MOUNTING AND OPERATING INSTRUCTIONS

EB 3018 EN

Translation of original instructions

Type 42-36 E with Type 5827 Actuator

Type 42-36 E with Type 3374 Actuator

Type 42-36 E Pressure-independent Control Valve (PICV)

With Type 5827 or Type 3374 Electric Actuator

Edition March 2025

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 (aftersalesservice@samsongroup.com).

Documents relating to the device, such as the mounting and operating instructions, are available on our website at ***www.samsongroup.com > 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

1 Safety instructions and measures

Intended use

The Type 42-36 E Pressure-independent Control Valve (PICV) with an electric actuator is intended for flow control of liquids up to 150 °C as well as air and non-flammable gases up to 80 °C. It consists of a Type 2423 Valve, a Type 2426 Actuator and an electric actuator. The regulator is delivered as separate components.
The pressure-independent control valve is mainly used to control liquids or gases in district heating supply networks.

The regulators are 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 applications or conditions other than those 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.

Personal protective equipment

SAMSON recommends 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. Follow the instructions given by the plant operator.
– Hard hat
– Safety harness, e.g. when working at height
– Safety footwear, if applicable ESD (electrostatic discharge) footwear

➔ 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, warnings 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 standard operating procedures drawn up by the operator.

SAMSON also recommends 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.

These mounting and operating instructions deal with the standard version of the device. Components of the device that differ to those used for the standard version described in this document can be exchanged with other certain SAMSON components. The residual hazards of these components are described in the associated mounting and operating instructions (see section 'Referenced documents').

Safety features

The Type 42-36 E Pressure-independent Control Valve (PICV) with an electric actuator without fail-safe action does not have any special safety features.

The Type 42-36 E Pressure-independent Control Valve (PICV) with an electric actuator with fail-safe action moves to a certain fail-safe position upon supply voltage failure. The fail-safe action of SAMSON actuators is specified on the actuator nameplate.

When relieved of pressure, the regulator without an electric actuator and with an open restriction is opened by the force of the set point springs.

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.
Operators are additionally responsible for ensuring that the limits for the product defined in the technical data are observed. This also applies to the start-up and shutdown procedures. Start-up and shutdown procedures fall within the scope of the operator's duties and, as such, are not part of these mounting and operating instructions. SAMSON is unable to make any statements about these procedures since the operative details (e.g. differential pressures and temperatures) vary in each individual case and are only known to the operator.

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 and the Machinery Directive 2006/42/EC. Regulators with a CE marking have a declaration of conformity which includes information about the applied conformity assessment procedure. The declaration of conformity is included in the 'Certificates' chapter.

According to the ignition hazard assessment performed in accordance with Clause 5.2 of ISO 80079-36, 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 Clause 6.4 of EN 60079-14 (VDE 0165-1).

Referenced documents

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

– Mounting and operating instructions for

e.g.	**Type 2 N or 2 NI Strainer**	▶ EB 1015
e.g.	**Type 5827 Actuator (version with three-step signal)**	▶ EB 5827-1
e.g.	**Type 5827 Actuator (version with positioner)**	▶ EB 5827-2
e.g.	**Type 3374 Actuator (version with three-step signal)**	▶ EB 8331-3
e.g.	**Type 3374 Actuator (version with positioner)**	▶ EB 8331-4

– Data sheets for

e.g.	**Accessories · Differential pressure and flow regulators**	▶ T 3095
e.g.	**Type 2 N or 2 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 of the pressure equipment can lead to regulator components bursting.

- ➔ Observe the maximum permissible pressure for regulator and plant.
- ➔ If necessary, a suitable overpressure protection must be installed on site in the plant section.
- ➔ Before starting any work on the regulator, depressurize all plant sections affected as well as the regulator.
- ➔ Drain the process medium from the plant sections affected as well as from the regulator.
- ➔ Wear personal protective equipment.

Risk of fatal injury due to electric shock.

- ➔ Before connecting wiring, performing any work on the device or opening the device, disconnect the supply voltage and protect it against unintentional reconnection.
- ➔ Only use power interruption devices that are protected against unintentional reconnection of the power supply.
- ➔ Do not remove any covers to perform adjustment work on live parts.
- ➔ Avoid jets of water.
- ➔ Refer to the mounting and operating instructions of the electric actuator for further information.

1.2 Notes on possible personal injury

⚠ WARNING

Risk of personal injury due to 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.

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 pressurized components and as a result of process medium being discharged.

Incorrect opening of pressure equipment or mounting parts may lead to the process medium escaping to the atmosphere.

➔ Do not unscrew the control line while the valve is pressurized.

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.

⚠ 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.

➔ If possible, drain the process medium from the plant sections affected and from the regulator.

➔ Wear protective clothing, safety gloves and eye protection.

Damage to health relating to the REACH regulation.

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

➔ Information on the safe use of the part affected (▶ www.samsongroup.com/en/about-samson/material-compliance/reach-regulation/).

Crush hazard arising from moving parts.

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

➔ Do not insert hands or fingers into the yoke while the valve is in operation.

➔ Disconnect the supply voltage and protect it against unintentional reconnection before performing any work on the control valve.

➔ Do not impede the movement of the actuator or plug stem by inserting objects into their path.

➔ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

➔ Before starting any work on the regulator, depressurize plant sections as well as the regulator.

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 actuator housing.

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 the equipment.

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 over- or under-torquing.

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 the 'Tightening torques' chapter in the Appendix).

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 plug or diaphragm stem guide.

➔ 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.

NOTICE

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. SAMSON cannot prevent this reaction.

➔ Use suitable inhibitors. The plant operator is responsible for the selection and use of suitable inhibitors.

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.

Risk of damage to the electric actuator due to the supply voltage exceeding the permissible tolerances.

The electric actuator is designed for use according to regulations for low-voltage installations.

➔ Observe the permissible tolerances of the supply voltage.

Risk of damage to the electric actuator due to over-torquing.

Observe the specified torques when tightening the mounting parts of the electric actuator. Excessive tightening torques lead to parts wearing out more quickly.

➔ Observe the specified tightening torques.

Risk of actuator damage due to incorrect wiring of the binary inputs.

➔ Always wire the binary inputs as floating contacts.

NOTICE

Risk of damage to the electric actuator due to incorrect operation of the manual override.

The actuator stem of the electric actuator can be adjusted manually.

➔ Do not operate the manual override while the actuator is in operation. Only operate the manual override of actuators without fail-safe action in the de-energized state.

Risk of damage to the electric actuator by moving the actuator stem too far.

The actuator stem of the electric actuator can be adjusted manually.

➔ Only retract the actuator stem as far as the end position at the maximum.

Risk of damage to the electric actuator due to incorrect connection of the voltage.

The electric actuator has terminals to retract the stem (eL terminal) and to extend the stem (aL terminal).

➔ Do not apply a voltage to eL and aL at the same time.

Malfunction due to a configuration that does not meet the requirements of the application.

The electric actuator is configured for the specific application by setting configuration items and parameters.

➔ Perform the configuration for the specific application during start-up and after a reset to default settings.

Note

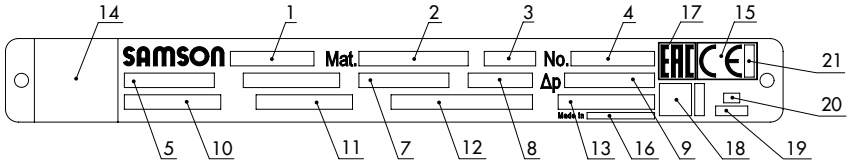
SAMSON's After-sales Service can support you concerning lubricant, tightening torques and tools approved by SAMSON.

2 Markings on the device

Several nameplates are affixed to the device. The nameplates shown were up to date at the time of publication of this document. The nameplates on the device may differ from the ones shown. The nameplates are used to identify the separate regulator components (see Chapter 2.1 to Chapter 2.2).

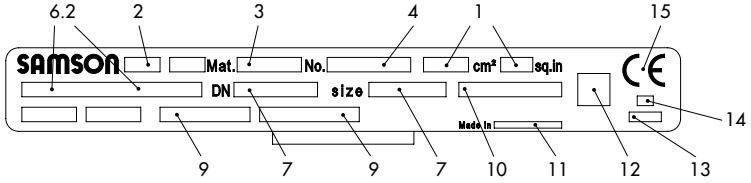
2.1 Nameplate on valve and actuator

Nameplate for Type 2423 Valve



1	Model number with index	8	Pressure rating	15	CE marking
2	Material number/ configuration ID	9	Perm. differential pressure	16	Country of origin
3	Type	10	Perm. temperature	17	EAC, if applicable
4	Production number	11	Body material	18	UKCA, if applicable
5	K_{VS}/C_V	12	Serial number	19	Year of manufacture
7	Valve size	13	TÜV registration no.	20	Month of manufacture
		14	Data Matrix code	21	ID of the certification body

Nameplate of Type 2426 Actuator



1	Actuator area	6.2	Max. perm. pressure at actuator	12	UKCA, if applicable
2	Actuator model	7	Valve size	13	Year of manufacture
2.1	Valve model	9	Set point range	14	Month of manufacture
3	Material number and device index	10	Diaphragm material	15	CE marking
4	ID number	11	Country of origin		

Fig. 2-1: *Nameplates on valve and actuator*

2.2 Nameplate of the electric actuator

See associated actuator documentation.

2.3 Location of the nameplates

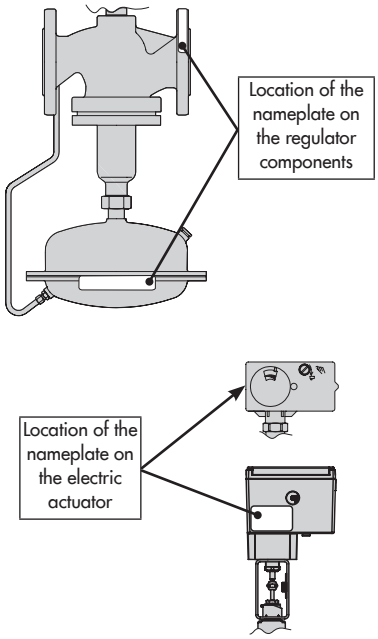


Fig. 2-2: *Nameplate of the valve, diaphragm actuator and electric actuators*

2.4 Material identification number

2.4.1 Type 2423 Valve

See the nameplate (11 for DIN/ANSI version, body material) for the material used. For more details on the nameplate, see Chapter 2.1.

2.4.2 Type 2426 Actuator

Specifying the material number, you can contact us to find out which material is used. It is specified on the nameplate in the 'MNo.' field (3 for DIN/ANSI). For more details on the nameplate, see Chapter 2.1.

2.4.3 Electric actuator

Specifying the configuration ID, you can contact us to find out which material is used. See associated actuator documentation for more details on the nameplate.

3 Design and principle of operation

➔ See Fig. 3-1 and Fig. 3-2

The device combinations for the Type 42-36 E consist of the Type 42-36 Pressure-independent Control Valve (PICV) and a Type 5827 or Type 3374 Electric Actuator (depending on the nominal size).

The regulator closes when the flow rate or the output signal of the electric controller increases.

Version

Type 42-36 E: DN 15 to 250, consisting of a Type 2426 Diaphragm Actuator and a Type 2423 E Valve (balanced by a bellows or diaphragm) with restriction to adjust the flow rate set point. The regulator is installed in the flow or return pipe.

The valves are fitted with an adapter for connection of an electric actuator. It serves to apply the control signal (mostly a temperature signal) of an electric control device. The electric actuator adjusts the restriction and thus the flow set point.

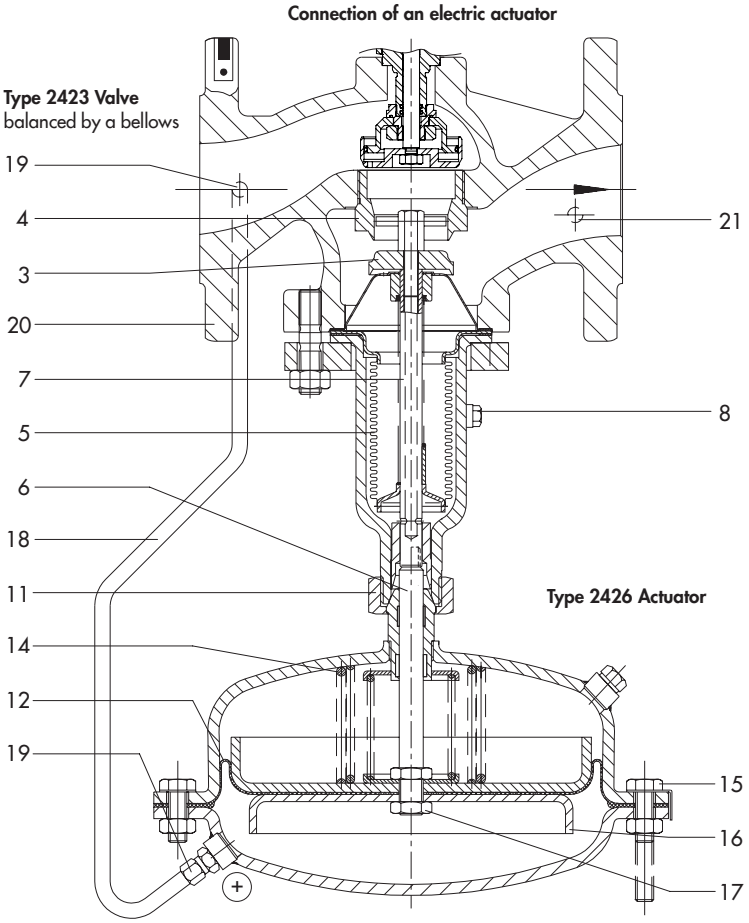


Fig. 3-1: *Functional diagram of regulator, DN 15 to 250 with balancing bellows (without electric actuator)*

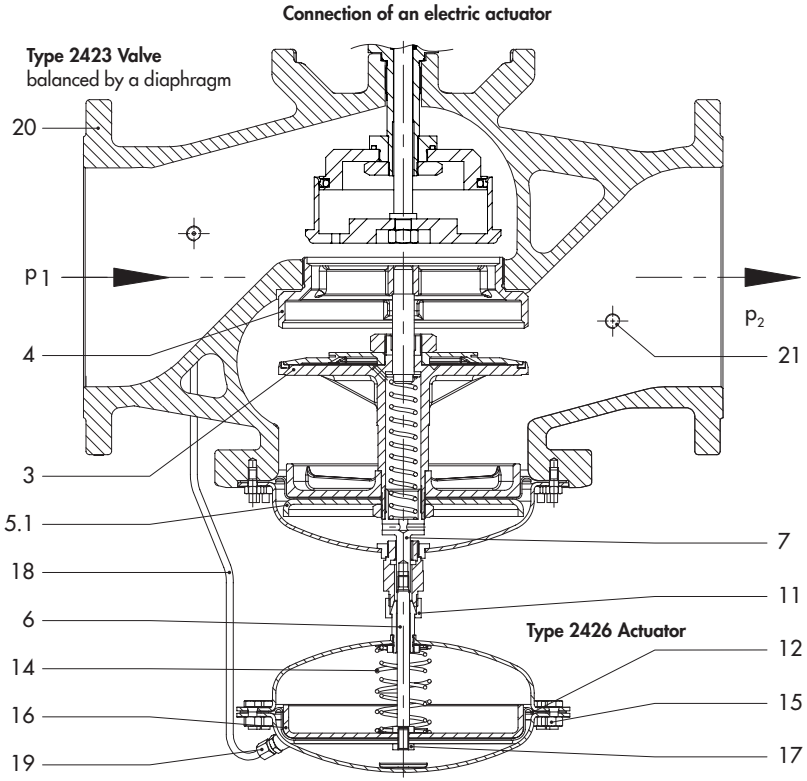
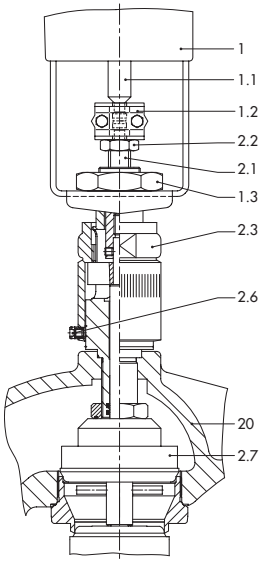


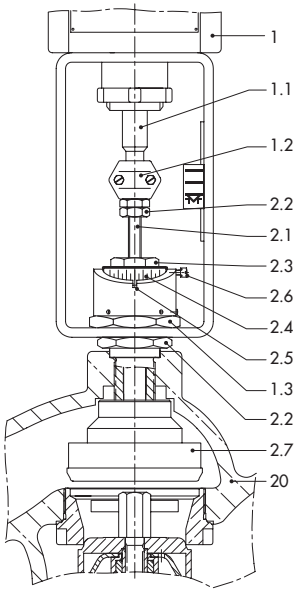
Fig. 3-2: *Functional diagram of regulator, DN 65 to 250 with balancing diaphragm (without electric actuator)*

Legend for Fig. 3-1 and Fig. 3-2

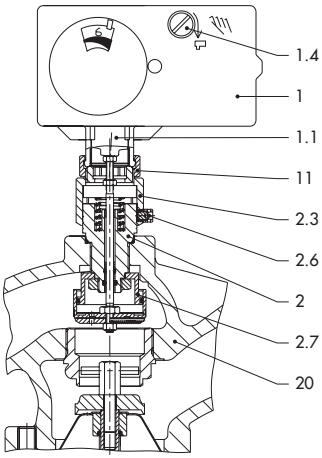
- 3 Plug
- 4 Seat
- 5 Balancing bellows
- 5.1 Balancing diaphragm
- 6 Diaphragm stem
- 7 Plug stem
- 8 Vent plug (DN 125 and larger)
- 11 Coupling nut
- 12 Operating diaphragm
- 14 Differential pressure springs
- 15 Screws
- 16 Diaphragm plate
- 17 Nut
- 18 High-pressure control line
- 19 Control line connection
- 20 Valve body
- 21 Blanking plug



Type 3374 Actuator · DN 65 to 100



Type 3374 Actuator · DN 125 to 250



Type 5827 Actuator · DN 15 to 50

1	Electric actuator
1.1	Actuator stem
1.2	Stem connector
1.3	Hex nut
1.4	Manual adjuster
2	Connecting piece
2.1	Stem
2.2	Lock nut
2.3	Set point adjuster
2.4	Scale
2.5	Groove mark
2.6	Locking screw
2.7	Restriction
11	Coupling nut
20	Valve body

Fig. 3-3: *Functional diagram of the restriction, DN 15 to 250 with electric actuator*

3.1 Additional fittings

➔ See Fig. 3-4

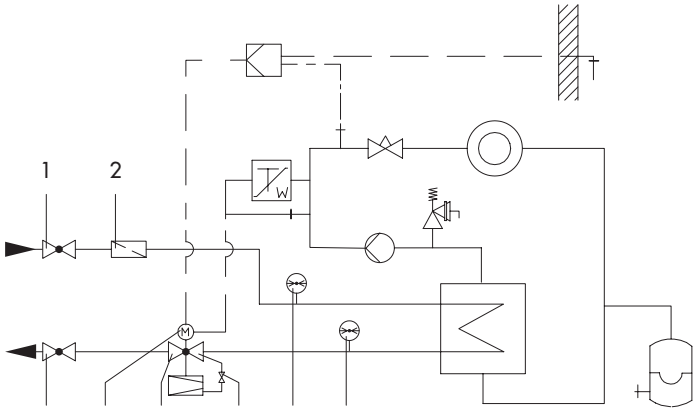
Pressure gauges

Install a pressure gauge (3 and 5) at suitable points to monitor the pressures prevailing in the plant.

Bypass and shut-off valves

SAMSON recommends installing a shut-off valve (1 and 6) 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.

Indirect connection to district heating system with Type 42-36 E PICV:



1	Shut-off valve	4	Type 42-36 E PICV	8	Needle valve
2	Strainer	5	Pressure gauge (return pipe)	9	Electric actuator
3	Pressure gauge (flow pipe)	6	Shut-off valve		

Fig. 3-4: *Type 42-36 E (installation example)*

Strainers

SAMSON recommends installing a SAMSON strainer (2) 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.

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 2 NI) upstream of the pressure reducing valve (▶ EB 1015).

Insulation

Regulators can be insulated to reduce heat energy transfer.
Refer to the instructions in the 'Installation' chapter.

Note

The Type 42-36 E 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 nameplates on the valve, actuator and electric actuator provide information on the valve and actuator versions (see the 'Markings on the device' chapter).

Note

More information is available in Data Sheet ▶ T 3018.

Conformity

The Type 42-36 E Regulator bears the CE mark of conformity.

CE

Process medium and scope of application

The Type 42-36 E Pressure-independent Control Valve (PICV) is designed to maintain the flow rate in a plant to the adjusted set point.

- Suitable for **liquids, air and non-flammable gases**
- Max. temperature **150 °C**
- Set points from **0.5 to 360 m³/h**
- Nominal size **DN 15 to 250**
- Pressure ratings from **PN 16 to 40**

The regulator is open when relieved of pressure. The regulator **closes** when the **flow rate** or the **output signal** of the electric controller increases.

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.

Temperature range

Depending on how the regulator is configured, it can be used up to temperatures of 150 °C (see Table 3-1). The minimum temperature is limited by the accessories used and the actuator's diaphragm material (▶ T 3018).

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.

Dimensions and weights

Fig. 3-5 to Fig. 3-7 provide an overview of the dimensions and weights. The lengths and heights in the dimensional drawings are shown on pages 3-11 to 3-13.

Differential pressure across the valve

The minimum required differential pressure Δp_{min} across the valve is calculated as follows:

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

Δp_{min}	Minimum differential pressure across the valve in bar
$\Delta p_{restriction}$	Differential pressure created at the restriction for measuring the flow rate in the regulator
$\dot{V}$	Adjusted flow rate in m^3/h
K_{VS}	Valve flow coefficient in m^3/h

Table 3-1: *Technical data · Valves · All pressures in bar*

Type 2423 Valve	Balanced by a bellows	Balanced by a diaphragm
Nominal size	**DN 15** to **250**	**DN 65** to **250**
Pressure rating	PN 16, 25 and 40	
Max. medium temperature	Liquids 150 °C [1] Air and nitrogen 150 °C [2]	Liquids 150 °C [1] · Air 80 °C
Max. ambient temperature	50 °C	
Conformity	CE	

1) Use an intermediate insulating piece (1990-1713) for DN 15 to 50 and water temperatures ≥130 °C.
2) Special version: valve with orifice stem seal and operating diaphragm made of FKM

Table 3-2: *Technical data · Electric actuators for valve nominal sizes DN 15 to 250*

Type ... Electric Actuator	Fail-safe action: Actuator stem extends	Nominal size DN			
		15 to 25	32 to 50	65 to 100	125 to 250
5827-N1	–	•	–	–	–
5827-A1	•				
5827-N2	–	–	•	–	–
5827-A2	•				
5827-N3	–	–	–	•	–
3374-11					
3374-21	•				
3374-15	–	–	–	–	•
3374-25	•				

Table 3-3: *Materials · Material number according to DIN EN*

Type 2423 E Valve balanced by a bellows						
Pressure rating		**PN 16**	**PN 25**	**PN 16, 25 and 40**		
Valve body		Cast iron EN-GJL-250	Spheroidal graphite iron EN-GJS-400-18-LT	Cast steel 1.0619	Cast stainless steel 1.4408	Forged stainless steel 1.4404 [1]
Seat		1.4104, 1.4006			1.4404	
Plug	Up to DN 100	1.4104, 1.4006 [2]			1.4404	
	DN 125 to 250	1.4301, 1.4404 with PTFE seal				
Plug stem		1.4301				
Metal bellows		1.4571 · DN 125 and larger: 1.4404				
Bottom section		P265GH			1.4571	
Body gasket		Graphite on metal core				
Type 2423 E Valve balanced by a diaphragm						
Pressure rating		**PN 16**	**PN 25**	**PN 16, 25 and 40**		
Valve body		Cast iron EN-GJL-250	Spheroidal graphite iron EN-GJS-400-18-LT	Cast steel 1.0619 [6]	Cast stainless steel 1.4408 [6]	–
Valve seat		Red brass [3] [4]				
Plug (standard version)		Red brass [3] [5] · WITH EPDM soft seal, max. 150 °C or with PTFE soft seal, max. 150 °C				
Pressure balancing		Balancing cases made of sheet steel DD11 · EPDM balancing diaphragm, max. 150 °C [7]				
Type 2426 Actuator						
Diaphragm cases		1.0332			1.4301	
Diaphragm		EPDM with fabric reinforcement · Special version for mineral oils: FKM with fabric reinforcement [7] or FKM without fabric reinforcement [9] · PVMQ diaphragm [10] for inert gases				
Max. perm. temperature at the diaphragm		Air and gases 80 °C; liquids 80 °C · 90 °C [10] · 120 °C · 150 °C [8]				
Guide bushing		DU bushing			PTFE	
Seals		EPDM/PTFE [7]				
Electric actuators						
Materials		**Type 5827** Electric Actuator ▶ T 5827 **Type 3374** Electric Actuator ▶ T 8331				

1) DN 15, 25, 40 and 50 only
2) Optionally with soft seal with standard K_{VS} coefficients
3) Special version 1.4409
4) DN 65 to 100: 1.4006
5) DN 65 to 100: 1.4104/1.4006
6) DN 125 to 250 only
7) Special version with FKM and two diaphragms; height: H = +55 mm
8) Only with mounting position with the actuator suspended (see 'Permissible mounting position')
9) Only with actuator with one diaphragm, max. 80 °C, only with 0.2 bar differential pressure across the restriction
10) Only for temperatures from –60 to +90 °C with air and gases

Table 3-4: *K_{VS} coefficients, x_{FZ} values, flow rate set point ranges for water and max. permissible differential pressures (valve balanced by a bellows)*

Type 2423 E Valve balanced by a bellows														
Nominal size DN		**15**	**20**	**25**	**32**	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**	**250**
Valve travel		10 mm						16 mm			22 mm			
K_{VS} coefficient		4	6.3	8	16	20	32	50	80	125	190	280	420	500
x_{FZ} value		0.65	0.6	0.55		0.45	0.4		0.35				0.3	
Max. perm. differential pressure Δp		25 bar						20 bar		16 bar		12 bar	10 bar	
Flow rate set point ranges for water in m³/h														
for differential pressure across the restriction [1]	$\Delta p_{restriction}$ = 0.2 bar	0.5 to 2	0.5 to 3	0.8 to 3.5	2 to 7	3 to 11	3 to 16	5 to 28	7 to 35 [1]	10 to 63	40 to 80	50 to 120	70 to 180	90 to 220
	$\Delta p_{restriction}$ = 0.5 bar	0.8 to 3	0.8 to 4.5	1.2 to 5.3	3 to 9.5	4.5 to 16	4.5 to 24	7.5 to 40	10 to 55	15 to 90	60 to 120	75 to 180	100 to 260	120 to 300

[1] $\Delta p_{restriction}$ in 0.3 bar possible as special version

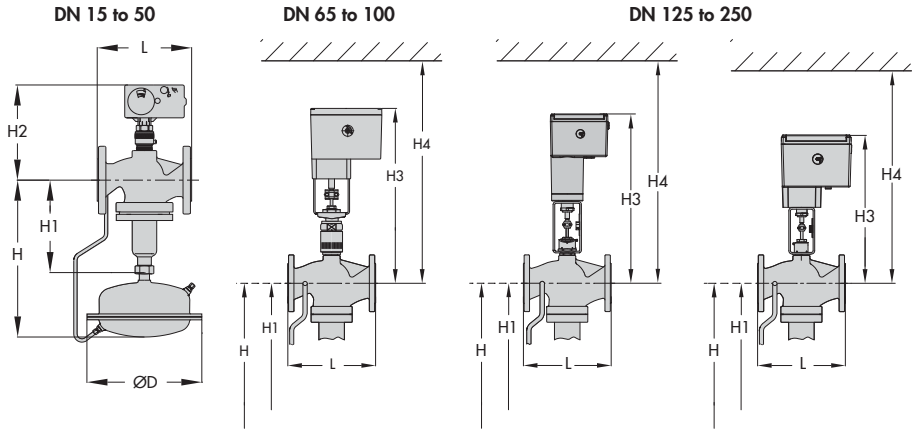
Table 3-5: *K_{VS} coefficients, x_{FZ} values, flow rate set point ranges for water and max. permissible differential pressures (valve balanced by a diaphragm)*

Type 2423 E Valve balanced by a diaphragm								
Nominal size DN		**65**	**80**	**100**	**125**	**150**	**200**	**250**
K_{VS} coefficients in m³/h		50	80	125	250	380	650	800
x_{FZ} value		0.4	0.35				0.3	
Max. perm. differential pressure Δp		12 bar		10 bar	12 bar		10 bar	
Flow rate set point ranges for water in m³/h								
for differential pressure across the restriction [2]	$\Delta p_{restriction}$ = 0.2 bar	5 to 28	7 to 35 [1]	10 to 63	40 to 90	50 to 140	70 to 220	90 to 260
	$\Delta p_{restriction}$ = 0.5 bar	7.5 to 40	10 to 55	15 to 90	60 to 130	75 to 200	100 to 310	120 to 360

[1] 7 to 35 m³/h (160 cm² actuator), 7 to 40 m³/h (320 cm² actuator)
[2] $\Delta p_{restriction}$ in 0.3 bar possible as special version

Dimensions and weights · Type 42-36 E with Type 2423 E Valve balanced by a bellows

Dimensional drawings · Type 2423 E Valve balanced by a bellows · DN 15 to 250



Type 42-36 E with actuator

Type 5827-N1/-N2
Type 5827-A1/-A2 [4]

Types 3374-11/-21

Type 3374-25

Type 3374-15

Dimensions in mm and weights		With Types 5827-N1/-N2/-A1/-A2 Actuator						With Types 3374-11/-21 Actuator		
Nominal size	**DN**	**15**	**20**	**25**	**32**	**40**	**50**	**65**	**80**	**100**
Overall length L		130	150	160	180	200	230	290	310	350
Height H1		225						300		355
Height H2	Forged steel	221	–	243	–	263	269	–		
	Other materials	223			243			–		
Height H3		–						520		540
Height H4		–						820		890
Type 42-36 E PICV										
Height H [2] [3]		390						465		520
Diaphragm actuator		ØD = 225 mm, A = 160 cm² [2]								
Weight for PN 16 [1] in kg (approx.)		13.5	14	15	21.5	22	24.5	51	56	71

[1] +10 % for cast steel PN 40 and spheroidal graphite iron PN 25
[2] Minimum clearance required to remove the diaphragm actuator: +100 mm
[3] Actuator with two diaphragms: Height H +55 mm

Fig. 3-5: *Dimensions of the regulators with a valve balanced by a bellows*

Dimensions and weights · Type 42-36 E with Type 2423 E Valve balanced by a bellows

Dimensions in mm and weights	With Type 3374-25 Actuator				With Type 3374-15 Actuator			
Nominal size DN	**125**	**150**	**200**	**250**	**125**	**150**	**200**	**250**
Overall length L	400	480	600	730	400	480	600	730
Height H1	460	590	730	730	460	590	730	730
Height H3	655	685	800	800	510	595	660	690
Height H4	1000	1030	1150	1150	860	950	1010	940
Type 42-36 E PICV								
Height H [4) 5)]	625	765	895	895	625	765	895	895
Diaphragm actuator	ØD = 285 mm, A = 320 cm² [3)]							
Weight for PN 16 [1)] in kg (approx.)	130	180	435	495	125	170	425	485

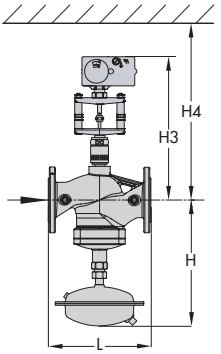
1) +10 % for cast steel PN 40 and spheroidal graphite iron PN 25
2) Optionally with 320 cm² actuator for DN 65 to 100. For regulators with double adapter (▶ T 3018) for DN 65 to 100, actuator 320 cm² recommended
3) Optionally with 640 cm² actuator and ØD = 390 mm
4) Minimum clearance required to remove the diaphragm actuator: +100 mm
5) Actuator with two diaphragms: Height H +55 mm

Fig. 3-5: *Dimensions of the regulators with a valve balanced by a bellows*

Dimensions and weights · Type 42-36 E with Type 2423 E Valve balanced by a diaphragm

Dimensional drawings · Type 2423 E Valve balanced by a diaphragm · DN 65 to 100

Type 42-36 E with Type 5827-N3 Electric Actuator [4)]



Dimensions in mm and weights	With Type 5827-N3 Actuator		
Nominal size DN	**65**	**80**	**100**
Overall length L	290	310	350
Height H [2) 3)]	355	355	380
Height H3	433	433	453
Height H4	730	730	800
Weight for PN 16 [1)] in kg (approx.)	43	48	65

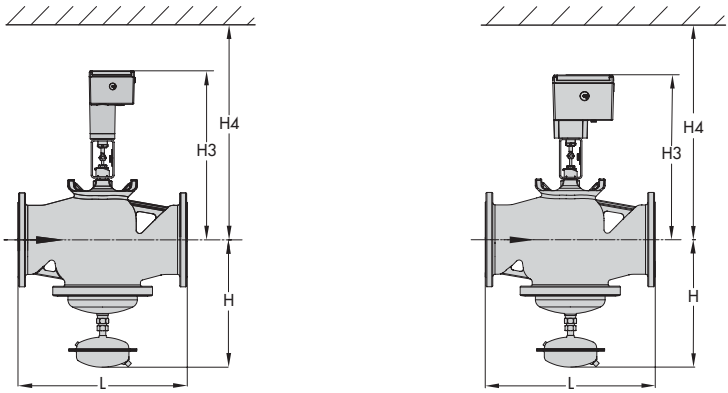
1) +10 % for cast steel PN 40 and spheroidal graphite iron PN 25
2) Minimum clearance required to remove the diaphragm actuator: +100 mm
3) Actuator with two diaphragms: Height H +55 mm

Fig. 3-6: *Dimensions of the regulators with a valve balanced by a diaphragm, DN 65 to 100*

Dimensions and weights · Type 42-36 E with Type 2423 E Valve **balanced by a diaphragm**

Dimensional drawings · Type 2423 E Valve balanced by a diaphragm · DN 65 to 250

Type 42-36 E with Type 3374 Electric Actuator



Dimensions in mm and weights	With Type 3374-25 Actuator			
Nominal size DN	**125**	**150**	**200**	**250**
Overall length L	400	480	600	730
Height H [2) 3)]	450	475	545	545
Height H3	655	685	800	800
Height H4	1000	1030	1150	1150
Weight for PN 16 [1)] in kg (approx.)	95	115	295	315

1) +10 % for cast steel PN 40 and spheroidal graphite iron PN 25
2) Minimum clearance required to remove the diaphragm actuator: +100 mm
3) Actuator with two diaphragms: Height H +55 mm

Dimensions in mm and weights	With actuator						
	Types 3374-11/-21			Type 3374-15			
Nominal size DN	**65**	**80**	**100**	**125**	**150**	**200**	**250**
Overall length L	290	310	350	400	480	600	730
Height H [2) 3)]	355	355	380	450	475	545	545
Height H3	520	520	540	510	595	660	690
Height H4	820	820	890	860	950	1010	940
Weight for PN 16 [1)] in kg (approx.)	46	51	68	90	110	290	310

1) +10 % for cast steel PN 40 and spheroidal graphite iron PN 25
2) Minimum clearance required to remove the diaphragm actuator: +100 mm
3) Actuator with two diaphragms: Height H +55 mm

Fig. 3-7: *Dimensions of the regulators with a valve balanced by a diaphragm, DN 65 to 250*

4 Shipment and on-site transport

The work described in this chapter is to be performed only 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 for the valve, actuator and electric actuator match the specifications in the delivery note. See the 'Markings on the device' chapter 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' chapter.

i ***Note***

Do not remove the packaging until immediately before installation.

4.2 Removing the packaging from the regulator

The components (valve, actuator, electric actuator and, if applicable, control line) of the regulator are delivered separately. A tested regulator is delivered as an assembled unit.

Proceed as follows to lift and install the valve:

➔ Do not open or remove the packaging until immediately before lifting to install the regulator into the pipeline.

➔ Leave the regulator components 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 into the pipeline. They prevent foreign particles from entering the valve.

➔ Dispose and recycle the packaging in accordance with the local regulations.

! ***NOTICE***

Risk of regulator damage due to foreign particles entering the valve.

The protective caps fitted on the inlet and outlet of the valve with flanged body prevent foreign particles from entering the valve and damaging it.

Do not remove the protective caps until immediately before installation.

4.3 Transporting and lifting the regulator

⚠ DANGER

Danger due to suspended loads falling.

➔ *Stay clear of suspended or moving loads.*

➔ *Close off and secure the transport paths.*

⚠ WARNING

Risk of injury due to incorrect lifting without the use of lifting equipment.

Lifting the regulator without the use of lifting equipment may lead to injuries (back injury in particular) depending on the weight of the regulator and/or actuator.

➔ *Observe the occupational health and safety regulations valid in the country of use.*

➔ *Observe the guideline weight for manual handling: 15 to max. 55 kg per person taking into account age, gender and physical fitness.*

➔ *When the actuator is filled with medium, take the weight of the medium also into account.*

➔ *Refer to the 'Design and principle of operation' chapter for the weights of the regulator and actuator.*

⚠ WARNING

Risk of personal injury due to the regulator tipping.

➔ *Observe the regulator's center of gravity.*

➔ *Secure the regulator against tipping over or turning.*

⚠ WARNING

Risk of lifting equipment tipping over and risk of damage to lifting accessories due to exceeding the rated lifting capacity.

➔ *Only use approved lifting equipment and accessories whose minimum lifting capacity is higher than the weight of the valve (including actuator and packaging, if applicable).*

➔ *Refer to the 'Design and principle of operation' chapter for the weights.*

Tip

Our after-sales service can provide more detailed transport and lifting instructions on request.

4.3.1 Transporting the regulator

The regulator can be transported using lifting equipment (e.g. crane or forklift).

➔ 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.
- ➔ Protect the piping and any mounted valve accessories against damage.
- ➔ The permissible ambient temperature of standard regulators is –20 to +80 °C.

4.3.2 Lifting the regulator

To install a large regulator into the pipeline, use lifting equipment (e.g. crane or forklift) to lift it.

Lifting instructions

- ➔ Use a hook with safety latch to secure the slings from slipping off the hook during lifting and transporting (see Fig. 4-1).
- ➔ Secure slings against slipping.
- ➔ Make sure the slings can be removed after installation.
- ➔ Prevent the regulator from tilting or tipping.
- ➔ Do not leave loads suspended when interrupting work for longer periods of time.
- ➔ Make sure that the axis of the pipeline is always horizontal during lifting and the axis of the plug stem is always vertical.

Lifting

1. Attach one sling to the flange of the body and to the rigging equipment (e.g. hook) of the crane or forklift (see Fig. 4-1).
2. Carefully lift the regulator. Check whether the lifting equipment and accessories can bear the weight.
3. Move the regulator at an even pace to the site of installation.
4. Install the regulator into the pipeline (see the 'Installation' chapter).
5. After installation in the pipeline, check whether the regulator flanges are bolted tight.
6. Remove slings.

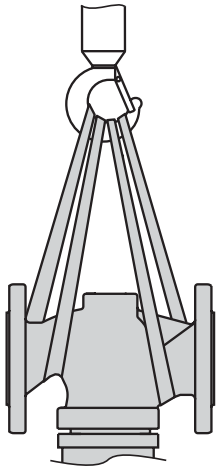


Fig. 4-1: *Schematic drawing of lifting points on the regulator*

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.*

Note

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

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.

➔ Do not place any objects on the regulator.

Special storage instructions for elastomers

Elastomer, e.g. operating diaphragm

➔ To keep elastomers in shape and to prevent cracking, do not bend them or hang them up.

➔ Store elastomers away from lubricants, chemicals, solutions and fuels.

– We recommend a storage temperature of 15 °C for elastomers.

Tip

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

5 Installation

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

Valve, diaphragm actuator and electric actuator can be assembled before or after the valve has been installed in the pipeline. We recommend first installing the valve without the diaphragm actuator and without the electric actuator into the pipeline.

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 sections"Mounting position" and "Work position" in this chapter.

➔ Install the regulator allowing sufficient space to remove the valve, actuator and electric actuator or to perform service work on them.

Mounting position

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

➔ Standard mounting position: install the actuator housing suspended downward in horizontal pipelines (see Fig. 5-1).

➔ The electric actuator must be mounted above the valve body.

➔ 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

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

– Do not install the regulator outdoors or in rooms prone to frost.

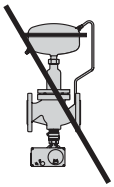
– Protect the regulator against frost if it is used to control freezing media.

– Either heat the regulator or remove it from the plant and completely drain the residual medium.

Mounting position with the electric actuator upright on top

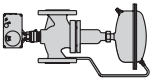
Balanced by a diaphragm
- Air and gases up to 80 °C
- Liquids up to 150 °C

Balanced by a bellows
- Air and gases up to 80 °C
- Liquids up to 150 °C
- Steam control, up to max. 220 °C



Mounting position with the actuator suspended

Not permissible



Alternative mounting position in riser pipes · Balanced by a bellows

Version with fixed plug guide plus:
- Air and gases up to 80 °C
- Liquids up to 120 °C

Fig. 5-1: *Schematic drawing of mounting position*

Support or suspension

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 valve, actuator and pipeline must be supported or suspended.

NOTICE

Risk of regulator damage due to incorrect support.

➔ *Do not attach supports to the valve, to moving parts on the actuator or to the control lines.*

➔ *Contact SAMSON if the mounting position differs from the standard mounting position.*

Control line kit

After the actuator has been mounted, attach the supplied high-pressure control line to the regulator (see the 'Design and principle of operation' chapter).

A control line kit for tapping pressure at the valve body is available as an accessory part from SAMSON (▶ T 3095).

Tip

Needle valves and compression-type screw fittings can be supplied as required. These accessories are listed in ▶ T 3095.

Needle valve

If the regulator tends to hunt, we recommend installing a needle valve in the control line in addition to the standard SAMSON screw joint with restriction.

5.2 Preparation for installation

Valve, actuator and electric actuator can be assembled before or after the valve has been installed in the pipeline. We recommend first installing the valve without the actuators into the pipeline.

Before installation, make sure the following conditions are met:

- The valve is clean.
- The valve, actuator, electric actuator and all piping are not damaged.
- Install a strainer upstream of the regulator.
- The valve 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' chapter for nameplate details.
- The requested or required additional fittings (see the 'Design and principle of operation' chapter) 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.

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

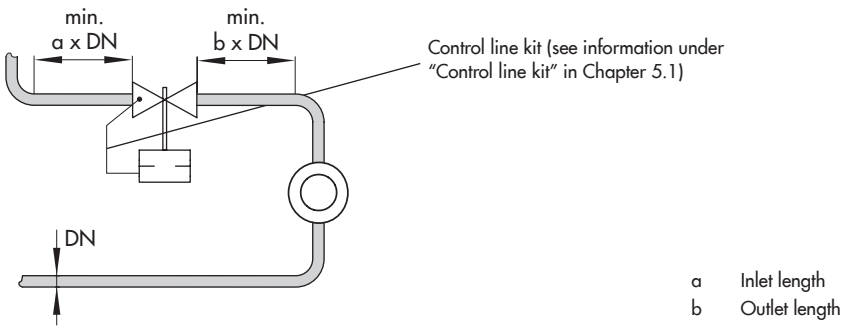
i Note

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

i Note

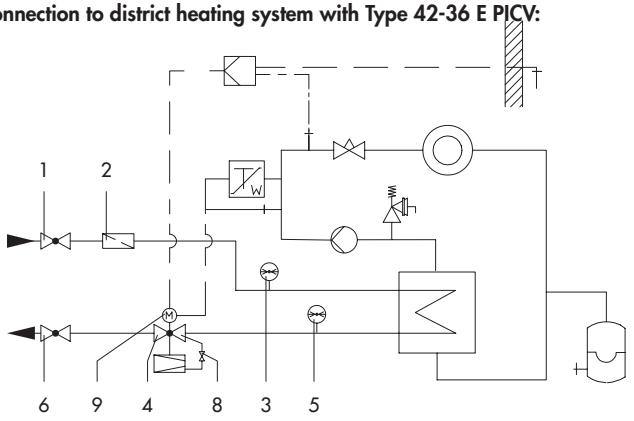
Any impurities carried along by the process medium may impair the proper functioning of the regulator. Therefore, we recommend installing a strainer (e.g. SAMSON Type 2 NI) upstream of the regulator.

Table 5-1: *Inlet and outlet lengths*



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

Indirect connection to district heating system with Type 42-36 E PICV:



1 Shut-off valve
2 Strainer
3 Pressure gauge (flow pipe)
4 Type 42-36 E PICV
5 Pressure gauge (return flow pipe)
6 Shut-off valve
8 Needle valve
9 Electric actuator

Fig. 5-2: *Type 42-36 E (installation example)*

5.3 Installation

The components (actuator, valve, control line, accessories) of the SAMSON regulator are delivered separately. The activities listed below are necessary for installation and before start-up of the regulator.

⚠ DANGER

Danger due to suspended loads falling.

➔ *Stay clear of suspended or moving loads.*

➔ *Close off and secure the transport paths.*

⚠ WARNING

Risk of injury due to incorrect lifting without the use of lifting equipment.

Lifting the regulator without the use of lifting equipment may lead to injuries (back injury in particular) depending on the weight of the regulator and/or actuator.

➔ *Observe the guideline weight for manual handling: 15 to max. 55 kg per person taking into account age, gender and physical fitness.*

➔ *When the actuator is filled with medium, take the weight of the medium also into account.*

➔ *Refer to the 'Design and principle of operation' chapter for the weights of the regulator and actuator.*

➔ *Observe the occupational health and safety regulations valid in the country of use.*

⚠ WARNING

Risk of lifting equipment tipping over and risk of damage to lifting accessories due to exceeding the rated lifting capacity.

➔ *Only use approved lifting equipment and accessories whose minimum lifting capacity is higher than the weight of the valve (including actuator and packaging, if applicable).*

➔ *Refer to the 'Design and principle of operation' chapter for the weights.*

⚠ WARNING

Risk of personal injury due to the regulator tipping.

➔ *Observe the regulator's center of gravity.*

➔ *Secure the regulator against tipping over or turning.*

❗ NOTICE

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

➔ *Only use tools approved by SAMSON (see 'Tools' in the Appendix).*

❗ NOTICE

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

➔ *Only use lubricants approved by SAMSON (see 'Lubricants' in the Appendix).*

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 the Appendix).*

5.3.1 Installing the regulator

Note

Before installing the regulator, tighten the blanking plug(s) at the side of the valve body using a suitable box wrench (see 'Tightening torques' in the the Appendix).

The regulator can be installed into the downstream pressure pipe (return flow pipe) or the upstream pressure pipe (flow pipe) of the plant. See installation examples in Fig. 5-2.

1. Close the shut-off valves (1, 6) upstream and downstream of the regulator while the regulator is being installed.

➔ **Mounting the valve**

2. Remove the protective caps from the valve ports before installing the valve.
3. Lift the valve using suitable lifting equipment 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 flange gaskets are used.
5. Bolt the pipe to the valve free of stress.

➔ **Mounting the actuator**

6. Fasten the actuator on the valve by tightening the coupling nut (11). Observe the alignment of the control line connection. Observe the specified tightening torques (see 'Tightening torques' in the Appendix).

➔ **Mounting the control line**

7. Mount the control line onto the valve and actuator. Observe the specified tightening torques (see 'Tightening torques' in the Appendix).

➔ **Mounting the electric actuator without fail-safe action**

Note

Read the mounting and operating instructions of actuators with fail-safe action (see documents listed under 'Referenced documentation' in the 'Safety instructions and measures' chapter).

8. Mount the electric actuator (1) on the valve connection (2). Refer to the associated mounting and operating instructions of the electric actuator. Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
9. Connect the power supply to the electric actuator (1). Refer to the associated mounting and operating instructions of the electric actuator.

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

5.3.2 Cleaning the pipeline

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

➔ Unscrew the control line (18) from the valve body.

➔ Seal the valve body with stoppers.

➔ 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 the 'Troubleshooting' chapter.

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 fatal injury due to electric shock.

➔ *Upon installation of the electric cables, you are required to observe the regulations concerning low-voltage installations according to DIN VDE 0100 as well as the regulations of your local power supplier.*

➔ *Use a suitable voltage supply which guarantees that no dangerous voltages reach the device in normal operation or in the event of a fault in the system or any other system parts.*

➔ *Only perform the electrical connection after switching off the supply voltage. Make sure the supply voltage cannot be switched on again unintentionally.*

⚠ 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, valve components 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 Leakage

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.

➔ All required control lines are connected to the actuator and are not shut off.

1. Install the regulator into the pipeline (see the 'Installation' chapter).
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.

5.4.2 Pressure test

⚠ WARNING

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

Incorrect opening of pressure equipment or mounting parts may lead to the process medium escaping to the atmosphere.

- ➔ *Do not loosen the control line while the valve is pressurized.*
- ➔ *Do not start up the regulator until all parts have been mounted.*

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 valve 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:

Pressure test with mounted diaphragm actuator

- ➔ All required control lines are connected to the actuator and are not shut off.
- ➔ Do not allow the pressure to exceed the 1.5 times the pressure rating of the valve body.
- ➔ Do not apply a pressure higher than the maximum specified pressure rating or maximum operating pressure to the actuator (see 'Technical data' in the 'Design and principle of operation' chapter).
- ➔ Make sure that the pressure rises simultaneously upstream and downstream of the regulator to avoid damaging the balancing bellows or the balancing diaphragm.

If the **test pressure** of the valve is **higher** than the specified maximum permissible operating pressure of the diaphragm actuator, the pressure test is always performed **without** a mounted diaphragm actuator.

Pressure test without mounted diaphragm actuator

- ➔ Depressurize the plant and remove the control line. Close any control line connection in the plant by closing the installed shut-off valve or inserting a blanking plug.
- ➔ Seal the body connections with blanking plugs.

If the valve is not sealed off, the test medium escapes at the connection where the actuator is connected to the valve. It is not possible to perform a pressure test on the valve in this case (see Fig. 5-3).

- ➔ Seal off the valve using a coupling nut (0250-1037) with seal (0340-1962).

Fig. 5-3: *Medium escaping when an actuator is not mounted on the valve*

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.

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

NOTICE

Risk of regulator damage due to incorrect insulation.

➔ *The actuator must be insulated for medium temperatures below 0 °C.*

➔ *Do not insulate the electric actuator as well.*

6 Start-up

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

⚠ DANGER

Risk of fatal injury due to electric shock.

➔ *Upon installation of the electric cables, you are required to observe the regulations concerning low-voltage installations according to DIN VDE 0100 as well as the regulations of your local power supplier.*

➔ *Use a suitable voltage supply which guarantees that no dangerous voltages reach the device in normal operation or in the event of a fault in the system or any other system parts.*

➔ *Only perform the electrical connection after switching off the supply voltage. Make sure the supply voltage cannot be switched on again unintentionally.*

⚠ 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 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 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

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 finger into the yoke while the valve is in operation.*

➔ *Disconnect the supply voltage and protect it against unintentional reconnection before performing any work on the control valve.*

➔ *Do not impede the movement of the actuator or plug stem by inserting objects into their path.*

➔ *Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.*

➔ *Before starting any work on the regulator, depressurize plant sections as well as the regulator.*

⚠ 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.*

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' chapter).
– The leak and function tests have been completed successfully (see the 'Testing the regulator' chapter).
– The prevailing conditions in the plant section concerned meet the regulator sizing requirements (see information under 'Intended use' in the 'Safety instructions and measures' chapter).

6.1 Start-up and putting the device 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.

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

– The control line is open (needle valve) 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.

i *Note*

The restriction (2.7) must be open while filling the plant.

➔ Put the flow regulator into operation by **slowly** opening the shut-off valves preferably starting from the return flow pipe.

➔ Vent the bellows housing of valves balanced by a bellows (DN 125 and larger) at the stopper (8) located at the side.

7 Operation

Immediately after completing start-up or placing the regulator back into service (see the 'Start-up' chapter), 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 as a result of process medium being discharged.

- ➔ *Do not unscrew 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.*

⚠ 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 into the yoke while the valve is in operation.*
- ➔ *Disconnect the supply voltage and protect it against unintentional reconnection before performing any work on the control valve.*
- ➔ *Do not impede the movement of the actuator or plug stem by inserting objects into their path.*
- ➔ *Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.*
- ➔ *Before starting any work on the regulator, depressurize plant sections as well as the regulator.*

7.1 Set point adjustment

The flow rate can be adjusted either when the electric actuator is mounted on the valve or without a mounted electric actuator.

The flow rate set point is determined by the position of the restriction (2.7) on the valve.

➔ The control and shut-off valves as well as all consumers or a bypass valve (if installed) must be open to ensure that the maximum flow rate is reached.

➔ Set the required flow rate by adjusting the restriction (2.7), while watching, for example the reading of a flow rate measuring unit at the heat meter.

Note

Adjustment is always based on the closed restriction.

To adjust the flow rate, use the adjustment diagrams for water (Fig. 7-2, Fig. 7-3 and Fig. 7-4).

Refer to the associated mounting and operating instructions (see section 'Referenced documents' in the 'Safety instructions and measures' chapter) for further possible settings of the electric actuator.

In addition to the details in the mounting and operating instructions of the basic device, adjust the flow rate as described in Chapters 7.2.1 to 7.2.3.

Note

Observe the differential pressure across the restriction $\Delta p_{restriction}$ of 0.2 bar or 0.5 bar. It is determined by the differential pressure springs (14) installed in the actuator (see the 'Markings on the device' chapter).

7.2 Adjusting the flow rate

7.2.1 DN 15 to 50

Type 5827 Electric Actuator

➔ Adjustment **without** actuator · See Fig. 7-1

1. Loosen the locking screw (2.6) and turn the set point adjuster (2.3) clockwise (↻) as far as it will go to close the restriction (2.7).
2. Determine the turns required to achieve the desired flow rate from the adjustment diagrams (see Table 7-1).
3. Based on a closed restriction, turn the set point adjuster counterclockwise (↺) to adjust the flow rate set point.
4. Check the flow rate at the heat meter and correct it, if necessary.
5. Once the flow rate is set as required, lock the setting with the locking screw (2.6).
6. Close a possibly open bypass valve again.
7. Lead-seal the setting, if necessary.
8. For a tension-free installation, place the actuator with retracted stem on the restriction connection and fasten using the coupling nut (see 'Tightening torques' in the Appendix).

➔ Adjustment **with** actuator · See Fig. 7-1

More details on the electric actuator [1)] in ▶ EB 5827-1 and ▶ EB 5827-2.

With Type 5827 Electric Actuator [1)]

1. Retract the actuator stem (1.1) by turning the manual adjuster (1.4) counterclockwise (↺) or by applying a corresponding control signal from the control device.
2. Loosen the locking screw (2.6) and turn the set point adjuster (2.3) clockwise (↻) as far as it will go to close the restriction (2.7).
3. Determine the turns required to achieve the desired flow rate from the adjustment diagrams (see Table 7-1).
4. Based on a closed restriction, turn the set point adjuster counterclockwise (↺) to adjust the flow rate set point.
5. Check the flow rate at the heat meter and correct it, if necessary.
6. Once the flow rate is set as required, lock the setting with the locking screw (2.6).
7. Close a possibly open bypass valve again.
8. Lead-seal the setting, if necessary.

With Type 5827-A… Electric Actuator

1. Retract the actuator stem by applying a corresponding control signal from the control device.
2. Loosen the locking screw (2.6) and turn the set point adjuster (2.3) clockwise (↻)

as far as it will go to close the restriction (2.7).

3. Determine the turns required to achieve the desired flow rate from the adjustment diagrams (see Table 7-1).
4. Based on a closed restriction, turn the set point adjuster counterclockwise (↺) to adjust the flow rate set point.
5. Check the flow rate at the heat meter and correct it, if necessary.
6. Once the flow rate is set as required, lock the setting with the locking screw (2.6).
7. Close a possibly open bypass valve again.
8. Lead-seal the setting, if necessary.

Note

Once the magnet has been released, the spring mechanism pushes the actuator stem back to the fail-safe position.

7.2.2 DN 65 to 100

Type 5827-N3 or Type 3374 Electric Actuator

➔ Adjustment **without** actuator · See Fig. 7-1

1. Thread the lock nut (2.2) upwards on the rod (2.1).
2. Loosen the locking screw (2.6) and turn the set point adjuster (2.3) clockwise (↻) as far as it will go to close the restriction (2.7). Close the restriction (2.7).
3. Determine the turns required to achieve the desired flow rate from the adjustment diagrams (see Table 7-2).
4. Turn the set point adjuster (2.3) counterclockwise (↺) by the corresponding number of turns.
5. Thread the lock nut (2.2) clockwise (↻) as far as it will go onto the rod (2.1). The restriction opens until the adjusted set point is reached.
6. Check the flow rate and correct it, if necessary. Secure this setting with the locking screw (2.6).
7. Retract the actuator stem (1.1) using the manual override. Place the actuator on the restriction connection. Secure it by tightening the hex nut (1.3, see 'Tightening torques' in the Appendix).
8. Extend the actuator stem all the way to the rod (2.1) using the manual override.
9. Position the stem connector (1.2) and fasten with screws.
10. Thread the lock nut (2.2) all the way to the top toward the stem connector (1.2) and lock in place (see 'Tightening torques' in the Appendix).

➔ Adjustment **with** actuator · See Fig. 7-1

More details on the Type 5827-N3 Electric Actuator in ▶ EB 5827-1 and ▶ EB 5827-2 as well as on the Type 3374 Electric Actuator in ▶ EB 8331-3 and ▶ EB 8331-4

with Type 5827-N3 or Type 3374 Actuator

1. Extend the actuator stem (1.1) all the way to close the restriction (2.7) using the manual override (4 mm hex wrench) or by applying an electric control signal. The lock nut (2.2) must be threaded upward against the stem connector (1.2).
2. Loosen the locking screw (2.6) and turn the set point adjuster (2.3) clockwise (↻) as far as it will go to close the restriction (2.7).
3. Determine the turns required to achieve the desired flow rate from the adjustment diagrams (see Table 7-2).
4. Based on a closed restriction, turn the set point adjuster counterclockwise (↺) to adjust the flow rate set point.
5. Check the flow rate at the heat meter and correct it, if necessary.
6. Once the flow rate is set as required, lock the setting with the locking screw (2.6).

Manual changes or changes in the control signal to retract actuator stem now cause the restriction to open until the flow rate reaches the adjusted set point.

7.2.3 DN 125 to 250

Type 3374 Electric Actuator

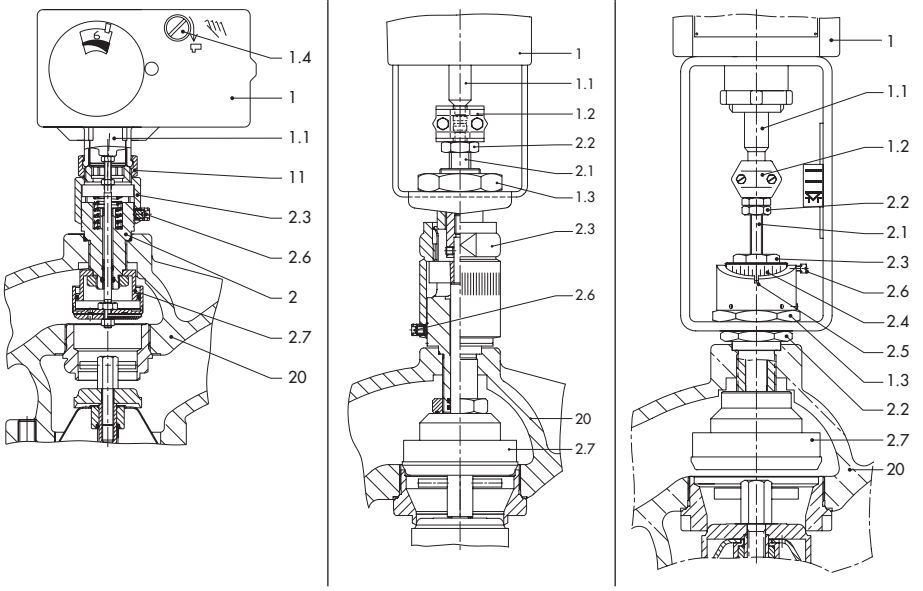
➔ Adjustment **without** actuator · See Fig. 7-1

1. Thread the lock nut (2.2) upwards to the top of the rod (2.1).
2. Press the rod (2.1) downward to close the restriction (2.7).
3. Loosen the locking screw (2.6) and turn the set point adjuster (2.3) clockwise (↻) until the scale reading 0 is located above the red groove mark (2.5).
4. Thread the lock nut (2.2) downward against the set point adjuster (2.3) while making sure the rod is not turned by holding the threaded rod (2.1) stationary at the flattened part using a wrench.
5. Determine the scale divisions required to achieve the desired flow rate from the adjustment diagrams (see Table 7-2).
6. Turn the hex nut on the set point adjuster (2.3) until the previously determined scale reading is located above the red groove mark (2.5) on the reference ring.
7. Check the flow rate at the heat meter and correct it, if necessary.
8. Once the flow rate is set as required, lock the setting with the locking screw (2.6).
9. Thread the lock nut (2.2) upwards to the head of the rod (2.1).
10. Extend the actuator stem (1.1) using the manual override. Place the actuator on the yoke and screw tight (see 'Tightening torques' in the Appendix).
11. Position the stem connector (1.2) and fasten with screws.
12. Thread the lock nut (2.2) all the way to the top toward the stem connector (1.2) and lock in place (see 'Tightening torques' in the Appendix).

➔ Adjustment **with** actuator · See Fig. 7-1

More details on the Type 3374 Electric Actuator in ▶ EB 8331-3 and ▶ EB 8331-4

1. Close the restriction. To do this, extend the actuator stem (1.1) of the actuator (1) as far as it will go by pressing the electric override button (or the manual mode of the controller).
2. Remove the stem connector (1.2) and retract the actuator stem to the top end position using the manual override.
3. Loosen the locking screw (2.6) and turn the set point adjuster (2.3) clockwise (↻) until the scale reading 0 is located above the red groove mark (2.5).
4. Thread the lock nut (2.2) downward against the set point adjuster (2.3) while making sure the rod is not turned by holding the threaded rod (2.1) stationary at the flattened part using a wrench.
5. Determine the scale divisions required to achieve the desired flow rate from the adjustment diagrams (see Table 7-3).
6. Turn the hex nut on the set point adjuster (2.3) until the previously determined scale reading is located above the red groove mark (2.5) on the reference ring.
7. Check the flow rate at the heat meter and correct it, if necessary.
8. Once the flow rate is set as required, lock the setting with the locking screw (2.6).
9. Extend the actuator stem (1.1) as far as it will go using the manual override.
10. Position the stem connector (1.2) and fasten with screws.
11. Slightly retract the actuator stem to allow the lock nut (2.2) to move.
12. Thread the lock nut (2.2) all the way to the top toward the stem connector (1.2) and lock in place (see 'Tightening torques' in the Appendix).



1	Electric actuator	1.4	Manual adjuster	2.3	Set point adjuster	2.7	Restriction
1.1	Actuator stem	2	Connecting piece	2.4	Scale	11	Coupling nut
1.2	Stem connector	2.1	Stem	2.5	Groove mark	20	Valve body
1.3	Hex nut	2.2	Lock nut	2.6	Locking screw		

Fig. 7-1: *Functional diagram of the restriction, DN 15 to 250 with electric actuator*

Table 7-1: *Flow rate set point ranges for water · Type 2423 E Regulator, balanced by a bellows*

Set point ranges in m³/h with ...	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
Differential pressure $\Delta p_{restriction}$ = 0.2 bar	0.5 to 2	0.5 to 3	0.8 to 3.5	2 to 7	3 to 11	3 to 16
Differential pressure $\Delta p_{restriction}$ = 0.5 bar	0.8 to 3	0.8 to 4.5	1.2 to 5.3	3 to 9.7	4.5 to 16	4.5 to 24

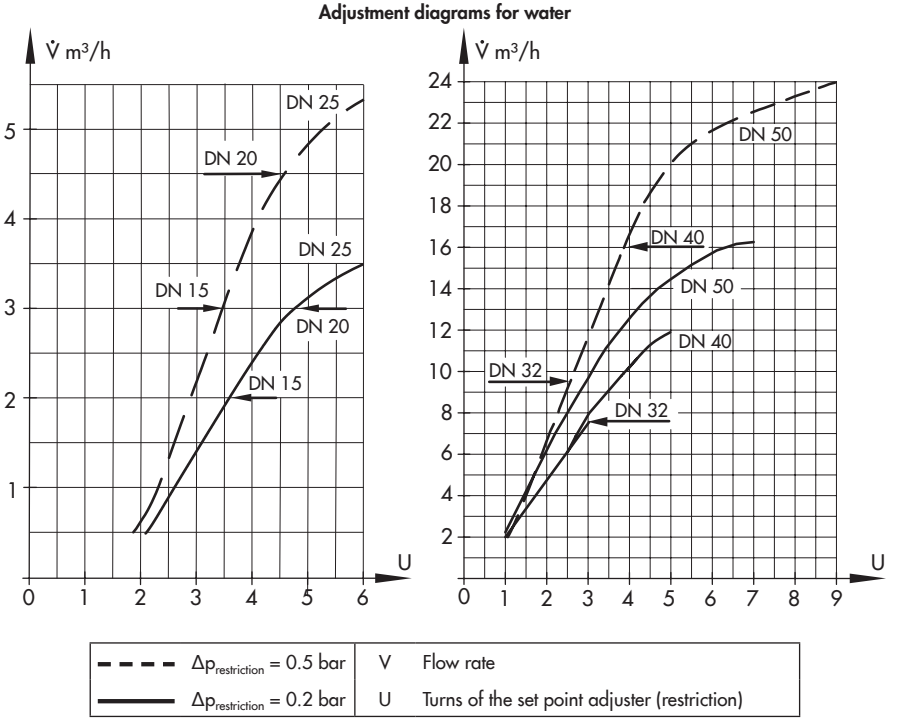


Fig. 7-2: *Adjustment diagrams for Type 2423 E Regulator,* ***balanced by a bellows****, DN 15 to 50*

Table 7-2: *Flow rate set point ranges for water · Type 2423 E Balanced by a bellows or diaphragm*

Set point ranges in m³/h with ...	DN 65	DN 80	DN 100
Differential pressure $\Delta p_{restriction}$ = 0.2 bar	5 to 28	7 to 35 [1)]	10 to 63
Differential pressure $\Delta p_{restriction}$ = 0.5 bar	7.5 to 40	10 to 55	15 to 90

1) 7 to 35 m³/h (160 cm² actuator), 7 to 40 m³/h (320 cm² actuator)

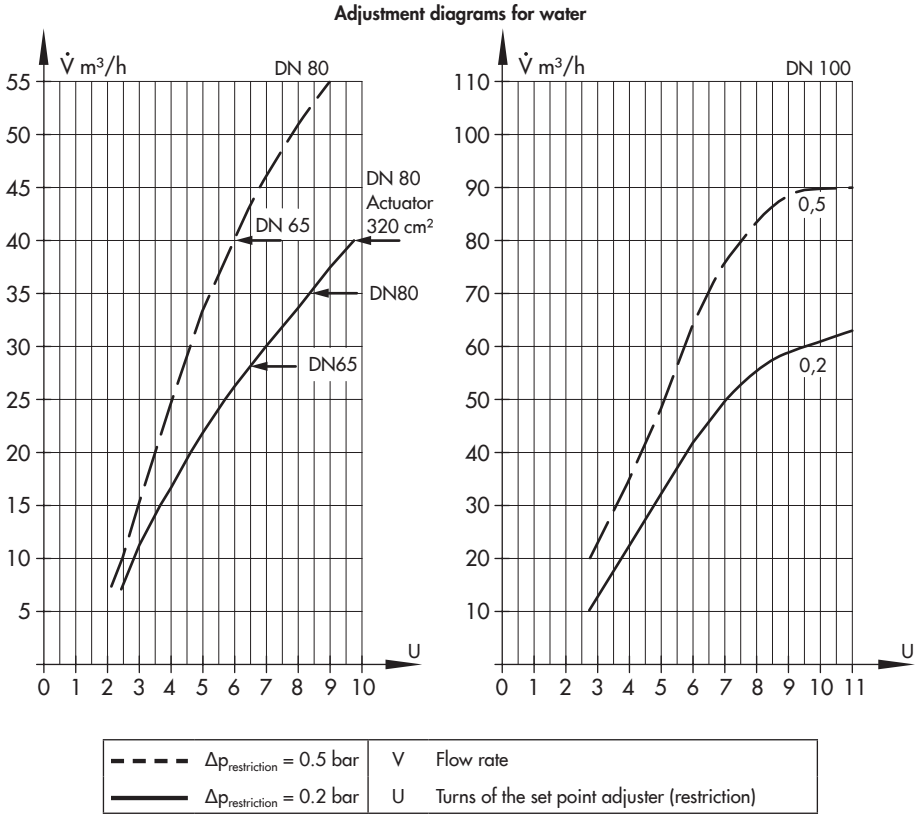


Fig. 7-3: *Adjustment diagrams for Type 2423 E Regulator, balanced by a bellows or diaphragm, DN 65 to 100*

Table 7-3: *Flow rate set point ranges for water · Type 2423 E Regulator, balanced by a bellows*

Set point ranges in m³/h with ...	DN 125	DN 150	DN 200	DN 250
Differential pressure $\Delta p_{restriction}$ = 0.2 bar	40 to 80	50 to 120	70 to 180	90 to 220
Differential pressure $\Delta p_{restriction}$ = 0.5 bar	60 to 120	75 to 180	100 to 260	120 to 300

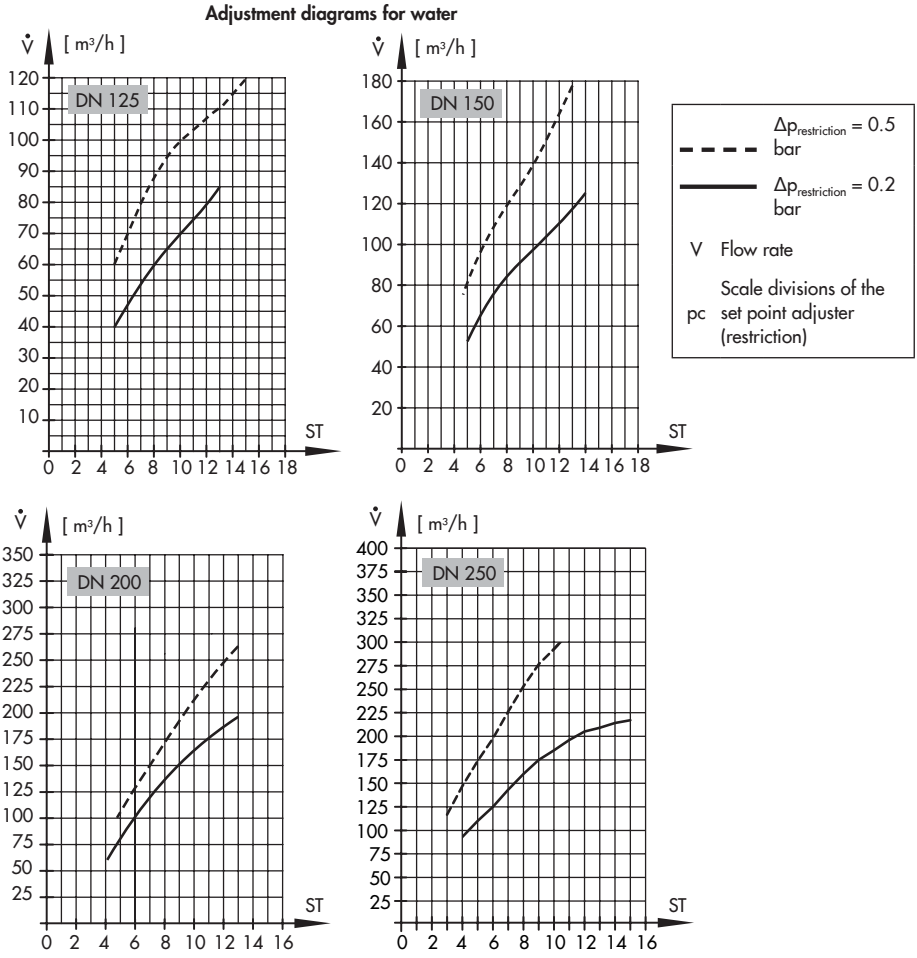


Fig. 7-4: *Adjustment diagrams for Type 2423 E Regulator,* ***balanced by a bellows****, DN 125 to 250*

Table 7-4: *Flow rate set point ranges for water · Type 2423 E Regulator, balanced by a diaphragm*

Set point ranges in m³/h with ...	DN 125	DN 150	DN 200	DN 250
Differential pressure $\Delta p_{restriction}$ = 0.2 bar	40 to 90	50 to 140	70 to 220	90 to 260
Differential pressure $\Delta p_{restriction}$ = 0.5 bar	50 to 130	60 to 200	80 to 310	100 to 360

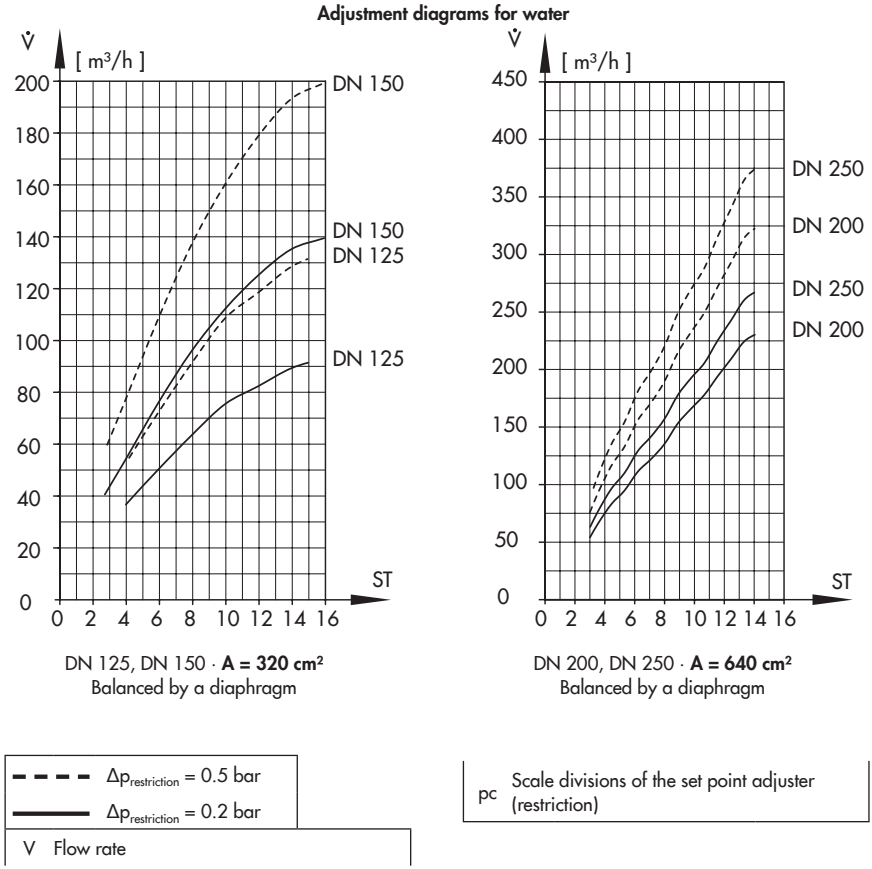


Fig. 7-5: *Adjustment diagrams for Type 2423 E Regulator, **balanced by a diaphragm**, DN 125 to 250*

8 Malfunctions

8.1 Troubleshooting

Malfunction	Possible reasons	Recommended action
Flow rate exceeds adjusted set point.	Insufficient pressure pulses on the operating diaphragm	➔ Clean the control line and screw fittings.
	Foreign particles blocking the plug	➔ Remove foreign particles. ➔ Replace damaged parts. ➔ Contact SAMSON's After-sales Service.
	Seat and plug are worn or leak.	➔ Replace the damaged seat and plug. ➔ Contact SAMSON's After-sales Service.
	Valve too large for control task (flow rate) or too small (differential pressure)	➔ Check the sizing. ➔ Change K_{VS}/C_V coefficient, if necessary or install a different sized regulator. ➔ Contact SAMSON's After-sales Service.
	Defective operating diaphragm	➔ Replace damaged diaphragm.
Flow set point not reached.	Regulator installed against the flow	➔ 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	➔ Check the sizing. ➔ Change K_{VS}/C_V coefficient, if necessary or install a different sized regulator. ➔ Contact SAMSON's After-sales Service.
	Incorrect set point range selected	➔ Check set point range ➔ Contact SAMSON's After-sales Service.
	Safety device, e.g. pressure limiter, has been triggered	➔ Check plant. If necessary, unlock safety device.
	The fail-safe action of the actuator has been triggered.	➔ Check the plant and place the actuator back into operation.
	Plant differential pressure Δp too low	➔ Compare differential pressure in the plant with the plant's drag. Differential pressure across the plant: $\Delta p_{min} = \Delta p_{restriction} + (\dot{V}/K_{VS})^2$
	Foreign particles blocking the plug	➔ Remove foreign particles. ➔ Replace damaged parts. ➔ Contact SAMSON's After-sales Service.

Malfunction	Possible reasons	Recommended action
Flow set point not reached.	Control line blocked	➔ Clean the control line and screw fittings.
	Strainer blocked	➔ Clean the strainer.
Flow rate fluctuates	Regulator or K_{VS}/C_V coefficient too large	➔ Check the sizing. ➔ Change K_{VS}/C_V coefficient, if necessary or install a different sized regulator. ➔ Contact SAMSON's After-sales Service.
	The restriction in the control line for pressure tapping is too large or missing.	➔ Install a restriction. ➔ Install a smaller restriction.
Slow control response	Restriction in the screw joint of the actuator dirty or too small	➔ Clean screw joint or install larger screw joint.
	Dirt in the control line	➔ Clean the control line.
Jerky control response	Increased friction, e.g. due to foreign particles between seat and plug	➔ Remove foreign particles. ➔ Replace damaged parts. ➔ Contact SAMSON's After-sales Service.
Loud noises	High flow velocity, cavitation	➔ Check the sizing. ➔ Install larger regulator, if necessary.
Leakage at the actuator	Defective operating diaphragm	➔ Replace damaged diaphragm.

i ***Note***

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

The malfunctions listed in Chapter 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 Chapter 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 device back into operation after a malfunction

See the 'Start-up' chapter.

9 Servicing

The regulators do not require much maintenance. Nevertheless, they are subject to natural wear, particularly at the seat, plug, operating diaphragm and electric actuator. 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' chapter.

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

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

⚠ DANGER

Risk of fatal injury due to electric shock.

- ➔ *Upon installation of the electric cables, you are required to observe the regulations concerning low-voltage installations according to DIN VDE 0100 as well as the regulations of your local power supplier.*
- ➔ *Use a suitable voltage supply which guarantees that no dangerous voltages reach the device in normal operation or in the event of a fault in the system or any other system parts.*
- ➔ *Only perform the electrical connection after switching off the supply voltage. Make sure the supply voltage cannot be switched on again unintentionally.*

⚠ DANGER

Danger due to suspended loads falling.

- ➔ *Stay clear of suspended or moving loads.*
- ➔ *Close off and secure the transport paths.*

⚠ WARNING

Risk of injury due to incorrect lifting without the use of lifting equipment.

Lifting the regulator without the use of lifting equipment may lead to injuries (back injury in particular) depending on the weight of the regulator and/or actuator.

- ➔ *Observe the guideline weight for manual handling: 15 to max. 55 kg per person taking into account age, gender and physical fitness.*
- ➔ *When the actuator is filled with medium, take the weight of the medium also into account.*
- ➔ *Refer to the 'Design and principle of operation' chapter for the weights of the regulator and actuator.*
- ➔ *Observe the occupational health and safety regulations valid in the country of use.*

⚠ 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.*

⚠ WARNING

Risk of personal injury due to the regulator tipping.

➔ *Observe the regulator's center of gravity.*

➔ *Secure the regulator against tipping over or turning.*

⚠ WARNING

Risk of lifting equipment tipping over and risk of damage to lifting accessories due to exceeding the rated lifting capacity.

➔ *Only use approved lifting equipment and accessories whose minimum lifting capacity is higher than the weight of the valve (including actuator and packaging, if applicable).*

➔ *Refer to the 'Design and principle of operation' chapter for the weights.*

⚠ 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.*

! 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 the Appendix).*

! NOTICE

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

➔ *Only use tools approved by SAMSON (see 'Tools' in the Appendix).*

! NOTICE

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

➔ *Only use lubricants approved by SAMSON (see 'Lubricants' in the Appendix).*

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 and Fig. 9-2

3	Plug
4	Seat
5	Balancing bellows
5.1	Balancing diaphragm
6	Diaphragm stem
7	Plug stem
8	Vent plug (DN 125 and larger)
11	Coupling nut
12	Operating diaphragm
14	Differential pressure springs
15	Bolts, nuts
16	Diaphragm plate
17	Nut
18	High-pressure control line
19	Control line connection
20	Valve body
21	Blanking plug

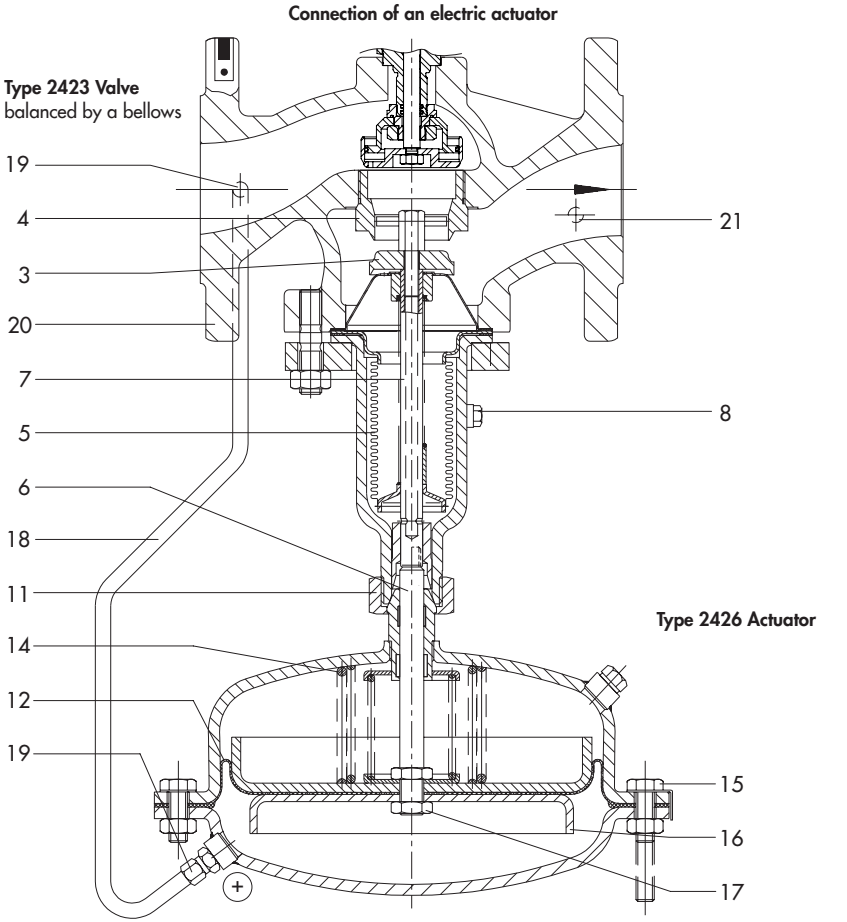


Fig. 9-1: *Functional diagram for regulators, DN 15 to 250 with balancing bellows*

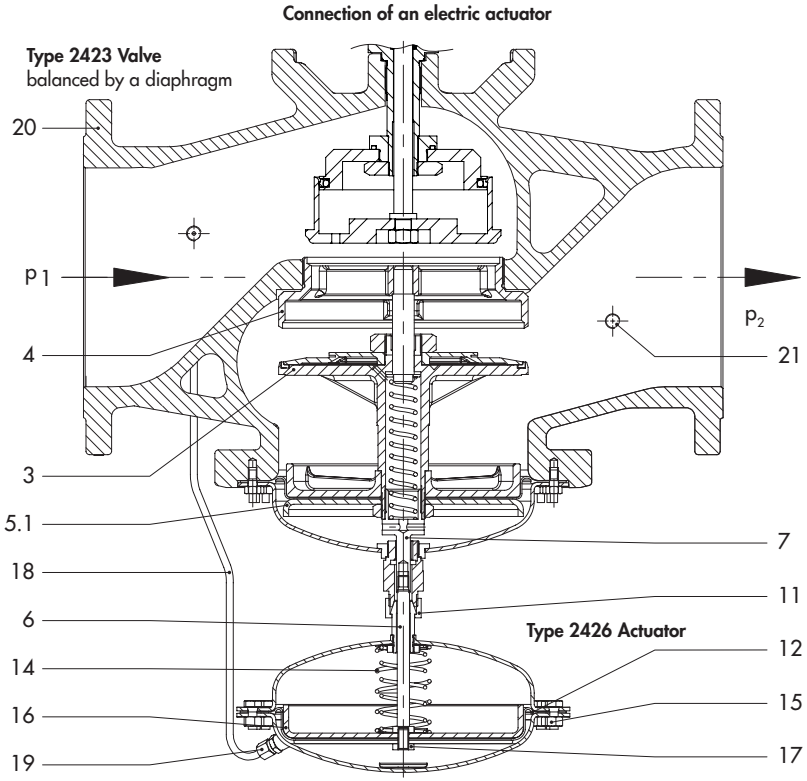
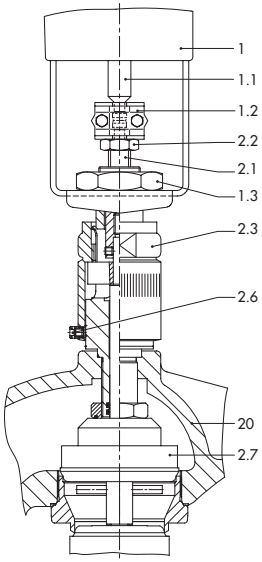
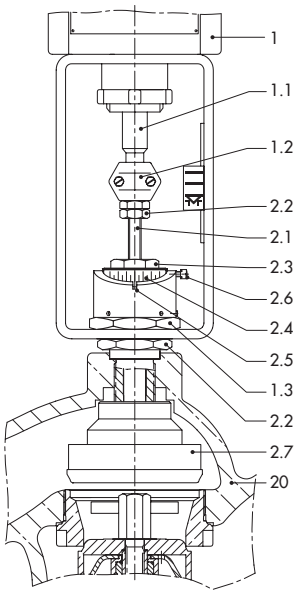


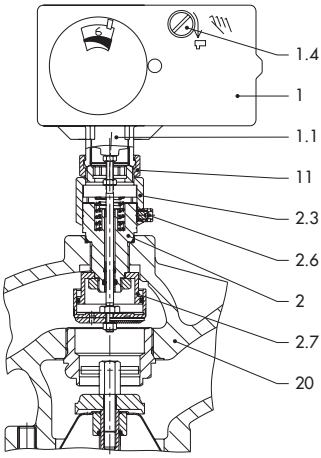
Fig. 9-2: *Functional diagram for regulators, DN 65 to 250 with balancing diaphragm*



Type 3374 Actuator · DN 65 to 100



Type 3374 Actuator · DN 125 to 250



Type 5827 Actuator · DN 15 to 50

1	Electric actuator
1.1	Actuator stem
1.2	Stem connector
1.3	Hex nut
1.4	Manual adjuster
2	Connecting piece
2.1	Stem
2.2	Lock nut
2.3	Set point adjuster
2.4	Dial plate
2.5	Groove mark
2.6	Locking screw
2.7	Restriction
11	Coupling nut
20	Valve body

Fig. 9-3: *Functional diagram of the restriction, DN 15 to 250 with electric actuator*

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' chapter).

Tip

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

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

– Replace the actuator (see Chapter 9.3.1)
– Replace the seat and plug (see Chapter 9.3.2)
– Replace the actuator's operating diaphragm (see Chapter 9.3.3)
– Replace the electric actuator (see Chapter 9.3.4)

9.2 Installing the regulator after service work

➔ Put the regulator back into operation (see the 'Start-up' chapter). 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 Chapter 9.1).

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

9.3.1 Replacing the actuator

➔ See Fig. 9-1 and Fig. 9-2

Note

Read the mounting and operating instructions of actuators with fail-safe action (see documents listed under 'Referenced documentation' in the 'Safety instructions and measures' chapter).

Removing the actuator

1. Put the regulator out of operation (see the 'Decommissioning' chapter).
2. Unscrew the control line (18) at the control line connection (19).
3. Unscrew the coupling nut (11) of the diaphragm actuator from the valve. Remove the actuator.

Mounting the actuator

1. Place the diaphragm actuator on the valve and fasten tight the coupling nut (11). Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
2. Screw the control line (18) to the control line connection (19) on the valve and actuator. Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
3. Put the regulator back into operation (see the 'Start-up' chapter).

9.3.2 Replacing the seat and plug

To replace seat and plug, contact SAMSON's After-sales Service.

Further information is available in the Appendix ('After-sales service').

9.3.3 Replacing the actuator's operating diaphragm

Tip

The associated order number is written on the actual operating diaphragm.

➔ See Fig. 9-1 and Fig. 9-2

Removing the operating diaphragm

1. Put the regulator out of operation (see the 'Decommissioning' chapter).
2. Unscrew the control line (18) at the control line connection (19).
3. Unscrew the coupling nut (11) of the diaphragm actuator from the valve. Remove the actuator.
4. Clamp the coupling nut (11) into a suitable fixture.
5. Unscrew nuts and bolts (15) from the actuator. Remove the actuator case.
6. Unscrew the diaphragm plate nut (17) and remove the operating diaphragm (12) from the diaphragm plate (16).

Mounting the operating diaphragm

1. Place a new operating diaphragm (12) onto the diaphragm plate (16) (ensuring the pressurized side is facing in the correct direction) and tighten the diaphragm plate nut (17). Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
2. Place on the actuator case.
3. Insert nuts and bolts (15) and tighten gradually in a crisscross pattern. Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
4. Place the diaphragm actuator on the valve and fasten tight the coupling nut (11). Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
5. Screw the control line (18) to the control line connection (19) on the valve and actuator. Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
6. Put the regulator back into operation (see the 'Start-up' chapter).

9.3.4 Replacing the electric actuator

⚠ WARNING

Observe the relevant safety regulations on mounting or removing the electric actuator.

⚠ WARNING

Before removing the electric actuator from the valve, disconnect the power supply and protect it against inadvertent reconnection.

i *Note*

Refer to the mounting and operating instructions of the electric actuator for more details (see documents listed under 'Referenced documentation' in the 'Safety instructions and measures' chapter).

i *Note*

Read the mounting and operating instructions of actuators with fail-safe action (see documents listed under 'Referenced documentation' in the 'Safety instructions and measures' chapter).

➔ See Fig. 9-3

Removing Type 5827 Electric Actuator without fail-safe action

1. Put the regulator out of operation (see the 'Decommissioning' chapter).
2. Unscrew the coupling nut (11) of the electric actuator from the valve. Remove the actuator.

Mounting Type 5827 Electric Actuator without fail-safe action

1. Place the electric actuator on the valve and fasten tight the coupling nut (11). Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
2. Put the regulator back into operation (see the 'Start-up' chapter).

Removing Type 3374 Electric Actuator

1. Put the regulator out of operation (see the 'Decommissioning' chapter).
2. Undo and remove the clamps of the stem connector (1.2).
3. Unscrew the hex nut (1.3) and remove the electric actuator from the valve.

Mounting Type 3374 Electric Actuator

1. Place the electric actuator on the valve and fasten tight the hex nut (1.3). Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
2. Position the stem connector clamps (1.2) and screw them tight (see 'Tightening torques' in the Appendix).
3. Put the regulator back into operation (see the 'Start-up' chapter).

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 the Appendix for details on spare parts.

Lubricants

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 chapter is to be performed only 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.*

➔ *Drain the process medium from all the plant sections concerned as well as the valve.*

⚠ DANGER

Risk of fatal injury due to electric shock.

➔ *Upon installation of the electric cables, you are required to observe the regulations concerning low-voltage installations according to DIN VDE 0100 as well as the regulations of your local power supplier.*

➔ *Use a suitable voltage supply which guarantees that no dangerous voltages reach the device in normal operation or in the event of a fault in the system or any other system parts.*

➔ *Only perform the electrical connection after switching off the supply voltage. Make sure the supply voltage cannot be switched on again unintentionally.*

⚠ WARNING

Observe the relevant safety regulations on mounting or removing the electric actuator.

⚠ WARNING

Before removing the electric actuator from the valve, disconnect the power supply and protect it against inadvertent reconnection.

⚠ 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 regulator.*

⚠ WARNING

Crush hazard arising from moving parts.

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

➔ *Do not insert hands or finger into the yoke while the valve is in operation.*

➔ *Disconnect the supply voltage and protect it against unintentional reconnection before performing any work on the control valve.*

➔ *Do not impede the movement of the actuator or plug stem by inserting objects into their path.*

➔ *Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.*

➔ *Before starting any work on the regulator, depressurize plant sections as well as 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.*

i *Note*

Refer to the mounting and operating instructions of the electric actuator for more details (see documents listed under 'Referenced documentation' in the 'Safety instructions and measures' chapter).

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

1. Disconnect the supply voltage from the electric actuator (see documents listed under 'Referenced documentation' in the 'Safety instructions and measures' chapter).
2. Close the shut-off valve (1) on the upstream side of the regulator.
3. Close the shut-off valve (6) on the downstream side of the regulator.
4. Completely drain the pipelines and valve.
5. Depressurize the plant.
6. 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 chapter is to be performed only by personnel appropriately qualified to carry out such tasks.

⚠ 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 finger into the yoke while the valve is in operation.*
- ➔ *Disconnect the supply voltage and protect it against unintentional reconnection before performing any work on the control valve.*
- ➔ *Do not impede the movement of the actuator or plug stem by inserting objects into their path.*
- ➔ *Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.*
- ➔ *Before starting any work on the regulator, depressurize plant sections as well as 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.*

⚠ 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.*

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

– The regulator is put out of operation (see the 'Decommissioning' chapter).

11.1 Removing the actuator from the valve

i Note

Read the mounting and operating instructions of actuators with fail-safe action (see documents listed under 'Referenced documentation' in the 'Safety instructions and measures' chapter).

1. Unfasten electric actuator (1) from the valve body (20) (see 'Replacing the actuator' in the 'Servicing' chapter).

11.2 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' chapter).
2. Unbolt the flanged joint.
3. Remove the regulator from the pipeline (see the 'Shipment and on-site transport' chapter).

11.3 Removing the actuator from the valve

See 'Replacing the actuator' in the 'Servicing' chapter.

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 service and repair work.*

12.1 Returning devices to SAMSON

Defective devices can be returned to SAMSON for repair.

Proceed as follows to return devices:

1. Exceptions apply concerning some special device models
   ▶ www.samsongroup.com > Service > After-sales Service.
2. Send an e-mail ▶ retouren@samsongroup.com to register the return shipment including the following information:
   – Type
   – Material number
   – Item numbers of accessories
   – Original order
   – Completed Declaration on Contamination, which can be downloaded from our website at ▶ www.samsongroup.com > Service > After-sales Service.

   After checking your registration, we will send you a return merchandise authorization (RMA).
3. Attach the RMA (together with the Declaration on Decontamination) to the outside of your shipment so that the documents are clearly visible.
4. Send the shipment to the address given on the RMA.

Note

Further information on returned devices and how they are handled can be found at ▶ www.samsongroup.com > Service > After-sales Service.

13 Disposal

SAMSON is a producer registered in Europe, agency in charge ▶ https://www.samsongroup.com/en/about-samson/environment-social-governance/material-compliance/waste-electrical-and-electronic-equipment-weee-and-its-safe-disposal/.
WEEE reg. no.: DE 62194439

Information on substances listed as substances of very high concern (SVHC) on the candidate list of the REACH regulation can be found in the document "Additional Information on Your Inquiry/Order", which is added to the order documents, if applicable. This document includes the SCIP number assigned to the devices concerned. This number can be entered into the database on the European Chemicals Agency (ECHA) website (▶ https://www.echa.europa.eu/scip-database) to find out more information on the SVHC contained in the device.

Note

SAMSON can provide you with a recycling passport on request. Simply e-mail us at aftersalesservice@samsongroup.com giving details of your company address.

Tip

On request, SAMSON can appoint a service provider to dismantle and recycle the product as part of a distributor take-back scheme.

➔ Observe local, national and international refuse regulations.

➔ Do not dispose of components together with your other 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.
- EU declaration of conformity in compliance with Machinery Directive 2006/42/EC for Type 42-36 E Regulator on page 14-8.
- Declaration of incorporation in compliance with Machinery Directive 2006/42/EC for the Type 2423 Valve, Type 2426 Actuator and the electric actuator on page 14-9.

EU DECLARATION OF CONFORMITY
TRANSLATION

Module A

For the following products, SAMSON hereby declares under its sole responsibility:

Devices	Series	Type	Version
Self-operated Regulators	43	2432	DIN EN, body, CC499K and EN-GJS-400-18-LT, DN 50, PN 25, fluids G2, L2, L1[1)]
	43	2436	DIN EN, body, CC499K and EN-GJS-400-18-LT, DN 50, PN 25, fluids G2, L2, L1[1)]
	43	2437	DIN EN, body, CC499K and EN-GJS-400-18-LT, DN 50, PN 25, fluids G2, L2, L1[1)]
	---	2111	DIN EN, body, EN-GJS-400-18-LT, DN 50, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 40-50, PN 40, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-2, Class 300, fluids G2, L2, L1[1)]
Three-way valve	---	2119	DIN EN, body, EN-GJL-250 and 1.0619, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619, DN 50-80, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 40-50, PN 40, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-4, Class 150, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½, Class 300, fluids G2, L2, L1[1)]
Control valve	---	3222	DIN EN, body, EN-GJS-400-18-LT, DN 50, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, CC499K, DN 32-40, PN 25, all fluids
Three-way valve	---	3226	DIN EN, body, CC499K, DN 50, PN 25, fluids G2, L2[2)]
Three-way valve	---	3260	DIN EN, body, EN-GJL-250, DN 65-200, PN 16, fluids G2, L2[2)]
Globe valve Three-way valve	V2001	3531 3535	DIN EN, body, EN-GJS-400-18-LT, DN 50-80, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 32-40, PN 25, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-2, Class 150, all fluids
Control valve	---	3214	DIN EN, body, EN-GJL-250, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 50-80, PN 25, fluids G2, L2, L1[1)]
			ANSI, body, A126 B, NPS 3-4, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-2, Class 150, all fluids
Self-operated Regulators	42	2423	DIN EN, body, EN-GJL-250 and EN-GJS-400-18-LT, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-418-LT, DN 50-80, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 32-50, PN 16, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 32-40, PN 25, all fluids
			ANSI, body, A126 B, NPS 3-4, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-2, Class 150, all fluids
	42	2422	DIN EN, body, EN-GJL-250 and EN-GJS-400-18-LT, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 50-80, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619, 1.4408 and 1.6220+QT, DN 32-50, PN 16, all fluids
			ANSI, body, A126 B, NPS 3-4, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC, A351 CF8M and A352 LCC, NPS 1½-2, Class 150, all fluids
Strainers	1N/1NI	2601	DIN EN, body, CB752S, G 2 (DN50), PN25, fluids G2, L2[2)]
Strainers	2N/2NI	2602	DIN EN, body, EN-GJL-250, DN 200-250, PN 10, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJL-250, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 100-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 50-80, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.4408, DN 32-50, PN 16, all fluids
Self-operated Regulators	---	2373/2375	ANSI, body, A995 4A and A995 5A, NPS 1½-2, Class 150, all fluids
	44	2440 (44-0B) 2441 (44-1B) 2446 (44-6B)	DIN EN, body, EN-GJS-400-18-LT, DN 50, PN 25, fluids G2, L2, L1[1)]
		2442 (44-2) 2443 (44-3) 2444 (44-4) 2447 (44-7) 2449 (44-9)	DIN EN, body, EN-GJS-400-18-LT and CC499K, DN 50, PN 25, fluids G2, L2, L1[1)]

Revision 01

EU DECLARATION OF CONFORMITY
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Devices	Series	Type	Version
Self-operated Regulators	45	2451 (45-1) 2452 (45-2) 2453 (45-3) 2454 (45-4) 2456 (45-6) 2459 (45-9)	DIN EN, body, EN-GJS-400-18-LT and CC499K, DN 50, PN 25, fluids G2, L2, L1[1)]
	46	2465 (46-5) 2466 (46-6) 2467 (46-7) 2469 (46-9)	DIN EN, body, EN-GJS-400-18-LT and CC499K, DN 50, PN 25, fluids G2, L2, L1[1)]
	47	2471 (47-1) 2474 (47-4) 2475 (47-5) 2479 (47-9)	DIN EN, body, EN-GJS-400-18-LT and CC499K, DN 50, PN 25, fluids G2, L2, L1[1)]
	48	2488 2489	DIN EN, body, EN-GJS-400-18-LT and CC499K, DN 50, PN 25, fluids G2, L2, L1[1)]
	40	2405	DIN EN, body, EN-GJS-400-18-LT, DN 50, PN 25, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-2, Class 150, all fluids
		2406	DIN EN, body, EN-GJL-250, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 50, PN 25, fluids G2, L2, L1[1)]
			ANSI, body, A126 B, NPS 3-4, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-2, Class 150, all fluids
	41	2412 2417	DIN EN, body, EN-GJL-250, DN 65-100, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 50-80, PN 25, fluids G2, L2, L1[1)]
			ANSI body, A126 B, NPS 3-4, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-2, Class 150, all fluids
	42	2421 RS	DIN EN, body, 1.0619, 1.4408, 1.4571 and 1.4401/1.4404, DN 32-50, PN 16, all fluids
			DIN EN, body, 1.0619, 1.4408, 1.4571 and 1.4401/1.4404, DN 32-40, PN 25, all fluids
			ANSI, body, A216 WCC, A351 CF8M and A182 F316/A182 F316L, NPS 1½-2, Class 150, all fluids
	---	2331	DIN EN, body, EN-GJL-250, DN 65-200, PN 16, fluids G2, L2[2)]
			DIN EN, body, EN-GJS-400-18-LT, DN 65-150, PN 16, fluids G2, L2[2)]
			DIN EN, body, EN-GJS-400-18-LT, DN 65-125, PN 25, fluids G2, L2[2)]
			DIN EN, body 1.0619, DN 65-200, PN 16, fluids G2, L2[2)]
			DIN EN, body 1.0619, DN 65-100, PN 40, fluids G2, L2[2)]
	---	2337	DIN EN, body 1.0619, DN 250, PN 25, fluids L1[1)]
			DIN EN, body 1.0619, DN 250, PN 40, fluids L1[1)]
	---	2333 2335	DIN EN, body, EN-GJL-250, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 65-80, PN 25, fluids G2, L2, L1[1)]
			ANSI body, A126 B, NPS 3-4, Class 125, fluids G2, L2, L1[1)]
	---	2334	DIN EN, body, EN-GJL-250, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 65-80, PN 25, fluids G2, L2, L1[1)]
			ANSI, body, A126 B, NPS 3-4, Class 125, fluids G2, L2, L1[1)]
	---	2404-1	DIN EN, body, EN-GJL-250, DN 65-125, PN16, fluids G2, L2, L1[1)]
			ANSI body, A126 B, NPS 3-4, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC und A351 CF8M, NPS 1½-2, Class 150, all fluids
	---	2404-2	DIN EN, body, EN-GJL-250, DN 65-125, PN 16, fluids G2, L2, L1[1)]
			ANSI, body, A126 B, NPS 3-4, Class 125, fluids G2, L2, L1[1)]

[1)] Gases according to Article 4(1)(c.i), second indent
Liquids according to Article 4(1)(c.ii)

[2)] Gases according to Article 4(1)(c.i), second indent
Liquids according to Article 4(1)(c.ii), second indent

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That the products mentioned above comply with the requirements of the following standards:

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**
Applied conformity assessment procedure for fluids according to Article 4(1)	**Module A**	

Technical standards applied: DIN EN 12516-2, DIN EN 12516-3, ASME B16.34

Manufacturer: SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany

Frankfurt am Main, 05. June 2024

ppa. Norbert Tollas
Senior Vice President
Global Operations

i.V. Peter Scheermesser
Director
Product Maintenance & Engineered Products

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Module H / N° CE-0062-PED-H-SAM 001-22-DEU-rev-A

For the following products, SAMSON hereby declares under its sole responsibility:

Devices	Series	Type	Version
Three-way valve	---	2119	DIN EN, body, EN-GJL-250 and 1.0619, DN 150, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619, DN 100-150, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 65-150, PN 40, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 6, Class 150, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 2-6, Class 300, fluids G2, L2, L1[1)]
Self-operated Regulators	---	3222	DIN EN, body, CC499K, DN 50, PN 25, all fluids
Three-way valve	---	3260	DIN EN, body, EN-GJL-250, DN 250-300, PN 16, fluids G2, L2[1)]
Globe valve Three-way valve	V2001	3531 3535	DIN EN, body, 1.0619 and 1.4408, DN 50-80, PN 25, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-3, Class 150, all fluids
Control valve	---	3214	DIN EN, body, EN-GJL-250, DN 150-400, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 100-150, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619, DN 32-400, PN 40, all fluids
			ANSI, body, A126 B, NPS 6-10, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC, NPS 2½-10, Class 150, all fluids
			ANSI, body, A216 WCC, NPS 1½-10, Class 300, all fluids
Self-operated Regulators	42	2423	DIN EN, body, EN-GJL-250, DN 150-250, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 150, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 100-150, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 65-250, PN 16, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 50-250, PN 25, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 32-250, PN 40, all fluids
			ANSI, body, A126 B, NPS 6-10, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-10, Class 150, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-10, Class 300, all fluids
	42	2422	DIN EN, body, EN-GJL-250, DN 150-400, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 100-150, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 65-400, PN 16, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 200-400, PN 25, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 32-400, PN 40, all fluids
			DIN EN, body, 1.0460, DN 40-50, PN 40, all Fluids
			DIN EN, body, 1.6220+QT, DN 65-250, PN 16, all fluids
			DIN EN, body, 1.6220+QT, DN 200-250, PN 25, all fluids
			DIN EN, body, 1.6220+QT, DN 32-250, PN 40, all fluids
			ANSI, body, A126 B, NPS 6-16, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351CF8M, NPS 2½-16, Class 150, all fluids
			ANSI, body, A216 WCC and A351CF8M, NPS 1½-16, Class 300, all fluids
			ANSI, body, A105, NPS 1½-2, Class 300, all fluids
			ANSI, body, A352 LCC, NPS 2½-10, Class 150, all fluids
			ANSI, body, A352 LCC, NPS 1½-10, Class 300, all fluids
	42	2421RS	DIN EN, body, 1.0619 and 1.4408, DN 65-150, PN 16, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 50-150, PN 25, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 32-150, PN 40, all fluids
			DIN EN, body, 1.4571 and 1.4401/1.4404, DN 50, PN 25, all fluids
			DIN EN, body, 1.4571 and 1.4401/1.4404, DN 32-50, PN 40, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-6, Class 150, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-6, Class 300, all fluids

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Devices	Series	Type	Version
Self-operated Regulators	40	2405	DIN EN, body, 1.0619, 1.4571, 1.4404, 1.4408, 1.0460, DN 32-50, PN40, all fluids
			ANSI, body, A105, A182 F316L, A351 CF8M, A216 WCC, NPS 1½-2, Class 300, all fluids
		2406	DIN EN, body, EN-GJL-250, DN 150, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 32-150, PN 40, all fluids
			DIN EN, body, 1.0460 and 1.4404, DN 32-50, PN 40, all fluids
			ANSI, body, A126 B, NPS 6, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-6, Class 150, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-6, Class 300, all fluids
			ANSI, body, A105 and A182 F316L, NPS 1½-2, Class 300, all fluids
	41	2412 2417	DIN EN, body, EN-GJS-400-18-LT, DN 100, PN25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 32-100, PN 40, all fluids
			DIN EN, body, 1.0460, 1.4571 and 1.4404, DN 32-80, PN 40, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-4, Class 150, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 1½-4, Class 300, all fluids
			ANSI, body, A105 and A182 F316L, NPS 1½-3, Class 300, all fluids
	---	2404-1	DIN EN, body, EN-GJL-250, DN 150, PN16, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 und 1.4408, DN 32-150, PN 40, all fluids
			ANSI, body, A126 B, NPS 6, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC und A351 CF8M, NPS 2½-6, Class 150, all fluids
			ANSI, body, A216 WCC und A351 CF8M, NPS 1½-6, Class 300, all fluids
	---	2404-2	DIN EN, body, EN-GJL-250, DN 150-400, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 und 1.4408, DN 65-400, PN 16, all fluids
			DIN EN, body, 1.0619 und 1.4408, DN 65-400, PN 40, all fluids
			ANSI, body, A126 B, NPS 6-16, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC und A351 CF8M, NPS 2½-16, Class 150, all fluids
			ANSI, body, A216 WCC und A351 CF8M, NPS 2½-10, Class 300, all fluids
	---	2331	DIN EN, body, EN-GJL-250, DN 250, PN 16, fluids G2, L2[1)]
			DIN EN, body, 1.0619, DN 250, PN 16, fluids G2, L2[1)]
			DIN EN, body, 1.0619, DN 200-250, PN 25, fluids G2, L2[1)]
			DIN EN, body, 1.0619, DN 125-250, PN 40, fluids G2, L2[1)]
	---	2333 2335	DIN EN, body, EN-GJL-250, DN 150-400, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 100-150, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 65-400, PN 16, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 200-400, PN 25, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 65-400, PN 40, all fluids
			ANSI, body, A126 B, NPS 6-16, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-16, Class 150, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-16, Class 300, all fluids
	---	2334	DIN EN, body, EN-GJL-250, DN 150-400, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 150, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 100-150, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619 and 1.4408, DN 65-400, PN 16, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 200-400, PN 25, all fluids
			DIN EN, body, 1.0619 and 1.4408, DN 65-400, PN 40, all fluids
			ANSI, body, A126 B, NPS 6-16, Class 125, fluids G2, L2, L1[1)]
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-16, Class 150, all fluids
			ANSI, body, A216 WCC and A351 CF8M, NPS 2½-16, Class 300, all fluids
	---	2373 2375	DIN EN, body, 1.4469 and 1.4470, DN 32-50, PN 40, all fluids
			ANSI, body, A995 5A and A995 4A, NPS 1½-2, Class 300, all fluids
Strainers	2N/2NI	2602	DIN EN, body, EN-GJL-250, DN 150-250, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 150, PN 16, fluids G2, L2, L1[1)]
			DIN EN, body, EN-GJS-400-18-LT, DN 100-150, PN 25, fluids G2, L2, L1[1)]
			DIN EN, body, 1.0619, DN 100-250, PN 16, all fluids

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Devices	Series	Type	Version
Strainers	2N/2NI	2602	DIN EN, body, 1.0619, DN 200-250, PN 25, all fluids
			DIN EN, body, 1.0619, DN 32-250, PN 40, all fluids
			DIN EN, body, 1.4408, DN 65-100, PN 16, all fluids
			DIN EN, body, 1.4408, DN 32-100, PN 40, all fluids

[1] Gases according to Article 4(1)(c.i), second indent
Liquids according to Article 4(1)(c.ii)

That the products mentioned above comply with the requirements of the following standards:

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**
Applied conformity assessment procedure for fluids according to Article 4(1)	**Module H**	**by Bureau Veritas 0062**

The manufafacturer's quality management system is monitored by the following notified body:
Bureau Veritas Services SAS, 4 place des Saisons, 92400 Courbevoie, France
Technical standards applied: DIN EN 12516-2, DIN EN 12516-3, ASME B16.34

Manufacturer: SAMSON AG, Weismuellerstrasse 3, 60314 Frankfurt am Main, Germany

Frankfurt am Main, 05. June 2024

ppa. Norbert Tollas
Senior Vice President
Global Operations

i.V. Peter Scheermesser
Director
Product Maintenance & Engineered Products

Revision 01

DECLARATION OF INCORPORATION
TRANSLATION

Declaration of Incorporation in Compliance with Machinery Directive 2006/42/EC

For the following product:
Type 2423 Valve

We certify that the Type 2423 Valve is partly completed machinery as defined in the Machinery Directive 2006/42/EC and that the safety requirements stipulated in Annex I, 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.3.7 are observed. The relevant technical documentation described in Annex VII, part B has been compiled.

Products we supply must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive 2006/42/EC.

Operators are obliged to install the products observing the accepted industry codes and practices (good engineering practice) as well as the mounting and operating instructions. Operators must take appropriate precautions to prevent hazards that could be caused by the process medium and operating pressure in the valve as well as by the signal pressure and moving parts.

The permissible limits of application and mounting instructions for the products are specified in the associated mounting and operating instructions; the documents are available in electronic form on the Internet at www.samsongroup.com.

For product descriptions refer to:
- Type 42-34 and Type 42-38 Differential Pressure Regulators with Flow Limitation: Mounting and Operating Instructions EB 3013
- Type 42-36 Flow Regulator: Mounting and Operating Instructions EB 3015
- Type 42-36 E Pressure-independent Control Valve (PICV): Mounting and Operating Instructions EB 3018
- Type 42-37 Flow and Differential Pressure Regulator as well as Type 42-39 Flow and Differential Pressure or Pressure Regulator: Mounting and Operating Instructions EB 3017

Referenced technical standards and/or specifications:
- VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]
- VCI, VDMA, VGB: "Zusatzdokument zum Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen vom Mai 2018" [German only], based on DIN EN ISO 12100:2011-03

Comments:
- See mounting and operating instructions for residual hazards.
- Also observe the referenced documents listed in the mounting and operating instructions.

Persons authorized to compile the technical file:

SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany
Frankfurt am Main, 10 November 2021

i.V.

Stephan Giesen
Director
Product Management

i. V. P.

Peter Scheermesser
Director
Product Life Cycle Management and ETO
Development for Valves and Actuators

Revision no. 00

15 Appendix

15.1 Tightening torques

Table 15-1: *Tightening torque*

Component	Width across flats	Valve size/actuator area	Tightening torque in Nm
Hex nut (1.3)	A/F 36	Type 3374 Electric Actuator (DN 65 to 100)	100
	A/F 36	Type 3374 Electric Actuator (DN 125 to 250)	150
Lock nut (2.2)	A/F 12	All	25
Coupling nuts (11)	A/F 36	All	120
Nuts and bolts (15)	–	40 to 640 cm²	25
Diaphragm plate nut (17)	A/F 12	40 to 640 cm²	40
Control line connection (19)	–	40 to 640 cm²	22
Stopper (21)	–	All	25

15.2 Lubricants

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

15.4.1 Valve

Legend for Fig. 15-1 and Fig. 15-2

2	Bellows
5	Restriction
12	Screw
16	Seat
17	Plug
20	Body
21	Guide cap
22	Label
24	Compression spring
26	Guide tube
27	Bottom section
34	Flange
35	Screw plug
46	Graphite seal on metal core
51	Stud
52	Hex nut
81	Cap
82	Hex nut
97	Hex nut (self-locking)
132	O-ring
171	Clamping ring
172	Seal

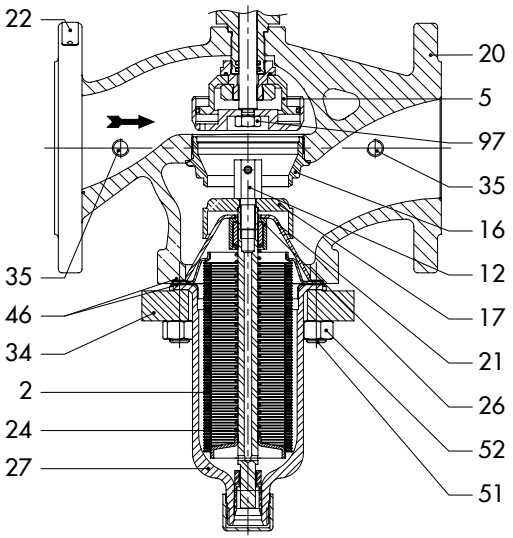

Fig. 15-1: *Type 2423 Valve, DN 15 to 100 · Balanced by a bellows*

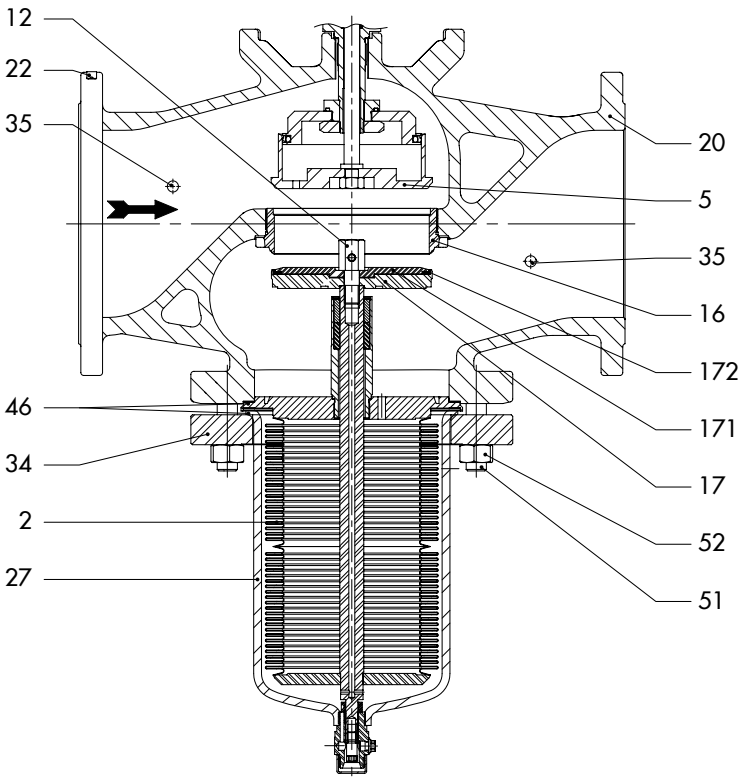

Fig. 15-2: *Type 2423 Valve, DN 125 to 250 · Balanced by a bellows*

Legend for Fig. 15-3	
5	Restriction
8	Compression spring
10	Diaphragm plate
11	Diaphragm
12	Castle nut
13	Washer
14	Plug stem
16	Seat
18	Plug
19	Screw
20	Body
21	Guide cap
22	Label
27	Diaphragm case
34	Ring
46	Seal
51	Stud
52	Hex nut
53	Screw plug
81	Nut
82	Hex nut
94	Stem
97	Hex nut (self-locking)

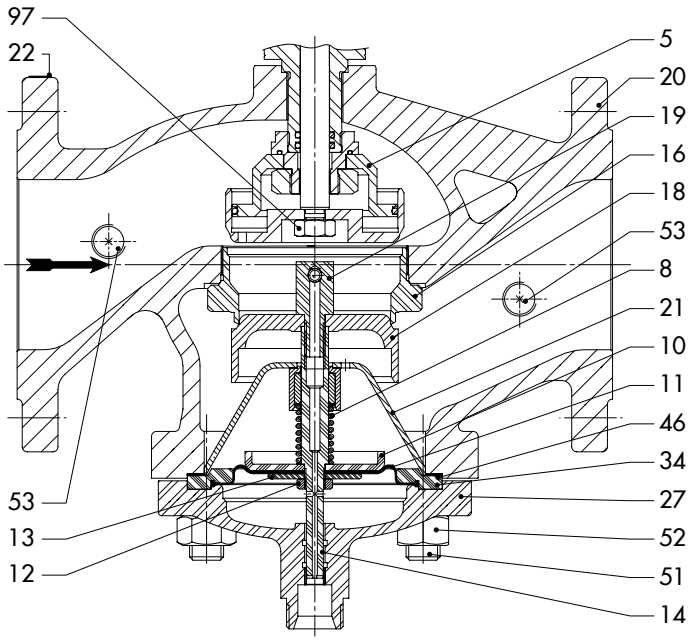

Fig. 15-3: *Type 2423 Valve, DN 65 to 100 · Balanced by a diaphragm*

Legend for Fig. 15-4	
2	Restriction
5	Seat
6	Diaphragm case
11	Cap
12	Body
17	Label
19	Plug
20	Body
21	Nipple
24	Nut
38	Diaphragm plate
39	Diaphragm plate
42	Clamping disk
46	Seal
47	Diaphragm
49	Screw plug
50	Screw plug
51	Stud
52	Hex nut
53	Hex nut
54	Hex nut
57	O-ring

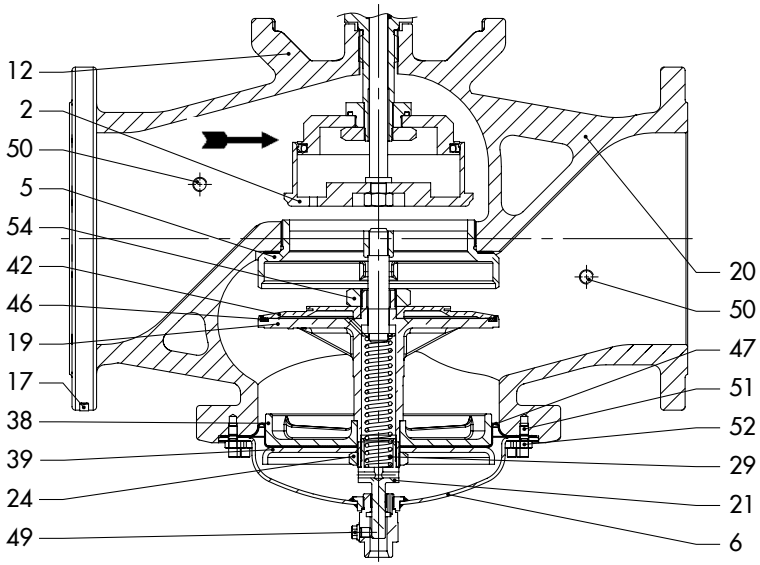

Fig. 15-4: *Type 2423 Valve, DN 125 to 250 · Balanced by a diaphragm*

15.4.2 Actuator

Legend for Fig. 15-5	
1	Diaphragm case
2	Diaphragm case
3	Screw joint with restriction
6	Nut
8	Diaphragm stem
13	Diaphragm plate
14	Washer
15	Diaphragm
17	Hex bolt
19	Hex nut
23	Hanger
26	Compression spring
27	Compression spring

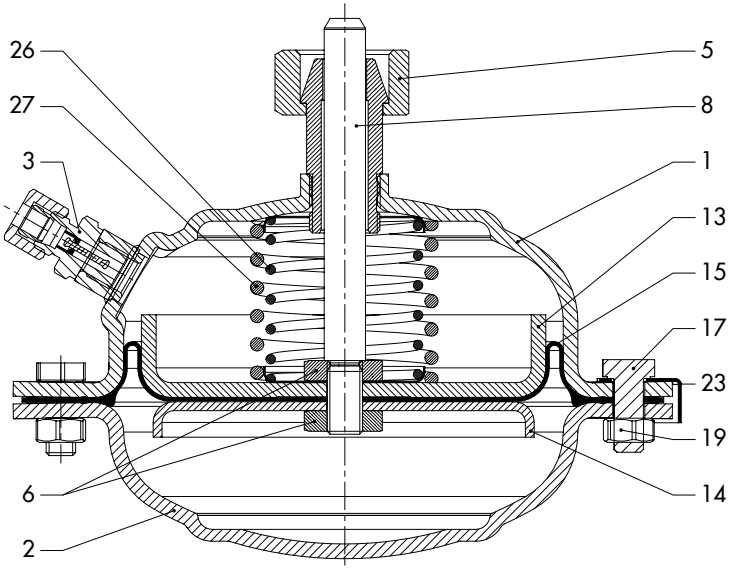

Fig. 15-5: *Type 2426 Diaphragm Actuator, DN 15 to 250*

15.4.3 Electric actuator

Refer to the associated mounting and operating instructions (see documents listed under 'Referenced documentation' in the 'Safety instructions and measures' chapter) for spare parts or accessories for the electric actuator.

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
- Valve balanced by a bellows or diaphragm
- Model number or material number
- Upstream and downstream pressure
- Temperature and process medium
- Min. and max. flow rate in m^3/h
- 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 3018 EN

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