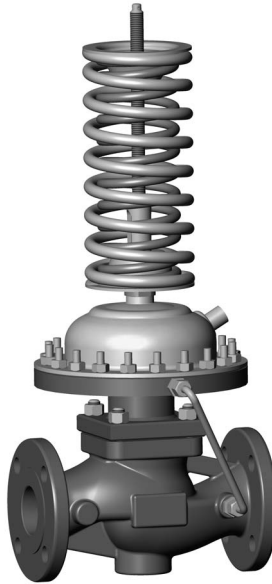


Self-operated Regulators

SAMSON

Type 2373 Universal Pressure Reducing Valve



Type 2373 Universal Pressure Reducing Valve

Mounting and Operating Instructions

EB 2534 EN

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CE

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Definition of the signal words used in these mounting and operating instructions

CAUTION!

Indicates a hazardous situation, which, if not avoided, may result in minor or moderate injury.

NOTICE!

Indicates a property damage warning.

Note!

Indicates supplementary explanations, information and hints.

General safety instructions



- ▶ The regulators are to be mounted, started up or serviced by fully trained and qualified personnel only. Make sure employees or third persons are not exposed to any danger.
- ▶ According to these mounting and operating instructions, trained personnel is referred to as individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the relevant standards.
- ▶ The regulators fulfil the requirements of the European Pressure Equipment Directive 97/23/EC. Valves with a CE marking have a declaration of conformity that includes information about the applied conformity assessment procedure.
The declaration of conformity is available on request.
- ▶ For appropriate operation, make sure that the regulators are only used in areas where the operating pressure and temperatures do not exceed the operating values that are based on the valve sizing data submitted in the order. The manufacturer does not assume any responsibility for damage caused by external forces or any other external influence!
- ▶ Any hazards that could be caused in the regulators by the process medium, the operating pressure or by moving parts are to be prevented by means of the appropriate measures.
- ▶ Proper shipping and storage are assumed.

Note! Non-electric valve versions whose bodies are not lined with an insulating material coating do not have their own potential ignition source according to the risk assessment stipulated in EN 13463-1:2001, paragraph 5.2, even in the rare incident of an operating fault. Therefore, such valve versions do **not** fall within the scope of Directive 94/9/EC.

For connection to the equipotential bonding system, observe section 6.3 of EN 60079-14:2008 (VDE 0165, Part 1).

1 Design and principle of operation

Refer to Fig. 1 · Principle of operation, p. 5.

The process medium flows through the valve body (1) in the direction indicated by the arrow on the body. The position of the valve plug (3) determines the flow rate across the area released between the plug and seat (2).

To regulate the pressure, the set point springs (7) are tensioned by the set point adjuster (6). As a result, the valve is opened by the force of the set point springs when it is relieved of pressure ($p_1 = p_2$).

The downstream pressure p_2 to be regulated is tapped downstream of the valve and transmitted over the control line (14) to the operating diaphragm (12), where it is converted into a positioning force. This positioning force is used to adjust the valve plug (3) depending on the force of the set point springs (7). The plug stem (5) and plug are connected to the actuator stem (11).

The spring force is adjusted on the set point adjuster (6). If the force resulting from the downstream pressure p_2 exceeds the adjusted pressure set point, the valve is closed proportional to the pressure change.

1.1 Process medium, application

The Type 2373 Universal Pressure Reducing Valve is suitable for regulating **gases** and **liquids** in the pressure range **0.8 to 16 bar** at temperatures **up to 80 °C**.

2 Installation

Refer to Fig. 1 · Principle of operation, p. 5.

2.1 Mounting position

Standard mounting · Install the regulator in a horizontal pipeline with the set point springs pointing up and the direction of flow matching the arrow on the body.



Choose a place of installation that allows you to freely access the regulator even after the entire plant has been completed.

NOTICE!

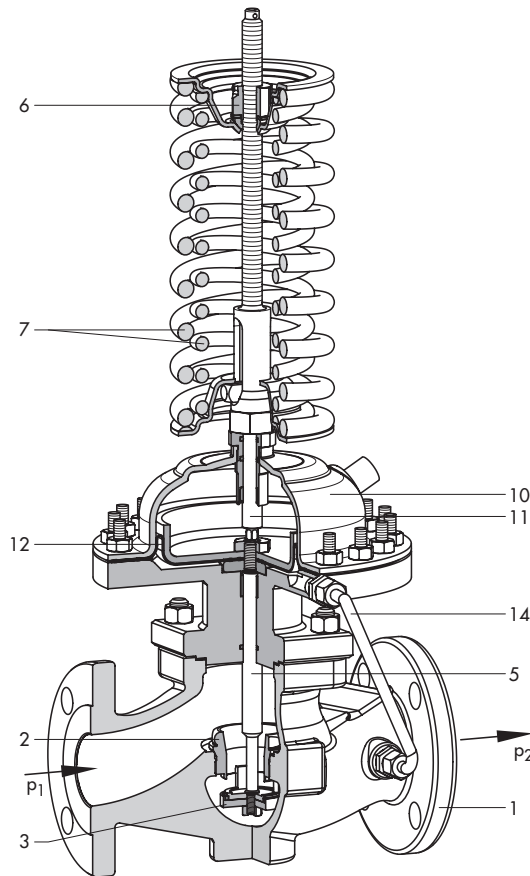
Install the regulator free of stress. If necessary, support the pipeline near the connecting flanges. Never attach supports to the regulator or actuator.

Note!

Install a strainer (e.g. SAMSON Type 2 N or 2 NI) upstream of the regulator to prevent that any sealing parts, weld spatter and other impurities carried along by the process medium impair the proper functioning of the regulator.

NOTICE!

Make sure the regulator is frost protected when it is used to control freezing process media. When installed in locations subject to frost, remove the depressurized and drained regulator from the pipeline when it is not operated.



- | | | | | |
|---|------------------------|----|---------------------|---------------------------|
| 1 | Valve body | 7 | Set point springs | Upstream pressure p_1 |
| 2 | Seat | 10 | Actuator | Downstream pressure p_2 |
| 3 | Plug with soft sealing | 11 | Actuator stem | |
| 5 | Plug stem | 12 | Operating diaphragm | |
| 6 | Set point adjuster | 14 | Control line | |

Fig. 1 - Sectional diagram of Type 2373 Universal Pressure Reducing Valve

2.2 Strainer

A strainer installed upstream of the regulator collects dirt and other foreign particles carried along by the process medium (see Fig. 2).

Observe the following points:

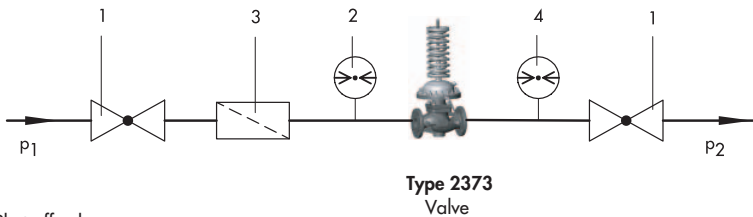
- ▶ Install the strainer such that the direction of flow corresponds to the arrow on the body.
- ▶ The filter element must be installed to hang downwards.
- ▶ Remember to leave enough space to remove it.

2.3 Shut-off valve

Install a hand-operated shut-off valve both upstream of the strainer and at the outlet of the return flow pipe (see Fig. 2) so that the plant can be shut down for cleaning and maintenance, and when the plant is not used for longer periods of time.

2.4 Pressure gauge

To monitor the pressures in the plant, install a pressure gauge both upstream and downstream of the regulator (see Fig. 2).



- 1 Shut-off valve
- 2 Pressure gauge, upstream pressure
- 3 Strainer
- 4 Pressure gauge, downstream pressure

Fig. 2 · Typical installation for Type 2373 Universal Pressure Reducing Valve

3 Operation

Refer to Fig. 1 · Principle of operation, p. 5.

3.1 Start-up

- ▶ Open all valves on the consumer side. Slowly open the shut-off valves, preferably from the return flow pipe.

Flushing the plant · Completely open the consumer when the plant is filled. With high flow rates, flush the pipeline system for several minutes. Check the installed strainer (e.g. by measuring the pressure drop). Clean the strainer, if necessary.

NOTICE!

*When pressure-testing the plant with the regulator installed, make sure the max. permissible pressure at the actuator does not exceed **1.5 times the upper set point range value.***

If necessary, remove the regulator from the pipeline.

All plant sections must be sized to withstand the test pressure.

3.2 Set point adjustment

Proceed as follows

- ▶ Adjust the downstream pressure p_2 by tensioning the set point springs (7) on the set point adjuster (6).
- Clockwise rotation \curvearrowright : tensions the springs → increases the set point.

- Counterclockwise rotation \curvearrowleft : relieves the springs → reduces the set point.

Check the adjusted set point on the pressure gauge installed downstream of the regulator (see Fig. 2).

3.3 Decommissioning

Close the shut-off valves from the flow side.

4 Maintenance · Troubleshooting

The regulator does not require maintenance. Nevertheless, it is subject to natural wear, particularly at the seat, plug and operating diaphragm.

As a result, it is necessary to check the proper functioning of the regulator at defined intervals depending on the operating conditions to detect and remove possible malfunctions.

Table 1 · Troubleshooting may be helpful in determining the cause of a fault and correcting it.

CAUTION!

Before performing any work on the regulator, make sure the relevant section of the plant has been depressurized and, depending on the process medium, drained as well.

When used at high temperatures, allow the plant section to cool down to ambient temperature.

As valves are not free of cavities, remember that residual process medium might still be contained in the regulator.

We recommend to relieve the regulator of pressure and drain it before removing it from the pipeline.

Table 1 · Troubleshooting

Malfunction	Possible cause	Recommended action
Pressure rises above the adjusted set point	Insufficient pressure pulse on the operating diaphragm as the control line clogged	Clean control line.
	Wear on seat and plug due to deposits or foreign particles	Remove foreign particles and replace damaged parts.
	Plug blocked by foreign particles	Remove foreign particles to allow the plug to move freely again.
Pressure falls below the adjusted set point	Valve installed against direction of flow	Check direction of flow, install valve correctly; see arrow on valve body.
	Valve or K_{VS} coefficient too small	Check sizing, install larger valve, if necessary.
	Plug blocked by foreign particles	Remove foreign particles to allow the plug to move freely again.
Jerky control response	Increased friction, e.g. due to foreign particles in the seat-plug area	Remove foreign particles and replace damaged parts, if necessary.
Sluggish control response	Dirt in control line, insufficient flow rate	Clean control line.
Downstream pressure oscillates	Valve too big	Check sizing, install valve with smaller K_{VS} coefficient, if necessary.
High noise emissions	High flow velocity, cavitation	Check sizing.

5 Customer service

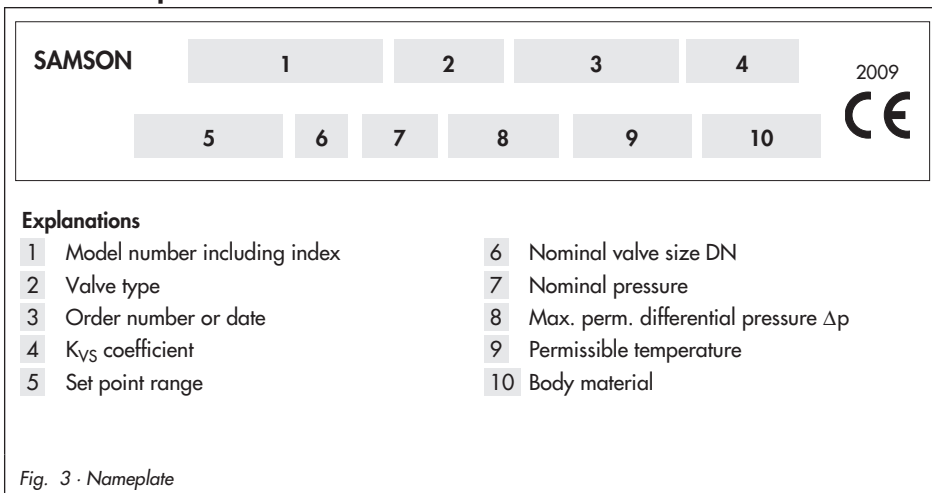
If malfunctions or defects occur, contact the SAMSON After-sales Service for support.

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found on the Internet at www.samson.de, in a SAMSON product catalog or on the back of these Mounting and Operating Instructions.

For fault detection and in case of an unclear mounting situation, specify the following details (see section 6 · Nameplate):

- ▶ Valve type and nominal size
- ▶ Order number and model number including index
- ▶ Upstream and downstream pressures
- ▶ Temperature and process medium
- ▶ Min. and max. flow rate in m³/h
- ▶ Is a strainer installed?
- ▶ Installation drawing

6 Nameplate



7 Technical data

Table 2 · Technical data · All pressures given as gauge pressures

Type 2373 Universal Pressure Reducing Valve	
Nominal size	DN 15 to DN 50 ¹⁾
Nominal pressure	PN 40
Max. perm. temperature	80 °C
Max. perm. differential pressure Δp	See Table 4
Set point ranges	0.8 to 2.5 bar · 2 to 5 bar · 2.4 to 6.3 bar · 4.5 to 10 bar 8 to 16 bar
Leakage rate Metal sealing Soft sealing	$\leq 0.05\%$ of K_{VS} coefficient, Class I $\leq 0.01\%$ of K_{VS} coefficient, Class IV
Actuator	
Diaphragm area	See Table 5 · Dimensions and weights

¹⁾ Larger nominal sizes on request

Table 3 · Materials · Material numbers according to DIN EN

Valve	
Valve body	Stainless cast steel 1.4408
Seat and plug	Stainless CrNiMo steel
Soft sealing	EPDM, FPM, NBR or PTFE
Sealing ring	Graphite on metal core
Actuator	
Diaphragm case	1.4301
Diaphragm	EPDM, FPM or NBR

Table 4 · K_{VS} coefficients, max. perm. differential pressures

Nominal size	K_{VS} coefficients		Max. perm. differential pressures Δp	
	Standard version	Special version	Standard version	Special version
DN 15	4	1 · 2.5	10 bar	14 bar
DN 20	6.3			
DN 25	8			
DN 32	16	10	4 bar	10 bar
DN 40	20			
DN 50	32	16		8 bar

8 Dimensions

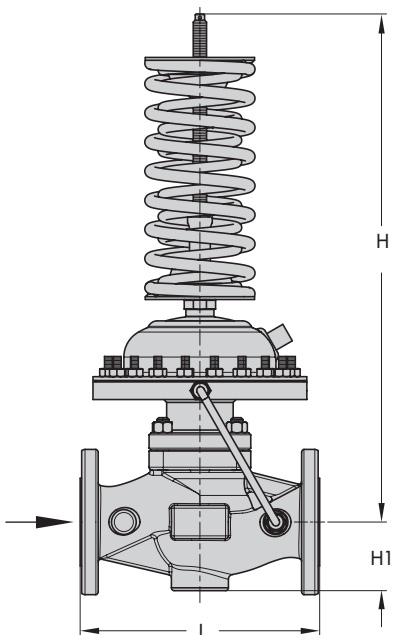
Table 5 · Dimensions in mm and weights in kg

Type 2373 Universal Pressure Reducing Valve									
Nominal size		DN	15	20	25	32	40	50	
Valve dimensions		Length L	130	150	160	180	200	230	
		Height H1	55 mm			72 mm			
Set point ranges	0.8 to 2.5 bar	Height H	560 mm			575 mm			
		Actuator housing	∅ D = 225 mm, A = 160 cm ²						
	2 to 5 bar	Height H	560 mm			575 mm			
		Actuator housing	∅ D = 170 mm, A = 80 cm ²			∅ D = 170 mm, A = 80 cm ² 1)			
	2.4 to 6.3 bar	Height H	560 mm			575 mm			
		Actuator housing	∅ D = 170 mm, A = 80 cm ²			∅ D = 170 mm, A = 80 cm ²			
	4.5 to 10 bar	Height H	560 mm			575 mm			
		Actuator housing	∅ D = 170 mm, A = 80 cm ²			∅ D = 170 mm, A = 160 cm ²			
	6 to 11 bar	Height H	560 mm			575 mm			
		Actuator housing	∅ D = 170 mm, A = 80 cm ²			∅ D = 170 mm, A = 80 cm ²			
	8 to 16 bar	Height H	560 mm			575 mm			
		Actuator housing	∅ D = 170 mm, A = 40 cm ²			∅ D = 170 mm, A = 40 cm ²			
	Weight 2) in kg (approx.)			19	20	20	23	26	29

1) In special version with set point range 2 to 5 bar also actuator with 160 cm² also possible.
Dimensions same as for set point range 0.8 to 2.5 bar

2) Weights apply to regulators with a diaphragm area of A = 80 cm². For A = 160 cm², add 4 kg.

Dimensional drawing



Type 2373 Universal Pressure Reducing Valve

Fig. 4 · Dimensions



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