

MOUNTING AND OPERATING INSTRUCTIONS



EB 2626-2 EN

Translation of original instructions



Red brass body with screwed ends



Stainless steel body with screwed ends

Type 44-6 B Pressure Regulator Self-operated Pressure Regulators

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. The images shown in these instructions are for illustration purposes only. The actual product may vary.

- 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@samsongroup.com).



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 > **Service & Support** > **Downloads** > **Documentation**.

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 Safety instructions and measures

Intended use

The SAMSON Type 44-6 B Regulator is suitable for pressure control of liquids, gases and vapors.

The regulator is designed to operate under exactly defined conditions (e.g. operating pressure, process medium, temperature). Therefore, operators must ensure that the regulators are only used in operating conditions that meet the specifications used for sizing the devices at the ordering stage. In case operators intend to use the regulators in other applications or conditions than specified, contact SAMSON.

SAMSON does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

→ Refer to the technical data and nameplate for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse

The regulators are not suitable for the following applications:

- Use outside the limits defined during sizing and by the technical data
- Use outside the limits defined by the additional fittings mounted on the regulator

Furthermore, the following activities do not comply with the intended use:

- Use of non-original spare parts
- Performing service and repair work not described

Qualifications of operating personnel

The regulator must be mounted, started up, serviced and repaired by fully trained and qualified personnel only; the accepted industry codes and practices must be 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 hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.

Safety features

The Type 44-6 B Regulator does not have any special safety features. When relieved of pressure, the regulator is closed by the force of the positioning springs.

Safety instructions and measures

Personal protective equipment

We recommend checking the hazards posed by the process medium being used (e.g.

▶ GESTIS (CLP) hazardous substances database). Depending on the process medium and/or the activity, the protective equipment required includes:

- ➔ Protective clothing, safety gloves and eye protection in applications with hot, cold and/or corrosive media
- ➔ Wear hearing protection when working near the valve
- ➔ Check with the plant operator for details on further protective equipment.

Revisions and other modifications

Revisions, conversions or other modifications of the product are not authorized by SAMSON. They are performed at the user's own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use.

Warning against residual hazards

To avoid personal injury or property damage, plant operators and operating personnel must prevent hazards that could be caused in the regulator by the process medium, the operating pressure or by moving parts by taking appropriate precautions. Plant operators and operating personnel must observe all hazard statements, warning and caution notes in these mounting and operating instructions.

Hazards resulting from the special working conditions at the installation site of the regulator must be identified in a risk assessment and prevented through the corresponding safety instructions drawn up by the operator.

We also recommend checking the hazards posed by the process medium being used (e.g.

▶ GESTIS (CLP) hazardous substances database).

- ➔ Observe safety measures for handling the device as well as fire prevention and explosion protection measures.

Responsibilities of the operator

Operators are responsible for proper use and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions as well as the referenced documents to the operating personnel and to instruct them in proper operation. Furthermore, operators must ensure that operating personnel or third parties are not exposed to any danger.

Responsibilities of operating personnel

Operating personnel must read and understand these mounting and operating instructions as well as the referenced documents and observe the specified hazard statements, warnings and caution notes. Furthermore, operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards, directives and regulations

The regulators comply with the requirements of the European Pressure Equipment Directive 2014/68/EU. Regulators with a CE marking have an EU declaration of conformity, which includes information about the applied conformity assessment procedure. This EU declaration of conformity is included in the 'Certificates' section.

According to the ignition risk assessment performed in accordance with EN 13463-1:2009, section 5.2, the non-electrical regulators do not have their own potential ignition source even in the rare incident of an operating fault. As a result, they 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).

Referenced documentation

The following documents apply in addition to these mounting and operating instructions:

- Mounting and operating instructions for
e.g. **Type 1 NI Strainer** ▶ EB 1010
- Data sheets for
e.g. **Type 1 NI Strainer** ▶ T 1015
- Mounting and operating instructions as well as data sheets for additional fittings (e.g. shut-off valves, pressure gauges etc.).

1.1 Notes on possible severe personal injury

⚠ DANGER

Risk of bursting in pressure equipment.

Regulators and pipelines are pressure equipment. Impermissible pressure or improper opening can lead to regulator components bursting.

- Observe the maximum permissible pressure for regulator and plant.
- Before starting any work on the regulator, depressurize all plant sections affected as well as the regulator.
- Drain the process medium from all the plant sections affected as well as the regulator.

1.2 Notes on possible personal injury

⚠ 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 ► www.samsongroup.com/reach-en.html.

Risk of personal injury through incorrect operation, use or installation as a result of information on the regulator being illegible.

Over time, markings, labels and nameplates on the regulator may become covered with dirt or become illegible in some other way. As a result, hazards may go unnoticed and the necessary instructions not followed. There is a risk of personal injury.

- Keep all relevant markings and inscriptions on the device in a constantly legible state.
- Immediately renew damaged, missing or incorrect nameplates or labels.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipelines.

Depending on the process medium, regulator components and pipelines may get very hot or cold and cause burn injuries.

- Allow components and pipelines to cool down or warm up to the ambient temperature.
- Wear protective clothing and safety gloves.

Risk of hearing loss or deafness due to loud noise.

The noise emissions depend on the valve version, plant facilities and process medium.

- Wear hearing protection when working near the valve.

Risk of personal injury due to residual process medium in the regulator.

While working on the regulator, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- If possible, drain the process medium from all the plant sections affected and the regulator.
- Wear protective clothing, safety gloves and eye protection.

1.3 Notes on possible property damage

! NOTICE

Risk of regulator damage due to incorrectly attached slings.

→ Do not attach load-bearing slings to the regulator.

Risk of regulator damage due to unsuitable medium properties.

The regulator is designed for a process medium with defined properties.

→ Only use the process medium specified for sizing.

Risk of regulator damage due to contamination (e.g. solid particles) in the pipeline.

The plant operator is responsible for cleaning the pipelines in the plant.

→ Flush the pipelines before start-up.

Risk of regulator damage due to the use of unsuitable lubricants.

The lubricants to be used depend on the regulator material. Unsuitable lubricants may corrode and damage surfaces.

→ Only use lubricants approved by SAMSON.
When in doubt, consult SAMSON.

Risk of leakage and regulator damage due to excessively high or low tightening torques.

Observe the specified torques when tightening regulator components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

→ Observe the specified tightening torques (see 'Tightening torques' in Annex).

Risk of excess pressure damaging plant sections due to construction-related seat leakage through the regulator.

→ Always install a safety device (e.g. safety excess pressure valve or safety relief valve) in the plant.

! NOTICE

Risk of regulator damage due to the use of unsuitable tools.

Certain tools are required to work on the regulator.

- Only use tools approved by SAMSON.
When in doubt, consult SAMSON.

Risk of the process medium being contaminated through the use of unsuitable lubricants and/or contaminated tools and components.

- Keep the regulator and the tools used free from solvents and grease.
- Make sure that only suitable lubricants are used.

i Note

SAMSON's After-sales Service can support you concerning lubricant, tightening torques and tools approved by SAMSON.

2 Markings on the device

2.1 Nameplates

Nameplate on red brass body

1	2	3
4		5
6		7
8		9

- 1 Model number
- 2 Material number and device index
- 3 Order number or year of manufacture
- 4 Type designation
- 5 Valve size/thread size
- 6 K_{VS}/C_V
- 7 Perm. temperature in °C/°F
- 8 Set point range in bar/psi
- 9 Max. perm. differential pressure Δp in bar/psi

Nameplate on bodies made of stainless steel or spheroidal graphite iron

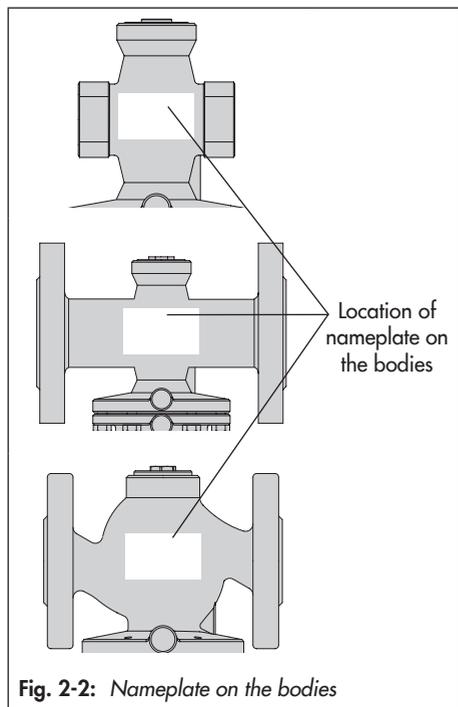
2		4
3		1
6	5	7
8		9
	10	

- 1 Pressure rating:
DIN: PN · ANSI: CL · JIS: K
- 2 Material number and device index
- 3 Order number or year of manufacture
- 4 Type designation
- 5 Thread size/valve size:
DIN: DN · ANSI: NPS · JIS: DN ... A/B
- 6 Flow coefficient:
DIN: K_{VS} · ANSI: C_V · JIS: C_V
- 7 Perm. temperature:
DIN: °C · ANSI: °F · JIS: °C/°F
- 8 Set point range:
DIN: bar · ANSI: psi · JIS: bar/psi
- 9 Max. perm. differential pressure Δp :
DIN: bar · ANSI: psi · JIS: bar/psi
- 10 Arrow indicating the direction of flow

Fig. 2-1: Regulator nameplates

2.2 Location of the nameplates

The nameplate of all sizes is affixed to the body (see Fig. 2-2).



2.3 Material identification number

The material is indicated on the cast body. Specifying the material number, you can contact us to find out more details. The configuration ID is specified on the nameplate (2).

For more details on the nameplate, see section 2.2.

3 Design and principle of operation

→ See Fig. 3-1

The Type 44-6 B Pressure Regulator consists of a single-seated globe valve with integrated actuator unit.

The regulator mainly consists of the valve (1) with seat (3), plug (2) and balancing bellows (6) as well as a spring housing with operating bellows (5), set point spring (7) and set point adjuster (8)/set point screw (9).

The excess pressure valve is used to maintain the pressure upstream of the valve to an adjusted set point.

The regulator is closed when relieved of pressure. It opens when the upstream pressure rises above the adjusted set point. The process medium flows through the valve between seat and plug in the direction indicated by the arrow on the body. The position of the valve plug determines the flow rate and, as a result, the upstream pressure.

The upstream pressure p_1 to be controlled is transmitted through a borehole (4) in the valve body to the operating bellows (5) where it is converted into a positioning force. This force is used to move the valve plug according to the force of the set point spring (7). The spring force is adjustable at the set point adjuster (8/9).

Legend for Fig. 3-1

- | | |
|-----|---|
| 1 | Valve body |
| 1.1 | Body gasket |
| 1.2 | Seal |
| 2 | Plug |
| 3 | Seat |
| 4 | Borehole in body for upstream pressure p_1 |
| 5 | Operating bellows |
| 6 | Balancing bellows |
| 7 | Set point spring |
| 8 | Set point adjuster |
| 9 | Set point screw with stainless steel/spheroidal graphite iron version (DN 40/50) as well as 8 to 20 bar set point range |
| 10 | Screws |
| 12 | Spring housing |

Design and principle of operation

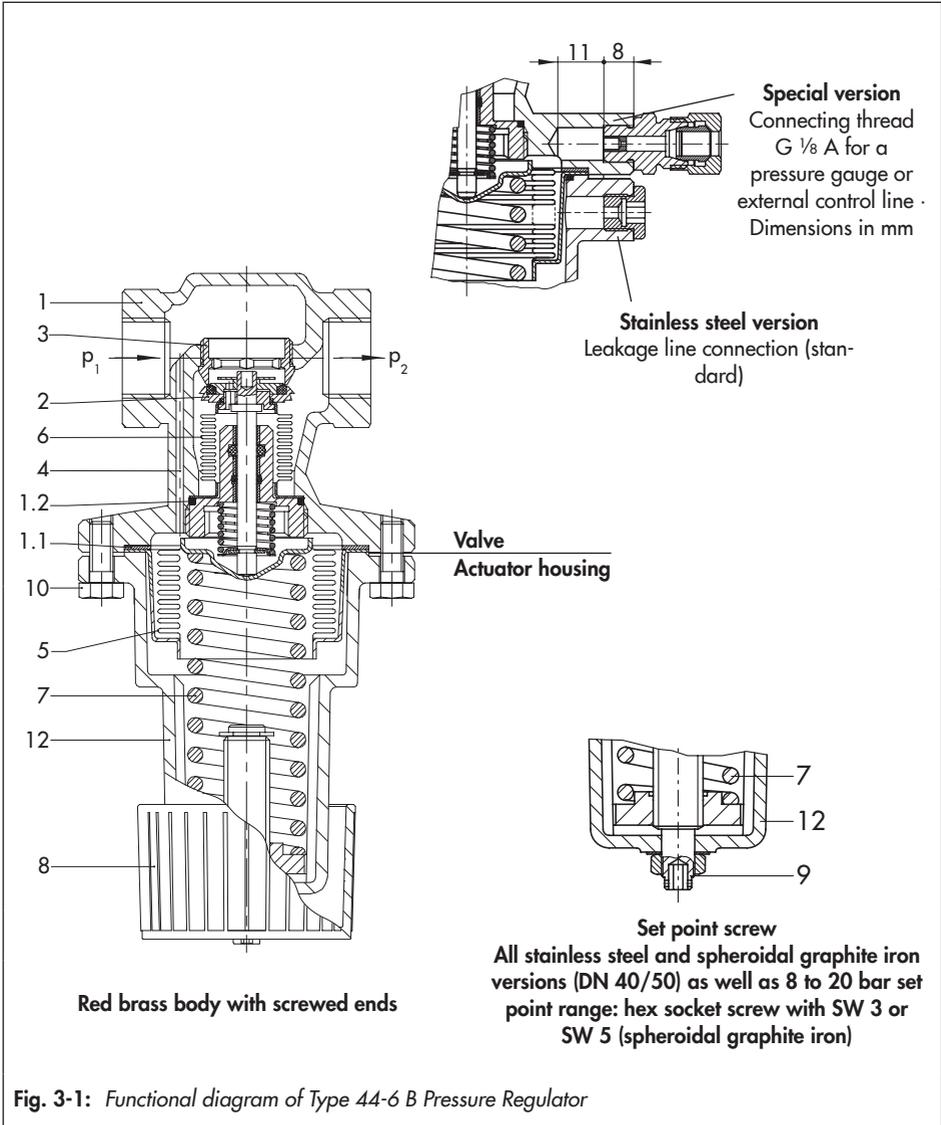


Fig. 3-1: Functional diagram of Type 44-6 B Pressure Regulator

3.1 Additional fittings

→ See Fig. 3-2

Strainers

We recommend installing a SAMSON strainer (3) upstream of the valve. It prevents solid particles in the process medium from damaging the regulator.

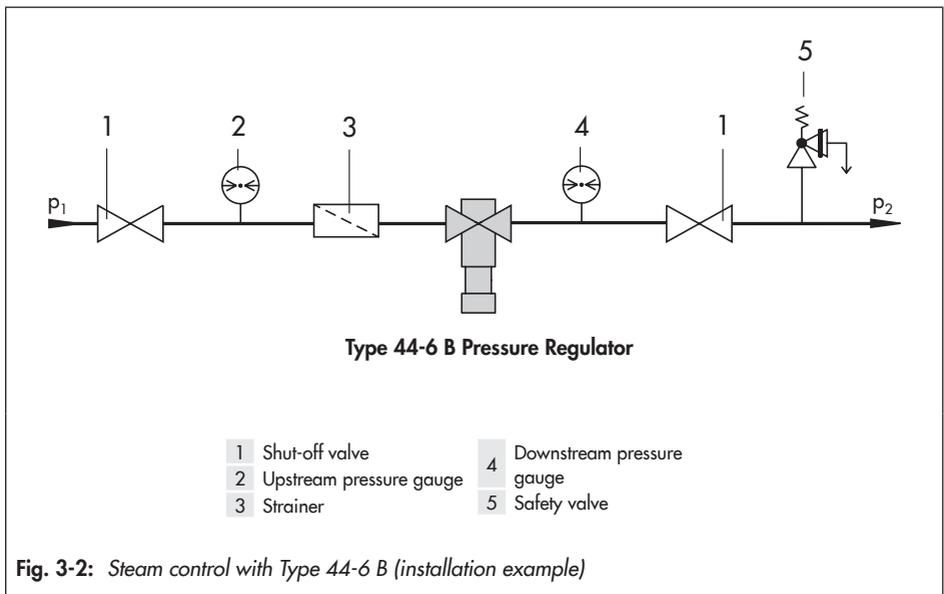
- Do not use the strainer to permanently filter the process medium.
- Select a strainer (mesh size) suitable for the process medium.

i Note

Any impurities carried along by the process medium may impair the proper functioning of the regulator. We recommend installing a strainer (e.g. SAMSON Type 1 NI) upstream of the pressure regulator (► EB 1010).

Pressure gauges

Install a pressure gauge (2 and 4) both upstream and downstream of the regulator to monitor the pressures prevailing in the plant.



Bypass and shut-off valves

We recommend installing a shut-off valve (1) both upstream of the strainer and downstream of the regulator and installing a bypass line. The bypass ensures that the plant does not need to be shut down for service and repair work on the regulator.

Insulation

Regulators can be insulated to reduce heat energy transfer.

Refer to the instructions in the 'Installation' section.

i Note

The Type 44-6 B Regulator is not a safety valve. If necessary, a suitable overpressure protection must be installed on site in the plant section.

3.2 Technical data

The regulator nameplate provides information on the regulator version (see the 'Markings on the device' section).

i Note

More information is available in Data Sheet T 2626.

Process medium and scope of application

The Type 44-6 B Pressure Regulator is used to maintain the pressure upstream of the regulator to an adjusted set point.

- For **liquids, gases and vapors**
- Max. temperature up to **200 °C/390 °F**
- Set points from **0.2 to 20 bar/3 to 290 psi**
- Valve sizes **G ½ to 1 ½ NPT to 1 NPT** and **DN 15 to 25/NPS ½ to 1**
- Pressure ratings **PN 25/Class 150 and 300/JIS 20K**

The regulator is closed when relieved of pressure. The valve **opens** when the **upstream** pressure rises.

Leakage class

The regulator has the leakage class I according to IEC 60534-4.

Temperature range

Depending on how the regulator is configured, it can be used up to max. 200 °C. The minimum temperature is limited by the seal material used in the regulator (see Table 3-2).

Noise emissions

SAMSON is unable to make general statements about noise emissions. The noise emissions depend on the regulator version, plant facilities, process medium and operating conditions.

Conformity

The Type 44-6 B Regulator bears both the CE and EAC marks of conformity.



Dimensions and weights

Table 3-4 provides a summary of the dimensions and weights. The lengths and heights in the dimensional drawings are shown on page 3-9.

Table 3-1: Materials · Material numbers according to DIN EN

Body	Red brass CC499K ⁴⁾	Spheroidal graphite iron EN-GJS- 400-18-LT ⁴⁾	Stainless steel 1.4408 · A351 CF8M
Seat	1.4305		1.4404
Plug	Brass (free of dezincification), soft seal ¹⁾		1.4404 metal or soft seal ²⁾
	Brass (resistant to dezincification) with PTFE soft seal or metal seal ^{1) 5)}		1.4404 with EPDM/FKM/PTFE soft seal or metal seal ⁵⁾
Balancing bellows	1.4571		1.4571
Plug spring	1.4310		1.4310
Set point spring	1.7104 (55SiCr6)		1.4310
Operating bellows	1.4571		1.4571
Spring housing	EN AC-44300-DF (die-cast aluminum)		1.4408
Set point adjuster	Manual adjuster made of PTFE with 30 % glass fiber ³⁾		Hexagonal socket head screw made of 1.4571

¹⁾ For spheroidal graphite iron body with internal parts free of non-ferrous metal: plug made of 1.4404, metal or soft seal

²⁾ EPDM, FKM, FFKM or PTFE

³⁾ 8 to 20 bar set point range in stainless steel 1.4571: hexagonal socket head screw made of 1.4571

⁴⁾ Only selectable for DIN and JIS versions

⁵⁾ For steam as process medium

Design and principle of operation

Table 3-2: Technical data · All pressures in bar (gauge)

Regulator		
Port	Stainless steel/red brass body	Female thread G ½, G ¾, G 1 · ½ NPT, ¾ NPT, 1 NPT
	Stainless steel body	Flanges DN 15 and 25 · NPS ½ and 1
	Spheroidal graphite iron body ¹⁾	Flanges DN 15, 25, 40 and 50
Pressure rating		PN 25/Class 150 ²⁾ and Class 300 ³⁾ /JIS 20K
Max. permissible temperature ⁶⁾	Liquids	-10 to +150 °C/14 to 300 °F
	Non-flammable gases, air	-10 to +80 °C/14 to 175 °F
	Air ⁷⁾	-10 to +150 °C/14 to 300 °F
	Nitrogen ⁷⁾	-10 to +200 °C/14 to 390 °F
Max. permissible differential pressure Δp	Steam	200 °C/390 °F
	G ½, G ¾, G 1 · DN 15 and 25	16 bar/230 psi
Set point range (continuously adjustable)	DN 40 and 50	8 bar
	DIN	0.2 to 2 bar ⁴⁾ · 1 to 4 bar · 2 to 6 bar 4 to 10 bar · 8 to 20 bar ⁵⁾
	ANSI	3 to 30 psi ⁴⁾ · 15 to 60 psi · 30 to 90 psi 60 to 145 psi · 120 to 290 psi
Leakage class according to IEC 60534-4		Class I (≤0.05 % of K _{VS} coefficient)
Conformity		
Max. perm. ambient temperature		-20 to +60 °C/-4 to +140 °F

¹⁾ DIN body only

²⁾ Flanged valve body made of stainless steel A351 CF8M

³⁾ Body with screwed ends made of stainless steel A351 CF8M

⁴⁾ Without balancing bellows

⁵⁾ Set point range not for DN 40 and 50

⁶⁾ The maximum permissible temperature is limited to 60 °C with FDA compliance. DIN only

⁷⁾ FKM seal

Table 3-3: K_{VS} coefficients and x_{Fz} values · Terms for noise level calculation according to VDMA 24422 (edition 1.89)

Body with screwed ends					
Connection size		G ½ · ½ NPT	G ¾ · ¾ NPT	G 1 · 1 NPT	
K_{VS} coefficients	Standard version ¹⁾	3.2	4.0	5.0	
	Special version ³⁾	0.4 ²⁾ · 1.0 ¹⁾⁴⁾ · 2.5			
C_V coefficients	Standard version ¹⁾	4.0	5.0	6.0	
	Special version ³⁾	0.5 ²⁾ · 1.2 ¹⁾⁴⁾ · 3.0			
x_{Fz} values		0.60		0.55	

Flanged body						
Valve size		DN 15/NPS ½	DN 25/NPS 1	DN 40	DN 50	
K_{VS} coefficients	Standard version	3.2 ¹⁾	5.0 ¹⁾	16.0	20.0	
	Special version ³⁾	0.4 ²⁾ · 1.0 ¹⁾⁴⁾ · 2.5			8.0 ²⁾	
C_V coefficients	Standard version	4.0 ¹⁾	6.0 ¹⁾	-	-	
	Special version ³⁾	0.5 ²⁾ · 1.2 ¹⁾⁴⁾ · 3.0				
x_{Fz} values		0.60	0.55	0.40		

1) Also available as special version for regulators with stainless steel body and FFKM soft seal

2) Metal seal

3) Unbalanced

4) Soft seal. Seal material: EPDM, FKM or PTFE

Design and principle of operation

Table 3-4: Dimensions in mm/in · Weights in kg/lb

Regulator		DN	15	–	25	40	50	
		G/NPT	½	¾	1	–	–	
		NPS	½	–	1	–	–	
Length L	G · NPT ^{1) 2)}	mm	65	75	90	–	–	
		in	2.6	3.0	3.5	–	–	
	DN	mm	130	–	160	200	230	
		mm	184	–	184	–	–	
		in	7.2	–	7.2	–	–	
Width across flats SW	G	mm	34	34	46	–	–	
	NPT	in	1.3	1.3	1.8	–	–	
Height H1 ⁴⁾	G ⁵⁾	mm	165 (205)			–	–	
		mm	155 (205)			–	–	
	G ⁶⁾ · NPT ^{2) 6)}	in	6.1 (8.1)			–	–	
		mm	155 (205)	–	155 (205)	245 (290)	245 (290)	
	NPS ^{3) 6)}	mm	155 (205)	–	155 (205)	–	–	
		in	6.1 (8.1)	–	6.1 (8.1)	–	–	
Height H2	G ⁵⁾	mm	25	25	25	–	–	
	G ⁶⁾ · DN	mm	46	46	46	95	95	
	NPT ²⁾	in	1.8	1.8	1.8	–	–	
Ø spring housing	G · DN	mm	90				–	–
	NPT · NPS	in	3.5			–	–	
Weight, approx.	Body with screwed ends	kg	1.0	1.1	1.5	–	–	
		lb	2.2	2.4	3.3	–	–	
	Flanged body	kg	2.6	–	4.2	7.0	8.0	
		lb	5.7	–	9.3	–	–	

¹⁾ Face-to-face dimensions according to ANSI/ISA 75.08.01

²⁾ NPT in Class 300 (A351 CF8M)

³⁾ NPS in Class 150 (A351 CF8M)

⁴⁾ Dimensions in parentheses apply to values with 8 to 20 bar/120 to 290 psi set point range

⁵⁾ Red brass CC499K

⁶⁾ Stainless steel-1.4408/A351 CF8M

⁷⁾ Spheroidal graphite iron EN-GJS-400-18-LT

Dimensional drawings

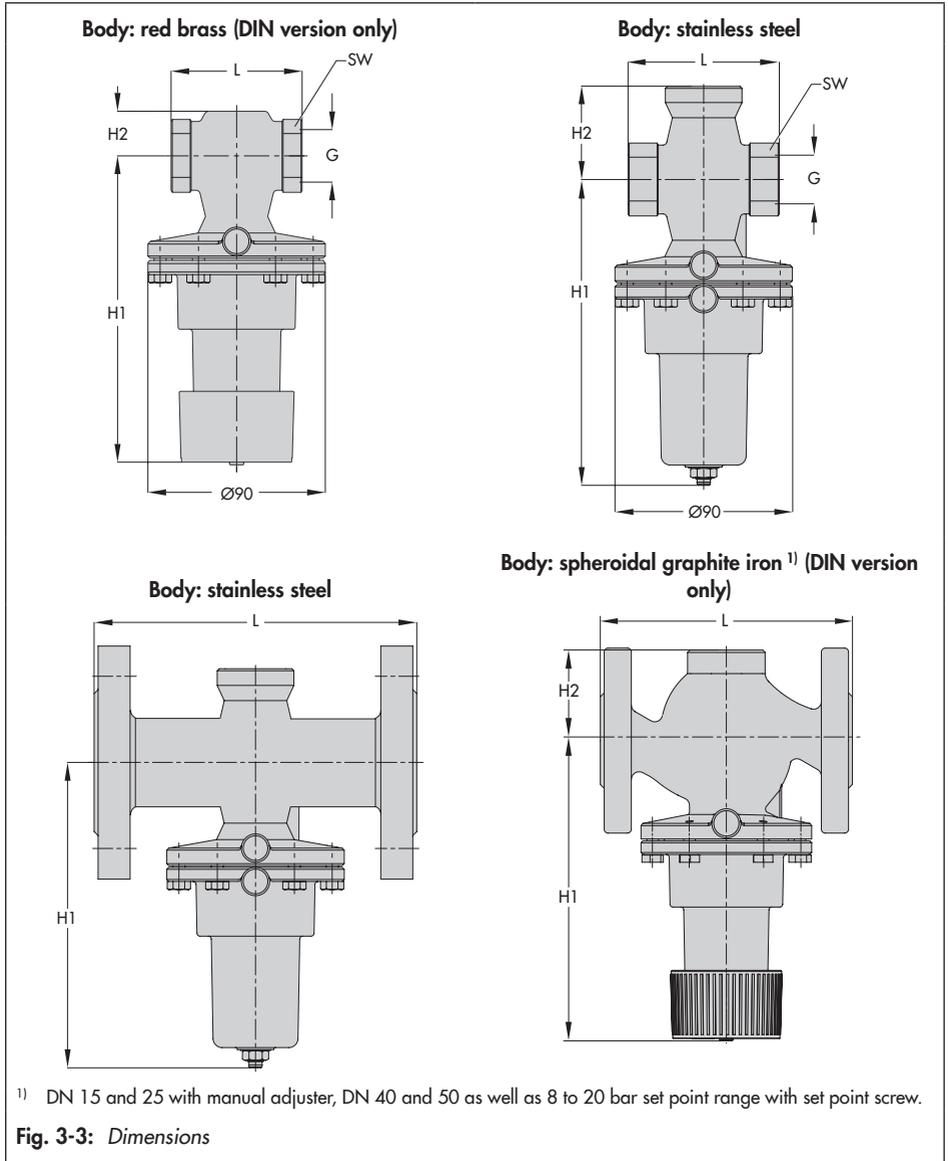


Fig. 3-3: Dimensions

4 Shipment and on-site transport

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Check that the specifications on the nameplate and on the regulator itself match the specifications in the delivery note. See the 'Markings on the device' section for nameplate details.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).
3. Determine the weight and dimensions of the units to be lifted and transported in order to select the appropriate lifting equipment and lifting accessories. Refer to the transport documents and the 'Design and principle of operation' section.

4.2 Removing the packaging from the regulator

The regulator is delivered as an assembled unit.

- Do not open or remove the packaging until immediately before lifting to install the regulator into the pipeline.
- Leave the regulator in its transport container or on the pallet to transport it on site.
- Do not remove the protective caps from the inlet and outlet until immediately before installing the valve with flanges into the pipeline. They prevent foreign particles from entering the valve.
- Dispose and recycle the packaging in accordance with the local regulations.

4.3 Transporting and lifting the regulator

Due to the low service weight, lifting equipment is not required to lift and transport the regulator (e.g. to install it into the pipeline).

- Leave the regulator in its transport container or on the pallet to transport it.
- Observe the transport instructions.

Transport instructions

- Protect the regulator against external influences (e.g. impact).
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the regulator against moisture and dirt.
- The permissible ambient temperature of standard regulators is -20 to $+60$ °C/ -4 to $+140$ °F.

4.4 Storing the regulator

NOTICE

Risk of regulator damage due to improper storage.

- Observe the storage instructions.
- Avoid long storage times.
- Contact SAMSON in case of different storage conditions or longer storage times.

Storage instructions

- Protect the regulator against external influences (e.g. impact).
- Secure the regulator in the stored position against slipping or tipping over.
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the regulator against moisture and dirt. Store it at a relative humidity of less than 75 %. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Make sure that the ambient air is free of acids or other corrosive media.
- The permissible storage temperature of standard regulators is -20 to $+65$ °C/ -4 to $+150$ °F.
- Do not place any objects on the regulator.

Note

We recommend regularly checking the regulator and the prevailing storage conditions during long storage periods.

Special storage instructions for elastomers

Elastomer, e.g. O-rings

- To keep elastomers in shape and to prevent cracking, do not bend them or hang them up.
- We recommend a storage temperature of 15 °C/ 60 °F for elastomers.
- Store elastomers away from lubricants, chemicals, solutions and fuels.

Tip

SAMSON's After-sales Service can provide more detailed storage instructions on request.

5 Installation

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

5.1 Installation conditions

Work position

The work position for the regulator is the front view onto all operating controls on the regulator (including any additional fittings) seen from the position of operating personnel.

Plant operators must ensure that, after installation of the device, the operating personnel can perform all necessary work safely and easily access the device from the work position.

Pipeline routing

The inlet and outlet lengths vary depending on several variables and process conditions and are intended as recommendations. Contact SAMSON if the lengths are significantly shorter than the recommended lengths.

To ensure that the regulator functions properly, proceed as follows:

- Observe the inlet and outlet lengths (see Table 5-1). Contact SAMSON if the regulator conditions or state of the medium process deviate.
- Install the regulator free of stress and with the least amount of vibrations as possible. Read information under 'Mounting position' and 'Support or suspension' in this section.

- For media with a tendency to condensate, install the pipeline with a slight downward slope on both sides so that the condensate can drain properly. If the pipeline upstream and downstream of the regulator run vertically upwards, an automatic drainage is required.
- Install the regulator allowing sufficient space to remove the actuator and valve or to perform service work on them.

Mounting position

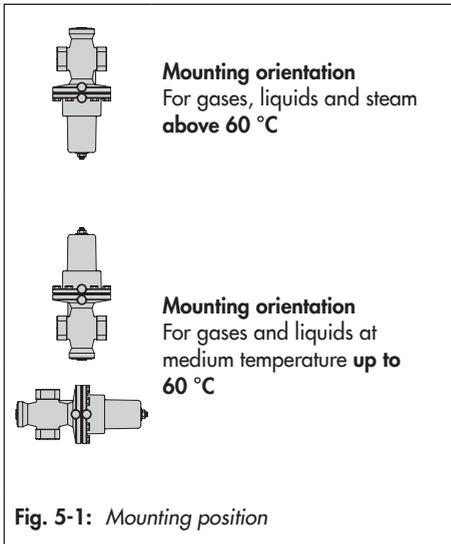
To ensure that the regulator functions properly, proceed as follows:

- The regulator can be mounted in any position when the medium temperature is up to 60 °C.
- At medium temperatures above 60 °C, install it with the actuator housing suspended downward in horizontal pipelines (see Fig. 5-1).
- Make sure the direction of flow matches the direction indicated by the arrow on the body.
- Contact SAMSON if the mounting position is not as specified above.

! NOTICE

Damage due to freezing.

Protect the regulator from icing up when controlling media that can freeze. Unless the regulator is installed in locations where no frost occurs, remove the regulator from the pipeline when the plant is shut down.



Support or suspension

i Note

The plant engineering company is responsible for selecting and implementing a suitable support or suspension of the installed regulator and the pipeline.

Depending on the regulator version and mounting position, the regulator and pipeline must be supported or suspended.

! NOTICE

Do not attach supports directly to the regulator.

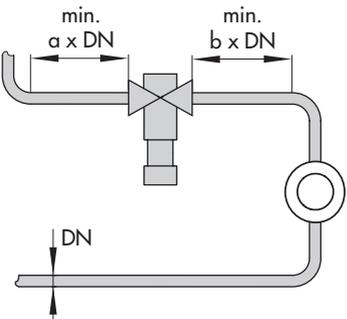
5.2 Preparation for installation

Before mounting, make sure the following conditions are met:

- The regulator is clean.
- The regulator is not damaged.
- Install a strainer upstream of the regulator.
- The regulator data on the nameplate (type designation, valve size, material, pressure rating and temperature range) match the plant conditions (size and pressure rating of the pipeline, medium temperature etc.). See the 'Markings on the device' section for nameplate details.
- The requested or required additional fittings (see the 'Design and principle of operation' section) have been installed or prepared as necessary before installing the valve.

Proceed as follows:

- Lay out the necessary material and tools to have them ready during installation work.
- Flush the pipeline **before** installing the regulator.
The plant operator is responsible for cleaning the pipelines in the plant.
- For steam applications, dry the pipelines. Moisture will damage the inside of the regulator.
- Check any mounted pressure gauges to make sure they function properly.

Table 5-1: Inlet and outlet lengths


State of process medium	Valve conditions	Inlet length a	Outlet length b
Gas	$Ma \leq 0.3$	2	4
Vapors ¹⁾	$Ma \leq 0.3$	2	4
Liquid	Free of cavitation/ $w < 3 \text{ ‰}$	2	4
	Cavitation producing noise/ $w \leq 3 \text{ ‰}$	2	4

¹⁾ No saturated steam

5.3 Installation

SAMSON regulators are delivered as assembled units. The activities listed below are necessary for installation and before start-up of the regulator.

NOTICE

Risk of regulator damage due to the use of unsuitable tools.

→ Only use tools approved by SAMSON (see 'Tools' in Annex).

NOTICE

Risk of regulator damage due to excessively high or low tightening torques.

Observe the specified torques when tightening regulator components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

→ Observe the specified tightening torques (see 'Tightening torques' in Annex).

NOTICE

Risk of regulator damage due to the use of unsuitable lubricants.

→ Only use lubricants approved by SAMSON (see 'Lubricants' in Annex).

5.3.1 Installing the regulator

1. Close the shut-off valves upstream and downstream of the regulator while the regulator is being installed.

2. Remove the protective caps from the valve ports of regulators with flanges before installation.
3. Observe the flow direction through the valve. The arrow on the valve indicates the direction of flow.
4. Make sure that the correct gaskets are used.
5. Bolt the pipe to the valve free of stress.
6. Slowly open the shut-off valves in the pipeline after the regulator has been installed.

5.3.2 Cleaning the pipeline

We recommend additionally flushing the pipeline without the installed regulator before start-up. In this case, install a suitable length of pipe into the pipeline in place of the regulator.

- Observe the mesh size of the upstream strainer for the maximum particle size. Use strainers to suit the process medium.
- Check the strainer for dirt each time the pipeline is flushed and clean it, if necessary.

5.4 Testing the regulator

⚠ DANGER

Risk of bursting due to incorrect opening of pressurized equipment or components.

Regulators and pipelines are pressure equipment that may burst when handled incorrectly. Flying projectile fragments or the

release of process medium under pressure can cause serious injury or even death.

Before working on the regulator:

- Depressurize all plant sections concerned and the regulator.
- Disconnect the control line.
- Drain the process medium from all the plant sections concerned as well as the valve.

⚠ DANGER

Risk of personal injury due to process medium escaping.

- Do not start up the regulator until all parts have been mounted.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions.

- Wear hearing protection when working near the regulator.

⚠ WARNING

Risk of burn injuries due to hot or very cold components and pipelines.

Depending on the process medium, the regulator and pipelines may get very hot or cold and cause burn injuries.

- Wear protective clothing and safety gloves.

SAMSON regulators are delivered ready for use. To test the regulator functioning before start-up or putting back the regulator into operation, perform the following tests:

5.4.1 Leak test

The plant operator is responsible for performing the leak test and selecting the test method. The leak test must comply with the requirements of the national and international standards that apply at the site of installation.

💡 Tip

SAMSON's After-sales Service can support you to plan and perform a leak test for your plant.

1. Slowly open the shut-off valve installed upstream of the regulator.
2. Apply the required test pressure.
3. Check the regulator for leakage to the atmosphere.
4. Depressurize the pipeline section and regulator.
5. Rework any parts that leak and repeat the leak test.

5.4.2 Pressure test

i Note

The plant operator is responsible for performing the pressure test. SAMSON's After-sales Service can support you to plan and perform a pressure test for your plant.

Installation

NOTICE

Risk of regulator damage due to a sudden pressure increase and resulting high flow velocities.

→ *Slowly open the shut-off valves.*

During the pressure test, make sure the following conditions are met:

- Do not allow the pressure to exceed the 1.5 times the pressure rating of the valve body.
- The regulator must remain open. Therefore, adjust the lowest set point to ensure that the regulator does not close.
- Make sure that the pressure rises simultaneously upstream and downstream of the regulator to avoid damaging the balancing bellows.

5.5 Insulation

To insulate cold systems, we recommend first filling the plant and carefully rinsing it. The regulator must not yet be insulated at this stage.

NOTICE

Risk of regulator damage due to incorrect insulation.

→ *Only insulate the regulator up to the actuator housing for medium temperatures below 0 °C/32 °F or above 80 °C/175 °F.*

1. Start up the plant and adjust the set point (see the 'Start-up' section).

2. Shut down the plant again and let it heat up until the condensation water has dried off.
3. Insulate the regulator and pipes conveying the process medium using insulation material with a water vapor barrier. If an external control line is to be routed through the insulation, special care must be taken with the sealing since slight changes in shape may occur. The insulation thickness depends on the medium temperature and the ambient conditions. 50 mm is a typical thickness.

6 Start-up

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of personal injury due to process medium escaping.

→ *Do not start up the regulator until all parts have been mounted.*

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

→ *Allow components and pipelines to cool down or warm up to the ambient temperature.*

→ *Wear protective clothing and safety gloves.*

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions.

→ *Wear hearing protection when working near the valve.*

⚠ WARNING

Risk of personal injury due to pressurized components and process medium being discharged.

→ *Do not loosen the control line while the valve is pressurized.*

Before start-up or putting the device back into service, make sure the following conditions are met:

- The regulator is properly installed into the pipeline (see the 'Installation' section).
- The leak and function tests have been completed successfully (see the 'Testing the regulator' section).
- The prevailing conditions in the plant section concerned meet the regulator sizing requirements (see information under 'Intended use' in the 'Safety instructions and measures' section).

6.1 Start-up and putting the regulator back into operation

1. Depending on the field of application, allow the regulator to cool down or warm up to reach ambient temperature before start up.
2. Slowly open the shut-off valves in the pipeline. Slowly opening these valves prevents a sudden surge in pressure and high flow velocities which can damage the valve.
3. Check the regulator to ensure it functions properly.

6.1.1 Starting up the plant when gases and liquids are controlled

1. Open the shut-off valves slowly preferably starting from the upstream pressure side. Afterwards, open all the valves on the consumer side (downstream of the regulator).
2. Fill the plant **slowly** with the process medium. Avoid pressure surges.
3. Make sure that the pressure rises simultaneously upstream and downstream of the regulator to avoid damaging the balancing bellows.
4. To start up the pressure regulator, open shut-off valves **slowly**.

6.1.2 Starting up the plant when vapors are controlled

1. Completely drain and dry steam lines to prevent water hammering.
2. Slowly allow the steam to enter the plant to ensure that the pipes and valves warm up evenly and to avoid excessive flow velocities.
3. Before the full capacity is reached, drain off the start-up condensate.
4. Make sure that the air contained in the plant escapes as quickly as possible.
5. Open the shut-off valves slowly preferably starting from the upstream pressure side.
6. Avoid pressure surges.

7 Operation

Immediately after completing start-up or placing the regulator back into service (see the 'Start-up' section), the regulator is ready for use.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

- *Allow components and pipelines to cool down or warm up to the ambient temperature.*
- *Wear protective clothing and safety gloves.*

⚠ WARNING

Risk of personal injury due to pressurized components and process medium being discharged.

- *Do not loosen the control line while the valve is pressurized.*

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions.

- *Wear hearing protection when working near the valve.*

7.1 Adjusting the set point

Adjust the required set point by turning the set point adjuster (8) by hand or the set point screw (9) using an Allen key ¹⁾ (3 or 5 mm width across flats).

Set point adjuster

- Turn the set point adjuster clockwise (↻) to increase the pressure set point.
- Turn the set point adjuster counterclockwise (↺) to reduce the pressure set point.

Set point screw

- Undo the lock nut.
- Turn the set point screw clockwise (↻) to increase the pressure set point.
- Turn the set point screw counterclockwise (↺) to reduce the pressure set point.
- Tighten the lock nut.

The pressure gauge installed on the upstream side on site allows the adjusted set point to be monitored.

i Note

The set point range can be changed by exchanging the set point spring (see 'Replacing the set point spring' in the 'Servicing' section).

¹⁾ Versions with bodies made of spheroidal graphite iron (DN 40 and 50), stainless steel bodies and all regulators with 8 to 20 bar set point range.

8 Malfunctions

8.1 Troubleshooting

Malfunction	Possible reasons	Recommended action
Upstream pressure drops below the adjusted set point.	Insufficient pressure pulses on the operating bellows.	<ul style="list-style-type: none"> ➔ Clean the borehole in the body. ➔ Connect the control line on site for regulators with external control line. Clean the control line and screw fittings.
	Foreign particles blocking the plug	<ul style="list-style-type: none"> ➔ Remove foreign particles. ➔ Replace damaged parts. ➔ Contact SAMSON's After-sales Service.
	Seat and plug are worn or leak.	<ul style="list-style-type: none"> ➔ Replace the damaged seat and plug. ➔ Contact SAMSON's After-sales Service.
	Pressure tapped at the wrong place (regulator with external control line)	<ul style="list-style-type: none"> ➔ Reconnect the control line at another point. ➔ Do not connect the control line at pipe bends or necks.
	Regulator or K_{VS}/C_V coefficient too large	<ul style="list-style-type: none"> ➔ Check the sizing. ➔ Change K_{VS}/C_V coefficient, if necessary or install a different sized regulator. ➔ Contact SAMSON's After-sales Service.
	Operating bellows defective	<ul style="list-style-type: none"> ➔ Replace the damaged operating bellows.
Upstream pressure exceeds the adjusted set point.	Regulator installed against the flow	<ul style="list-style-type: none"> ➔ Install the regulator so that the direction of flow matches the direction indicated by the arrow on the body.
	Regulator or K_{VS}/C_V coefficient too small	<ul style="list-style-type: none"> ➔ Check the sizing. ➔ Change K_{VS}/C_V coefficient, if necessary or install a different sized regulator. ➔ Contact SAMSON's After-sales Service.
	Pressure tapped at the wrong place (regulator with external control line)	<ul style="list-style-type: none"> ➔ Reconnect the control line at another point. ➔ Do not connect the control line at pipe bends or necks.
	Foreign particles blocking the plug	<ul style="list-style-type: none"> ➔ Remove foreign particles. ➔ Replace damaged parts. ➔ Contact SAMSON's After-sales Service.
	Strainer blocked	<ul style="list-style-type: none"> ➔ Clean the strainer.

Malfunctions

Malfunction	Possible reasons	Recommended action
Upstream pressure fluctuates	Regulator or K_{VS}/C_V coefficient too large	<ul style="list-style-type: none"> → Check the sizing. → Change K_{VS}/C_V coefficient, if necessary or install a different sized regulator. → Contact SAMSON's After-sales Service.
	Pressure tapped at the wrong place (regulator with external control line)	<ul style="list-style-type: none"> → Reconnect the control line at another point. → Do not connect the control line at pipe bends or necks.
Jerky control response	Increased friction, e.g. due to foreign particles between seat and plug	<ul style="list-style-type: none"> → Remove foreign particles. → Replace damaged parts. → Contact SAMSON's After-sales Service.
Loud noises	High flow velocity, cavitation	<ul style="list-style-type: none"> → Check the sizing. → Install larger regulator, if necessary. → Install flow divider with gases and steam.
Leakage at the regulator	Operating bellows defective	<ul style="list-style-type: none"> → Replace the operating bellows. → Contact SAMSON's After-sales Service.

i Note

Contact SAMSON's After-sales Service for malfunctions not listed in the table.

The malfunctions listed in section 8.1 are caused by mechanical faults and incorrect regulator sizing. In the simplest case, the functioning can be restored following the recommended action. Special tools may be required to rectify the fault.

Exceptional operating and installation conditions may lead to changed situations that may affect the control response and lead to malfunctions. For troubleshooting, the conditions, such as installation, process medium, temperature and pressure conditions, must be taken into account.

💡 Tip

SAMSON's After-sales Service can support you in drawing up an inspection and test plan for your plant.

8.2 Emergency action

Plant operators are responsible for emergency action to be taken in the plant.

We recommend removing the regulator from the pipeline before repairing it.

In the event of a regulator malfunction:

1. Close the shut-off valves upstream and downstream of the regulator to stop the process medium from flowing through the regulator.
2. Perform troubleshooting (see section 8.1).
3. Rectify those malfunctions that can be remedied based on the instructions provided here. Contact SAMSON's After-sales Service in all other cases.

Putting the regulator back into operation after a malfunction

See the 'Start-up' section.

9 Servicing

The regulator does not require any maintenance. Nevertheless, it is subject to natural wear, particularly at the seat, plug and operating diaphragm/bellows. Depending on the operating conditions, check the regulator at regular intervals to avoid possible malfunctions. Plant operators are responsible for drawing up an inspection and test plan. Details on faults and how to remedy them can be found in the 'Malfunctions' section.

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

We recommend removing the regulator from the pipeline before performing any maintenance or service work.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

- *Allow components and pipelines to cool down or warm up to the ambient temperature.*
 - *Wear protective clothing and safety gloves.*
-

⚠ WARNING

Risk of personal injury due to residual process medium in the regulator.

While working on the regulator, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- *Wear protective clothing, safety gloves and eye protection.*
-

ⓘ NOTICE

Risk of regulator damage due to excessively high or low tightening torques.

Observe the specified torques when tightening regulator components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

- *Observe the specified tightening torques (see 'Tightening torques' in Annex).*
-

NOTICE

Risk of regulator damage due to the use of unsuitable tools.

➔ Only use tools approved by SAMSON (see 'Tools' in Annex).

NOTICE

Risk of regulator damage due to the use of unsuitable lubricants.

➔ Only use lubricants approved by SAMSON (see 'Lubricants' in Annex).

Note

The regulator was checked by SAMSON before it left the factory.

- Certain test results certified by SAMSON lose their validity when the regulator is opened. Such testing includes seat leakage and leak tests.
 - The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON's After-sales Service.
 - Only use original spare parts by SAMSON, which comply with the original specifications.
-

Tip

SAMSON's After-sales Service can support you in drawing up an inspection and test plan for your plant.

Legend for Fig. 9-1

1	Valve body
1.1	Body gasket
1.2	Seal
2	Plug
3	Seat
4	Borehole in body for upstream pressure p_1
5	Operating bellows
6	Balancing bellows
7	Set point spring
8	Set point adjuster
9	Set point screw with stainless steel/ spheroidal graphite iron version (DN 40/50) as well as 8 to 20 bar set point range
10	Screws
12	Spring housing

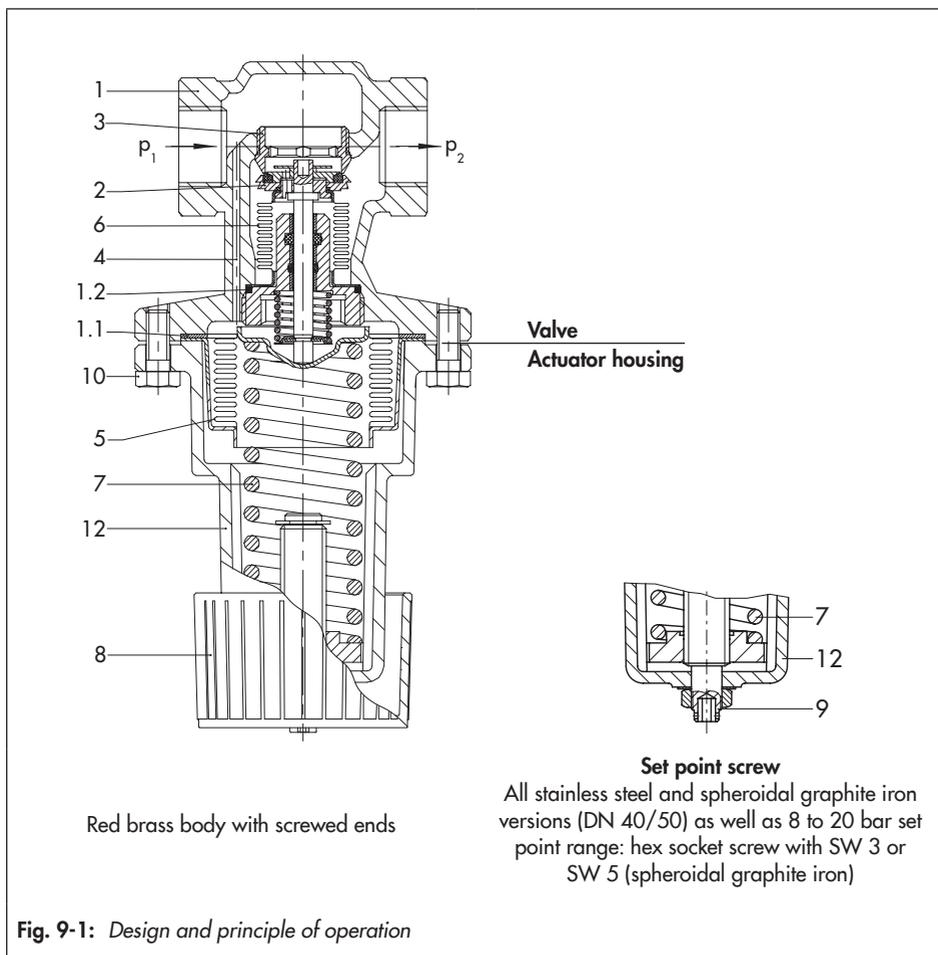


Fig. 9-1: Design and principle of operation

9.1 Preparing the valve for service work

1. Lay out the necessary material and tools to have them ready for the service work.
2. Put the regulator out of operation (see the 'Decommissioning' section).



Tip

We recommend removing the regulator from the pipeline before performing any service work (see the 'Removing the regulator from the pipeline' section).

The following service work can be performed after preparation is completed:

- Clean and exchange the seat and plug (see section 9.3.1)
- Replace the operating bellows (see section 9.3.2)
- Replace the set point spring (see section 9.3.3)

9.2 Installing the regulator after service work

- Put the regulator back into operation (see the 'Start-up' section). Make sure the requirements and conditions for start-up or putting the valve back into operation are met.

9.3 Service work

- Before performing any service work, preparations must be made to the regulator (see section 9.1).

- After all service work is completed, check the regulator before putting it back into operation (see the 'Testing the regulator' section).

9.3.1 Cleaning and exchanging the seat and plug

! NOTICE

Risk of damage to the facing of the seat and plug due to incorrect service or repair.
Always replace both the seat and plug.

- See Fig. 9-1

Disassembly

1. Completely relieve the tension from the set point spring (7) by turning the set point adjuster/set point screw (8/9) counterclockwise (↺).
2. Unscrew the screws (10).
3. Remove the seal (1.1).
4. Remove the spring housing with set point spring (7) and operating bellows (5).
5. **DN 15 to 25**
Use the plug wrench ¹⁾ to unscrew the plug (2).
DN 32 to 50
Use the plug wrench ¹⁾ to unscrew the plug nipple with plug (2).
6. Remove the seal (1.2).
7. Thoroughly clean the seat and plug. If the plug or balancing bellows is dam-

aged, replace the entire unit with a new one.

8. Unscrew the seat using a seat wrench ¹⁾ if the seat facing is damaged.

Assembly

1. Screw in the seat using a seat wrench ¹⁾. Observe the specified tightening torques (see 'Tightening torques' in Annex).
2. Insert a new seal (1.2).
3. **DN 15 to 25**
Use the plug wrench ¹⁾ to screw in the plug (2). Observe the specified tightening torques (see 'Tightening torques' in Annex).

DN 32 to 50

- Use the plug wrench ¹⁾ to screw in the plug nipple with plug (2). Observe the specified tightening torques (see 'Tightening torques' in Annex).
4. Insert a new seal (1.1) into the body.
5. Place the spring housing with spring (7) and operating bellows (5) onto the valve body.
6. Screw in the screws (10). Observe the specified tightening torques (see 'Tightening torques' in Annex).

9.3.2 Replacing the operating bellows

→ See Fig. 9-1

Disassembly

1. Completely relieve the tension from the set point spring (7) by turning the set point adjuster/set point screw (8/9) counterclockwise (↺) as far as it will go.
2. Undo the screws (10).
3. Remove the spring housing with set point spring (7) and operating bellows (5).
4. Remove the operating bellows and replace with a new one.

Assembly

1. Replace the body gasket (1.1) with a new one.
2. Place the spring housing with spring (7) and operating bellows (5) onto the valve body.
3. Screw in the screws (10). Observe the specified tightening torques (see 'Tightening torques' in Annex).

¹⁾ Contact SAMSON concerning the special tool.

9.3.3 Replacing the set point spring

→ See Fig. 9-1

Disassembly

1. Completely relieve the tension from the set point spring (7) by turning the set point adjuster/set point screw (8/9) counterclockwise (↺) as far as it will go.
2. Undo the screws (10).
3. Remove the spring housing with set point spring (7) and operating bellows (5).
4. Remove the set point spring and replace with a new one.

Assembly

1. Replace the body gasket (1.1) with a new one.
2. Place the spring housing with spring (7) and operating bellows (5) onto the valve body.
3. Screw in the screws (10). Observe the specified tightening torques (see 'Tightening torques' in Annex).

i Note

Change the nameplate and configuration ID after changing the set point range.

9.4 Ordering spare parts and operating supplies

Contact your nearest SAMSON subsidiary or SAMSON's After-sales Service for information on spare parts, lubricants and tools.

Spare parts

See Annex for details on spare parts.

Lubricant

Contact SAMSON's After-sales Service for more information on lubricants.

Tools

Contact SAMSON's After-sales Service for more information on tools.

10 Decommissioning

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of bursting due to incorrect opening of pressurized equipment or components.

Regulators and pipelines are pressure equipment that may burst when handled incorrectly. Flying projectile fragments or the release of process medium under pressure can cause serious injury or even death.

Before working on the regulator:

- Depressurize all plant sections concerned and the regulator.
- Shut off an external control line.
- Drain the process medium from all the plant sections affected as well as the regulator.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

- Allow components and pipelines to cool down or warm up to the ambient temperature.
- Wear protective clothing and safety gloves.

⚠ WARNING

Risk of personal injury due to pressurized components and process medium being discharged.

- Do not loosen the external control line while the valve is pressurized.

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions.

- Wear hearing protection when working near the regulator.

⚠ WARNING

Risk of personal injury due to residual process medium in the regulator.

While working on the regulator, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- Wear protective clothing, safety gloves and eye protection.

Decommissioning

To decommission the regulator for service work or disassembly, proceed as follows:

1. Close the shut-off valve (1 and 6) on the downstream and upstream side of the regulator.
2. Completely drain the pipelines and regulator.
3. Depressurize the plant.
4. Shut off or disconnect any external control line.
5. If necessary, allow the pipeline and regulator components to cool down or warm up to the ambient temperature.

11 Removal

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ WARNING

Risk of burn injuries due to hot or cold components and pipeline.

Regulator components and the pipeline may become very hot or cold. Risk of burn injuries.

- *Allow components and pipelines to cool down or warm up to the ambient temperature.*
- *Wear protective clothing and safety gloves.*

⚠ WARNING

Risk of personal injury due to residual process medium in the regulator.

While working on the regulator, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- *Wear protective clothing, safety gloves and eye protection.*

Before removing the valve, make sure the following conditions are met:

- The regulator is put out of operation (see the 'Decommissioning' section).

11.1 Removing the regulator from the pipeline

1. Support the regulator to hold it in place when separated from the pipeline (see the 'Shipment and on-site transport' section).
2. Undo any externally mounted control line.
3. Unbolt the pipe/flange joint.
4. Remove the regulator from the pipeline (see the 'Shipment and on-site transport' section).

11.2 Removing the actuator from the valve

See the 'Servicing' section.

12 Repairs

If the regulator does not function properly according to how it was originally sized or does not function at all, it is defective and must be repaired or exchanged.

! NOTICE

Risk of regulator damage due to incorrect service or repair work.

- *Do not perform any repair work on your own.*
 - *Contact SAMSON's After-sales Service for repair work.*
-

12.1 Returning devices to SAMSON

Defective devices can be returned to SAMSON for repair. Proceed as follows to return devices to SAMSON:

1. Put the regulator out of operation (see the 'Decommissioning' section).
2. Decontaminate the valve. Remove any residual process medium.
3. Fill in the Declaration on Contamination. The declaration form can be downloaded from our website at
▶ www.samsongroup.com > SERVICE & SUPPORT > After-sales Service.
4. Continue as described on our website at
▶ www.samsongroup.com > SERVICE & SUPPORT > After Sales Service > Returning goods.

13 Disposal

- Observe local, national and international refuse regulations.
- Do not dispose of components, lubricants and hazardous substances together with your household waste.

14 Certificates

The EU declarations of conformity are included on the next pages:

- EU declaration of conformity in compliance with Pressure Equipment Directive 2014/68/EU on page 14-2.

SMART IN FLOW CONTROL.



**EU-KONFORMITÄTserklärung
EU DECLARATION OF CONFORMITY**

Modul H/Module H, Nr./No. / N° CE-0062-PED-H-SAM 001-16-DEU-rev-A

SAMSON erklärt in alleiniger Verantwortung für folgende Produkte:/For the following products, SAMSON hereby declares under its sole responsibility:

Ventile für Druck- Differenzdruck-, Volumenstrom- und Temperaturregler/Valves for pressure, differential pressure, volume flow and temperature regulators

2333 (Erz.-Nr./Model No. 2333), 2334 (2334), 2335 (2335), 2336, 2373, 2375, 44-0B, 44-1B, 44-2, 44-3, 44-6B, 44-7, 44-8, 45-1, 45-2, 45-3, 45-4, 45-5, 45-6, 2468, 2478 (2720), 45-9, 46-5, 46-6, 46-7, 46-9, 47-1, 47-4, 47-5, 47-9, 2487, 2488, 2489, 2491, 2494, 2495 (2730), 2405, 2406, 2421 (2811), 2392, 2412 (2812), 2114 (2814), 2417 (2817), 2422 (2814), 2423 (2823)

die Konformität mit nachfolgender Anforderung/the conformity with the following requirement.

Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Druckgeräten auf dem Markt.	2014/68/EU	vom 15.05.2014
Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating of the making available on the market of pressure equipment.	2014/68/EU	of 15 May 2014
Angewandtes Konformitätsbewertungsverfahren für Fluide nach Art. 4(1)(c.ii) und (c.i) zweiter Gedankenstrich.	Modul siehe Tabelle	durch certified by Bureau Veritas S. A. (0062)
Conformity assessment procedure applied for fluids according to Article 4(1)(c.ii) and (c.i), second indent	See table for module	

Nenndruck Pressure rating	DN NPS	15 ½	20 ¾	25 1	32 1¼	40 1½	50 2	65 -	80 3	100 4	125 -	150 6	200 8	250 10	300 12	400 16
PN 16		ohne/without (1)						A (2)(3)			H					
PN 25		ohne/without (1)						A (2)(3)			H					
PN 40		ohne/without (1)						A (2)(3)			H					
PN 100 und PN 160		ohne/without (1)						H			-					
Class 150		ohne/without (1)						A (2)(3)			H					
Class 300		ohne/without (1)						A (2)(3)			H					
Class 600 und Class 900		ohne/without (1)						H			-					

- (1) Das auf dem Stellgerät aufgebrauchte CE-Zeichen hat keine Gültigkeit im Sinne der Druckgeräterichtlinie.
The CE marking affixed to the control valve is not valid in the sense of the Pressure Equipment Directive.
- (2) Das auf dem Stellgerät aufgebrauchte CE-Zeichen gilt ohne Bezeichnung der benannten Stelle (Kenn-Nr. 0062).
The CE marking affixed to the control valve is valid without specifying the notified body (ID number 0062).
- (3) Die Identifikationsnummer 0062 von Bureau Veritas S.A. gilt nicht für Modul A.
The identification number 0062 of Bureau Veritas S.A. is not valid for Modul A.

Geräte, denen laut Tabelle das Konformitätsbewertungsverfahren Modul H zugrunde liegt, beziehen sich auf die „Zulassungsbescheinigung eines Qualitätssicherungsystems“ ausgestellt durch die benannte Stelle.
Devices whose conformity has been assessed based on Module H refer to the certificate of approval for the quality management system issued by the notified body.

Dem Entwurf zu Grunde gelegt sind Verfahren aus:/The design is based on the procedures specified in the following standards:
DIN EN 12516-2, DIN EN 12516-3 bzw./or ASME B16.1, ASME B16.24, ASME B16.34, ASME B16.42
Das Qualitätssicherungssystem des Herstellers wird von folgender benannter Stelle überwacht:
The manufacturer's quality management system is monitored by the following notified body:

**Bureau Veritas S.A. Nr./No. 0062, Newtime, 52 Boulevard du Parc, Ile de la Jatte, 92200 Neuilly sur Seine, France
Hersteller/Manufacturer: SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany**

Frankfurt am Main, 08. Februar 2017/08 February 2017

Klaus Hirsch
Klaus Hirsch
Zentralabteilungsleiter/Head of Central Department
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Dr. Michael Heß
Dr. Michael Heß
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SAMSON AKTIENGESELLSCHAFT
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Telefon: 069 4009-0 · Telefax: 069 4009-1507
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Revision 03

EU-Konformitätsbescheinigung, Blatt 01, Modul A, Model H, DE, Rev.03, 2017-02-08, 06/00

SMART IN FLOW CONTROL



**EU-KONFORMITÄTSERKLÄRUNG
EU DECLARATION OF CONFORMITY**

Modul H/Module H, Nr./No. / N° CE-PED-H-SAM 001-13-DEU-rev-A

SAMSON erklärt in alleiniger Verantwortung für folgende Produkte/For the following products, SAMSON hereby declares under its sole responsibility:

Ventile für Druck-, Differenzdruck-, Temperatur- und Volumenstromregler/Valves for pressure, temperature, flowregulators and differential pressure regulators

Typ 2336, 2373, 2375, 44-1B, 44-2, 44-3, 44-4, 44-6B, 44-9, 45-1, 45-2, 45-3, 45-4, 45-6, (Erz.-Nr. 2720), 45-9, 47-4, 2488, 2489, (2730), 2405, 2406, 2421 (2811), 2412 (2812), 2417 (2817), 2422 (2814), 2423 (2823), 2423E (2823)

die Konformität mit nachfolgender Anforderung/the conformity with the following requirement

Richlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Druckgeräten auf dem Markt.

2014/68/EU vom 15.05.2014

Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating of the making available on the market of pressure equipment (see also Articles 41 and 48).

2014/68/EU of 15 May 2014

Angeordnetes Konformitätsbewertungsverfahren für Fluide nach Art. 4(1)(c.i) erster Gedankenstrich.

Modul siehe Tabelle
durch certified by
See table for Bureau Veritas
module S. A. (0062)

Conformity assessment procedure applied for fluids according to Article 4(1)(c.i), first indent

Neindruck Pressure rating	DN NPS	15 ½	20 ¾	25 1	32 1¼	40 1½	50 2	65 -	80 3	100 4	125 -	150 6	200 8	250 10	300 12	400 16	
PN 16		ohne/without ⁽¹⁾				A ⁽²⁾⁽³⁾		-	-	-	-	H	-	-	-	-	-
PN 25		ohne/without ⁽¹⁾				A ⁽²⁾⁽³⁾						H					
PN 40		ohne/without ⁽¹⁾															
PN 100 und PN 160		ohne/without ⁽¹⁾						H						-	-	-	-
Class 150		ohne/without ⁽¹⁾				A ⁽²⁾⁽³⁾						H					
Class 300		ohne/without ⁽¹⁾									H						
Class 600 und Class 900		ohne/without ⁽¹⁾						H						-	-	-	-

(1) Das auf dem Stellgerät aufgebrachte CE-Zeichen hat keine Gültigkeit im Sinne der Druckgeräterichtlinie.
The CE marking affixed to the control valve is not valid in the sense of the Pressure Equipment Directive.

(2) Das auf dem Stellgerät aufgebrachte CE-Zeichen gilt ohne Bezeichnung der benannten Stelle (Kenn-Nr. 0062).
The CE marking affixed to the control valve is valid without specifying the notified body (ID number 0062).

(3) Die Identifikationsnummer 0062 von Bureau Veritas S.A. gilt nicht für Modul A.
The identification number 0062 of Bureau Veritas S.A. is not valid for Modul A.

Geräte, denen laut Tabelle das Konformitätsbewertungsverfahren Modul H zugrunde liegt, beziehen sich auf die „Zulassungsbescheinigung eines Qualitätssicherungsystems“ ausgestellt durch die benannte Stelle.

Devices whose conformity has been assessed based on Module H refer to the certificate of approval for the quality management system issued by the notified body.

Dem Entwurf zu Grunde gelegt sind Verfahren aus/The design is based on the methods of:

DIN EN 12516-2, DIN EN 12516-3 bzw./or ASME B16.1, ASME B16.24, ASME B16.34, ASME B16.42

Das Qualitätssicherungssystem des Herstellers wird von folgender benannter Stelle überwacht:

The manufacturer's quality management system is monitored by the following notified body:

**Bureau Veritas S.A. Nr./No. 0062, Newtime, 52 Boulevard du Parc, Ile de la Jatte, 92200 Neuilly sur Seine, France
Hersteller:/Manufacturer: SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany**

Frankfurt am Main, 08. Februar 2017/08 February 2017

Klaus Hörschken

Klaus Hörschken
Zentralabteilungsleiter / Head of Central Department
Entwicklung Ventile und Antriebe / R&D, Valves and Actuators

Dr. Michael Heß

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Revision 03

EU-Konformitätserklärung_Blaust-08_Modul-H_De-EN_Rev.03_2017-02-08.docx

SMART IN FLOW CONTROL.



**EU-KONFORMITÄTserklärung
EU DECLARATION OF CONFORMITY**

Modul H/Module H, Nr./No. / N° CE-0062-PED-H-SAM 001-16-DEU-rev-A

SAMSON erklärt in alleiniger Verantwortung für folgende Produkte:/For the following products, SAMSON hereby declares under its sole responsibility:

Ventile für Druck- Differenzdruck-, Volumenstrom- und Temperaturregler/Valves for pressure, differential pressure, volume flow and temperature regulators

2333 (Erz.-Nr./Model No. 2333), 2334 (2334), 2335 (2335), 2336, 2373, 2375, 44-0B, 44-1B, 44-2, 44-3, 44-6B, 44-7, 44-8, 45-1, 45-2, 45-3, 45-4, 45-5, 45-6, 2468, 2478 (2720), 45-9, 46-5, 46-6, 46-7, 46-9, 47-1, 47-4, 47-5, 47-9, 2487, 2488, 2489, 2491, 2494, 2495 (2730), 2405, 2406, 2421 (2811), 2392, 2412 (2812), 2114 (2814), 2417 (2817), 2422 (2814), 2423 (2823)

die Konformität mit nachfolgender Anforderung/the conformity with the following requirement.

Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Druckgeräten auf dem Markt.	2014/68/EU	vom 15.05.2014
Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating of the making available on the market of pressure equipment.	2014/68/EU	of 15 May 2014
Angewandtes Konformitätsbewertungsverfahren für Fluide nach Art. 4(1)(c.ii) und (c.i) zweiter Gedankenstrich.	Modul siehe Tabelle	durch certified by Bureau Veritas S. A. (0062)
Conformity assessment procedure applied for fluids according to Article 4(1)(c.ii) and (c.i), second indent	See table for module	

Nenndruck Pressure rating	DN NPS	15 ½	20 ¾	25 1	32 1¼	40 1½	50 2	65 -	80 3	100 4	125 -	150 6	200 8	250 10	300 12	400 16
PN 16		ohne/without (1)						A (2)(3)			H					
PN 25		ohne/without (1)						A (2)(3)			H					
PN 40		ohne/without (1)						A (2)(3)			H					
PN 100 und PN 160		ohne/without (1)						H			-					
Class 150		ohne/without (1)						A (2)(3)			H					
Class 300		ohne/without (1)						A (2)(3)			H					
Class 600 und Class 900		ohne/without (1)						H			-					

- (1) Das auf dem Stellgerät aufgebrauchte CE-Zeichen hat keine Gültigkeit im Sinne der Druckgeräterichtlinie.
The CE marking affixed to the control valve is not valid in the sense of the Pressure Equipment Directive.
- (2) Das auf dem Stellgerät aufgebrauchte CE-Zeichen gilt ohne Bezeichnung der benannten Stelle (Kenn-Nr. 0062).
The CE marking affixed to the control valve is valid without specifying the notified body (ID number 0062).
- (3) Die Identifikationsnummer 0062 von Bureau Veritas S.A. gilt nicht für Modul A.
The identification number 0062 of Bureau Veritas S.A. is not valid for Modul A.

Geräte, denen laut Tabelle das Konformitätsbewertungsverfahren Modul H zugrunde liegt, beziehen sich auf die „Zulassungsbescheinigung eines Qualitätssicherungsystems“ ausgestellt durch die benannte Stelle.
Devices whose conformity has been assessed based on Module H refer to the certificate of approval for the quality management system issued by the notified body.

Dem Entwurf zu Grunde gelegt sind Verfahren aus:/The design is based on the procedures specified in the following standards:
DIN EN 12516-2, DIN EN 12516-3 bzw./or ASME B16.1, ASME B16.24, ASME B16.34, ASME B16.42
Das Qualitätssicherungssystem des Herstellers wird von folgender benannter Stelle überwacht:
The manufacturer's quality management system is monitored by the following notified body:

**Bureau Veritas S.A. Nr./No. 0062, Newtime, 52 Boulevard du Parc, Ile de la Jatte, 92200 Neuilly sur Seine, France
Hersteller/Manufacturer: SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany**

Frankfurt am Main, 08. Februar 2017/08 February 2017

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Revision 03

EU-Konformitätsbescheinigung, Blatt 01, Modul A, Modul H, DE, EN, Rev.03, 2017-02-08, 0600

15 Annex

15.1 Tightening torques

Table 15-1: *Tightening torque*

Component	Width across flats	Valve size/actuator area	Tightening torque in Nm
Plug nipple with plug (2)	Special tool	G ½ to 1 · ½ to 1 NPT DN 15 to 25/NPS ½ to 1	40
		G 1½ and 2 · 1½ and 2 NPT DN 40 and 50/NPS 1½ and 2	110
Seat (3)	-	G ½ to 1 · ½ to 1 NPT DN 15 to 25/NPS ½ to 1	45
		G 1½ and 2 · 1½ and 2 NPT DN 40 and 50/NPS 1½ and 2	110
Set point screw (9)	SW 3	G ½ to 1 · ½ to 1 NPT DN 15 to 25/NPS ½ to 1	-
	SW 5	G 1½ and 2 · 1½ and 2 NPT DN 40 and 50/NPS 1½ and 2	
Screws (10)	-	G ½ to 1 · ½ to 1 NPT DN 15 to 25/NPS ½ to 1	10
		G 1½ and 2 · 1½ and 2 NPT DN 40 and 50/NPS 1½ and 2	18

15.2 Lubricant

SAMSON's After-sales Service can support you concerning lubricants and sealants approved by SAMSON.

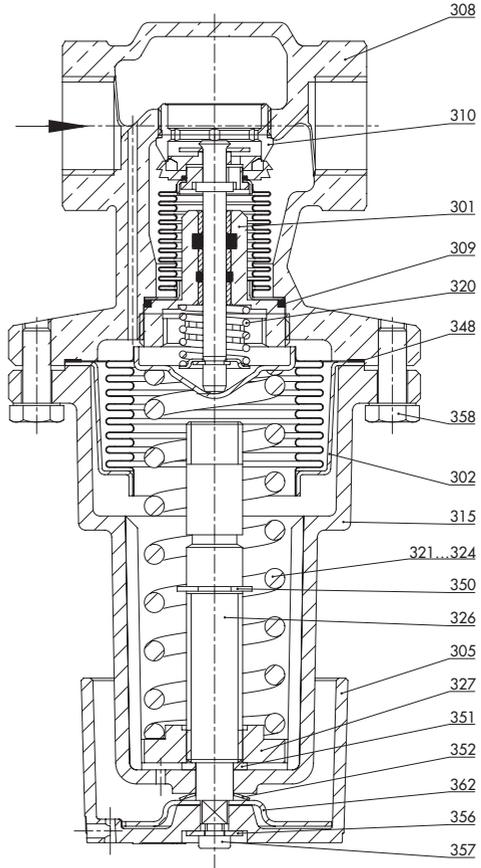
15.3 Tools

SAMSON's After-sales Service can support you concerning tools approved by SAMSON.

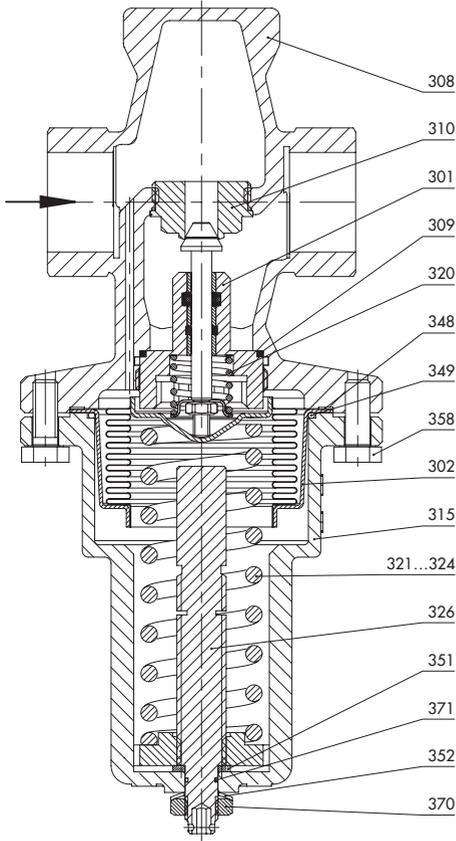
15.4 Spare parts

Red brass body · Screwed end

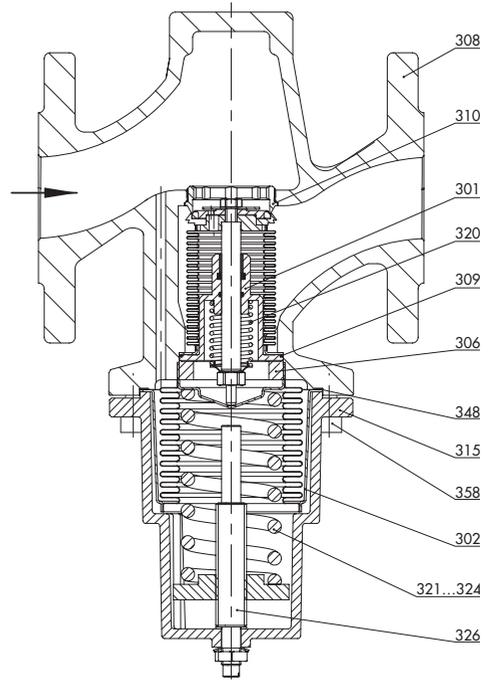
301	Plug assembly
302	Bellows assembly
305	Handwheel
306	Plug nipple (DN 32 to 50)
308	Body
309	Seal
310	Threaded seat
315	Spring housing
320	Compression spring
321 ... 324	Set point spring
326	Spindle
327	Spring plate
348	Gasket
349	O-ring
350	Retaining washer (8 to 20 bar set point range)
351	Shim
352	Spring washer
356	Washer
357	Cap screw
358	Hex screw
362	Reinforcement plate
370	Lock nut
371	Seal



Stainless steel body · Screwed end and flange



Spheroidal graphite iron body · Flange



15.5 After-sales service

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 aftersalesservice@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 (▶ www.samsongroup.com) or in all SAMSON product catalogs.

Required specifications

Please submit the following details:

- Device type and valve size
- Model number and configuration 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.)



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