

Temperature Regulators Series 43

Type 43-1

Type 43-2



Mounting and operating instructions

EB 2171 EN

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Typetesting

The Type 43-1 and Type 43-2 Temperature Regulators are typetested according to DIN 3440 by the German technical surveillance association TÜV. Register number available on request

General safety instructions



- ▶ *The temperature regulators may only be mounted, started up or serviced by fully trained and qualified personnel, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger.
All safety instructions and warnings in these mounting and operating instructions, particularly those concerning assembly, start-up and maintenance, must be observed.*
- ▶ *The control valves fulfil the requirements of the European Pressure Equipment Directive 97/23/EC. Valves with a CE marking have a declaration of conformity which includes information about the applied conformity assessment procedure. The declaration can be viewed and downloaded on the Internet at <http://www.samson.de>.*
- ▶ *For appropriate operation, make sure that the temperature regulators are only used in areas where the operating pressure and temperatures do not exceed the operating values which 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 which could be caused in the temperature regulator by the process medium, the operating pressure or by moving parts are to be prevented by means of the appropriate measures.*
- ▶ *Proper shipping and appropriate storage are assumed.*

Caution!

- ▶ *Do not start up the temperature regulators before the valve and control thermostat have been installed.*
- ▶ *Prior to removing the regulator from the pipeline, make sure the relevant section of the pipeline is depressurized and drained.*
- ▶ *Allow the plant to fill up slowly on start-up.*
- ▶ *Make sure regulators are frost protected when used to control freezing media.*
- ▶ *If the sensor is used in combination with a thermowell, only SAMSON thermowells should be used.*

1. Design and principle of operation

1.1 Temperature regulator

The temperature regulators consist of a valve with the Type 2430 K Thermostat screwed onto it.

The valve consists of a valve body, seat and a pressure-balanced plug. The thermostat contains a positioning bellows, set point spring, capillary tube and temperature sensor.

1.2 Version with safety thermostat

When a Type 2439 K/ 2403 K Safety Thermostat is attached to the valve or regulator, these versions are used as safety temperature limiters STL or safety temperature monitors STM.

Refer to the mounting and operating instructions EB 2185 EN for more details.

1.3 Version with double adapter and/or manual adjustment

The temperature regulator can be equipped with a double adapter and/or manual adjustment to control a further control variable.

Refer to the mounting and operating instructions EB 2176 EN for more details.

Principle of operation:

The temperature regulator functions according to the adsorption principle. The temperature of the medium to be controlled creates a pressure in the sensor which corresponds with the temperature measured. This pressure is transferred over the capillary tube (10) to the operating element (13) where it is converted into a positioning force. The force acts over the positioning bellows (9) and pin of the operating element (12) on the plug stem and plug (3).

By turning the set point adjuster (8), the point of response over the spring (7) is changed. As a result, the valve plug moves through its full travel range within a higher or lower temperature range measured by the sensor.

Note:

Thermostats that function according to the vapor pressure principle are described in EB 2430-3 EN.

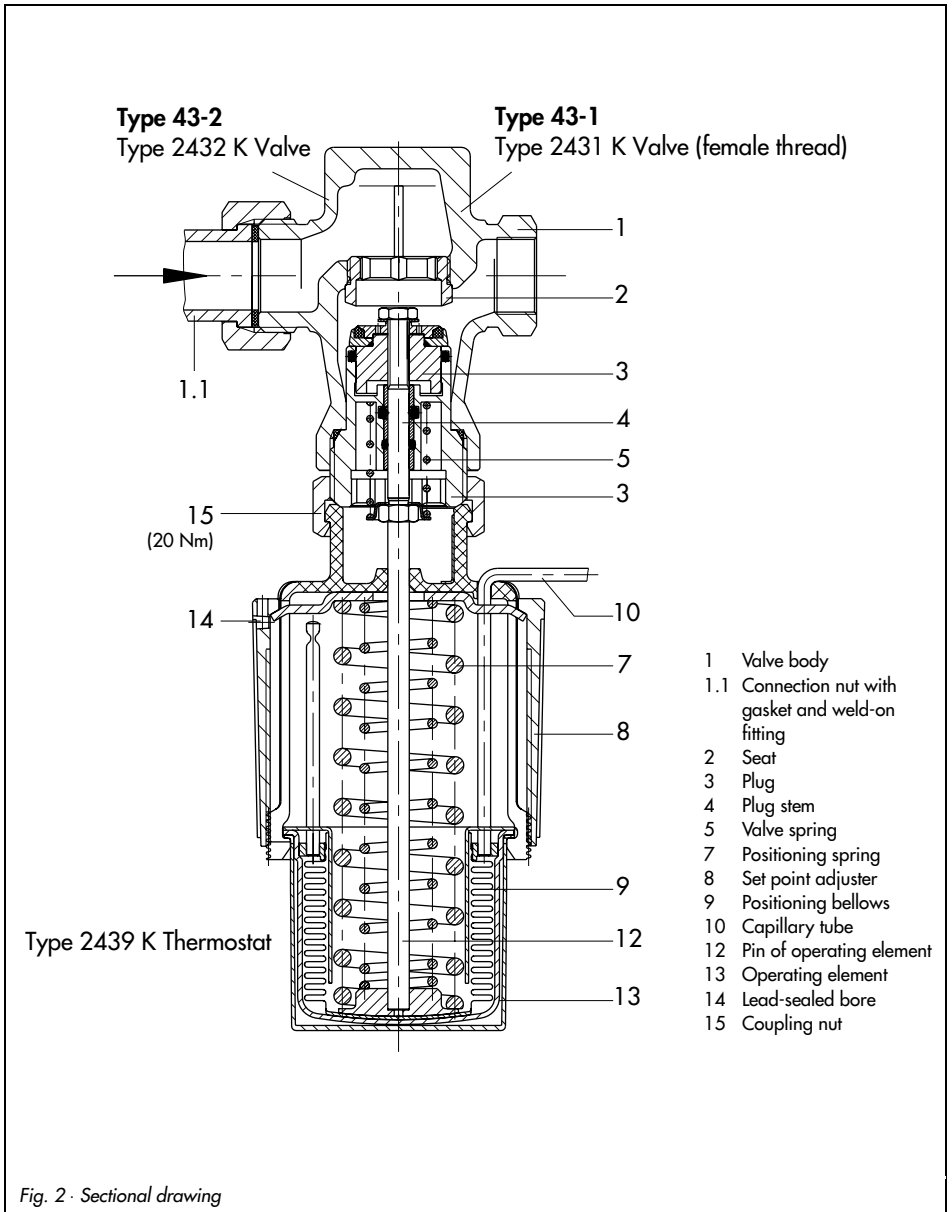


Fig. 2 · Sectional drawing

2. Installation

Make sure that the permissible ambient temperature of 80 °C is not exceeded.

2.1 Installing the valve

The valve must be installed in a horizontal pipeline with the thermostat suspended downwards. Other installation positions are also possible for temperatures lower than 110 °C.

The direction of flow must correspond with the arrow on the valve body.

2.1.1 Strainer

Install a strainer (SAMSON Type 1 or Type 2, refer to Data Sheet T 1010 EN and 1015 EN) upstream of the valve to prevent any sealing parts, weld spatter or other impurities carried along by the process medium from impairing the proper functioning of the valve, particularly tight shut-off.

The filter element of the strainer must be suspended downwards.

Make sure sufficient space is left to allow the filter element to be removed.

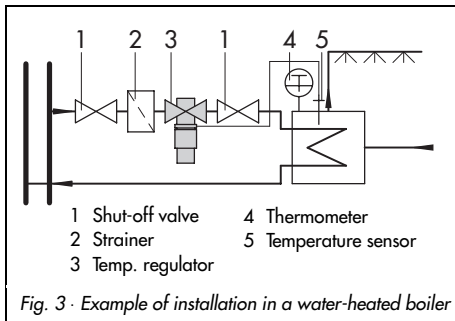


Fig. 3 - Example of installation in a water-heated boiler

2.1.2 Additional installation instructions

We recommend installing a hand-operated shut-off valve both upstream of the strainer and downstream of the regulator to be able to shut down the plant for cleaning and maintenance, and when the plant is not used for long periods of time.

For checking the adjusted set point, it is advisable to install a thermometer which is submerged in the controlled medium close to the sensor.

2.2 Installing the temperature sensor

The Type 2430 K Temperature Sensor can be installed in any position. The instructions of the corresponding mounting and operating instructions must be observed for the Type 2430 K-3 Vapor Pressure Sensor. The entire length of the sensor must be immersed in the medium which is being controlled. Select a point of installation where overheating and considerable delays cannot occur. Weld in a welding sleeve with G 1/2 or G 3/4 female thread at the point of installation.

Seal the screw gland or thermowell into the welded-in sleeve. Insert the sensor and fix into place using a clamping screw.

Note: To prevent damage caused by corrosion, make sure that the same kinds of materials are used when installing the sensor or thermowell. For example, do not use a temperature sensor or thermowell made of non-ferrous metal in a stainless steel heat exchanger. In this case, use a stainless steel thermowell for the sensor.

2.2.1 Capillary tube

The capillary tube must be run without bending or twisting it. The smallest bending radius should not be less than 50 mm.

Do not damage or shorten the capillary tube. Roll up any excess tube to form a ring. Make sure no considerable temperature fluctuations occur along the entire length of the tube.

3. Operation

3.1 Set point adjustment

- ▶ Use the black plastic ring (set point adjuster 8) to set the set point while watching the reference thermometer.

The adjustment diagrams are intended to help you find a rough initial value.

- ▶ Turning the adjuster clockwise results in a lower temperature and turning it counterclockwise a higher temperature.

The adjusted value can be lead-sealed at the bore (14) in the set point adjuster.

| Set point range °C | Change in set point per turn | Sensor diameter |
|--------------------|------------------------------|-----------------|
| 0 to 35 | 2.5 | 9.5 |
| | 2 | 16 |
| 25 to 70 | 3 | 9.5 |
| | 2 | 16 |
| 40 to 100 | 4 | 9.5 |
| | 3 | 16 |
| 50 to 120 | 4 | 9.5 |
| | 4.5 | 16 |
| 70 to 150 | 4.5 | 9.5 |
| | 5 | 16 |

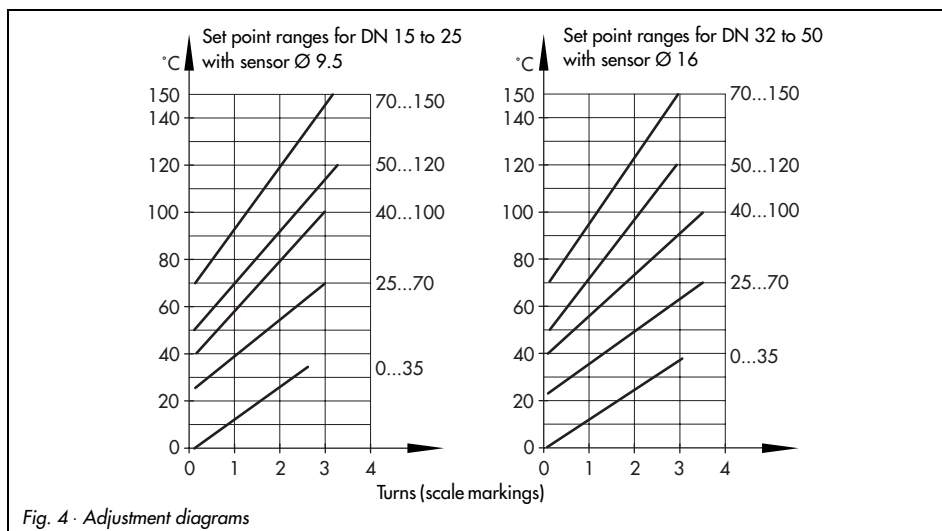


Fig. 4 · Adjustment diagrams

4. Maintenance - Replacing parts

The temperature regulator is maintenance free. Nevertheless, it is subject to natural wear, particularly at the seat and plug.

Depending on the operating conditions, the regulator needs to be checked at regular intervals to avoid possible malfunctions.

If the valve does not shut off tightly, this may be due to dirt on the seat and plug, or the valve seat and plug have become untight due to natural wear.

The valve can be removed from the pipeline to repair it.



Note

If you intend carrying out maintenance work on the temperature regulator, first relieve the corresponding plant section of pressure and, depending on the process medium, drain it as well.

Let the plant section cool down to reach ambient temperature, if necessary.

We recommend removing the regulator from the pipeline.

4.1 Cleaning or replacing the plug

To change the plug section (3), a special socket wrench is needed:

For DN 15 to 25 Order no. 1280-3001,
For DN 32 to 50 Order no. 1280-3007.

For nominal sizes DN 15 to 25, this wrench can be made, for example, from a GEDORE screwdriver bit (IN 19-19) by drilling a hole into the 19 mm hexagon bit as shown in Fig. 5.

Note: To replace the seat, a special tool is additionally required. Refer to the EB 029 EN (formerly WA 029 EN) for the product numbers 2710 to 2730 (also available on the Internet at http://www.samson.de/pdf_en/e00290en.pdf).

1. Unscrew the coupling nut (15) and take the control thermostat off the valve.
2. Use the socket wrench to unscrew the entire plug section.
3. Thoroughly clean the seat and plug. If the seat is damaged, use the seat wrench (EB 029 EN) to replace the seat.

If the plug is damaged, the entire plug section as well as the seal ring in the body must be replaced with new ones.

4. Proceed in the reverse order to reassemble the valve. Insert a new seal ring for the plug section in the body. Apply a drop of "Omnifit 222" before screwing on the plug section (tightening torque 80 Nm). Tighten the coupling nut of the thermostat on the valve with 20 Nm.

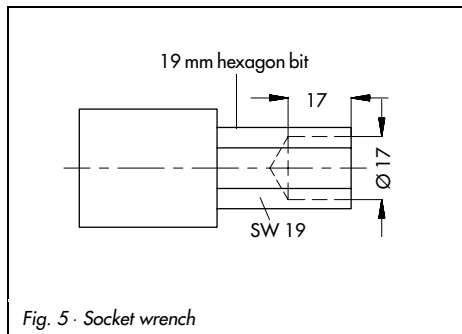


Fig. 5 · Socket wrench

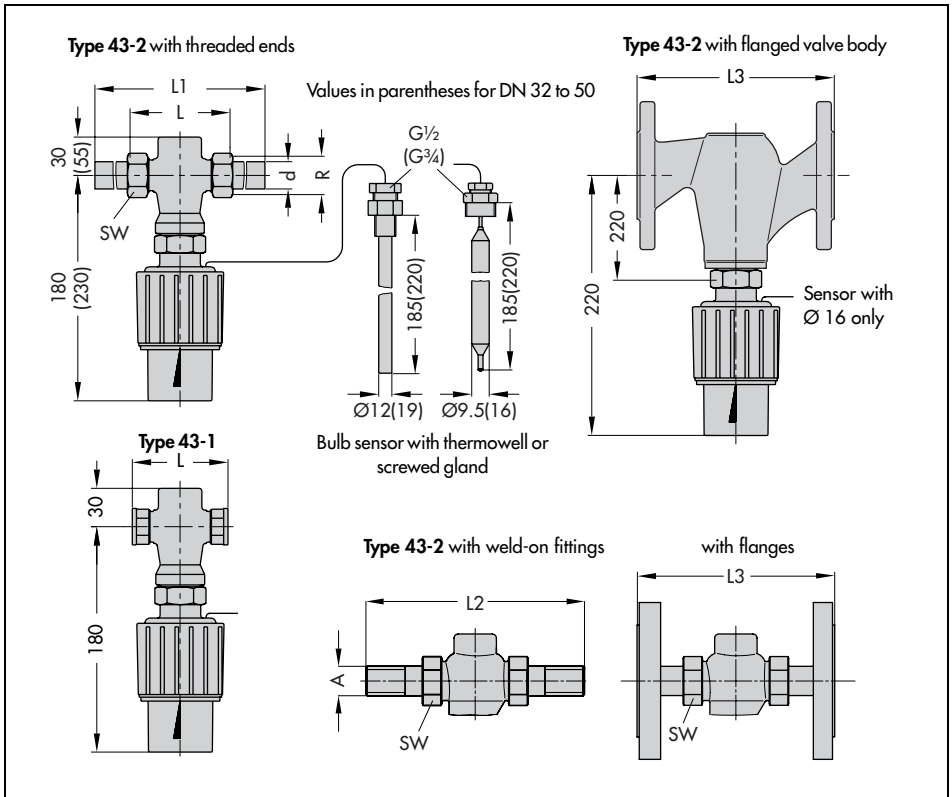
5. Troubleshooting

| Problem | Possible source | Remedy |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| The value at the sensor exceeds or falls below the set point | Leakage at the seat and plug | Remove the valve. Clean the seat and plug. Contact SAMSON after-sales service if the regulator is defective. |
| | Valve is too small or too big for the control task | Recalculate the K_{VS} value and contact SAMSON. |
| | Sensor is installed in the wrong place | Check whether the entire length of the sensor is immersed in the medium or whether it is installed where delays can occur or heat can accumulate. |
| | Safety device, e.g. STL or STM has been triggered | Check the plant and unlock safety device. |
| | Insufficient cooling or warming energy available | Draw up an energy balance. |
| The value at the sensor exceeds the set point | Thermostat defective | Send the thermostat to SAMSON for repair. |
| | Strainer is blocked | Empty strainer filter and clean it. |
| | The medium flows through the valve in the opposite direction than indicated by the arrow | Remove the valve and reinstall it so that the medium flows through the valve in the direction indicated by the arrow. |
| Control loop is unstable | Valve is too big for the control task | Recalculate K_{VS} value and contact SAMSON. |
| | Time constant is too large for the control loop | Fill the thermowell with conductive paste, or remove thermowell or use a sensor with a smaller time constant. |

6. Dimensions in mm and weights

| | | | | | | | | |
|--------------------------------------------------|-----------|---------|-------|-------|---------|---------|-------------------|------------------|
| Type 43-1 | Nom. size | G | 1/2 | 3/4 | 1 | | | |
| Length | | L | 65 | 75 | 90 | | | |
| Weight ¹⁾ | | App. kg | 1.4 | 1.5 | 1.6 | | | |
| Type 43-2 | Nom. size | DN | 15 | 20 | 25 | 32 | 40 | 50 |
| Pipe Ød | | | 21.3 | 26.8 | 33.7 | 42 | 48 | 60 |
| R | | | G 3/4 | G 1 | G 1 1/4 | G 1 3/4 | G 2 | G 2 1/2 |
| Width across flats SW | | | 30 | 36 | 46 | 59 | 65 | 82 |
| Length L | | | 65 | 70 | 75 | 100 | 110 | 130 |
| L1 with weld-on fittings | | | 210 | 234 | 244 | 268 | 294 | 330 |
| Weight ¹⁾ | | App. kg | 1.7 | 2 | 2.3 | 4.4 | 5.1 | 5.9 |
| Special version with threaded ends (male thread) | | | | | | | | |
| Length L2 | | | 129 | 144 | 159 | 180 | 196 | 228 |
| Male thread A | | | G 1/2 | G 3/4 | G 1 | G 1 1/4 | G 1 1/2 | G 2 |
| Weight ¹⁾ | | App. kg | 1.7 | 2 | 2.3 | 4.4 | 5.1 | 5.9 |
| Special version with flanges PN 16/25 | | | | | | | | |
| Length L3 | | | 130 | 150 | 160 | 180 | 200 | 230 |
| Weight | | App. kg | 3.1 | 4 | 4.8 | 7.6 | 9.1 ²⁾ | 11 ²⁾ |
| Version with flanged valve body | | | | | | | | |
| L3 | | | – | | | | 200 | 230 |
| Weight ¹⁾ | | App. kg | – | | | | 10 | 13.2 |

¹⁾ For versions with bulb sensor and thermowell, versions without thermowell: minus 0.2 kg



7. Customer inquiries

Should you have any questions, please submit the following details (see nameplate):

- ▶ Type and nominal size
- ▶ Product and order numbers
- ▶ Pressures upstream and downstream of the valve
- ▶ Process medium and temperature
- ▶ Minimum and maximum flow rate
- ▶ Has a strainer been installed?
- ▶ Installation drawing



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