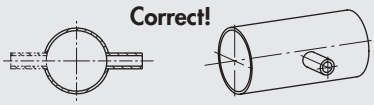
- Install the strainer upstream of the regulator.
- The direction of flow must correspond to the arrow on the body.
- The filter element must be installed to hang downwards.
- Remember to leave enough space to remove the filter element.

## 5.3 Shut-off valve

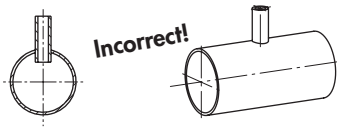
Install a hand-operated shut-off valve both upstream of the strainer and at the outlet of the return flow pipe. This allows the plant to be shut down for cleaning and maintenance, and when the plant is not used for longer periods of time (see Fig. 3).

## 5.4 Pressure gauge

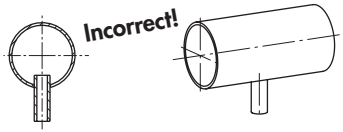
Install a pressure gauge at a suitable point to monitor the pressures prevailing in the plant (see Fig. 3).



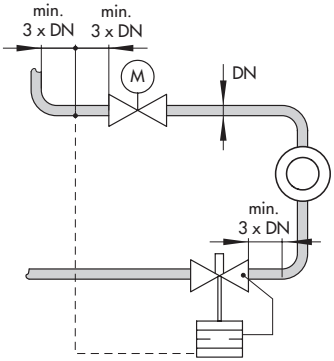

Connection at the side – optimal




Connection at the top – incorrect position




Connection at the bottom – incorrect position




DN = Nominal size

Control line connection, depending on how the pipeline is routed

**Fig. 4:** *Control line connection*

## 5.5 Control line

**Control line** (see Fig. 4) · Depending on the regulator version, a control line (standard: 6x1 mm pipe diameter) must be adapted and mounted on site. Make sure that the control line is free of dirt.
The control line for tapping pressure from the pipeline must be installed at least 3 x DN away from any pipe fittings (e.g. restrictions, bends or branches), that may cause turbulence in the flow. How the lines are routed generally depends on the installation site.
Preferably connect the control line to the side of the main pipe.
Do not change the pipe diameter of the main pipeline so that it is off center!
Refer to installation schematics (Fig. 3) for line routing.

# 6 Operation

*See Fig. 1 on page 6 and Fig. 2 on page 7.*

## 6.1 Start-up

➔ First start up the regulator after mounting all parts.

➔ Make sure the control lines are open and correctly connected.

➔ Open all the valves on the consumer side. Open the shut-off valves **slowly** preferably starting from the return flow pipe.

***Note:***
*On filling the plant, make sure the restriction (1.2) is open by turning the set point screw (17) counterclockwise (↺) as far as it will go.*

**Pressure testing of the plant** · All plant components must be designed for the test pressure. Replace the regulator, if necessary.

***NOTICE***
*Impermissible excessive pressure.*
*The diaphragm actuator can be damaged.*
*The pressure must not exceed the* ***nominal pressure by 1.5 times*** *on testing the pressure of the plant when the regulator is already installed.*

**Rinsing the plant** · After filling the plant, first completely open the consumers. Set the maximum flow cross-section (by turning the set point screw counterclockwise (↺) as far as it will go) and the maximum differential pressure (by tensioning the set point spring). Rinse out the pipeline at full flow rate for several minutes. Check the installed strainer (e.g. by measuring the pressure drop). Clean the strainer, if necessary.

## 6.2 Adjusting the set point

The following generally applies: first adjust the differential pressure set point and the flow limitation afterwards.

## 6.3 Differential pressure set point

### 6.3.1 Adjusting the differential pressure set point

For **Type 46-6** · Adjust the desired **differential pressure** at the set point adjuster (10) or manual adjuster (19) with the plant almost shut and with fully open restriction (1.2). First afterwards adjust the limit value for the flow rate.

**Set point adjuster (10) or manual adjuster (19):**

➔ Turn clockwise ↻:
Tension the springs to increase the set point.

➔ Turn counterclockwise ↺:
Relieve the spring tension to reduce the set point.

**How to proceed**

Close the motorized valve.

➔ Unscrew the cap (18) and undo lock nut (1.2).

➔ Open the restriction (1.2) so that the flow restriction does not take effect by turning the set point screw (17) counterclockwise ↺ as far as it will go.

➔ Slightly open the motorized valve (approx. 10 % travel).

➔ Adjust the differential pressure by turning the set point adjuster (10) to load the set point springs (8).

For regulators in sizes DN 15 to 32 with set point range from 0.2 to 1 bar, the set point spring is installed in the bottom section of the valve body.

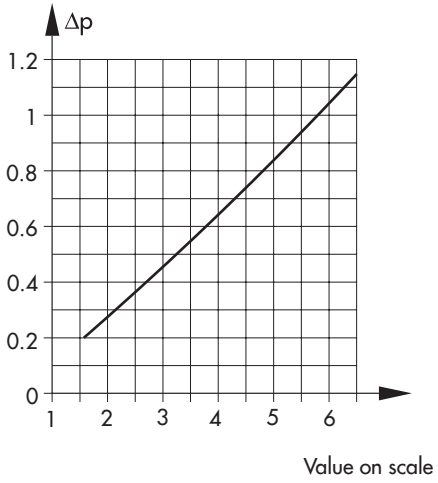



**Fig. 5:** *Differential pressure set point adjusted at the manual adjuster according to the value on the scale*

In this case, the set point can be directly adjusted at the manual adjuster (19) according to the scale.

One turn of the manual adjuster will change the differential pressure by 0.033 bar.

***Note:***
*Do not adjust the set point to a value on the scale lower than 1. Under unfavorable conditions, the set point cannot be adjusted anymore as a result. In this case, the following action is recommended:*
*– Relieve the regulator of pressure.*
*– Turn the manual adjuster counterclockwise ↺ as far as it will go to its lowest position.*
*– Turn the manual adjuster back clockwise ↻ at least past the the value 1 to 2 on the scale.*
*The set point can be adjusted again.*

## 6.4 Adjusting the flow limitation

To achieve the maximum flow rate, all control and shut-off valves as well as all consumers including the motorized valve must be open (to ensure minimum drag in the plant).

Close the bypass valve, if installed.

***Note:***
*Set point adjustment is always based on a closed restriction (1.2).*

**Set point screw (17)**
(hexagon socket SW 4):

➔ Turn clockwise ↻:
The restriction closes. The flow rate drops.

➔ Turn counterclockwise ↺:
The restriction opens. The flow rate rises.

### 6.4.1 Based on a known plant pressure drop

To adjust the flow rate limit when the pressure drop of the plant is known, use the adjustment diagrams for water (Fig. 7, Fig. 8 and Fig. 9).

**How to proceed**

➔ Unscrew the cap (18).

➔ Undo lock nut (16) and turn the set point screw (17) clockwise as far as it will go to close the restriction.

➔ Adjust the flow rate according to the value determined (number of turns in counterclockwise direction ↺).

➔ Secure restriction setting using the lock nut (16) at the set point screw (17). Screw cap (18) back on.

➔ Lead-seal the set point setting at set point screw (17) and cap (18).

For special versions with a scaled cap, the limit value can be adjusted directly. One scale division corresponds to one turn of the set point screw (17).

***Note:***
*To determine the flow limitation to be adjusted, and for Type 46-6 additionally the differential pressure required, the differential pressure across the restriction ($\Delta p_{restriction}$) must be added to the known pressure drop of the plant ($\Delta p_{plant}$). From experience, the differential pressure at the restriction is assumed to be 0.2 bar. The curves of the flow ranges in the following diagrams (Fig. 7, Fig. 8 and Fig. 9) apply to 0.2 and 0.4 bar.*

### 6.4.2 Based on an unknown plant pressure drop

**How to proceed**

➔ Unscrew the cap (18).

➔ Undo lock nut (16) and turn the set point screw (17) clockwise ↻ to close the restriction.

➔ Completely open the motorized valve.

➔ Open the restriction initially one turn at a time. Check the flow rate at the heat meter (reading of flow measuring unit). Adjust the flow rate in smaller steps until the required flow rate is constant (2 % deviations are generally acceptable).

If the maximum flow rate is not reached, the differential pressure set point (in Type 46-6) must be increased.

➔ After reaching the required flow rate, secure the restriction setting using the lock nut (16). Screw cap (18) back on.

➔ Lead-seal the set point setting at set point screw (17) and cap (18).

## 6.5 Decommissioning

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

**Table 2:** *Flow rate set points for water in m³/h*

| $\Delta p_{set\ point}$ | $\Delta p_{plant}$ | $\Delta p_{restriction}$ | DN ... | 15 | | | | 20 | 25 | 32 | 40 [1] | 50 [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $K_{VS}$ | 0.4 | 1 | 2.5 | 4 | 6.3 | 8 | 12.5 | 16/20 [2] | 20/25 [2] |
| 0.2 bar | 0.1 bar | 0.1 bar | $\dot{V}$ Max. | 0.14 | 0.45 | 0.85 | 1.8 | 2.6 | 3.0 | 7.1 | 8.9 | 10.7 |
| | | | $\dot{V}$ Min. | 0.01 | 0.12 | 0.2 | 0.5 | 0.8 | 0.8 | 2 | 3 | 4 |
| 0.5 bar | 0.3 bar | 0.2 bar | $\dot{V}$ Max. | 0.2 | 0.65 | 1.2 | 2.5 | 3.6 | 4.2 | 10 | 12.5 | 14.1 [2] |
| | | | | – | – | – | 1.3 [2] | 2.3 [2] | 3.5 [2] | 5.8 [2] | 9.1 [2] | 14.1 [2] |

[1] Additional version: Valve with flanged body made of spheroidal graphite iron (EN-GJS-400-18-LT)

[2] An increase in noise level can be expected when the specified flow rates are exceeded, even if cavitation does not occur.

## 6.6 Pressure conditions in the plant and at the regulator

On selecting the differential pressure set point or set point range, note that the differential pressure set point results from the known pressure drop across the fully open plant and the differential pressure created at the restriction.

The flow rate set points for water at a differential pressure at the restriction $\Delta p_{restriction}$ of 0.1 and 0.2 bar are specified in Table 2.

$$\mathbf{\Delta p_{set\ point}} = \Delta p_{plant} + \Delta p_{restriction}$$

The minimum required differential pressure $\Delta p_{min}$ across the valve is calculated as follows:

$$\mathbf{\Delta p_{min}} = \Delta p_{set\ point} + \left(\frac{\dot{V}}{K_{VS}}\right)^2$$

| | |
|---|---|
| $\Delta p_{min}$ | Minimum differential pressure across the valve in bar |
| $\Delta p_{restriction}$ | Differential pressure created at the restriction for measuring the flow rate |
| $\Delta p_{set\ point}$ | Differential pressure set point in bar |
| $\Delta p_{plant}$ | Differential pressure (pressure loss) when the plant is completely open in bar |
| $\dot{V}$ | Adjusted flow rate in $m^3/h$ |
| $K_{VS}$ | Valve flow coefficient in $m^3/h$ |

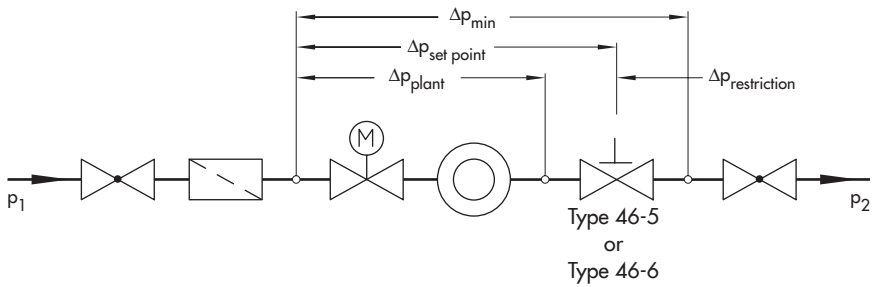



**Fig. 6:** *Pressure conditions in the plant*

## 6.7 Sample application

Adjusting the flow limitation (medium: water) when the pressure loss across the plant is known.

**Known:**

– **Type 46-6, DN 15, $K_{VS}$ = 1**
  The regulator is to limit the flow rate in the plant to **0.63 m³/h**.
– The pressure drop across the plant ($\Delta p_{plant}$) is **0.4 bar**.
– Determine the adjustment values using the adjustment diagram Fig. 7 on page 17.

**To be determined:**

What is the limit value of the differential pressure set point and how many turns of the set point screw are necessary?

**Solution:**

Sequence: points **A** to **E** in diagram (Fig. 7).

The calculation is based on the pressure drop Δp in the plant, therefore, this value must be known.

**Δp = 0.4 bar** is specified in the example and corresponds with **point A** in the diagram. The differential pressure at the restriction ($\Delta p_{restriction}$) assumed to be **0.2** bar in the example, must be added.

A line representing this value is drawn from **A** across to the right and results in **point B**. Point B is situated on the same straight line for the differential pressure Δp = 0.6 bar.

Differential pressure to be set: **Δp = 0.6 bar.**

A vertical line is drawn from **point B** until it reaches the limiting curve for the flow rate (in the example, it is 0.63 m³/h). This is **point C**.

The horizontal line is drawn from **point C** across to the curve relevant for the nominal size (DN) or $K_{VS}$ coefficient used; this is **point D**.

When a line is drawn vertically upwards from **point D**, this results in **point E** which indicates how many turns of the set point screw are required.

The example shows that around **6 turns** are required.

Based on a closed restriction, turn the set point screw (17) six turns counterclockwise ↺ to open the restriction.

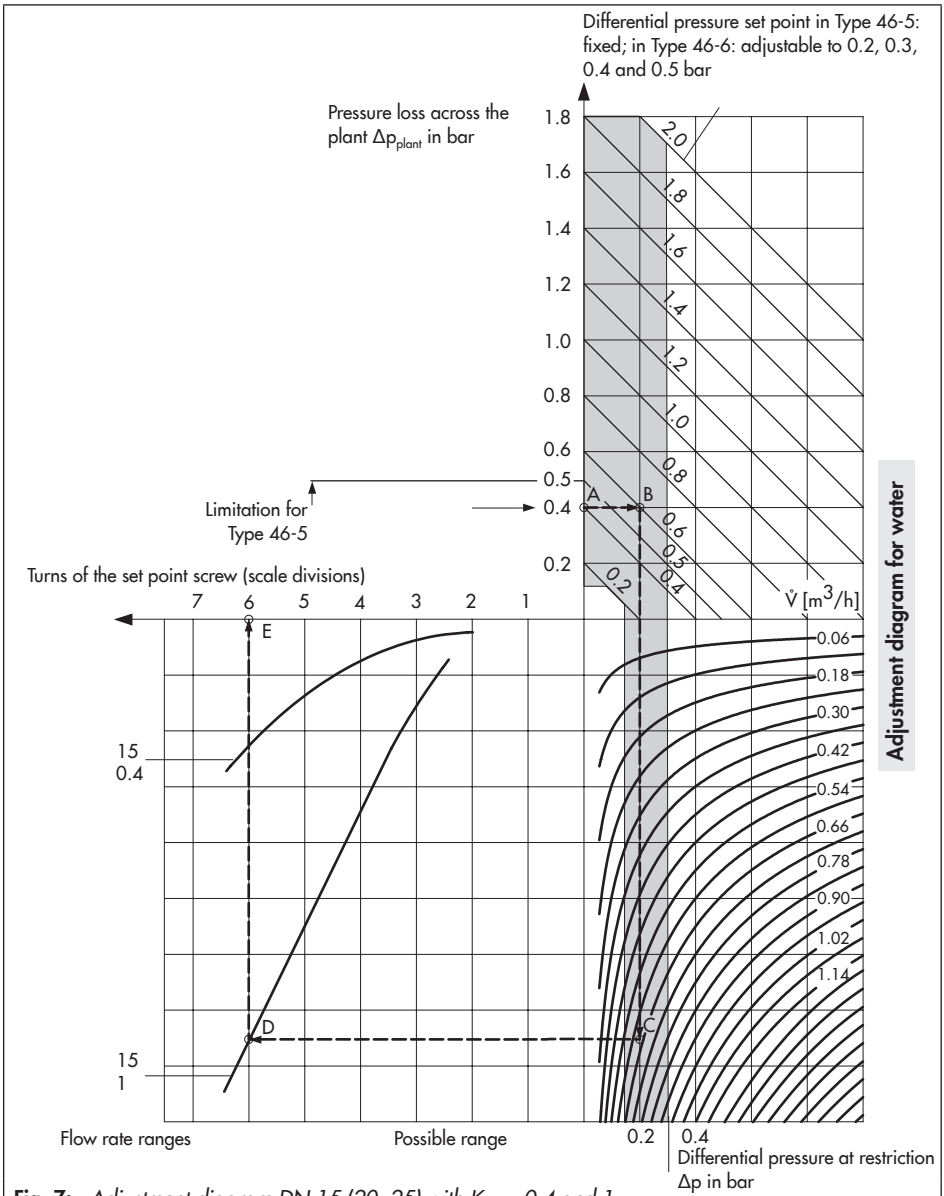



**Fig. 7:** *Adjustment diagram DN 15 (20, 25) with $K_{VS}$ = 0.4 and 1*

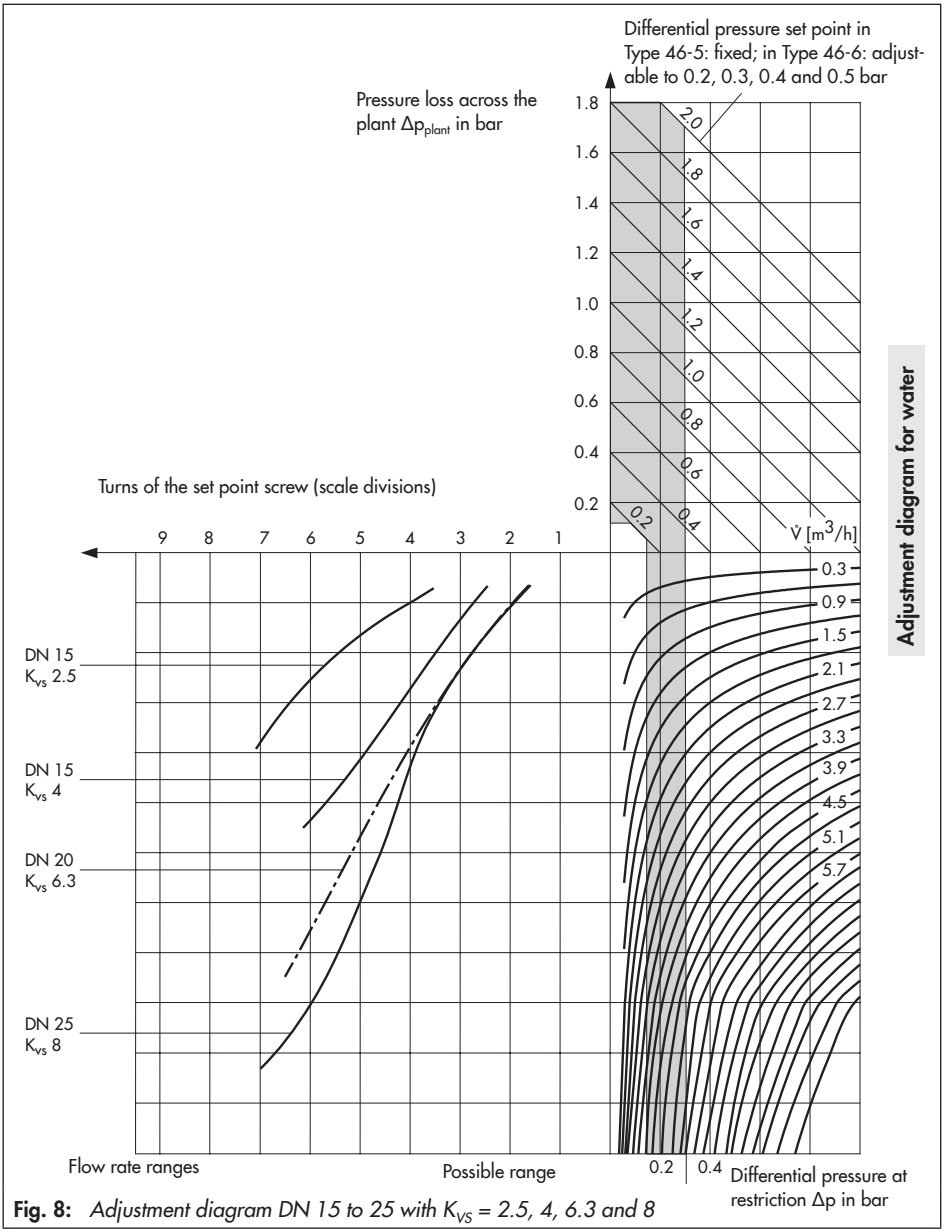



**Fig. 8:** *Adjustment diagram DN 15 to 25 with $K_{VS}$ = 2.5, 4, 6.3 and 8*

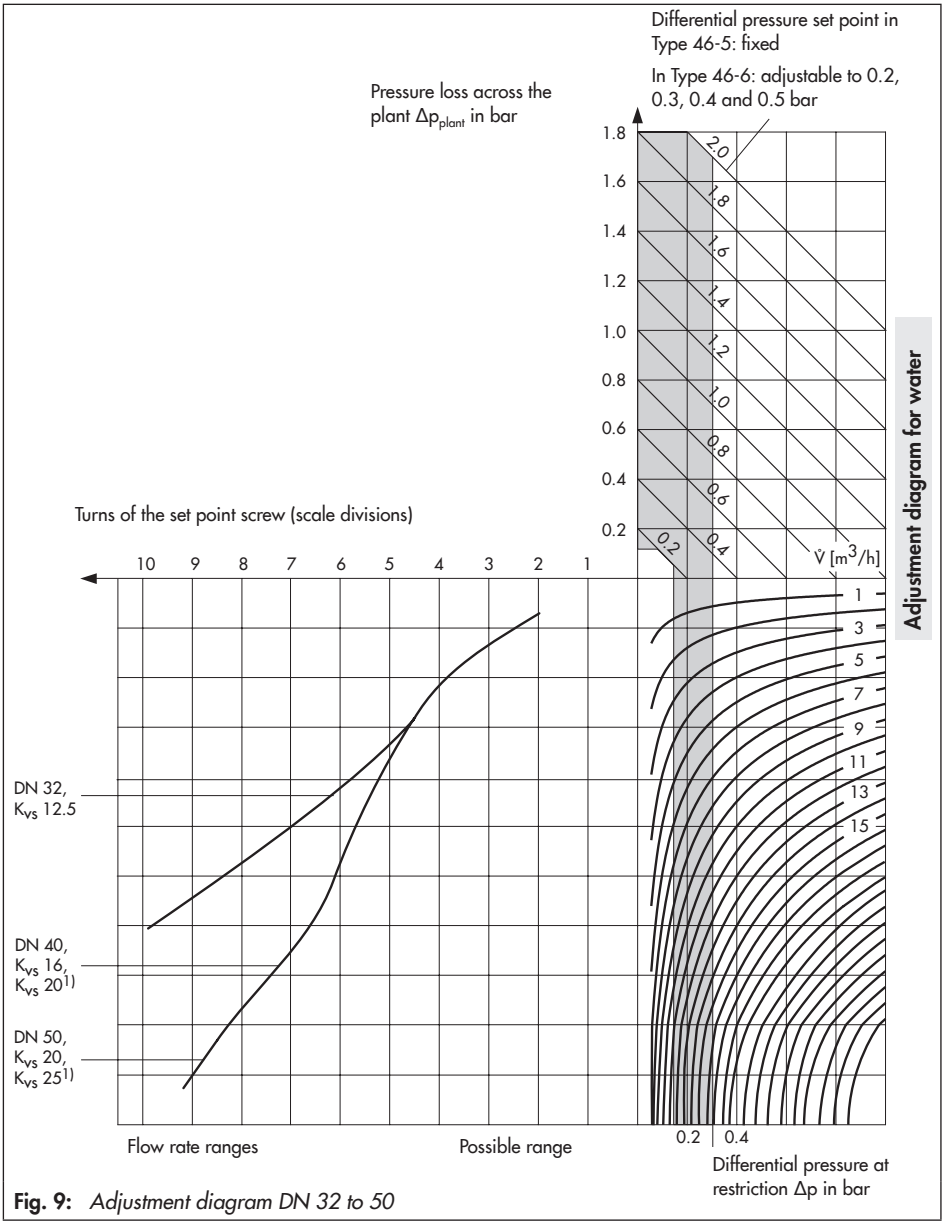



**Fig. 9:** *Adjustment diagram DN 32 to 50*

# 7 Maintenance · Replacing parts

*See Fig. 1 on page 6 and Fig. 2 on page 7.*

The regulator does not require any maintenance. Nevertheless, it is 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.

Details on faults and how to remedy them can be found in Table 3. If faults cannot be remedied following the recommended action, contact SAMSON.

To replace the plug and operating diaphragm, proceed as described in section 7.1 and 7.2.

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***WARNING!***
*Before performing any work on the regulator, make sure the relevant plant section has been depressurized and, depending on the process medium, drained as well. We recommend removing the valve from the pipeline. When used at high temperatures, allow the plant section to cool down to ambient temperature.*
*Disconnect or shut off the control line to prevent the risk of moving regulator parts. As valves are not free of cavities, remember that residual process medium might still be contained in the valve.*

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## 7.1 Cleaning or replacing the plug

1. Unscrew the external control line (11) and remove the device from the pipeline.
2. For Type 46-6, completely relieve the tension from the spring (8) by turning the set point adjuster (10) or manual adjuster (19) counterclockwise ↺.
3. Loosen the screws (15) and lift the actuator off the valve body. Pull the valve spring (5), if installed, out of the body.
4. For valve sizes DN 15 to 25, unscrew and pull out the guide nipple with plug section (3) using a socket wrench (order no. 1280-3001).

   For valve sizes DN 32 to 50, unscrew the stopper first and pull out the plug section.
5. Clean the seat and plug thoroughly. Check the control line for any blockages. If the plug is damaged, replace the entire plug section with a new one.
6. To reassemble, proceed in reverse order. Observe tightening torques specified in Table 1.

## 7.2 Replacing the diaphragm

*See Fig. 1 on page 6 and Fig. 2 on page 7.*

1. Unscrew the external control line (11) and remove the device from the pipeline.
2. For Type 46-6, completely relieve the tension from the spring (8) by turning the set point adjuster (10) or manual adjuster (19) counterclockwise ↺.
3. Unscrew the screws (15). Remove the bottom diaphragm case together with the operating diaphragm (6.1) and diaphragm plate.
4. Hold the bottom nut (6.4) stationary and unscrew the nut (6.3).
5. Replace the diaphragm and screw tight nut (6.3) (tightening torque of 22 Nm).
6. To reassemble, proceed in reverse order. Observe tightening torques specified in Table 1.

**Type 46-6: version with manual adjuster**

1. Unscrew the control line (11).
2. Completely relieve the tension from the spring (8) by turning the manual adjuster (19) counterclockwise ↺ until a clicking noise is heard.
3. Remove the screws (15). Take off the bottom section (22) of the valve body.
4. Unscrew the complete unit, consisting of diaphragm (6.1) together the diaphragm plates, spring (8) and support (21), from the spindle (20) by turning the unit counterclockwise ↺. Remove it from the bottom section of the valve body.
5. Push the complete assembly unit over the spindle (20) and turn it clockwise ↻ one turn to fasten it onto the spindle.
6. Lift the diaphragm plate to check whether the thread of the spring plate (23) has engaged. If not, turn it once more.
7. To continue assembly, proceed in reverse order. Observe tightening torques specified in Table 1.

For start-up, proceed as described in section 6.1.

**Table 3:** *Troubleshooting*

| Malfunction | Possible reasons | Recommended action |
|---|---|---|
| Flow rate or differential pressure exceeds adjusted set point | Leak between seat and plug | Remove valve from the pipeline and clean seat and plug. Renew plug, if necessary (see section 7.1). If this is not possible, return regulator to SAMSON for repair. |
| | Defective operating diaphragm | Replace diaphragm (see section 7.2) or return regulator to SAMSON for repair. |
| | Control line blocked | Remove control line and clean it. |
| | Valve too large for control task (flow rate) or too small (differential pressure) | Recalculate $K_{VS}$ and contact SAMSON for further action. |
| Flow or differential pressure set point not reached | Leak between seat and plug | Remove valve from the pipeline and clean seat and plug. Renew plug, if necessary (see section 7.1). If this is not possible, return regulator to SAMSON for repair. |
| | Incorrect set point range selected. | Check set point range and contact SAMSON for further action. |
| | Safety device, e.g. pressure limiter, has been triggered. | Check plant. Unlock safety device. |
| | Plant differential pressure too low | Compare differential pressure in the plant with the plant's drag. |
| | Strainer blocked | Drain and clean filter of the strainer. |
| | Incorrectly installed valve (direction of flow). | Install the valve in such a way that the flow of direction corresponds with the direction indicated by the arrow on the valve body. |
| Control loop hunts. | Valve too large for control task | Recalculate $K_{VS}$ and contact SAMSON for further action. |

# 8 Customer inquiries

Contact SAMSON's After-sales Service department for support concerning maintenance or repair work or when malfunctions or defects arise.
**E-mail:** aftersalesservice@samson.de

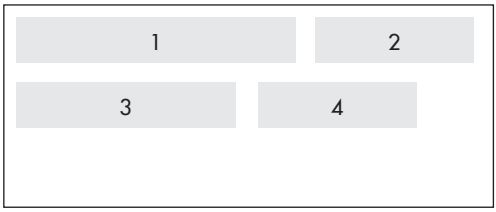
**Addresses of SAMSON AG and its subsidiaries**

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 (on nameplate):

- Device type and nominal size
- Model number or configuration ID (Var.-ID)
- 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.)

# 9 Nameplate

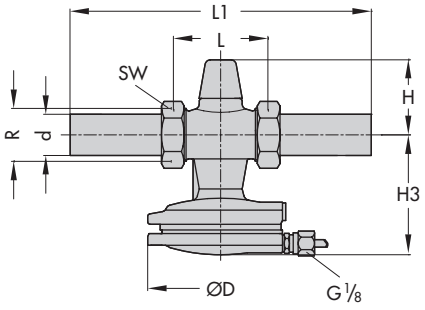



1 Configuration ID (Var.-ID)
2 Type designation
3 Model number
4 Date of manufacture

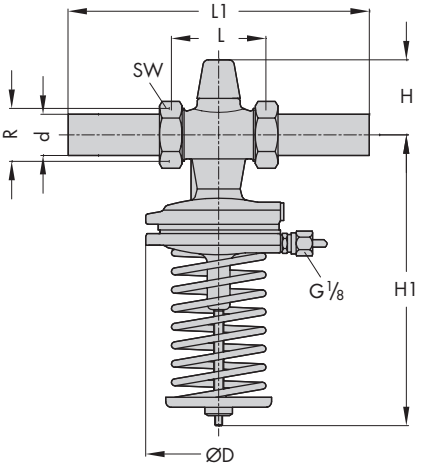
In the other fields:
$K_{VS}$ or $C_V$ coefficient
Max. permissible temperature in °C or °F
Differential pressure set point range in bar or psi
Flow rate set point range in m³/h
Max. perm. differential pressure Δp
Nominal pressure PN or ANSI Class

**Fig. 10:** *Nameplates*

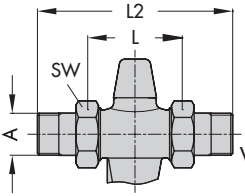
# 10 Dimensions and weights



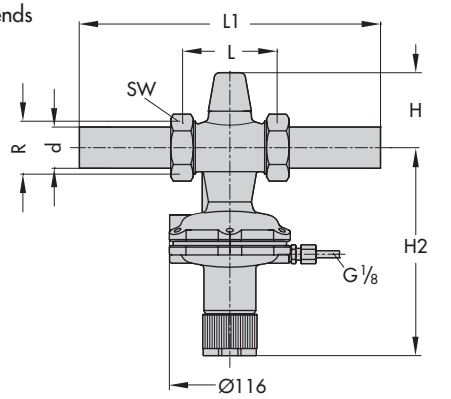

**Type 46-5** · With welding ends



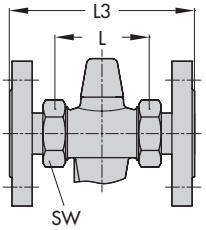

**Type 46-6** · With welding ends



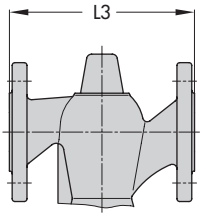

With threaded ends




**Type 46-6** · With manual adjuster, DN 15 to 32, set point range 0.2 to 1 bar




With flanges




With flanged body (DN 32, 40 and 50)

**Fig. 11:** *Dimensional drawings*

**Table 4:** *Regulator **with** connecting parts · Dimensions in mm and weights in kg*

| Valve size | | DN 15 | DN 20 | DN 25 | DN 32 | DN 40 | DN 50 |
|---|---|---|---|---|---|---|---|
| **With welding ends** | | | | | | | |
| L1 | | 210 | 234 | 244 | 268 | 294 | 330 |
| Weight, approx. kg | 46-5 | 1.6 | 1.7 | 1.8 | 3 | 5.5 | 6 |
| | 46-6 | 2.0 | 2.1 | 2.2 | 3.2 | 10 | 10.5 |
| **With threaded ends** | | | | | | | |
| L2 | | 129 | 144 | 159 | 192 | 206 | 228 |
| Male thread A | | G ½ | G ¾ | G 1 | G 1¼ | G 1½ | G 2 |
| Weight, approx. kg | 46-5 | 1.6 | 1.7 | 1.8 | 3 | 5.5 | 6 |
| | 46-6 | 2.0 | 2.1 | 2.2 | 3.2 | 10 | 10.5 |
| **With flanges [1] [2] or with flanged body (DN 32 to 50)** | | | | | | | |
| L3 | | 130 | 150 | 160 | 180 | 200 | 230 |
| Weight, approx. kg | 46-5 | 3.0 | 3.7 | 4.3 | 6.2 | 9.5 | 11 |
| | 46-6 | 3.4 | 4.1 | 4.7 | 6.4 | 14 | 15.5 |

1) PN 16/25
2) Flanges are already mounted on valves in DN 40 and 50

The dimensions and weights of valves with flanged bodies (DN 32, 40 and 50) are the same as valves with screwed-on flanges.

**Table 5:** *Regulators **without** connecting parts · Dimensions in mm*

| Valve size | DN 15 | DN 20 | DN 25 | DN 32 [1] | DN 40 [1] | DN 50 [1] |
|---|---|---|---|---|---|---|
| Pipe Ø d | 21.3 | 26.8 | 32.7 | 42 | 48 | 60 |
| Width across flats SW | 30 | 36 | 46 | 59 | 65 | 82 |
| L | 65 | 70 | 75 | 100 | 110 | 130 |
| H | 65 | | | 85 | | |
| H1 | 230 | | | 250 | 380 | |
| H2 | 160 | | | 180 | - | |
| H3 | 85 | | | 105 | 140 | |
| ØD | 116 | | | | 160 | |

1) Additional version: valve with flanged body

# 11 Technical data

| Nominal size | 15 | 20 | 25 | 32 [1] | 40 [1] | 50 [1] |
|---|---|---|---|---|---|---|
| $K_{VS}$ coefficient | 2.5 | 6.3 | 8 | 12.5 | 16 | 20 |
| Special version | 0.4 · 1 · 4 | – | | | | |
| Flanged body | – | | | 12.5 | 20 | 25 |
| $x_{FZ}$ value (standard) | 0.6 | | 0.55 | | 0.5 | 0.45 |
| Flanged body | – | | | 0.45 | 0.45 | 0.4 |
| Nominal pressure | PN 16 · PN 25 | | | PN 25 | | |
| Max. permissible differential pressure Δp across the valve | 10 [2] bar · 20 bar | | | | 16 bar | |
| Max. permissible temperature | For liquids 130 °C [2]/150 °C · For air and non-flammable gases 80 °C | | | | | |
| Pressure above adjusted differential pressure at which internal excess pressure limiter responds | 0.5 bar | | | | | |
| Compliance | CE · EAC | | | | | |
| **Differential pressure set point ranges** | | | | | | |
| Types 45-6 · Continuously adjustable set point | 0.2 to 1 · 0.5 to 2 bar | | | | | |
| Type 46-5 · Fixed set point | 0.1 · 0.2 · 0.3 · 0.4 or 0.5 bar | | | | | |

1) Additional version: Valve with flanged body made of spheroidal graphite iron (EN-GJS-400-18-LT)
2) For PN 16 version

***Note:***
***Conversion from chromate coating to iridescent passivation***
*We at SAMSON are converting the surface treatment of passivated steel parts in our production. As a result, you may receive a device assembled from parts that have been subjected to different surface treatment methods. This means that the surfaces of some parts show different reflections. Parts can have an iridescent yellow or silver color. This has no effect on corrosion protection.*
*For further information go to ▶ www.samson.de/chrome-en.html*

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samson.de · www.samson.de

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