

MOUNTING AND OPERATING INSTRUCTIONS

SAMSON

EB 3124 EN

Translation of original instructions



Type 45-1



Type 45-2

Types 45-1, 45-2, 45-3 and 45-4 Differential Pressure Regulators
Self-operated regulators · Installation in the flow or return flow pipe

Note on these mounting and operating instructions

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

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- If you have any questions about these instructions, contact SAMSON's After-sales Service (aftersaleservice@samson.de).



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 Type 45-1 and Type 45-2 Regulators are designed for differential pressure control in the flow pipe. The Type 45-3 and Type 45-4 Regulators are designed for differential pressure control in the return flow pipe. The regulators are mainly used in district heating supply networks and industrial plants. The regulator and actuator are designed to operate under exactly defined conditions (e.g. operating pressure, process medium, temperature).

Therefore, operators must ensure that the regulator and actuator 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 devices 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 regulator is 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 accessories 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 in these instructions

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 are to 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 instructions and measures

Personal protective equipment

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

▶ GESTIS (CLP) hazardous substance database).

- Provide protective equipment (e.g. safety gloves, eye protection) appropriate for the process medium used.
- 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 device by the process medium, the operating pressure or by moving parts by taking appropriate precautions. They must observe all hazard statements, warning and caution notes in these mounting and operating instructions, especially for installation, start-up and service work.

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

▶ GESTIS (CLP) hazardous substance database).

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

Safety features

The Types 45-1, 45-2, 45-3 and 45-4 Regulators do not have any special safety equipment. When relieved of pressure, the valves are opened by the force of the set point springs.

Responsibilities of the operator

The operator is responsible for proper operation 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, the operator 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, the operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards and regulations

The regulators comply with the requirements of the European Pressure Equipment Directive 2014/68/EU. Devices with a CE marking have an EU declaration of conformity, which includes information about the applied conformity assessment procedure. This EU declaration of conformity is included in the annex of these instructions (see section 14).

Non-electric regulator versions whose bodies are not lined with an insulating material coating do not have their own potential ignition source according to the risk assessment stipulated in EN 13463-1: 2009, section 5.2, even in the rare incident of an operating fault. Therefore, such valve versions do not fall within the scope of Directive 2014/34/EU.

➔ For connection to the equipotential bonding system, observe the requirements specified in section 6.4 of EN 60079-14 (VDE 0165 Part 1).

Referenced documentation

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

- Mounting and operating instructions for
 - Type 1 N and Type 1 NI Strainers** ▶ EB 1010
 - Type 2 N and Type 2 NI Strainers** ▶ EB 1015
- Mounting and operating instructions as well as data sheets for additional components (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. Improper opening can lead to device components bursting.

- Observe the maximum permissible pressure for regulator and plant.
- Before starting any work on the device, 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.
- If necessary, a suitable overpressure protection must be installed on site in the plant section.
- Wear personal protective equipment.

1.2 Notes on possible personal injury

WARNING

Crush hazard arising from moving parts.

The regulator contains moving parts, which can injure hands or fingers if inserted into the valve.

- Do not insert hands or fingers between the set point springs while the regulator is in operation.
- Before performing any work on the regulator, depressurize the plant. Disconnect or shut off the external control line.

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.

1.2 Notes on possible personal injury

WARNING

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.

Damage to health relating to the REACH regulation.

If a SAMSON device contains a substance which is listed as being a substance of very high concern on the candidate list of the REACH regulation, this circumstance is indicated on the SAMSON delivery note.

- Information on safe use of the part affected, see ► www.samson.de/reach-en.html.

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.

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 heat up.
- Wear protective clothing and safety gloves.

Risk of personal injury due to loaded springs.

The set point springs of regulators with adjusted set point are preloaded and are under tension.

- Before starting any work on the springs, relieve the compression from the preloaded springs.

1.3 Notes on possible property damage

! NOTICE

Risk of regulator damage due to unsuitable medium properties.

The regulator is designed for process media with defined properties.

→ Only use process media specified for sizing the valve.

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.

Incorrect control due to the formation of ice on the regulator.

Medium temperatures below 0 °C may cause ice to form on the regulator, depending on the air humidity. This may affect, in particular, the functioning of the actuator stem guide or set point adjuster.

→ Prevent the formation of ice by taking appropriate precautions (e.g. enclosure, trace heater etc.). The plant operator is responsible for selecting and implementing appropriate precautions.

Regulator damage due to condensed glycol.

In principle, the materials 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.

→ Use suitable inhibitors. The plant operator is responsible for selecting and using suitable inhibitors.

Risk of regulator damage due to incorrectly attached slings.

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

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

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

1.3 Notes on possible property damage

! NOTICE

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

Observe the specified torques on tightening regulator components. Excessively tightened torques lead to parts wearing out quicker. Parts that are too loose may cause leakage.

→ Observe the tightening torques specified in section 1.5.1.

Risk of contamination of the process medium through the use of unsuitable lubricant 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.

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 the surface.

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

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

Certain tools are required to work on the regulator.

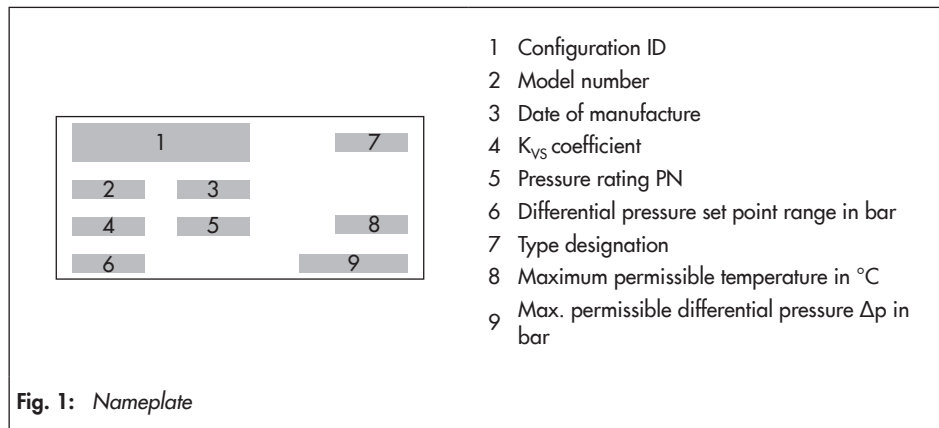
→ Only use tools approved by SAMSON. When in doubt, consult SAMSON.

i Note

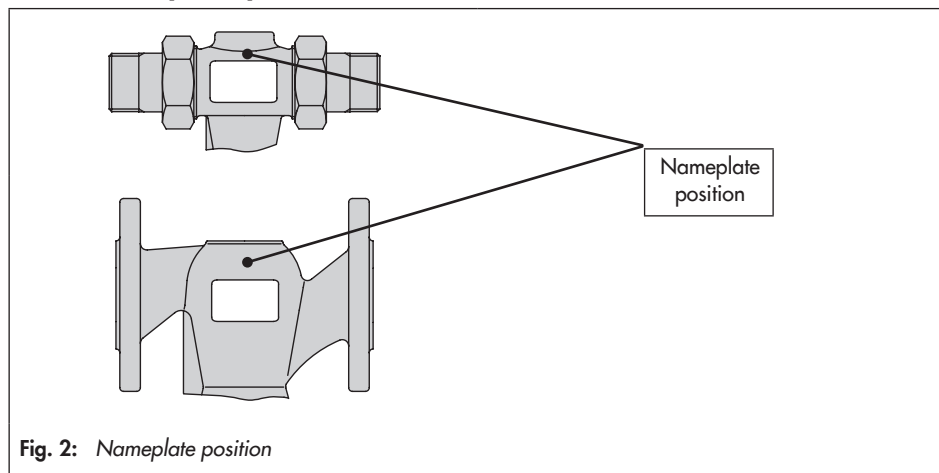
SAMSON's After-sales Service can support you concerning lubricant, tightening torques and tools approved by SAMSON.

2 Markings on the device

2.1 Regulator nameplate



2.2 Nameplate position



2.3 Material numbers

The material designation can be found on the cast body or you can contact us (the configuration ID specification is needed) to find out which material is used. The configuration ID is specified on the nameplate (1, configuration ID). For more details on the nameplate, see Fig. 1.

3 Design and principle of operation

The differential pressure regulators basically consist of the valve body (1) with balanced plug (3) as well as a closing actuator with an operating diaphragm.

In Type 45-1 and Type 45-3, the set point spring (8) installed into the valve determines the set point. Whereas, in Type 45-2 and Type 45-4, the set point can be adjusted by the set point springs (8) in the actuator.

The regulators are designed to maintain a constant differential pressure between the high-pressure and low-pressure lines to an adjustable set point. The valve closes when the differential pressure exceeds the adjusted set point.

Types 45-1 and 45-2 · Installation in the flow pipe

The medium flows through the regulator in the direction indicated by the arrow. The pressure in the valve outlet (high pressure) is transferred to the high-pressure chamber of the actuator over the attached control line (11) and the low pressure from the return flow pipe is transferred to the low-pressure chamber of the actuator over a control line (12) to be installed on site. See Fig. 3.

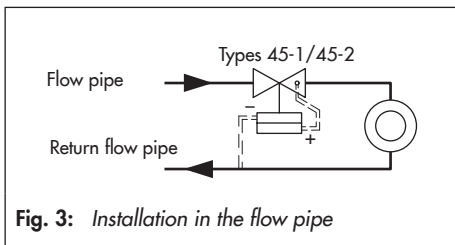


Fig. 3: Installation in the flow pipe

Types 45-3 and 45-4 · Installation in the return flow pipe

The pressure upstream of the valve (low pressure) is transferred to the low-pressure chamber of the actuator through the borehole (13) and the high pressure from the flow pipe is transferred to the high-pressure chamber of the actuator over a control line (11) to be installed on site.

The differential pressure creates a positioning force at the operating diaphragm which moves the valve plug depending on the force of the set point spring(s) (8/10). See Fig. 4.

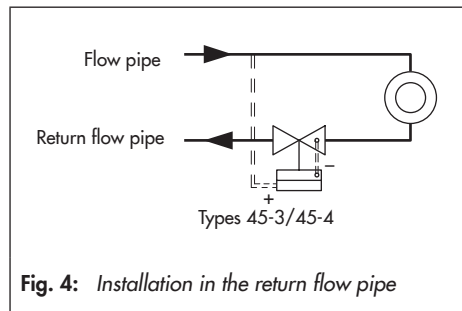


Fig. 4: Installation in the return flow pipe

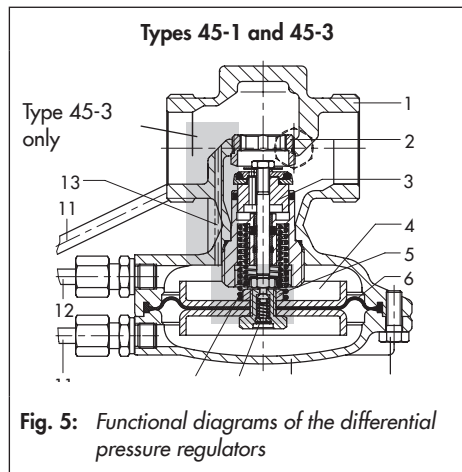
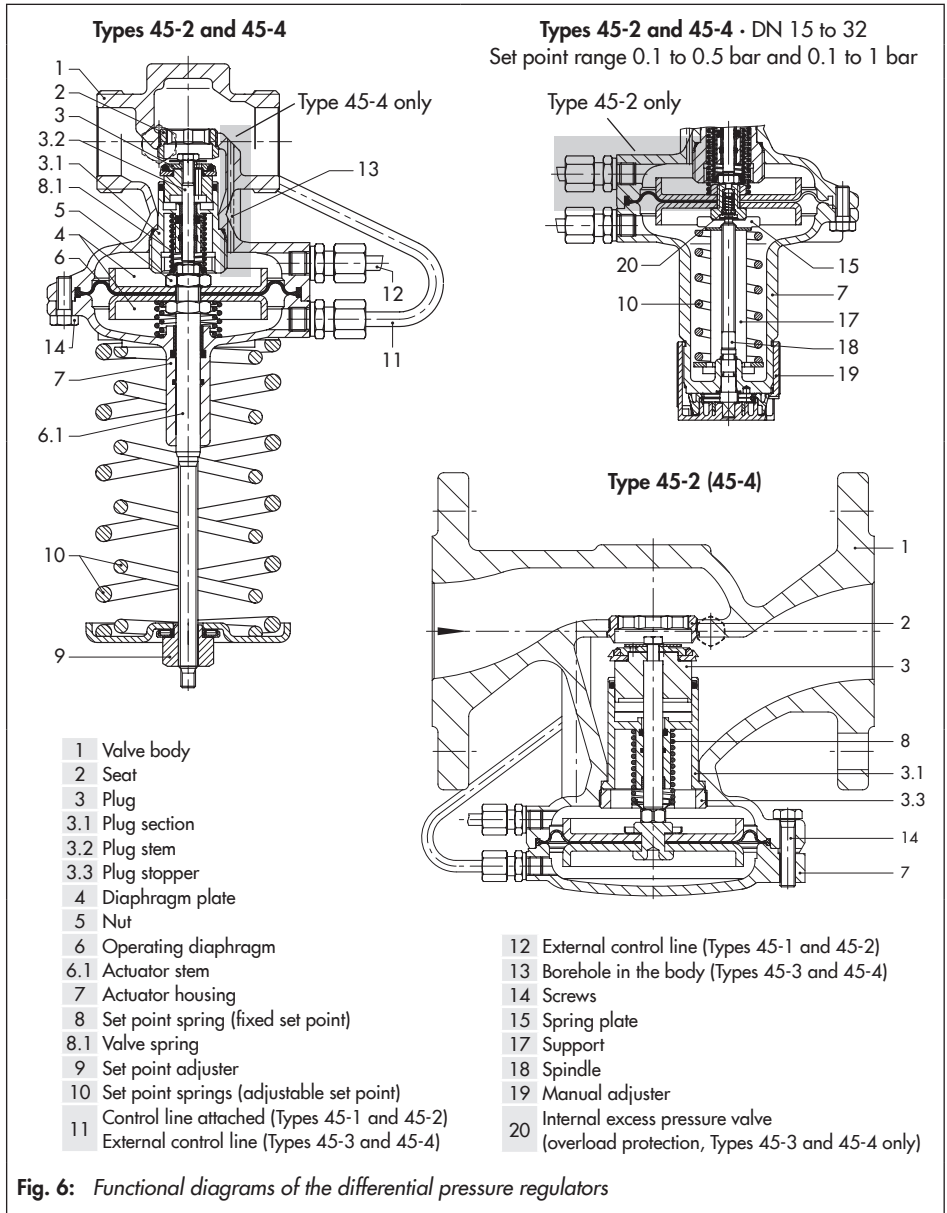


Fig. 5: Functional diagrams of the differential pressure regulators



3.1 Technical data

The regulator's nameplate contains information on the regulator version (see section 2).

Conformity

The Types 45-1, 45-2, 45-3 and 45-4 Regulators bear both the CE and EAC marks of conformity.

CE

EAC

Process medium and scope of application

The regulators are designed to maintain a constant differential pressure between the high-pressure and low-pressure lines to an adjustable set point.

- Suitable for **gases and liquids**
- Max. temperature **150 °C**
- Set points fixed from **0.1 to 0.5 bar** for Type 45-1 and Type 45-3
- Set points adjustable from **0.1 to 10.5 bar** for Type 45-2 and Type 45-4
- Valve size **DN 15 to 50**
- Pressure rating **PN 16 or 25**

The valves **close** when the differential pressure rises.

Temperature range

Depending on how the regulator is configured, it can be used up to temperatures of 150 °C (see Table 1).

The minimum temperature is limited by the accessories used and the actuator's diaphragm material (see Table 1).

Leakage class

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

The soft-seated regulator has the leakage class IV according to IEC 60534-4.

Noise emission

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

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

– *Wear hearing protection when working near the regulator.*

i Note


The Types 45-1, 45-2, 45-3 and 45-4 Regulators are not safety valves.

If necessary, a suitable overpressure protection must be installed on site in the plant section.

Dimensions in mm · Weights in kg

The lengths and heights in the dimension diagrams are shown on pages 18 and 19.

Table 1: *Technical data*

Valve size		DN 15	DN 20	DN 25	DN 32 ³⁾	DN 40 ³⁾	DN 50 ³⁾
K _{VS} coefficient	Standard	4.0	6.3	8.0	12.5	16	20
	Special version	0.4 · 1.0 · 2.5	–				
	Flanged body	–			12.5	20	25
X _{Fz} value	Standard	0.6	0.55			0.45	
	Flanged body	–			0.45		0.40
Pressure rating	Types 45-2 and 45-4	PN 25					
	Types 45-1 and 45-3	PN 16 · PN 25			PN 25		
Max. permissible differential pressure Δp across the regulator		20 bar/10 bar ²⁾				16 bar	
Max. permissible temperature		Liquids: 150 °C/130 °C ²⁾ · Air and nitrogen: 150 °C ¹⁾					
Pressure above adjusted diff. pressure set point at which internal excess pressure limiter responds (Type 45-3 and Type 45-4)		0.5 bar					
Compliance							
Differential pressure set point ranges	Types 45-2 and 45-4: continuously adjustable	0.1 to 0.5 bar ⁴⁾ · 0.1 to 1.0 bar				0.2 to 1.0 bar	
		0.5 to 2.0 bar · 1.0 to 4.0 bar · 2.4 to 6.3 bar · 6.0 to 10.5 bar					
	Types 45-1 and 45-3: fixed set point	0.1 bar · 0.2 bar · 0.3 bar · 0.4 bar · 0.5 bar					

¹⁾ Diaphragm and seals made of FKM; PN 25 version only

²⁾ For PN 16 version

³⁾ Additional version: regulator with flanged body made of spheroidal graphite iron (EN-GJS-400-18-LT)

⁴⁾ For Type 45-4 only

Table 2: *Materials · Material numbers according to DIN EN*

Types 45-1, 45-2, 45-3 and 45-4 Regulators		
Body	CC499K (red brass Rg 5) · Spheroidal graphite iron EN-GJS-400-18-LT ¹⁾	
Seat	Stainless steel 1.4305	
Plug	PN 25	Brass, resistant to dezincification, with EPDM soft seal ²⁾
	PN 16	Brass, resistant to dezincification and plastic with EPDM soft seal
Diaphragm case	PN 25	CC499K (red brass, Rg 5)
	PN 16	DC 01
Valve springs	Stainless steel 1.4310	
Operating diaphragm	EPDM with fabric reinforcement ²⁾	
Seals	EPDM ²⁾	

¹⁾ Additional version in DN 32, 40 and 50: valve with flanged body made of spheroidal graphite iron

²⁾ Special version in PN 25, e.g. for mineral oils: FKM

Design and principle of operation

Table 3: Regulator without connecting parts

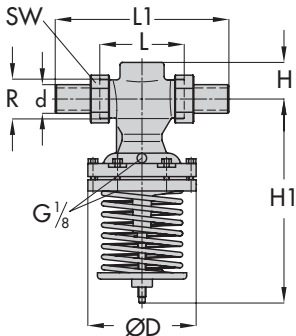
Valve size	DN 15	DN 20	DN 25	DN 32 ¹⁾	DN 40 ¹⁾	DN 50 ¹⁾
Pipe Ø d	21.3	26.9	33.7	42.4	48.3	60.3
Connection R	G ¾	G 1	G 1¼	G 1¾	G 2	G 2½
Width across flats SW	30	36	46	59	65	82
Length L	65	70	75	100	110	130
H	32			45		
H1	230			250	380	
H2	160			180	-	
H3	85			105	140	
ØD	116				160	

¹⁾ Additional version: regulator with flanged body

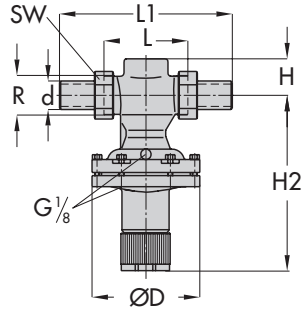
Table 4: Regulator with connecting parts

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	Type 45-2 Type 45-4	2.0	2.1	2.2	8.5	9.0	9.5
	Type 45-1 Type 45-3	1.5	1.6	1.8	4.8	5.3	6.0
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	Type 45-2 Type 45-4	2.0	2.1	2.2	8.5	9.0	9.5
	Type 45-1 Type 45-3	1.5	1.6	1.8	4.8	5.3	5.8
With flanged valve body (DN 32 to 50)							
L3	130	150	160	180	200	230	
Weight, approx. kg	Type 45-2 Type 45-4	3.4	4.1	4.7	11.7	13.0	14.5
	Type 45-1 Type 45-3	2.9	3.6	4.3	8.0	9.3	10.8

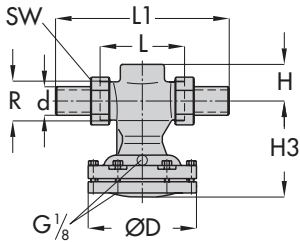
Dimensional drawings



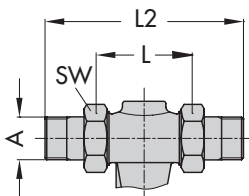
Type 45-2, Type 45-4 · DN 15 to 50
with welding ends



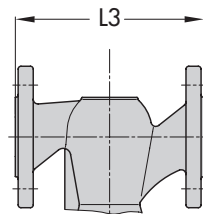
Type 45-2 and Type 45-4 · DN 15 to 32
With welding ends · Version with manual
adjuster to adjust the differential pressure
set point



Type 45-1 and Type 45-3
DN 15 to 50 · With welding ends



Types 45-1, 45-2, 45-3 and 45-4
DN 15 to 50 · With threaded ends



Flanged valve body DN 32 to 50

Fig. 7: Dimensional drawings

4 Shipment and on-site transport

The work described in this section is only to be performed by personnel qualified for the assignment accordingly.

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 regulator nameplate match the specifications in the delivery note.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).

4.2 Removing the packaging from the regulator

The tested regulator is delivered as an assembled unit.

Proceed as follows to lift and install the regulator:

- 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 regulator 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).

Transport instructions

- Protect the device against external influences (e.g. impact).
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the piping and any mounted valve accessories against damage.
- Protect the device against moisture and dirt.
- The permissible ambient temperature of standard regulators is +5 to 65 °C.

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 long storage periods.

Note

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

Storage instructions

- Protect the device against external influences (e.g. impact).
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the device 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 +5 to 65 °C.
- Do not place any objects on the device.

Special storage instructions for elastomers

Elastomer, e.g. diaphragm

- 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 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 qualified for the assignment accordingly.

5.1 Preparation for installation

Proceed as follows:

- Flush the pipelines.
- Install a strainer upstream of the regulator.

i Note

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

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 reducing valve (see section 5.3).

- Check the regulator to make sure that it is clean.
- Check the regulator for damage.
- Check to make sure that the type designation, valve size, material, pressure rating and temperature range of the regulator match the plant conditions (size and pressure rating of the pipeline, medium temperature etc.).
- The requested or required additional pipe fittings have been installed or pre-

pared as necessary before installing the valve (see section 5.3).

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.
- Check any mounted pressure gauges to make sure they function properly.

5.2 Installation conditions

! NOTICE

Risk of overheating due to excessive ambient temperatures or insufficient heat dissipation when components are insulated.

- *Do not include the regulator in the insulation of the pipeline.*
-

! NOTICE

Risk of impaired functioning of the regulator and leakage at the joint due to installation under tension.

- *Bolt the regulator to the pipeline free of stress.*
 - *If necessary, support the pipelines near to the connections.*
 - *Do not attach supports directly to the valve or control thermostat.*
-

5.2.1 Mounting position

Standard mounting position

- Install the regulator in a horizontal pipeline with the actuator housing (7) facing downward (see Fig. 5 and Fig. 6).
- The regulator in valve sizes **DN 15 and 25** can also be installed in vertical pipes.

Installation conditions

- Make sure that the regulator remains freely accessible after the plant has been completed.
- Install a strainer upstream of the regulator (see section 5.3).
- 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. 10)
- Install the regulator free of stress.

! NOTICE

Possible malfunction and damage due to adverse weather conditions (temperature, humidity).

- *Do not install the device outdoors or in rooms prone to frost.*
- *Protect the regulator against frost if it is used to control freezing media.*
- *Either heat the regulator or remove it from the plant and completely drain the residual medium.*

5.2.2 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.

5.2.3 Pipeline routing

The inlet and outlet lengths vary depending on the process medium and the flow conditions in the regulator. To ensure the regulator functions properly, follow the installation instructions given below:

- Observe the inlet and outlet lengths (see Table 5). 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. If necessary, attach supports to the valve.
- Install the regulator allowing sufficient space to remove the valve or to perform service and repair work on it.

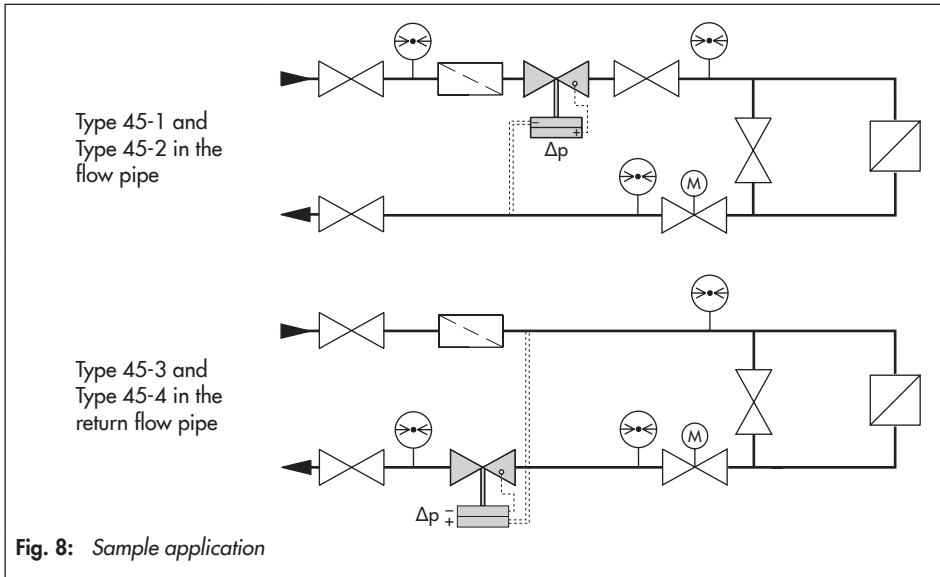


Table 5: Inlet and outlet lengths

a Inlet length
b Outlet length

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

5.3 Additional fittings

Strainer

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

- Install the strainer upstream of the regulator.
- Do not use the strainer to permanently filter the process medium.
- Select a strainer (mesh size) suitable for the process medium.
- Allow sufficient space to remove the filter.
- Observe the flow direction.
- In horizontal pipelines, the filter element faces downward.
- Install strainers in vertical pipelines with the medium flowing upward with the drain plug facing upward.

i Note

Check the strainer at regular intervals and clean it, if necessary.

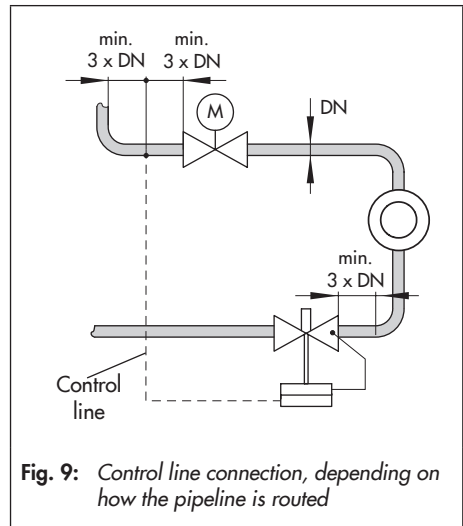


Fig. 9: Control line connection, depending on how the pipeline is routed

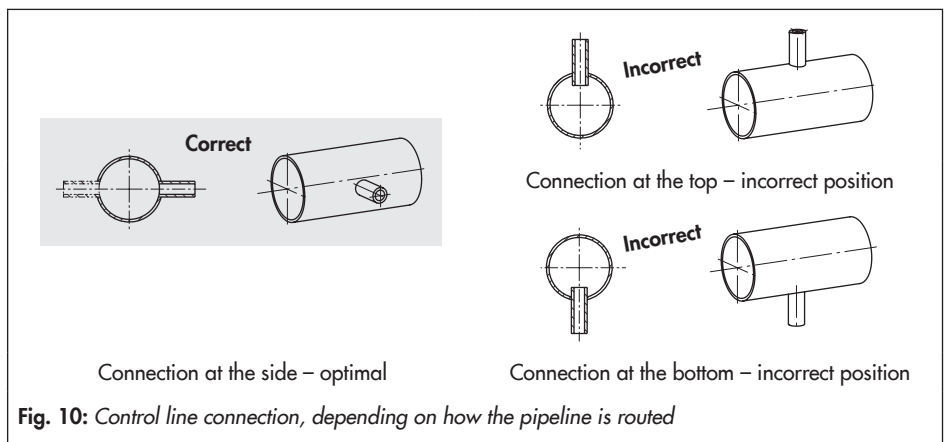


Fig. 10: Control line connection, depending on how the pipeline is routed

Installation

Pressure gauges

Install a pressure gauge at a suitable point to monitor the pressures prevailing in the plant (see Fig. 8).

Shut-off valve

Install a hand-operated shut-off valve both upstream of the strainer and at the outlet of the return flow pipe (see Fig. 8). This allows the plant to be shut down for cleaning and maintenance, and when the plant is not used for longer periods of time.

Control line

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.

We recommend installing the control line for tapping pressure from the pipeline at a distance of at least three times the nominal size (DN) away from any pipe fittings (e.g. manifolds, bends, branches or other valves), 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 with an eccentric reducer.
- Refer to installation schematics (Fig. 9) for line routing.

5.4 Mounting

Tested SAMSON regulators are delivered as assembled units. Proceed as follows to assemble the regulator and before start-up.

! NOTICE

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

Observe the specified torques on tightening regulator components. Excessively tightened torques lead to parts wearing out quicker.

Parts that are too loose may cause leakage.

Observe the tightening torques specified in section 15.1.

! NOTICE

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

– Only use tools approved by SAMSON.

! NOTICE

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

– Only use lubricants approved by SAMSON.

5.4.1 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 before installing the regulator with flanges.
3. Lift the regulator to the site of installation. 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 regulator to the pipeline free of stress.
6. Attach an external control line (12) to the regulator. Observe the tightening torques specified in section 1.5.1.

7. Slowly open the shut-off valves in the pipeline after the valve has been installed.

5.4.2 Cleaning the pipeline

We recommend additionally flushing the pipeline with installed regulator before start-up.

- See Fig. 8
- 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.

If the regulator malfunctions due to clogging after flushing the pipeline, proceed as described in section 8.1.

Rinsing the plant

1. After filling the plant, first completely open the consumer
2. Adjust the maximum differential pressure at the regulator (see section 7.1).
3. Rinse out the pipeline at full flow rate for several minutes.
4. Check the strainer (e.g. measure the pressure drop) and clean it, if necessary.

If the regulator malfunctions due to clogging after flushing the pipeline, proceed as described in section 8.

5.5 Checking the regulator

⚠ DANGER

Risk of bursting in pressure equipment. Regulators and pipelines are pressure equipment. Improper opening can lead to device components bursting.

- Before starting any work on the device, 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.
 - If necessary, a suitable overpressure protection must be installed on site in the plant section.
 - Wear personal protective equipment.
-

⚠ 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 heat up.
 - Wear protective clothing and safety gloves.
-

⚠ WARNING

Risk of personal injury due to process medium escaping under pressure.

- First start up the regulator after mounting all parts.
-

⚠ WARNING

Crush hazard arising from moving parts. The regulator contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- Do not insert hands or fingers between the set point springs while the regulator is in operation.
 - Before performing any work on the regulator, depressurize the plant. Disconnect or shut off the external control line.
-

⚠ WARNING

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.
-

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

5.5.1 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

Our 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 valve.
5. Rework any parts that leak and repeat the leak test.

5.5.2 Pressure test

All plant components must be designed for the test pressure. Remove the regulator from the pipeline, if necessary.

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

- Do not allow the pressure to exceed the 1.5 times the nominal pressure of the valve body.
- Make sure that the regulator is open while filling the plant. To proceed, turn the set point adjuster (9) or manual adjuster (19) counterclockwise (↺) as far as it will go.

! NOTICE

Risk of damage to the diaphragm actuator due to impermissible excess pressure. The test pressure must not exceed the nominal pressure at the actuator by 1.5 times on testing the pressure of the plant when the regulator is already installed.

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.

! NOTICE

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

– Slowly open the shut-off valves.

6 Start-up

The work described in this section is only to be performed by personnel qualified for the assignment accordingly.

⚠ WARNING

Risk of personal injury due to process medium escaping under pressure.

- First start up the regulator after mounting all parts.

⚠ 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 heat up.
- Wear protective clothing and safety gloves.

⚠ WARNING

Crush hazard arising from moving parts.

The regulator contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- Do not insert hands or fingers between the set point springs while the regulator is in operation.
 - Before performing any work on the regulator, depressurize the plant. Disconnect or shut off the external control line.
-

⚠ WARNING

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.

⚠ WARNING

Risk of personal injury due to pressurized components and process medium escaping under pressure.

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

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

- The regulator is properly installed into the pipeline (see section 5).
- The leak and function tests have been completed successfully (see section 5.5).
- The prevailing conditions in the plant section affected meet the regulator sizing requirements (see information under 'Intended use' in section 1).
- Make sure that the regulator is open while filling the plant. To proceed, turn the set point adjuster (9) or manual adjuster (19) counterclockwise (↺) as far as it will go.
- Open the shut-off valves slowly over a time period of several minutes, preferably starting from the return flow pipe.

NOTICE

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

Slowly open the shut-off valve in the pipeline during start-up.

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 heat 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 resulting high velocities that can damage the valve.
3. Check the regulator to ensure it functions properly.

Before starting up the plant, make sure the following conditions are met:

- The control line is open and correctly connected.

6.2 Starting up the plant

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 and plug.

7 Operation

Immediately after completing start-up or placing the regulator back into service (see section 6.1), the regulator is ready for use.

⚠ WARNING

Risk of personal injury due to process medium escaping under pressure.

- First start up the regulator after mounting all parts.

⚠ 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 heat up.
- Wear protective clothing and safety gloves.

⚠ WARNING

Crush hazard arising from moving parts.

The regulator contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- Do not insert hands or fingers between the set point springs while the regulator is in operation.
- Before performing any work on the regulator, depressurize the plant. Disconnect or shut off the external control line.

⚠ WARNING

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.

7.1 Adjusting the differential pressure

i Note

The differential pressure can only be adjusted on the Type 45-2 and Type 45-4 Regulators. The differential pressure of the Type 45-1 and Type 45-3 Regulators is fixed.

Differential pressure adjustment in Type 45-2 and Type 45-4

1. Close the shut-off valves or the bypass to reduce the maximum flow rate to approx. 5 to 10 %.
If you are using a motorized valve, close it to approx. 10 % of its travel.
2. Adjust the required differential pressure at the set point adjuster (9) or manual adjuster (19).
Turn clockwise (↻) to load the set point spring (10). The Δp set point increases.
Turn counterclockwise (↺) to relieve the tension from the set point spring (10).
The Δp set point is reduced.

For regulators with manual adjuster, the set point spring is installed in the bottom section of the valve body (see Fig. 5 and Fig. 6). The set point can be continuously adjusted using the set point adjuster/manual adjuster according to the value on the scale (see Fig. 11).

i Note

The maximum value on the scale of the manual adjuster is 8. However, the maximum set point is reached earlier (see Fig. 11).

One turn of the manual adjuster will change the differential pressure by approx. 0.033 bar in the range from 0.2 to 1 bar and by approx. 0.02 bar in the range from 0.2 to 0.6 bar.

NOTICE

Risk of regulator malfunction due to incorrect setting.

A scale value below 1 may lead to incorrect control.

Only adjust values above 1 on the scale.

If the setting is incorrect (value on the scale below 1), proceed as follows:

- *Depressurize the regulator.*
- *Turn the set point adjuster counterclockwise (⤵) as far as it will go (minimum setting).*
- *Turn the set point adjuster back clockwise to a value between 1 to 2 on the scale.*

The set point can now be adjusted.

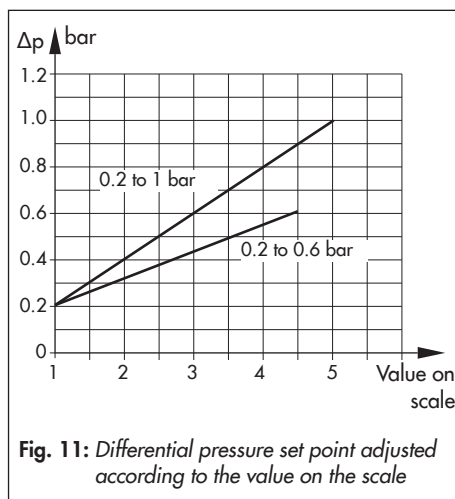


Fig. 11: Differential pressure set point adjusted according to the value on the scale

8 Malfunctions

8.1 Troubleshooting

Table 6: *Troubleshooting*

Malfunction	Possible reasons	Recommended action
Differential pressure exceeds adjusted set point.	Leak between seat and plug	Remove regulator from the pipeline and clean seat and plug. If necessary, replace plug (see section 9.4) or return regulator to SAMSON for repair.
	Defective operating diaphragm	Replace operating diaphragm (see section 9.5) or return regulator to SAMSON for repair.
	Control line or needle valve blocked.	Remove control line and needle valve. Clean them.
	Regulator too large for control task	Recalculate K_{VS} and contact SAMSON for further action.
Differential pressure set point not reached	Regulator too small for control task	Recalculate K_{VS} and contact SAMSON for further action.
	Leak between seat and plug	Remove regulator from the pipeline and clean seat and plug. If necessary, replace plug (see section 9.4) or 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.
Control loop hunts.	Incorrectly installed regulator (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.
	Regulator too large for control task	Recalculate K_{VS} and contact SAMSON for further action.

i Note

Contact SAMSON's After-sales Service for malfunctions not listed in the table and when the malfunction cannot be remedied as described.

The malfunctions listed in Table 6 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 for repair work.

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.

SAMSON's After-sales Service can help during troubleshooting. Further information is available in section 15.6.

i Note

Contact SAMSON's After-sales Service for malfunctions not listed in the table and when the malfunction cannot be remedied as described.

8.2 Emergency action

The plant operator is 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 Table 6).
3. Rectify those malfunctions that can be remedied based on the instructions provided here. Contact our after-sales service in all other cases.

Putting the valve back into operation after a malfunction

→ See section 6.

9 Servicing

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. Operators are responsible for drawing up a test plan.

Details on faults and how to remedy them can be found in the section 8.

The work described in this section is only to be performed by personnel qualified for the assignment accordingly.

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

DANGER

Risk of bursting in pressure equipment. Regulators and pipelines are pressure equipment. Improper opening can lead to device components bursting.

- Before starting any work on the device, 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.
- If necessary, a suitable overpressure protection must be installed on site in the plant section.
- Wear personal protective equipment.

WARNING

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

While working on the regulator and control line, 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.

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 heat up.
- Wear protective clothing and safety gloves.

NOTICE

Risk of regulator damage due to incorrect servicing or repair.

Service and repair work must be performed by trained staff only.

NOTICE

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

Observe the specified torques on tightening regulator components. Excessively tightened torques lead to parts wearing out quicker.

Parts that are too loose may cause leakage.

Observe the tightening torques specified in section 1.5.1.

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.

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 section 10).

Tip

We recommend removing the regulator from the pipeline before performing any service work (see 11.1).

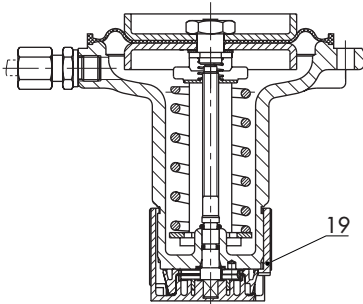
The following service work can be performed after preparation is completed:

- Replace the plug (see section 9.4)
- Replace the operating diaphragms (see section 9.5)

9.2 Install the regulator after service work

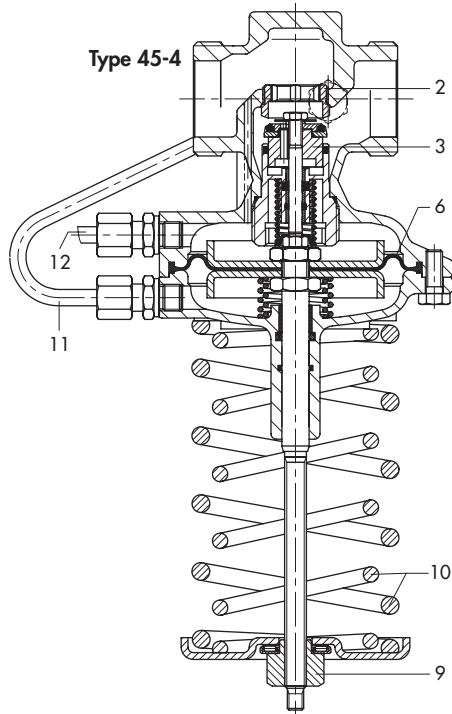
- Put the regulator into operation (see section 6) Make sure the requirements and conditions for start-up or putting the regulator back into operation are met.

Type 45-2 and Type 45-4



DN 15 to 32, set point range 0.2 to 0.6 bar and 0.2 to 1 bar, with manual adjuster and scale for Δp set point adjustment.

Type 45-4



- 2 Seat
- 3 Plug
- 6 Operating diaphragm
- 9 Set point adjuster
- 10 Set point spring
- 11 Control line
- 12 Connection of the external control line
- 19 Manual adjuster

Fig. 12: Differential pressure control using Type 45-4 and Type 45-2

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 start-up (see section 5.5).

9.4 Cleaning and replacing the plug

See Fig. 5 and Fig. 6.

Removal

1. Put the regulator out of operation (see section 10).
2. For **Type 45-4 and Type 45-2**, completely relieve the tension from the set point spring (10) by turning the set point adjuster (9) or manual adjuster (19) counterclockwise (↺).
3. Unscrew the control lines (11, 12).
4. Unscrew and remove the screws (14) and lift the actuator (7) off the valve body (1).
5. Pull the valve spring (8.1), if installed, out of the body.
6. **DN 15 to 25:** unscrew the guide nipple of the plug (3.1) using a socket wrench (order no. 1280-3001) and pull out the plug (3).
DN 32 to 50 unscrew stopper (3.3) and pull out the guide nipple (3.1) with plug (3).

7. Thoroughly clean the seat and plug. If the plug is damaged, replace the entire plug with a new one.
8. Check the control lines (11, 12) and the borehole in the body (13, Type 45-3 and Type 45-4) for blockage. Clean, if necessary.

Installation

1. Insert cleaned or new plug.
2. **DN 15 to 25:** tighten the guide nipple with plug (3.1) using a socket wrench (order no. 1280-3001). Observe the tightening torques specified in section 15.1.
DN 32 to 50: insert the plug (3) followed by the stopper of the plug (3.3). Observe the tightening torques specified in section 15.1.
3. Insert the valve spring (8.1), if installed, into the body.
4. Place the actuator on the body. Tighten screws (14). Observe the tightening torques specified in section 15.1.
5. Install the regulator into the pipeline.
6. Fasten the control lines (11, 12). Observe the tightening torques specified in section 15.1.
7. Put the regulator into operation (see section 6).

9.5 Replacing the operating diaphragm

→ See Fig. 5 and Fig. 6.

i Note

The operating diaphragm in some versions can only be replaced together with the diaphragm plate.

9.5.1 Version without manual adjuster

Disassembly

1. Put the regulator out of operation (see section 10).
2. For **Type 45-4** and **Type 45-2**, completely relieve the tension from the set point spring (10) by turning counterclockwise (↺).
3. Unscrew the control lines (11, 12).
4. Remove the regulator from the pipeline.
5. Remove the bolts (14).
6. Lift off the actuator housing (7) with actuator stem (6.1) and set point springs.
7. Pull the valve spring (8.1), if installed, out of the body.
8. Clamp the actuator housing (7) with actuator stem (6.1) and set point springs into a vise.
9. Unscrew the nut (5) and lift off the top diaphragm plate (4).

10. Note which side of the damaged operating diaphragm (6) is the pressurized side and remove the diaphragm.

Installation

1. Place the new operating diaphragm (6) with pressurized side on the bottom diaphragm plate (4).
2. Place on the top diaphragm plate (4) and mount the nut (5). Observe the tightening torques specified in section 15.1.
3. Insert the valve spring (8.1), if installed, into the body.
4. Place on the actuator housing (7) with actuator stem (6.1) and set point springs and tighten the screws (14) evenly. Observe the tightening torques specified in section 15.1.
5. Install the regulator into the pipeline.
6. Fasten the control lines (11, 12). Observe the tightening torques specified in section 15.1.
7. Put the regulator into operation (see section 6).

9.5.2 Version with manual adjuster

Disassembly

1. Put the regulator out of operation (see section 10).
2. To completely relieve the tension from the set point springs (8), turn the manual adjuster (19) counterclockwise (↺) until you hear it a clicking noise.

3. Unscrew the control lines (11, 12).
4. Remove the regulator from the pipeline.
5. Remove the bolts (14).
6. Lift off the actuator housing (7).
7. Pull the valve spring (8.1), if installed, out of the body.
8. Unscrew the assembly, consisting of operating diaphragm (6) together the diaphragm plates, set point spring (10) and support (17), from the spindle (18) by turning the assembly counterclockwise. Pull it out the bottom section of the valve body.

Installation

1. Slide the new assembly over the spindle (18) into the actuator housing.
2. Turn the assembly clockwise (↻) by one turn to screw it onto the spindle (18).
Lift the diaphragm plate to check whether the thread of the assembly has engaged. Turn the assembly one turn further, if necessary.
3. Insert the valve spring (8.1), if installed, into the body.
4. Place on the actuator housing (7) with actuator stem (6.1) and set point springs and tighten the screws (14) evenly. Observe the tightening torques specified in section 15.1.
5. Install the regulator into the pipeline.
6. Fasten the control lines (11, 12). Observe the tightening torques specified in section 15.1.

7. Put the regulator into operation (see section 6).

9.6 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

Contact SAMSON's After-sales Service for more information 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 qualified for the assignment accordingly.

⚠ DANGER

Risk of bursting in pressure equipment. Regulators and pipelines are pressure equipment. Improper opening can lead to bursting of the valve.

- Before starting any work on the regulator, depressurize all plant sections affected as well as the control line.
- Drain the process medium from all the plant sections affected as well as the regulator.
- Wear personal protective equipment.

⚠ WARNING

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

While working on the regulator and control line, 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.

⚠ WARNING

Risk of personal injury due to pressurized components and process medium escaping under pressure.

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

⚠ 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 heat up.
- Wear protective clothing and safety gloves.

⚠ WARNING

Crush hazard arising from moving parts. The regulator contains moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- Do not insert hands or fingers between the set point springs while the regulator is in operation.
- Before performing any work on the regulator, depressurize the plant. Disconnect or shut off the external control line.

⚠ WARNING

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.

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

1. Close the shut-off valve on the upstream side of the regulator.
2. Close the shut-off valve on the downstream side of the regulator.
3. If necessary, allow the pipeline and regulator to cool down or heat up.
4. Depressurize the plant.
5. Depressurize the plant sections connected through the external control line.
6. Unscrew the control line.
7. Completely drain the pipelines and regulator.

11 Removal

The work described in this section is only to be performed by personnel qualified for the assignment accordingly.

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 heat up.
 - Wear protective clothing and safety gloves.
-

WARNING

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

While working on the regulator and control line, 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 control valve is put out of operation (see section 10).

11.1 Removing the regulator from the pipeline

1. Support the regulator to hold it in place when separated from the pipeline.
2. Undo any externally mounted control line.
3. Undo the flange or bolted connection.
4. Remove the regulator from the pipeline.

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 servicing or repair.
Service and repair work must be performed by trained staff only.*

12.1 Returning devices to SAMSON

Defective devices can be returned to SAMSON for repair.

Proceed as follows to return devices:

1. Decommission the regulator as described in section 10.
2. Decontaminate the regulator. Remove all residue medium.
3. Fill out the Declaration on Contamination, which can be downloaded from our website at ► www.samsongroup.com > Service & Support > After-sales Service > Returning goods.
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 47.



**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

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 (see also Articles 41 and 48). 2014/68/EU of 15 May 2014

Angewandtes Konformitätsbewertungsverfahren für Fluide nach Art. 4(1)(c.i) erster Gedankenstrich. Modul siehe Tabelle durch certified by
Conformity assessment procedure applied for fluids according to Article 4(1)(c.i), first indent See table for module Bureau Veritas S. A. (0062)

Druck 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)													
PN 25		ohne/without (1)		A (2)(3)													
PN 40		ohne/without (1)				H											
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 Stelgerät 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 Stelgerät 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 Qualitätssicherungssystems“ 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 Hörtschken
Klaus Hörtschken
Zentralabteilungsleiter / Head of Central Department
Entwicklung Ventile und Antriebe / R&D, Valves and Actuators

Dr. Michael Heß
Dr. Michael Heß
Zentralabteilungsleiter / Head of Central Department
Product Management & Technical Sales

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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 to 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	20	25	32	40	50	65	80	100	125	150	200	250	300	400
		½	¾	1	1¼	1½	2	-	3	4	-	6	8	10	12	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)						A (2)(3)				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 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 Qualitätssicherungssystems“ 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 Hörschen
Zentralabteilungsleiter/Head of Central Department
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Dr. Michael Heß
Zentralabteilungsleiter/Head of Central Department
Product Management & Technical Sales

15 Appendix

15.1 Tightening torques

Component	DN	Tightening torque in Nm
Guide nipple (3.1)	15 to 25 32	70 110
Plug stopper (3.3)	40 to 50	110
Nut (5)	15 to 50	22
Control line (11, 12)	15 to 50	22
Screws (14)	15 to 32 40 to 50	8 18
Connection nut on the threaded/welding end	15 to 50	80

15.2 Mounting parts

Valve size	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
Welding ends ¹⁾	1400-6500	1400-6501	1400-6502	1400-6509	1400-6510	1400-6511
Threaded ends ¹⁾	1400-6503	1400-6504	1400-6505	1400-6512	1400-6513	1400-6514
Gasket	8413-3000	8413-3001	8413-3002	8413-3003	8413-3004	8413-3005

¹⁾ Pair including flat gasket

15.3 Lubricant

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

15.5 Spare parts

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

15.4 Tools

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

15.6 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@samson.de.

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.samson.de) or in all SAMSON product catalogs.

To assist diagnosis and in case of an unclear mounting situation, specify the following details (so far as possible). See section 2:

- Device type and nominal size
- Model number and configuration ID
- High pressure and low pressure in the actuator
- Adjusted set point or set point range of the regulator
- 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.)

EB 3124 EN



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