

MOUNTING AND OPERATING INSTRUCTIONS



EB 2512 EN

Translation of original instructions



Type 41-23 Universal Pressure Reducing Valve Self-operated Pressure Regulators

Edition January 2024



Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices. The images shown in these instructions are for illustration purposes only. The actual product may vary.

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



The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at www.samsongroup.com > **Downloads** > **Documentation**.

Definition of signal words

DANGER

Hazardous situations which, if not avoided, will result in death or serious injury

WARNING

Hazardous situations which, if not avoided, could result in death or serious injury

NOTICE

Property damage message or malfunction

Note

Additional information

Tip

Recommended action

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1 Safety instructions and measures

Intended use

The SAMSON Type 41-23 Regulator is a pressure regulator. It consists of a Type 2412 Valve and a Type 2413 Actuator. The valve and actuator (except for tested regulators) are delivered separately and must be assembled together according to these instructions.

The self-operated regulator is used to control the downstream pressure p_2 in the pipeline to the adjusted set point. Liquids, gases and vapors in processing and industrial plants can be controlled by the regulator.

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.

Safety instructions and measures

Personal protective equipment

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

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

- Protective clothing, safety gloves and eye protection in applications with hot, cold and/or corrosive media
 - Wear hearing protection when working near the valve
 - 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 safety instructions drawn up by the operator.

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

▶ GESTIS (CLP) hazardous substances database).

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

Safety features

The Type 41-23 Regulator does not have any special safety features. When relieved of pressure, the regulator 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 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 documentation

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

- Mounting and operating instructions for

Safety instructions and measures

- | | | |
|------|--|-----------|
| e.g. | Accessories: Compensation chamber | ▶ EB 2595 |
| e.g. | Type 2 NI Strainer | ▶ EB 1015 |
- Data sheets for
- | | | |
|------|--|----------|
| e.g. | Accessories: Compensation chamber · Screw fittings · Control line connection · Control line | ▶ T 2595 |
| e.g. | Type 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 can lead to regulator components bursting.

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

1.2 Notes on possible personal injury

WARNING

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.

Crush hazard arising from moving parts.

The regulator contains moving parts (set point springs), which can injure hands or fingers if inserted into the regulator.

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

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

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

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

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

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 safe use of the part affected. ► www.samsongroup.com/en/about-samson/material-compliance/reach-regulation/

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

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

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

Risk of personal injury due to loaded springs.

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

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

1.3 Notes on possible property damage

ⓘ NOTICE

Risk of regulator damage due to unsuitable medium properties.

The regulator is designed for 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 regulator damage due to incorrectly attached slings.

- Do not attach load-bearing slings to the actuator housing.

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

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

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

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

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

Damage due to pressure peaks.

If solenoid valves are installed downstream of the regulator when the regulator is used to control liquids, pressure peaks may occur when the solenoid valves close quickly. These pressure peaks may damage the regulator.

- The installation of solenoid valves is not permitted when the regulator is used to control liquids.

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

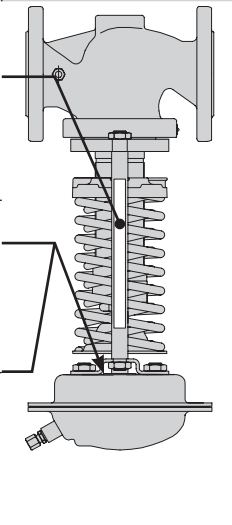
Medium temperatures below 0 °C may cause ice to form on the regulator, depending on the air humidity. This may affect, in particular, the functioning of the plug or diaphragm stem guide.

- 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. See the 'Installation' chapter.

i Note

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

1.4 Warnings on the regulator

Warning symbols	Meaning of the warning	Location on the device
<p>Attention ! Do not disassemble the valve without relieving the tension from the set point spring.</p>	<p>Warning to indicate that the set point springs are loaded. There is a risk of serious head or face injury through the sudden release of the set point springs while unscrewing the crossbeam when the set point springs are loaded.</p>	
<p>Completely relieve the tension from the set point springs before unthreading the two nuts.</p>	<p>Warning to indicate that the set point springs are loaded. There is a risk of injury to hands or fingers through the sudden release of the actuator stem if they are inserted between the crossbeam and set point springs while exchanging the actuator.</p>	
<p>Unlock/unlock the plug stem</p>	<p>Warning to indicate property damage at the bellows seal. There is a risk of damage to the bellows seal due to the incorrect mounting or removal of the plug stem.</p>	

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 Fig. 2-1).

2.1 Nameplates

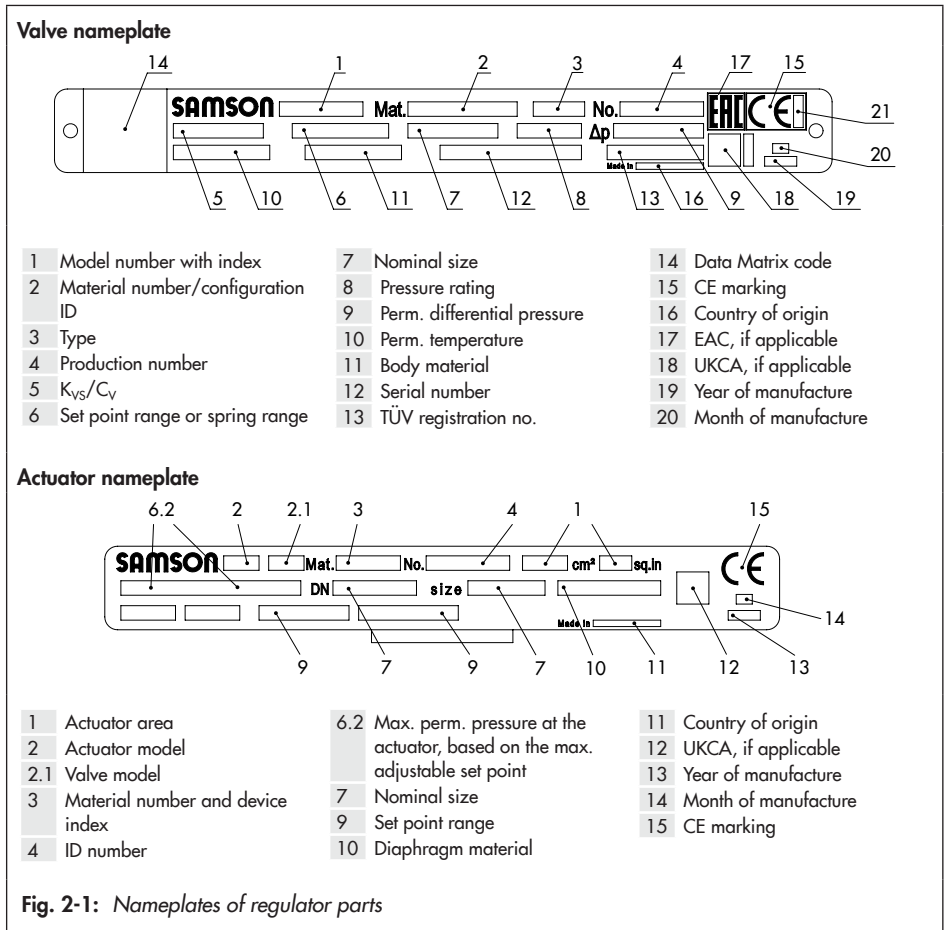


Fig. 2-1: Nameplates of regulator parts

2.2 Location of the nameplates

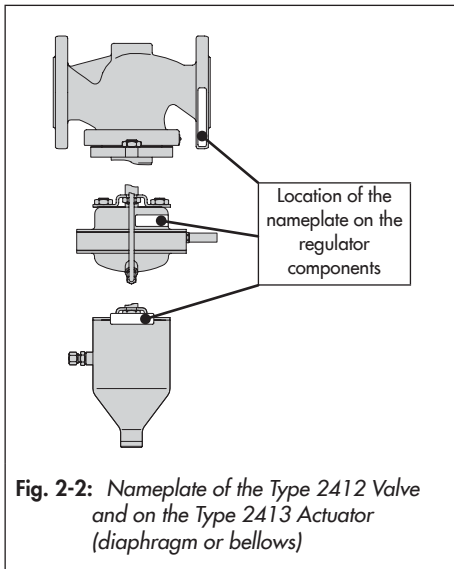


Fig. 2-2: Nameplate of the Type 2412 Valve and on the Type 2413 Actuator (diaphragm or bellows)

2.3 Material identification number

2.3.1 Type 2412 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.

2.3.2 Type 2413 Actuator

Specifying the material number, you can contact SAMSON to find out which material is used. It is specified on the nameplate in the 'Mat.-No.' field (3 for DIN/ANSI). For more details on the nameplate, see Chapter 2.1.

3 Design and principle of operation

→ See Fig. 3-1

The Type 41-23 Pressure Reducing Valve consists of a Type 2412 Closing Valve and a Type 2413 Actuator. The valve and actuator (as well as the control line in certain cases) are delivered separately or assembled depending on the order. Regulator components that are delivered separately must be assembled according to the instructions in the 'Installation' chapter. Fig. 3-3 shows the location of the connections on the actuator.

The pressure reducing valve is used to maintain the pressure downstream of the valve to an adjusted set point.

The process medium flows through the valve between seat (2) and plug (3) in the direction indicated by the arrow on the body. The position of the valve plug determines the flow rate and, as a result, the pressure ratio across the valve. The plug stem is sealed by a frictionless bellows (5.1). The downstream pressure p_2 is transmitted over the compensation chamber (18) (for liquids above 150 °C and for steam) and the control line (17) to the operating diaphragm (12) (operating bellows (12.1) in the version with bellows actuator) where it is converted into a positioning force. This force is used to move the valve plug depending on the force of the set point springs (7). The spring force is adjustable at the set point adjuster (6). The valves with K_{VS} 4 and higher have a balancing bellows (4). The upstream pressure acts on the outside of the bellows and the downstream pressure on the inside of the

bellows. As a result, the forces produced by the upstream and downstream pressures acting on the plug are balanced out.

Depending on the valve and actuator used, the regulator can be upgraded to create a pressure reducing valve for low flow rates, a steam pressure reducing valve or a pressure reducing valve with increased safety (actuator with two diaphragms).

The valve closes when the downstream pressure rises.

Legend for Fig. 3-1

- 1 Valve body
- 2 Seat
- 3 Plug
- 4 Balancing bellows
- 5 Plug stem
- 5.1 Bellows
- 6 Set point adjuster
- 7 Set point springs
- 7.1 Spring plate
- 8 Bracket
- 8.1 Pillar (view drawn turned by 90°)
- 8.2 Nuts for pillars
- 8.3 Tapped holes
- 9 Fastening nuts
- 10 Diaphragm actuator/bellows actuator
- 11 Actuator stem
- 12 Operating diaphragm
- 12.1 Operating bellows
- 13 Diaphragm plate
- 14 Diaphragm plate nut
- 15 Nuts and bolts
- 16 Control line connection G ¼ (with screw joint with restriction when used with steam)
- 17 Control line (to be provided on site) (available as control line kit for direct pressure tapping at the body ▶ T 2595)
- 18 Compensation chamber
- 19 Filler plug
- 20 Travel stop cap with cotter pin

Design and principle of operation

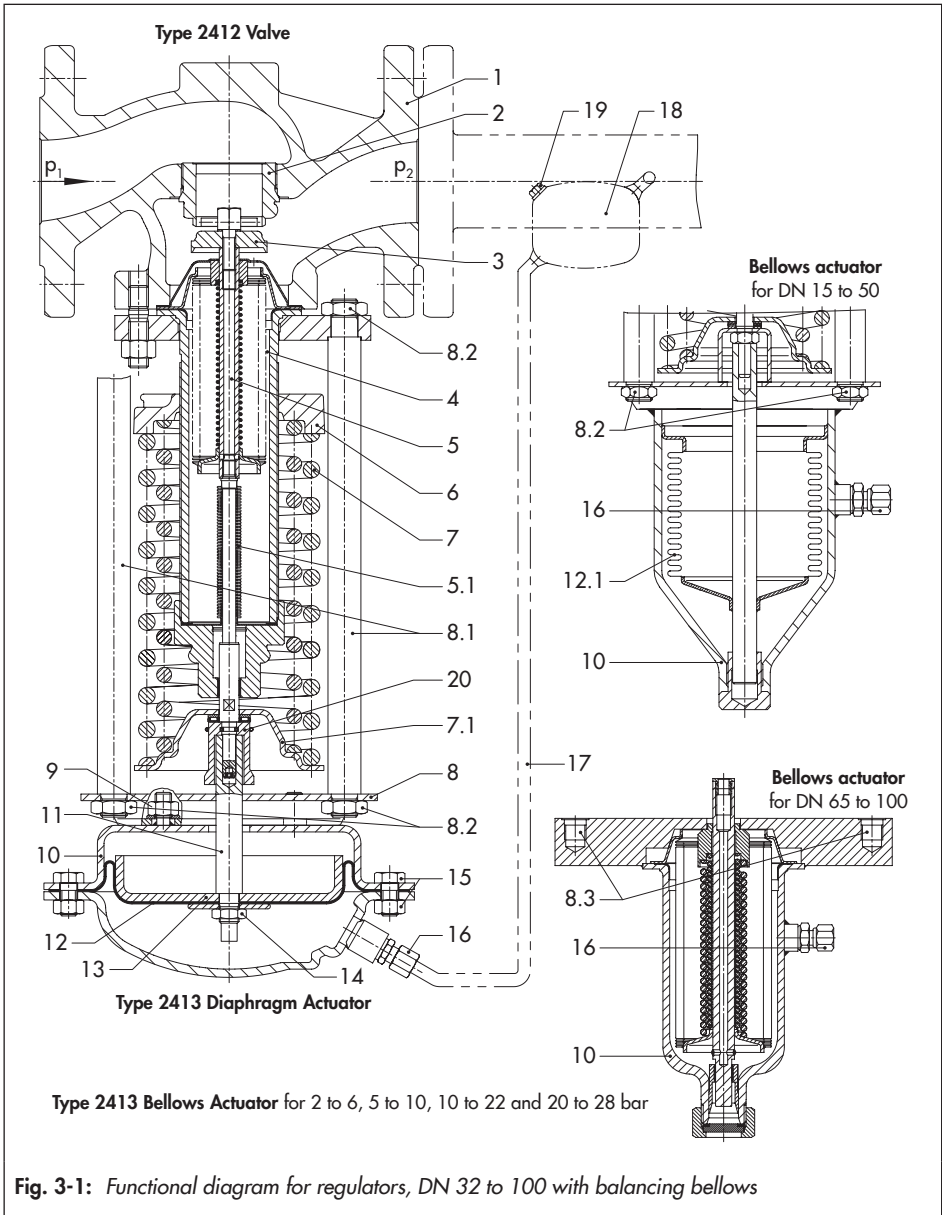


Fig. 3-1: Functional diagram for regulators, DN 32 to 100 with balancing bellows

3.1 Additional fittings

→ See Fig. 3-2

Strainers

We recommend 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.

i Note

Any impurities carried along by the process medium may impair the proper functioning of the regulator. We recommend installing a strainer (e.g. SAMSON Type 2 NI) upstream of the pressure reducing valve (► EB 1015).

Pressure gauges

Install a pressure gauge (3 and 5) both upstream and downstream of the regulator to monitor the pressures prevailing in the plant.

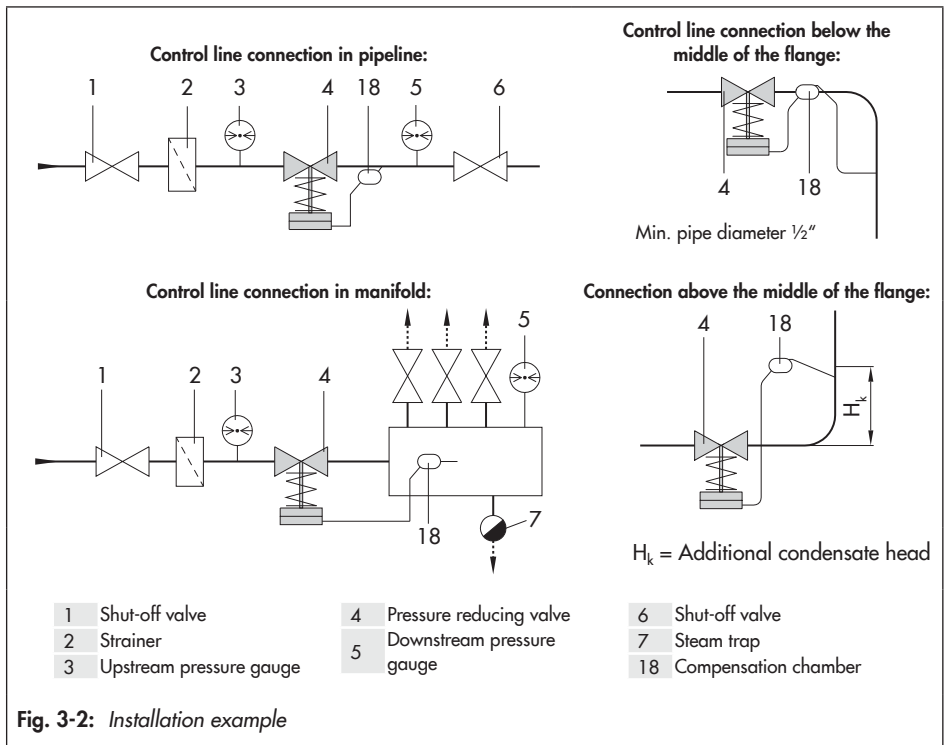


Fig. 3-2: Installation example

Design and principle of operation

Bypass and shut-off valves

We recommend 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.

Insulation

Regulators can be insulated to reduce heat energy transfer.

Refer to the instructions in the 'Installation' chapter.

Noise emissions

Trims with flow dividers can be used to reduce noise emission (▶ T 2512).

i Note

The Type 41-23 Regulator does not have a safety valve. If necessary, a suitable over-pressure protection must be installed on site.

3.2 Technical data

The valve and actuator nameplates provide information on the valve and actuator versions (see the 'Markings on the device' chapter).

i Note

More information is available in Data Sheet ▶ T 2512.

Conformity

The Type 41-23 Regulator bears the CE and EAC marks of conformity.

CE

EAC

Process medium and scope of application

The Type 41-23 Pressure Reducing Valve is used to maintain the pressure downstream of the regulator to an adjusted set point.

- For **liquids, gases and vapors**
- Max. temperature **350 °C**
- Set points from **0.05 to 28 bar**
- Nominal size **DN 15 to 100**
- Pressure ratings from **PN 16 to 40**

The regulator is open when relieved of pressure. The valve **closes** when the **downstream** pressure rises.

Temperature range

Depending on how the regulator is configured, it can be used up to temperatures of 350 °C (see Table 3-1). The minimum temperature is limited by the accessories used and the actuator's diaphragm material (▶ T 2595).

Leakage class

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

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

Noise 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

Table 3-5 provides a summary of the dimensions and weights. The lengths and heights in the dimensional drawings are shown on page 3-10.

Table 3-1: Technical data · All pressures in bar (gauge)

Valve		Type 2412				
Nominal size		DN 15 to 50	DN 65 to 80	DN 100		
Pressure rating		PN 16, 25 or 40				
Max. perm. differential pressure Δp		25 bar	20 bar	16 bar		
Max. permissible temperature	Valve	▶ T 2500 · Pressure-temperature diagram				
	Valve plug	Metal seal: 350 °C · PTFE soft seal: 220 °C EPDM or FKM soft seal: 150 °C · NBR soft seal: 80 °C				
Leakage class according to IEC 60534-4		Metal seal: leakage class I (≤ 0.05 % of K_{VS} coefficient) Soft seal: leakage class IV (≤ 0.01 % of K_{VS} coefficient)				
Conformity		UK CE EAC				
Diaphragm actuator		Type 2413				
Actuator area	cm ²	640	320	160	80	40
Set point ranges	bar	0.05 to 0.25 0.1 to 0.6	0.2 to 1.2	0.8 to 2.5 ²⁾	2 to 5	4.5 to 10 8 to 16
Max. permissible temperature		Gases 350 °C , however, max. 80 °C at the actuator · Liquids 150 °C , with compensation chamber 350 °C · Steam with compensation chamber 350 °C				
Set point spring		1750 N	4400 N		8000 N	
Bellows actuator		Type 2413				
Actuator area	cm ²	33			62	
Set point ranges	bar	10 to 22 · 20 to 28			2 to 6 ¹⁾ · 5 to 10 bar	
Max. permissible temperature		350 °C				
Set point spring		8000 N				

¹⁾ Set point spring 4400 N

²⁾ Version with actuator with two diaphragms: 1 to 2.5 bar

Design and principle of operation

Table 3-2: Max. permissible pressure at actuator

	Set point ranges	Max. perm. pressure above the set point adjusted at the actuator
Diaphragm actuator	0.05 to 0.25 bar · 0.1 to 0.6 bar	0.6 bar
	0.2 to 1.2 bar	1.3 bar
	0.8 to 2.5 bar	2.5 bar
	2 to 5 bar	5 bar
	4.5 to 10 bar · 8 to 16 bar	10 bar
Bellows actuator	2 to 6 bar · 5 to 10 bar	6.5 bar
	10 to 22 bar	8 bar
	20 to 28 bar	2 bar

i Note

The Type 41-23 Regulator does not have a safety valve. If necessary, a suitable overpressure protection must be installed on site.

i Note

The maximum permissible pressure at the actuator depends on the currently adjusted set point. Add the value listed in the table to it.

Example:

Set point range: 0.2 to 1.2 bar

Set point adjusted: 0.8 bar

Max. permissible pressure at the actuator: 0.8 bar + 1.3 bar = **2.1 bar**

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

Nominal size	DN	15	20	25	32	40	50	65	80	100
$K_{VS}^{1)}$ · Standard version		4.0	6.3	8.0	16	20	32	50	80	125
x_{FZ}		0.5	0.45	0.4					0.35	
$K_{VS}^{1)}$ · Special version		1.0	1.0 · 4.0		4.0 · 8.0			32 ²⁾		80
x_{FZ}		0.6		0.5		0.45		0.4		
$K_{VS}^{1)}$ · With flow divider		3.0	5.0	6.0	12	15	25	38	42	66

¹⁾ $K_{VS} \leq 4$: valve without balancing bellows

²⁾ Max. permissible Δp : 25 bar

Table 3-4: *Materials · Material numbers according to DIN EN*

Valve		Type 2412			
Pressure rating		PN 16	PN 25	PN 40	
Max. permissible temperature		300 °C	350 °C		
Body		Cast iron EN-GJL-250	Spheroidal graphite iron EN-GJS-400-18-LT	Cast steel 1.0619	Stainless steel 1.4408
Seat		CrNi steel			CrNiMo steel
Plug	Material	CrNi steel			CrNiMo steel
	Seal	PTFE with 15 % glass fiber · EPDM · NBR · FKM			
Guide bushing		CrNi steel			
Balancing bellows and bellows seal		CrNiMo steel			
Actuator		Type 2413			
		Diaphragm actuator		Bellows actuator	
Diaphragm cases		1.0332 ¹⁾		–	
Diaphragm		EPDM · FKM · NBR		–	
Bellows housing		–		1.0460/1.4301 (stainless steel only)	
Bellows		–		CrNiMo steel	

¹⁾ In corrosion-resistant version (CrNi steel)

Table 3-5: *Dimensions in mm and weights in kg*

Universal Pressure Reducing Valve		Type 41-23								
Nominal size		DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100
Length L		130	150	160	180	200	230	290	310	350
Height H1		335			390		517		540	
Height H2	Forged steel	53	–	70	–	92	98	–	128	–
	Other materials	44			72		98		118	

¹⁾ +10 % for all other materials

²⁾ Actuator with two diaphragms: 1 to 2.5 bar

³⁾ Actuator with two diaphragms: Height H + 50 mm

Design and principle of operation

Table 3-5: Dimensions in mm and weights in kg

Universal Pressure Reducing Valve		Type 41-23								
Nominal size		DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100
Height H ⁴		100								
Standard version with Type 2413 Diaphragm Actuator										
Set point ranges	0.05 to 0.25 bar	Height H ³⁾	445		500		627		650	
		Actuator	ØD = 380 mm, A = 640 cm ²							
		Valve spring force F	1750 N							
	0.1 to 0.6 bar	Height H ³⁾	445		500		627		650	
		Actuator	ØD = 380 mm, A = 640 cm ²							
		Valve spring force F	4400 N							
	0.2 to 1.2 bar	Height H ³⁾	430		480		607		635	
		Actuator	ØD = 285 mm, A = 320 cm ²							
		Valve spring force F	4400 N							
	0.8 to 2.5 bar ²⁾	Height H ³⁾	430		485		612		635	
		Actuator	ØD = 225 mm, A = 160 cm ²							
		Valve spring force F	4400 N							
	2 to 5 bar	Height H ³⁾	410		465		592		615	
		Actuator	ØD = 170 mm, A = 80 cm ²							
		Valve spring force F	4400 N							
	4.5 to 10 bar	Height H ³⁾	410		465		592		615	
		Actuator	ØD = 170 mm, A = 40 cm ²							
		Valve spring force F	4400 N							
8 to 16 bar	Height H ³⁾	410		465		592		615		
	Actuator	ØD = 170 mm, A = 40 cm ²								
	Valve spring force F	8000 N								
Weight for version with Type 2413 Diaphragm Actuator										
Set point ranges	0.05 to 0.6 bar	24.8	25.9	32.5	34.7	38.5	56.1	63.8	73.7	
	0.2 to 2.5 bar	Weight, based on cast iron ¹⁾ , approx. kg								
	2 to 16 bar	20.6	22.8	28.9	31.1	34.9	52.5	60.2	70.1	
		13.2	14.3	20.4	23.1	26.4	44.0	51.7	61.6	

¹⁾ +10 % for all other materials

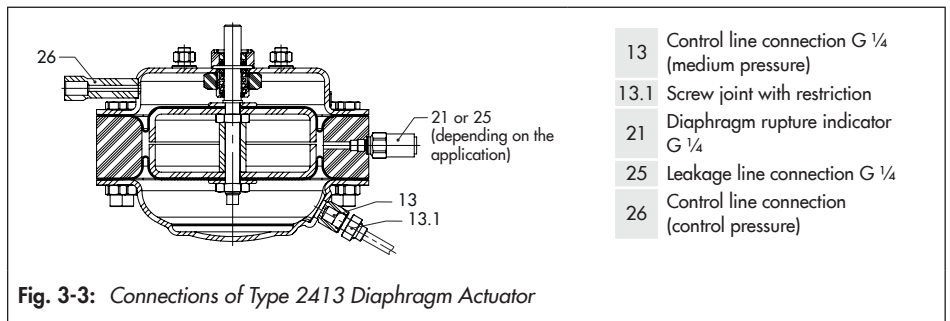
²⁾ Actuator with two diaphragms: 1 to 2.5 bar

³⁾ Actuator with two diaphragms: Height H + 50 mm

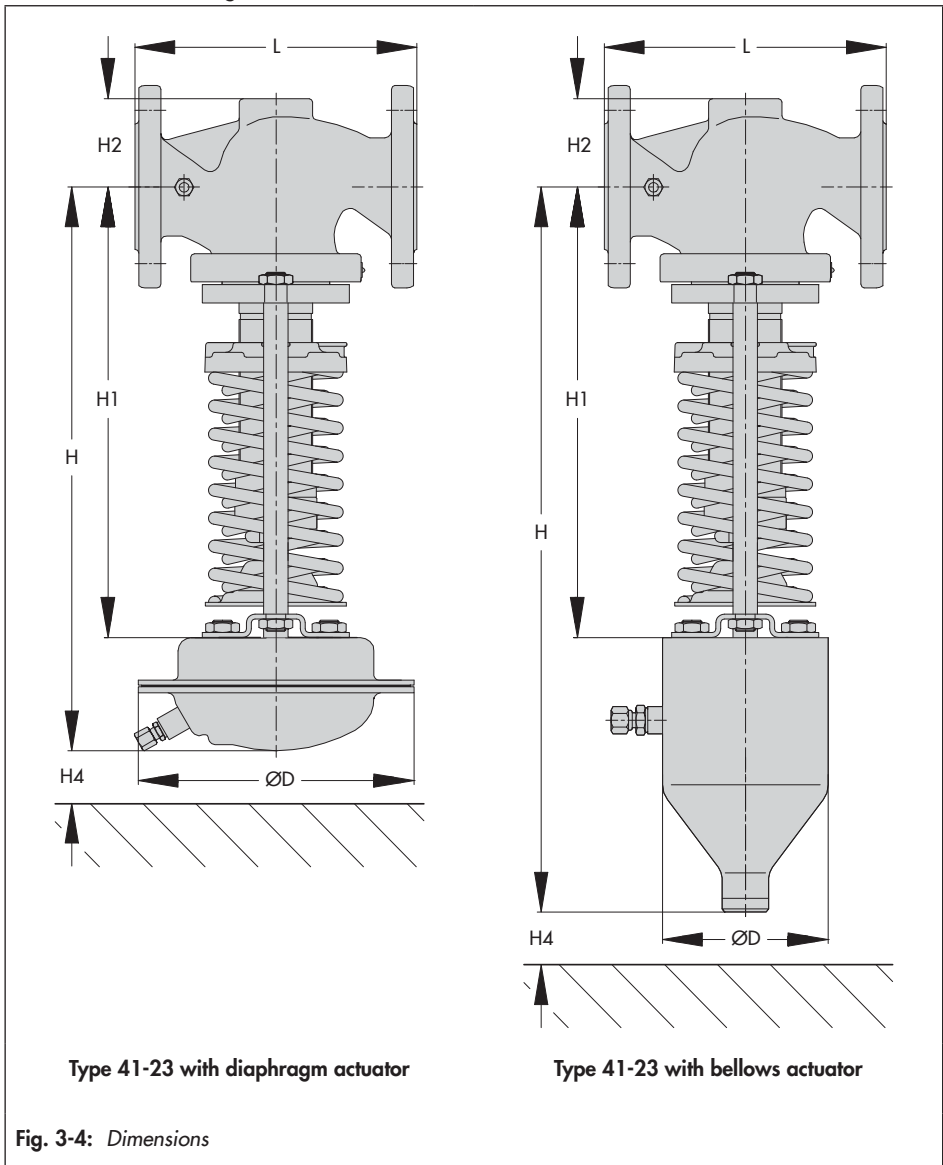
Table 3-5: Dimensions in mm and weights in kg

Universal Pressure Reducing Valve		Type 41-23									
Nominal size		DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	
Version with Type 2413 Bellows Actuator											
Set point ranges	2 to 6 bar	Height H	550		605		732		755		
		Actuator	ØD = 120 mm, A = 62 cm ²								
		Valve spring force F	4400 N								
	5 to 10 bar	Height H	550		605		732		755		
		Actuator	ØD = 120 mm, A = 62 cm ²								
		Valve spring force F	8000 N								
	10 to 22 bar	Height H	535		590		717		740		
		Actuator	ØD = 90 mm, A = 33 cm ²								
		Valve spring force F	8000 N								
	20 to 28 bar	Height H	535		590		717		740		
		Actuator	ØD = 90 mm, A = 33 cm ²								
		Valve spring force F	8000 N								
Weight for version with bellows actuator											
Set point ranges	2 to 10 bar	Weight, based on cast iron ¹⁾ , approx. kg	22.6	23.7	24.2	30.3	32.5	36.3	60.5	68.2	78.1
	10 to 28 bar		18.2	19.3	19.8	25.9	28.1	31.9	48.4	61.6	71.5

- 1) +10 % for all other materials
- 2) Actuator with two diaphragms: 1 to 2.5 bar
- 3) Actuator with two diaphragms: Height H + 50 mm



Dimensional drawings



4 Shipment and on-site transport

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

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Check that the specifications on the valve and actuator nameplate 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.

4.2 Removing the packaging from the valve and actuator

The components (valve, 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 valve 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.

4.3 Transporting and lifting the regulator

⚠ DANGER

Risk due to suspended loads falling.

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

⚠ 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 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.

- Observe the guideline weight for manual handling: 15 to max. 55 kg taking into account age, gender and physical fitness
- Observe the occupational health and safety regulations valid in the country of use.

⚠ 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.

💡 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 piping and any mounted valve accessories against damage.
- Protect the regulator against moisture and dirt.
- 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 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 over.
- 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.

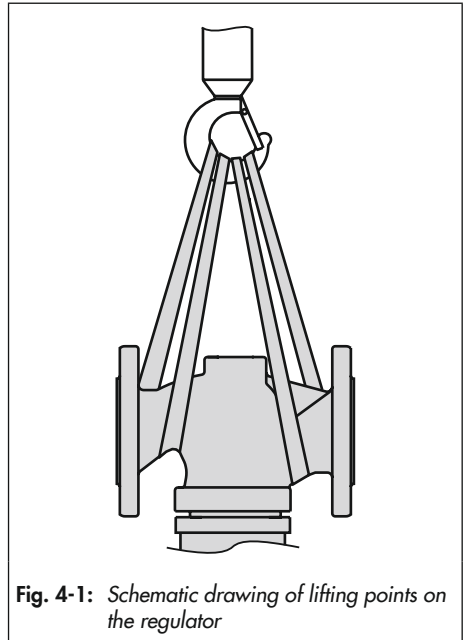


Fig. 4-1: Schematic drawing of lifting points on the regulator

4.4 Storing the valve

NOTICE

Risk of regulator damage due to improper storage.

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

Note

We recommend regularly checking the 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 only to be performed by personnel appropriately qualified to carry out such tasks.

5.1 Installation conditions

Work position

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

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

Pipeline routing

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

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

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

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

Mounting position

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

- ➔ Install the actuator housing with the set point springs suspended downward in horizontal pipelines (see Fig. 5-1).
- ➔ Make sure the direction of flow matches the direction indicated by the arrow on the body.
- ➔ Contact SAMSON if the mounting position is not as specified above.

NOTICE

Damage due to pressure peaks.

If solenoid valves are installed downstream of the regulator when the regulator is used to control liquids, pressure peaks may occur when the solenoid valves close quickly. The installation of solenoid valves is not permitted when the regulator is used to control liquids.

NOTICE

Damage due to freezing.

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

Note

Do not install any instruments (e.g. temperature regulators or shut-off valves) that restrict the cross-section of the pipe between the pressure tapping point and the regulator.

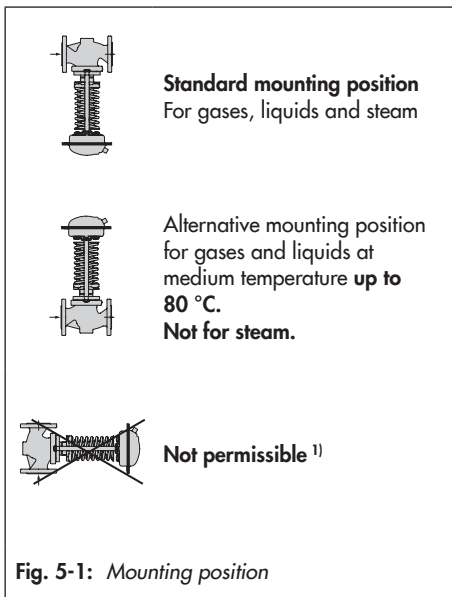


Fig. 5-1: Mounting position

¹⁾ On request: Permissible for regulators with fixed plug stem guide plus with medium temperature up to 80 °C. Not for steam.

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

Do not attach supports directly to the valve or actuator.

Control line

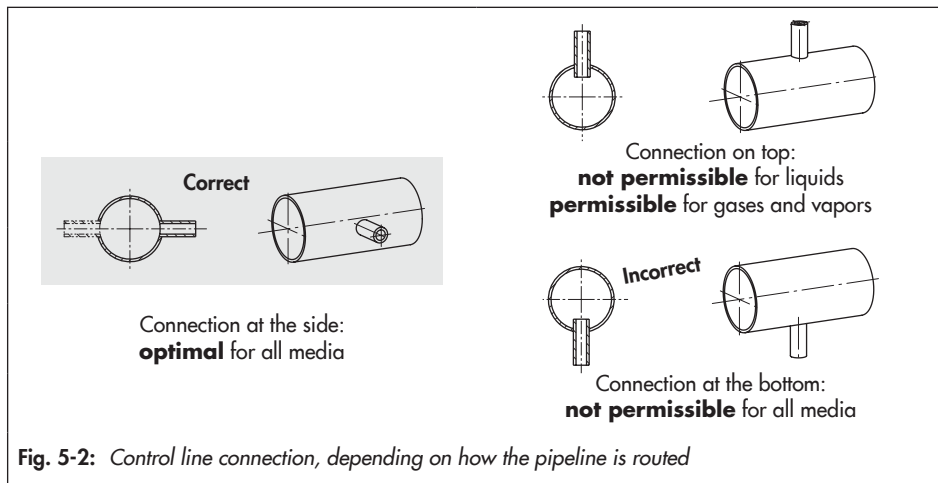
The control line must be provided at the site of installation, e.g. a 3/8" pipe for steam or an 8x1 or 6x1 mm pipe for air/water.

Connect the control line to the downstream line (p₂) at least one meter away from the valve outlet.

Weld the control line at the side in the middle of the pipe, inclining at a ratio of approximately 1:10 up to the compensation chamber. If a manifold is located downstream of the pressure reducing valve, connect the valve to the manifold, even if it is several meters away (see Table 5-1 and Fig. 5-2).

Control line kit

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



Compensation chamber

A compensation chamber (18) is required for liquids above 150 °C as well as for steam. The mounting position of the compensation chamber is indicated by an adhesive label on the chamber itself as well as by an arrow and the word "top" stamped on the top of the chamber.

This mounting position must be adhered to; otherwise the safe functioning of the regulator cannot be guaranteed.

Weld the line coming from the pressure tapping point to the $\frac{3}{8}$ " pipe socket on the chamber.

Install the compensation chamber at the highest point of the pipeline. Consequently, the control line between compensation chamber and actuator must also be installed with a downward slope. In this case, use a $\frac{3}{8}$ " pipe with screw fittings.

If the control line connection is located below the middle of the valve inlet flange, arrange the compensation chamber at the same level as the inlet flange. In this case, use a pipe which is at least $\frac{1}{2}$ " in size for the control line from the tapping point to the compensation chamber.

If the control line is connected above the middle of the valve inlet flange, install the compensation chamber at the same level as the upstream pressure tapping point. The additional pressure of the condensate head (H_k , Fig. 5-3) must be compensated for by adjusting the set point.

Needle valve

If the regulator tends to hunt, we recommend installing a needle valve at the control line connection (16) in addition to the standard SAMSON screw joint with restriction.

5.2 Preparation for installation

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

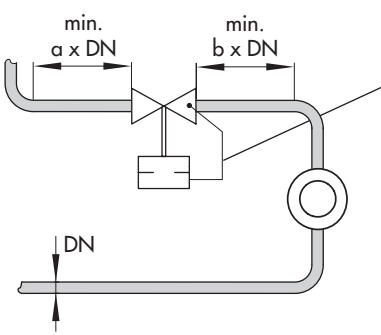
Before installation, make sure the following conditions are met:

- The valve is clean.
- The valve, actuator and all piping are not damaged.
- Install a strainer upstream of the regulator.
- The valve data on the nameplate (type designation, nominal 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.
- For steam applications, drain and dry the pipelines. Moisture will damage the inside of the regulator.
- Check any mounted pressure gauges to make sure they function properly.

Table 5-1: Inlet and outlet lengths (example)

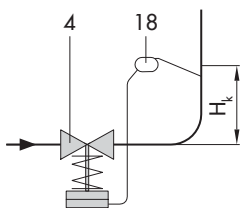


State of process medium	Valve conditions	Inlet length a	Outlet length b
Gas	$Ma \leq 0.3$	2	4
Vapors ¹⁾	$Ma \leq 0.3$	2	4
Liquid	Free of cavitation/ $w < 3 \text{ m/s}$	2	4
	Cavitation producing noise/ $w \leq 3 \text{ m/s}$	2	4

a Inlet length
b Outlet length

¹⁾ No wet steam

Connection above the middle of the flange:



Additional condensate head

- 4 Pressure regulator
- 18 Compensation chamber

i Note

The arising condensate head will lower the maximum set point that can be adjusted at the regulator.

Example:

The maximum set point of a regulator with a set point range from 0.05 to 0.25 bar is reduced to 0.15 bar when a condensate head exists in the 1 m control line installed on site.

For this reason, the height H_k of the control line installed on site must be kept as short as possible.

Fig. 5-3: Installation example with steam

5.3 Installation

Tested SAMSON regulators are delivered as an assembled unit. In all other cases, the separate components (valve, actuator and control line) of the regulator are delivered separately. Upon delivery, the separate components must be assembled together. The activities listed below are necessary for installation and before start-up of the regulator.

⚠ 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).*

5.3.1 Installing the regulator

1. Close the shut-off valves upstream and downstream of the regulator while the regulator is being installed.
2. Remove the protective caps from the valve ports 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.
6. Mount the actuator.

→ Diaphragm actuator DN 15 to 100

- Insert the actuator stem (11) through the hole in the crossbeam (8) into the travel stop cap with cotter pin (20).
- Align actuator stem (11) and fasten the actuator with the nuts (9). Observe the specified tightening torques (see 'Tightening torques' in the Appendix).

→ Bellows actuator DN 15 to 50

- Remove the crossbeam (8) from the valve.
- Insert the actuator stem (11) into the travel stop cap with cotter pin (20).
- Align pillars (8.1) and fasten the actuator with the nuts (8.2). Observe the specified tightening torques (see 'Tightening torques' in the Appendix).

→ Bellows actuator DN 65 to 100

- Remove the crossbeam (8) from the valve.
 - Unscrew the pillars (8.1).
 - Screw the pillars (8.1) into the threaded holes (8.3) of the actuator flange as far as they will go.
 - Insert the actuator stem (11) into the travel stop cap with cotter pin (20).
 - Fasten the pillars (8.1) with the nuts (8.2) onto the valve flange. Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
7. Lock the cotter pin (20) on the travel stop cap.
 8. Mount the control line (17) onto the valve and actuator. Observe the specified tightening torques (see 'Tightening torques' in the Appendix).

→ With diaphragm actuators

- For **steam** or **liquids above 150 °C** install the compensation chamber and fill it with the process medium. Observe the specified tightening torques (see 'Tightening torques' in the Appendix).
9. 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 (17) from the valve body.
- Seal the valve body with G ¼ stoppers (accessories: stopper 8323-0030 and seal 8412-0771).
- 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 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

Crush hazard arising from moving parts.

- Do not insert hands or fingers between the set point springs while the regulator is in operation.
- Do not insert hands or fingers between the pillars and set point springs while the regulator is in operation.
- Do not insert hands or fingers between the spring plate and crossbeam while the regulator is in operation.
- Before starting any work on the regulator, depressurize plant sections as well as 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.

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

5.4.2 Pressure test

i Note

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

! NOTICE

Risk of valve damage due to a sudden pressure increase.

→ *Slowly open the shut-off valves.*

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

→ **Remove the control line.**

Seal the opening at the valve body with a G 1/4 stopper. (accessories: stopper 8323-0030 and seal 8412-0771)

→ Do not allow the pressure to exceed the **1.5 times the pressure rating** of the valve body.

→ Make sure that the pressure rises simultaneously upstream and downstream of the regulator to avoid damaging the balancing bellows.

5.5 Insulation

5.5.1 Insulation for medium temperatures above 150 °C

Only the valve body is to be insulated up to the set point springs at the most for medium temperatures above 150 °C.

NOTICE***Risk of regulator damage due to incorrect insulation.***

Only insulate the regulator up to the set point springs at the most for medium temperatures above 150 °C.

→ *Do not insulate the control lines, compensation chambers or diaphragm actuator.*

5.5.2 Cold insulation

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

NOTICE***Risk of regulator damage due to incorrect insulation.***

- *Insulate the regulator according to common practice when the medium temperature is below the dew point of the ambient air.*
 - *Install the regulator with the actuator in the upright position above the valve.*
 - *Do not pack the regulator in gas-tight insulation since it requires the atmospheric pressure to work.*
 - *An installed diaphragm rupture indicator must remain visible after insulation.*
-

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.

6 Start-up

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

⚠ DANGER

Risk of personal injury due to process medium escaping.

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

⚠ WARNING

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

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

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

⚠ WARNING

Risk of hearing loss or deafness due to loud noise.

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

- Wear hearing protection when working near the valve.

⚠ WARNING

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

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

⚠ WARNING

Crush hazard arising from moving parts.

- Do not insert hands or fingers between the set point springs while the regulator is in operation.
- Do not insert hands or fingers between the pillars and set point springs while the regulator is in operation.
- Do not insert hands or fingers between the spring plate and crossbeam while the regulator is in operation.
- Before starting any work on the regulator, depressurize plant sections as well as the regulator.

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

- The regulator is properly installed into the pipeline (see 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 which can damage the regulator's valve.
3. Check the regulator to ensure it functions properly.

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

- The control line is open and correctly connected.

6.2 Starting up the plant

⚠ WARNING

Risk of personal injury due to process medium escaping.

Depending on the conditions in the plant in operation, it may be necessary to install compensation chambers to protect the regulator.

→ *Proceed as described in 'Regulation of liquids' and 'Regulation of steam' for liquids or steam above 150 °C before starting up the plant.*

1. The plant (e.g. consumer valve) must be open while the plant is being filled.
2. The control lines are correctly connected.
3. **For media that do not reach their boiling point at atmospheric pressure and for gases:**

Open the shut-off valves **slowly** over a time period of several minutes starting from the upstream pressure side. Fill the plant with the medium. Avoid pressure surges.

For media that reach their boiling point at atmospheric pressure:

Open the shut-off valves **slowly** starting from the downstream side to avoid steam hammering.

4. Make sure that the pressure rises simultaneously upstream and downstream of the regulator to avoid damaging the balancing bellows.

6.2.1 Regulation of liquids

→ For liquid medium temperatures above 150 °C, first fill the compensation chamber with the process medium. Proceed as follows:

1. Unscrew filler plug from the compensation chamber.
2. Use the included plastic funnel or a jug to pour in the process medium until it reaches the filling opening.
3. Screw the filler plug back in and tighten it.

6.2.2 Regulation of steam

→ Warm up the plant very slowly. During this procedure, drain off any condensate and vent the plant.

→ First fill the compensation chamber with water. Proceed as follows:

1. Unscrew filler plug from the compensation chamber.
2. Use the included plastic funnel or a jug to pour in water until it reaches the filling opening.
3. Screw the filler plug back in and tighten it.
 - All pipes conveying the process medium must be completely drained and dry.
 - Air and condensate must be allowed to escape from the plant.
 - Allow time for the pipes and valves to heat up.

7 Operation

Immediately after completing start-up or placing the regulator back into operation (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 heat up.
- Wear protective clothing and safety gloves.

⚠ WARNING

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

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

⚠ WARNING

Risk of 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.

- Do not insert hands or fingers between the set point springs while the regulator is in operation.
- Do not insert hands or fingers between the pillars and set point springs while the regulator is in operation.
- Do not insert hands or fingers between the spring plate and crossbeam while the regulator is in operation.
- Before starting any work on the regulator, depressurize plant sections as well as the regulator.

7.1 Adjusting the set point

- The required downstream pressure is set by turning the set point adjuster (6) using an open-end wrench:
 - DN 15 to 50 with width across flats SW 19
 - DN 65 and 100 with width across flats SW 24
 - The set point of the stainless steel regulator must be adjusted using the rod included.
- Turn the set point adjuster clockwise (↻) to increase the pressure set point.
- Turn the set point adjuster counterclockwise (↺) to reduce the pressure set point.

The pressure gauge located on the downstream pressure side allows the adjusted set point to be monitored.

Operation

An initial adjustment of the set point can also be made by changing the spring tension until the distance x (see Fig. 7-1 and Table 7-1) is reached.

i Note

Note that during initial set point adjustment only a rough set point adjustment is performed by turning the set point adjustment until the distance x is reached. The special properties of the process medium and plant are not taken into account in this case. Check the pressure at the pressure gauge downstream of the regulator for a precise set point adjustment.

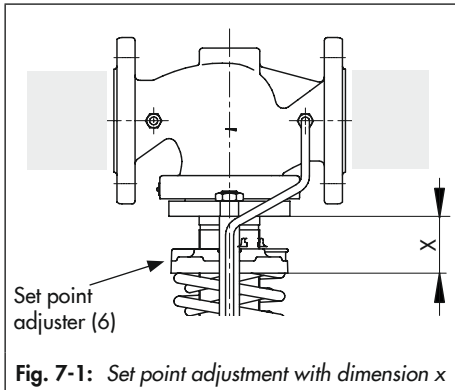


Fig. 7-1: Set point adjustment with dimension x

Table 7-1: Set point adjustment · Dimension x

Set point range	Nominal size DN			
	15 to 25	32 to 50	65 to 100	
8 to 16 bar	10 bar	$x=89$ mm	$x=106$ mm	$x=133$ mm
	12 bar	$x=97$ mm	$x=117$ mm	$x=150$ mm
	14 bar	$x=104$ mm	$x=128$ mm	$x=168$ mm
4.5 to 10 bar				
Set point	5.9 bar	$x=85$ mm	$x=100$ mm	$x=131$ mm
	7.3 bar	$x=93$ mm	$x=112$ mm	$x=152$ mm
	8.6 bar	$x=101$ mm	$x=123$ mm	$x=172$ mm
2 to 5 bar				
Set point	2.8 bar	$x=83$ mm	$x=97$ mm	$x=126$ mm
	3.5 bar	$x=92$ mm	$x=110$ mm	$x=170$ mm
	4.3 bar	$x=100$ mm	$x=122$ mm	$x=184$ mm
0.8 to 2.5 bar				
Set point	1.2 bar	$x=79$ mm	$x=92$ mm	$x=117$ mm
	1.7 bar	$x=89$ mm	$x=106$ mm	$x=142$ mm
	2.1 bar	$x=99$ mm	$x=121$ mm	$x=167$ mm
0.2 to 1.2 bar				
Set point	0.45 bar	$x=71$ mm	$x=81$ mm	$x=98$ mm
	0.70 bar	$x=83$ mm	$x=98$ mm	$x=127$ mm
	1.0 bar	$x=95$ mm	$x=117$ mm	$x=157$ mm
0.1 to 0.6 bar				
Set point	0.23 bar	$x=71$ mm	$x=81$ mm	$x=98$ mm
	0.35 bar	$x=83$ mm	$x=98$ mm	$x=127$ mm
	0.48 bar	$x=95$ mm	$x=115$ mm	$x=157$ mm
0.05 to 0.25 bar				
Set point	0.10 bar	$x=70$ mm	$x=80$ mm	$x=92$ mm
	0.15 bar	$x=81$ mm	$x=95$ mm	$x=116$ mm
	0.20 bar	$x=91$ mm	$x=110$ mm	$x=139$ mm

8 Malfunctions

8.1 Troubleshooting

Malfunction	Possible reasons	Recommended action
Downstream pressure exceeds the adjusted set point.	Insufficient pressure pulses on the operating diaphragm	<ul style="list-style-type: none"> → Connect the control line on site for regulators with external control line. → Clean the control line and screw fittings.
	Foreign particles blocking the plug	<ul style="list-style-type: none"> → Remove foreign particles. → When parts are damaged, contact SAMSON's After-sales Service.
	Seat and plug are worn or leak.	<ul style="list-style-type: none"> → When parts are damaged, contact SAMSON's After-sales Service.
	Control line blocked	<ul style="list-style-type: none"> → Clean the control line and screw fittings.
	Pressure tapped at the wrong place (regulator with external control line)	<ul style="list-style-type: none"> → Reconnect the control line at another point. → Do not connect the control line at pipe bends or necks.
	Regulator or K_{VS}/C_V coefficient too large	<ul style="list-style-type: none"> → Check the sizing. → Change K_{VS}/C_V coefficient, if necessary or install a different sized regulator. → Contact SAMSON's After-sales Service.
	Compensation chamber in the wrong position or too small (with steam)	<ul style="list-style-type: none"> → Reconnect compensation chamber at a different place or replace it (see the Appendix).
Downstream pressure hunts	Defective operating diaphragm	<ul style="list-style-type: none"> → Replace damaged diaphragm.
	Regulator or K_{VS}/C_V coefficient too large	<ul style="list-style-type: none"> → Check the sizing. → Change K_{VS}/C_V coefficient, if necessary or install a different sized regulator. → Contact SAMSON's After-sales Service.
	Pressure tapped at the wrong place (regulator with external control line)	<ul style="list-style-type: none"> → Reconnect the control line at another point. → Do not connect the control line at pipe bends or necks.
	The restriction in the control line for pressure tapping is too large or missing.	<ul style="list-style-type: none"> → Install a restriction. → Install a smaller restriction.

Malfunctions

Malfunction	Possible reasons	Recommended action
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.
Downstream pressure drops below the adjusted set point.	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.
	Pressure tapped at the wrong place (regulator with external control line)	→ Reconnect the control line at another point. → Do not connect the control line at pipe bends or necks.
	Foreign particles blocking the plug	→ Remove foreign particles. → When parts are damaged, contact SAMSON's After-sales Service.
	Compensation chamber in the wrong position or too small (with steam)	→ Reconnect compensation chamber at a different place or replace it (see the Appendix).
	Control line blocked	→ Clean the control line and screw fittings.
	Strainer blocked	→ Clean strainer.
Jerky control response	Increased friction, e.g. due to foreign particles between seat and plug	→ Remove foreign particles. → When parts are damaged, contact SAMSON's After-sales Service.
Loud noises	High flow velocity, cavitation	→ Check the sizing. → Install larger regulator, if necessary. → Install flow divider with gases and steam.
Leakage at the actuator	Defective operating diaphragm/bellows	→ Replace damaged diaphragm/bellows.
Leakage at the bellows seal	Defective bellows seal	→ When parts are damaged, contact SAMSON's After-sales Service.
Red mark appears at the diaphragm rupture indicator (actuator with two diaphragms).	Defective operating diaphragm	→ Replace damaged operating 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 remedy 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 department can support you in drawing up an inspection and test plan for your plant.

8.2 Emergency action

The plant operator is responsible for emergency action to be taken in the plant.

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

In the event of a regulator malfunction:

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

Putting the valve back into operation after a malfunction

See the 'Start-up' chapter.

9 Servicing

The regulator does not require any maintenance. Nevertheless, it is subject to natural wear, particularly at the seat, plug and operating diaphragm/bellows. Depending on the operating conditions, check the regulator at regular intervals to avoid possible malfunctions. 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 only to be performed by personnel qualified for the assignment accordingly.

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

⚠ WARNING

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

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

- ➔ Allow components and pipelines to cool down or heat up.
- ➔ Wear protective clothing and safety gloves.

⚠ WARNING

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

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

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

⚠ NOTICE

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

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

- ➔ Observe the specified tightening torques (see the Appendix).

⚠ NOTICE

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

- ➔ Only use tools approved by SAMSON (see the Appendix).

⚠ NOTICE

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

- ➔ Only use lubricants approved by SAMSON (see the Appendix).

Note

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

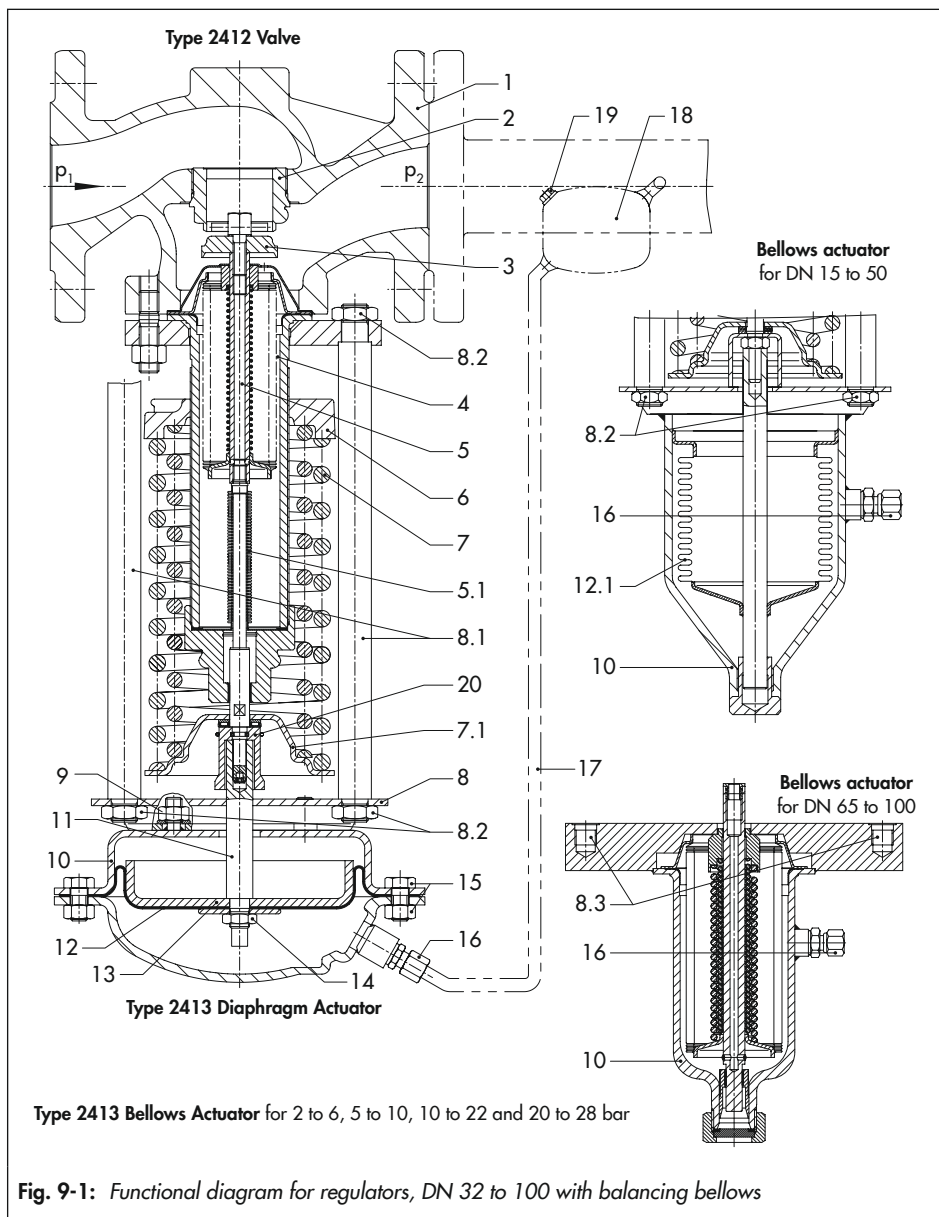
- Certain test results (seat leakage and leak test) certified by SAMSON lose their validity when the regulator is opened.
- The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON's After-sales Service.
- Only use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

Tip

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

Legend for Fig. 9-1

- 1 Valve body
- 2 Seat
- 3 Plug
- 4 Balancing bellows
- 5 Plug stem
- 5.1 Bellows
- 6 Set point adjuster
- 7 Set point springs
- 7.1 Spring plate
- 8 Crossbeam
- 8.1 Pillar
(view drawn turned by 90°)
- 8.2 Nuts for pillars
- 8.3 Tapped holes
- 9 Fastening nuts
- 10 Diaphragm actuator/bellows actuator
- 11 Actuator stem
- 12 Operating diaphragm
- 12.1 Operating bellows
- 13 Diaphragm plate
- 14 Diaphragm plate nut
- 15 Nuts and bolts
- Control line connection G ¼
(with screw joint with restriction when used with steam)
- 17 Control line (to be provided on site)
(available as control line kit for direct pressure tapping at the body ▶ T 2595)
- 18 Compensation chamber
- 19 Filler plug
- 20 Travel stop cap with cotter pin



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 valve from the pipeline' chapter).

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

- Replacing the actuator (see Chapter 9.3.1)
- Replacing the set point springs (see Chapter 9.3.2)
- Replacing the seat and plug (see Chapter 9.3.3)
- Replacing the operating diaphragm (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 requirements and conditions for start-up 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 start-up (see 'Testing the regulator' in the 'Installation' chapter).

9.3.1 Replacing the actuator

→ Refer to Fig. 9-1

Removing the actuator

1. Put the regulator out of operation (see the 'Decommissioning' chapter).
2. Unscrew the control line (17).
3. Completely relieve the tension from the set point springs (7) by turning the set point adjuster (6) counterclockwise (↺).

⚠ WARNING

Stored energy in the set point springs can cause components to move in an uncontrolled manner resulting in injury to hands or fingers.

4. Unlock the cotter pin (20) on the travel stop cap.
5. **Diaphragm actuator DN 15 to 100**
Unscrew the nuts (9) from the actuator and remove the actuator.
- **Bellows actuator DN 15 to 50**
Unscrew the nuts (8.2) from the actuator and remove the actuator.
- **Bellows actuator DN 65 to 100**
Unscrew the nuts (8.2) on the pillars (8.1).
Unscrew the pillars (8.1) out of the threaded holes (8.3) of the actuator flange and remove the actuator.

Mounting the actuator

1. **Diaphragm actuator DN 15 to 100**
Insert the actuator stem (11) through the hole in the crossbeam (8) into the travel stop cap with cotter pin (20) and fasten the actuator with the nuts (9). Observe the tightening torques specified in the Appendix.
- **Bellows actuator DN 15 to 50**
Insert the actuator stem (11) into the travel stop cap with cotter pin (20).
Align actuator on the pillars (8.1) and fasten it with the nuts (8.2). Observe the tightening torques specified in the Appendix.
- **Bellows actuator DN 65 to 100**
Screw the pillars (8.1) into the threaded holes (8.3) of the actuator flange as far as they will go.
Insert the actuator stem (11) into the travel stop cap with cotter pin (20).
Fasten the pillars (8.1) with the nuts (8.2) onto the valve flange. Observe the tightening torques specified in the Appendix.
2. Lock the cotter pin (20) on the travel stop cap.
3. Screw on the control line (17). Observe the tightening torques specified in the Appendix.
4. Put the regulator into operation (see the 'Operation' chapter).

9.3.2 Replacing the set point springs

→ Refer to Fig. 9-1

Removing the set point springs

1. Put the regulator out of operation (see the 'Decommissioning' chapter).
2. Completely relieve the tension from the set point springs (7) by turning the set point adjuster (6) counterclockwise (↺).

⚠ WARNING

Stored energy in the set point springs can cause components to move in an uncontrolled manner resulting in injury to hands or fingers.

3. Unscrew the control line (17).
4. Remove the device from the pipeline
5. Unlock the cotter pin (20) on the travel stop cap.
6. Remove the actuator (10) from the valve (see Chapter 9.3.1).
7. Unscrew the nuts (8.2) on the crossbeam. Remove the crossbeam (8).
8. Remove the travel stop cap with cotter pin (20) and spring plate (7.1).
9. Lift off the set point springs (7).

Mounting the set point springs

1. Place the set point springs (7) on the set point adjuster (6).
2. Place on the spring plate (7.1) and the travel stop cap with cotter pin (20).
Place the crossbeam (8) on the pillars (8.1) and fasten with the nuts (8.2). Observe the tightening torques specified in the Appendix.
3. Mount the actuator (10) (see Chapter 9.3.1). Observe the tightening torques specified in the Appendix.
4. Lock the cotter pin (20) on the travel stop cap.
5. Install the regulator into the pipeline.
6. Screw on the control line (17). Observe the tightening torques specified in the Appendix.
7. Put the regulator into operation (see the 'Operation' chapter).

i Note

Change the nameplate and material number after changing the set point range.

9.3.3 Replacing the seat and plug

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

Further information is available in the Appendix.

9.3.4 Replacing the operating diaphragm

NOTICE

Do not exchange the operating diaphragm in an FDA-compliant regulator version. SAMSON's After-sales Service can support you to perform such service work.

Note

There are no spare parts available for the bellows actuators. The entire actuator must be replaced if it is defective.

Tip

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

→ Refer to Fig. 9-1

Removing the operating diaphragm

1. Put the regulator out of operation (see the 'Decommissioning' chapter).
2. Completely relieve the tension from the set point springs (7) by turning the set point adjuster (6) counterclockwise (↺).

WARNING

Stored energy in the set point springs can cause components to move in an uncontrolled manner resulting in injury to hands or fingers.

3. Unscrew the control line (17).
4. Unscrew the nuts (9) and remove the actuator.
5. Clamp the actuator stem (11) into a suitable fixture. Mark the side of the actuator to avoid reassembling it the wrong way.
6. Unscrew nuts and bolts (15) from the actuator. Remove the actuator case with control line connection (16).
7. Unscrew the diaphragm plate nut (14) and remove the operating diaphragm (12) from the diaphragm plate (13).

Mounting the operating diaphragm

1. Place a new operating diaphragm (12) onto the diaphragm plate (13) (ensuring the pressurized side is facing in the correct direction) and tighten the diaphragm plate nut (14). Observe the tightening torques specified in the Appendix.
2. Place on the actuator case with control line connection (16). Check the correct position of the control line connection nipple (marking).
3. Insert nuts and bolts (15) and tighten gradually in a crisscross pattern. Observe the tightening torques specified in the Appendix.
4. Insert the actuator into the travel stop cap with cotter pin (20) and tighten the fastening nuts (9). Observe the tightening torques specified in the Appendix.
5. Screw on the control line (17). Observe the tightening torques specified in the Appendix.
6. Put the regulator into operation (see the 'Operation' 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 only to be performed by personnel qualified for the assignment accordingly.

⚠ 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 compressed medium can cause serious injury or even death.

Before working on the regulator:

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

⚠ WARNING

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

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

- Allow components and pipelines to cool down or heat up.
- Wear protective clothing and safety gloves.

⚠ WARNING

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

- 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.

- Do not insert hands or fingers between the set point springs while the regulator is in operation.
- Do not insert hands or fingers between the pillars and set point springs while the regulator is in operation.
- Do not insert hands or fingers between the spring plate and crossbeam while the regulator is in operation.
- 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.*

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

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

11 Removal

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

⚠ WARNING

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

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

- *Allow components and pipelines to cool down or heat up.*
- *Wear protective clothing and safety gloves.*

⚠ WARNING

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

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

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

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

- The control valve is put out of operation (see the 'Decommissioning' chapter).

11.1 Removing the valve 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. Undo any externally mounted control line.
3. Unbolt the flange joint.
4. Remove the regulator from the pipeline (see the 'Shipment and on-site transport' chapter).

11.2 Removing the actuator from the valve

See '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 repair work.

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

12.1 Returning devices to SAMSON

Defective devices can be returned to SAMSON for repair.

Proceed as follows to return devices:

1. Put the regulator out of operation (see the 'Decommissioning' chapter).
2. Decontaminate the valve. Remove any residual process medium.
3. Fill in the Declaration on Contamination, which can be downloaded from our website at ► www.samsongroup.com > Service > After-sales Service.
4. Continue as described on our website at ► www.samsongroup.com > Service > After-sales Service > Returning goods.

13 Disposal



SAMSON is a producer registered at the following European institution ► <https://www.samsongroup.com/en/about-samson/environment-social-governance/material-compliance/waste-electrical-and-electronic-equipment-veee-and-its-safe-disposal/>.
WEEE reg. no.: DE 62194439

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

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 assigned SCIP number, which 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.

i Note

SAMSON can provide you with a recycling passport on request. Simply e-mail us at aftersaleservice@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.

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 41-23 Regulator on page 14-5.
- Declaration of incorporation in compliance with Machinery Directive 2006/42/EC for Type 2412 Valve on page 14-6.
- Declaration of incorporation in compliance with Machinery Directive 2006/42/EC for Type 2413 Actuator on page 14-7.

EU DECLARATION OF CONFORMITY
TRANSLATION



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

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	DIN EN, body, 1.0619 and 1.4408, DN 50-80, PN 25, all fluids
		3535	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
Self-operated Regulators	42	2423	ANSI, body, A216 WCC, NPS 1½-10, Class 300, all fluids
			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
			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	2422RS	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, 1.0619 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		
			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		
		41	2406	DIN EN, body, 1.0460 and 1.4404, DN 32-50, PN 40, all fluids	
				ANSI, body, A128 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	
			41	2412 2417	ANSI, body, A105 and A182 F316L, NPS 1½-2, Class 300, all fluids
					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
	---			2404-1	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
					DIN EN, body, EN-GJL-250, DN 150, PN16, fluids G2, L2, L1 ¹⁾
		---		2404-2	DIN EN, body, 1.0619 und 1.4408, DN 32-150, PN 40, all fluids
					ANSI, body, A128 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
			---	2331 2337	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, A128 B, NPS 6-16, Class 125, fluids G2, L2, L1 ¹⁾
	---			2333 2335	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
					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⁾
		---		2334	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⁾
					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⁾
			---	2373 2375	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, A128 B, NPS 6-16, Class 125, fluids G2, L2, L1 ¹⁾
---	2334			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	
				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⁾	
	---	2334		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	
		---	2373 2375	ANSI, body, A128 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	
				DIN EN, body, 1.4469 and 1.4470, DN 32-50, PN 40, all fluids	
Strainers			2N/2N1	2602	ANSI, body, A995 5A and A995 4A, NPS 1½-2, Class 300, all fluids
					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 manufacturer's quality management system is monitored by the following notified body:
Bureau Veritas Services SAS, 8 Cours du Triangle, 92800 PUTEAUX – LA DEFENSE, 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, 14. October 2022



ppa. Norbert Tollas
Senior Vice President
Global Operations



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

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EU DECLARATION OF CONFORMITY
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Declaration of conformity according to Machinery Directive 2006/42/EC

For the following self-operated regulators:

Type 41-23 Universal Pressure Reducing Valve consisting of Type 2412 Valve and Type 2413 Actuator as well as Type 41-73 Universal Excess Pressure Valve consisting of Type 2417 Valve and Type 2413 Actuator

We hereby declare that the machinery mentioned above complies with all applicable requirements stipulated in Machinery Directive 2006/42/EC.

For product descriptions of the valve and actuator, refer to:

- Type 41-23 Universal Pressure Reducing Valve: Mounting and Operating Instructions EB 2512
- Type 41-73 Universal Excess Pressure Valve: Mounting and Operating Instructions EB 2517

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:

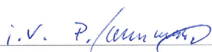
- See mounting and operating instructions for residual hazards.
- Also observe the referenced documents listed in the mounting and operating instructions.

Persons authorized to compile the technical file:

SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany
Frankfurt am Main, 1 October 2019



Dr. Michael Heß
Director
Product Management and Technical Sales



Peter Scheermesser
Director
Product Upgrades and ETO Valves and Actuators

Revision no. 00

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

For the following product:

Type 2412 Valve

We certify that the Type 2412 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 41-23 Universal Pressure Reducing Valve: Mounting and Operating Instructions EB 2512

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, 08 September 2023

Stephan Giesen
Director
Product Management

Peter Scheermesser
Director
Product Maintenance & Engineered Products

Revision no. 01

DECLARATION OF INCORPORATION
TRANSLATION



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

For the following product:
Type 2413 Actuator

We certify that the Type 2413 Actuator 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 41-23 Universal Pressure Reducing Valve: Mounting and Operating Instructions EB 2512
- Type 41-73 Universal Excess Pressure Valve: Mounting and Operating Instructions EB 2517

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, 08 September 2023

S. Giesen

Stephan Giesen
Director
Product Management

P. Scheermesser

Peter Scheermesser
Director
Product Maintenance & Engineered Products

Revision no. 01

Classification: Public · SAMSON AKTIENGESELLSCHAFT · Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany

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15 Appendix

15.1 Tightening torques

Table 15-1: *Tightening torque*

Component	Width across flats	Nominal size/ actuator area	Tightening torque in Nm
Set point adjuster (6)	SW 19	DN 15 to 50	–
	SW 24	DN 65 to 100	
Nuts for pillars (8.2)	SW 24	DN 15 to 100	60
Fastening nuts (9)	SW 16	DN 15 to 100	25
Diaphragm plate nut (14)	SW 12	40 to 640 cm ²	40
Nuts and bolts (15)	–	40 to 640 cm ²	25
Control line connection (16)	–	40 to 640 cm ²	22

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 Accessories

Table 15-2: *Assignment of compensation chamber (18) to regulator, with item no.*

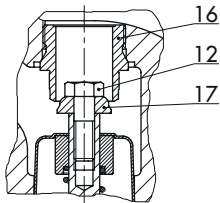
Type 2413 Actuator Actuator area A	Item number · Compensation chamber	
	DN 15 to 50	DN 65 to 100
640 cm ²	1190-8789	1190-8790
320 cm ²	1190-8788	1190-8789
160, 80, 40 cm ²	1190-8788	

15.5 Spare parts

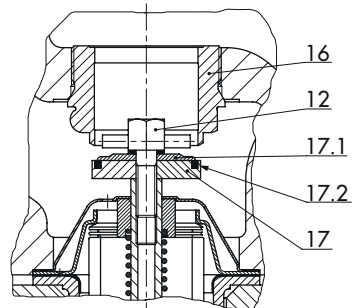
Version (2012 onwards)

1	Bellows
2	Bellows assembly
6	Coupling nut
12	Balancing screw
16	Seat
17	Plug
17.1	Pre-stage of plug
17.2	Seal
20	Body
21	Guide cap
25	Guide (DN 32 to 100)
25, 26	Guide bushing/pipe (DN 15 to 25)
27	Flanged pipe
28	Washer
34	Flange
40	Set point adjuster
42	Retaining washer
44	Pillar
46	Seal
51	Stud
52	Hex nut
60	Flow divider
70, 71	Spring
73	Travel stop cap with cotter pin
74	Spring plate
75	Seal
76	Axial needle bearing

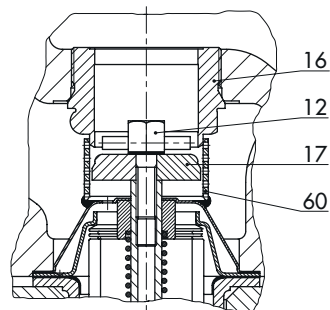
77	Lock washer
79	Hex nut
80	Crossbeam
101, 102	Diaphragm case
103	Screw plug
104	Diaphragm stem
105	Diaphragm plate
106	Diaphragm washer
108	Operating diaphragm
111	Hex bolt
112 - 114	Hex nut
116	Washer



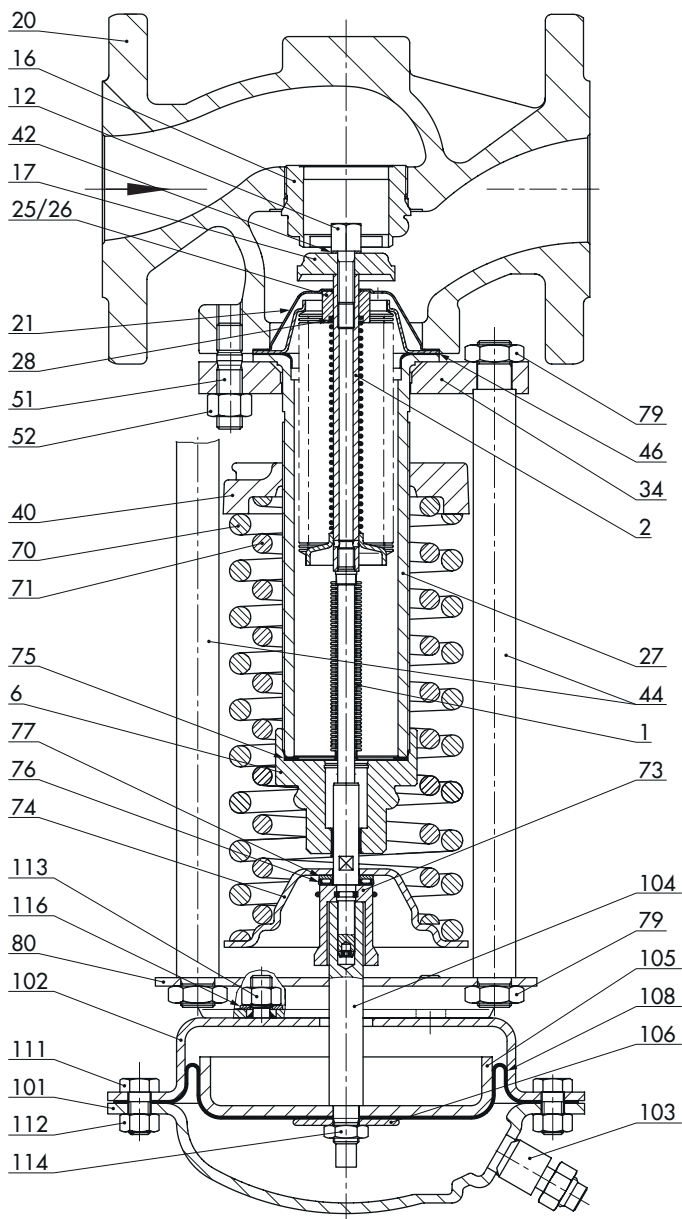
Standard version (DN 15 to 25)



Version with soft-seated plug



Version with flow divider



i Note

There are no spare parts available for the bellows actuators. The entire actuator must be replaced when it is defective.

15.6 After-sales service

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

E-mail address

You can reach our after-sales service at aftersalesservice@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 nominal size
- Model number or material number
- Upstream and downstream pressure
- Temperature and process medium
- Min. and max. flow rate
- Is a strainer installed?
- Installation drawing showing the exact location of the regulator and all the additionally installed components (shut-off valves, pressure gauge etc.)

EB 2512 EN



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