

# Universal thermostats

Temperature control, temperature monitoring and temperature limitation: SAUTER universal thermostats are used for these three applications. They provide control, monitoring and limitation according to needs without auxiliary energy.

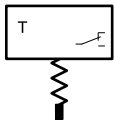
## Overview of universal thermostats



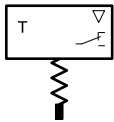
Type designation	TUC
<b>Application</b>	
Clamp-on temperature	•
Duct	•
Pipe	•
<b>Operating mode</b>	
Temperature controller, monitor (TR, TW)	•
Safety temperature limiter (STB)	•
Temperature limiter (TB)	•
<b>Further information</b>	Page 20



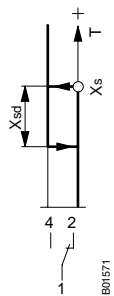
TUC\*0\*F00\*



TW, STW



TB, STB



TUC407F001

TUC407F002

TUC207F003

## TUC: Universal thermostat

### Features

- Regulates and monitors the temperature of liquids in baths, containers, pipes and ducts
- Variants as temperature monitors (TW), safety temperature monitors (STW), temperature limiters (TB) or safety temperature limiters (STB)
- Thermostat with remote sensor
- Clamp-on thermostat
- Capillary tube thermostat with or without thermowell
- Double thermostat, e.g. as TW and STB
- Certified as per EN 14597 (TUC207F003 and TUC407F001, TUC407F002)
- As per PED 2014/68/EU classified as cat. IV (TUC207F003, TUC407F001 and TUC407F002)
- The shift in the change-over point is minimised due to the temperature compensation.
- Thermowell 100 mm supplied (max. 12 bar)

### Technical data

Power supply		
Max. load	Terminal 1-2	230 V~, 10 (2.5) A (on the normally-closed contact)
	Terminal 1-4	230 V~, 2 (0.4) A
Min. load	Terminals 1-2, 1-4	24V =/~, 100 mA

### Parameters

Adjustment point	For $t_a$ 22 °C
Effect of temperature at instrument head	Approx. -0.1...-0.2 K/K
Time constant with thermowell (LW 7)	< 45 s (water)
	< 60 s (oil)
Time constant without thermowell	< 120 s (air)

### Ambient conditions

Ambient temperature	0...70 °C
Storage and transport temperature	-25...80 °C
Max. Pipe temperature during fitting	120 °C

### Construction

Connection terminals	Plug-in connectors
Cable cross-section	0.75...2.5 mm <sup>2</sup>
Sensor cartridge	Ø 6.5 mm
Housing	Two sections, lower section black, upper section yellow, including inspection window
Housing material	PA, ABS, PMMA
Weight	0.2 kg

### Standards and directives

Type of protection	IP54 (EN 60529)
Protection class	I (EN 60730)
Test mark	TÜV ID: 0000046121 (EN 14597)



## Overview of types

Type	Setting range	Type	Switching difference	Capillary tube length	Sensor cartridge length (± 12 mm)	Thermowell	Max. sensor temp.
TUC101F003	-10...50 °C	TW	Approx. 4.2 K	1.6 m	80 mm	100 mm, brass	140 °C
TUC102F001	5...30 °C	TW	Approx. 5.6 K	0.7 m	65 mm	100 mm, brass	200 °C
TUC105F001	15...95 °C	TW	Approx. 5.6 K	0.7 m	65 mm	100 mm, brass	200 °C
TUC106F001	40...120 °C	TW	Approx. 5.6 K	0.7 m	65 mm	100 mm, brass	200 °C
TUC107F001	50...130 °C	TW	Approx. 5.6 K	0.7 m	65 mm	100 mm, brass	200 °C
TUC108F001	80...160 °C	TW	Approx. 5.6 K	0.7 m	65 mm	100 mm, stainless steel	200 °C
TUC207F003	70...130 °C	STW	Approx. 10 K	1.6 m	60 mm	100 mm, brass	160 °C
TUC303F001	15...60 °C	TB	≤ 20 K	0.7 m	70 mm	100 mm, brass	200 °C
TUC307F001	50...130 °C	TB	≤ 20 K	0.7 m	65 mm	100 mm, brass	200 °C
TUC407F001	95...130 °C	STB	≤ 20 K	0.7 m	76 mm	100 mm, brass	160 °C
TUC407F002	95...130 °C	STB	≤ 20 K	0.7 m	76 mm	150 mm, brass	160 °C

☛ With TUC407F001, TUC407F002 and TUC207F003, only use the supplied thermowells or stainless-steel thermowells (part nos.: 0393022\*\*\* or 0392022\*\*\*).

☛ TUC108 with adapter for temperature reduction, only use the supplied thermowell.

## Accessories

Type	Description
0300360008	Retaining holder for cable temperature sensor or capillary tube with 0392022*** (LW 7) or LW 15 (10 pcs)
0300360009	Holder for sensor cartridge
0300360010	Retaining strap for fitting onto pipes for a pipe diameter of 15-100 mm
0300360011	Mounting plate for double thermostats
0300360012	Sensor support spiral for fitting in ventilation duct
0300360013	Duct/wall mounting bracket

## Thermowells

### Features

- Fitted in pipes and containers for holding sensor cartridges, immersion stems, temperature sensors, temperature controllers or thermostats
- Made of brass (Ms) or stainless steel (V4A)
- Versions with cylindrical pipe thread (G $\frac{1}{2}$ " male ISO 228/1, flat-sealing)<sup>1)</sup> or cone-shaped (R $\frac{1}{2}$ " ISO 7/1 sealing in thread)
- With pressure spring (LW 15)
- With retaining holder



### Overview of types

Type	LW	Length	Material	Thread	Nominal pressure	Test pressure	T <sub>max</sub>
0391022050	7	50 mm	Stainless steel	G $\frac{1}{2}$ "	40 bar	60 bar	325 °C
0391022100	7	100 mm	Stainless steel	G $\frac{1}{2}$ "	40 bar	60 bar	325 °C
0391022200	7	200 mm	Stainless steel	G $\frac{1}{2}$ "	40 bar	60 bar	325 °C
0391022300	7	300 mm	Stainless steel	G $\frac{1}{2}$ "	40 bar	60 bar	325 °C
0391022450	7	450 mm	Stainless steel	G $\frac{1}{2}$ "	40 bar	60 bar	325 °C
0391022600	7	600 mm	Stainless steel	G $\frac{1}{2}$ "	40 bar	60 bar	325 °C
0391011050	7	50 mm	Brass	R $\frac{1}{2}$ "	10 bar	16 bar	160 °C
0391011100	7	100 mm	Brass	R $\frac{1}{2}$ "	10 bar	16 bar	160 °C
0391011150	7	150 mm	Brass	R $\frac{1}{2}$ "	10 bar	16 bar	160 °C
0391011200	7	200 mm	Brass	R $\frac{1}{2}$ "	10 bar	16 bar	160 °C
0391011300	7	300 mm	Brass	R $\frac{1}{2}$ "	10 bar	16 bar	160 °C
0391011450	7	450 mm	Brass	R $\frac{1}{2}$ "	10 bar	16 bar	160 °C
0393022100	15	100 mm	Stainless steel	G $\frac{1}{2}$ "	40 bar	60 bar	450 °C
0393022200	15	200 mm	Stainless steel	G $\frac{1}{2}$ "	40 bar	60 bar	450 °C
0393022450	15	450 mm	Stainless steel	G $\frac{1}{2}$ "	40 bar	60 bar	450 °C
0393012100	15	100 mm	Brass	G $\frac{1}{2}$ "	16 bar	25 bar	160 °C
0393012200	15	200 mm	Brass	G $\frac{1}{2}$ "	16 bar	25 bar	160 °C
0392022100	7	100 mm	Stainless steel	G $\frac{1}{2}$ "	25 bar	40 bar	450 °C
0392022300	7	300 mm	Stainless steel	G $\frac{1}{2}$ "	25 bar	40 bar	450 °C




<sup>1)</sup> G $\frac{1}{2}$ " male ISO 228/1, flat-sealing: for welding bushings with flat seal (accessories)



- ☛ 0392022100 and 0392022300 for TUC thermostats only
- ☛ With TUC407F001 and TUC207F003, only use the supplied thermowells or stainless-steel thermowells (part nos.: 0393022\*\*\* or 0392022\*\*\*).
- ☛ 0391... with pressure screw (retaining holder) up to max. 200°C

### Accessories

Type	Description
0300360008	Retaining holder for cable temperature sensor or capillary tube with 0392022*** (LW 7) or LW 15 (10 pcs)
0364263000	Welding sleeve of steel, with female thread G $\frac{1}{2}$ ", flat seal of copper
0300360017	Pressure spring for LW 15 (10 pieces)

			
LW 7, 50 mm	•	• L > 50 mm	–
LW 7, 100 mm	•	•	–
LW 7, 150 mm	•	•	–
LW 7, 200 mm	•	•	–
LW 7, 300 mm	•	• L > 300 mm	–
LW 7, 450 mm	•	•	–
LW 7, 600 mm	•	–	–
LW 15, 100 mm	•	–	•
LW 15, 200 mm	•	–	•
LW 15, 450 mm	•	–	•
0392022100	–	–	•
0392022300	–	–	•

- ☛ 0392022100 and 0392022300 for TUC thermostats only.
- ☛ With TUC407F001 and TUC207F003, only use the supplied thermowells or stainless-steel thermowells (part nos.: 0393022\*\*\* or 0392022\*\*\*).
- ☛ Only use the thermowells (LW 15) with at least 2 sensors or thermostats with a diameter of at least 6 mm.
- ☛ 0391... with pressure screw (retaining holder) up to max. 200°C.

# Frost monitors

SAUTER frost monitors protect ventilation systems against icing. With their special construction and design, they are particularly suitable for compact installations and/or installations that are subject to vibrations.

## Overview of frost monitors



Type designation	TFL 201	TFL 611
<b>Function</b>		
Monitor	•	•
Limiter	•	–
<b>Output signal</b>		
Switched	•	•
Continuous	–	•
<b>Auxiliary energy</b>	•	–
<b>Further information</b>	Page 25	Page 27

## TFL 201: Frost protection monitor/limiter with capillary-tube sensor

### Features

- Temperature monitoring in heating coils and air ducts
- Variants as monitors or limiters
- Copper capillary tube
- Switching point can be set internally
- Small switching difference
- With capillary-tube holders made of plastic

### Technical data

#### Power supply

Max. load	Terminal 1-2	230 V~, 10 (2.5) A (on the normally-closed contact)
	Terminal 1-4	230 V~, 2 (0.4) A

#### Parameters

	Setting range	-10...15 °C
	Factory setting	5 °C
	Switching difference	1.5 K
	Tolerance of switching difference	Max. ±1 K
	Max. sensor temperature	120 °C
Time characteristic	Time constant in moving air (0.3 m/s) <sup>1)</sup>	Capillary tube length 1.5 m: 25 s
		Capillary tube length 3 m: 31 s
		Capillary tube length 6 m: 51 s

#### Ambient conditions

Ambient temperature <sup>2)</sup>	-5...70 °C
Max. capillary temperature	120 °C
Storage and transport temperature	-30...80 °C

#### Construction

Connection terminals	Plug-in connectors
Cable cross-section	Ø 0.75...2.5 mm <sup>2</sup>
Housing	Two sections, lower section black, upper section yellow, including inspection window
Housing material	ABS, PMMA
Weight	0.2 kg

#### Standards and directives

Type of protection	IP65 (EN 60529)
Protection class	I (IEC 60730)
EMC Directive 2014/30/EU	EN 60730-1, EN 60730-2-9
Low-Voltage Directive 2014/35/EU	EN 60730-1, EN 60730-2-9

### Overview of types

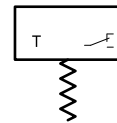
Type	Function	Switching difference	Capillary tube	Capillary tube holder
TFL201F002	Monitor	1.5 K (±1 K)	3000 mm	3
TFL201F022	Limiter	1.5 K (±1 K)	3000 mm	3
TFL201F102	Monitor	1.5 K (±1 K)	1500 mm	3
TFL201F602	Monitor	1.5 K (±1 K)	6000 mm	6
TFL201F622	Limiter	1.5 K (±1 K)	6000 mm	6

<sup>1)</sup> The frost monitor always reacts to the coldest point (minimum length 7.5 cm (1.5 m), 15 cm (3 m) und 30 cm (6 m))

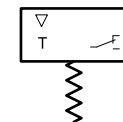
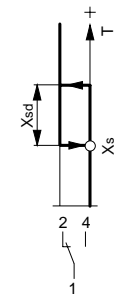
<sup>2)</sup> The head of the instrument must be fitted in a warmer location than the sensor, see fitting instructions



TFL201F\*\*2



TFL201F\*02



TFL201F\*22



### Accessories

Type	Description
0300360014	Six holders for fitting the capillary tube





## TFL 611: Continuous frost monitor with capillary sensor

### Features

- Records the lowest temperature that occurs for a length of at least 250 mm at any position along the capillary tube
- Used on air side in ventilation and air conditioning units where protective measures must be taken against freezing
- Active capillary sensor for measuring the lowest temperatures in the range 0...15 °C
- Vapour-filled capillary tube and diaphragm system with inductive system of measurement
- Setting range 1...10 °C
- Start-up function
- LED and 7-segment display
- Self-monitoring of sensor line

### Technical data

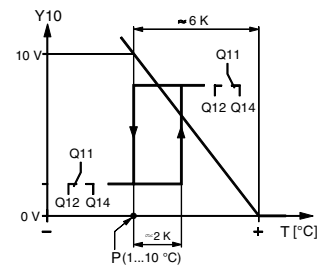
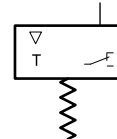
Power supply		
Power supply <sup>1)</sup>		24 V~, 10/-20%
Power consumption		< 6.6 VA
Frequency		50...60 Hz
Parameters		
Measuring range		0...15 °C
Setting range		1...10 °C
Adjustment point		5 °C
Accuracy for adjustment point		± 1 K
Switching difference		Approx. 2 K
Temperature for capillary tube		< 110 °C
Time constant in still air		Approx. 90 s
Time constant in moving air		< 40 s
Response length for capillary tube		Min. 250 mm
Inputs/outputs		
Admissible cable length		300 m with 1.5 mm <sup>2</sup>
Analogue input		
Valve control for terminal Y		0...10 V
Current		< 0.1 mA
Analogue outputs		
Sensor temperature for terminal B		0...10 V $\triangleq$ 0...15 °C
Valve control for terminal Y10		0...10 V
Current		± 1 mA
Potential-free relay outputs (Q terminals)		
Min. switching capacity		12 V~/=, 100 mA
Max. switching capacity		250 V~, 6(2) A; 24 V=, 6 A
Ambient conditions		
Operation		
Humidity (non-condensing)		< 85% rh
Temperature		-15...55 °C
Storage and transport		
Humidity (non-condensing)		< 95% rh
Temperature		-25...65 °C
Construction		
Terminals with spring technology		Max. 2 × 1.5 mm <sup>2</sup> Or 1 × 2.5 mm <sup>2</sup> Min. 0.25 mm <sup>2</sup>
Cable inlet		Cable gland M16 for cable diameter 5...10 mm
Protection class <sup>2)</sup>		I
Housing		PA, silver grey (RAL 7001)

<sup>1)</sup> SELV/PELV: Safety Extra Low Voltage/Protected Extra Low Voltage

<sup>2)</sup> No earth conductor necessary



TFL611F\*01



Housing cover	PC, transparent
Cap	ABS, light grey (RAL 7035)
Capillary tube	Copper

#### Standards and directives

Vibration resistance	EN 60721-3-3 (class 3M2)
Type of protection	IP42 (EN 60529)
Operation as per IEC 721-3-3	Class 3K5
Storage and transport as per IEC 721-3-2	Class 2K3
RoHS Directive 2011/65/EU	EN 50581
EMC Directive 2014/30/EU	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3
Low-Voltage Directive 2014/35/EU	EN 60730-1, EN60730-2-9

#### Overview of types

Type	Description	Weight
TFL611F201	Continuous frost monitor; 0...15 °C; capillary tube length= 2 m	340 g
TFL611F601	Continuous frost monitor; 0...15 °C; capillary tube length= 6 m	410 g

#### Accessories

Type	Description
0292146001	Set for duct fitting consisting of: 5 capillary-tube holders, 1 depth-adjustable flange
0300360014	Six holders for fitting the capillary tube
0374534001	Depth-adjustable flange