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Testing acc. to DIN EN 14597

The Type 43-3 Temperature Regulators are tested by the German Technical Inspectorate TÜV (Technischer Überwachungsverein) according to DIN EN 14597 under the type designation 2750-0.

The register number is available on request.

Note:

*Non-electric actuators and control valves do not have their own potential ignition source according to the risk assessment stipulated in EN 13463-1: 2009, paragraph 5.2, even in the rare incident of an operating fault. Therefore, they **do not** fall within the scope of Directive 94/9/EC.*

For connection to the equipotential bonding system, observe the requirements specified in EN 60079-14: 2009 (VDE 0165 Part 1), paragraph 6.3.



General safety instructions

- ▶ *The regulators must be installed, started up and serviced by fully trained and qualified personnel only, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger. 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 dangers due to their specialized training, their knowledge and experience as well as their knowledge of the relevant standards.*
- ▶ *The regulator complies with the requirements of the European Pressure Equipment Directive 97/23/EC. The declaration of conformity issued for a valve bearing the CE marking includes information on the applied conformity assessment procedure.
The declaration of conformity can be provided on request.*
- ▶ *For appropriate operation, make sure that the regulator is only used in applications where the operating pressure and temperatures do not exceed the operating values based on the sizing data submitted in the order.*
- ▶ *Note that the manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.*
- ▶ *Any hazards which could be caused in the regulator by the process medium or operating pressure are to be prevented by means of appropriate measures.*
- ▶ *Proper shipping and appropriate storage are assumed.*

1 Design and principle of operation

1.1 Temperature regulator

The temperature regulator consists of a Type 2433 K Three-way Valve with the Type 2430 K Thermostat attached to it.

The valve consists of the valve body designed for either mixing or diverting service and the plug with plug stem.

The thermostat consists of the operating bellows, set point adjuster, capillary tube and temperature sensor.

1.2 Version with safety thermostat

When a Type 2403 Safety Thermostat is attached to the valve or the regulator, this combination functions as a Safety Temperature Monitor (STM) or a Temperature Regulator with Safety Temperature Monitor (TR/STM).

Refer to EB 2183 EN for more details.

When a Type 2439 K Safety Thermostat is attached, this version functions as Safety Temperature Limiter (STL).

Refer to EB 2185 EN for more details.

Tested safety equipment (according to DIN EN)

A SAMSON thermowell must be used with the sensor in versions tested according to DIN EN.

The temperature regulator works according to the adsorption principle. The temperature of the medium to be controlled produces a pressure in the sensor which is proportional to the actual temperature measured. This pressure is transmitted by the capillary tube (11) to the operating element where it is converted into a positioning force. This force acts on the positioning bellows (9) and the pin of the operating element (10) which moves the plug stem and plug (3).

By turning the set point adjuster (8), the spring (7) changes the regulator's point of response. Consequently, the valve plug moves through its full travel range within a higher or lower temperature range measured by the sensor.

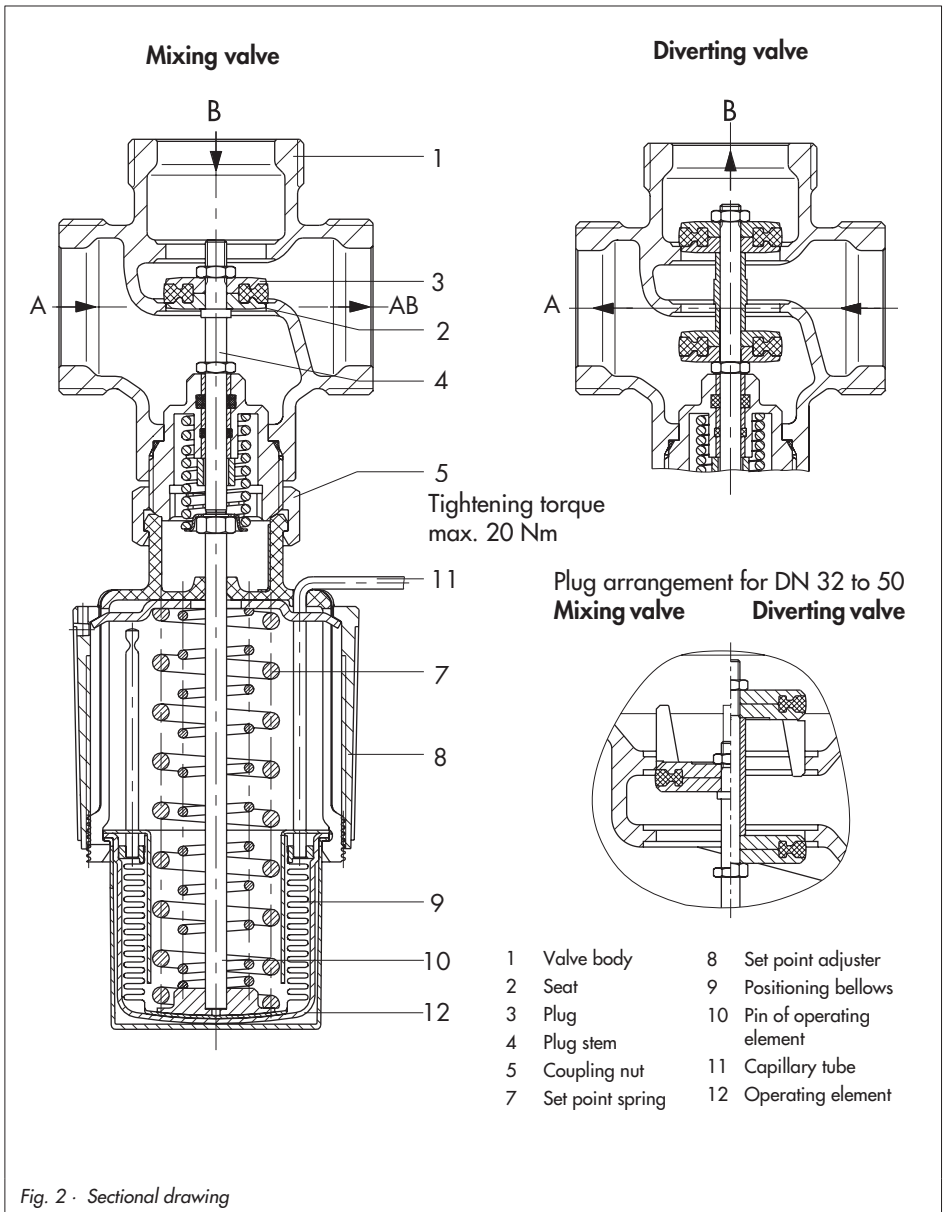
Depending on its plug arrangement, the three-way valve is either used as a mixing or diverting valve.

When used as a mixing valve, the media to be mixed enter at ports A and B. The combined stream flows off at port AB.

When the temperature rises, port A opens and port B closes.

When used as a diverting valve, the medium enters at port AB. The diverted streams flow off at ports A and B.

When the temperature rises, port A closes and port B opens.



2 Installation

On installing the regulator, make sure that the permissible ambient temperature does not exceed 80 °C.

2.1 Installing the valve

Install the valve in a horizontal pipeline with the thermostat suspended downwards. Other installation positions are permissible for medium temperatures up to 110 °C.

- ▶ The medium must flow through the valve in the direction indicated by the arrow on the valve body.
- ▶ The flow direction at ports A, B, and AB must correspond with the regulator arrangement specific to the installation (see Fig. 3).

2.2 Strainer

A strainer (SAMSON Type 1 NI) must be installed upstream of the relevant valve, since sealing particles, globules, or other impurities carried along by the process medium could impair the proper functioning of the valve, especially tight shut-off.

The filter element must be vertically suspended. Ensure that ample space is available to remove the filter.

2.3 Additional installation instructions

We recommend installing hand-operated shut-off valves both upstream of the strainer and downstream of the regulator. This allows the plant to be shut down for cleaning or

maintenance routines, or when the plant is not operated for extended periods.

To check the adjusted set point, we recommend that a thermometer be installed near the sensor so that it is immersed in the medium to be controlled.

2.4 Installing the sensor

The temperature sensor may be installed in any desired position. Its entire length must be immersed in the controlled medium.

When choosing the position of installation, make sure that the sensor is installed in a location where overheating and considerable idling times do not occur.

A welding socket with a G ½ or G ¾ female thread connection should be welded where the sensor is to be installed.

Seal the screw gland or thermowell into the welding socket. Insert the sensor and tighten it with the clamping screw.

NOTICE

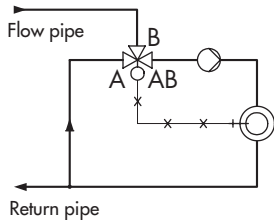
Only original SAMSON thermowells must be used with sensors.

To prevent damage caused by corrosion, it is important to make sure on installing the sensor or thermowell that only the same kind of materials are used together.

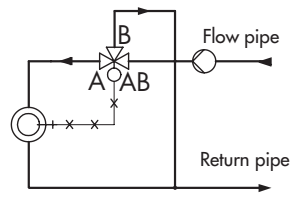
For example, do not use a sensor or thermowell made of non-ferrous metal in a stainless steel heat exchanger. In this case, the sensor should be used together with a stainless steel thermowell.

Heating

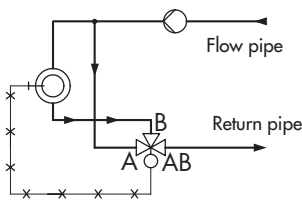
Mixing valve
in flow pipe



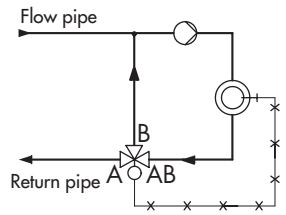
Diverting valve
in flow pipe



Mixing valve
in return pipe

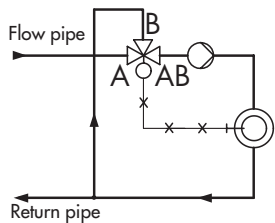


Diverting valve
in return pipe

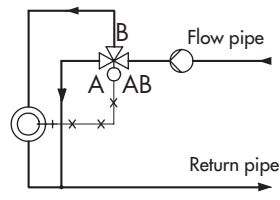


Cooling

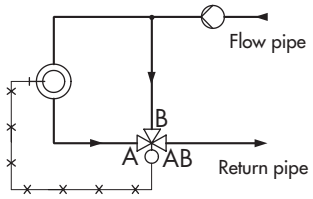
Mixing valve
in flow pipe



Diverting valve
in flow pipe



Mixing valve
in return pipe



Diverting valve
in return pipe

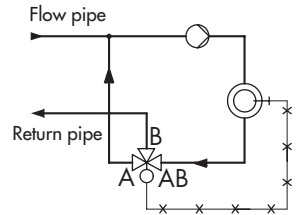


Fig. 3 · Installation schematics for the temperature regulator

2.4.1 Capillary tube

The capillary tube should be routed without bends or twists. The smallest bending radius is 50 mm. Roll up extra length to form a ring. Do not bend or shorten. The ambient temperature around the capillary tube must be kept as even as possible.

3 Operation

NOTICE

Do not start up the temperature regulators until the valve and control thermostat! Allow the plant to fill up slowly on start-up.

3.1 Adjusting the set point

To adjust the set point, use the black plastic adjustment ring (set point adjuster 8) while watching the reference thermometer.

Table 1 shows the set point changes per turn of the set point adjuster.

The adjustment diagrams in Fig. 4 can be used as a guide to find the first approximate value.

- ▶ Turn the set point adjuster clockwise (↻) to increase the temperature
- ▶ Turn the set point adjuster counterclockwise (↺) to reduce the temperature

The adjusted value can be fixed by lead-sealing the bore in the set point adjuster.

Table 1 · Set point adjustment

Set point range	Set point change per turn	Sensor diameter
0 to 35 °C	2.5 °C 2 °C	9.5 mm 16 mm
25 to 70 °C	3 °C 2 °C	9.5 mm 16 mm
40 to 100 °C	4 °C 3 °C	9.5 mm 16 mm
50 to 120 °C	4 °C 4.5 °C	9.5 mm 16 mm
70 to 150 °C	4.5 °C 5 °C	9.5 mm 16 mm

NOTICE

Protect the regulator against frost when controlling freezing media.

When used in a room not free of frost, remove the regulator when the plant is shut down.

Prior to removing the regulator, make sure the relevant section of the plant has been depressurized and drained.

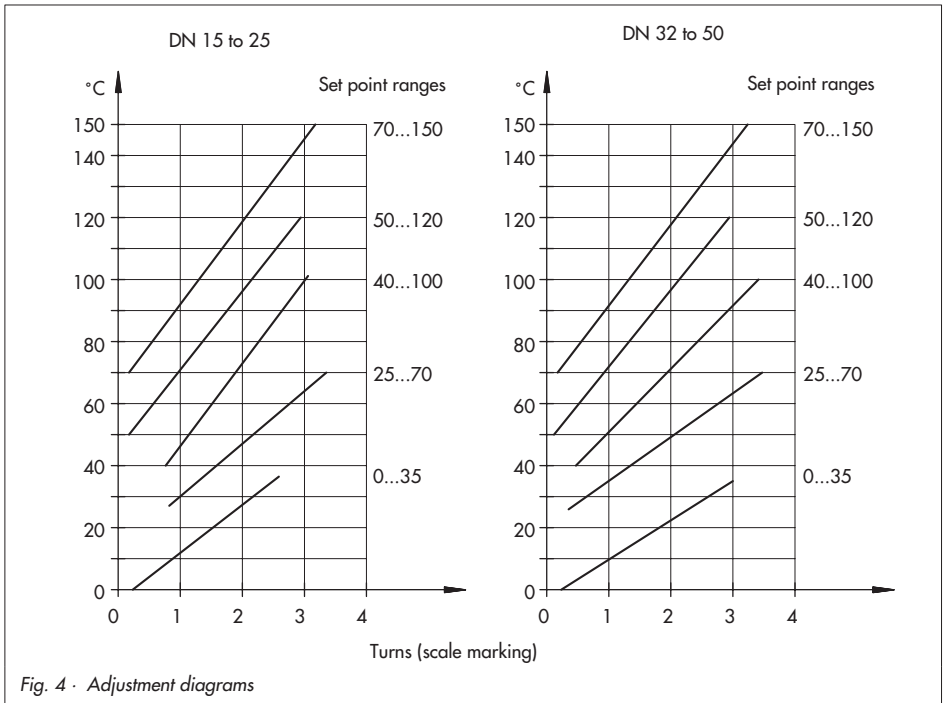


Fig. 4 - Adjustment diagrams

4 Description of the nameplate

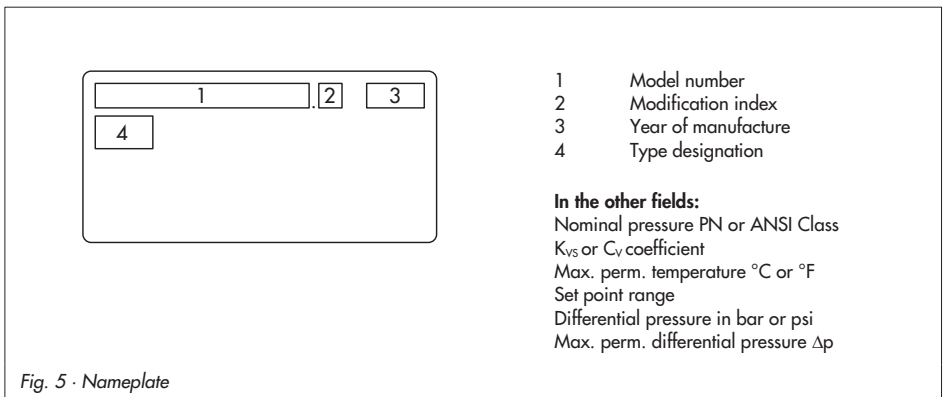
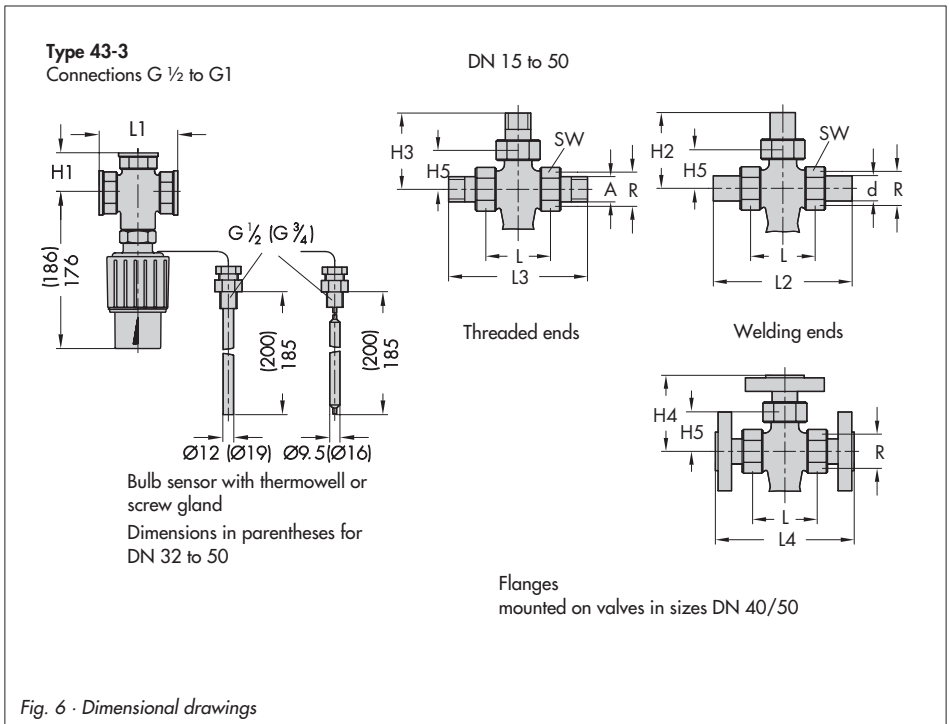


Fig. 5 - Nameplate

5 Dimensions in mm and weights

Nominal size	DN	15	20	25	32	40	50
Connection: female thread	G	½	¾	1	–		
Pipe Ø d		21.3	26.8	32.7	42	48	60
Connection R		G ¾	G 1	G 1¼	G 1¾	G 2	G 2½
Width across flats SW		30	36	46	59	65	82
Length L		65	70	75	100	110	130
Length L1		65	75	90	–		
Height H1		40	40	40	65	70	75
Weight approx. in kg		1.5	1.6	1.7	2.7	2.8	3.7
Versions with welding ends, threaded ends or flanges							
Height H5		40			60	65	
Special version with welding ends							
Length L2		210	234	244	268	294	330
Height H2		112	122	124	144	157	165
Weight approx. in kg		2	2.3	2.5	3.9	4.2	5.5
Special version with threaded ends (male thread)							
Length L3		129	144	159	180	196	228
Height H3		72	77	82	100	108	114
Male thread A		G ½	G ¾	G 1	G 1¼	G 1½	G 2
Weight approx. in kg		2.0	2.3	2.5	3.9	4.2	5.5
Special version with flanges PN 16/25							
Length L4		130	150	160	180	200	230
Height H4		70	80	85	100	105	120
Weight approx. in kg ¹⁾		4.1	5.3	6.3	8.7	10.2	13
¹⁾ Weight for versions with bulb sensor and thermowell; version without thermowell: subtract 0.2 kg							



6 Customer inquiries

Should any malfunctions or any defect occur, SAMSON's After-Sales Service is prepared to help you on site.

You can also send the defective regulator directly to your local SAMSON representative for repair. Addresses of SAMSON subsidiaries, agencies and service centers are listed in the product catalogs and in the Internet at www.samson.de.

To allow SAMSON to find the fault and to have an idea of the installation situation, specify the following details (see nameplate):

- ▶ Type and nominal size
- ▶ Order and model numbers
- ▶ Upstream and downstream pressures
- ▶ Temperature and medium
- ▶ Minimum and maximum flow rates
- ▶ Has a strainer been installed?
- ▶ Installation drawing



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