

T 2172 EN

Type 43-5 and Type 43-7 Self-operated Temperature Regulators (for heating) Type 43-6 Self-operated Temperature Regulator (for cooling)



Application

Temperature set points from **0 to 150 °C** · Valves **G ½ to G 1** · **DN 15 to 50** · Pressure rating **PN 25** · Suitable for liquids and steam up to 200 °C and non-flammable gases up to **80 °C** · For plants to be heated or cooled.

Note

Typetested temperature regulators (TR), safety temperature monitors (STM) and safety temperature limiters (STL) are available.

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Temperature sensor suitable for installation in any desired position and for operation at high excess temperatures (50 K above the set point), designed for operating pressures up to 40 bar (► EB 2430)
- Globe valves with plug balanced by a bellows
- Compact design with particularly low overall height
- Suitable for liquids, gases or vapors.

Versions (Fig. 1 to Fig. 4)

The regulators consist of a globe valve and control thermostat with set point adjuster, a capillary tube and temperature sensor operating according to the adsorption principle. Valve body made of red brass, spheroidal graphite iron or stainless steel.

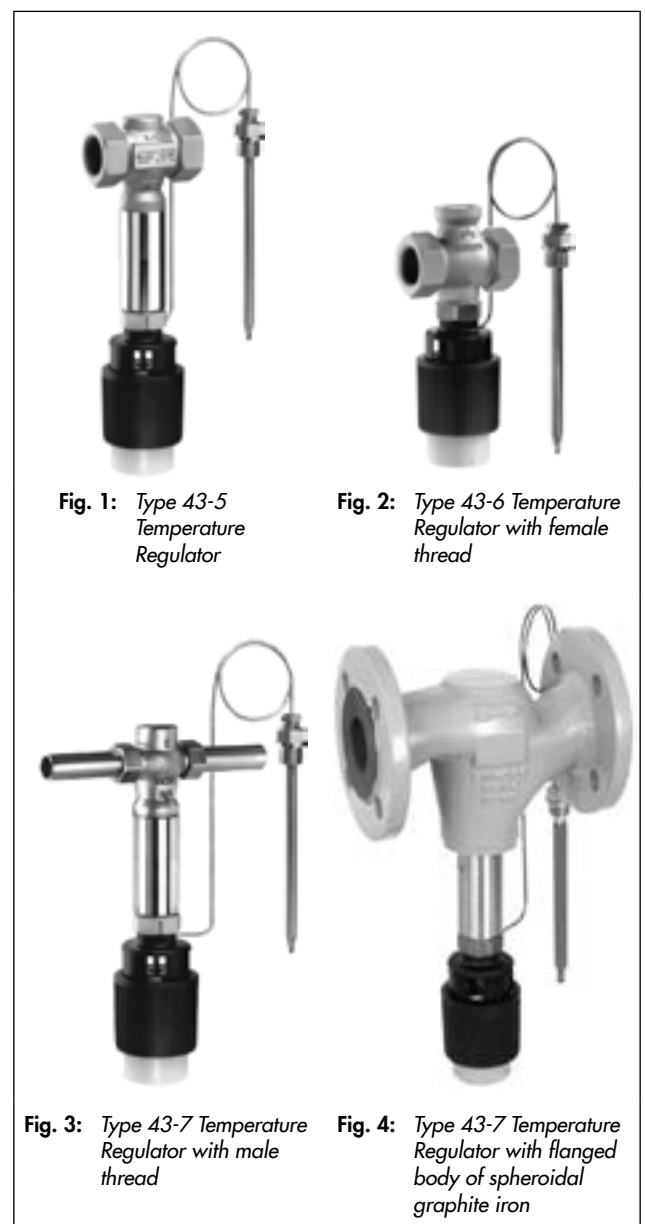
See Data Sheet ► T 2176 for versions with double adapter or manual adjuster for the attachment of additional control thermostats

Temperature regulators with Type 2430 Control Thermostat and valve with G ½, G ¾ or G 1 **female thread**

- **Type 43-5** · For plants to be heated · Type 2435 Valve for PN 25 · Suitable for liquids and steam up to 200 °C
- **Type 43-6** · For plants to be cooled · Type 2436 Valve for PN 25 · Suitable for gases up to 80 °C and liquids up to 150 °C

Temperature regulators with Type 2430 Control Thermostat and valve in DN 15 to 50 with welding ends, threaded ends or flanged valve body

- **Type 43-6** · For plants to be cooled · Type 2436 Valve for PN 25 · Valve size DN 32 to 50 · Suitable for gases up to 80 °C and liquids up to 150 °C
- **Type 43-7** · For plants to be heated · Type 2437 Valve for PN 25 · Valve size DN 15 to 50 · Suitable for liquids and steam up to 200 °C



Typetested safety devices

The register number is available on request. The following versions are available:

Type 43-5 and Type 43-7 Temperature Regulators (TR) for which the maximum operating pressure must not exceed the maximum permissible differential pressure Δp specified in the technical data. Only SAMSON thermowells can be used for sensors with thermowells.

Further details on the selection application of typetested equipment can be found in Information Sheet ► T 2181.

Additionally, the safety temperature monitors (STM) and safety temperature limiters (STL) are available. For more details refer to Data Sheets ► T 2183 and ► T 2185.

Accessories

- Thermowell made of:
 - Copper, PN 40
 - CrNiMo steel, PN 40
- Double adapter Do3 or manual adjuster

Special versions

- 5 m capillary tube
- Small K_{vs} in DN 15 or G ½
- Oil-resistant internal parts (Type 43-6)
- ANSI version (► T 2174)
- Stainless steel body for Type 43-6 · G ½ to G 1, DN 15 and 25
- Flanged valve body of EN-GJS-400-18-LT for Type 43-6 and Type 43-7

Principle of operation (Fig. 6)

The temperature regulators work according to the adsorption principle.

The temperature of the medium creates a pressure in the sensor which is proportional to the measured temperature. This pressure is transferred through a capillary tube (11) to the operating element (9) and converted into a positioning force. Depending on the set point adjustment, the positioning force acts on the valve plug (3) over the pin of the operating element (10).

By turning the set point adjuster (8), the point of response is changed in such a way that allows the valve plug to pass through its travel in a temperature range measured by the sensor.

The valves are balanced by the metal bellows (6). The balancing bellows counterbalances any changes in pressure upstream of the valve since the upstream pressure also acts on the inside of the bellows through a hole in the valve plug (3).

The **Type 43-5 and Type 43-7** Regulators are suitable for plants to be heated. The valves close when the temperature rises.

The **Type 43-6** Regulator has a valve which opens as the temperature rises. This regulator is therefore suitable for plants to be cooled.

Installation

Only the combination of the same kind of materials is permitted, e.g. a stainless steel heat exchanger with thermowells made of stainless steel 1.4571.

Valves

Install the regulators in horizontal pipelines. The control thermostat must be suspended to hang downward. Other mounting positions are possible for temperatures up to 110 °C.

The regulator in valve sizes DN 15 to 25 can also be installed in vertical pipes.

Installation conditions:

- The direction of flow must match the direction indicated by the arrow on the body
- If possible, install a strainer (e.g. SAMSON Type 1 NI) upstream of the valve.
- Further details can be found in ► EB 2171.

Capillary tube

The capillary tube must be run in such a way that the ambient temperature range cannot be exceeded, any deviations in temperature cannot occur and that the tube cannot be damaged. The smallest permissible bending radius is 50 mm.

Temperature sensor

The temperature sensor can be installed in any position as required. However, make sure its entire length is immersed in the process medium to be controlled. It must be installed in a location where overheating or considerable idling times cannot occur.

Flow rate diagram for water

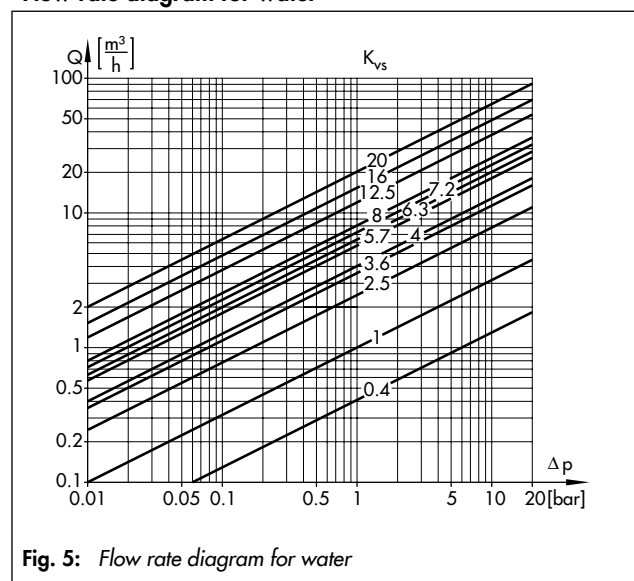
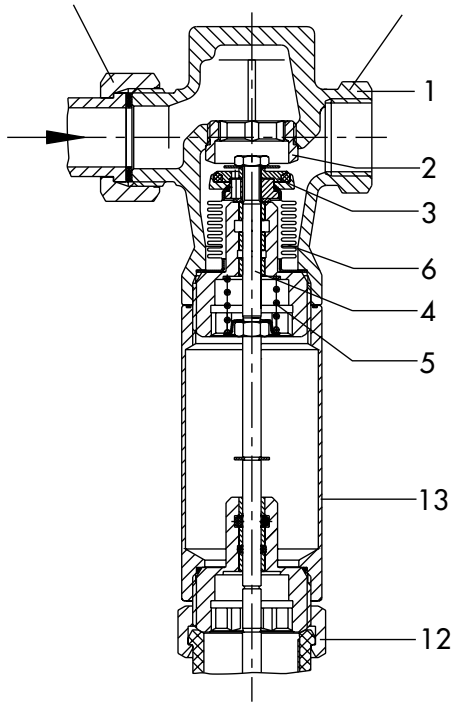


Fig. 5: Flow rate diagram for water

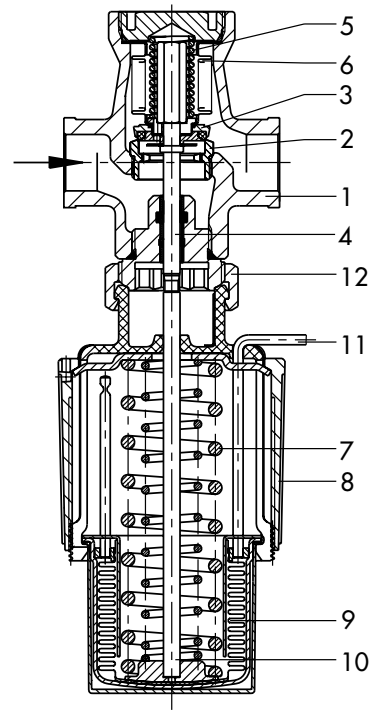
Type 2437 Valve
(connection nut)

Type 2435 Valve
(female thread)



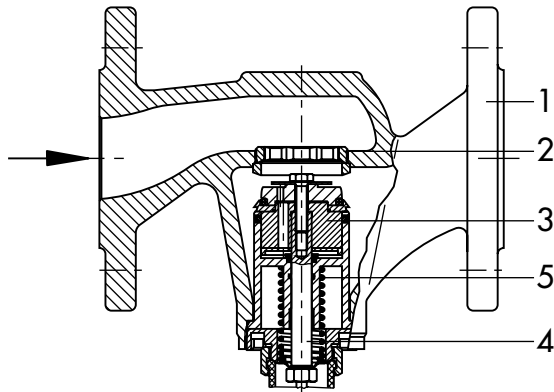
Functional diagram of Type 43-5 and Type 43-7
(control thermostat not shown)

Type 2436 Valve (female thread)



Functional diagram of Type 43-6

Type 2436 and Type 2437 Valve (flanged body)



Functional diagram of Type 43-7
(control thermostat not shown)

- 1 Valve body
- 2 Seat (exchangeable)
- 3 Valve plug
- 4 Plug stem
- 5 Valve spring
- 7 Set point spring(s)
- 8 Set point adjuster
- 9 Operating element
- 10 Pin of operating element
- 11 Capillary tube to sensor
- 12 Coupling nut
(connection valve/control thermostat)

Fig. 6: Functional diagram of Type 43-5, Type 43-6 and Type 43-7 Temperature Regulators

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

Temperature regulator		Type	43-5	43-6	43-7
Valve			2435	2436	2437
Thread size G · Female thread					
Body material	CC499K		G ½ to 1	G ½ to 1	-
	1.4408		-		
Valve size DN⁵⁾ · Male thread · Flange					
Body material	CC499K ²⁾		-	DN 32 to 50	DN 15 to 50
	EN-GJS-400-18-LT ³⁾			DN 15 to 50	
	1.4408 ³⁾			DN 15 · DN 25	-
Pressure rating			PN 25		
Perm. permissible temperature range of valve			0 to 200 °C	0 to 150 °C ¹⁾	0 to 200 °C
Type 2430 Control Thermostat					
Set point range ⁴⁾		°C	0 to 35 · 25 to 70 · 40 to 100 · 50 to 120 · 70 to 150		
Capillary tube			2 m (5 m as special version)		
Max. perm. temperature at the sensor			50 K above the adjusted set point		
Permissible ambient temperature range			-20 to 80 °C		
Permissible pressure at sensor/thermowell			PN 25 · PN 40		

¹⁾ With intermediate insulating piece: -15 to +150 °C with CC499K; -10 to +150 °C with EN-GJS-400-18-LT

²⁾ With male thread

³⁾ With flanged body

⁴⁾ Further set point ranges on request

⁵⁾ Standard version with welding ends (with threaded ends on request)

Table 2: K_{V5} coefficients · Max. perm. differential pressure Δp

K _{V5} coefficients for ...							
Connection size	G	½	¾	1	-		
Valve size	DN	15 ^{1) 2)}	20 ¹⁾	25 ^{1) 2)}	32 ¹⁾	40 ¹⁾	50 ¹⁾
Max. perm. differential pressure Δp		16 bar			8 bar		
K _{V5} coefficient		3.2	4.0	5.0	12.5	16.0	20.0
Special version		0.4 · 1.0 · 2.5 ³⁾					

¹⁾ Flanged valve body made of spheroidal graphite iron (Type 43-6 and Type 43-7)

²⁾ Flanged valve body made of stainless steel (Type 43-6)

³⁾ Special version on request

Table 3: Materials · Material numbers according to DIN EN

Body		CC499K · EN-GJS-400-18-LT	Stainless steel 1.4408
Valve seat		Stainless steel 1.4104 ¹⁾	
Valve plug	Type 43-5 Type 43-7	Brass, resistant to dezincification, CW617N (CuZn40Pb) and 1.4104 with PTFE soft seal ³⁾	
	Type 43-6	Brass, resistant to dezincification, CW617N (CuZn40Pb) with EPDM soft seal ^{2) 3)}	
Balancing bellows		Stainless steel 1.4571	
Valve spring		Stainless steel 1.4310	
Set point adjuster		PTFE, glass fiber reinforced	
Temperature sensor	Capillary tube	Copper	
	Thermowell	Copper or stainless steel 1.4571	
Set point adjuster		PTFE, glass fiber reinforced	

¹⁾ Type 43-6 in G ½ to G 1: 1.4305

²⁾ Special version for oils (ASTM I, II, III): FKM soft seal

³⁾ When K_{V5} = 0.4 and 1.0: 1.4305

Dimensions

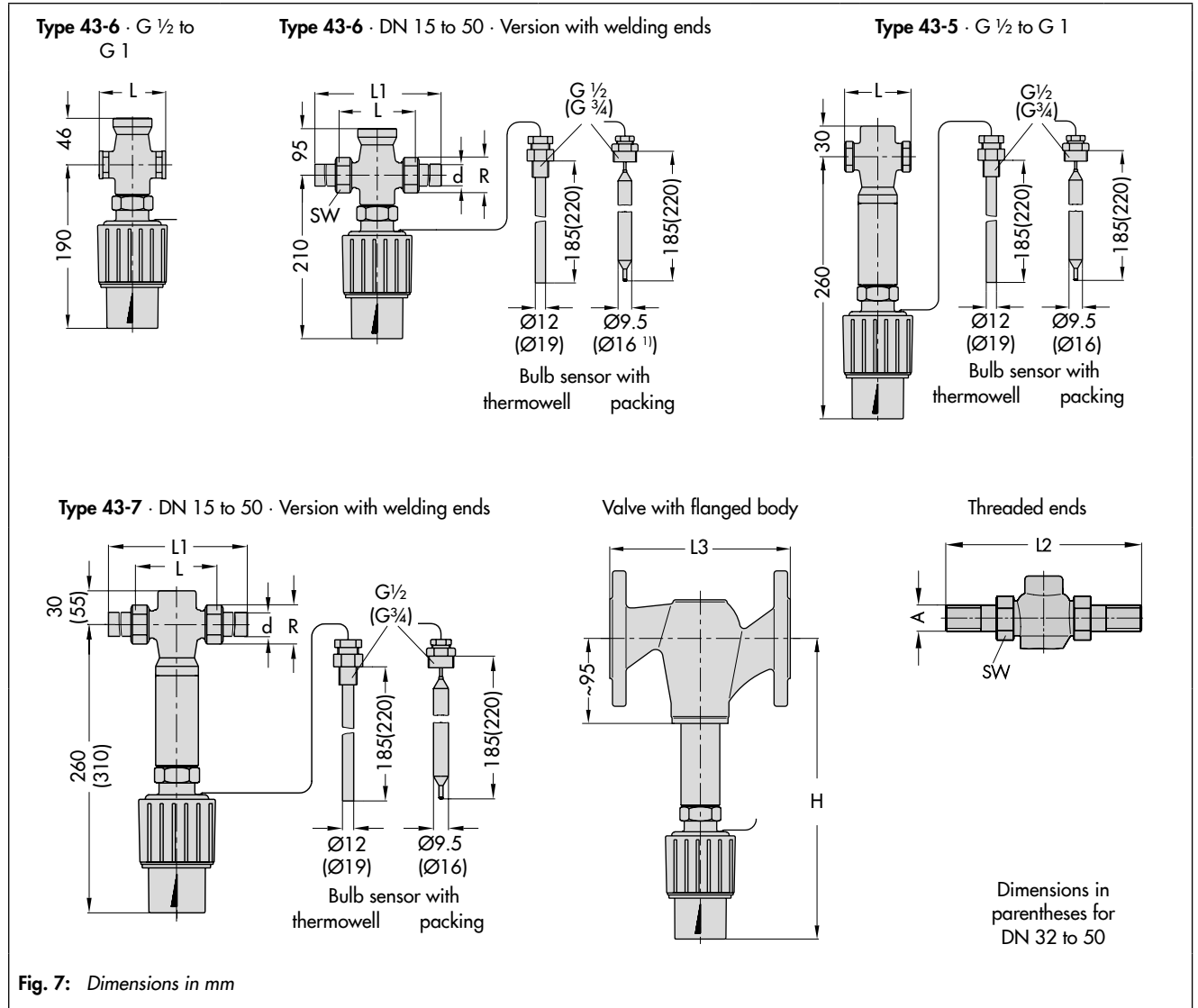


Fig. 7: Dimensions in mm

1) Ø16/220 mm: version as air sensor

Table 4: Dimensions in mm and weights in kg

Type 43-5 (G ½ to 1)						
Type 43-6 (G ½ to 1)						
Connection	G ½	G ¾	G 1	—		
Length L	65	75	90			
Width across flats SW	34	34	46			
Weight ^{1), 2)} , approx. kg	1.8	1.9	2.0			
Type 43-6 (DN 32 to 50)						
Type 43-7 (DN 15 to 50)						
Valve size	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
Pipe Ø d	21.3	26.8	32.7	42.0	48.0	60.0
Thread size 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
Height H	Type 43-6 ⁵⁾	190 ³⁾		210 ⁴⁾		
	Type 43-7 ⁶⁾	260 ³⁾		310 ⁴⁾		
Connection nuts with welding ends						
Length L1	210	234	244	268	294	330
Weight ^{1), 2)} , approx. kg	2.0	2.3	2.8	4.7	5.1	7.5
Connection nuts with threaded ends						
Length L2	129	144	159	180	196	228
Male thread A	G ½	G ¾	G 1	G 1¼	G 1½	G 2
Weight ^{1), 2)} , approx. kg	2.0	2.3	2.8	4.7	5.1	7.5
With flanged body · PN 25						
Length L3	130	150	160	180	200	230
Weight ^{1), 2)} , approx. kg	3.1	3.9	4.6	7.6	9.8	14.1

- ¹⁾ Version with bulb sensor and thermowell
- ²⁾ Version without thermowell: minus 0.2 kg
- ³⁾ With Ø9.5 mm sensor
- ⁴⁾ With Ø12 mm sensor
- ⁵⁾ Without separating piece
- ⁶⁾ With separating piece

Ordering text

Type 43-5 Temperature Regulator

G ...
 Set point range ...°C
 Optionally, special version
 Optionally, accessories ...

Type 43-6 Temperature Regulator

G ... or
 DN ... with welding ends, threaded ends or with flanged body
 Stainless steel or red brass body
 Set point range ...°C
 Optionally, special version
 Optionally, accessories ...

Type 43-7 Temperature Regulator

DN ... with welding ends, threaded ends or with flanged body
 Set point range ...°C
 Optionally, special version
 Optionally, accessories ...