



Temperature

THERMASGARD® passive sensors – tracking the perceived temperature

Our passive temperature sensors have proven themselves countless times in all temperature measurement applications. Technology and quality for precise measurement results you can rely on.

The units are available in a wide range of designs and individual variants to suit your requirements.

Application Areas

- Hospitals, museums, schools, hotels and administration buildings
- Power plants and district heating facilities
- Pharmaceutical and food industry
- Production plants
- Heating systems





THERMASGARD® PASSIVE TEMPERATURE SENSORS



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Temperature

THERMASGARD® & THERMASREG® Sensor technology for heat and cold

Broad Spectrum

Our passive temperature sensors have a proven fit in countless applications across all areas of temperature measurement. Technology for best measuring results you can rely on. Available in various different models and individual versions to meet your precise requirements.

Optimum Precision

The devices are calibrated in-house in climate cabinets and are tested according to the latest criteria. Each sensor is precisely re-adjustable using offset potentiometers. Take advantage of our experience, our development, manufacturing and product know-how and order these products directly from the manufacturer.

Approved Safety

The THERMASGARD® 1101-I with current output (Test No. 69871-01939-1) and the THERMASGARD® 1101-U with voltage output (Test No. 69871-01940-1) are tested and certified according to DIN EN 61326-1:2006 and EN 61326-2-3:2006 by TÜV SÜD.

THERMASREG® ETR and KTR are tested and certified to DIN EN 14597:2015-01.

Certified Quality



Our development and production in Nuremberg/Germany is certified by TÜV Thüringen according to DIN EN ISO 9001:2015.



GOST certified



EAC certified



DIN tested / certified devices



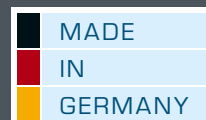
RoHS conforming materials

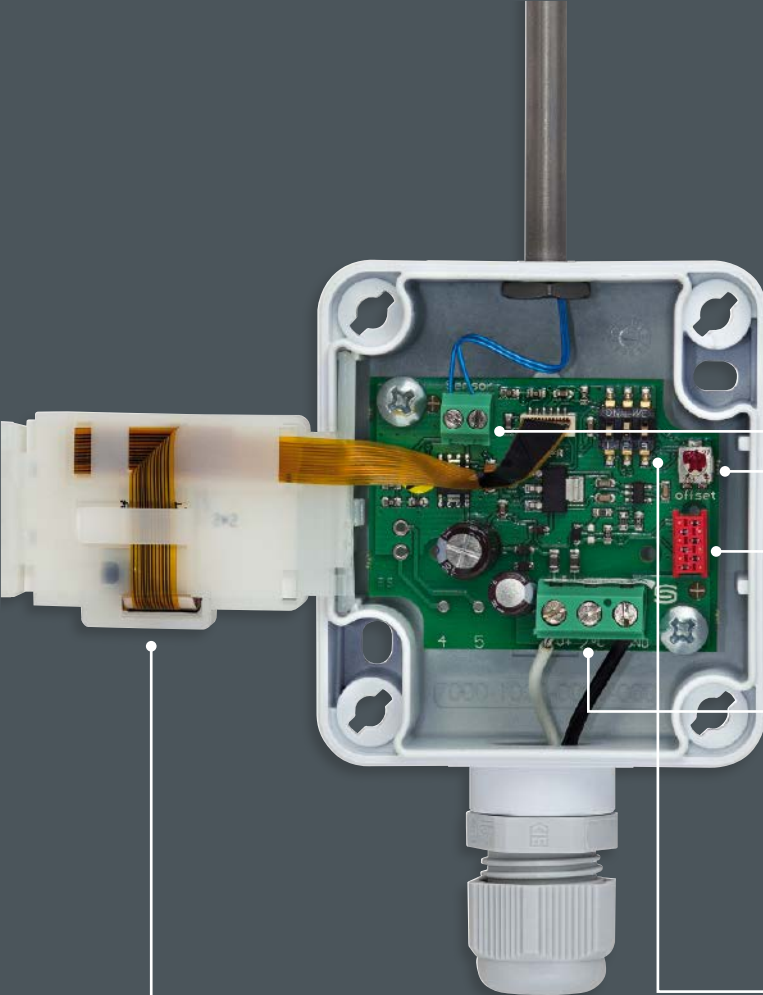


ESD compliant manufacturing

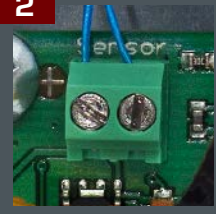


CE compliance tested by external laboratories





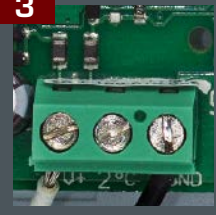
2



Sensors

Internal sensors / external sensors

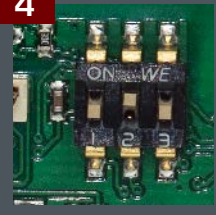
3



Screw Terminals

Active output signals 0-10V, 4...20 mA or switched as well as passive outputs (e.g. Pt1000, Ni1000 etc.)

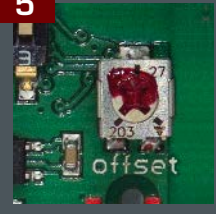
4



DIP Switches

For multi-range toggling and setting of measuring ranges

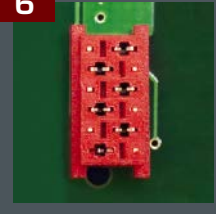
5



Offset Potentiometer

For fine adjustment (zero point offset) and readjustment upon recalibration

6



Quality Assurance

Calibration and balancing are done by means of the bus system in climate cabinets

1



Illuminated Display

With backlighting as well as display of range violation, sensor breakage, sensor short circuit and physical units



Configuration variants of room operating units

Room temperature sensors and measuring transducers, on-wall, device series Baldur

Housing temperature sensors are electric contact thermometers for measuring temperatures in the gases (air) surrounding them on all sides. Room temperature sensors/measuring transducers are used for measuring air temperature (in non-precipitating air), for changing setpoint values, for presence detection, or as operating panels with push-buttons, switches, potentiometers, status indicators (LEDs) in residential, working, office and business facilities as well as in the industrial sector.

Here are some design and configuration examples of variants of the new Baldur series devices that can be individually customized ...

DEVICE SERIES

- Baldur 1 (85 x 85 x 27 mm)
- Baldur 2 (98 x 98 x 33 mm)

Baldur lying



Baldur 1 without operating elements



Baldur 1 with display



Baldur 1 with display and potentiometer



Baldur 1 with potentiometer, push-button, and LED



Baldur 1 with potentiometer and rocker switch



Baldur 1 with potentiometer and push-buttons



Baldur 1 with potentiometer and LEDs



Baldur 1 with potentiometer and LEDs



Baldur 1 with potentiometer and LEDs





Baldur 2
without operating elements



Baldur 2
with display



Baldur 2 with display,
potentiometer, and LEDs



Baldur 2
with LEDs and push-buttons



Baldur 2
with LEDs and push-buttons



Baldur 2 with potentiometer,
turn switch, and LEDs



Baldur 2 with potentiometer,
turn switch, and LEDs



Baldur 2 with potentiometer,
push-buttons, LEDs, and rocker switch



Baldur 2 with potentiometer,
turn switch, and LEDs



Baldur 2 with potentiometer
and turn switch



Baldur 2 with potentiometer,
turn switch, LEDs, and push-buttons



Baldur 2 with potentiometer,
turn switch, LEDs, and push-buttons



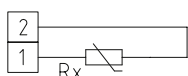
Room temperature sensors and measuring transducers, on-wall

Room temperature sensor **THERMASGARD® RTF 1** with passive output, in an elegant housing made of plastic, with snap-on lid, base with 4-hole attachment for installation on vertically or horizontally installed in-wall flush boxes, with predetermined breaking point for on-wall cable entry, or in enclosures made of stainless steel (top and bottom part are of stainless steel, the lid is screwed on), vandal-proof version e.g. for schools, military barracks, and public buildings. This residential room temperature sensor is used to detect/display temperatures in closed dry rooms, in apartments, in cinemas, supermarkets, storage rooms, office and business facilities.

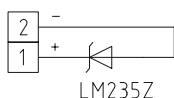
TECHNICAL DATA

Measuring range:	-30...+70 °C
Sensor / output:	see table, passive
Connection type:	2-wire connection (4-wire connection on PT100/PT1000A, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Process connection:	by screws
Housing:	plastic, material ABS, colour pure white (similar to RAL 9010), optional stainless steel V2A (1.4301)
Dimensions:	85 x 85 x 27 mm (Baldur 1) Standard 98 x 98 x 33 mm (Baldur 2) optional 75 x 75 x 25 mm (stainless steel V2A (1.4301) optional
Installation:	wall mounting or on in-wall flush box Ø55 mm, base with 4-hole for mounting on vertically or horizontally installed in-wall flush boxes for cable entry from the back, with predetermined breaking point for on-wall cable entry from top/bottom in case of plain on-wall installation
Electrical connection:	0.14 - 1.5 mm ² via terminal screws, secured against loss due to unscrewing, on safety extra-low voltage max. 24 V DC only
Humidity:	max. 90% RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 30 (according to EN 60 529)
ACCESSORIES	see last chapter

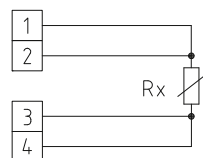
1x two-wire connection standard



1x two-wire connection LM235Z (KP10)



1x four-wire connection (optional)



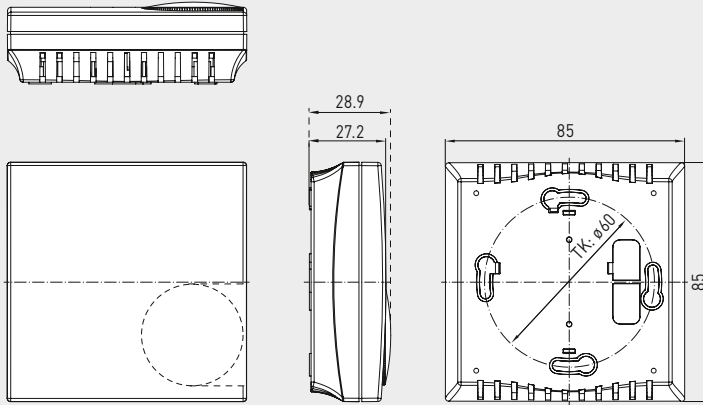
THERMASGARD® RTF 1 Room temperature sensors (Standard)

Type / WG03	Sensor / Output	Item No.	Price
RTF1 xx	passive	IP30 (-30...+70 °C)	
RTF1 Pt100	Pt100 (according to DIN EN 60 751, class B)	1101-40A0-1003-000	23,35 €
RTF1 Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-40A0-5000-000	25,97 €
RTF1 Pt1000A	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-40A0-6003-000	27,75 €
RTF1 Ni1000	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-40A0-9000-000	25,61 €
RTF1 NiTK	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-40A1-0000-000	25,61 €
RTF1 LM235Z	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-40A2-1000-000	23,95 €
RTF1 NTC1,8K	NTC 1.8K	1101-40A1-2000-000	21,82 €
RTF1 NTC10K	NTC 10K	1101-40A1-5000-000	21,82 €
RTF1 NTC20K	NTC 20K	1101-40A1-6000-000	21,82 €
Extra charge:	Stainless steel housing optional Other sensors optional		109,68 € on request



Dimensional drawing

Housing **Baldur 1**
(only one potentiometer possible)

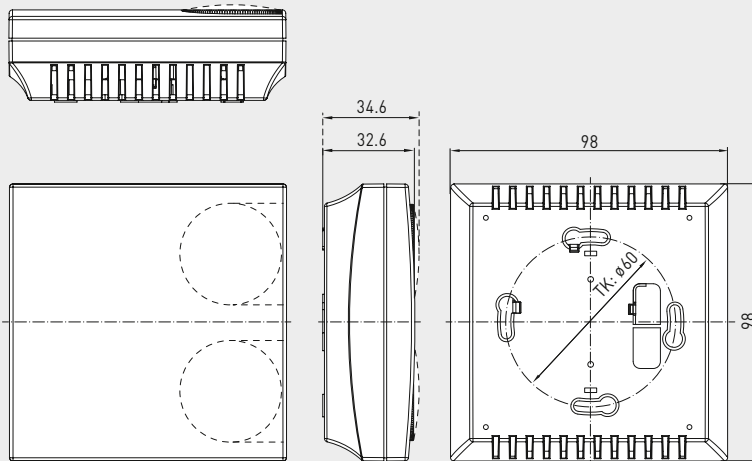


RTF
(Baldur 1)



Dimensional drawing

Housing **Baldur 2**
(one or two potentiometers possible)

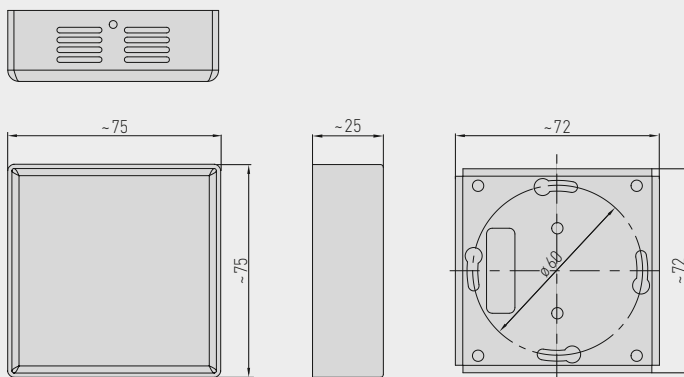


RTF
(Baldur 2)

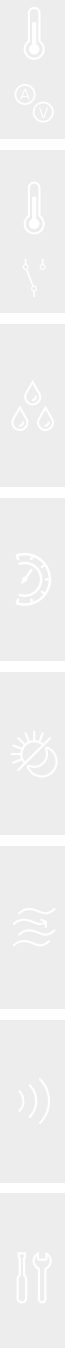


Dimensional drawing

Housing **stainless steel**



RTF
(stainless steel)



Room temperature sensors and measuring transducers,
on-wall, different versions

TECHNICAL DATA

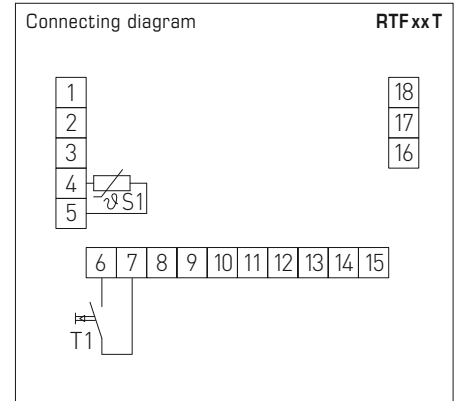
Measuring ranges:	-30...+70 °C (passive sensors) and 0...+50 °C (for U-variant)
Sensor:	for types, see table
Potentiometer:	standard 1kΩ, max. 0.1 W other ratings optional on request, e. g. 100 Ω, 2.5 kΩ, 5 kΩ, 10 kΩ, (optional potentiometer 0...10 V, linear), with angle of rotation limiter
Turn switch:	max. 24 V AC / DC, max. 130 mA, up to 5 steps (0, Auto, I, II, III), with angle of rotation limiter
Rocker switch:	max. 24 V AC / DC, max. 130 mA
Push-buttons:	normally open contact, max. 24 V DC, max. 10 mA
LEDs:	max. 24 V DC (optional max. 24 V AC), standard green (optional red, yellow, or two-colour)
Housing:	plastic, ABS, pure white (similar to RAL 9010), (optional stainless steel V2A (1.4301))
Dimensions:	85 x 85 x 27 mm (Baldur 1) Standard 98 x 98 x 33 mm (Baldur 2) 75 x 75 x 25 mm (stainless steel V2A (1.4301))
Installation:	wall mounting or on in-wall flush box Ø55 mm, base with 4-hole for mounting on vertically or horizontally installed in-wall flush boxes for cable entry from the back, with predetermined breaking point for on-wall cable entry from top / bottom in case of plain on-wall installation
Electrical connection:	0.14 - 1.5 mm ² via terminal screws, on safety extra-low voltage max. 24 V DC only
Humidity:	max. 90 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 30 (according to EN 60 529)
Lettering:	standard is swelling arrow with centre position, unfilled (optional special printing – see last chapter "Accessories")
ACCESSORIES	see last chapter

Potentiometer and
turn switch with
limited angle of rotation





RTF xx T
(Baldur 1)
Version with sensor and
push-button (max. 24 V DC, max. 10 mA)

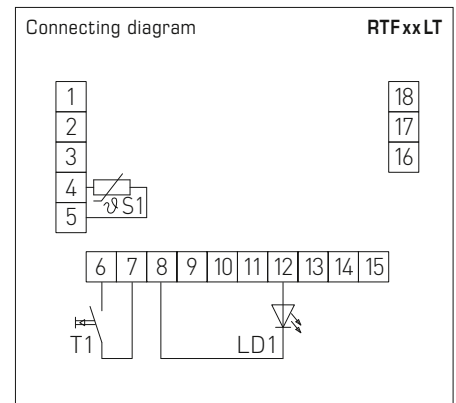


THERMASGARD® RTF xx T Room temperature sensors

Type /WG01	Sensor /Output	Item No.	Price
RTF xx T	passive	IP30 (-30...+70 °C)	
RTF Pt100 T	Pt100 (according to DIN EN 60 751, class B)	1101-40A0-1617-000	44,55 €
RTF Pt1000 T	Pt1000 (according to DIN EN 60 751, class B)	1101-40A0-5617-000	44,55 €
RTF Ni1000 T	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-40A0-9617-000	46,34 €
RTF NiTK T	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-40A1-0617-000	47,49 €
RTF LM235Z T	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-40A2-1617-000	46,98 €
RTF NTC1,8K T	NTC 1.8K	1101-40A1-2617-000	47,24 €
RTF NTC10K T	NTC 10K	1101-40A1-5617-000	43,92 €
RTF NTC20K T	NTC 20K	1101-40A1-6617-000	43,92 €



RTF xx LT
(Baldur 1)
Version with sensor, LED (green) and
push-button (max. 24 V DC, max. 10 mA)



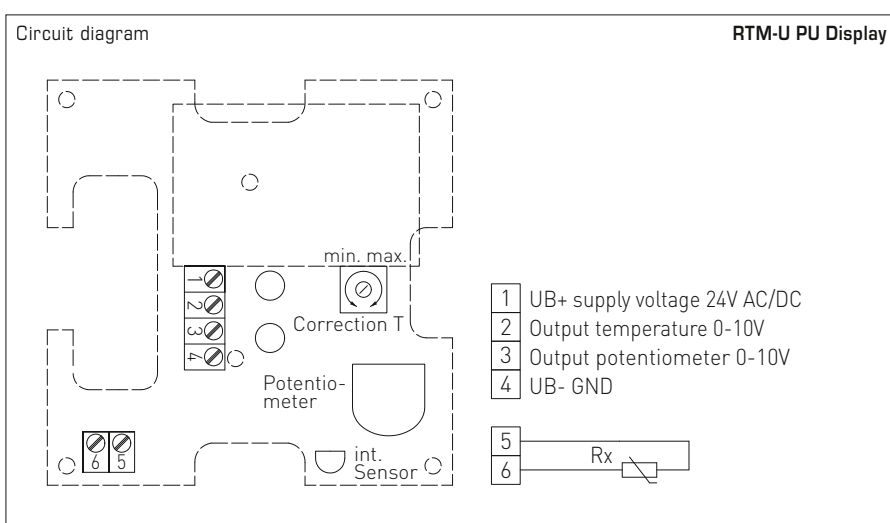
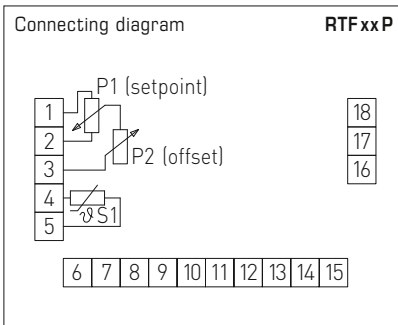
THERMASGARD® RTF xx LT Room temperature sensors

Type /WG01	Sensor /Output	Item No.	Price
RTF xx LT	passive	IP30 (-30...+70 °C)	
RTF Pt100 L T	Pt100 (according to DIN EN 60 751, class B)	1101-40A0-1593-002	47,09 €
RTF Pt1000 L T	Pt1000 (according to DIN EN 60 751, class B)	1101-40A0-5593-002	48,81 €
RTF Ni1000 L T	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-40A0-9593-002	49,15 €
RTF NiTK L T	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-40A1-0593-002	52,76 €
RTF LM235Z L T	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-40A2-1593-002	48,20 €
RTF NTC1,8K L T	NTC 1.8K	1101-40A1-2593-002	52,46 €
RTF NTC10K L T	NTC 10K	1101-40A1-5593-002	47,54 €
RTF NTC20K L T	NTC 20K	1101-40A1-6593-002	47,54 €



RTF xx P
RTF xx PU
RTM-U PU
(Baldur 1)

Version with sensor and potentiometer (1 kOhm, max. 0.1 W)



THERMASGARD® RTF xx P Room temperature sensors

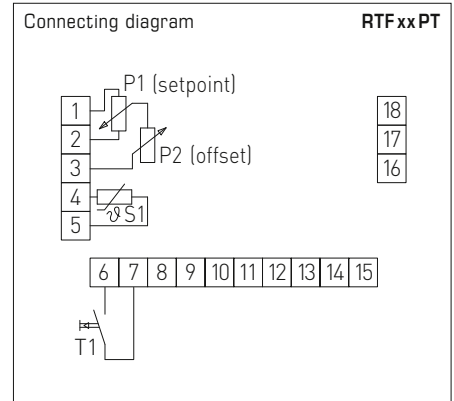
Type/WG01	Sensor/Output	Display	Item No.	Price
RTF xx P	passive		IP 30 (-30...+70 °C)	
RTF Pt100 P	Pt100 (according to DIN EN 60 751, class B)		1101-40A0-1001-345	47,09 €
RTF Pt1000 P	Pt1000 (according to DIN EN 60 751, class B)		1101-40A0-5001-345	48,37 €
RTF Ni1000 P	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)		1101-40A0-9001-345	49,65 €
RTF NiTK P	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000		1101-40A1-0001-345	50,31 €
RTF LM235Z P	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10		1101-40A2-1001-345	48,37 €
RTF NTC1,8K P	NTC 1.8K		1101-40A1-2001-345	48,50 €
RTF NTC10K P	NTC 10K		1101-40A1-5001-345	47,09 €
RTF NTC20K P	NTC 20K		1101-40A1-6001-345	47,09 €
RTF xx PU	passive / active		IP 30 (0...+50 °C)	
RTF Pt1000 PU	Pt1000 / 0 - 10 V (potentiometer)*		1101-40A0-5004-345	112,02 €
RTF Pt1000 PU	Pt1000 / 0 - 10 V (potentiometer, central position)*		1101-40A0-5004-642	112,02 €
RTF Pt1000 PU	Pt1000 / 0 - 10 V (potentiometer, marking points)*		1101-40A0-5004-050	112,02 €
RTM PU	aktive		IP 30 (0...+50 °C)	
RTM-U PU	0 - 10 V (temperature and potentiometer)*		1101-41A1-0004-346	146,79 €
RTM-U PU LCD	0 - 10 V (temperature and potentiometer)*	■	1101-41A1-1004-346	248,63 €

For special orders please specify: **Ohm rating** of potentiometer (standard is 1kOhm; optional 100 Ohm, 2.5kOhm, 5kOhm, 10kOhm, 0-10V), **type of swelling arrow*** (standard = wedge-shaped, optional with central position or marking points) and differing specific **wiring requests**



RTF xxPT
(Baldur 1)

Version with sensor, potentiometer (1 kOhm, max. 0.1 W) and push-button (max. 24 V DC, max. 10 mA)



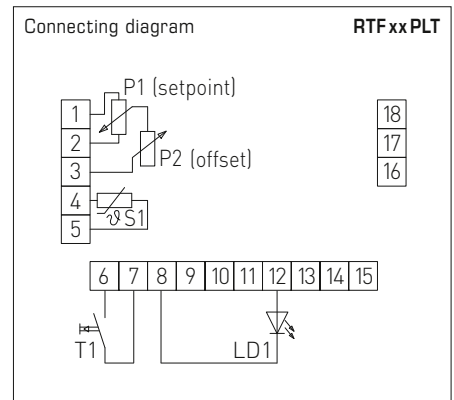
THERMASGARD® RTF xxPT Room temperature sensors

Type / WG01	Sensor / Output	Item No.	Price
RTF xx PT	passive	IP30 (-30...+70 °C)	
RTF Pt100 P T	Pt100 (according to DIN EN 60 751, class B)	1101-40A0-1021-345	52,08 €
RTF Pt1000 P T	Pt1000 (according to DIN EN 60 751, class B)	1101-40A0-5021-345	54,05 €
RTF Ni1000 P T	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-40A0-9021-345	54,37 €
RTF NiTK P T	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-40A1-0021-345	56,66 €
RTF LM235Z P T	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-40A2-1021-345	56,02 €
RTF NTC1,8K P T	NTC 1.8 K	1101-40A1-2021-345	56,13 €
RTF NTC10K P T	NTC 10K	1101-40A1-5021-345	54,68 €
RTF NTC20K P T	NTC 20K	1101-40A1-6021-345	54,68 €
RTF xx PUT	passive / active	IP30 (0...+50 °C)	
RTF Pt1000 PU T	Pt1000 / 0 - 10 V (potentiometer)	1101-40B0-5033-345	119,79 €



RTF xxPLT
(Baldur 1)

Version with sensor, potentiometer (1 kOhm, max. 0.1 W), LED (green) and push-button (max. 24 V DC, max. 10 mA)



THERMASGARD® RTF xxPLT Room temperature sensors

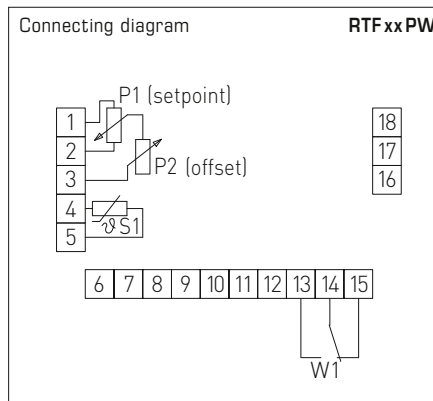
Type / WG01	Sensor / Output	Item No.	Price
RTF xx PLT	passive	IP30 (-30...+70 °C)	
RTF Pt100 P L T	Pt100 (according to DIN EN 60 751, class B)	1101-40A0-1663-347	66,38 €
RTF Pt1000 P L T	Pt1000 (according to DIN EN 60 751, class B)	1101-40A0-5663-347	69,71 €
RTF Ni1000 P L T	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-40A0-9663-347	70,02 €
RTF NiTK P L T	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-40A1-0663-347	73,06 €
RTF LM235Z P L T	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-40A2-1663-347	68,37 €
RTF NTC1,8K P L T	NTC 1.8 K	1101-40A1-2663-347	72,56 €
RTF NTC10K P L T	NTC 10K	1101-40A1-5663-347	66,38 €
RTF NTC20K P L T	NTC 20K	1101-40A1-6663-347	66,38 €
RTF xx PULT	passive / active	IP30 (-30...+70 °C)	
RTF Pt1000 PU L T	Pt1000 / 0 - 10 V (potentiometer)	1101-40B0-5669-347	137,50 €

Room temperature sensors and measuring transducers,
on-wall, different versions



RTF xx PW
(Baldur 1)

Version with sensor,
potentiometer (1 kOhm, max. 0.1 W) and
rocker switch (max. 24 V AC/DC, max. 130 mA)



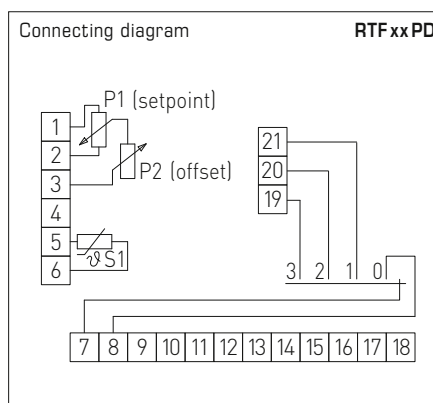
THERMASGARD® RTF xx PW Room temperature sensors

Type / WG01	Sensor / Output	Item No.	Price
RTF xx PW	passive	IP 30 (-30...+70 °C)	
RTF Pt100 P W	Pt100 (according to DIN EN 60 751, class B)	1101-40A0-1061-348	52,84 €
RTF Pt1000 P W	Pt1000 (according to DIN EN 60 751, class B)	1101-40A0-5061-348	54,74 €
RTF Ni1000 P W	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-40A0-9061-348	55,26 €
RTF NiTK P W	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-40A1-0061-348	57,29 €
RTF LM235Z P W	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-40A2-1061-348	56,66 €
RTF NTC1,8K P W	NTC 1.8K	1101-40A1-2061-348	57,17 €
RTF NTC10K P W	NTC 10K	1101-40A1-5061-348	55,40 €
RTF NTC20K P W	NTC 20K	1101-40A1-6061-348	55,40 €
RTF xx PUW	passive / active	IP 30 (0...+50 °C)	
RTF Pt1000 PU W2	Pt1000 / 0-10 V (potentiometer)	1101-40B0-5067-348	120,44 €



RTF xx PD
(Baldur 2)

Version with sensor,
potentiometer (1 kOhm, max. 0.1 W) and
turn switch (max. 24 V AC/DC, max. 130 mA)



THERMASGARD® RTF xx PD Room temperature sensors

Type / WG01	Sensor / Output	Item No.	Price
RTF xx PD	passive	IP 30 (-30...+70 °C)	
RTF Pt100 P D4	Pt100 (according to DIN EN 60 751, class B)	1101-40B0-1007-349	53,35 €
RTF Pt1000 P D4	Pt1000 (according to DIN EN 60 751, class B)	1101-40B0-5007-349	55,31 €
RTF Ni1000 P D4	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-40B0-9007-349	55,62 €
RTF NiTK P D4	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-40B1-0007-349	57,93 €
RTF LM235Z P D4	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-40B2-1007-349	57,29 €
RTF NTC1,8K P D4	NTC 1.8K	1101-40B1-2007-349	57,40 €
RTF NTC10K P D4	NTC 10K	1101-40B1-5007-349	55,97 €
RTF NTC20K P D4	NTC 20K	1101-40B1-6007-349	55,97 €
RTF xx PUD	passive / active	IP 30 (0...+50 °C)	
RTF Pt1000 PU D4	Pt1000 / 0-10 V (potentiometer)	1101-40B0-5019-349	120,93 €

Operating elements Baldur 1	Possible combinations	1	2	3	4	5	6
Sensor 1		●	●	●	●	●	●
Sensor 2		●		●			
Sensor 3 LM235Z with calibrating pot (4-wire)		●			●	●	
Potentiometer 1 with/without series resistor		●	●	●	●		
Potentiometer 2 with calibrating pot						●	●
LED 1 (max. one LED)							
LED 2 (max. two LEDs)							
LED 3 (max. three LEDs)							
LED 4 (max. four LEDs)		●	●	●	●	●	●
Rocker switch			●	●			●
Push-button 1 (max. one button)		●		●		●	●
Push-button 2 (max. two buttons)			●	●			

Please specify in your order:

Ohm rating of potentiometer
(e. g. 100 Ohm, 1 kOhm, 2.5 kOhm, 5 kOhm, 10 kOhm)

Colour of LED
(e. g. green, red, yellow)

Printing, form of swelling arrow
(wedge-shaped or with central position, points or numerical scale)

Requested features regarding operating and/or display elements and wiring

We offer special designs on request in written form including approval drawing.

Special printing:
See last chapter "Accessories"

With 4-conductor-circuitry, Sensor 3 is used, thus a maximum of 3 LEDs is possible.
LM235Z with calibrating pot = calibration of sensor output signal.
Satchwell switching possible with sensor 2.
Turn switches are not possible with Baldur 1!

Operating elements Baldur 2	Possible combinations	1	2	3	4	5	6	7	8	9	10
Sensor 1		●	●	●	●	●	●	●	●	●	●
Sensor 2 LM235Z with calibrating pot		●						●			
Sensor 3 with heat sink (4-wire)											
Potentiometer 1 (at bottom) with/without series resistor		●	●		●		●	●	●		●
Potentiometer 2 (at top)			●						●		
Key switch (at bottom)				●						●	
Turn switch 1 (at top) with/without series resistor					●						●
Turn switch 2 (at bottom)						●					
LED 1 (max. one LED)											
LED 2 (max. two LEDs)											
LED 3 (max. three LEDs)			●						●		
LED 4 (max. four LEDs)					●						●
LED 5 (max. five LEDs)		●		●		●		●		●	
LED 6 (max. six LEDs)							●				
Rocker switch		●	●	●	●	●	●				
Push-button 1 (max. one button)											
Push-button 2 (max. two buttons)		●	●	●		●	●				●
Push-button 3 (max. three buttons)											
Push-button 4 (max. four buttons)								●	●	●	

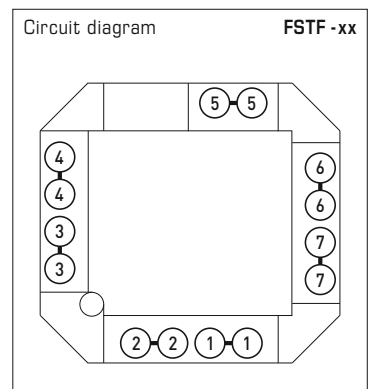
Sensor 3 can also be used instead of sensor 1.
LM235Z with calibrating pot = calibration of sensor output signal.
In the case cascade connections with turn switch 1, LEDs are not possible!
With the Baldur 2 housing, only one operating element is possible at each of the positions "[at bottom]" and "[at top]"!

Room temperature sensors
in-wall, panel switch programme,
general

A room temperature sensor **THERMASGARD® FSTF** is used for air temperature measurement or setpoint adjustment, for presence detection or as room control and operating panel with temperature sensor, push-buttons, potentiometers, status indicators (LEDs).

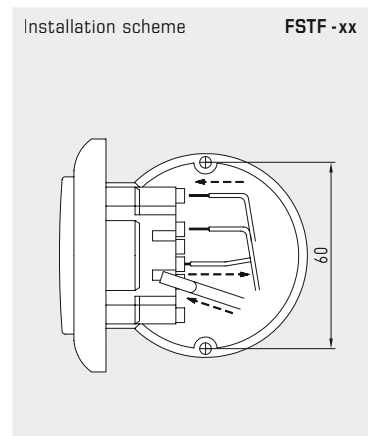
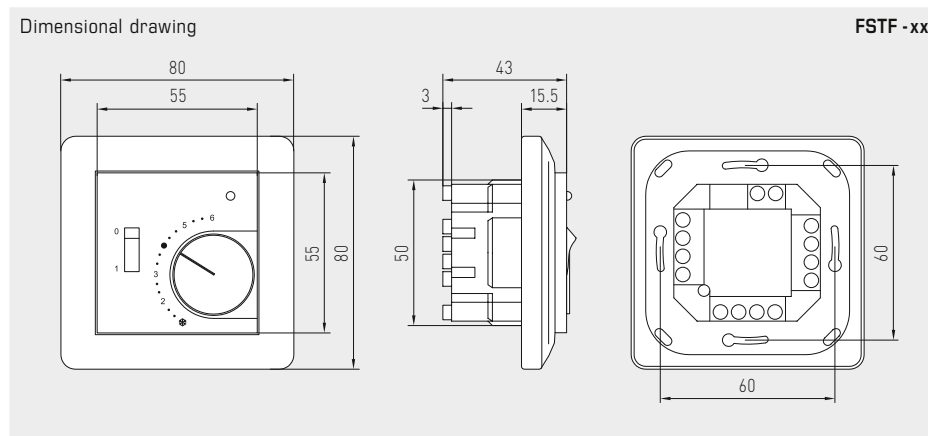
The in-wall sensor is mounted in high-quality panel switch programmes, ideally of the brands Gira, Berker, Merten, Jung, Siemens or Busch-Jaeger (using in-wall adapters) either individually or in combination with light switches, socket outlets, etc.

It is used in non-aggressive, dust-free environments, in refrigeration, air conditioning and clean room technology, and in interior rooms, such as living rooms, offices, hotels, etc.



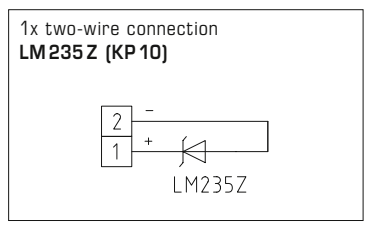
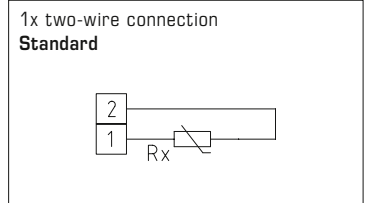
TECHNICAL DATA

Measuring ranges:	-30...+60 °C
Sensor / output:	see table, assembled on board, passive
Range suppression:	in the button
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Potentiometers:	standard 1 kΩ, max. 0.1 W (other ratings optional on request, e. g. 100 Ω, 2.5 kΩ, 5 kΩ, 10 kΩ optional 0-10V linear)
Turn switches:	max. 24 V AC / DC, max. 130 mA, max. 5 steps (0, Auto, I, II, III)
Rocker switch:	max. 24 V AC / DC, max. 130 mA
Push-buttons:	normally open contact, max. 24 V DC / 10 mA
LEDs:	max. 24 V DC (optional max. 24 V AC), standard green (red, yellow or two-colour optional)
Installation:	in in-wall flush box Ø 55 mm
Electrical connection:	FSTF-1 via screw terminals 0.14 - 1.5 mm ² , FSTF-xx via plug terminals 1.0 - 2.5 mm ²
Humidity:	max. 90% RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 20 (according to EN 60 529)
SWITCH PROGRAMMES	
Manufacturer:	GIRA System 55 Standard (other switch programmes, manufacturers, and prices upon request)
Housing:	plastic, colour pure white glossy (similar to RAL 9010) (other colours are possible on request with colour variants depending on the respective switch programme)



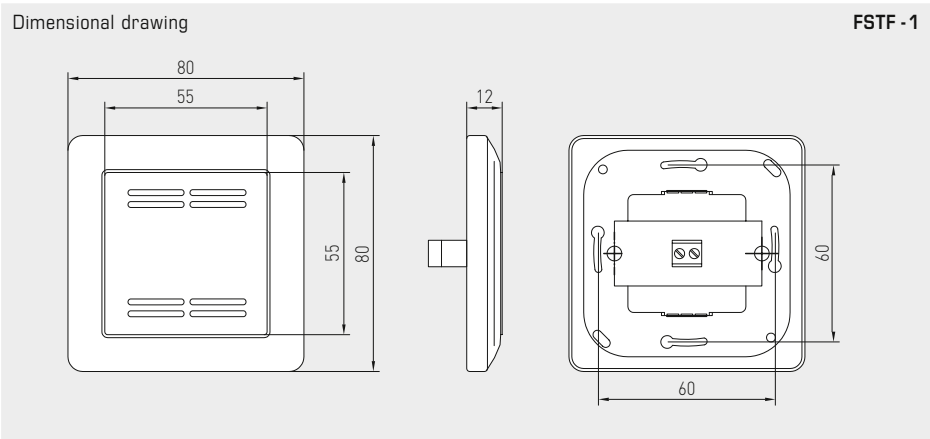


FSTF 1
Standard version
with sensor



THERMASGARD® FSTF 1 Room temperature sensors

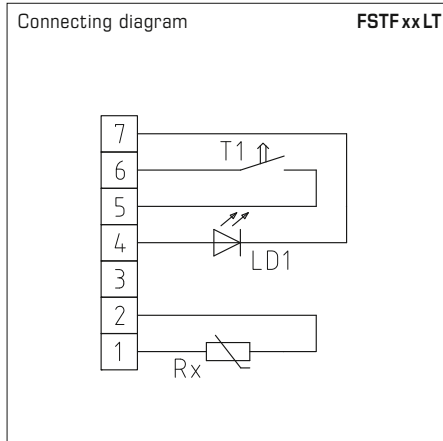
Type / WG01	Sensor / Output	Item No.	Price
FSTF1	passive	IP 20 (-30...+60 °C)	
FSTF1 Pt100	Pt100 (according to DIN EN 60 751, class B)	1101-5020-1000-162	50,79 €
FSTF1 Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-5020-5000-162	50,79 €
FSTF1 Ni1000	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-5020-9000-162	52,31 €
FSTF1 NiTK	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-5021-0000-162	54,74 €
FSTF1 LM235Z	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-5022-1000-162	50,93 €
FSTF1 NTC1,8K	NTC 1.8K	1101-5021-2000-162	50,31 €
FSTF1 NTC10K	NTC 10K	1101-5021-5000-162	49,78 €
FSTF1 NTC20K	NTC 20K	1101-5021-6000-162	49,78 €



Room temperature sensors
in-wall, panel switch programme,
different versions



FSTFxxLT
Version with sensor,
LED (green), and push-button
(max. 24 V DC, max. 10 mA)

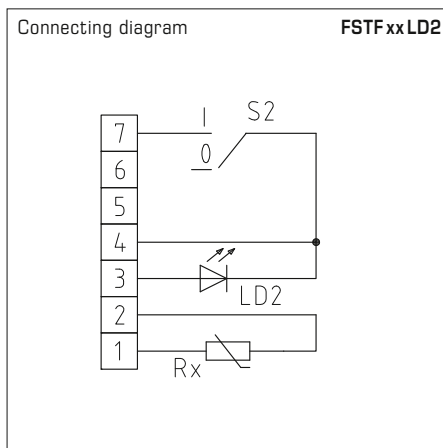


THERMASGARD® FSTFxxLT Room temperature sensors

Type/WG01	Sensor/Output	Item No.	Price
FSTFxxLT	passive	IP 20 (-30...+60 °C)	
FSTF Pt100 L T	Pt100 (according to DIN EN 60 751, class B)	1101-5020-1593-350	66,85 €
FSTF Pt1000 L T	Pt1000 (according to DIN EN 60 751, class B)	1101-5020-5593-350	66,85 €
FSTF Ni1000 L T	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-5020-9593-350	68,74 €
FSTF NiTK L T	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-5021-0593-350	68,74 €
FSTF LM235Z L T	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-5022-1593-350	67,47 €
FSTF NTC1,8K L T	NTC 1.8K	1101-5021-2593-350	66,85 €
FSTF NTC10K L T	NTC 10K	1101-5021-5593-350	66,20 €
FSTF NTC20K L T	NTC 20K	1101-5021-6593-350	66,20 €



FSTFxxLD2
Version with sensor,
LED (green), and turn switch (2-step)
(max. 24 V AC/DC, max. 130 mA)

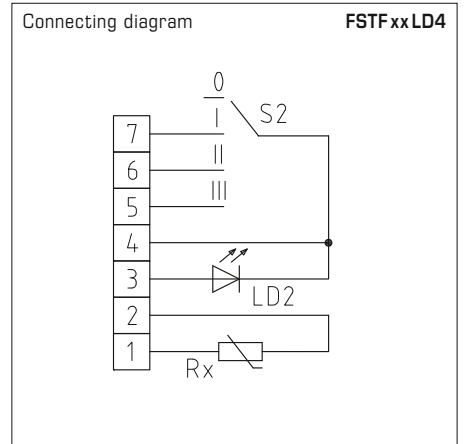


THERMASGARD® FSTFxxLD2 Room temperature sensors

Type/WG01	Sensor/Output	Item No.	Price
FSTFxxLD2	passive	IP 20 (-30...+60 °C)	
FSTF Pt100 D2 L	Pt100 (according to DIN EN 60 751, class B)	1101-5020-1631-351	76,50 €
FSTF Pt1000 D2 L	Pt1000 (according to DIN EN 60 751, class B)	1101-5020-5631-351	76,50 €
FSTF Ni1000 D2 L	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-5020-9631-351	78,92 €
FSTF NiTK D2 L	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-5021-0631-351	78,92 €
FSTF LM235Z D2 L	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-5022-1631-351	77,02 €
FSTF NTC1,8K D2 L	NTC 1.8K	1101-5021-2631-351	77,02 €
FSTF NTC10K D2 L	NTC 10K	1101-5021-5631-351	76,39 €
FSTF NTC20K D2 L	NTC 20K	1101-5021-6631-351	76,39 €



FSTFxxLD4
Version with sensor,
LED (green) and turn switch (4-step)
(max. 24 V AC / DC, max. 130 mA)

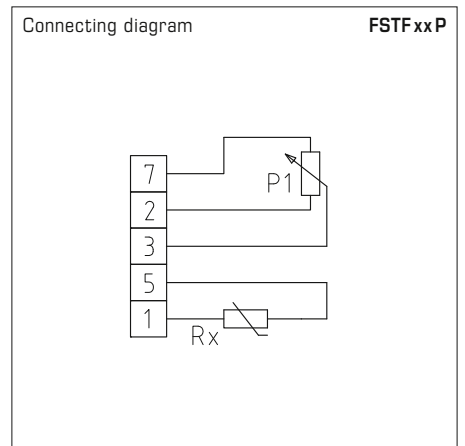


THERMASGARD® FSTFxxLD4 Room temperature sensors

Type / WG01	Sensor / Output	Item No.	Price
FSTFxxLD4	passive	IP20 (-30...+60 °C)	
FSTF Pt100 D4 L	Pt100 (according to DIN EN 60751, class B)	1101-5020-1643-352	79,58 €
FSTF Pt1000 D4 L	Pt1000 (according to DIN EN 60751, class B)	1101-5020-5643-352	79,58 €
FSTF Ni1000 D4 L	Ni1000 (according to DIN EN 43760, class B, TCR = 6180 ppm / K)	1101-5020-9643-352	81,48 €
FSTF NiTK D4 L	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-5021-0643-352	81,48 €
FSTF LM235Z D4 L	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-5022-1643-352	80,21 €
FSTF NTC1,8K D4 L	NTC 1.8K	1101-5021-2643-352	79,58 €
FSTF NTC10K D4 L	NTC 10K	1101-5021-5643-352	78,92 €
FSTF NTC20K D4 L	NTC 20K	1101-5021-6643-352	78,92 €



FSTFxxP
Version with sensor
and potentiometer
(1 kOhm, max. 0.1 W)



THERMASGARD® FSTFxxP Room temperature sensors

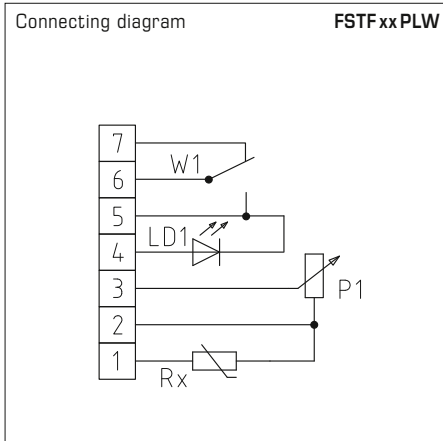
Type / WG01	Sensor / Output	Item No.	Price
FSTFxxP	passive	IP20 (-30...+60 °C)	
FSTF Pt100 P	Pt100 (according to DIN EN 60751, class B)	1101-5020-1001-282	82,11 €
FSTF Pt1000 P	Pt1000 (according to DIN EN 60751, class B)	1101-5020-5001-162	82,11 €
FSTF Ni1000 P	Ni1000 (according to DIN EN 43760, class B, TCR = 6180 ppm / K)	1101-5020-9001-162	82,89 €
FSTF NiTK P	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-5021-0001-162	85,68 €
FSTF LM235Z P	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-5022-1001-162	78,29 €
FSTF NTC1,8K P	NTC 1.8K	1101-5021-2001-162	79,58 €
FSTF NTC10K P	NTC 10K	1101-5021-5001-162	78,29 €
FSTF NTC20K P	NTC 20K	1101-5021-6001-162	78,29 €

Room temperature sensors
in-wall, panel switch programme,
different versions



FSTFxxPLW

Version with sensor,
potentiometer (1 kOhm, max. 0.1 W),
LED (green), and rocker switch
(max. 24 V AC/DC, max. 130 mA)



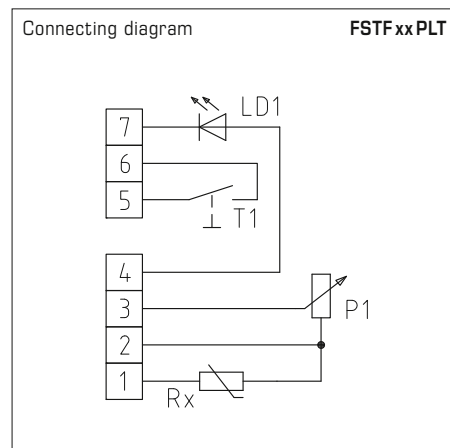
THERMASGARD® FSTF xx PLW Room temperature sensors

Type/WG01	Sensor/Output	Item No.	Price
FSTFxxPLW	passive	IP 20 (-30...+60 °C)	
FSTF Pt100 P L W	Pt100 (according to DIN EN 60 751, class B)	1101-5020-1655-353	104,20 €
FSTF Pt1000 P L W	Pt1000 (according to DIN EN 60 751, class B)	1101-5020-5655-353	106,82 €
FSTF Ni1000 P L W	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-5020-9655-353	107,45 €
FSTF NiTK P L W	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-5021-0655-353	110,04 €
FSTF LM235Z P L W	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-5022-1655-353	104,84 €
FSTF NTC1,8K P L W	NTC 1.8K	1101-5021-2655-353	110,57 €
FSTF NTC10K P L W	NTC 10K	1101-5021-5655-353	104,20 €
FSTF NTC20K P L W	NTC 20K	1101-5021-6655-353	104,20 €



FSTFxxPLT

Version with sensor,
potentiometer (1 kOhm, max. 0.1 W),
LED (green), and push-button
(max. 24 V DC, max. 10 mA)

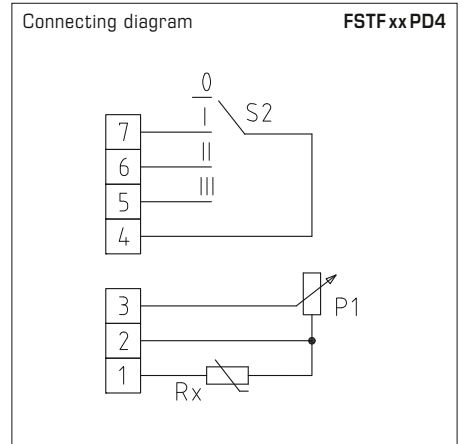


THERMASGARD® FSTF xx PLT Room temperature sensors

Type/WG01	Sensor/Output	Item No.	Price
FSTFxxPLT	passive	IP 20 (-30...+60 °C)	
FSTF Pt100 P L T	Pt100 (according to DIN EN 60 751, class B)	1101-5020-1663-162	104,14 €
FSTF Pt1000 P L T	Pt1000 (according to DIN EN 60 751, class B)	1101-5020-5663-162	106,75 €
FSTF Ni1000 P L T	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-5020-9663-350	107,38 €
FSTF NiTK P L T	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-5021-0663-350	109,99 €
FSTF LM235Z P L T	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-5022-1663-350	104,77 €
FSTF NTC1,8K P L T	NTC 1.8K	1101-5021-2663-350	110,50 €
FSTF NTC10K P L T	NTC 10K	1101-5021-5663-350	104,14 €
FSTF NTC20K P L T	NTC 20K	1101-5021-6663-350	104,14 €



FSTF xx PD4
Version with sensor,
potentiometer (1 kOhm, max. 0.1 W)
and turn switch
(max. 24 V AC / DC, max. 130 mA)

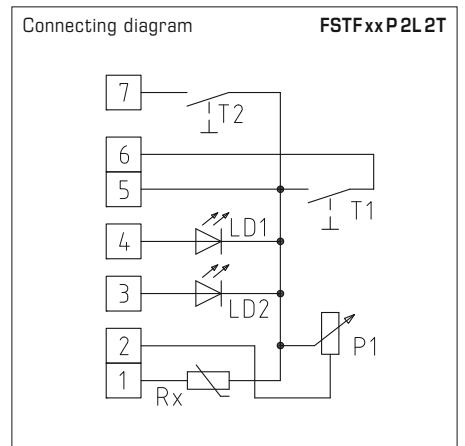


THERMASGARD® FSTF xx PD4 Room temperature sensors

Type / WG01	Sensor / Output	Item No.	Price
FSTF xx PD4	passive	IP20 (-30...+60 °C)	
FSTF Pt100 P D4	Pt100 (according to DIN EN 60751, class B)	1101-5020-1007-354	107,39 €
FSTF Pt1000 P D4	Pt1000 (according to DIN EN 60751, class B)	1101-5020-5007-354	110,00 €
FSTF Ni1000 P D4	Ni1000 (according to DIN EN 43760, class B, TCR = 6180 ppm / K)	1101-5020-9007-354	110,65 €
FSTF NiTK P D4	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-5021-0007-354	113,26 €
FSTF LM235Z P D4	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-5022-1007-354	107,39 €
FSTF NTC1,8K P D4	NTC 1.8K	1101-5021-2007-354	109,33 €
FSTF NTC10K P D4	NTC 10K	1101-5021-5007-354	106,75 €
FSTF NTC20K P D4	NTC 20K	1101-5021-6007-354	106,75 €



FSTF xx P 2L 2T
Version with sensor,
potentiometer (1 kOhm, max. 0.1 W),
2 LEDs (green, red), and 2 push-buttons (max.
24 V DC, max. 10 mA)



THERMASGARD® FSTF xx P 2L 2T Room temperature sensors

Type / WG01	Sensor / Output	Item No.	Price
FSTF xx P 2L 2T	passive	IP20 (-30...+60 °C)	
FSTF Pt100 P 2L 2T	Pt100 (according to DIN EN 60751, class B)	1101-5020-1672-256	109,99 €
FSTF Pt1000 P 2L 2T	Pt1000 (according to DIN EN 60751, class B)	1101-5020-5672-256	113,55 €
FSTF Ni1000 P 2L 2T	Ni1000 (according to DIN EN 43760, class B, TCR = 6180 ppm / K)	1101-5020-9672-256	117,24 €
FSTF NiTK P 2L 2T	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-5021-0672-256	119,41 €
FSTF LM235Z P 2L 2T	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-5022-1672-256	112,54 €
FSTF NTC1,8K P 2L 2T	NTC 1.8K	1101-5021-2672-256	116,12 €
FSTF NTC10K P 2L 2T	NTC 10K	1101-5021-5672-256	110,50 €
FSTF NTC20K P 2L 2T	NTC 20K	1101-5021-6672-256	110,50 €

**In-ceiling temperature sensors
with passive output**

THERMASGARD® DTF is a small in-ceiling resistance thermometer with passive output for in-wall installation, e.g. in plasterboard walls or suspended ceilings. The in-ceiling temperature sensor DTF is preferably installed in ceilings and walls, blends in seamlessly with the overall architectural design and detects the temperature at the surface. The connecting head is pluggable for quick, easy mounting.

DTF

Connecting head,
pluggable

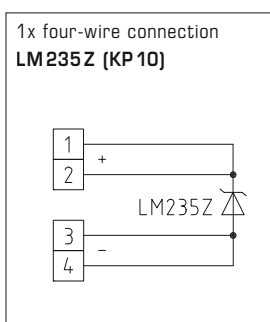
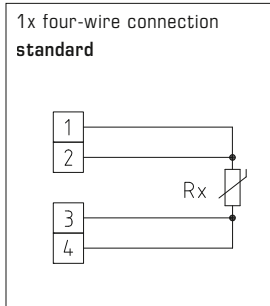
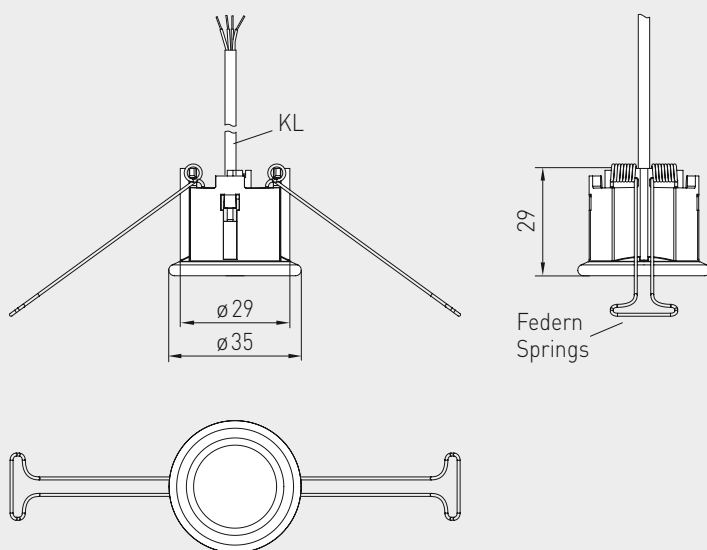


TECHNICAL DATA

Measuring range:	-20...+90 °C
Sensors / output:	see table, passive
Connection type:	4-wire connection terminal 1 / 2: + (marked red, wire colours: yellow, brown) terminal 3 / 4: - (marked black, wire colours: white, green)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Connecting head:	plastic, material polycarbonate (PC), colour white (can be painted as an option), pluggable
Connecting cable:	PVC, LiYY, 4 x 0.14 mm ² , KL = approx. 2 m
Process connection:	inside suspended ceiling, ceiling cutout Ø = 30 mm, cover Ø = < 35 mm
Insulating resistance:	≥ 100 MΩ, at +20 °C (500V DC)
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 30 (according EN 60 529) Sensor in the built-in state

Dimensional drawing

DTF





DTF



THERMASGARD® DTF		In-ceiling temperature sensors	
Type / WG03	Sensor / Output	Item No.	Price
DTF		IP30	
DTF Pt100	Pt100 (according to DIN EN 60 751, class B)	1101-60C0-1003-000	40,74 €
DTF Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-60C0-5003-000	40,74 €
DTF Ni1000	Ni1000 (according to DIN EN 43760, class B, TCR = 6180 ppm/K)	1101-60C0-9003-000	40,48 €
DTF NiTK	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-60C1-0003-000	44,45 €
DTF LM235Z	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-60C2-1003-000	41,69 €
DTF NTC1,8K	NTC 1.8K	1101-60C1-2003-000	41,69 €
DTF NTC10K	NTC 10K	1101-60C1-5003-000	41,69 €
DTF NTC20K	NTC 20K	1101-60C1-6003-000	41,69 €
Note:	Other sensors optional	on request	

**Outside temperature sensors / wet room temperature sensors
with passive output**

Outside wall resistance thermometer / weather sensor **THERMASGARD® ATF 1** (internal sensor) with passive output, housing made of impact-resistant plastic and quick-locking screws.

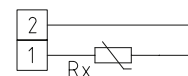
Outside wall resistance thermometer / weather sensor **THERMASGARD® ATF 01** (internal sensor) with passive output, housing made of impact-resistant plastic and snap-on lid.

It is used to measure outside temperatures, temperatures in wet room areas, e.g. as an outdoor sensor, weather sensor for installation on outside walls, in cold storage buildings and greenhouses, in halls, in the industrial sector and in agriculture. Installation in outdoor areas preferably at the north side of a building or in a protected place. In cases of direct solar irradiation, we recommend the use of our **WS01** or **WS04** sun protection hood (accessory).

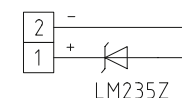
TECHNICAL DATA

Measuring range:	-50...+90 °C
Sensors / output:	passive (see table), sensors internal
Connection type:	2-wire connection (4-wire connection on PT100/PT1000A, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016), ATF01 with snap-on lid, ATF1 with quick-locking screws (slotted / Phillips head combination)
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 / Tyr 01)
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101
Electrical connection:	0.14 - 1.5 mm ² , via terminal screws
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	ATF01 IP 54 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713160960A (Tyr 01) ATF1 IP 67 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1)

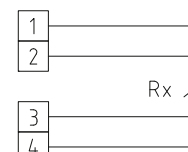
1x two-wire connection
standard



1x two-wire connection
LM235Z (KP 10)



1x four-wire connection
(optional)



THERMASGARD® ATF 01 Outside temperature sensors / wet room temperature sensors, *Standard*
with snap-on lid

Type / WG03	Sensor / Output	Item No.	Price
ATF 01		IP 54	
ATF01 Pt100	Pt100 (according to DIN EN 60 751, class B)	1101-1030-1003-000	15,29 €
ATF01 Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-1030-5001-000	17,90 €
ATF01 Ni1000	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-1030-9001-000	18,70 €
ATF01 NiTK	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-1031-0001-000	21,70 €
ATF01 LM235Z	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-1032-1001-000	15,76 €
ATF01 NTC1,8K	NTC 1.8K	1101-1031-2001-000	14,52 €
ATF01 NTC10K	NTC 10K	1101-1031-5001-000	14,52 €
ATF01 NTC20K	NTC 20K	1101-1031-6001-000	14,52 €
Extra charge:	Other sensors optional Cable connection with M12 connector according to DIN EN 61076-2-101		on request on request
ACCESSORIES			
WS-01	Sun and ball-impact protection hood , 184 x 180 x 80 mm, stainless steel V2A (1.4301)	7100-0040-2000-000	31,77 €
WS-04	Weather and sun protection hood , 130 x 180 x 135 mm, stainless steel V2A (1.4301)	7100-0040-7000-000	37,49 €

For further information see last chapter!



S+S REGELTECHNIK

THERMASGARD® ATF 1
THERMASGARD® ATF 01

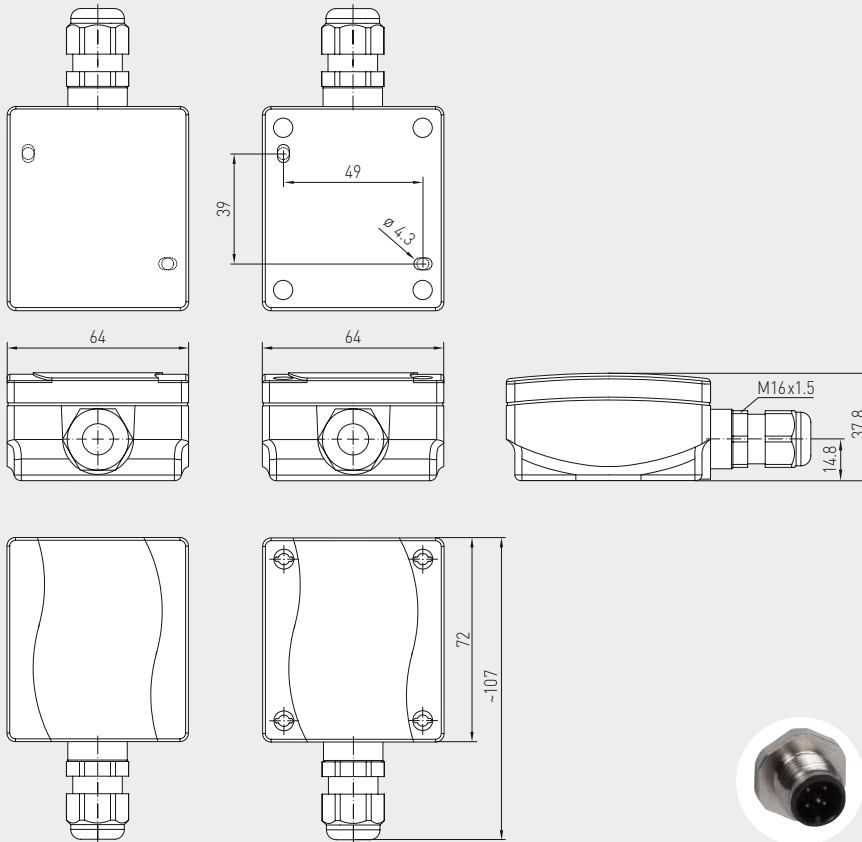
Outside temperature sensors / wet room temperature sensors
with passive output



Dimensional drawing

ATF 1
ATF01

ATF 01
with snap-on lid
(IP54)



with snap-on lid

with quick-locking screws

M12 connector
(optional on request)



ATF 1
with quick-locking screws
(IP67)



THERMASGARD® ATF 1 Outside temperature sensors / wet room temperature sensors, Premium with quick-locking screws

Type / WG03	Sensor / Output	Item No.	Price
ATF 1		IP67	
ATF1 Pt100	Pt100 (according to DIN EN 60 751, class B)	1101-1040-1003-000	17,67 €
ATF1 Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-1040-5001-000	20,28 €
ATF1 Pt1000A	Pt1000 (according to VDI / VDE 3512, class A-TGA)	1101-1040-6003-000	23,71 €
ATF1 Ni1000	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-1040-9001-000	19,80 €
ATF1 NiTK	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-1041-0001-000	24,08 €
ATF1 LM235Z	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-1042-1001-000	18,13 €
ATF1 NTC1,8K	NTC 1.8K	1101-1041-2001-000	16,13 €
ATF1 NTC10K	NTC 10K	1101-1041-5001-000	16,13 €
ATF1 NTC20K	NTC 20K	1101-1041-6001-000	16,13 €

Extra charge:: Other sensors optional on request
Cable connection with M12 connector according to DIN EN 61076-2-101 on request

ACCESSORIES

WS-01	Sun and ball-impact protection hood, 184 x 180 x 80 mm, stainless steel V2A (1.4301)	7100-0040-2000-000	31,77 €
WS-04	Weather and sun protection hood, 130 x 180 x 135 mm, stainless steel V2A (1.4301)	7100-0040-7000-000	37,49 €

For further information see last chapter!

**Outside temperature sensors / wet room temperature sensors
with passive output**

Outside wall resistance thermometers / weather sensors **THERMASGARD® ATF 2** (external sensor) with passive output and housing made of impact-resistant plastic and with quick-locking screws.

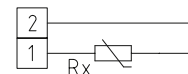
It is used to measure outside temperatures, temperatures in wet room areas, e.g. as a weather sensor, for installation on outside walls, in cold storage buildings and greenhouses, in halls, in the industrial sector and in agriculture. Outdoor installation should preferably be performed at the north side of a building or in a protected place.

In cases of direct solar irradiation, we recommend the use of our **WS01** or **WS04** sun protection hood (accessory) or the device version with installed sun protection hood **SS02** (available upon request).

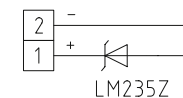
TECHNICAL DATA

Measuring range:	-50...+90 °C
Sensors / output:	passive (see table), sensor inside external sensor tube, stainless steel V4A (1.4571) (Perfect Sensor Protection)
Connection type:	2-wire connection (4-wire connection on PT100/PT1000A, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016)
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1)
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101
Electrical connection:	0.14 - 1.5 mm ² via terminal screws
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Permissible humidity:	< 95% RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP65 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1)
Optional:	with sun protection hood SS02 (available on request)

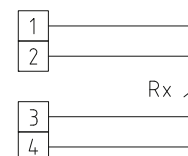
1x two-wire connection
standard



1x two-wire connection
LM235Z (KP 10)

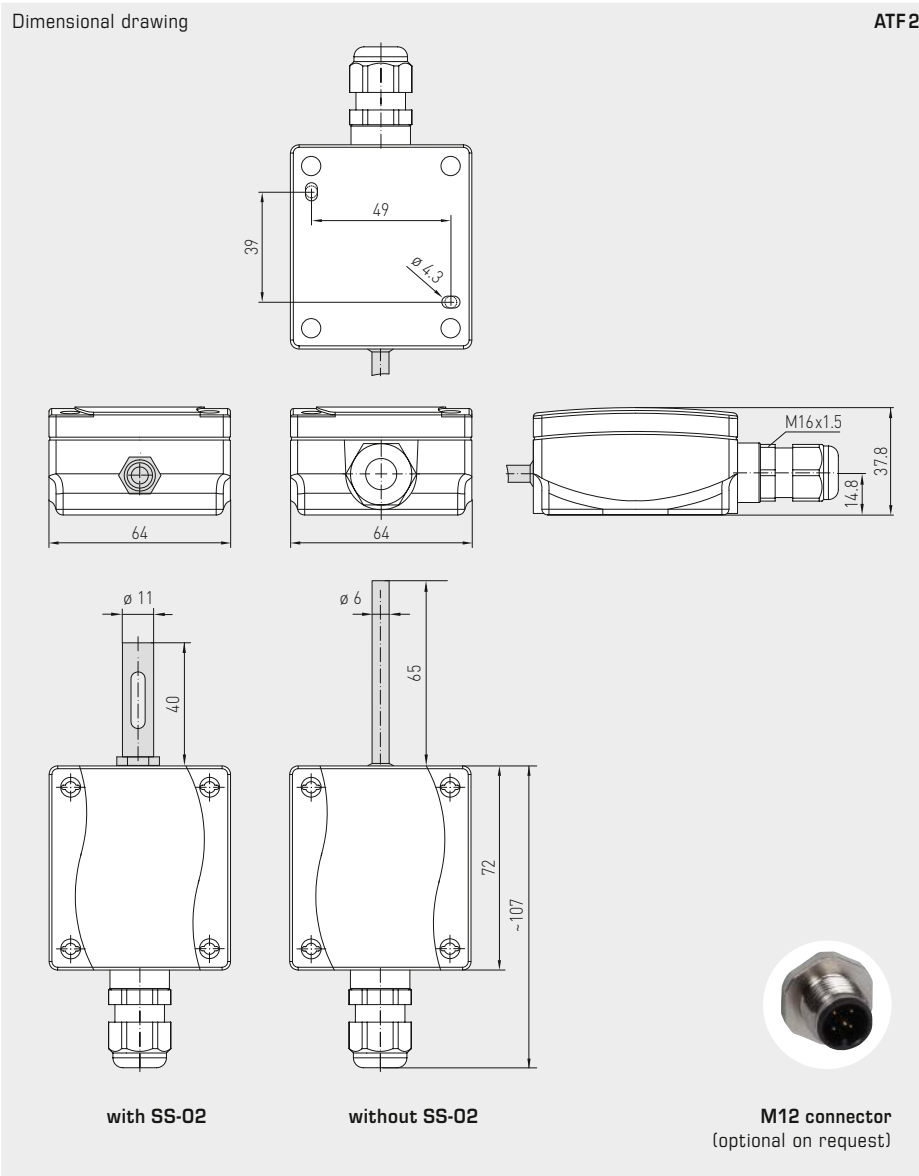


1x four-wire connection
(optional)



High-performance encapsulation against
vibration, mechanical stress and humidity





THERMASGARD® ATF 2 Outside temperature sensors / wet room temperature sensors

Type / WG03	Sensor / Output	Item No.	Price
ATF 2			
ATF2 Pt100	Pt100 (according to DIN EN 60 751, class B)	1101-1050-1003-000	38,54 €
ATF2 Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-1050-5001-000	38,54 €
ATF2 Pt1000A	Pt1000 (according to VDI / VDE 3512, class A-TGA)	1101-1050-6003-000	47,86 €
ATF2 Ni1000	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-1050-9001-000	40,79 €
ATF2 NiTK	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-1051-0001-000	40,79 €
ATF2 LM235Z	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-1052-1001-000	37,95 €
ATF2 NTC1,8K	NTC 1.8 K	1101-1051-2001-000	37,17 €
ATF2 NTC10K	NTC 10K	1101-1051-5001-000	37,17 €
ATF2 NTC20K	NTC 20K	1101-1051-6001-000	37,17 €
Extra charge:	Other sensors optional	on request	
	with sun protection hood SS02	on request	9,74 €
	Cable connection with M12 connector according to DIN EN 61076-2-101	on request	
ACCESSORIES			
WS-01	Sun and ball-impact protection hood , 184 x 180 x 80 mm, stainless steel V2A (1.4301)	7100-0040-2000-000	31,77 €
WS-04	Weather and sun protection hood , 130 x 180 x 135 mm, stainless steel V2A (1.4301)	7100-0040-7000-000	37,49 €

For further information see last chapter!

**Immersion / screw-in / duct temperature sensors
with passive output**

Patented quality product (Immersion sensor patent no. DE 10 2012 017 500.0)

THERMASGARD® TF 43 is a resistance thermometer with a passive output, housing made from impact-resistant plastic with snap-on lid, and straight protective tube.

THERMASGARD® TF 65 is a resistance thermometer with a passive output, housing made from impact-resistant plastic with quick-locking screws, and straight protective tube.

These immersion / screw-in / duct temperature sensors are electric contact thermometers for temperature measurement in liquids and gases, which are installed for example in piping systems and vessels. For aggressive media, stainless steel immersion sleeves must be used.

Applications of these temperature sensors in piping systems, in heating technology, in storage tanks, in district heating compact stations, in hot and cold-water systems, in oil and lubricant circulation systems, in mechanical, apparatus and plant engineering as well as in the entire industrial sector.

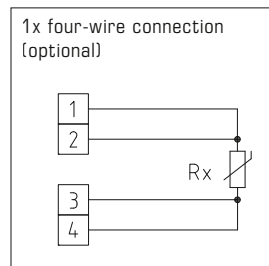
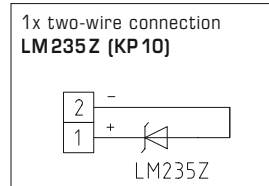
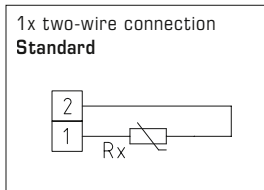
TECHNICAL DATA

Measuring range:	-30...+150 °C (T_{max} NTC = +150 °C, T_{max} LM235Z = +125 °C)
Sensors / output:	see table, passive (Perfect Sensor Protection) (optional also with two sensors)
Connection type:	2-wire connection (4-wire connection on PT100/PT1000A, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Ambient temperature:	-20...+100 °C
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016) TF 43 with snap-on lid TF 65 with quick-locking screws (slotted / Phillips head combination)
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 / Tyr 01)
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (optional on request)
Electrical connection:	0.14 - 1.5 mm ² , via terminal screws
Protective tube:	stainless steel, V4A (1.4571), Ø = 6 mm, inserted length (EL) = 50 - 400 mm (see table)
Permissible humidity:	< 95% RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	TF 43 IP 54 (according to EN 60 529)* Housing tested, TÜV SÜD, Report No. 713160960A (Tyr 01) TF 65 IP 67 (according to EN 60 529)* Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1) * Housing in the built-in state

ACCESSORIES

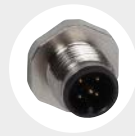
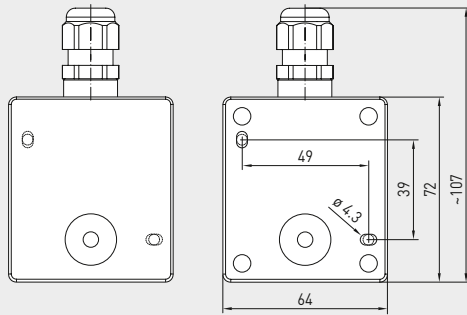
MF-15-K	Mounting flange , plastic, 56.8 x 84.3 mm, Ø = 15.2 mm tube gland, T_{max} = +100 °C
TH08-ms/xx	Immersion sleeve , brass, nickel-plated, Ø = 8 mm, T_{max} = +150 °C, p_{max} = 10 bar
TH08-VA/xx	Immersion sleeve , stainless steel, V4A (1.4571), Ø = 8 mm, T_{max} = +600 °C, p_{max} = 40 bar
TH08-VA/xx/90	Immersion sleeve , stainless steel, V4A (1.4571), with neck tube (90 mm), Ø = 8 mm, T_{max} = +600 °C, p_{max} = 40 bar

High-performance encapsulation against
vibration, mechanical stress and humidity

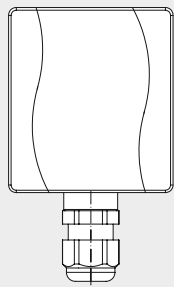
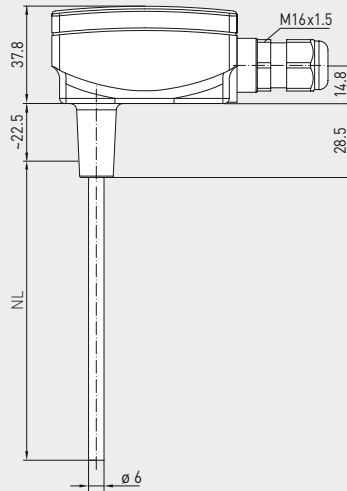
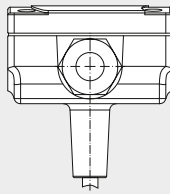




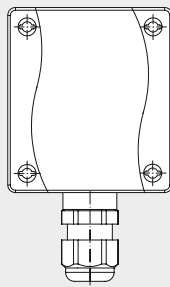
Dimensional drawing



M12 connector
(optional on request)



with snap-on lid



with quick-locking screws

TF 43
TF 65

TF 43
with snap-on lid
(IP54)



TF 65
with quick-locking screws
(IP67)



PATENTED



TFxx
Basic device
with accessories

Immersion / screw-in / duct temperature sensors
with passive output

THERMASGARD® TF 65 Temperature sensors (Basic device with quick-locking screws), *Premium*

Type / WG03 / EL	Sensor / Output	Item No.	Price
TF65 PT100 xx	Pt100	IP 67	
TF65 Pt100 50mm	Pt100 (according to DIN EN 60 751, class B)	1101-7020-1013-000	37,82 €
TF65 Pt100 100mm	Pt100 (according to DIN EN 60 751, class B)	1101-7020-1023-000	39,36 €
TF65 Pt100 150mm	Pt100 (according to DIN EN 60 751, class B)	1101-7020-1033-000	40,91 €
TF65 Pt100 200mm	Pt100 (according to DIN EN 60 751, class B)	1101-7020-1043-000	41,51 €
TF65 Pt100 250mm	Pt100 (according to DIN EN 60 751, class B)	1101-7020-1053-000	43,40 €
TF65 Pt100 300mm	Pt100 (according to DIN EN 60 751, class B)	1101-7020-1063-000	44,82 €
TF65 Pt100 350mm	Pt100 (according to DIN EN 60 751, class B)	1101-7020-1073-000	45,64 €
TF65 Pt100 400mm	Pt100 (according to DIN EN 60 751, class B)	1101-7020-1083-000	46,73 €
TF65 PT1000 xx	Pt1000	IP 67	
TF65 Pt1000 50mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7020-5011-000	40,43 €
TF65 Pt1000 100mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7020-5021-000	41,98 €
TF65 Pt1000 150mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7020-5031-000	43,51 €
TF65 Pt1000 200mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7020-5041-000	44,10 €
TF65 Pt1000 250mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7020-5051-000	46,01 €
TF65 Pt1000 300mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7020-5061-000	47,43 €
TF65 Pt1000 350mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7020-5071-000	48,02 €
TF65 Pt1000 400mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7020-5081-000	48,85 €
TF65 PT1000A xx	Pt1000A	IP 67	
TF65 Pt1000A 50mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7020-6013-000	42,37 €
TF65 Pt1000A 100mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7020-6023-000	43,05 €
TF65 Pt1000A 150mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7020-6033-000	45,30 €
TF65 Pt1000A 200mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7020-6043-000	45,89 €
TF65 Pt1000A 250mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7020-6053-000	47,79 €
TF65 Pt1000A 300mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7020-6063-000	49,32 €
TF65 Pt1000A 350mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7020-6073-000	50,86 €
TF65 Pt1000A 400mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7020-6083-000	51,09 €
TF65 Ni1000 xx	Ni 1000	IP 67	
TF65 Ni1000 50mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-7020-9011-000	39,72 €
TF65 Ni1000 100mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-7020-9021-000	41,62 €
TF65 Ni1000 150mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-7020-9031-000	43,16 €
TF65 Ni1000 200mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-7020-9041-000	43,75 €
TF65 Ni1000 250mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-7020-9051-000	45,64 €
TF65 Ni1000 300mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-7020-9061-000	47,06 €
TF65 Ni1000 350mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-7020-9071-000	48,02 €
TF65 Ni1000 400mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-7020-9081-000	48,62 €
TF65 NI1000TK xx	Ni1000 TK5000	IP 67	
TF65 NiTK 50mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-7021-0011-000	39,72 €
TF65 NiTK 100mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-7021-0021-000	41,62 €
TF65 NiTK 150mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-7021-0031-000	43,16 €
TF65 NiTK 200mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-7021-0041-000	43,75 €
TF65 NiTK 250mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-7021-0051-000	45,64 €
TF65 NiTK 300mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-7021-0061-000	47,06 €
TF65 NiTK 350mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-7021-0071-000	48,02 €
TF65 NiTK 400mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-7021-0081-000	44,38 €

Continued on next page...

High-performance encapsulation against
vibration, mechanical stress and humidity





THERMASGARD® TF 65 Temperature sensors (Basic device with quick-locking screws), <i>Premium</i>			
Type/WG03 / EL	Sensor/Output	Item No.	Price
TF65 LM235Z xx	LM235Z	IP67	
TF65 LM235Z 50mm	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-7022-1011-000	38,41 €
TF65 LM235Z 100mm	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-7022-1021-000	39,84 €
TF65 LM235Z 150mm	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-7022-1031-000	41,38 €
TF65 LM235Z 200mm	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-7022-1041-000	41,98 €
TF65 LM235Z 250mm	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-7022-1051-000	43,98 €
TF65 LM235Z 300mm	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-7022-1061-000	45,41 €
TF65 LM235Z 350mm	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-7022-1071-000	46,24 €
TF65 LM235Z 400mm	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-7022-1081-000	46,83 €
TF65 NTC 1.8K xx	NTC 1.8K	IP67	
TF65 NTC1,8K 50mm	NTC 1.8K	1101-7021-2011-000	36,29 €
TF65 NTC1,8K 100mm	NTC 1.8K	1101-7021-2021-000	37,82 €
TF65 NTC1,8K 150mm	NTC 1.8K	1101-7021-2031-000	39,36 €
TF65 NTC1,8K 200mm	NTC 1.8K	1101-7021-2041-000	39,84 €
TF65 NTC1,8K 250mm	NTC 1.8K	1101-7021-2051-000	41,84 €
TF65 NTC1,8K 300mm	NTC 1.8K	1101-7021-2061-000	43,27 €
TF65 NTC1,8K 350mm	NTC 1.8K	1101-7021-2071-000	44,05 €
TF65 NTC1,8K 400mm	NTC 1.8K	1101-7021-2081-000	45,06 €
TF65 NTC10K xx	NTC 10K	IP67	
TF65 NTC10K 50mm	NTC 10K	1101-7021-5011-000	36,29 €
TF65 NTC10K 100mm	NTC 10K	1101-7021-5021-000	37,82 €
TF65 NTC10K 150mm	NTC 10K	1101-7021-5031-000	39,36 €
TF65 NTC10K 200mm	NTC 10K	1101-7021-5041-000	39,84 €
TF65 NTC10K 250mm	NTC 10K	1101-7021-5051-000	41,84 €
TF65 NTC10K 300mm	NTC 10K	1101-7021-5061-000	43,27 €
TF65 NTC10K 350mm	NTC 10K	1101-7021-5071-000	44,05 €
TF65 NTC10K 400mm	NTC 10K	1101-7021-5081-000	45,06 €
TF65 NTC20K xx	NTC 20K	IP67	
TF65 NTC20K 50mm	NTC 20K	1101-7021-6011-000	36,29 €
TF65 NTC20K 100mm	NTC 20K	1101-7021-6021-000	37,82 €
TF65 NTC20K 150mm	NTC 20K	1101-7021-6031-000	39,36 €
TF65 NTC20K 200mm	NTC 20K	1101-7021-6041-000	39,84 €
TF65 NTC20K 250mm	NTC 20K	1101-7021-6051-000	41,73 €
TF65 NTC20K 300mm	NTC 20K	1101-7021-6061-000	43,27 €
TF65 NTC20K 350mm	NTC 20K	1101-7021-6071-000	44,05 €
TF65 NTC20K 400mm	NTC 20K	1101-7021-6081-000	45,06 €
Note:	Other sensors optional	on request	
Optional:	Cable connection with M12 connector according to DIN EN 61076-2-101	on request	



Immersion / screw-in / duct temperature sensors
with passive output

THERMASGARD® TF 43 Temperature sensors (Basic device with snap-on lid), *Standard*

Type / WG03 / EL	Sensor / Output	Item No.	Price
TF43 PT100 xx	Pt100	IP 54	
TF43 Pt100 50mm	Pt100 (according to DIN EN 60 751, class B)	1101-7010-1013-000	28,27 €
TF43 Pt100 100mm	Pt100 (according to DIN EN 60 751, class B)	1101-7010-1023-000	28,39 €
TF43 Pt100 150mm	Pt100 (according to DIN EN 60 751, class B)	1101-7010-1033-000	29,30 €
TF43 Pt100 200mm	Pt100 (according to DIN EN 60 751, class B)	1101-7010-1043-000	30,11 €
TF43 Pt100 250mm	Pt100 (according to DIN EN 60 751, class B)	1101-7010-1053-000	31,65 €
TF43 Pt100 300mm	Pt100 (according to DIN EN 60 751, class B)	1101-7010-1063-000	34,25 €
TF43 Pt100 350mm	Pt100 (according to DIN EN 60 751, class B)	1101-7010-1073-000	35,30 €
TF43 Pt100 400mm	Pt100 (according to DIN EN 60 751, class B)	1101-7010-1083-000	36,42 €
TF43 PT1000 xx	Pt1000	IP 54	
TF43 Pt1000 50mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7010-5011-000	28,27 €
TF43 Pt1000 100mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7010-5021-000	28,39 €
TF43 Pt1000 150mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7010-5031-000	29,30 €
TF43 Pt1000 200mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7010-5041-000	30,11 €
TF43 Pt1000 250mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7010-5051-000	31,65 €
TF43 Pt1000 300mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7010-5061-000	34,25 €
TF43 Pt1000 350mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7010-5071-000	35,30 €
TF43 Pt1000 400mm	Pt1000 (according to DIN EN 60 751, class B)	1101-7010-5081-000	36,42 €
TF43 PT1000A xx	Pt1000A	IP 54	
TF43 Pt1000A 50mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7010-6013-000	30,04 €
TF43 Pt1000A 100mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7010-6023-000	30,18 €
TF43 Pt1000A 150mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7010-6033-000	31,07 €
TF43 Pt1000A 200mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7010-6043-000	31,89 €
TF43 Pt1000A 250mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7010-6053-000	33,42 €
TF43 Pt1000A 300mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7010-6063-000	36,03 €
TF43 Pt1000A 350mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7010-6073-000	37,09 €
TF43 Pt1000A 400mm	Pt1000 (according to VDI/VDE 3512, class A-TGA)	1101-7010-6083-000	38,21 €
TF43 Ni1000 xx	Ni 1000	IP 54	
TF43 Ni1000 50mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-7010-9011-000	28,97 €
TF43 Ni1000 100mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-7010-9021-000	31,71 €
TF43 Ni1000 150mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-7010-9031-000	31,94 €
TF43 Ni1000 200mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-7010-9041-000	32,64 €
TF43 Ni1000 250mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-7010-9051-000	33,56 €
TF43 Ni1000 300mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-7010-9061-000	35,77 €
TF43 Ni1000 350mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-7010-9071-000	36,79 €
TF43 Ni1000 400mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-7010-9081-000	38,44 €
TF43 NI1000TK xx	Ni1000 TK5000	IP 54	
TF43 NiTK 50mm	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-7011-0011-000	29,02 €
TF43 NiTK 100mm	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-7011-0021-000	31,77 €
TF43 NiTK 150mm	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-7011-0031-000	32,10 €
TF43 NiTK 200mm	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-7011-0041-000	32,78 €
TF43 NiTK 250mm	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-7011-0051-000	33,67 €
TF43 NiTK 300mm	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-7011-0061-000	35,91 €
TF43 NiTK 350mm	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-7011-0071-000	37,03 €
TF43 NiTK 400mm	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-7011-0081-000	38,58 €

Continued on next page...

High-performance encapsulation against
vibration, mechanical stress and humidity





THERMASGARD® TF 43 Temperature sensors (Basic device with snap-on lid), <i>Standard</i>			
Type/WG03/EL	Sensor/Output	Item No.	Price
TF43 LM235Z xx	LM235Z	IP54	
TF43 LM235Z 50mm	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-7012-1011-000	29,54 €
TF43 LM235Z 100mm	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-7012-1021-000	29,86 €
TF43 LM235Z 150mm	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-7012-1031-000	30,94 €
TF43 LM235Z 200mm	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-7012-1041-000	31,65 €
TF43 LM235Z 250mm	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-7012-1051-000	32,01 €
TF43 LM235Z 300mm	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-7012-1061-000	34,76 €
TF43 LM235Z 350mm	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-7012-1071-000	35,18 €
TF43 LM235Z 400mm	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-7012-1081-000	37,38 €
TF43 NTC 1.8K xx	NTC 1.8K	IP54	
TF43 NTC1,8K 50mm	NTC 1.8K	1101-7011-2011-000	28,27 €
TF43 NTC1,8K 100mm	NTC 1.8K	1101-7011-2021-000	29,80 €
TF43 NTC1,8K 150mm	NTC 1.8K	1101-7011-2031-000	30,56 €
TF43 NTC1,8K 200mm	NTC 1.8K	1101-7011-2041-000	31,27 €
TF43 NTC1,8K 250mm	NTC 1.8K	1101-7011-2051-000	32,78 €
TF43 NTC1,8K 300mm	NTC 1.8K	1101-7011-2061-000	33,86 €
TF43 NTC1,8K 350mm	NTC 1.8K	1101-7011-2071-000	35,01 €
TF43 NTC1,8K 400mm	NTC 1.8K	1101-7011-2081-000	35,91 €
TF43 NTC10K xx	NTC 10K	IP54	
TF43 NTC10K 50mm	NTC 10K	1101-7011-5011-000	28,27 €
TF43 NTC10K 100mm	NTC 10K	1101-7011-5021-000	29,80 €
TF43 NTC10K 150mm	NTC 10K	1101-7011-5031-000	30,56 €
TF43 NTC10K 200mm	NTC 10K	1101-7011-5041-000	31,27 €
TF43 NTC10K 250mm	NTC 10K	1101-7011-5051-000	32,78 €
TF43 NTC10K 300mm	NTC 10K	1101-7011-5061-000	33,86 €
TF43 NTC10K 350mm	NTC 10K	1101-7011-5071-000	35,01 €
TF43 NTC10K 400mm	NTC 10K	1101-7011-5081-000	35,91 €
TF43 NTC20K xx	NTC 20K	IP54	
TF43 NTC20K 50mm	NTC 20K	1101-7011-6011-000	28,27 €
TF43 NTC20K 100mm	NTC 20K	1101-7011-6021-000	29,80 €
TF43 NTC20K 150mm	NTC 20K	1101-7011-6031-000	30,56 €
TF43 NTC20K 200mm	NTC 20K	1101-7011-6041-000	31,27 €
TF43 NTC20K 250mm	NTC 20K	1101-7011-6051-000	32,78 €
TF43 NTC20K 300mm	NTC 20K	1101-7011-6061-000	33,86 €
TF43 NTC20K 350mm	NTC 20K	1101-7011-6071-000	35,01 €
TF43 NTC20K 400mm	NTC 20K	1101-7011-6081-000	35,91 €
Note	Other sensors optional	on request	
Optional:	Cable connection with M12 connector according to DIN EN 61076-2-101	on request	

TF43
with snap-on lid
(IP54)

Immersion / screw-in / duct temperature sensors
 with passive output

One basic device in four variants...



PATENTED

TFxx + TH08 -ms/xx

Immersion / screw-in temperature sensor with immersion sleeve, brass, nickel-plated

TFxx + TH08 -VA/xx

Immersion / screw-in temperature sensor with immersion sleeve, stainless steel, V4A

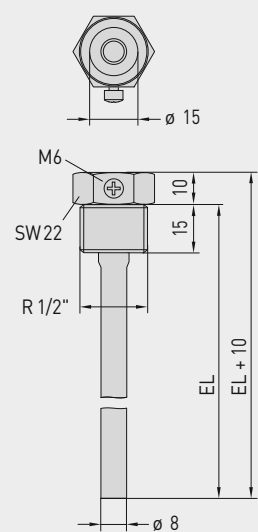
TFxx + TH08 -VA/xx/90

Immersion / screw-in temperature sensor with immersion sleeve with neck tube, stainless steel, V4A

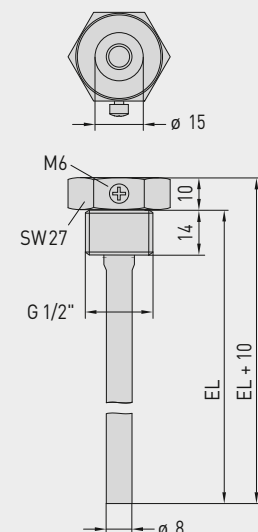
TFxx + MF-15-K

Duct temperature sensor with mounting flange, plastic

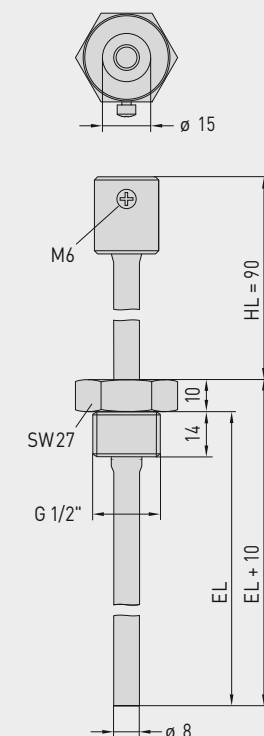
Dimensional drawing TH08 -ms/xx



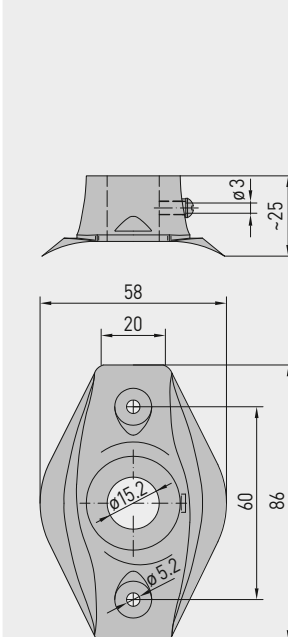
Dimensional drawing TH08 -VA/xx



Dimensional drawing TH08 -VA/xx/90



Dimensional drawing MF-15-K





...through combination with accessories:



TH08-ms/xx
Immersion sleeve,
brass, nickel-plated,
thread-sealing, conical,
according to DIN 10226



TH08-VA/xx
Immersion sleeve,
stainless steel, V4A,
flat-sealing, cylindrical,
according to DIN 228



TH08-VA/xx/90
Immersion sleeve with neck tube,
stainless steel, V4A,
flat-sealing, cylindrical,
according to DIN 228



MF-15-K
Mounting flange,
plastic

THERMASGARD® TH08 Immersion sleeve Ø 8 mm (Accessories)					
Type / WG01B	p _{max} (static)	T _{max}	Inserted Length (EL)	Item No.	Price
TH08-ms/xx Brass, nickel-plated					
TH08-MS 50MM	10 bar	+150 °C	50 mm	7100-0011-0010-132	9,31 €
TH08-MS 100MM	10 bar	+150 °C	100 mm	7100-0011-0020-132	10,61 €
TH08-MS 150MM	10 bar	+150 °C	150 mm	7100-0011-0030-132	11,20 €
TH08-MS 200MM	10 bar	+150 °C	200 mm	7100-0011-0040-132	11,56 €
TH08-MS 250MM	10 bar	+150 °C	250 mm	7100-0011-0050-132	13,39 €
TH08-MS 300MM	10 bar	+150 °C	300 mm	7100-0011-0060-132	13,76 €
TH08-MS 350MM	10 bar	+150 °C	350 mm	7100-0011-0070-132	13,87 €
TH08-MS 400MM	10 bar	+150 °C	400 mm	7100-0011-0080-132	14,00 €
TH08-VA/xx Stainless steel, V4A (1.4571)					
without neck tube					
TH08-VA 50MM	40 bar	+600 °C	50 mm	7100-0012-0010-132	20,28 €
TH08-VA 100MM	40 bar	+600 °C	100 mm	7100-0012-0020-132	22,41 €
TH08-VA 150MM	40 bar	+600 °C	150 mm	7100-0012-0030-132	24,08 €
TH08-VA 200MM	40 bar	+600 °C	200 mm	7100-0012-0040-132	25,38 €
TH08-VA 250MM	40 bar	+600 °C	250 mm	7100-0012-0050-132	31,55 €
TH08-VA 300MM	40 bar	+600 °C	300 mm	7100-0012-0060-132	32,97 €
TH08-VA 350MM	40 bar	+600 °C	350 mm	7100-0012-0070-132	33,19 €
TH08-VA 400MM	40 bar	+600 °C	400 mm	7100-0012-0080-132	33,78 €
TH08-VA/xx/90 Stainless steel, V4A (1.4571)					
with neck tube (90 mm)					
TH08-VA 50/90MM	40 bar	+600 °C	50 mm	7100-0012-0012-132	29,04 €
TH08-VA 100/90MM	40 bar	+600 °C	100 mm	7100-0012-0022-132	30,35 €
TH08-VA 150/90MM	40 bar	+600 °C	150 mm	7100-0012-0032-132	31,84 €
TH08-VA 200/90MM	40 bar	+600 °C	200 mm	7100-0012-0042-132	33,19 €
TH08-VA 250/90MM	40 bar	+600 °C	250 mm	7100-0012-0052-132	34,79 €
TH08-VA 300/90MM	40 bar	+600 °C	300 mm	7100-0012-0062-132	37,71 €

Note: inner diameter of socket 15.0 mm
For further information see last chapter!

Mounting flange (Accessories)				
Type / WG01B		T _{max}	Item No.	Price
MF				
MF-15-K	Mounting flange, plastic, 56.8x84.3 mm, Ø 15.2 mm tube gland	+100 °C	7100-0032-0000-000	6,12 €

Note: For further information see last chapter!

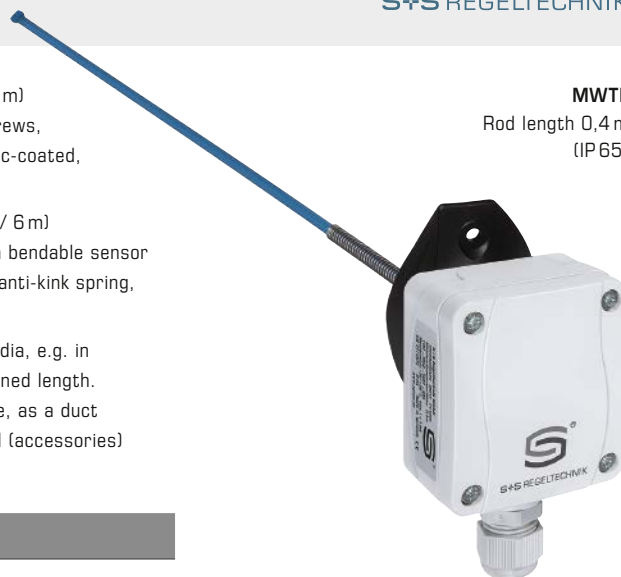
Mean value / rod / duct temperature sensor including mounting flange, with passive output

Mean-value temperature sensor **THERMASGARD® MWTF** (rod sensor 0.4...20 m) with passive output, in an impact-resistant plastic housing with quick-locking screws, with bendable sensor rod (fully active), protective tube made from copper, plastic-coated, and anti-kink spring, incl. mounting flange.

Mean-value temperature sensor **THERMASGARD® MWTF-SD** (rod sensor 3 m / 6 m) with passive output, in an impact-resistant plastic housing with snap-on lid, with bendable sensor rod (fully active), protective tube made from reinforced thermoplastic hose and anti-kink spring, incl. mounting flange.

The sensor is used to detect the mean temperature (mean value) in gaseous media, e.g. in ventilation and air conditioning ducts over the entire cross section or over a defined length. Laid along a meandering route, it uniformly detects the surrounding temperature, as a duct temperature sensor. For proper mounting of the rod, mounting clamps **MK-05-M** (accessories) are available.

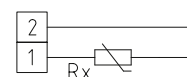
MWTF
 Rod length 0,4 m
 (IP 65)



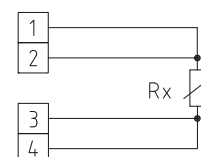
TECHNICAL DATA

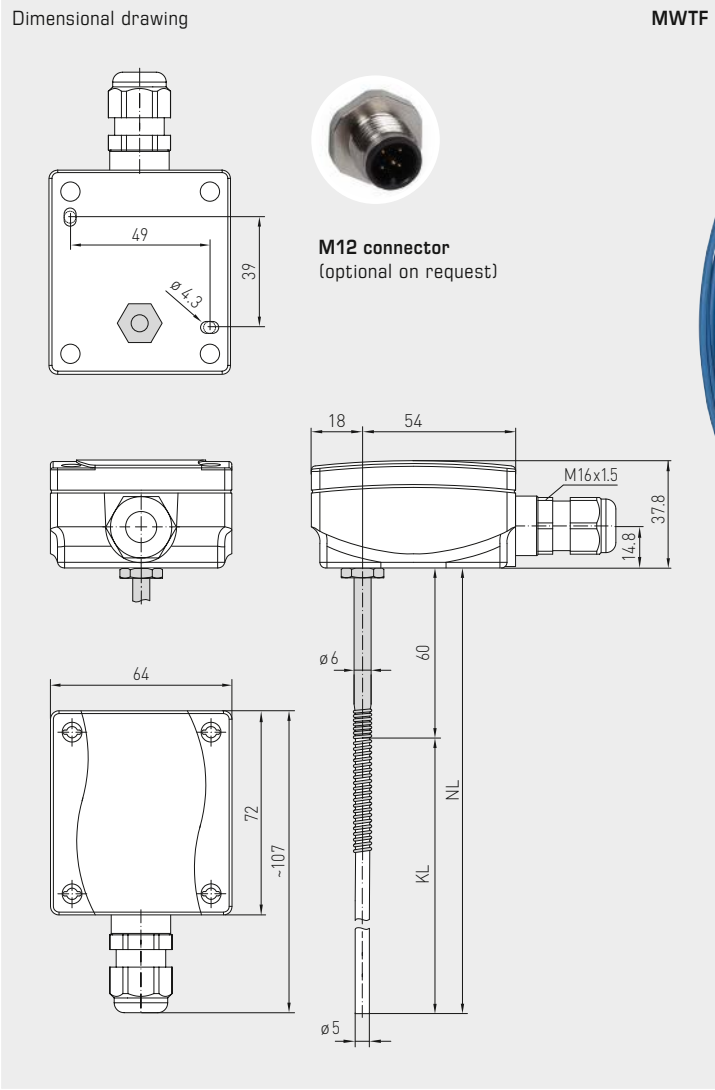
Measuring range:	-30...+80 °C
Sensors / output:	see table, passive
Connection type:	2-wire connection (4-wire connection on PT100, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000)
Sensor:	active over the entire length (averaging)
Rod material:	protective tube made from copper, plastic-coated, (MWTF) (made from reinforced thermoplastic hose on the MWTF-SD , with anti-kink spring and sleeve, stainless steel, V4A (1.4571))
Rod dimensions:	Ø = 5.0 mm, nominal length (NL) = 0.4 m / 3 m / 6 m, see table (nominal length optionally up to max. 20 m)
Rod laying:	Observe the admissible values! Bending radius: > 35 mm Vibration load: ≤ 0.5 g Tensile load: < 480 N for the MWTF < 100 N for the MWTF-SD
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016)
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1)
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (optional on request)
Electrical connection:	0.14 - 1.5 mm ² via terminal screws
Process connection:	by mounting flange, plastic, (galvanised steel optional, see accessories) and mounting clamps MK-05-M
Ambient temperature:	-20...+80 °C
Humidity:	< 95% RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 54 (according to EN 60 529) for the MWTF-SD IP 65 (according to EN 60 529) for the MWTF Housing tested, TÜV SÜD, report no. 713139052 (Tyr 1)
ACCESSORIES	see table

1x two-wire connection
standard



1x four-wire connection
 (optional)





MWTF
Rod length 3 m / 6 m
(IP65)



MWTF-SD
Rod length 3 m / 6 m
(IP54)

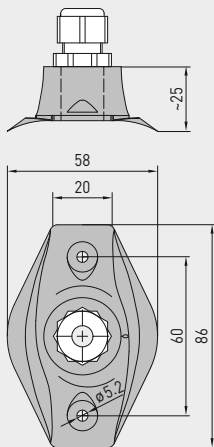


Mean value / rod / duct temperature sensor
including mounting flange, with passive output

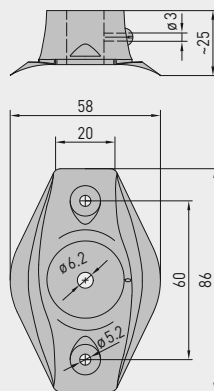
MWTF
Rod length 0,4 m
(IP 65)



Dimensional drawing **KRD-04**



Dimensional drawing **MF-06-K**



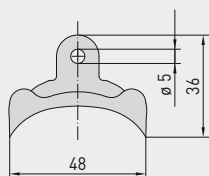
MF-06-K
Mounting flange,
plastic
(Included in the
scope of delivery)



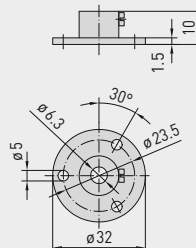
KRD-04
Capillary tube
bushing, plastic
(optional)



Dimensional drawing **MK-05-M**



Dimensional drawing **MF-06-M**



MF-06-M
Mounting flange,
metal
(optional)



MK-05-M
Mounting clamps,
galvanised steel
(from 3 m rod length,
included in the scope
of delivery)





THERMASGARD® MWTF-SD		Mean-value temperature sensor with rod made from reinforced thermoplastic hose, <i>Standard</i>		
Type / WG03B	Sensor / Output	Rod length	Item No.	Price
MWTF-SD	Pt1000		IP54	
MWTF-SD Pt1000 3m	Pt1000 (according to DIN EN 60 751, class B)	3.0 m	1101-3050-5231-200	94,63 €
MWTF-SD Pt1000 6m	Pt1000 (according to DIN EN 60 751, class B)	6.0 m	1101-3050-5261-200	105,28 €
Optional:	Cable connection with M12 connector according to DIN EN 61076-2-101		on request	

THERMASGARD® MWTF		Mean-value temperature sensor with rod made from copper, plastic-coated, <i>Premium</i>		
Type / WG03	Sensor / Output	Rod length	Item No.	Price
MWTF	Pt100		IP65	
MWTF Pt100 0,4m	Pt100 (according to DIN EN 60 751, class B)	0.4 m	1101-3050-1083-000	82,76 €
MWTF Pt100 3m	Pt100 (according to DIN EN 60 751, class B)	3.0 m	1101-3050-1233-000	145,12 €
MWTF Pt100 6m	Pt100 (according to DIN EN 60 751, class B)	6.0 m	1101-3050-1263-000	194,79 €
MWTF	Pt1000		IP65	
MWTF Pt1000 0,4m	Pt1000 (according to DIN EN 60 751, class B)	0.4 m	1101-3050-5081-000	82,76 €
MWTF Pt1000 3m	Pt1000 (according to DIN EN 60 751, class B)	3.0 m	1101-3050-5231-000	145,12 €
MWTF Pt1000 6m	Pt1000 (according to DIN EN 60 751, class B)	6.0 m	1101-3050-5261-000	194,79 €
MWTF	Ni1000		IP65	
MWTF Ni1000 0,4m	Ni1000 (according to DIN EN 43 760, class B)	0.4 m	1101-3050-9081-000	94,88 €
MWTF Ni1000 3m	Ni1000 (according to DIN EN 43 760, class B)	3.0 m	1101-3050-9231-000	152,13 €
MWTF Ni1000 6m	Ni1000 (according to DIN EN 43 760, class B)	6.0 m	1101-3050-9261-000	194,79 €
Extra charge:	Per meter sensor cable (from 6 m to max. 20 m)		on request	
Optional:	Cable connection with M12 connector according to DIN EN 61076-2-101		on request	

ACCESSORIES			
MF-06-K	Mounting flange, plastic (included in the scope of delivery)	7100-0030-1000-000	6,12 €
MF-06-M	Mounting flange, metal, galvanised steel, Ø = 35 mm	7100-0030-5000-100	9,56 €
KRD-04	Capillary tube gland bracket, plastic	7100-0030-7000-000	8,91 €
MK-05-M	Mounting clamps, galvanised steel (6 pieces) (from 3 m rod length, included in the scope of delivery)	7100-0034-0000-000	9,88 €

For further information see last chapter!

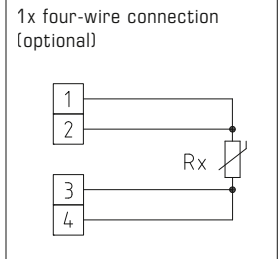
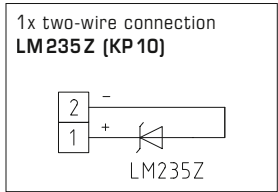
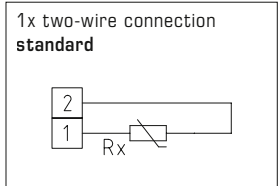
**Screw-in / immersion temperature sensors
with neck tube (stepped once)
with passive output**

ETF 7

Very quickly responding screw-in resistance thermometer / immersion temperature sensor **THERMASGARD® ETF 7** with passive output, neck tube and a single-tapered stainless steel protective tube, housing cover with quick-locking screws, very short reaction time, particularly suitable for very quick temperature changes and control operations, e.g. in hydraulic systems.

TECHNICAL DATA

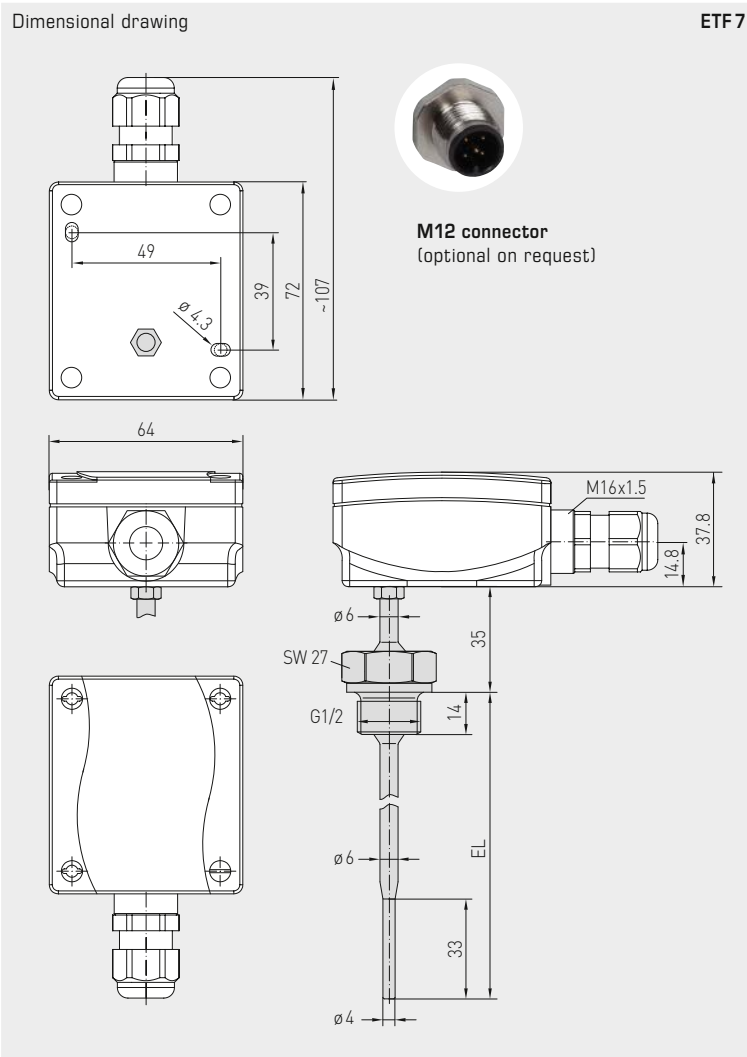
Measuring range:	-35...+150 °C
Sensors / output:	see table, passive (Perfect Sensor Protection)
Response times:	$t_{0.5} = 2.8 \text{ s}$ $t_{0.9} = 10 \text{ s}$ (for water at a flow rate of 2 m/s)
Connection type:	2-wire connection (4-wire connection on PT100, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Electrical connection:	0.14 - 1.5 mm² via terminal screws
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101
Housing:	plastic, UV-resistant, material polyamide, 30 % glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016)
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1)
Protective tube:	stainless steel V4A (1.4571), G 1/2" straight pipe thread, wrench size 27 mm, $p_{max} = 6 \text{ bar}$, $\varnothing = 6 \text{ mm}$, single-tapered to $\varnothing = 4 \text{ mm}$ (see dimensional drawing) length of neck tube (HL) = 25 mm inserted length (EL) = 100 - 250 mm (see table)
Process connection:	screwed socket with G 1/2" straight pipe thread
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP65 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1)



High-performance encapsulation against vibration, mechanical stress and humidity



PS-PROTECTION
PERFECT SENSOR PROTECTION



ETF 7

THERMASGARD® ETF 7		Screw-in / immersion temperature sensor with neck tube	
Type / WG01	Sensor / Output	Item No.	Price
ETF7 Pt100 xx	Pt100		
ETF7 Pt100 100mm	Pt100 (according to DIN EN 60 751, class B)	1101-2080-1023-000	142,71 €
ETF7 Pt100 150mm	Pt100 (according to DIN EN 60 751, class B)	1101-2080-1033-000	144,12 €
ETF7 Pt100 250mm	Pt100 (according to DIN EN 60 751, class B)	1101-2080-1053-000	147,41 €
ETF7 Pt1000 xx	Pt1000		
ETF7 Pt1000 100mm	Pt1000 (according to DIN EN 60 751, class B)	1101-2080-5021-000	144,24 €
ETF7 Pt1000 150mm	Pt1000 (according to DIN EN 60 751, class B)	1101-2080-5031-000	145,18 €
ETF7 Pt1000 250mm	Pt1000 (according to DIN EN 60 751, class B)	1101-2080-5051-000	148,11 €
ETF7 Ni1000 xx	Ni1000		
ETF7 Ni1000 100mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-2084-2021-000	159,08 €
ETF7 Ni1000 150mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-2084-2031-000	160,61 €
ETF7 Ni1000 250mm	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-2084-2051-000	162,62 €
ETF7 Ni1000TK xx	Ni1000 TK5000		
ETF7 NiTK 100mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-2081-0021-000	149,95 €
ETF7 NiTK 150mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-2081-0031-000	150,35 €
ETF7 NiTK 250mm	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-2081-0051-000	151,74 €
Optional:	Cable connection with M12 connector according to DIN EN 61076-2-101	on request	

**Immersion / screw-in / duct temperature sensor,
with passive output**

TF 54
Basic unit

Resistance thermometer / temperature sensor **THERMASGARD® TF 54** with passive output, with connecting head made from aluminium (optionally with **cable gland** or **M12 connector** according to DIN EN 61076-2-101) and straight protective tube.

A basic unit in four variants through combination with accessories, eg, for robust applications with a separate immersion sleeve made from stainless steel.

The duct sensor is used to detect temperatures in liquid or gaseous media. It is used in pipes, heating engineering, storage systems, compact district heating stations, warm and cold water systems, oil and lubrication cycle systems, mechanical, apparatus and plant engineering and throughout the industrial sector.



TECHNICAL DATA

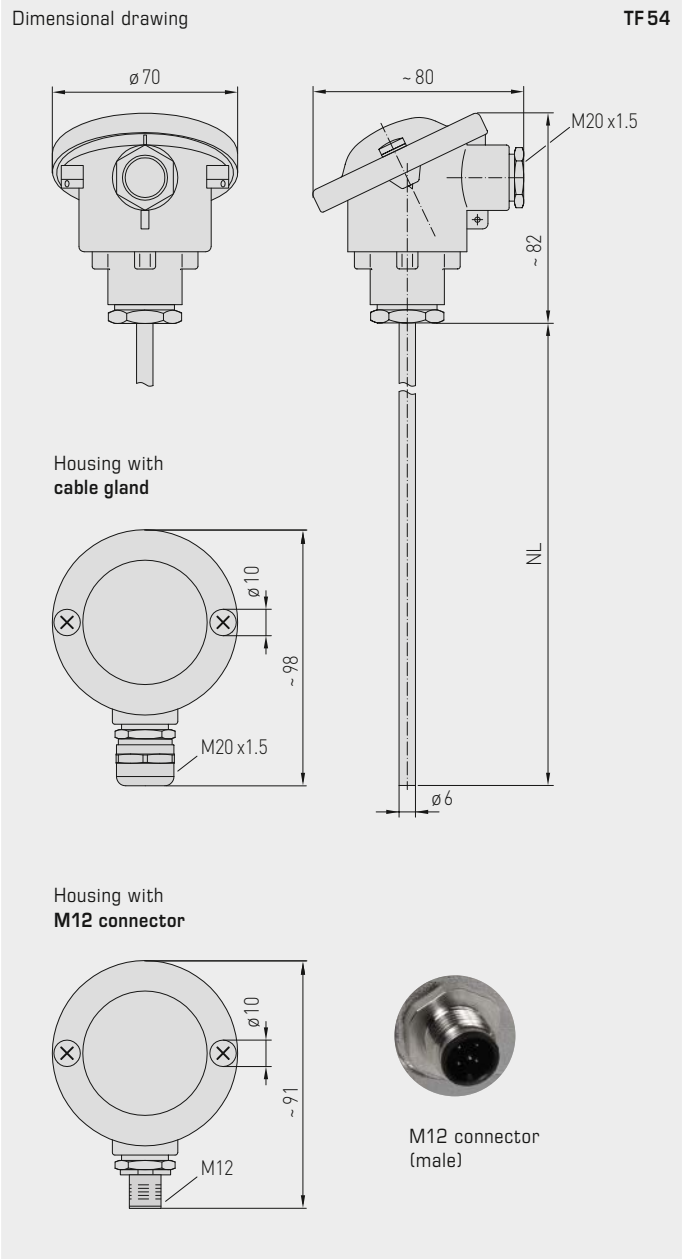
Measuring range:	-35...+180 °C (T_{max} NTC = +150 °C, T_{max} LM235Z = +125 °C)
Sensors / output:	see table, passive (Perfect Sensor Protection) (optionally also with two or other sensors)
Connection type:	2-wire connection (4-wire connection on PT100, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Electrical connection:	0.14 - 2.5 mm ² , via terminal screws on ceramic base
Cable connection:	TF 54 (standard) adjusting screw made of metal (M20 x 1,5) TF 54-KV (optional) cable gland, brass, nickel-plated (M20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) TF 54-Q (optional) M12 connector according to DIN EN 61076-2-101 (male, 5-pin, A-code)
Dimensions:	see dimensional drawing
Connecting head:	form B, material aluminium, colour white aluminium (similar RAL 9006), ambient temperature -20...+100 °C
Protective tube:	stainless steel, V4A (1.4571), Ø = 6 mm, inserted length (EL) = 50 - 400 mm (see table)
Process connection:	by means of immersion sleeve or mounting flange (accessories)
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 54 (according to EN 60 529) TF 54 IP 65 (according to EN 60 529) TF 54-KV / TF 54-Q
ACCESSORIES	(see table)
TH-ms / xx	Immersion sleeve, brass, nickel-plated, Ø = 8 mm, T_{max} = +150 °C, p_{max} = 10 bar
TH-VA / xx	Immersion sleeve, stainless steel, V4A (1.4571), Ø = 8 mm, T_{max} = +600 °C, p_{max} = 40 bar
TH-VA / xx / 90	Immersion sleeve, stainless steel, V4A (1.4571), with neck tube (90 mm), Ø = 8 mm, T_{max} = +600 °C, p_{max} = 40 bar
MF-06-M	Mounting flange, metal, galvanised steel, Ø = 32 mm, Ø = 6.3 mm tube gland, T_{max} = +700 °C



2-wire connection



4-wire connection



TF 54
Standard
(IP 54)



TF 54-KV
with cable gland
(IP 65)



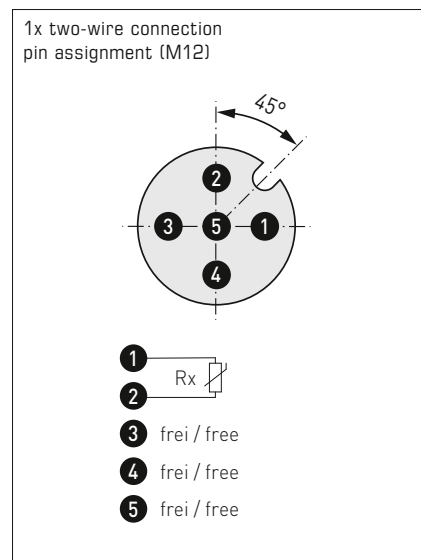
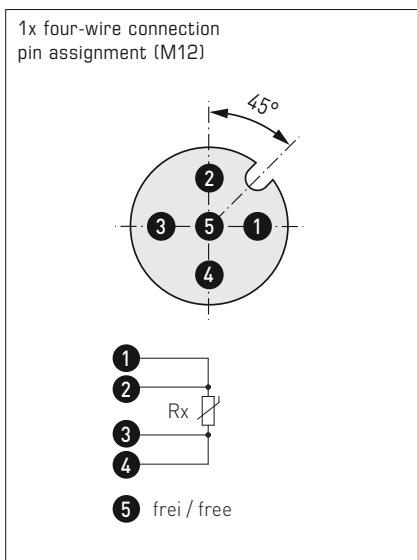
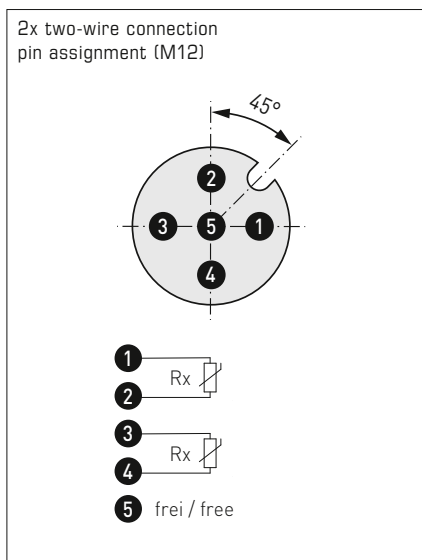
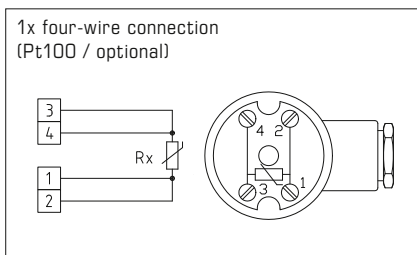
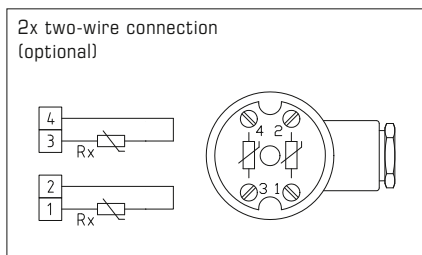
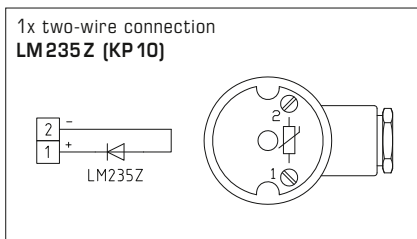
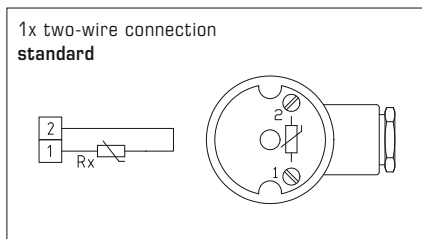
TF 54-Q
with M12 connector
(IP 65)

High-performance encapsulation against vibration, mechanical stress and humidity



Immersion / screw-in / duct temperature sensor,
with passive output

TM54
standard
(IP 54)



THERMASGARD® Temperature sensor
TF 54 (Basic unit)

Type / WG03	Sensor / Output	Installation length (EL)	Item No.	Price
TF 54 Pt100 xx	Pt100 (according to DIN EN 60751, class B)		IP 54, 4-wire	
TF54 Pt100 50mm	Pt100	50 mm	1101-7050-1013-000	66,38 €
TF54 Pt100 100mm	Pt100	100 mm	1101-7050-1023-000	67,99 €
TF54 Pt100 150mm	Pt100	150 mm	1101-7050-1033-000	69,45 €
TF54 Pt100 200mm	Pt100	200 mm	1101-7050-1043-000	72,12 €
TF54 Pt100 250mm	Pt100	250 mm	1101-7050-1053-000	72,43 €
TF54 Pt100 300mm	Pt100	300 mm	1101-7050-1063-000	72,69 €
TF54 Pt100 400mm	Pt100	400 mm	1101-7050-1083-000	73,70 €
TF 54 Pt1000 xx	Pt1000 (according to DIN EN 60751, class B)		IP 54, 2-wire	
TF54 Pt1000 50mm	Pt1000	50 mm	1101-7050-5011-000	66,38 €
TF54 Pt1000 100mm	Pt1000	100 mm	1101-7050-5021-000	67,99 €
TF54 Pt1000 150mm	Pt1000	150 mm	1101-7050-5031-000	69,45 €
TF54 Pt1000 200mm	Pt1000	200 mm	1101-7050-5041-000	72,12 €
TF54 Pt1000 250mm	Pt1000	250 mm	1101-7050-5051-000	72,49 €
TF54 Pt1000 300mm	Pt1000	300 mm	1101-7050-5061-000	72,69 €
TF54 Pt1000 400mm	Pt1000	400 mm	1101-7050-5081-000	73,70 €

Continued on next page...



THERMASGARD® TF 54		Temperature sensor (Basic unit)		
Type/WG03	Sensor/Output	Installation length (EL)	Item No.	Price
TF 54 Ni1000 xx	Ni 1000 (according to DIN EN 43760, class B, TCR = 6180 ppm/K)		IP 54, 2-wire	
TF54 Ni1000 50mm	Ni1000	50 mm	1101-7050-9011-000	67,53 €
TF54 Ni1000 100mm	Ni1000	100 mm	1101-7050-9021-000	69,46 €
TF54 Ni1000 150mm	Ni1000	150 mm	1101-7050-9031-000	70,58 €
TF54 Ni1000 200mm	Ni1000	200 mm	1101-7050-9041-000	72,18 €
TF54 Ni1000 250mm	Ni1000	250 mm	1101-7050-9051-000	72,63 €
TF54 Ni1000 300mm	Ni1000	300 mm	1101-7050-9061-000	72,89 €
TF54 Ni1000 400mm	Ni1000	400 mm	1101-7050-9081-000	73,97 €
TF 54 Ni1000TK xx	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000		IP 54, 2-wire	
TF54 NiTK 50mm	Ni1000 TK5000	50 mm	1101-7051-0011-000	67,80 €
TF54 NiTK 100mm	Ni1000 TK5000	100 mm	1101-7051-0021-000	70,28 €
TF54 NiTK 150mm	Ni1000 TK5000	150 mm	1101-7051-0031-000	71,45 €
TF54 NiTK 200mm	Ni1000 TK5000	200 mm	1101-7051-0041-000	72,44 €
TF54 NiTK 250mm	Ni1000 TK5000	250 mm	1101-7051-0051-000	72,89 €
TF54 NiTK 300mm	Ni1000 TK5000	300 mm	1101-7051-0061-000	73,12 €
TF54 NiTK 400mm	Ni1000 TK5000	400 mm	1101-7051-0081-000	74,22 €
TF 54 LM235Z xx	LM235Z (TCR = 10 mV/K; 2.73V at 0°C), KP10		IP 54, 2-wire	
TF54 LM235Z 50mm	LM235Z	50 mm	1101-7052-1011-000	67,75 €
TF54 LM235Z 100mm	LM235Z	100 mm	1101-7052-1021-000	68,18 €
TF54 LM235Z 150mm	LM235Z	150 mm	1101-7052-1031-000	68,30 €
TF54 LM235Z 200mm	LM235Z	200 mm	1101-7052-1041-000	69,07 €
TF54 LM235Z 250mm	LM235Z	250 mm	1101-7052-1051-000	70,85 €
TF54 LM235Z 300mm	LM235Z	300 mm	1101-7052-1061-000	71,43 €
TF54 LM235Z 400mm	LM235Z	400 mm	1101-7052-1081-000	72,63 €
TF 54 NTC 1,8K xx	NTC 1,8K		IP 54, 2-wire	
TF54 NTC1,8K 50mm	NTC 1,8K	50 mm	1101-7051-2011-000	67,42 €
TF54 NTC1,8K 100mm	NTC 1,8K	100 mm	1101-7051-2021-000	71,43 €
TF54 NTC1,8K 150mm	NTC 1,8K	150 mm	1101-7051-2031-000	71,79 €
TF54 NTC1,8K 200mm	NTC 1,8K	200 mm	1101-7051-2041-000	72,30 €
TF54 NTC1,8K 250mm	NTC 1,8K	250 mm	1101-7051-2051-000	73,52 €
TF54 NTC1,8K 300mm	NTC 1,8K	300 mm	1101-7051-2061-000	74,22 €
TF54 NTC1,8K 400mm	NTC 1,8K	400 mm	1101-7051-2081-000	74,50 €
TF 54 NTC10K xx	NTC 10K		IP 54, 2-wire	
TF54 NTC10K 50mm	NTC 10K	50 mm	1101-7051-5011-000	67,42 €
TF54 NTC10K 100mm	NTC 10K	100 mm	1101-7051-5021-000	71,43 €
TF54 NTC10K 150mm	NTC 10K	150 mm	1101-7051-5031-000	71,79 €
TF54 NTC10K 200mm	NTC 10K	200 mm	1101-7051-5041-000	72,30 €
TF54 NTC10K 250mm	NTC 10K	250 mm	1101-7051-5051-000	73,52 €
TF54 NTC10K 300mm	NTC 10K	300 mm	1101-7051-5061-000	74,22 €
TF54 NTC10K 400mm	NTC 10K	400 mm	1101-7051-5081-000	74,50 €
TF 54 NTC20K xx	NTC 20K		IP 54, 2-wire	
TF54 NTC20K 50mm	NTC 20K	50 mm	1101-7051-6011-000	67,42 €
TF54 NTC20K 100mm	NTC 20K	100 mm	1101-7051-6021-000	71,43 €
TF54 NTC20K 150mm	NTC 20K	150 mm	1101-7051-6031-000	71,79 €
TF54 NTC20K 200mm	NTC 20K	200 mm	1101-7051-6041-000	72,30 €
TF54 NTC20K 250mm	NTC 20K	250 mm	1101-7051-6051-000	73,52 €
TF54 NTC20K 300mm	NTC 20K	300 mm	1101-7051-6061-000	74,22 €
TF54 NTC20K 400mm	NTC 20K	400 mm	1101-7051-6081-000	74,50 €
Housing variant:	equipped as standard with pressure screw (IP 54), optional housing variants with cable gland (IP 65) or M12 connector (IP 65) see the next page!			
Extra charge:	optionally also with two or other sensors		on request	

Immersion/screw-in/duct temperature sensor,
with passive output

S+S REGELTECHNIK

TF 54 - Q
with M12 connector
(IP 65)



THERMASGARD®		Temperature sensor (Basic unit with M12 connector)			
Type/WG03	Sensor/Output	Installation length (EL)	Q	Item No.	Price
TF 54 Pt100 xx Q	Pt100 (according to DIN EN 60751, class B)		●	IP 65, 4-wire	
TF54 Pt100 50mm Q	Pt100	50 mm	●	2Z01-4111-0100-011	108,30 €
TF54 Pt100 100mm Q	Pt100	100 mm	●	2Z01-4111-0100-021	109,90 €
TF54 Pt100 150mm Q	Pt100	150 mm	●	2Z01-4111-0100-031	111,38 €
TF54 Pt100 200mm Q	Pt100	200 mm	●	2Z01-4111-0100-041	114,03 €
TF54 Pt100 250mm Q	Pt100	250 mm	●	2Z01-4111-0100-051	114,36 €
TF54 Pt100 300mm Q	Pt100	300 mm	●	2Z01-4111-0100-061	114,62 €
TF54 Pt100 400mm Q	Pt100	400 mm	●	2Z01-4111-0100-081	115,64 €
TF 54 Pt1000 xx Q	Pt1000 (according to DIN EN 60751, class B)		●	IP 65, 2-wire	
TF54 Pt1000 50mm Q	Pt1000	50 mm	●	2Z05-4111-0100-011	108,30 €
TF54 Pt1000 100mm Q	Pt1000	100 mm	●	2Z05-4111-0100-021	109,90 €
TF54 Pt1000 150mm Q	Pt1000	150 mm	●	2Z05-4111-0100-031	111,38 €
TF54 Pt1000 200mm Q	Pt1000	200 mm	●	2Z05-4111-0100-041	114,03 €
TF54 Pt1000 250mm Q	Pt1000	250 mm	●	2Z05-4111-0100-051	114,36 €
TF54 Pt1000 300mm Q	Pt1000	300 mm	●	2Z05-4111-0100-061	114,62 €
TF54 Pt1000 400mm Q	Pt1000	400 mm	●	2Z05-4111-0100-081	115,64 €
Housing variant "Q":	Cable connection with M12 connector (male, 5-pin, A-code)				
Extra charge:	optionally also with two or other sensors			on request	

ACCESSORIES

Special accessories for M12 connector
see chapter Accessories!

Immersion / screw-in / duct temperature sensor,
with passive outputTF54 - KV
with cable gland
(IP 65)

THERMASGARD®		Temperature sensor (Basic unit with cable gland)		
Type / WG03	Sensor / Output	Installation length (EL)	Item No.	Price
TF54 Pt100 xx KV	Pt100 (according to DIN EN 60751, class B)		IP65, 4-wire	
TF54 Pt100 50mm KV	Pt100	50 mm	1101-7070-1013-000	75,81 €
TF54 Pt100 100mm KV	Pt100	100 mm	1101-7070-1023-000	77,41 €
TF54 Pt100 150mm KV	Pt100	150 mm	1101-7070-1033-000	78,87 €
TF54 Pt100 200mm KV	Pt100	200 mm	1101-7070-1043-000	78,28 €
TF54 Pt100 250mm KV	Pt100	250 mm	1101-7070-1053-000	81,87 €
TF54 Pt100 300mm KV	Pt100	300 mm	1101-7070-1063-000	82,11 €
TF54 Pt100 400mm KV	Pt100	400 mm	1101-7070-1083-000	83,15 €
TF54 Pt1000 xx KV	Pt1000 (according to DIN EN 60751, class B)		IP65, 2-wire	
TF54 Pt1000 50mm KV	Pt1000	50 mm	1101-7070-5011-000	75,82 €
TF54 Pt1000 100mm KV	Pt1000	100 mm	1101-7070-5021-000	77,41 €
TF54 Pt1000 150mm KV	Pt1000	150 mm	1101-7070-5031-000	75,63 €
TF54 Pt1000 200mm KV	Pt1000	200 mm	1101-7070-5041-000	81,55 €
TF54 Pt1000 250mm KV	Pt1000	250 mm	1101-7070-5051-000	81,88 €
TF54 Pt1000 300mm KV	Pt1000	300 mm	1101-7070-5061-000	79,07 €
TF54 Pt1000 400mm KV	Pt1000	400 mm	1101-7070-5081-000	83,15 €
Housing variant "KV":	Cable connection with cable gland			
Extra charge:	optionally also with two or other sensors			on request

Immersion / screw-in / duct temperature sensor,
with passive output

One basic device in four variants...



**TF 54 +
TH -ms/xx**

Immersion / screw-in
temperature sensor
with immersion sleeve,
brass, nickel-plated

**TF 54 +
TH -VA/xx**

Immersion / screw-in
temperature sensor
with immersion sleeve,
stainless steel, V4A

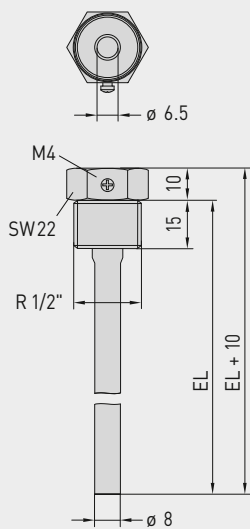
**TF 54 +
TH -VA/xx/90**

Immersion / screw-in
temperature sensor with
immersion sleeve with
neck tube, stainless steel, V4A

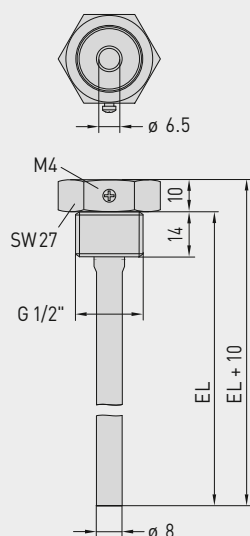
**TF 54 +
MF-06-M**

Duct temperature sensor
with mounting flange, metal

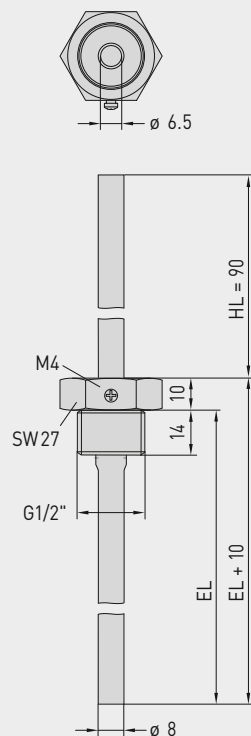
**Dimensional drawing
TH -ms/xx**



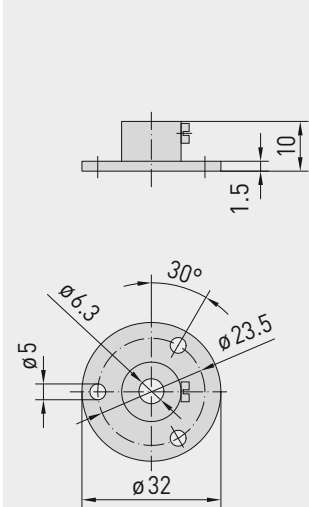
**Dimensional drawing
TH -VA/xx**



**Dimensional drawing
TH -VA/xx/90**



**Dimensional drawing
MF-06-M**





...through combination with accessories:



TH - ms / xx
Immersion sleeve,
brass, nickel-plated,
thread-sealing, conical,
according to DIN 10226



TH - VA / xx
Immersion sleeve,
stainless steel, V4A,
flat-sealing, cylindrical,
according to DIN 228



TH - VA / xx / 90
Immersion sleeve with neck tube,
stainless steel, V4A,
flat-sealing, cylindrical,
according to DIN 228



MF-06-M
Mounting flange,
metal

THERMASGARD® TH Immersion sleeve Ø 8 mm (accessories)					
Type / WG01	p _{max} (static)	T _{max}	Inserted Length (EL)	Item No.	Price
TH - ms / xx Brass nickel-plated					
without neck tube					
TH-MS 50MM	10 bar	+150 °C	50 mm	7100-0011-0010-001	9,31 €
TH-MS 100MM	10 bar	+150 °C	100 mm	7100-0011-0020-001	10,61 €
TH-MS 150MM	10 bar	+150 °C	150 mm	7100-0011-0030-001	11,20 €
TH-MS 200MM	10 bar	+150 °C	200 mm	7100-0011-0040-001	11,56 €
TH-MS 250MM	10 bar	+150 °C	250 mm	7100-0011-0050-001	13,39 €
TH-MS 300MM	10 bar	+150 °C	300 mm	7100-0011-0060-001	13,76 €
TH-MS 350MM	10 bar	+150 °C	350 mm	7100-0011-0070-001	13,87 €
TH-MS 400MM	10 bar	+150 °C	400 mm	7100-0011-0080-001	14,00 €
TH - VA / xx Stainless steel, V4A (1.4571)					
without neck tube					
TH-VA 50MM	40 bar	+600 °C	50 mm	7100-0012-0010-001	20,28 €
TH-VA 100MM	40 bar	+600 °C	100 mm	7100-0012-0020-001	22,41 €
TH-VA 150MM	40 bar	+600 °C	150 mm	7100-0012-0030-001	24,08 €
TH-VA 200MM	40 bar	+600 °C	200 mm	7100-0012-0040-001	25,38 €
TH-VA 250MM	40 bar	+600 °C	250 mm	7100-0012-0050-001	31,55 €
TH-VA 300MM	40 bar	+600 °C	300 mm	7100-0012-0060-001	32,97 €
TH-VA 350MM	40 bar	+600 °C	350 mm	7100-0012-0070-001	33,19 €
TH-VA 400MM	40 bar	+600 °C	400 mm	7100-0012-0080-001	33,78 €
TH - VA / xx / 90 Stainless steel, V4A (1.4571)					
with neck tube (90 mm)					
TH-VA 50/90MM	40 bar	+600 °C	50 mm	7100-0012-2010-001	29,04 €
TH-VA 100/90MM	40 bar	+600 °C	100 mm	7100-0012-2020-001	30,35 €
TH-VA 150/90MM	40 bar	+600 °C	150 mm	7100-0012-2030-001	31,84 €
TH-VA 200/90MM	40 bar	+600 °C	200 mm	7100-0012-2040-001	33,19 €
TH-VA 250/90MM	40 bar	+600 °C	250 mm	7100-0012-2050-001	34,79 €
TH-VA 300/90MM	40 bar	+600 °C	300 mm	7100-0012-2060-001	37,71 €
Note:	inner diameter of socket 6.5 mm For further information see last chapter!				
Mounting flange (accessories)					
Type / WG01		T _{max}		Item No.	Price
MF					
MF-06-M	Mounting flange, metal (galvanised steel) Ø 32 mm, tube gland Ø 6.3 mm		+700 °C	7100-0030-5000-100	9,56 €
Note:	For further information see last chapter!				

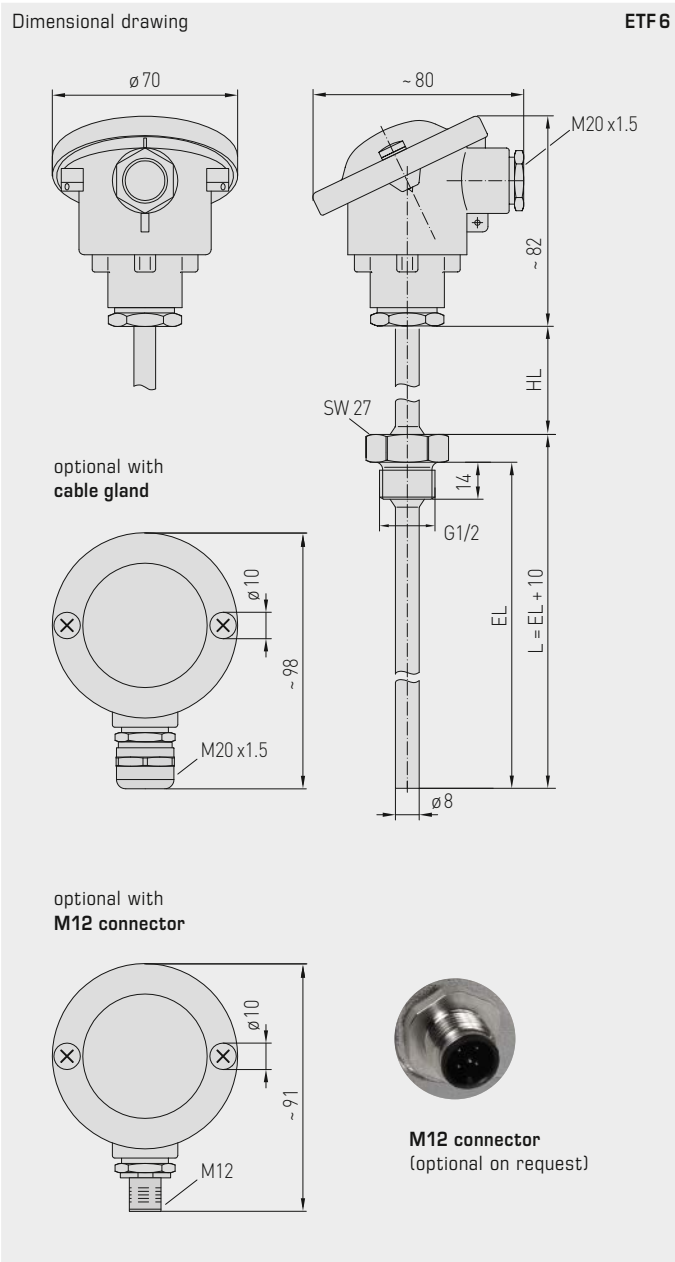
**Screw-in/immersion temperature sensor with neck tube,
with passive output**
ETF 6
standard

Screw-in resistance thermometer / temperature sensor with neck tube
THERMASGARD® ETF 6 with passive output, with connecting head made from aluminium (optionally with **cable gland** or **M12 connector** according to DIN EN 61076-2-101) and straight protective tube.

The duct sensor is used to detect temperatures in liquid or gaseous media. It is used in pipes, tanks or storage systems, preferably where tubes or tanks must be isolated.


TECHNICAL DATA

Measuring range:	-35...+180 °C (T_{\max} NTC = +150 °C, T_{\max} LM235Z = +125 °C)
Sensors / output:	see table, passive (Perfect Sensor Protection) (optionally also with two or other sensors)
Connection type:	2-wire connection (4-wire connection on PT100, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Electrical connection:	0.14 - 2.5 mm ² , via terminal screws on ceramic base
Cable connection:	ETF 6 (standard) adjusting screw made of metal (M20 x 1,5) ETF 6-KV (optional) cable gland, brass, nickel-plated (M20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) ETF 6-Q (optional) M12 connector according to DIN EN 61076-2-101 (male, 5-pin, A-code)
Dimensions:	see dimensional drawing
Connecting head:	form B, material aluminium, colour white aluminium (similar RAL 9006), ambient temperature -20...+100 °C
Protective tube:	stainless steel V4A (1.4571), G ½" straight pipe thread, wrench size 27 mm, p_{\max} = 40 bar, Ø = 8 mm length of neck tube (HL) = 80 mm inserted length (EL) = 100 - 400 mm (see table)
Process connection:	screwed socket with G ½"
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 54 (according to EN 60 529) ETF 6 IP 65 (according to EN 60 529) ETF 6-KV / ETF 6-Q



ETF 6
standard
(IP 54)



ETF 6-KV
with cable gland
(IP 65)



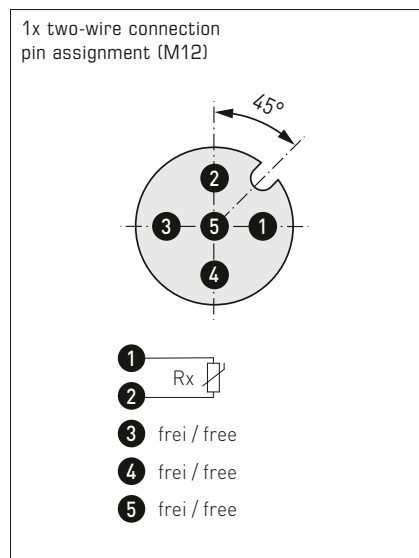
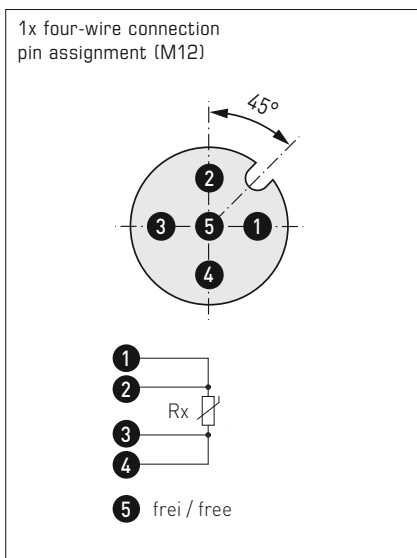
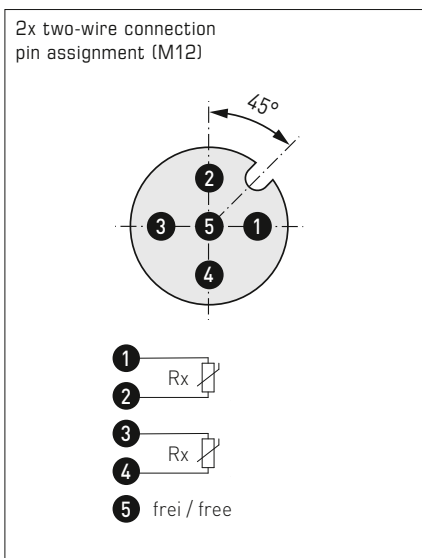
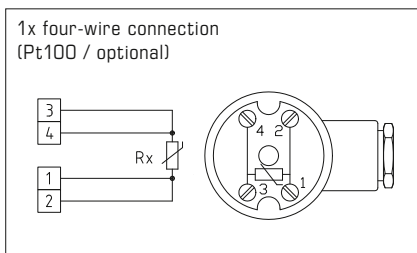
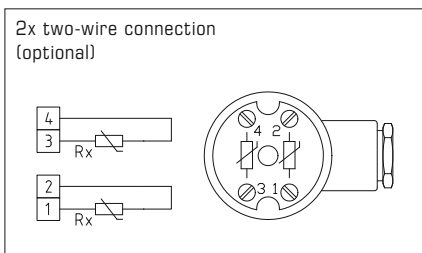
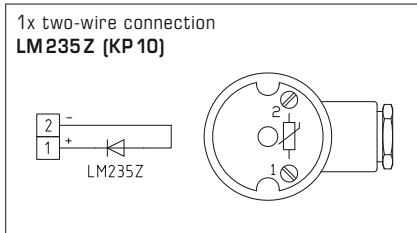
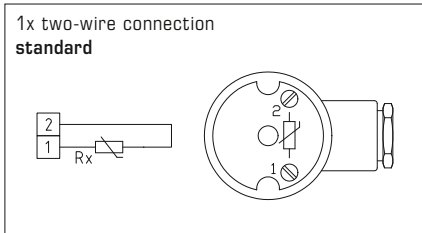
ETF 6-Q
with M12 connector
(IP 65)

High-performance encapsulation against vibration, mechanical stress and humidity



Screw-in/immersion temperature sensor with neck tube,
with passive output

ETF6
standard
(IP 54)



THERMASGARD® Screw-in / immersion temperature sensor with neck tube
ETF 6 (standard)

Type/WG03	Sensor/Output	Installation length (EL)	Item No.	Price
ETF6 Pt100 xx	Pt100 (according to DIN EN 60751, class B)		IP 54, 4-wire	
ETF6 Pt100 100/80	Pt100	100 mm	1101-2070-1023-000	84,67 €
ETF6 Pt100 150/80	Pt100	150 mm	1101-2070-1033-000	89,12 €
ETF6 Pt100 200/80	Pt100	200 mm	1101-2070-1043-000	91,65 €
ETF6 Pt100 250/80	Pt100	250 mm	1101-2070-1053-000	94,08 €
ETF6 Pt100 400/80	Pt100	400 mm	1101-2070-1083-000	97,02 €
ETF6 Pt1000 xx	Pt1000 (according to DIN EN 60751, class B)		IP 54, 2-wire	
ETF6 Pt1000 100/80	Pt1000	100 mm	1101-2070-5021-000	86,70 €
ETF6 Pt1000 150/80	Pt1000	150 mm	1101-2070-5031-000	91,65 €
ETF6 Pt1000 200/80	Pt1000	200 mm	1101-2070-5041-000	93,11 €
ETF6 Pt1000 250/80	Pt1000	250 mm	1101-2070-5051-000	94,22 €
ETF6 Pt1000 400/80	Pt1000	400 mm	1101-2070-5081-000	97,95 €

Continued on next page...



THERMASGARD® ETF 6		Screw-in / immersion temperature sensor with neck tube (standard)		
Type / WG03	Sensor / Output	Installation length (EL)	Item No.	Price
ETF6 Ni1000 xx	Ni1000 (according to DIN EN 43760, class B, TCR = 6180 ppm/K)		IP54, 2-wire	
ETF6 Ni1000 100/80	Ni1000	100 mm	1101-2070-9021-000	89,99 €
ETF6 Ni1000 150/80	Ni1000	150 mm	1101-2070-9031-000	91,58 €
ETF6 Ni1000 200/80	Ni1000	200 mm	1101-2070-9041-000	94,06 €
ETF6 Ni1000 250/80	Ni1000	250 mm	1101-2070-9051-000	94,54 €
ETF6 Ni1000 400/80	Ni1000	400 mm	1101-2070-9081-000	99,31 €
ETF6 Ni1000TK xx	Ni1000 TK5000 (TCR = 5000 ppm/K, LG-Ni1000)		IP54, 2-wire	
ETF6 NiTK 100/80	Ni1000 TK5000	100 mm	1101-2071-0021-000	90,39 €
ETF6 NiTK 150/80	Ni1000 TK5000	150 mm	1101-2071-0031-000	92,52 €
ETF6 NiTK 200/80	Ni1000 TK5000	200 mm	1101-2071-0041-000	94,92 €
ETF6 NiTK 250/80	Ni1000 TK5000	250 mm	1101-2071-0051-000	97,83 €
ETF6 NiTK 400/80	Ni1000 TK5000	400 mm	1101-2071-0081-000	100,32 €
ETF6 LM235Z xx	LM235Z (TCR = 10mV/K; 2.73V at 0°C), KP10		IP54, 2-wire	
ETF6 LM235Z 100/80	LM235Z	100 mm	1101-2072-1021-000	85,94 €
ETF6 LM235Z 150/80	LM235Z	150 mm	1101-2072-1031-000	89,74 €
ETF6 LM235Z 200/80	LM235Z	200 mm	1101-2072-1041-000	91,65 €
ETF6 LM235Z 250/80	LM235Z	250 mm	1101-2072-1051-000	92,94 €
ETF6 LM235Z 400/80	LM235Z	400 mm	1101-2072-1081-000	98,79 €
ETF6 NTC 1,8K xx	NTC 1,8K		IP54, 2-wire	
ETF6 NTC1,8K 100/80	NTC 1,8K	100 mm	1101-2071-2021-000	90,13 €
ETF6 NTC1,8K 150/80	NTC 1,8K	150 mm	1101-2071-2031-000	91,48 €
ETF6 NTC1,8K 200/80	NTC 1,8K	200 mm	1101-2071-2041-000	92,87 €
ETF6 NTC1,8K 250/80	NTC 1,8K	250 mm	1101-2071-2051-000	96,87 €
ETF6 NTC1,8K 400/80	NTC 1,8K	400 mm	1101-2071-2081-000	99,61 €
ETF6 NTC10K xx	NTC 10K		IP54, 2-wire	
ETF6 NTC10K 100/80	NTC 10K	100 mm	1101-2071-5021-000	90,13 €
ETF6 NTC10K 150/80	NTC 10K	150 mm	1101-2071-5031-000	91,48 €
ETF6 NTC10K 200/80	NTC 10K	200 mm	1101-2071-5041-000	92,87 €
ETF6 NTC10K 250/80	NTC 10K	250 mm	1101-2071-5051-000	96,87 €
ETF6 NTC10K 400/80	NTC 10K	400 mm	1101-2071-5081-000	99,61 €
ETF6 NTC20K xx	NTC 20K		IP54, 2-wire	
ETF6 NTC20K 100/80	NTC 20K	100 mm	1101-2071-6021-000	90,13 €
ETF6 NTC20K 150/80	NTC 20K	150 mm	1101-2071-6031-000	91,48 €
ETF6 NTC20K 200/80	NTC 20K	200 mm	1101-2071-6041-000	92,87 €
ETF6 NTC20K 250/80	NTC 20K	250 mm	1101-2071-6051-000	96,87 €
ETF6 NTC20K 400/80	NTC 20K	400 mm	1101-2071-6081-000	99,61 €
Housing variant:	equipped as standard with pressure screw (IP54), optional housing variants with cable gland (IP65) or M12 connector (IP65) see the next page!			
Extra charge:	optionally also with two or other sensors			on request

Screw-in / immersion temperature sensor with neck tube,
with passive output

S+S REGELTECHNIK

ETF6-Q
with M12 connector
(IP 65)



THERMASGARD® ETF 6-Q		Screw-in / immersion temperature sensor with neck tube (with M12 connector)			
Type / WG03	Sensor / Output	Installation length (EL)	Q ●	Item No.	Price
ETF6 Pt100 xx Q	Pt100 (according to DIN EN 60751, class B)			IP 65, 4-wire	
ETF6 Pt100 100/80mm Q	Pt100	100 mm	●	2Z01-4121-0100-041	126,60 €
ETF6 Pt100 150/80mm Q	Pt100	150 mm	●	2Z01-4121-0100-051	131,04 €
ETF6 Pt100 200/80mm Q	Pt100	200 mm	●	2Z01-4121-0100-061	133,58 €
ETF6 Pt100 250/80mm Q	Pt100	250 mm	●	2Z01-4121-0100-071	136,00 €
ETF6 Pt100 400/80mm Q	Pt100	400 mm	●	2Z01-4121-0100-101	139,04 €
ETF6 Pt1000 xx Q	Pt1000 (according to DIN EN 60751, class B)			IP 65, 2-wire	
ETF6 Pt1000 100/80mm Q	Pt1000	100 mm	●	2Z05-4121-0100-041	126,60 €
ETF6 Pt1000 150/80mm Q	Pt1000	150 mm	●	2Z05-4121-0100-051	131,04 €
ETF6 Pt1000 200/80mm Q	Pt1000	200 mm	●	2Z05-4121-0100-061	133,58 €
ETF6 Pt1000 250/80mm Q	Pt1000	250 mm	●	2Z05-4121-0100-071	136,00 €
ETF6 Pt1000 400/80mm Q	Pt1000	400 mm	●	2Z05-4121-0100-101	138,94 €
Housing variant "Q":	Cable connection with M12 connector (male, 5-pin, A-code)				
Extra charge:	optionally also with two or other sensors			on request	

ACCESSORIES

Special accessories for M12 connector
see chapter Accessories!



ETF6 - KV
with cable gland
(IP65)



THERMASGARD® ETF 6 - KV		Screw-in / immersion temperature sensor with neck tube (with cable gland)		
Type / WG03	Sensor / Output	Installation length (EL)	Item No.	Price
ETF6 Pt100 xx KV		Pt100 (according to DIN EN 60751, class B)	IP65, 4-wire	
ETF6 Pt100 100/80mm KV	Pt100	100 mm	1101-20C0-1023-000	94,11 €
ETF6 Pt100 150/80mm KV	Pt100	150 mm	1101-20C0-1033-000	98,55 €
ETF6 Pt100 200/80mm KV	Pt100	200 mm	1101-20C0-1043-000	101,09 €
ETF6 Pt100 250/80mm KV	Pt100	250 mm	1101-20C0-1053-000	103,51 €
ETF6 Pt100 400/80mm KV	Pt100	400 mm	1101-20C0-1083-000	106,45 €
ETF6 Pt1000 xx KV		Pt1000 (according to DIN EN 60751, class B)	IP65, 2-wire	
ETF6 Pt1000 100/80mm KV	Pt1000	100 mm	1101-20C0-5021-000	96,13 €
ETF6 Pt1000 150/80mm KV	Pt1000	150 mm	1101-20C0-5031-000	101,09 €
ETF6 Pt1000 200/80mm KV	Pt1000	200 mm	1101-20C0-5041-000	102,54 €
ETF6 Pt1000 250/80mm KV	Pt1000	250 mm	1101-20C0-5051-000	103,65 €
ETF6 Pt1000 400/80mm KV	Pt1000	400 mm	1101-20C0-5081-000	107,39 €
Housing variant "KV":	Cable connection with cable gland			
Extra charge:	optionally also with two or other sensors		on request	

Duct temperature sensors / smoke gas temperature sensors, including mounting flange, with passive output

RGTF 1
standard

Resistance thermometer / smoke gas temperature sensor **THERMASGARD® RGTF 1** with passive output, with connecting head made from aluminium (optionally with **cable gland** or **M12 connector** according to DIN EN 61076-2-101) and straight protective tube, incl. mounting flange.

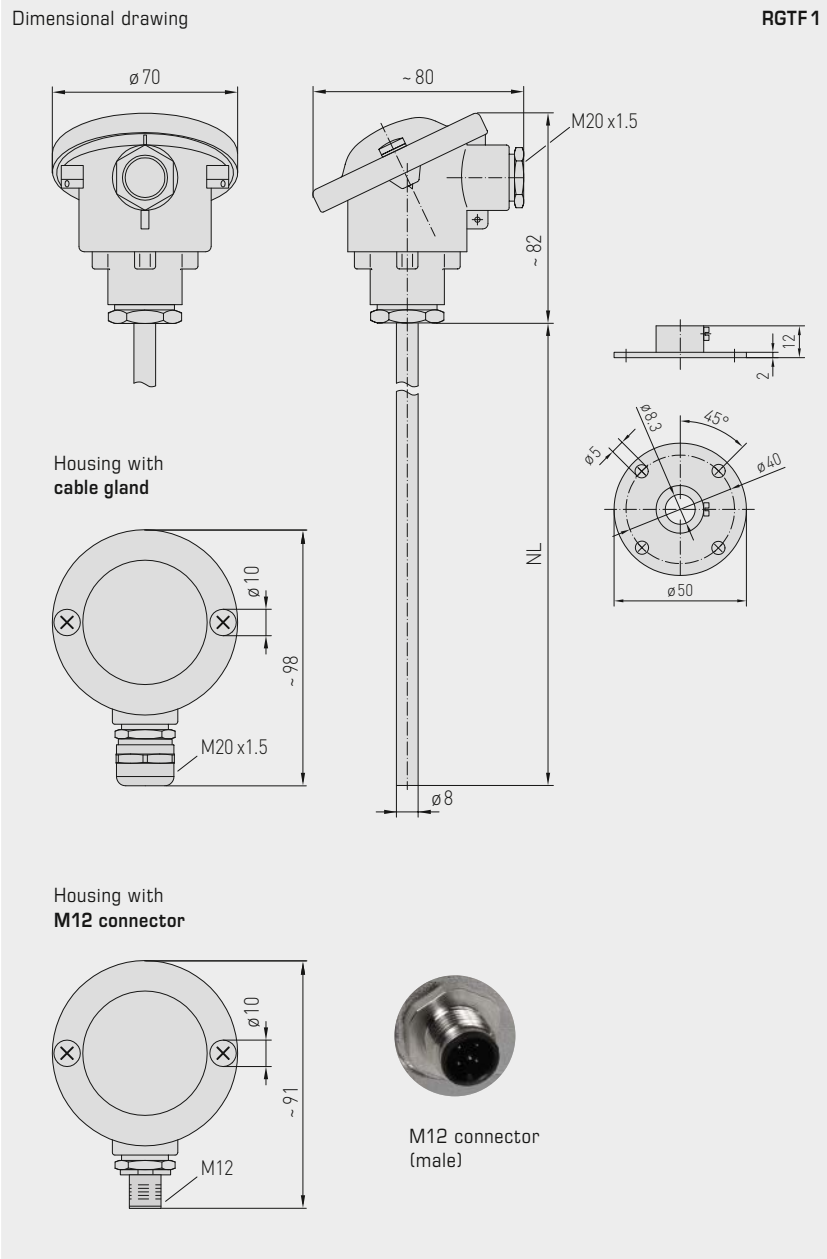
The duct sensor is used to detect relatively high temperatures in gaseous media, eg, for exhaust air and smoke gas temperature measurement.

TECHNICAL DATA

Measuring range:	-35...+600 °C (extended range limits from -100...+750 °C optional)
Sensor / output:	Pt100/Pt1000 (according to DIN EN 60 751, class B) (Perfect Sensor Protection)
Connection type:	2-wire connection (Pt1000) 4-wire connection (Pt100; optional Pt1000)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Electrical connection:	0.14 - 2.5 mm ² via terminal screws on ceramic base
Cable connection:	RGTF 1 (standard) adjusting screw made of metal (M20 x 1.5); RGTF 1-KV (optional) cable gland, brass, nickel-plated (M20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) RGTF 1-Q (optional) M12 connector according to DIN EN 61076-2-101 (male, 5-pin, A-code)
Dimensions:	see dimensional drawing
Connecting head:	form B, material aluminium, colour white aluminium (similar to RAL 9006), ambient temperature -20...+100 °C
Protective tube:	stainless steel V4A (1.4571), Ø = 8 mm inserted length (EL) = 200 - 500 mm (see table)
Process connection:	by mounting flange, stainless steel V2A (1.4305) (included in the scope of delivery)
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 54 (according to EN 60 529) RGTF 1 IP 65 (according to EN 60 529) RGTF1-KV / RGTF1-Q



RGTF 1
Measuring insert with ceramic tubelet



RGTF 1 standard (IP54)



RGTF 1-KV with cable gland (IP65)



RGTF 1-Q with M12 connector (IP65)

High-performance encapsulation against vibration, mechanical stress and humidity



Duct temperature sensors / smoke gas temperature sensors,
including mounting flange, with passive output

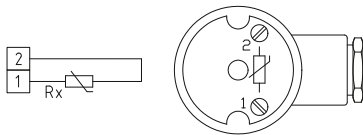
2-wire connection
(Pt1000)



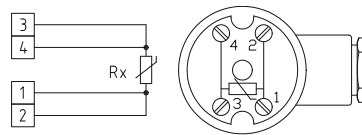
4-wire connection
(Pt100 / Pt1000 optional)



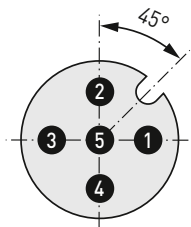
1x two-wire connection
(Pt1000)



1x four-wire connection
(Pt100 / Pt1000 optional)

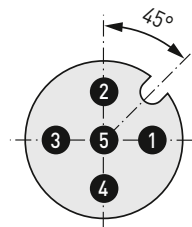


1x two-wire connection
pin assignment (M12)



- 1 Rx
- 2
- 3 frei / free
- 4 frei / free
- 5 frei / free

1x four-wire connection
pin assignment (M12)



- 1
- 2 Rx
- 3
- 4
- 5 frei / free



Duct temperature sensors / smoke gas temperature sensors,
including mounting flange, with passive output

RGTF 1
standard
(IP 54)



THERMASGARD® RGTF 1		Duct temperature sensors / smoke gas temperature sensors, including mounting flange (Standard)		
Type / WG01	Sensor / Output	Installation length (EL)	Item No.	Price
RGTF1 Pt100 xx	Pt100 (according to DIN EN 60751, class B)		IP 54, 4-wire	
RGTF1 Pt100 200mm	Pt100	200 mm	1101-3040-1043-000	184,46 €
RGTF1 Pt100 250mm	Pt100	250 mm	1101-3040-1053-000	186,39 €
RGTF1 Pt100 300mm	Pt100	300 mm	1101-3040-1063-000	190,58 €
RGTF1 Pt100 500mm	Pt100	500 mm	1101-3040-1103-000	205,36 €
RGTF1 Pt1000 xx	Pt1000 (according to DIN EN 60751, class B)		IP 54, 2-wire	
RGTF1 Pt1000 200mm	Pt1000	200 mm	1101-3040-5041-000	178,22 €
RGTF1 Pt1000 250mm	Pt1000	250 mm	1101-3040-5051-000	180,14 €
RGTF1 Pt1000 300mm	Pt1000	300 mm	1101-3040-5061-000	184,33 €
RGTF1 Pt1000 500mm	Pt1000	500 mm	1101-3040-5101-000	189,80 €
Housing variant:	equipped as standard with pressure screw (IP 54), optional housing variants with cable gland (IP 65) or M12 connector (IP 65) see the next page!			
Extra charge:	other measuring ranges optional			on request

Duct temperature sensors / smoke gas temperature sensors,
including mounting flange, with passive output

S+S REGELTECHNIK

RGTF1 - Q
with M12 connector
(IP 65)



THERMASGARD® RGTF 1 - Q		Duct temperature sensors / smoke gas temperature sensors, including mounting flange (with M12 connector)			
Type / WG03	Sensor / Output	Installation length (EL)	Q ●	Item No.	Price
RGTF1 Pt100 xx Q	Pt100 (according to DIN EN 60751, class B)			IP 65, 4-wire	
RGTF1 Pt100 200mm Q	Pt100	200 mm	●	2Z01-4131-0100-011	220,04 €
RGTF1 Pt100 250mm Q	Pt100	250 mm	●	2Z01-4131-0100-021	222,06 €
RGTF1 Pt100 300mm Q	Pt100	300 mm	●	2Z01-4131-0100-031	226,24 €
RGTF1 Pt100 500mm Q	Pt100	500 mm	●	2Z01-4131-0100-041	231,74 €
RGTF1 Pt1000 xx Q	Pt1000 (according to DIN EN 60751, class B)			IP 65, 2-wire	
RGTF1 Pt1000 200mm Q	Pt1000	200 mm	●	2Z05-4131-0100-011	220,04 €
RGTF1 Pt1000 250mm Q	Pt1000	250 mm	●	2Z05-4131-0100-021	222,06 €
RGTF1 Pt1000 300mm Q	Pt1000	300 mm	●	2Z05-4131-0100-031	226,24 €
RGTF1 Pt1000 500mm Q	Pt1000	500 mm	●	2Z05-4131-0100-041	231,74 €
Housing variant "Q":	Cable connection with M12 connector (male, 5-pin , A-code)				
Extra charge:	other measuring ranges optional			on request	

ACCESSORIES

Special accessories for M12 connector
see chapter Accessories!



Duct temperature sensors / smoke gas temperature sensors, including mounting flange, with passive output

RGTF 1 - KV
with cable gland
(IP 65)



THERMASGARD® RGTF 1 - KV		Duct temperature sensors / smoke gas temperature sensors, including mounting flange (with cable gland)		
Type / WG01	Sensor / Output	Installation length (EL)	Item No.	Price
RGTF1 Pt100 xx KV	Pt100 (according to DIN EN 60751, class B)		IP65, 4-wire	
RGTF1 Pt100 200mm KV	Pt100	200 mm	1101-30D0-1043-000	187,66 €
RGTF1 Pt100 250mm KV	Pt100	250 mm	1101-30D0-1053-000	189,58 €
RGTF1 Pt100 300mm KV	Pt100	300 mm	1101-30D0-1063-000	193,77 €
RGTF1 Pt100 500mm KV	Pt100	500 mm	1101-30D0-1103-000	199,25 €
RGTF1 Pt1000 xx KV	Pt1000 (according to DIN EN 60751, class B)		IP65, 2-wire	
RGTF1 Pt1000 200mm KV	Pt1000	200 mm	1101-30D0-5041-000	187,66 €
RGTF1 Pt1000 250mm KV	Pt1000	250 mm	1101-30D0-5051-000	189,58 €
RGTF1 Pt1000 300mm KV	Pt1000	300 mm	1101-30D0-5061-000	193,77 €
RGTF1 Pt1000 500mm KV	Pt1000	500 mm	1101-30D0-5101-000	199,25 €
Housing variant "KV":	Cable connection with cable gland			
Extra charge:	other measuring ranges optional			on request

Screw-in temperature sensors / smoke gas temperature sensors with neck tube and passive output

RGTF 2
standard

Screw-in resistance thermometer / smoke gas temperature sensor with neck tube
THERMASGARD® RGTF 2 with passive output, with connecting head made from aluminium (optionally with **cable gland** or **M12 connector** according to DIN EN 61076-2-101) and straight protective tube.

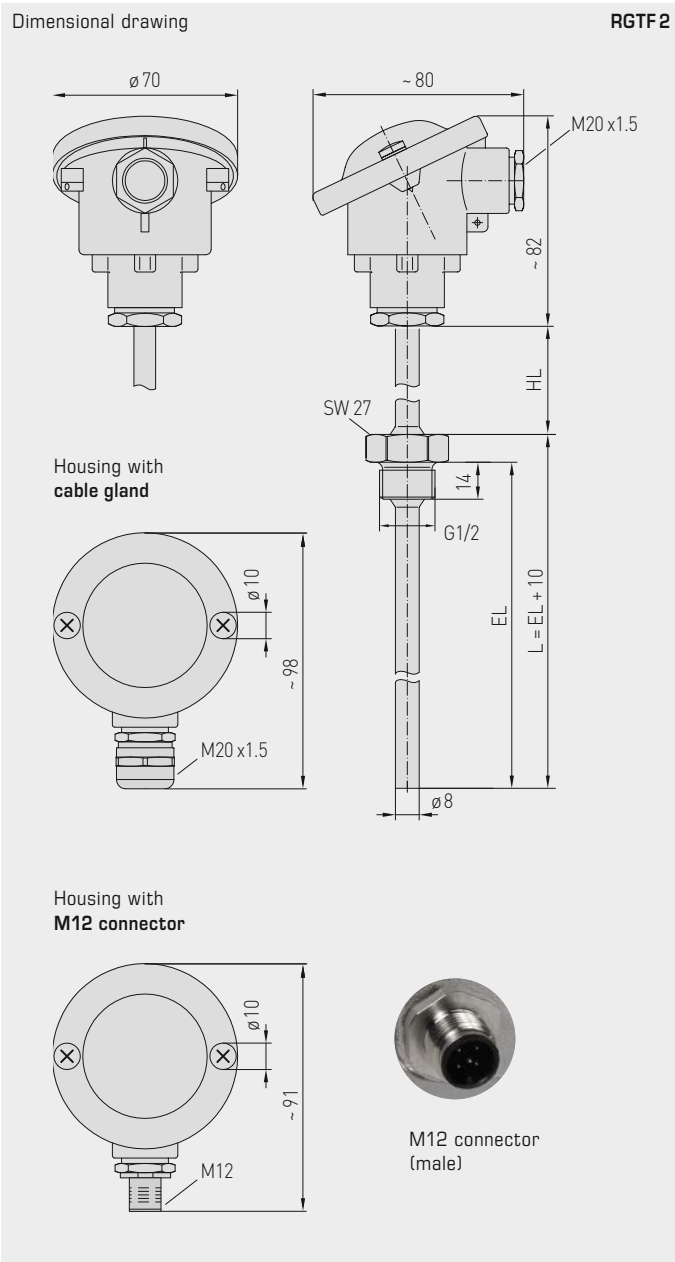
The duct sensor is used to detect relatively high temperatures in liquid or gaseous media, eg, for exhaust air and smoke gas temperature measurement..

TECHNICAL DATA

Measuring range:	-35...+600 °C (extended range limits from -100...+750 °C optional)
Sensor / output:	Pt100/Pt1000 (according to DIN EN 60 751, class B) (Perfect Sensor Protection)
Connection type:	2-wire connection (Pt1000) 4-wire connection (Pt100; optional Pt1000)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Electrical connection:	0.14 - 2.5 mm ² via terminal screws on ceramic base
Cable connection:	RGTF 2 (Standard) adjusting screw made of metal (M20 x 1.5); RGTF 2-KV (optional) cable gland , brass, nickel-plated (M20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) RGTF 2-Q (optional) M12 connector according to DIN EN 61076-2-101 (male, 5-pin, A-code)
Dimensions:	see dimensional drawing
Connecting head:	form B, material aluminium, colour white aluminium (similar to RAL 9006), ambient temperature -20...+100 °C
Protective tube:	stainless steel V4A (1.4571), G ½" straight pipe thread, wrench size 27 mm, p _{max} = 40 bar, Ø = 8 mm length of neck tube (HL) = 80 mm inserted length (EL) = 100 - 500 mm (see table)
Process connection:	screwed socket with G ½" straight pipe thread
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 54 (according to EN 60 529) RGTF 2 IP 65 (according to EN 60 529) RGTF 2-KV / RGTF 2-Q



RGTF 2
Measuring insert with ceramic tubelet



RGTF 2
standard
(IP 54)



RGTF 2-KV
with cable gland
(IP 65)



RGTF 2-Q
with M12 connector
(IP 65)

High-performance encapsulation against vibration, mechanical stress and humidity



Screw-in temperature sensors / smoke gas temperature sensors
with neck tube and passive output

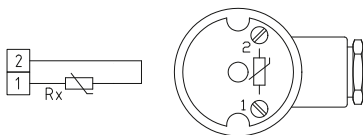
2-wire connection
(Pt1000)



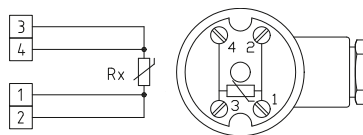
4-wire connection
(Pt100 / Pt1000 optional)



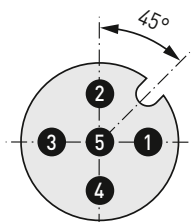
1x two-wire connection
(Pt1000)



1x four-wire connection
(Pt100 / Pt1000 optional)

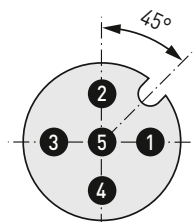


1x two-wire connection
pin assignment (M12)



- 1 Rx
- 2 Rx
- 3 frei / free
- 4 frei / free
- 5 frei / free

1x four-wire connection
pin assignment (M12)



- 1 Rx
- 2 Rx
- 3 Rx
- 4 Rx
- 5 frei / free



RGTF2
standard
(IP54)



THERMASGARD® RGTF 2		Screw-in temperature sensors / smoke gas temperature sensors with neck tube (standard)		
Type / WG01	Sensor / Output	Installation length (EL)	Item No.	Price
RGTF2 Pt100 xx		Pt100 (according to DIN EN 60751, class B)	IP54, 4-wire	
RGTF2 Pt100 100/80mm	Pt100	100 mm	1101-2090-1023-000	204,84 €
RGTF2 Pt100 150/80mm	Pt100	150 mm	1101-2090-1033-000	205,98 €
RGTF2 Pt100 200/80mm	Pt100	200 mm	1101-2090-1043-000	212,34 €
RGTF2 Pt100 250/80mm	Pt100	250 mm	1101-2090-1053-000	207,50 €
RGTF2 Pt100 300/80mm	Pt100	300 mm	1101-2090-1063-000	222,53 €
RGTF2 Pt100 500/80mm	Pt100	500 mm	1101-2090-1103-000	236,54 €
RGTF2 Pt1000 xx		Pt1000 (according to DIN EN 60751, class B)	IP54, 2-wire	
RGTF2 Pt1000 100/80	Pt1000	100 mm	1101-2090-5021-000	198,59 €
RGTF2 Pt1000 150/80	Pt1000	150 mm	1101-2090-5031-000	199,87 €
RGTF2 Pt1000 200/80	Pt1000	200 mm	1101-2090-5041-000	206,24 €
RGTF2 Pt1000 250/80	Pt1000	250 mm	1101-2090-5051-000	207,51 €
RGTF2 Pt1000 300/80	Pt1000	300 mm	1101-2090-5061-000	216,41 €
RGTF2 Pt1000 500/80	Pt1000	500 mm	1101-2090-5101-000	230,42 €
Housing variant:	equipped as standard with pressure screw (IP54), optional housing variants with cable gland (IP65) or M12 connector (IP65) see the next page!			
Extra charge:	other measuring ranges optional			on request

RGTF2 - Q
with M12 connector
(IP65)



THERMASGARD® RGTF 2 - Q		Screw-in temperature sensors / smoke gas temperature sensors with neck tube (with M12 connector)			
Type / WG03	Sensor / Output	Installation length (EL)	Q	Item No.	Price
RGTF2 Pt100 xx Q	Pt100 (according to DIN EN 60751, class B)		●	IP 65, 4-wire	
RGTF2 Pt100 100/80mm Q	Pt100	100 mm	●	2Z01-4141-0100-011	240,51 €
RGTF2 Pt100 150/80mm Q	Pt100	150 mm	●	2Z01-4141-0100-021	241,79 €
RGTF2 Pt100 200/80mm Q	Pt100	200 mm	●	2Z01-4141-0100-031	248,16 €
RGTF2 Pt100 250/80mm Q	Pt100	250 mm	●	2Z01-4141-0100-041	249,43 €
RGTF2 Pt100 300/80mm Q	Pt100	300 mm	●	2Z01-4141-0100-051	258,33 €
RGTF2 Pt100 500/80mm Q	Pt100	500 mm	●	2Z01-4141-0100-061	272,34 €
RGTF2 Pt1000 xx Q	Pt1000 (according to DIN EN 60751, class B)		●	IP 65, 2-wire	
RGTF2 Pt1000 100/80mm Q	Pt1000	100 mm	●	2Z05-4141-0100-011	240,51 €
RGTF2 Pt1000 150/80mm Q	Pt1000	150 mm	●	2Z05-4141-0100-021	241,79 €
RGTF2 Pt1000 200/80mm Q	Pt1000	200 mm	●	2Z05-4141-0100-031	248,16 €
RGTF2 Pt1000 250/80mm Q	Pt1000	250 mm	●	2Z05-4141-0100-041	249,43 €
RGTF2 Pt1000 300/80mm Q	Pt1000	300 mm	●	2Z05-4141-0100-051	258,33 €
RGTF2 Pt1000 500/80mm Q	Pt1000	500 mm	●	2Z05-4141-0100-061	272,34 €
Housing variant "Q":	Cable connection with M12 connector (male, 5-pin, A-code)				
Extra charge:	other measuring ranges optional			on request	

ACCESSORIES

Special accessories for M12 connector
see chapter Accessories!

RGTF2 - KV
with cable gland
(IP 65)**THERMASGARD®
RGTF 2 - KV**Screw-in temperature sensors / smoke gas temperature sensors with neck tube
(with cable gland)

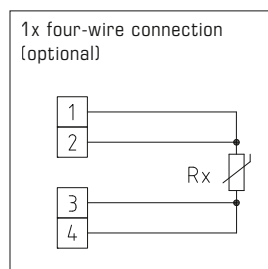
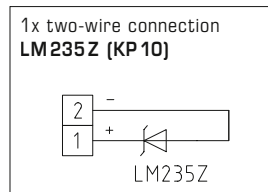
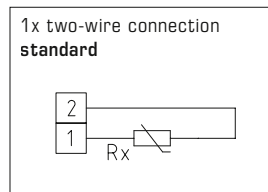
Type / WG01	Sensor / Output	Installation length (EL)	Item No.	Price
RGTF2 Pt100 xx KV	Pt100 (according to DIN EN 60751, class B)		IP 65, 4-wire	
RGTF2 Pt100 100/80mm KV	Pt100	100 mm	1101-20D0-1023-000	208,04 €
RGTF2 Pt100 150/80mm KV	Pt100	150 mm	1101-20D0-1033-000	209,31 €
RGTF2 Pt100 200/80mm KV	Pt100	200 mm	1101-20D0-1043-000	215,68 €
RGTF2 Pt100 250/80mm KV	Pt100	250 mm	1101-20D0-1053-000	216,93 €
RGTF2 Pt100 300/80mm KV	Pt100	300 mm	1101-20D0-1063-000	225,84 €
RGTF2 Pt100 500/80mm KV	Pt100	500 mm	1101-20D0-1103-000	239,86 €
RGTF2 Pt1000 xx KV	Pt1000 (according to DIN EN 60751, class B)		IP 65, 2-wire	
RGTF2 Pt1000 100/80mm KV	Pt1000	100 mm	1101-20D0-5021-000	208,04 €
RGTF2 Pt1000 150/80mm KV	Pt1000	150 mm	1101-20D0-5031-000	209,31 €
RGTF2 Pt1000 200/80mm KV	Pt1000	200 mm	1101-20D0-5041-000	215,68 €
RGTF2 Pt1000 250/80mm KV	Pt1000	250 mm	1101-20D0-5051-000	216,93 €
RGTF2 Pt1000 300/80mm KV	Pt1000	300 mm	1101-20D0-5061-000	225,84 €
RGTF2 Pt1000 500/80mm KV	Pt1000	500 mm	1101-20D0-5101-000	239,86 €
Housing variant "KV":	Cable connection with cable gland			
Extra charge:	other measuring ranges optional			on request

Sleeve sensor / cable temperature sensor
duct / immersion / screw-in temperature sensor,
with passive output

The sleeve sensor / cable sensor **THERMASGARD® HTF** is used to measure temperatures in liquid and gaseous media. It can be used as a duct sensor and - if installed in an immersion sleeve - as an immersion and screw-in sensor. The sleeve length varies, depending on request, from 30..400 mm (standard is 50 mm respectively 200 mm), the cable length is arbitrary (standard is 1.5 m). Depending on application, with silicone, glass fibre, or PVC leads, for two-wire or four-wire connection. For direct, continuous use in liquids, please use our **THE** immersion sleeves (see type table).

TECHNICAL DATA

Measuring ranges:	-35...+105 °C PVC , LiYY, 2 x 0.25 mm ² -50...+180 °C Silicone , SiHF, 2 x 0.25 mm ² -50...+250 °C PTFE , 2 x 1.0 mm ² -50...+350 °C glass fibre , 2 x 0.25 mm ² ends stripped with wire end sleeves (extended measuring range limits optional, depending on connection leads, T_{max} Ni1000 = +180 °C, T_{max} NTC / Ni1000 TK5000 = +150 °C, T_{max} LM235Z = +125 °C)
Sensors / output:	see table, passive (optional also with 2 sensors) (Perfect Sensor Protection with IP68)
Connection type:	2-wire connection (4-wire connection optional)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Protective tube	sensor sleeve made of stainless steel, V4A (1.4571), Ø = 6 mm HTF50 nominal length (NL) = 50 mm HTF200 nominal length (NL) = 200 mm (other optional dimensions also available, nominal length (NL) = 30...400 mm)
Connection cable:	cable length (KL) = 1.5 m (optional also 3 m, 5 m, 8 m, 10 m)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Process connection:	using immersion sleeves THE (see table) or mounting flange, plastic (see table) (optionally in galvanised steel, see chapter Accessories)
Permitted humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP65 (according to EN 60 529) sleeve humidity-tight (standard) IP68 (according to EN 60 529) sleeve water-tight (optional) IP54 (according to EN 60 529) with glass fibre cable (optional)
ACCESSORIES	
MF-06-K	Mounting flange , plastic, 56.8 x 84.3 mm, Ø = 6.2 mm tube gland, T _{max} = +100 °C (is not included in scope of delivery)
THE-ms/xx	Immersion sleeve, brass, nickel-plated , Ø = 9 mm, inserted length (EL) = 50 - 250 mm (see table), inner diameter of socket Ø = 5.2 mm, with adjusting screw M12 x 1.5 T _{max} = +130 °C, p _{max} = 16 bar
THE-VA/xx	Immersion sleeve, stainless steel, V4A (1.4571), Ø = 9 mm, inserted length (EL) = 50 - 400 mm (see table), inner diameter of socket Ø = 5.2 mm, with adjusting screw M12 x 1.5 T _{max} = +200 °C, p _{max} = 40 bar



IP65 (standard)
 humidity-tight



IP68 (optional)
 water-tight
Perfect Sensor Protection



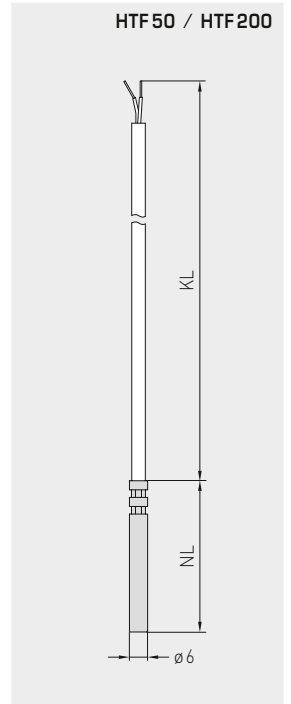
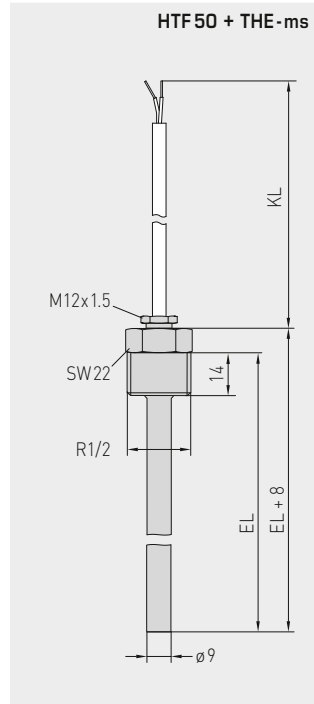
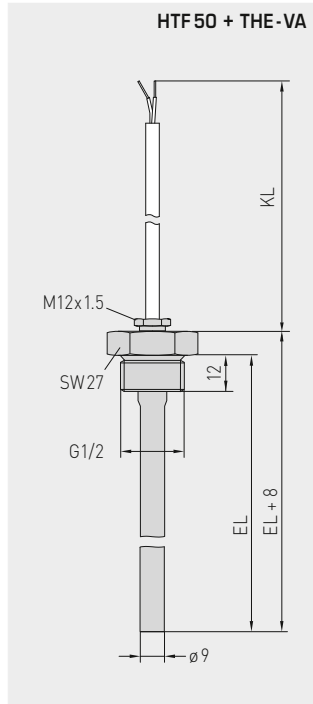
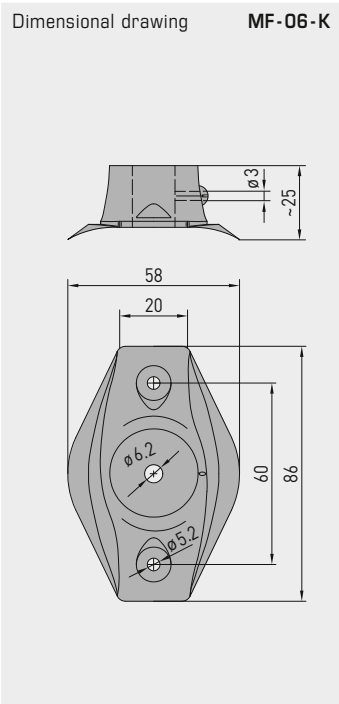
IP54 (optional)
 with **glass fibre** cable

MF-06-K
 Mounting flange,
 plastic
 (optional)



High-performance encapsulation against
 vibration, mechanical stress and humidity

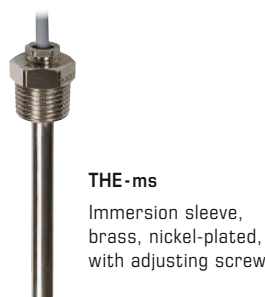
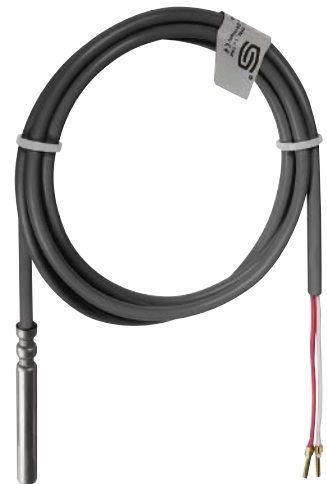
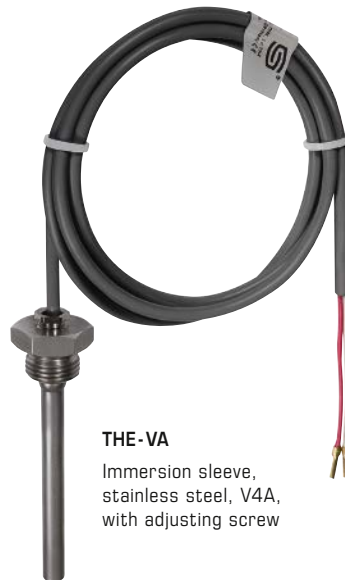




HTF 200 + MF-06-K
with accessory mounting flange
(see type table)
as duct temperature sensor

HTF 50 + THE-xx
with accessory immersion sleeve
(see type table)
as immersion / screw-in temperature sensor

HTF 50
with PVC / silicone cable
(standard)



**Sleeve sensor / cable temperature sensor
duct / immersion / screw-in temperature sensor,
with passive output**

THERMASGARD® HTF 50 sleeve sensor / cable temperature sensor (NL = 50 mm)

Type / WG03	Cable material	Cable length	Measuring Range	Protection class	Item No. Sensor	Price
HTF50 PT100					Pt 100, class B	
HTF50 Pt100 PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6030-1211-110	13,69 €
HTF50 Pt100 Silikon 1,5M	Silicone	1.5 m	-50...+180 °C	IP65 *	1101-6030-1211-120	17,20 €
HTF50 Pt100 PTFE 1,5M	PTFE	1.5 m	-50...+250 °C	IP65 *	1101-6030-1211-140	57,73 €
HTF50 Pt100	Glass Fibre	1.5 m	-50...+350 °C	IP54	1101-6030-1211-050	47,94 €
HTF50 Pt100 PVC 3M	PVC	3 m	-35...+105 °C	IP65 *	1101-6030-1231-110	16,57 €
HTF50 Pt100 Silikon 3M	Silicone	3 m	-50...+180 °C	IP65 *	1101-6030-1231-120	21,45 €
HTF50 Pt100 PVC 5M	PVC	5 m	-35...+105 °C	IP65 *	1101-6030-1251-110	20,39 €
HTF50 Pt100 Silikon 5M	Silicone	5 m	-50...+180 °C	IP65 *	1101-6030-1251-120	27,13 €
HTF50 Pt100 PVC 8M	PVC	8 m	-35...+105 °C	IP65 *	1101-6030-1281-110	26,15 €
HTF50 Pt100 Silikon 8M	Silicone	8 m	-50...+180 °C	IP65 *	1101-6030-1281-120	35,67 €
HTF50 Pt100 PVC 10M	PVC	10 m	-35...+105 °C	IP65 *	1101-6030-1301-110	29,97 €
HTF50 Pt100 Silikon 10M	Silicone	10 m	-50...+180 °C	IP65 *	1101-6030-1301-120	41,37 €
HTF50 PT1000					Pt 1000, class B	
HTF50 Pt1000 PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6030-5211-110	16,12 €
HTF50 Pt1000 Silikon 1,5M	Silicone	1.5 m	-50...+180 °C	IP65 *	1101-6030-5211-120	19,80 €
HTF50 Pt1000 PTFE 1,5M	PTFE	1.5 m	-50...+250 °C	IP65 *	1101-6030-5211-140	57,87 €
HTF50 Pt1000	Glass Fibre	1.5 m	-50...+350 °C	IP54	1101-6030-5211-050	47,94 €
HTF50 Pt1000 PVC 3M	PVC	3 m	-35...+105 °C	IP65 *	1101-6030-5231-110	18,99 €
HTF50 Pt1000 Silikon 3M	Silicone	3 m	-50...+180 °C	IP65 *	1101-6030-5231-120	24,08 €
HTF50 Pt1000 PVC 5M	PVC	5 m	-35...+105 °C	IP65 *	1101-6030-5251-110	22,82 €
HTF50 Pt1000 Silikon 5M	Silicone	5 m	-50...+180 °C	IP65 *	1101-6030-5251-120	29,76 €
HTF50 Pt1000 PVC 8M	PVC	8 m	-35...+105 °C	IP65 *	1101-6030-5281-110	28,57 €
HTF50 Pt1000 Silikon 8M	Silicone	8 m	-50...+180 °C	IP65 *	1101-6030-5281-120	38,28 €
HTF50 Pt1000 PVC 10M	PVC	10 m	-35...+105 °C	IP65 *	1101-6030-5301-110	32,40 €
HTF50 Pt1000 Silikon 10M	Silicone	10 m	-50...+180 °C	IP65 *	1101-6030-5301-120	43,96 €
HTF50 PT1000 A					Pt 1000 A, class A-TGA	
HTF50 Pt1000A PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6030-6211-110	23,64 €
HTF50 Pt1000A Silikon 1,5M	Silicone	1.5 m	-50...+180 °C	IP65 *	1101-6030-6211-120	27,15 €
HTF50 Ni1000					Ni 1000	
HTF50 Ni1000 PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6030-9211-110	15,66 €
HTF50 Ni1000 Silikon 1,5M	Silicone	1.5 m	-50...+180 °C	IP65 *	1101-6030-9211-120	19,50 €
HTF50 Ni1000 PVC 3M	PVC	3 m	-35...+105 °C	IP65 *	1101-6030-9231-110	18,54 €
HTF50 Ni1000 Silikon 3M	Silicone	3 m	-50...+180 °C	IP65 *	1101-6030-9231-120	23,75 €
HTF50 Ni1000 PVC 5M	PVC	5 m	-35...+105 °C	IP65 *	1101-6030-9251-110	22,38 €
HTF50 Ni1000 Silikon 5M	Silicone	5 m	-50...+180 °C	IP65 *	1101-6030-9251-120	29,43 €
HTF50 Ni1000 PVC 8M	PVC	8 m	-35...+105 °C	IP65 *	1101-6030-9281-110	28,12 €
HTF50 Ni1000 Silikon 8M	Silicone	8 m	-50...+180 °C	IP65 *	1101-6030-9281-120	37,97 €
HTF50 Ni1000 PVC 10M	PVC	10 m	-35...+105 °C	IP65 *	1101-6030-9301-110	31,94 €
HTF50 Ni1000 Silikon 10M	Silicone	10 m	-50...+180 °C	IP65 *	1101-6030-9301-120	43,65 €
HTF50 NiTK					Ni 1000 TK 5000	
HTF50 NiTK PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6031-0211-110	19,74 €
HTF50 NiTK Silikon 1,5M	Silicone	1.5 m	-50...+150 °C	IP65 *	1101-6031-0211-120	23,29 €
HTF50 NiTK PVC 3M	PVC	3 m	-35...+105 °C	IP65 *	1101-6031-0231-110	22,63 €
HTF50 NiTK Silikon 3M	Silicone	3 m	-50...+150 °C	IP65 *	1101-6031-0231-120	27,56 €
HTF50 NiTK PVC 5M	PVC	5 m	-35...+105 °C	IP65 *	1101-6031-0251-110	26,46 €
HTF50 NiTK Silikon 5M	Silicone	5 m	-50...+150 °C	IP65 *	1101-6031-0251-120	33,23 €
HTF50 NiTK PVC 8M	PVC	8 m	-35...+105 °C	IP65 *	1101-6031-0281-110	32,20 €
HTF50 NiTK Silikon 8M	Silicone	8 m	-50...+150 °C	IP65 *	1101-6031-0281-120	41,78 €
HTF50 NiTK PVC 10M	PVC	10 m	-35...+105 °C	IP65 *	1101-6031-0301-110	36,03 €
HTF50 NiTK Silikon 10M	Silicone	10 m	-50...+150 °C	IP65 *	1101-6031-0301-120	47,46 €
HTF50 LM235Z					LM235Z	
HTF50 LM235Z PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6032-1211-110	14,02 €
HTF50 LM235Z Silikon 1,5M	Silicone	1.5 m	-40...+125 °C	IP65 *	1101-6032-1211-120	17,84 €
HTF50 LM235Z PVC 3M	PVC	3 m	-35...+105 °C	IP65 *	1101-6032-1231-110	16,88 €
HTF50 LM235Z Silikon 3M	Silicone	3 m	-40...+125 °C	IP65 *	1101-6032-1231-120	22,09 €
HTF50 LM235Z PVC 5M	PVC	5 m	-35...+105 °C	IP65 *	1101-6032-1251-110	20,73 €
HTF50 LM235Z Silikon 5M	Silicone	5 m	-40...+125 °C	IP65 *	1101-6032-1251-120	27,77 €
HTF50 LM235Z PVC 8M	PVC	8 m	-35...+105 °C	IP65 *	1101-6032-1281-110	26,47 €
HTF50 LM235Z Silikon 8M	Silicone	8 m	-40...+125 °C	IP65 *	1101-6032-1281-120	36,32 €
HTF50 LM235Z PVC 10M	PVC	10 m	-35...+105 °C	IP65 *	1101-6032-1301-110	30,30 €
HTF50 LM235Z Silikon 10M	Silicone	10 m	-40...+125 °C	IP65 *	1101-6032-1301-120	42,00 €

Continued on next page ...



THERMASGARD® HTF 50 sleeve sensor / cable temperature sensor (NL = 50 mm)

Type / WG03	Cable material	Cable length	Measuring Range	Protection class	Item No. Sensor	Price
HTF50 NTC1.8K					NTC 1.8K	
HTF50 NTC1,8K PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6031-2211-110	13,24 €
HTF50 NTC1,8K Silikon 1,5M	Silicone	1.5 m	-50...+150 °C	IP65 *	1101-6031-2211-120	15,21 €
HTF50 NTC1,8K PVC 3M	PVC	3 m	-35...+105 °C	IP65 *	1101-6031-2231-110	16,13 €
HTF50 NTC1,8K Silikon 3M	Silicone	3 m	-50...+150 °C	IP65 *	1101-6031-2231-120	19,50 €
HTF50 NTC1,8K PVC 5M	PVC	5 m	-35...+105 °C	IP65 *	1101-6031-2251-110	19,96 €
HTF50 NTC1,8K Silikon 5M	Silicone	5 m	-50...+150 °C	IP65 *	1101-6031-2251-120	25,18 €
HTF50 NTC1,8K PVC 8M	PVC	8 m	-35...+105 °C	IP65 *	1101-6031-2281-110	25,69 €
HTF50 NTC1,8K Silikon 8M	Silicone	8 m	-50...+150 °C	IP65 *	1101-6031-2281-120	33,69 €
HTF50 NTC1,8K PVC 10M	PVC	10 m	-35...+105 °C	IP65 *	1101-6031-2301-110	29,53 €
HTF50 NTC1,8K Silikon 10M	Silicone	10 m	-50...+150 °C	IP65 *	1101-6031-2301-120	39,39 €
HTF50 NTC10K					NTC 10K	
HTF50 NTC10K PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6031-5211-110	13,24 €
HTF50 NTC10K Silikon 1,5M	Silicone	1.5 m	-50...+150 °C	IP65 *	1101-6031-5211-120	15,21 €
HTF50 NTC10K PVC 3M	PVC	3 m	-35...+105 °C	IP65 *	1101-6031-5231-110	16,13 €
HTF50 NTC10K Silikon 3M	Silicone	3 m	-50...+150 °C	IP65 *	1101-6031-5231-120	19,50 €
HTF50 NTC10K PVC 5M	PVC	5 m	-35...+105 °C	IP65 *	1101-6031-5251-110	19,96 €
HTF50 NTC10K Silikon 5M	Silicone	5 m	-50...+150 °C	IP65 *	1101-6031-5251-120	25,18 €
HTF50 NTC10K PVC 8M	PVC	8 m	-35...+105 °C	IP65 *	1101-6031-5281-110	25,69 €
HTF50 NTC10K Silikon 8M	Silicone	8 m	-50...+150 °C	IP65 *	1101-6031-5281-120	33,69 €
HTF50 NTC10K PVC 10M	PVC	10 m	-35...+105 °C	IP65 *	1101-6031-5301-110	29,53 €
HTF50 NTC10K Silikon 10M	Silicone	10 m	-50...+150 °C	IP65 *	1101-6031-5301-120	39,39 €
HTF50 NTC20K					NTC 20K	
HTF50 NTC20K PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6031-6211-110	13,24 €
HTF50 NTC20K Silikon 1,5M	Silicone	1.5 m	-50...+150 °C	IP65 *	1101-6031-6211-120	15,21 €
HTF50 NTC20K PVC 3M	PVC	3 m	-35...+105 °C	IP65 *	1101-6031-6231-110	16,13 €
HTF50 NTC20K Silikon 3M	Silicone	3 m	-50...+150 °C	IP65 *	1101-6031-6231-120	19,50 €
HTF50 NTC20K PVC 5M	PVC	5 m	-35...+105 °C	IP65 *	1101-6031-6251-110	19,96 €
HTF50 NTC20K Silikon 5M	Silicone	5 m	-50...+150 °C	IP65 *	1101-6031-6251-120	25,18 €
HTF50 NTC20K PVC 8M	PVC	8 m	-35...+105 °C	IP65 *	1101-6031-6281-110	25,69 €
HTF50 NTC20K Silikon 8M	Silicone	8 m	-50...+150 °C	IP65 *	1101-6031-6281-120	33,69 €
HTF50 NTC20K PVC 10M	PVC	10 m	-35...+105 °C	IP65 *	1101-6031-6301-110	29,53 €
HTF50 NTC20K Silikon 10M	Silicone	10 m	-50...+150 °C	IP65 *	1101-6031-6301-120	39,39 €
Extra charge:	* Protection type IP68 (Sensor sleeve watertight compound-filled) Other sensors optional Cable length (KL) 3 m, 5 m, 8 m, 10 m (standard lengths) Connection type 4-wire (4-conductor)					3,40 € on request on request on request
For special orders please specify: (possible for 25 or more pieces)	Type sensor length (NL), sensor, cable material, connection type, cable length (KL), protection type e.g. HTF-30mm, Pt1000, PVC, 2-wire, 10m, IP68; HTF-50mm, Ni1000 TK5000, silicon, 4-wire, 5m, IP65					

HTF 50
(NL = 50 mm)
with PVC / silicone cable

HTF 50
(NL = 50 mm)
with glass fibre cable



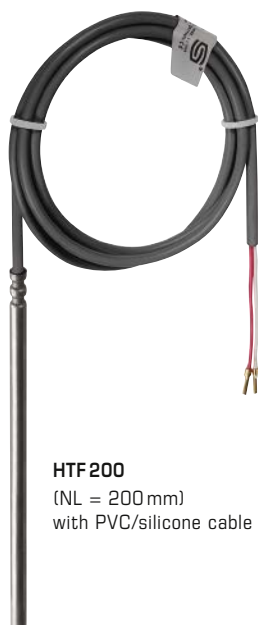
- IP 65** (standard)
humidity-tight
- IP 68** (optional)
water-tight
Perfect Sensor Protection
- IP 54** (optional)
with glass fibre cable



Sleeve sensor / cable temperature sensor
 duct / immersion / screw-in temperature sensor,
 with passive output

THERMASGARD® HTF 200 sleeve sensor / cable temperature sensor (NL = 200 mm)

Type / WG03	Cable material	Cable length	Measuring Range	Protection class	Item No. Sensor	Price
HTF200 PT100					Pt 100, class B	
HTF200 Pt100 PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6090-1211-110	20,37 €
HTF200 Pt100 Silikon 1,5M	Silicone	1.5 m	-50...+180 °C	IP65 *	1101-6090-1211-120	24,19 €
HTF200 PT1000					Pt 1000, class B	
HTF200 Pt1000 PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6090-5211-110	20,37 €
HTF200 Pt1000 Silikon 1,5M	Silicone	1.5 m	-50...+180 °C	IP65 *	1101-6090-5211-120	24,19 €
HTF200 PT1000 A					Pt 1000 A, class A-TGA	
HTF200 Pt1000A PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6090-6211-110	27,72 €
HTF200 Pt1000A Silikon 1,5M	Silicone	1.5 m	-50...+180 °C	IP65 *	1101-6090-6211-120	31,56 €
HTF200 Ni1000					Ni 1000	
HTF200 Ni1000 PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6090-9211-110	20,76 €
HTF200 Ni1000 Silikon 1,5M	Silicone	1.5 m	-50...+180 °C	IP65 *	1101-6090-9211-120	24,19 €
HTF200 NiTK					Ni 1000 TK 5000	
HTF200 NiTK PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6091-0211-110	21,78 €
HTF200 NiTK Silikon 1,5M	Silicone	1.5 m	-50...+150 °C	IP65 *	1101-6091-0211-120	25,21 €
HTF200 LM235Z					LM 235 Z	
HTF200 LM235Z PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6092-1211-110	21,00 €
HTF200 LM235Z Silikon 1,5M	Silicone	1.5 m	-40...+125 °C	IP65 *	1101-6092-1211-120	24,83 €
HTF200 NTC1,8K					NTC 1.8K	
HTF200 NTC1,8K PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6091-2211-110	20,37 €
HTF200 NTC1,8K Silikon 1,5M	Silicone	1.5 m	-50...+150 °C	IP65 *	1101-6091-2211-120	24,19 €
HTF200 NTC10K					NTC 10K	
HTF200 NTC10K PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6091-5211-110	20,37 €
HTF200 NTC10K Silikon 1,5M	Silicone	1.5 m	-50...+150 °C	IP65 *	1101-6091-5211-120	24,19 €
HTF200 NTC20K					NTC 20K	
HTF200 NTC20K PVC 1,5M	PVC	1.5 m	-35...+105 °C	IP65 *	1101-6091-6211-110	20,37 €
HTF200 NTC20K Silikon 1,5M	Silicone	1.5 m	-50...+150 °C	IP65 *	1101-6091-6211-120	24,19 €
Extra charge:	* Protection type IP68 (Sensor sleeve watertight compound-filled) Other sensors optional Cable length (KL) 3 m, 5 m, 8 m, 10 m (standard lengths) Connection type 4-wire (4-conductor)					3,40 € on request on request on request
For special orders please specify: (possible for 25 or more pieces)	Type sensor length (NL), sensor, cable material, connection type, cable length (KL), protection type e. g. HTF-200 mm, Pt1000, PVC, 2-wire, 10 m, IP68; HTF-400 mm, Ni1000 TK5000, silicon, 4-wire, 5 m, IP65					



HTF 200
 (NL = 200 mm)
 with PVC/silicone cable



IP65 (standard)
 humidity-tight



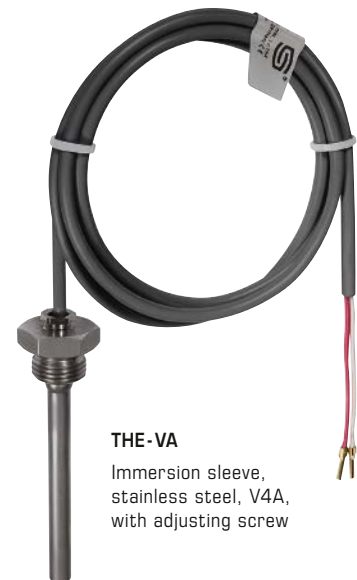
IP68 (optional)
 water-tight
Perfect Sensor Protection

THERMASGARD® HTF 50 accessory as immersion / screw-in sensor temperature sensor (ESTF)				
Type / WG01	Description		Item No.	Price
THE -ms / xx				
	Immersion sleeve, brass, nickel-plated, Ø 9 mm, inner diameter of socket Ø = 5.2 mm, with adjusting screw M12 x 1.5			
THE-MS 50MM	$p_{max} = 16 \text{ bar}, T_{max} = +130 \text{ °C}$	EL = 50 mm	7100-0011-6010-002	10,46 €
THE-MS 100MM	$p_{max} = 16 \text{ bar}, T_{max} = +130 \text{ °C}$	EL = 100 mm	7100-0011-6020-002	11,30 €
THE-MS 150MM	$p_{max} = 16 \text{ bar}, T_{max} = +130 \text{ °C}$	EL = 150 mm	7100-0011-6030-002	11,72 €
THE-MS 200MM	$p_{max} = 16 \text{ bar}, T_{max} = +130 \text{ °C}$	EL = 200 mm	7100-0011-6040-002	12,54 €
THE-MS 250MM	$p_{max} = 16 \text{ bar}, T_{max} = +130 \text{ °C}$	EL = 250 mm	7100-0011-6050-002	14,05 €
THE -VA / xx				
	Immersion sleeve, stainless steel, V4A (1.4571), Ø 9 mm, inner diameter of socket Ø = 5.2 mm, with adjusting screw M12 x 1.5			
THE-VA 50MM	$p_{max} = 40 \text{ bar}, T_{max} = +200 \text{ °C}$	EL = 50 mm	7100-0012-6010-002	20,70 €
THE-VA 100MM	$p_{max} = 40 \text{ bar}, T_{max} = +200 \text{ °C}$	EL = 100 mm	7100-0012-6020-002	22,86 €
THE-VA 150MM	$p_{max} = 40 \text{ bar}, T_{max} = +200 \text{ °C}$	EL = 150 mm	7100-0012-6030-002	24,55 €
THE-VA 200MM	$p_{max} = 40 \text{ bar}, T_{max} = +200 \text{ °C}$	EL = 200 mm	7100-0012-6040-002	25,89 €
THE-VA 250MM	$p_{max} = 40 \text{ bar}, T_{max} = +200 \text{ °C}$	EL = 250 mm	7100-0012-6050-002	32,18 €
THE-VA 300MM	$p_{max} = 40 \text{ bar}, T_{max} = +200 \text{ °C}$	EL = 300 mm	7100-0012-6060-002	33,62 €
THE-VA 400MM	$p_{max} = 40 \text{ bar}, T_{max} = +200 \text{ °C}$	EL = 400 mm	7100-0012-6080-002	34,71 €
xx = (EL)	Other installation lengths on request			

HTF 50
(NL = 50 mm)
with **THE** immersion sleeve
as immersion / screw-in temperature sensor



THE -ms
Immersion sleeve,
brass, nickel-plated,
with adjusting screw



THE -VA
Immersion sleeve,
stainless steel, V4A,
with adjusting screw

MF-06-K
Mounting flange,
plastic
(optional)



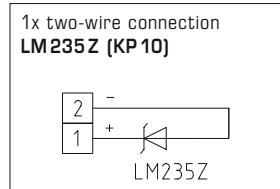
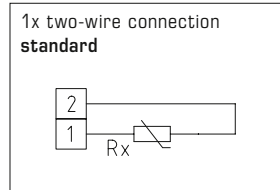
THERMASGARD® HTF 50 accessories (standard)				
THERMASGARD® HTF 200 accessories (standard)				
Type / WG01	Description	T_{max}	Item No.	Price
MF				
MF-06-K	Mounting flange plastic, 56.8 x 84.3 mm, Ø 6.2 mm tube gland (not included in scope of delivery)	+100 °C	7100-0030-1000-000	6,12 €
Note:	For further information see last chapter!			

Surface contact temperature sensors /
surface temperature sensors,
with passive output

Small surface contact resistance thermometer in aluminium enclosure (cable sensor).
The surface sensor **THERMASGARD® OFTF** is used for temperature detection on flat or slightly convex surfaces, for instance for surface temperature measurement at windows, for monitoring formation of condensate, or as heating surface sensor, e.g. at windows or walls.

TECHNICAL DATA

Measuring range:	-30...+105 °C
Sensors / output:	see table, passive (Perfect Sensor Protection with IP68)
Connection type:	2-wire connection
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Process connection:	attachment to the surface to be measured through fixing hole in the sensor head or by suitable adhesive
Protective sleeve:	aluminium
Dimensions:	8 x 8 x 50 mm
Connecting cable:	PVC; 1.5 m, LiYY, 2 x 0.25 mm ² , ends stripped with wire end sleeves (optional with silicone cable SiHF, up to +180 °C)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Permissible air humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP65 (according to EN 60 529) sleeve humidity-tight (standard) IP68 (according to EN 60 529) sleeve water-tight (optional)

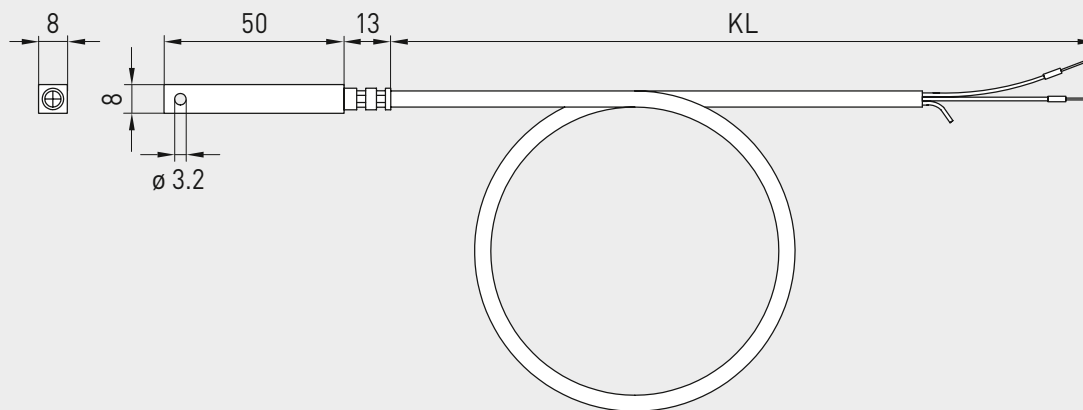


High-performance encapsulation against
vibration, mechanical stress and humidity



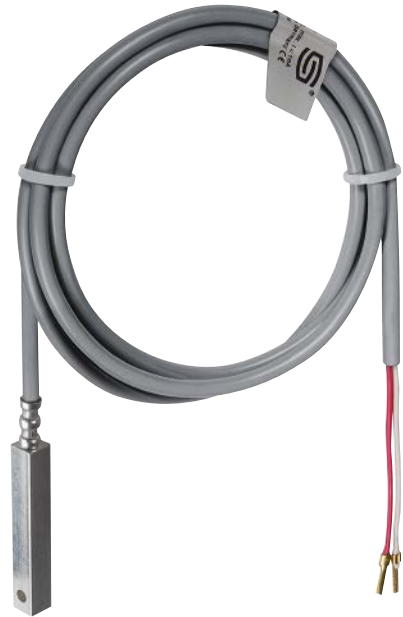
Dimensional drawing

OFTF





OUTF



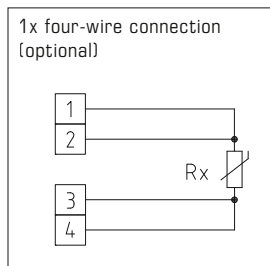
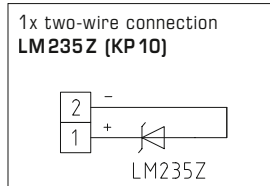
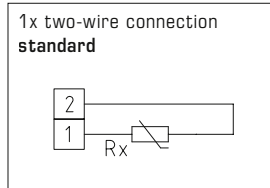
THERMASGARD® OUTF Surface contact temperature sensors / surface temperature sensors			
Type / WG03	Sensor / output	Item No.	Price
OUTF		IP65	
OUTF Pt100 PVC 1,5M	Pt100 (according to DIN EN 60 751, class B)	1101-6010-1211-110	36,99 €
OUTF Pt1000 PVC 1,5M	Pt1000 (according to DIN EN 60 751, class B)	1101-6010-5211-110	36,99 €
OUTF Ni1000 PVC 1,5M	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-6010-9211-110	39,13 €
OUTF NiTK PVC 1,5M	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-6011-0211-110	43,27 €
OUTF LM235Z PVC 1,5M	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-6012-1211-110	37,71 €
OUTF NTC1,8K PVC 1,5M	NTC 1.8K	1101-6011-2211-110	35,57 €
OUTF NTC10K PVC 1,5M	NTC 10K	1101-6011-5211-110	35,57 €
OUTF NTC20K PVC 1,5M	NTC 20K	1101-6011-6211-110	35,57 €
Extra charge:	Protection type IP68 (sensor sleeve watertight compound-filled) 2-wire connecting leads (PVC / silicone) per running metre 4-wire connecting leads (PVC / silicone) per running metre	on request on request	3,40 €
For special orders please specify:	Type, sensor type, cable length e.g. OUTF Pt100, 3m; OUTF Pt100 1 / 3 DIN, 4m; OUTF KTY 81-210, 6m		

Surface contact temperature sensors / tube contact temperature sensors, including strap, with passive output

THERMASGARD® ALTF 1 surface contact sensors are electric contact thermometers and are used for measuring surface temperatures of solids, having at least one so-called contact area that is brought into contact with the surface to be measured. The surface contact temperature sensor ALTF 1 with connection cable and passive output determines the temperature of a medium flowing inside a pipe (e.g. water temperature) via the surface temperature. ALTF 1 is a tube contact resistance thermometer with strap and axial feeler tube for measuring temperature on piping and tubes (e.g. cold-water and hot-water), or at heating sections for heating system control.

TECHNICAL DATA

Measuring range:	-35...+105 °C PVC -35...+180 °C silicone (T _{max} NTC = +150 °C, T _{max} LM235Z = +125 °C)
Sensors / output:	see table, passive (optional also with 2 sensors) (Perfect Sensor Protection with IP68)
Connection type:	2-wire connection (4-wire connection optional)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Connecting cable:	PVC; 1.5 m, LiYY, 2 x 0.25 mm ² or silicone, SiHF, 2 x 0.25 mm ² ends stripped, with wire end sleeves
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Sensor protection:	pipe feeder made of stainless steel V4A (1.4571), Ø = 6 mm, L = 50 mm
Process connection:	with endless strap with metal tightener (included in the scope of delivery) Ø = 13-92 mm (¼ - 3"); length 300 mm
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP65 (according to EN 60 529) sleeve humidity-tight (standard) IP68 (according to EN 60 529) sleeve water-tight (optional)



IP65 (standard)
humidity-tight



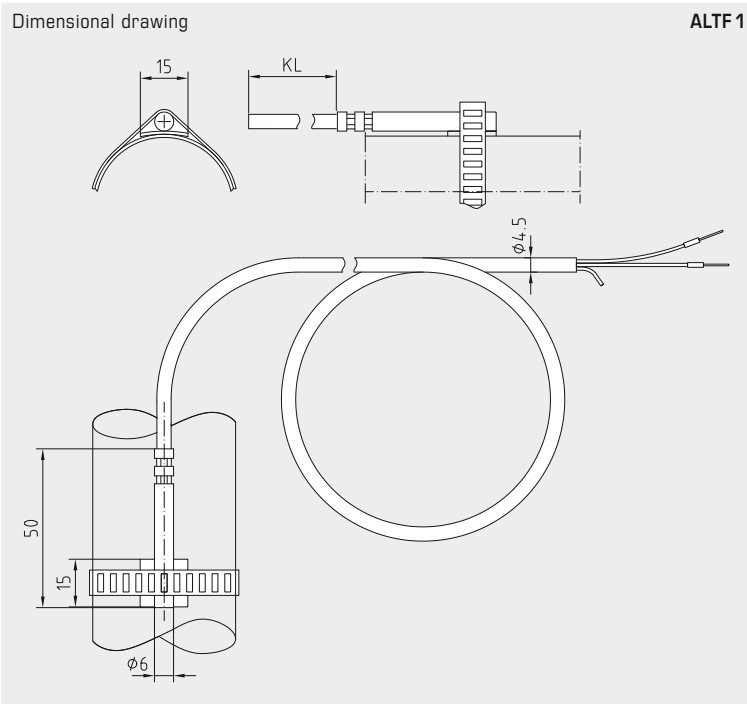
IP68 (optional)
water-tight
Perfect Sensor Protection

THERMASGARD® ALTF 1 Surface contact temperature sensors / tube contact temperature sensors (PVC)

Type / WG03	Sensor / Output	Item No.	Price
ALTF 1 xx PVC		IP 65, PVC	
ALTF1 Pt100 PVC 1,5M	Pt100 (according to DIN EN 60 751, class B)	1101-6020-1211-110	20,25 €
ALTF1 Pt1000 PVC 1,5M	Pt1000 (according to DIN EN 60 751, class B)	1101-6020-5211-110	20,25 €
ALTF1 Ni1000 PVC 1,5M	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-6020-9211-110	21,00 €
ALTF1 NiTK PVC 1,5M	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-6021-0211-110	21,78 €
ALTF1 LM235Z PVC 1,5M	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-6022-1211-110	21,39 €
ALTF1 NTC1,8K PVC 1,5M	NTC 1.8K	1101-6021-2211-110	20,76 €
ALTF1 NTC10K PVC 1,5M	NTC 10K	1101-6021-5211-110	20,76 €
ALTF1 NTC20K PVC 1,5M	NTC 20K	1101-6021-6211-110	20,76 €
Note:	including strap, connecting cable PVC (KL = 1.5 m)		
Extra charge:	Protection type IP68 (Sensor sleeve watertight compound-filled) 2-wire connecting leads, per running meter (PVC) Other sensors optional	on request on request	3,40 €

ACCESSORIES

WLP-1	Heat-conductive paste, silicone-free	7100-0060-1000-000	3,38 €
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High-performance encapsulation against vibration, mechanical stress and humidity

PS-PROTECTION
PERFECT SENSOR PROTECTION

THERMASGARD® ALTF 1 Surface contact temperature sensors / tube contact temperature sensors (silicone)

Type / WG03	Sensor / Output	Item No.	Price
ALTF 1 xx SILIKON		IP 65, silicone	
ALTF1 Pt100 Silikon 1,5M	Pt100 (according to DIN EN 60 751, class B)	1101-6020-1211-120	21,00 €
ALTF1 Pt1000 Silikon 1,5M	Pt1000 (according to DIN EN 60 751, class B)	1101-6020-5211-120	21,00 €
ALTF1 Ni1000 Silikon 1,5M	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-6020-9211-120	22,42 €
ALTF1 NiTK Silikon 1,5M	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-6021-0211-120	23,56 €
ALTF1 LM235Z Silikon 1,5M	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-6022-1211-120	21,78 €
ALTF1 NTC1,8K Silikon 1,5M	NTC 1.8K	1101-6021-2211-120	21,65 €
ALTF1 NTC10K Silikon 1,5M	NTC 10K	1101-6021-5211-120	21,65 €
ALTF1 NTC20K Silikon 1,5M	NTC 20K	1101-6021-6211-120	21,65 €
Note:	including strap, connecting cable silicone (KL = 1.5 m)		
Extra charge:	Protection type IP 68 (Sensor sleeve watertight compound-filled) 2-wire connecting leads, per running meter (silicone) Other sensors optional	on request on request	3,40 €

ACCESSORIES

WLP-1	Heat-conductive paste, silicone-free	7100-0060-1000-000	3,38 €
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Surface contact temperature sensors /
tube contact temperature sensors, including strap,
with passive output

S+S REGELTECHNIK

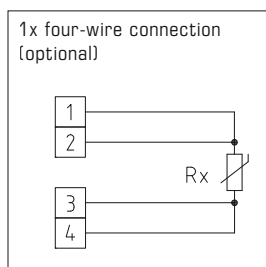
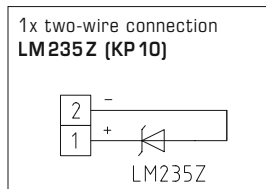
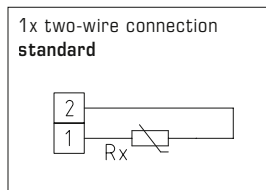
THERMASGARD® ALTF 2 is a tube contact resistance thermometer with passive output, in an impact-resistant plastic housing with quick-locking screws, incl.strap.

THERMASGARD® ALTF 02 is a cost-saving tube contact resistance thermometer with passive output, in an impact-resistant plastic housing with snap-on lid, incl.strap.

Surface contact sensors are electric contact thermometers used for surface temperature measurement on solids, having at least one so-called contact area that is brought into contact with the surface to be measured. This surface contact temperature sensor measures the temperature of a medium flowing inside a pipe (e.g. the water temperature). This tube surface sensor is used for measuring temperature on piping and tubes (e.g. cold-water and hot-water), wor on heating sections for heating system control.

TECHNICAL DATA

Measuring range:	-30...+110 °C
Sensors / output:	see table, passive (Perfect Sensor Protection) (optional also with two sensors)
Connection type:	2-wire connection (4-wire connection on PT100/PT1000A, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Housing:	plastic, UV-resistant, material polyamide, 30 % glass-globe reinforced, colour traffic white (similar to RAL 9016), ALTF 02 with snap-on lid, ALTF 2 with quick-locking screws (slotted / Phillips head combination)
Dimensions:	72 x 64 x 37.8 mm (Tyr 1 / Tyr 01)
Electrical connection:	0.14 - 1.5 mm ² via terminal screws
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (optional on request)
Process connection:	with endless strap with metal tightener (included in the scope of delivery) Ø = 13 - 92 mm (1/4 - 3"), length L = 300 mm
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	ALTF 02 IP 54 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713160960A (Tyr 01) ALTF 2 IP 65 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1)



THERMASGARD® ALTF 02 Surface contact temperature sensors / tube contact temperature sensors, *Standard* including strap, with snap-on lid

Type / WG03B	Sensor / Output	Item No.	Price
ALTF 02		IP 54	
ALTF02 Pt100	Pt100 (according to DIN EN 60 751, class B)	1101-1010-1003-000	21,65 €
ALTF02 Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-1010-5001-000	21,65 €
ALTF02 Ni1000	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-1010-9001-000	22,02 €
ALTF02 NiTK	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-1011-0001-000	25,21 €
ALTF02 LM235Z	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-1012-1001-000	22,28 €
ALTF02 NTC1,8K	NTC 1.8K	1101-1011-2001-000	21,00 €
ALTF02 NTC10K	NTC 10K	1101-1011-5001-000	21,00 €
ALTF02 NTC20K	NTC 20K	1101-1011-6001-000	21,00 €
Extra charge:	two or other sensors optional cable connection with M12 connector according to DIN EN 61076-2-101		on request on request

ACCESSORIES

WLP-1	Heat-conductive paste, silicone-free	7100-0060-1000-000	3,38 €
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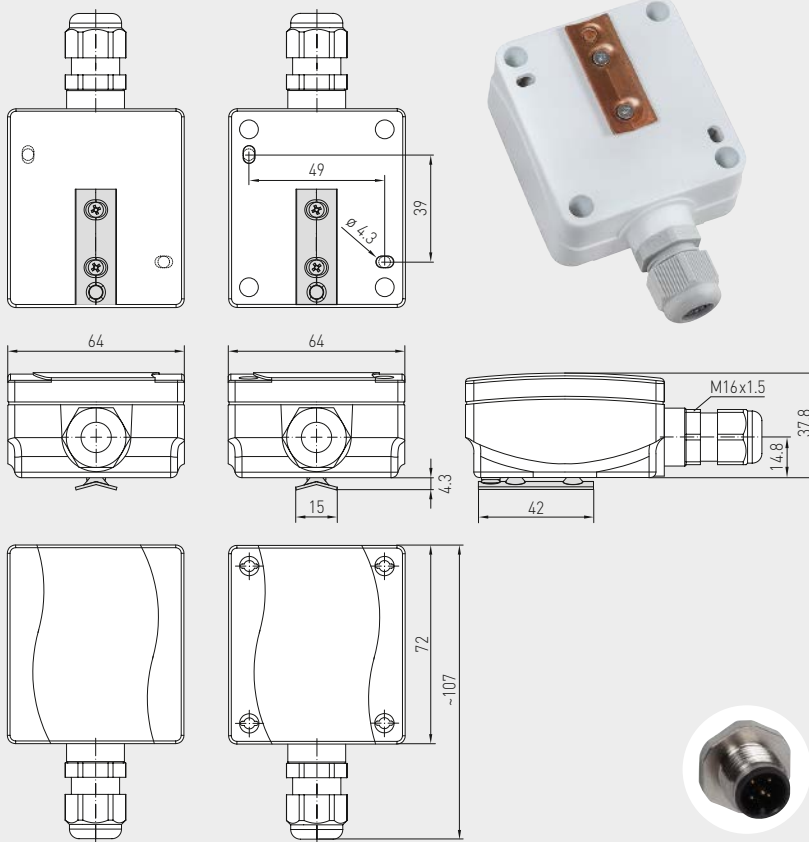


S+S REGELTECHNIK

THERMASGARD® ALTF 2
THERMASGARD® ALTF 02

Surface contact temperature sensors /
tube contact temperature sensors, including strap,
with passive output

Dimensional drawing



ALTF 2
ALTF 02

with snap-on lid

with quick-locking
screws

M12 connector
(optional on request)

ALTF 02
with snap-on lid
(IP54)



ALTF 2
with quick-locking
screws
(IP65)



High-performance encapsulation against
vibration, mechanical stress and humidity



THERMASGARD® ALTF 2 Surface contact temperature sensors / tube contact temperature sensors, *Premium*
including strap, with quick-locking screws

Type / WG03	Sensor / Output	Item No.	Price
ALTF 2		IP 65	
ALTF2 Pt100	Pt100 (according to DIN EN 60 751, class B)	1101-1020-1003-000	25,14 €
ALTF2 Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-1020-5001-000	25,85 €
ALTF2 Pt1000A	Pt1000 (according to VDI / VDE 3512, class A-TGA)	1101-1020-6003-000	29,40 €
ALTF2 Ni1000	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-1020-9001-000	25,49 €
ALTF2 NiTK	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-1021-0001-000	29,88 €
ALTF2 LM235Z	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-1022-1001-000	24,66 €
ALTF2 NTC1,8K	NTC 1.8K	1101-1021-2001-000	21,45 €
ALTF2 NTC10K	NTC 10K	1101-1021-5001-000	21,45 €
ALTF2 NTC20K	NTC 20K	1101-1021-6001-000	21,45 €
Extra charge:	two or other sensors optional cable connection with M12 connector according to DIN EN 61076-2-101	on request on request	

ACCESSORIES

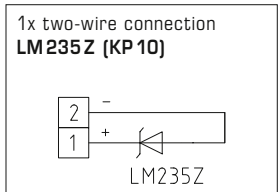
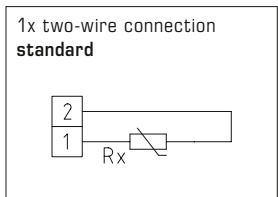
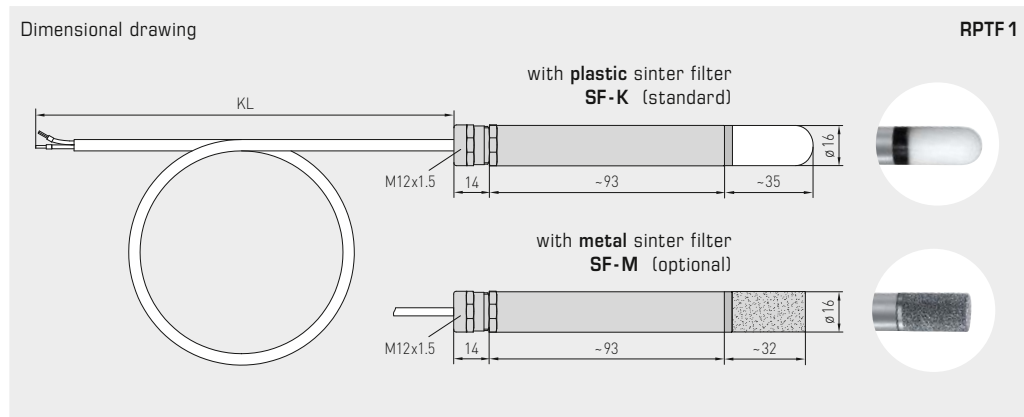
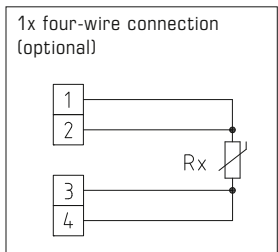
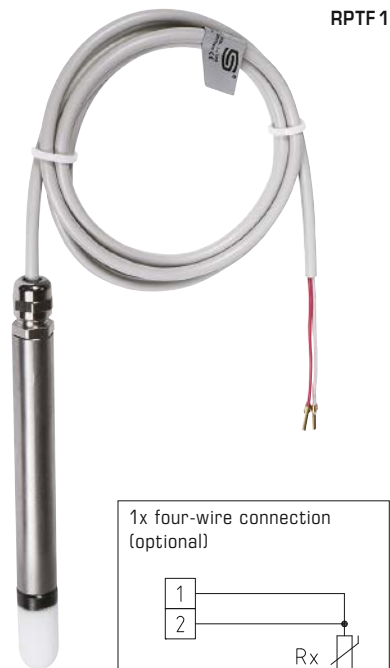
WLP-1	Heat-conductive paste, silicone-free	7100-0060-1000-000	3,38 €
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**Pendulum room temperature sensors
with passive output**

Resistance thermometer **THERMASGARD® RPTF 1** with passive output is specifically used for temperature detection in larger rooms and halls. Due to the measuring method employed by this pendulum room temperature sensor in combination with its positioning in the room, excellent and room-representative measuring results are achieved as ambient air of the room is steadily washing around the sensor.

TECHNICAL DATA

Measuring range:	-5...+60 °C
Sensors / output:	see table, passive (optional also with two sensors)
Sensor protection:	plastic sinter filter, Ø 16 mm, L = 35 mm, exchangeable (optional metal sinter filter, Ø 16 mm, L = 32 mm)
Connection type:	2-wire connection (4-wire connection optional)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Connection cable:	PVC, H03VV-F, 2 x 0.5 mm ² , ends stripped with wire end sleeves KL = approx. 1.5 m (other lengths optional)
Protective tube:	stainless steel V2A (1.4301), Ø=16 mm, NL = 142 mm
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Humidity:	< 95% RH
Protection class:	III (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)



THERMASGARD® RPTF 1 Pendulum room temperature sensors (with metal sleeve)

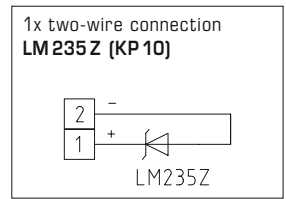
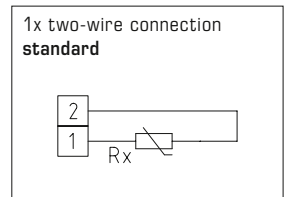
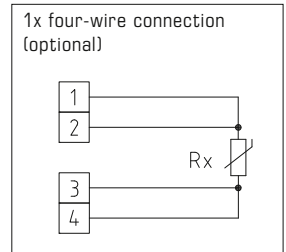
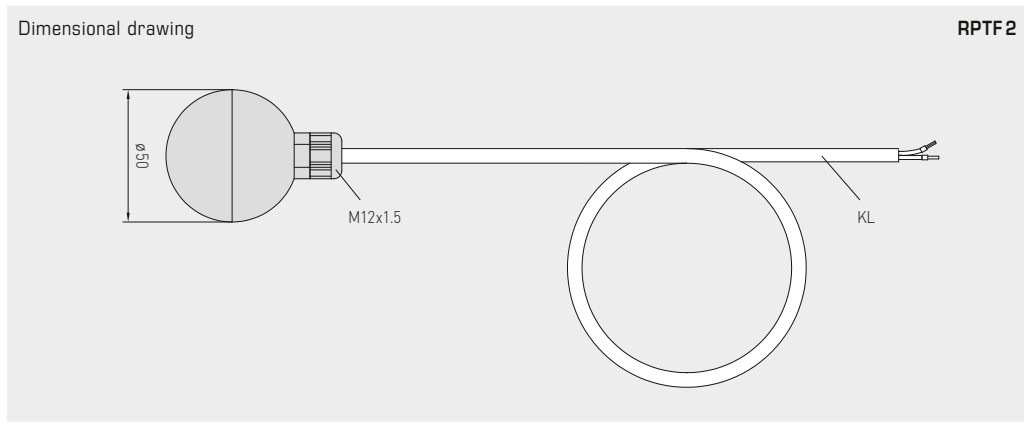
Type / WG03	Sensor / Output	Item No.	Price
RPTF 1		IP 65	
RPTF1 Pt100 PVC 1,5M	Pt100 (according to DIN EN 60 751, class B)	1101-6060-1211-010	58,68 €
RPTF1 Pt1000 PVC 1,5M	Pt1000 (according to DIN EN 60 751, class B)	1101-6060-5211-010	61,76 €
RPTF1 Ni1000 PVC 1,5M	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-6060-9211-010	60,72 €
RPTF1 NiTK PVC 1,5M	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-6061-0211-010	64,54 €
RPTF1 LM235Z PVC 1,5M	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-6062-1211-110	58,83 €
RPTF1 NTC1,8K PVC 1,5M	NTC 1.8K	1101-6061-2211-010	64,30 €
RPTF1 NTC10K PVC 1,5M	NTC 10K	1101-6061-5211-010	64,30 €
RPTF1 NTC20K PVC 1,5M	NTC 20K	1101-6061-6211-010	64,30 €

ACCESSORIES

SF-M	Metal sinter filter, Ø 16 mm, L = 32 mm, exchangeable stainless steel V4A (1.4404)	7000-0050-2200-100	42,33 €
Extra charge:	2-wire connecting leads, per running meter (PVC) 4-wire connecting leads, per running meter (PVC)		on request on request
For special orders please specify:	Type, sensor type and cable length e.g. RPTF1 Pt100, 3m; RPTF1 Pt1000, 4m; RPTF1 KTY 81-210, 6m		

Resistance thermometer **THERMASGARD® RPTF 2** with passive output is specifically used for temperature detection in larger rooms and halls, as dark radiation sensor for example. The pendulum room sensor RPTF-2 (globe thermometer) determines the effective portion of active radiation or also the effective radiant heat at the measured location. Due to the measuring method employed by this pendulum room temperature sensor in combination with its positioning in the room, an excellent and room-representative measuring result is achieved. The globe temperature is determined to take heat radiation into consideration and to estimate the degree of thermal comfort (operative room temperature). The operative room temperature describes the coaction of heat radiation and heat convection (the ratio of globe temperature / air temperature is approx. 70% / 30%).

TECHNICAL DATA	
Measuring range:	-5...+60 °C
Sensors / output:	see table, passive (optional also with two sensors)
Connection type:	2-wire connection (4-wire connection optional)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Globe:	plastic, colour black, Ø = 50 mm
Connection cable:	PVC, H03VV-F, 2 x 0.5 mm ² , ends stripped with wire end sleeves KL = approx. 1.5 m (other lengths optional)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Humidity:	< 95% RH
Protection class:	III (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)



THERMASGARD® RPTF 2 Pendulum room temperature sensors (with globe)

Type / WG03	Sensor / Output	Item No.	Price
RPTF 2		IP 65	
RPTF2 Pt100 PVC 1,5M	Pt100 (according to DIN EN 60 751, class B)	1101-6070-1211-010	58,83 €
RPTF2 Pt1000 PVC 1,5M	Pt1000 (according to DIN EN 60 751, class B)	1101-6070-5211-010	61,87 €
RPTF2 Ni1000 PVC 1,5M	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-6070-9211-010	60,84 €
RPTF2 NiTK PVC 1,5M	Ni1000 TK5000 (TCR = 5000 ppm / K), LG - Ni1000	1101-6071-0211-010	64,66 €
RPTF2 LM235Z PVC 1,5M	LM235Z (TCR = 10 mV / K; 2.73V at 0 °C), KP10	1101-6072-1211-010	58,95 €
RPTF2 NTC1,8K PVC 1,5M	NTC 1.8K	1101-6071-2211-010	64,42 €
RPTF2 NTC10K PVC 1,5M	NTC 10K	1101-6071-5211-010	64,42 €
RPTF2 NTC20K PVC 1,5M	NTC 20K	1101-6071-6211-010	64,42 €
Extra charge::	2-wire connecting leads, per running meter (PVC) 4-wire connecting leads, per running meter (PVC)	on request on request	
For special orders please specify:	Type, sensor type and cable length e. g. RPTF2 Pt100, 3m; RPTF2 Pt1000, 4m; RPTF2 KTY 81-210, 6m		

On-wall radiation temperature sensors with passive output

ASTF

Resistance thermometer **THERMASGARD® ASTF** with passive output, terminal box housing made of impact-resistant plastic and housing cover with quick-locking screws. This radiation sensor is specifically designed for temperature detection in wet areas or in larger rooms or halls. The on-wall radiation temperature sensor ASTF determines the effective portion of active radiation or the effective radiant heat at the measured location. Due to the measuring method employed by the dark radiation temperature sensor, excellent and room-representative measuring results are achieved.

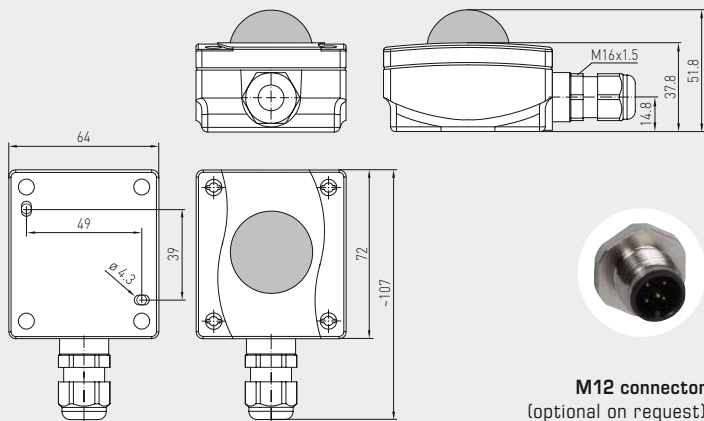


TECHNICAL DATA

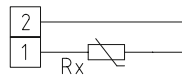
Measuring range:	-30 ...+75 °C
Sensors / output:	see table, passive (optional also with two sensors)
Connection type:	2-wire connection (4-wire connection on PT100, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Process connection:	by screws
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016), semi-globe: black
Housing dimensions:	72 x 64 x 37.8 (51.8) mm (Tyr 1)
Cable connection:	cable gland , plastic (M16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (optional on request)
Electrical connection:	0.14 - 1.5 mm², via terminal screws
Humidity:	< 95 % RH
Protection class:	III (according to EN 60 730)
Protection type:	IP65 (according to EN 60529) Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1)

Dimensional drawing

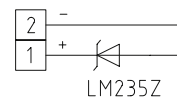
ASTF



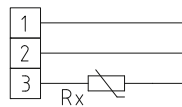
1x two-wire connection standard



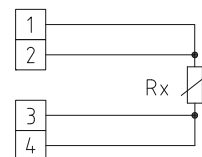
1x two-wire connection LM235Z (KP 10)



1x three-wire connection (optional)



1x four-wire connection (optional)



THERMASGARD® ASTF On-wall radiation temperature sensors

Type / WG03	Sensor / Output	Item No.	Price
ASTF		IP65	
ASTF Pt100	Pt100 (according to DIN EN 60 751, B)	1101-1060-1003-000	70,49 €
ASTF Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-1060-5001-000	70,49 €
ASTF Ni1000	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm/K)	1101-1060-9001-000	71,73 €
ASTF NiTK	Ni1000 TK5000 (TCR = 5000 ppm/K), LG- Ni1000	1101-1061-0001-000	74,10 €
ASTF LM235Z	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-1062-1001-000	69,18 €
ASTF NTC1,8K	NTC 1.8K	1101-1061-2001-000	74,10 €
ASTF NTC10K	NTC 10K	1101-1061-5001-000	74,10 €
ASTF NTC20K	NTC 20K	1101-1061-6001-000	74,10 €
Extra charge:	two or other sensors optional cable connection with M12 connector according to DIN EN 61076-2-101		on request on request

Resistance thermometer **THERMASGARD® RSTF** with passive output in an elegant housing made of plastic, with snap-on lid, base with 4-hole attachment for installation on vertically or horizontally installed in-wall flush boxes, with predetermined breaking point for on-wall cable entry, specifically used for temperature detection in larger rooms. The room radiation temperature sensor RSTF determines the effective portion of active radiation or the effective radiant heat at the measured location. Due to the measuring method employed by the dark radiation temperature sensor, an excellent and room-representative measuring result is achieved. In addition there is an independent passive output available to determinate the reference temperature.

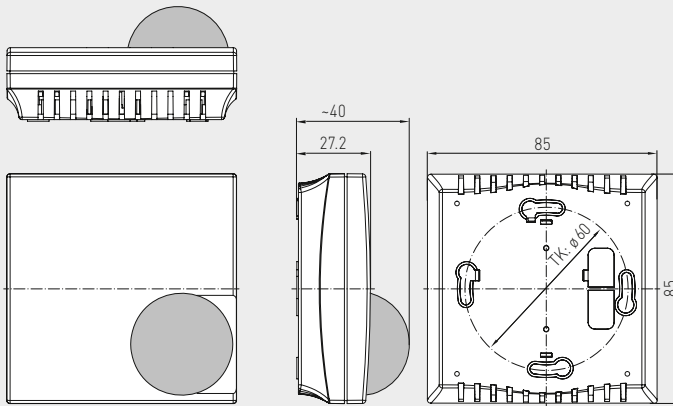


TECHNICAL DATA

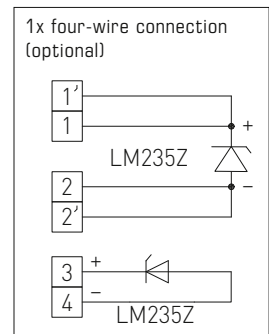
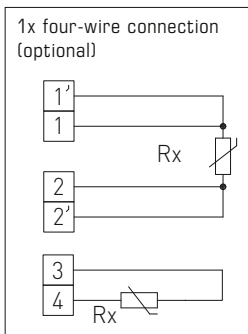
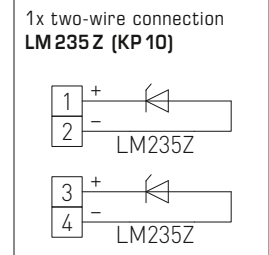
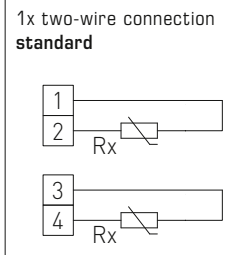
Measuring range:	-30...+75 °C
Sensors / output:	see table, passive (optional also with two sensors)
Connection type:	2-wire connection (4-wire connection on PT100, optional on other sensors)
Testing current:	< 0.6 mA (Pt1000) < 1.0 mA (Pt100) < 0.3 mA (Ni1000, Ni1000 TK5000) < 2.0 mW (NTC xx) 400 µA...5 mA (LM235Z)
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Process connection:	by screws
Housing:	plastic, material ABS Housing: pure white (similar to RAL 9010), Semi-globe: black
Dimensions:	85 x 85 x 27 (40) mm (Balduur 1)
Electrical connection:	0.14 - 1.5 mm ² , via terminal screws
Humidity:	< 95 % RH
Protection class:	III (according to EN 60 730)
Protection type:	IP 30 (according to EN 60529)

Dimensional drawing

RSTF



Terminals 3 and 4:
Sensor for reference temperature



THERMASGARD® RSTF Room radiation temperature sensors

Type / WG03	Sensor / Output	Item No.	Price
RSTF		IP30	
RSTF Pt100	Pt100 (according to DIN EN 60 751, class B)	1101-40C0-1003-000	69,18 €
RSTF Pt1000	Pt1000 (according to DIN EN 60 751, class B)	1101-40C0-5001-000	69,18 €
RSTF Ni1000	Ni1000 (according to DIN EN 43 760, class B, TCR = 6180 ppm / K)	1101-40C0-9001-000	71,73 €
RSTF NiTK	Ni1000 TK5000 (TCR = 5000 ppm / K), LG-Ni1000	1101-40C1-0001-000	73,75 €
RSTF LM235Z	LM235Z (TCR = 10 mV / K; 2.73 V at 0 °C), KP10	1101-40C2-1001-000	69,18 €
RSTF NTC1,8K	NTC 1.8K	1101-40C1-2001-000	73,00 €
RSTF NTC10K	NTC 10K	1101-40C1-5001-000	73,00 €
RSTF NTC20K	NTC 20K	1101-40C1-6001-000	73,00 €
Extra charge:	two or other sensors optional		on request



Temperature

THERMASGARD® active sensors – precise thermal management

Our active temperature sensors are easy to install, versatile and meet all requirements important to you.

Adjustable and calibratable temperature transmitters with self-diagnostics provide additional flexibility.

Application Areas

- Hospitals, museums, schools, hotels, public authorities, institutes and banks
- Sports arenas, holiday centers and movie theaters
- Car dealers
- Ships and shipyards
- Industrial plants and assembly halls
- Power plants and refineries





THERMASGARD® ACTIVE TEMPERATURE SENSORS

Room sensors, room control units

RTM 1	Room temperature measuring transducer	263
FSTM	Room temperature measuring transducer, in-wall	265
FSTM-P	Room control units, in-wall	265
RPTM 1	Pendulum room temperature measuring transducer	323
RPTM 2	Pendulum room temperature measuring transducer	325

Outdoor sensors, on-wall sensors

ATM 2	Outside temperature measuring transducer	269
ATM 2-VA	Outside temperature measuring transducer (Stainless steel housing Tyr 2E)	273

Cable sensors, surface-contact sensors

HFTM	Sleeve sensor with cable, temperature measuring transducer	307
HFTM-VA	Sleeve sensor with cable, temperature measuring transducer (Stainless steel housing Tyr 2E)	311
ALTM 1	Surface-contact temperature measuring transducer	313
ALTM 2	Surface-contact temperature measuring transducer with cable	317
ALTM 2-VA	Surface-contact temperature measuring transducer with cable (Stainless steel housing Tyr 2E)	321

Duct / immersion / screw-in sensors

TM 43	Duct / immersion / screw-in temperature measuring transducer	277
TM 65	Duct / immersion / screw-in temperature measuring transducer	277
TM 54	Duct / immersion / screw-in temperature measuring transducer	287
RGTM 2	Smoke gas temperature measuring transducer, screw-in sensor	301
RGTM 1	Smoke gas temperature measuring transducer, duct sensor	295
MWTM	Mean-value temperature measuring transducer, rod sensor	283
MWTM-SD	Mean-value temperature measuring transducer, rod sensor	283

Immersion sleeves and accessories

see chapter Accessories	644
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Room temperature measuring transducers, calibratable, with multi-range switching and active output

Calibratable room temperature measuring transducer **THERMASGARD® RTM 1** with continuous output, with or without optional display for displaying the actual temperature in an elegant housing made of plastic, with snap-on lid, base with 4-hole attachment for installation on vertically or horizontally installed in-wall flush boxes, with predetermined breaking point for on-wall cable entry, or in housing made of stainless steel (top and bottom part are of stainless steel, the lid is screwed on), vandal-proof version e.g. for schools, military barracks, and public buildings. This room temperature transmitter/residential room temperature sensor is used to detect/display temperatures in closed dry rooms, in apartments, in offices, supermarkets and business facilities.

RTM 1



TECHNICAL DATA

Power supply:	24 V AC / DC (± 10%) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	R_a (ohm) = $(U_b - 14 V) / 0.02 A$ for I variant
Load resistance:	$R_L > 5 k\Omega$ for U variant
Power consumption:	< 1.0 W / 24 V DC; < 2.2 VA / 24 V AC
Sensor:	Pt1000, DIN EN 60751, class B
Measuring ranges:	multi-range switching with 8 switchable measuring ranges , see table (other ranges optional) operating range -30...+70 °C with manual zero point correction (± 10K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Ambient temperature:	measuring transducer -30...+70 °C
Connection type:	2- or 3-wire connection
Process connection:	by screws
Housing:	plastic, material ABS, colour pure white (similar to RAL 9010), (optional stainless steel) V2A (1.4301)
Dimensions:	85 x 85 x 27 mm (Baldur 1) 75 x 75 x 25 mm (stainless steel)
Electrical connection:	0.14 - 1.5 mm ² via terminal screws
Installation:	wall mounting or on in-wall flush box Ø55 mm, base with 4-hole for mounting on vertically or horizontally installed in-wall flush boxes for cable entry from the back, with predetermined breaking point for on-wall cable entry from top / bottom in case of plain on-wall installation
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 30 (according to EN 60 529)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC directive 2014/30/EU
Optional:	Two-line display with illumination , cutout 36 x 15 mm (W x H), for displaying the ACTUAL temperature and the internal diagnostics (sensor breakage, sensor short circuit) see beginning of this chapter!

Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20 °C...+150 °C	ON	ON	ON
-50 °C... +50 °C	OFF	ON	ON
-20 °C... +80 °C	ON	OFF	ON
-30 °C... +60 °C	OFF	OFF	ON
0 °C... +40 °C	ON	ON	OFF
0 °C... +50 °C*	OFF	ON	OFF
0 °C...+100 °C	ON	OFF	OFF
0 °C...+150 °C	OFF	OFF	OFF

* (default / fixed with display)

Display and internal diagnostics

RTM 1-U-Display
RTM 1-I-Display



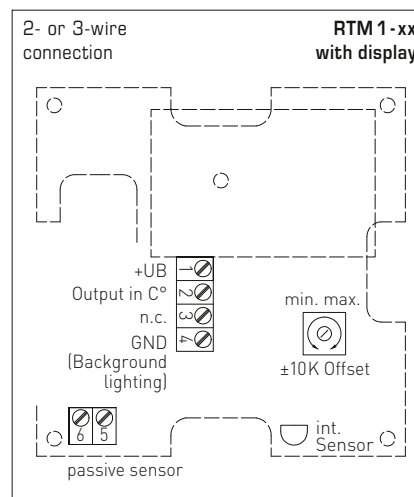
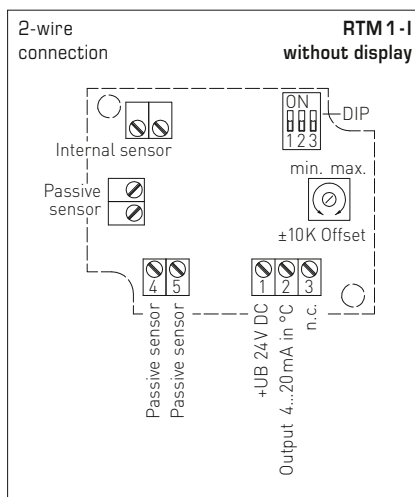
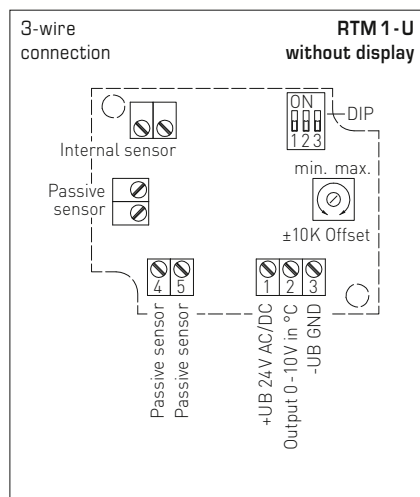
Standard



Sensor breakage



Sensor short circuit





S+S REGELTECHNIK

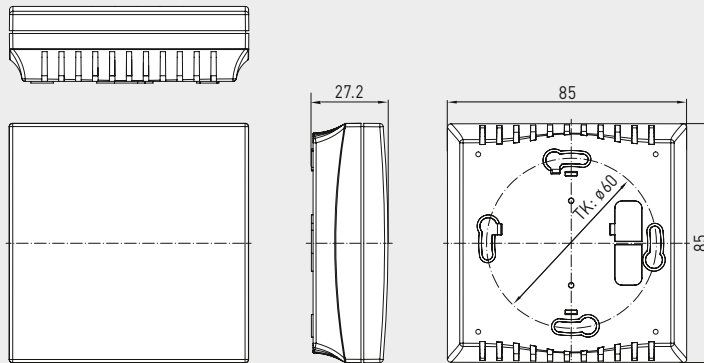
THERMASGARD® RTM 1

Room temperature measuring transducers, calibratable, with multi-range switching and active output



Dimensional drawing

Housing Baldur 1

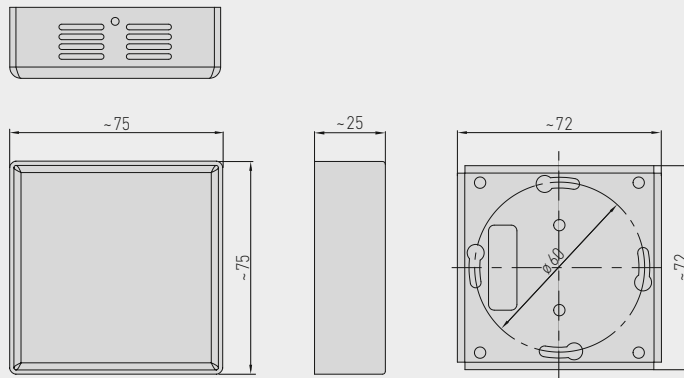


RTM 1 with display

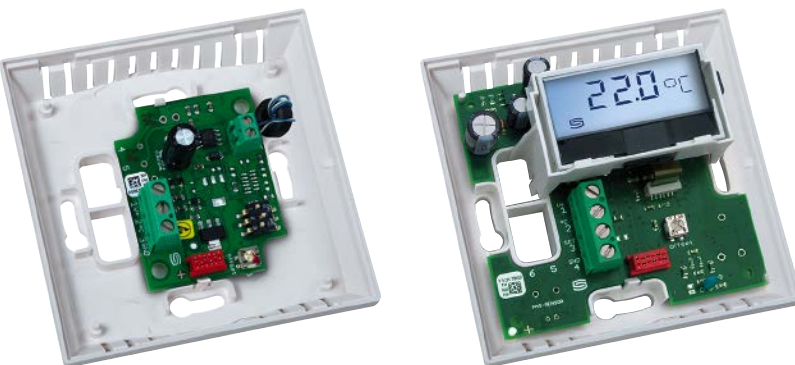


Dimensional drawing

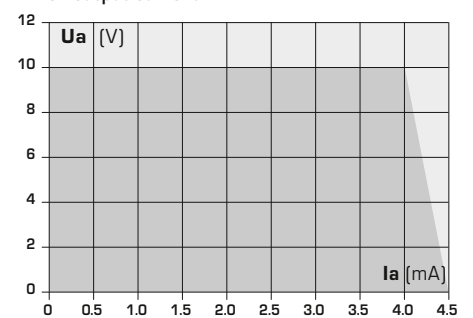
Housing stainless steel



RTM 1 (stainless steel)



Dependency of output voltage on output current



THERMASGARD® RTM 1 Room temperature measuring transducers

Type / WG01	Sensor	Output	Features	Display	Item No.	Price
RTM1 - U						
						IP 30, U-variant
RTM1-U	Pt1000	0 - 10 V	-		1101-41A1-0000-200	76,59 €
RTM1-U LCD	Pt1000	0 - 10 V	Display*	■	1101-41A1-2000-200	120,81 €
RTM1-U VA	Pt1000	0 - 10 V	Stainless steel housing V2A (1.4301)		1101-4151-0000-200	199,25 €
RTM1 - I						
						IP 30, I-variant
RTM1-I	Pt1000	4...20 mA	-		1101-41A2-0000-200	76,59 €
RTM1-I LCD	Pt1000	4...20 mA	Display*	■	1101-41A2-2000-200	120,81 €
RTM1-I VA	Pt1000	4...20 mA	Stainless steel housing V2A (1.4301)		1101-4152-0000-200	199,25 €
Extra charge:	Other ranges optional					25,40 €
Note:	* When equipped with display, the measuring range of 0...+50 °C is fixed.					

**Room temperature sensor or measuring transducer,
in-wall in the panel switch programme,
with active output**

The room sensor **THERMASGARD® FSTM / FSTM - P** in the in-wall housing, optionally with potentiometer, is used for measuring the room temperature, and for setpoint adjustment. It converts the measured values into a standard signal of 0-10 V. A digital, long-term stable sensor is used for temperature measurement.

The in-wall sensor is mounted in high-quality panel switch programmes, ideally of the brands Gira, Berker, Merten, Jung, Siemens or Busch-Jaeger (using in-wall adapters, no setpoint adjustment possible) either individually or in combination with light switches, socket outlets, etc.

It is used in non-aggressive, dust-free environments, in refrigeration, air conditioning and clean room technology, and in interior rooms, such as living rooms, offices, hotels, etc.

TECHNICAL DATA

Power supply: 24 V AC / DC (± 10 %)

Power consumption: < 1.1 W / 24 V DC; < 2.2 VA / 24 V AC

TEMPERATURE

Sensor: **digital temperature sensor,**
low hysteresis, high long-term stability

Long-term stability: ± 1 % per year

Measuring range: 0...+50 °C

Deviation, temperature: typically ± 0.8 K at +25 °C

Output, temperature: 0-10 V

POTENTIOMETER

Output, potentiometer: 0-10 V

Mounting: in-wall flush box Ø 55 mm

Electrical connection: 1,0-2,5 mm², via plug terminals

Ambient temperature: Storage -35...+85 °C;
Operation 0...+50 °C

Permitted humidity: max. 90 % RH, non-precipitating air

Medium: clean air and other non-aggressive, non-combustible gases

Protection class: III (according to EN 60 730)

Protection type: **IP 20** (according to 60 529)

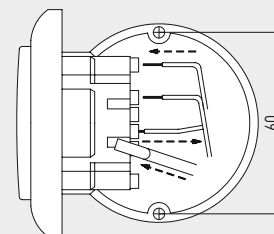
Standards: CE-conformity, electromagnetic compatibility
according to EN 61 326, EMC Directive 2014 / 30 / EU

SWITCH PROGRAMME

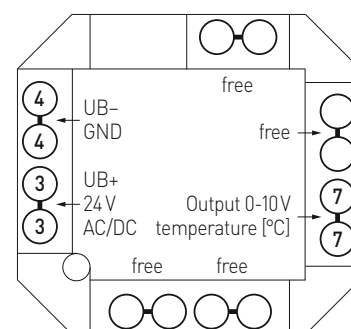
Manufacturer: GIRA System 55
(other switch programmes, manufacturers, colours
as well as prices available upon request)

Housing: plastic,
the standard colour is pure glossy white (similar to RAL 9010)
(other colours are available upon request with colour variants
depending on the respective light switch programme)

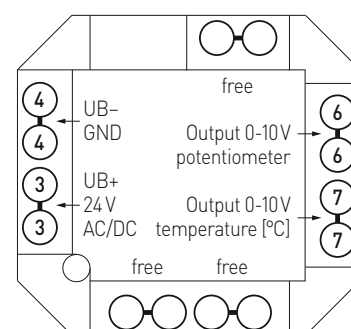
Mounting diagram **in-wall**

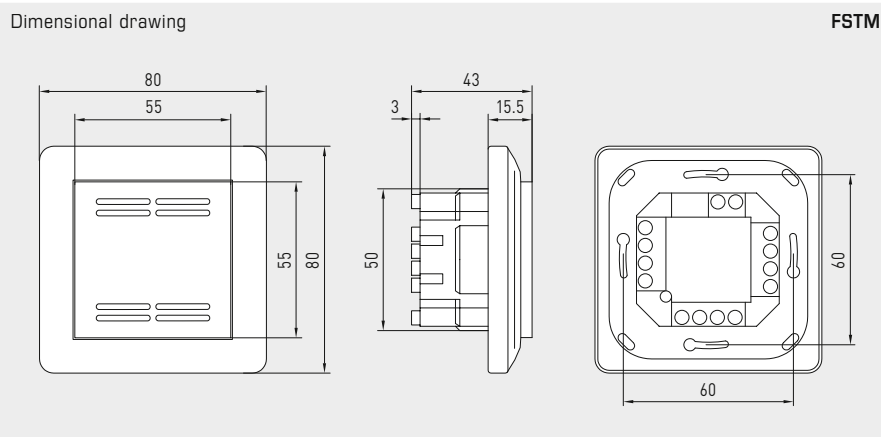


Connection diagram **FSTM**

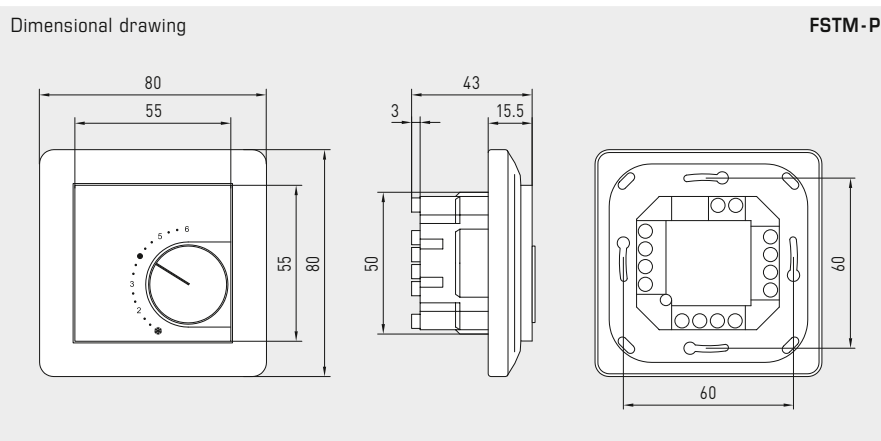


Connection diagram **FSTM - P**





FSTM
Standard



FSTM-P
with potentiometer



Temperature table
MR: 0...+50 °C

°C	U _A [V]
0	0.0
5	1.0
10	2.0
15	3.0
20	4.0
25	5.0
30	6.0
35	7.0
40	8.0
45	9.0
50	10.0

THERMASGARD® FSTM Room temperature sensor or measuring transducer, in-wall
 THERMASGARD® FSTM-P Room temperature sensor or measuring transducer, in-wall with potentiometer

Type / WG02	Measuring Range Temperature	Output Temperature	Potentiometer	Item No.	Price
FSTM					
FSTM-U	0...+50 °C	0-10V	-	1101-9121-0000-162	125,67 €
FSTM-P					
FSTM-U P	0...+50 °C	0-10V	0-10V	1101-9121-0004-282	149,38 €



Outside temperature / wet room temperature measuring transducers, calibratable, with multi-range switching and active output

Calibratable outside temperature measuring transducer **THERMASGARD® ATM 2** with eight switchable measuring ranges, external sensor, continuous output, housing made from impact-resistant plastic with quick-release screws, optionally **with/without display**, with **cable gland** or **M12 connector** according to DIN EN 61076-2-101.

It is used to detect outside temperatures, temperatures in wet rooms, e.g. for installation on outside walls, in cold storage buildings and greenhouses, in the industrial sector and in agriculture. Installation in outdoor areas preferably at the north side of a building or in a protected place. In case of direct solar irradiation, we recommend the use of our sun and ball-impact protection hood **WS01** or **WS04** (accessories) or the device version with the installed sun protection hood **SS02** (on request).

The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

TECHNICAL DATA

Power supply:	24 V AC / DC (± 10%) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	R_a (ohm) = $(U_b - 14 V) / 0.02 A$ for I variant, see load resistance diagram
Load resistance:	$R_L > 5 k\Omega$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Sensor:	Pt1000, DIN EN 60751, class B, (Perfect Sensor Protection) Sensor external
Measuring ranges:	multi-range switching with 8 switchable measuring ranges see table (other measuring ranges optional) operating range -30...+70 °C with manual zero point correction (± 10K)
Deviation in temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Connection type:	2- or 3-wire connection
Electrical connection:	0.14 - 1.5 mm², via screw terminals
Cable connection:	cable gland, stainless steel V2A (1.4305) (M20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) or M12 connector (male, 5-pin, A-code) according to DIN EN 61076-2-101
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, with quick-release screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016), cover for display is transparent!
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 without display) 72 x 64 x 43.3 mm (Tyr 1 with display)
Protective tube:	made from stainless steel V4A (1.4571), Ø 6 mm, NL = 65 mm
Process connection:	by means of screws (on the housing base)
Ambient temperature:	measuring transducer -30...+70 °C
Permissible humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529) Housing tested, TÜV SÜD, Report No.713139052 (Tyr 1)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC Directive 2014 / 30 / EU
Optional:	display with illumination , two-line, cut-out approx. 36 x 15 mm (B x H), to display the actual temperature and internal diagnostics (measuring range exceeded, measuring range not reached, sensor breakage, sensor short circuit)

ACCESSORIES (see table)

ATM 2
with cable gland
and SS-02



ATM 2 - Q
with M12 connector



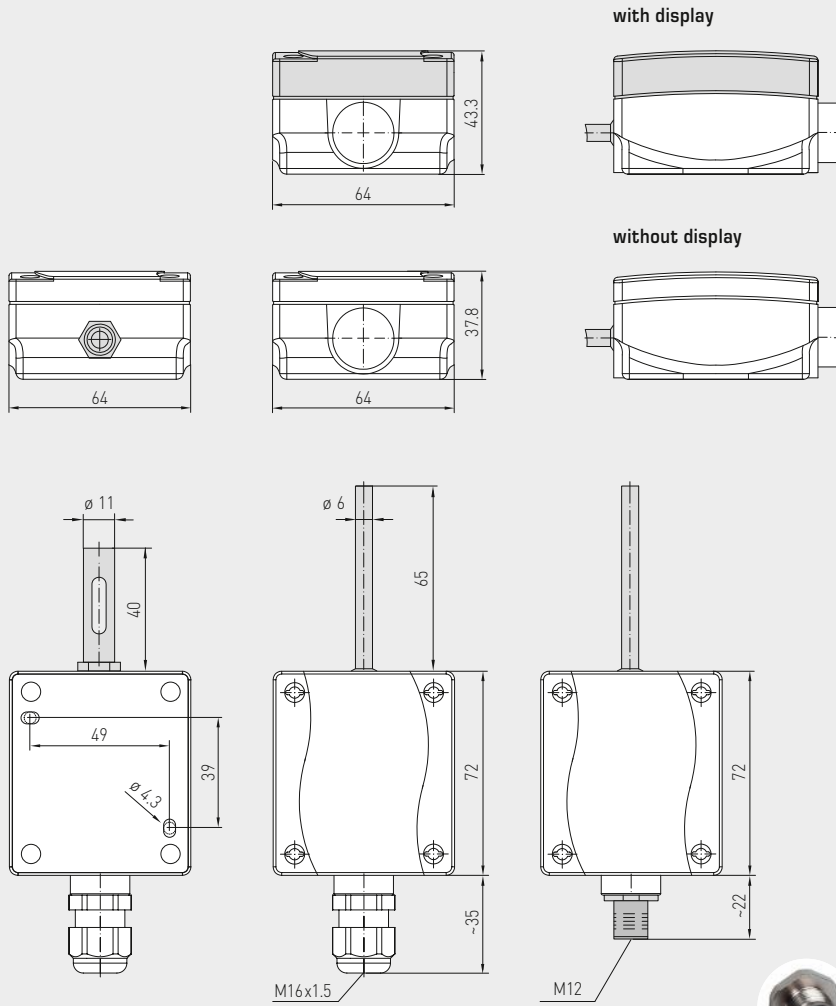


Outside temperature / wet room temperature measuring transducers, calibratable, with multi-range switching and active output



Dimensional drawing

ATM 2



Housing with SS-02 (on request)

Housing with cable gland

Housing with M12 connector

ATM 2 with cable gland and display



ATM 2-Q with M12 connector and display



Display and internal diagnostics

THERMASGARD® Measuring transducer with display



Standard



Measuring range exceeded



Measuring range not reached



Sensor breakage

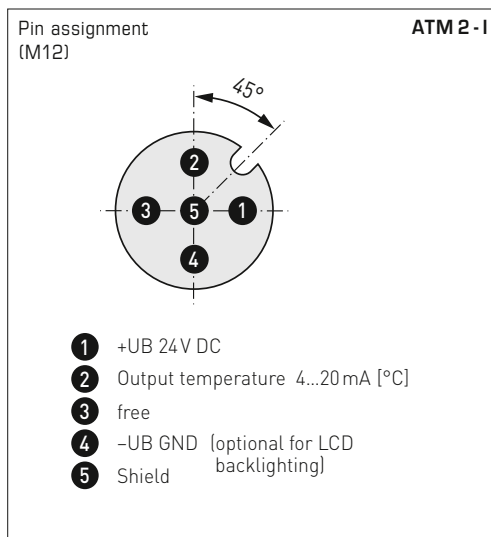
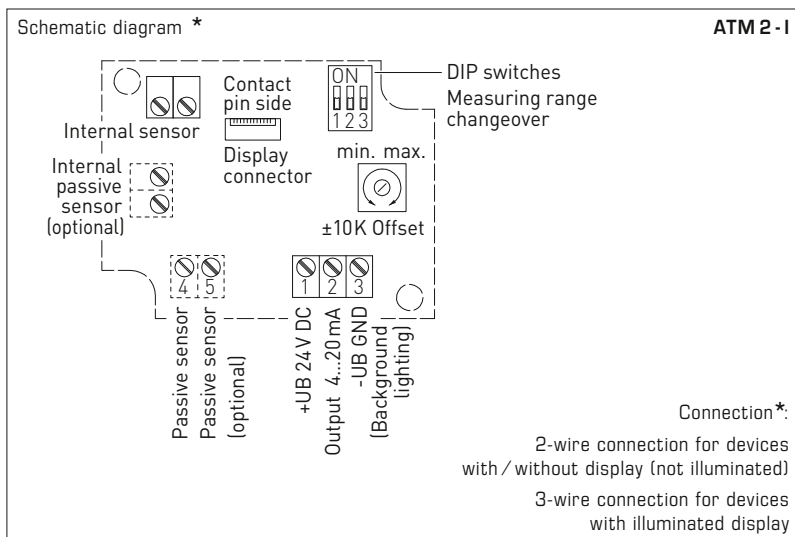
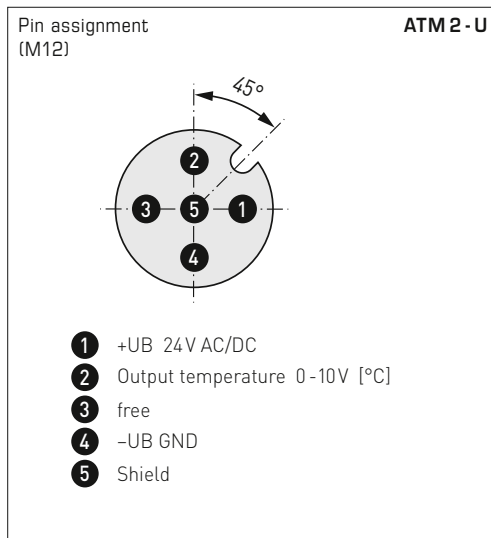
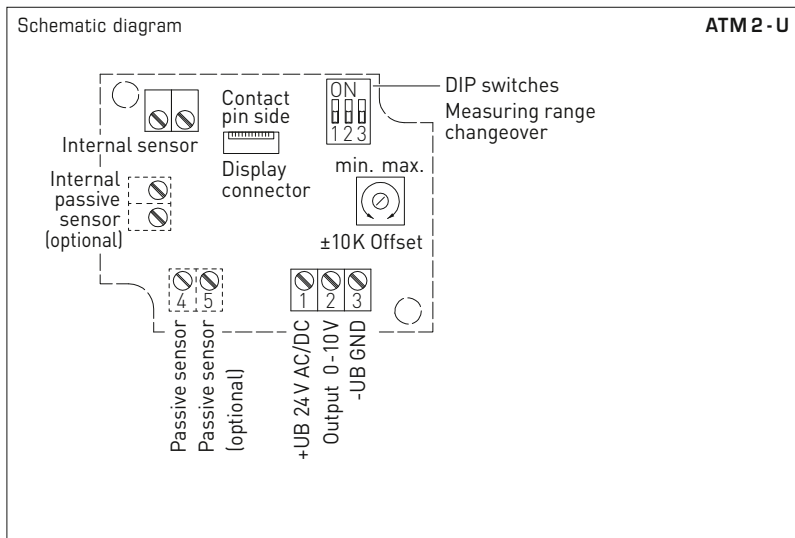


Sensor short circuit

High-performance encapsulation against vibration, mechanical stress and humidity

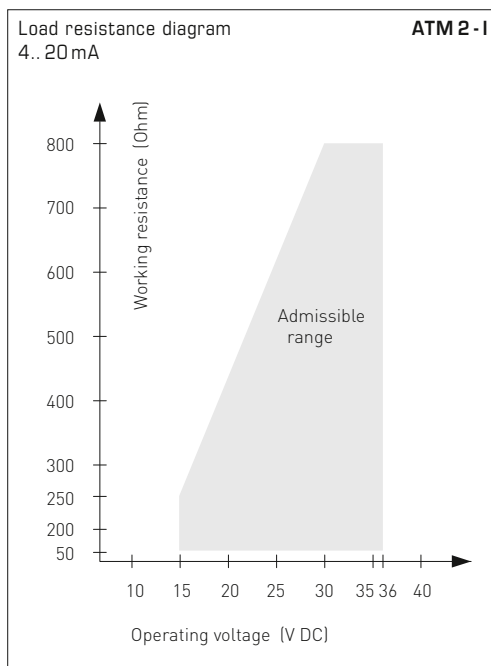
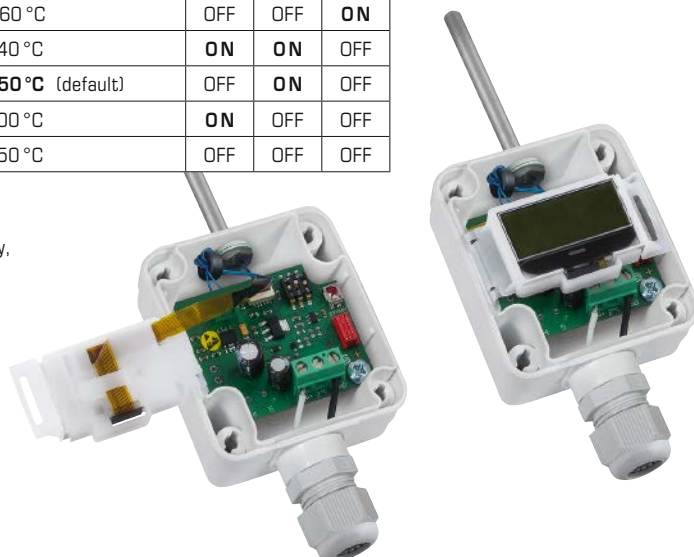


Outside temperature / wet room temperature measuring transducers, calibratable, with multi-range switching and active output



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20... +150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0... +100 °C	ON	OFF	OFF
0... +150 °C	OFF	OFF	OFF

ATM2-xx with display, hinged





S+S REGELTECHNIK

thermasgard® ATM 2

Outside temperature / wet room temperature measuring transducers, calibratable, with multi-range switching and active output

ATM 2 - Q
with M12 connector



ATM 2
with cable gland

THERMASGARD® ATM 2		Outside temperature / wet room temperature measuring transducers (with cable gland)			
Type / WG01	Sensor	Output	Display	Item No.	Price
ATM 2					
ATM2-I	Pt1000	4...20 mA		1101-1142-0009-900	100,53 €
ATM2-I LCD	Pt1000	4...20 mA	■	1101-1142-2009-900	151,44 €
ATM2-U	Pt1000	0-10 V		1101-1141-0009-900	100,53 €
ATM2-U LCD	Pt1000	0-10 V	■	1101-1141-2009-900	151,44 €
Housing variant:		Cable connection with cable gland			
Extra charge:		other measuring ranges optional with sun protection hood SS02			25,40 € on request
					9,74 €

THERMASGARD® ATM 2-Q		Outside temperature / wet room temperature measuring transducers (with M12 connector)			
Type / WG01	Sensor	Output	Display	Item No.	Price
ATM 2 - Q					
ATM2-I Q	Pt1000	4...20 mA	●	2001-6111-2100-001	142,44 €
ATM2-I Q LCD	Pt1000	4...20 mA	● ■	2001-6112-2100-001	193,37 €
ATM2-U Q	Pt1000	0-10 V	●	2001-6111-1100-001	142,44 €
ATM2-U Q LCD	Pt1000	0-10 V	● ■	2001-6112-1100-001	193,37 €
Housing variant "Q":		Cable connection with M12 connector (male, 5-pin, A-code)			
Extra charge:		see table above!			

ACCESSORIES					
WS-01	protection contre le soleil et pare-balle, 184 x 180 x 80 mm, en acier inox V2A (1.4301)			7100-0040-2000-000	31,77 €
WS-04	protection contre le soleil et les intempéries, 130 x 180 x 135 mm, en acier inox V2A (1.4301)			7100-0040-7000-000	37,49 €
Special accessories for M12 connector see chapter Accessories!					

**Outside temperature / wet room temperature measuring transducers,
calibratable, with multi-range switching and
active output**

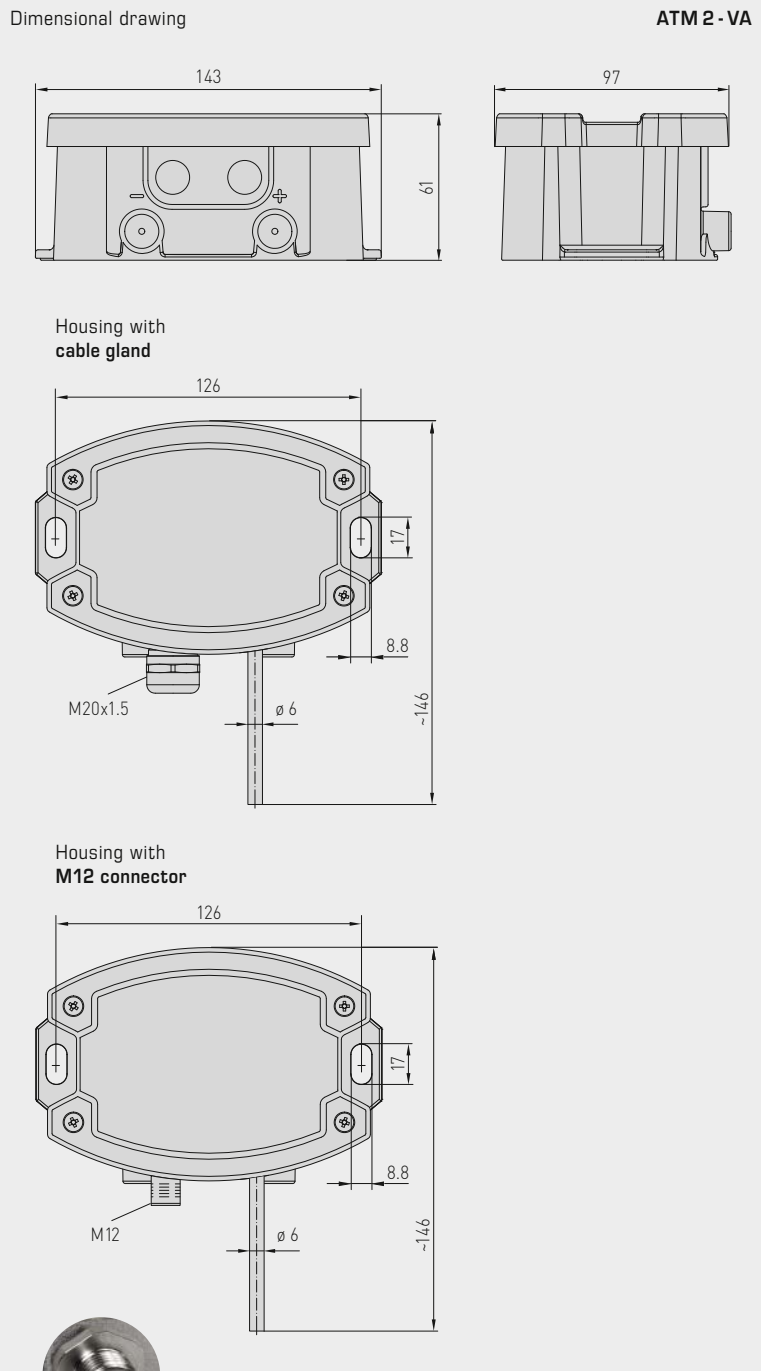
Calibratable outside temperature measuring transducer **THERMASGARD® ATM 2 - VA** with eight switchable measuring ranges, external sensor, continuous output, rugged housing made from **stainless steel V4A**, with **cable gland** or **M12 connector** according to DIN EN 61076-2-101.

It is used to detect outside temperatures, temperatures in wet rooms, e.g. for installation on outside walls, in cold storage buildings and greenhouses, in the industrial sector and in agriculture. Installation in outdoor areas preferably at the north side of a building or in a protected place. In case of direct solar irradiation, we recommend using our sun and ball-impact protection hood **WS01** or **WS03** (accessories).

The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

TECHNICAL DATA

Power supply:	24 V AC / DC ($\pm 10\%$) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	R_a (ohm) = $(U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant, see load resistance diagram
Load resistance:	$R_L > 5 \text{ k}\Omega$ for U variant
Power consumption:	$< 1.0 \text{ VA} / 24 \text{ V DC}$; $< 2.2 \text{ VA} / 24 \text{ V AC}$
Sensor:	Pt1000, DIN EN 60751, class B, (Perfect Sensor Protection) Sensor external
Measuring ranges:	multi-range switching with 8 switchable measuring ranges see table (other measuring ranges optional) operating range $-30...+70^\circ\text{C}$ with manual zero point correction ($\pm 10 \text{ K}$)
Deviation in temperature:	typically $\pm 0.2 \text{ K}$ at $+25^\circ\text{C}$
Output:	0 - 10 V or 4...20 mA
Connection type:	2-wire connection
Electrical connection:	0.14 - 1.5 mm ² , via screw terminals
Cable connection:	cable gland, stainless steel V2A (1.4305) (M20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) or M12 connector (male, 5-pin, A-code) according to DIN EN 61076-2-101
Housing:	stainless steel V4A (1.4571), with non-distortion cover bolting, impact resistant, high EMI shielding, corrosion, temperature, weather- and UV-resistant
Housing dimensions:	143 x 97 x 61 mm (Tyr 2E)
Protective tube:	made from stainless steel V4A (1.4571), $\varnothing 6 \text{ mm}$, NL = 65 mm
Process connection:	by screws
Ambient temperature:	measuring transducer $-30...+70^\circ\text{C}$
Permissible humidity:	$< 95\% \text{ RH}$, non-precipitating air
Protection class:	III (according to EN 60730)
Protection type:	IP 65 (according to EN 60529) Housing tested, TÜV SÜD, Report No. 713160960B (Skadi2)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC Directive 2014 / 30 / EU
ACCESSORIES	(see table)



M12 connector (male)

High-performance encapsulation against vibration, mechanical stress and humidity



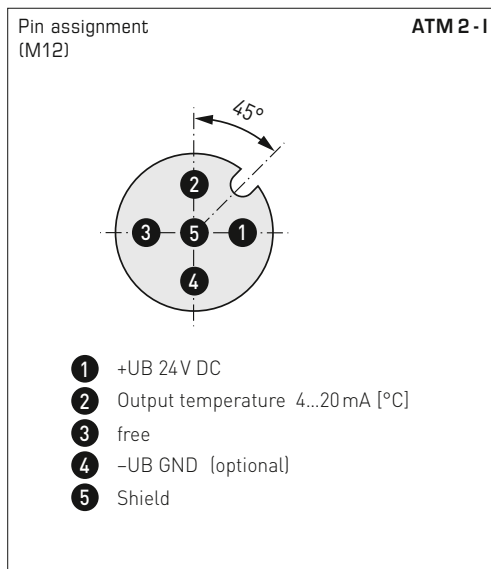
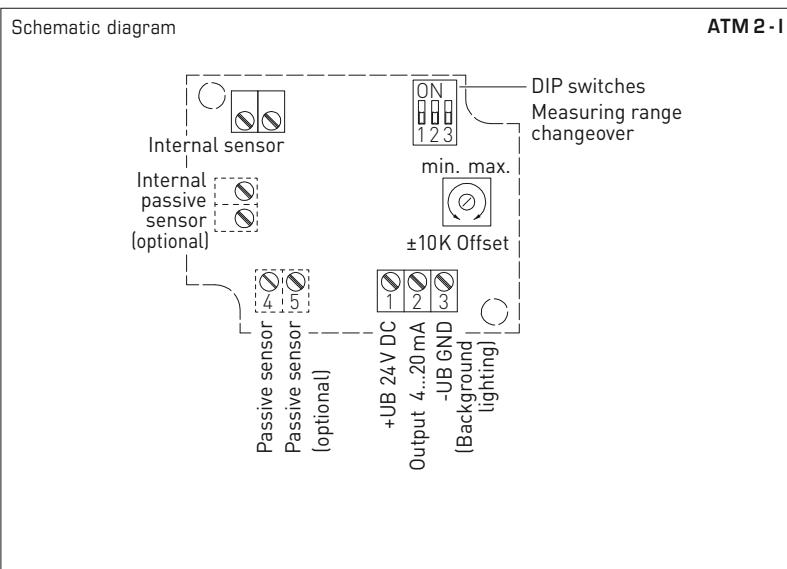
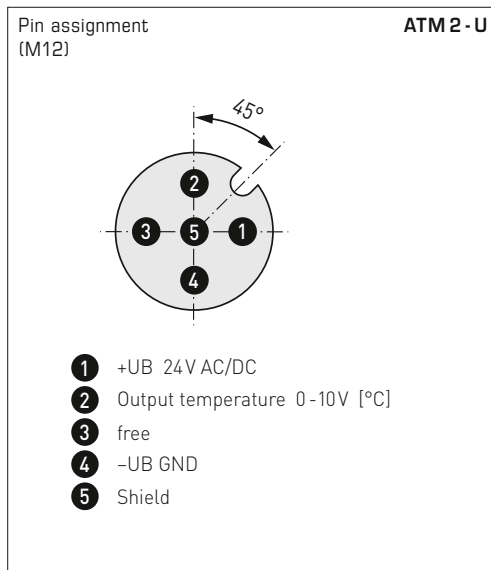
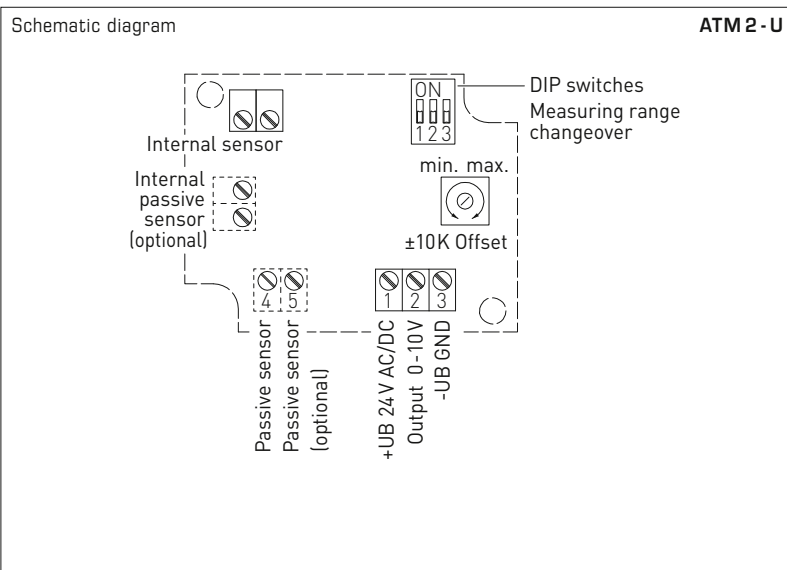
ATM 2 - VA with cable gland



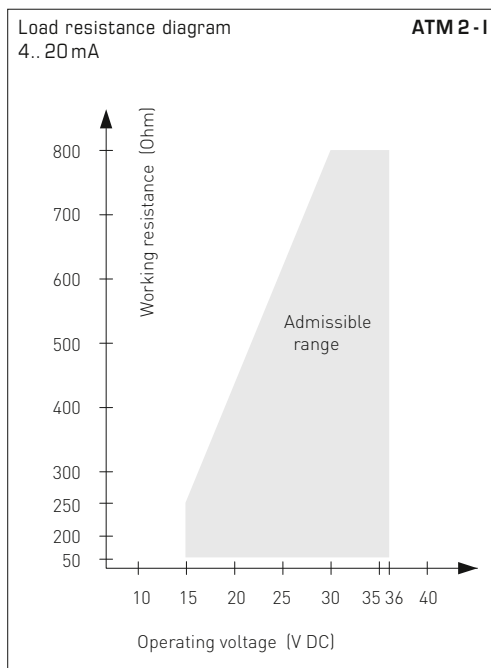
ATM 2 - VAQ with M12 connector



Outside temperature / wet room temperature measuring transducers, calibratable, with multi-range switching and active output



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20...+ 150 °C	ON	ON	ON
-50... + 50 °C	OFF	ON	ON
-20... + 80 °C	ON	OFF	ON
-30... + 60 °C	OFF	OFF	ON
0... + 40 °C	ON	ON	OFF
0... + 50 °C (default)	OFF	ON	OFF
0...+ 100 °C	ON	OFF	OFF
0...+ 150 °C	OFF	OFF	OFF





ATM 2 - VAQ
with M12 connector



ATM 2 - VA
with cable gland



THERMASGARD® ATM 2 - VA		Outside temperature / wet room temperature measuring transducers, <i>ID</i> (Stainless steel housing with cable gland)		
Type / WG02I	Sensor	Output	Item No.	Price
ATM 2 - VA				
ATM2-I VA	Pt1000	4...20 mA	2001-6171-2200-001	377,35 €
ATM2-U VA	Pt1000	0-10 V	2001-6171-1200-001	377,35 €
Housing variant:	Cable connection with cable gland			
Extra charge:	other measuring ranges optional			25,40 €

THERMASGARD® ATM 2 - VAQ		Outside temperature / wet room temperature measuring transducers, <i>ID</i> (Stainless steel housing with M12 connector)		
Type / WG02I	Sensor	Output	● = Q Item No.	Price
ATM 2 - VAQ				
ATM2-I VAQ	Pt1000	4...20 mA	● 2001-6171-2100-001	415,88 €
ATM2-U VAQ	Pt1000	0-10 V	● 2001-6171-1100-001	415,88 €
Housing variant "Q":	Cable connection with M12 connector (male, 5-pin, A-code)			
Extra charge:	see table above!			

ACCESSORIES	
Special accessories for M12 connector see chapter Accessories!	

Immersion / screw-in / duct temperature measuring transducer,
calibratable, with multi-range switching
and active output

Patented quality product (Immersion sensor patent no. DE 10 2012 017 500.0)

Calibratable temperature measuring transducer **THERMASGARD® TM 43** with eight switchable measuring ranges, continuous linear output, straight protective tube, housing made from impact-resistant plastic with snap-on lid.

Calibratable temperature measuring transducer **THERMASGARD® TM 65** with eight switchable measuring ranges, continuous linear output, straight protective tube, housing made from impact-resistant plastic with quick-locking screws, **with/without optional display**.

For the detection of temperatures in liquid or gaseous media. For aggressive media, stainless steel immersion sleeves must be used. It is used e.g. in piping systems, in heating technology, in storage tanks, in district heating compact stations, in hot-water and cold-water systems, in oil and lubricant circulation systems, in mechanical, apparatus and plant engineering as well as in the entire industrial sector. The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

TM 43
with snap-on lid
(IP 54)



TECHNICAL DATA

Power supply:	24 V AC / DC (± 10 %) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a \text{ (ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Sensor:	Pt1000, DIN EN 60751, class B (Perfect Sensor Protection)
Measuring ranges:	multi-range switching with 8 switchable measuring ranges, see table (other ranges optional) with manual zero point correction (± 10 K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Ambient temperature:	measuring transducer -30...+70 °C
Connection type:	2- or 3-wire connection
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016), TM 43 with snap-on lid TM 65 with quick-locking screws (slotted / Phillips head combination), housing cover for display is transparent!
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 / Tyr 01 without display) 72 x 64 x 43.3 mm (Tyr 1 with display)
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (optional on request)
Electrical connection:	0.14 - 1.5 mm ² via terminal screws on circuit board
Protective tube:	stainless steel, V4A (1.4571), Ø = 6 mm, inserted length (EL) = 50 - 400 mm (see table)
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60730)
Protection type:	TM 43 IP54 (according to EN 60529)* Housing tested, TÜV SÜD, Report No. 713160960A (Tyr 01) TM 65 IP67 (according to EN 60529)* Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1) * Housing in the built-in state
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC directive 2014 / 30 / EU
Optional:	two-line display with illumination , cutout approx. 36 x 15 mm (W x H), for displaying the ACTUAL temperature and the internal diagnostics (measuring range exceeded, measuring range not reached, sensor breakage, sensor short circuit)

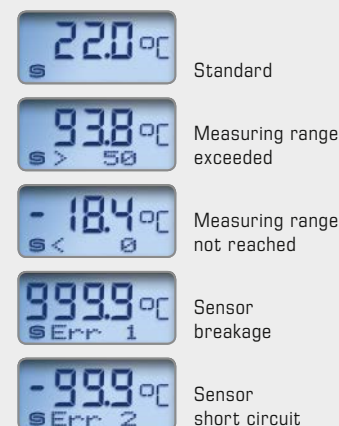
ACCESSORIES

MF-15-K	Mounting flange , plastic, 56.8 x 84.3 mm, Ø = 15.2 mm tube gland, $T_{max} = +100 \text{ °C}$
TH08-ms/xx	Immersion sleeve, brass, nickel-plated , Ø = 8 mm, $T_{max} = +150 \text{ °C}$, $p_{max} = 10 \text{ bar}$
TH08-VA/xx	Immersion sleeve, stainless steel, V4A (1.4571), Ø = 8 mm, $T_{max} = +600 \text{ °C}$, $p_{max} = 40 \text{ bar}$
TH08-VA/xx/90	Immersion sleeve, stainless steel, V4A (1.4571), with neck tube (90 mm), Ø = 8 mm, $T_{max} = +600 \text{ °C}$, $p_{max} = 40 \text{ bar}$

High-performance encapsulation against
vibration, mechanical stress and humidity



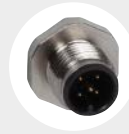
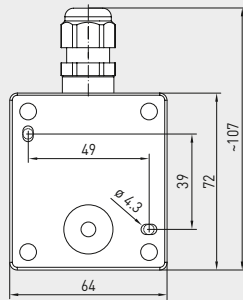
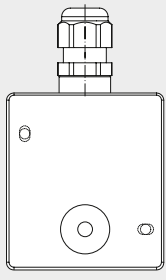
Display and internal diagnostics
THERMASGARD®
Measuring transducer with display



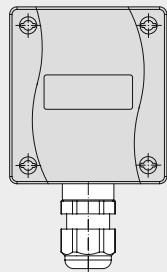
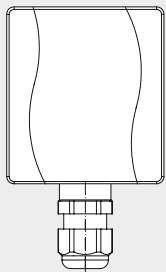
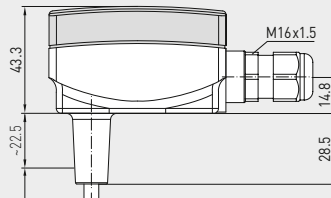
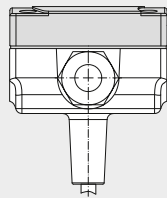
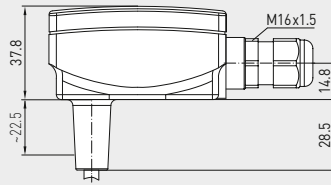
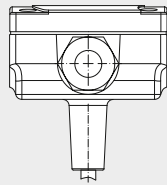


Dimensional drawing

TM 43
TM 65

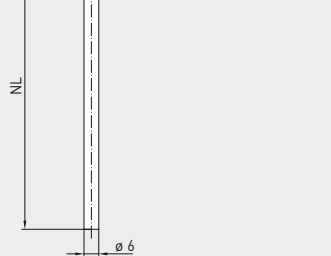


M12 connector
(optional on request)



with snap-on lid

with quick-locking
screws



TM 65
with quick-locking screws
(IP67)



TM 65
with display and
quick-locking screws
(IP67)

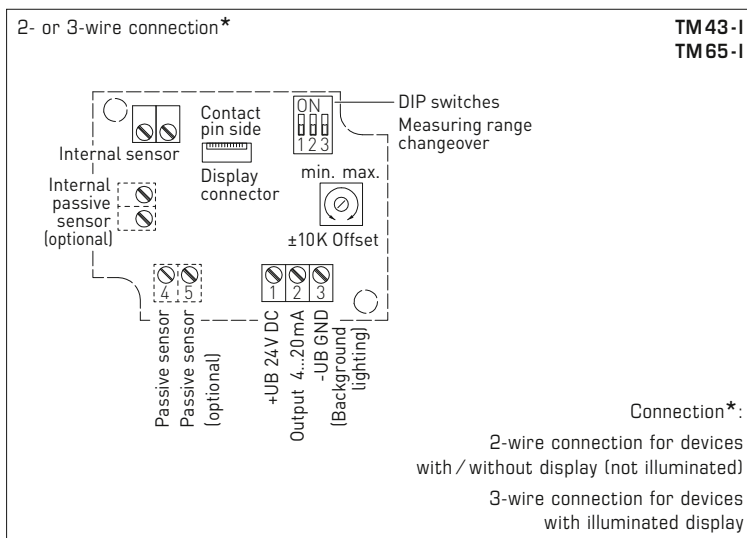
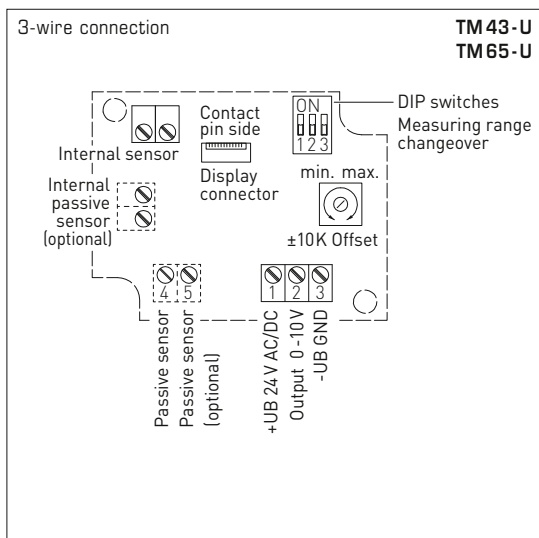


PATENTED



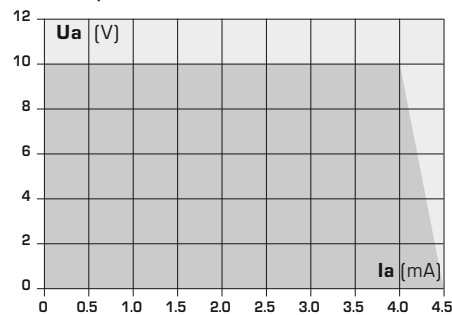
TM 65
Basic device
with accessories

Immersion / screw-in / duct temperature measuring transducer,
calibratable, with multi-range switching
and active output



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20... +150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0... +100 °C	ON	OFF	OFF
0... +150 °C	OFF	OFF	OFF

Dependency of output voltage on output current



TM 65
with display and
quick-locking screws
(IP 67)

TM 65
with quick-locking screws
(IP 67)

TM 43
with snap-on lid
(IP 54)





TEMP

TEMP



THERMASGARD® TM 43		Temperature measuring transducer (basic device with snap-on lid), <i>Standard</i>			
Type / WG01B	Output	Inserted Length (EL)	Item No.	Price	
TM 43 - I		IP 54, I-variant			
TM43-I 50mm	4...20 mA	50 mm	1101-7112-0019-900	72,29 €	
TM43-I 100mm	4...20 mA	100 mm	1101-7112-0029-900	73,48 €	
TM43-I 150mm	4...20 mA	150 mm	1101-7112-0039-900	74,55 €	
TM43-I 200mm	4...20 mA	200 mm	1101-7112-0049-900	74,91 €	
TM43-I 250mm	4...20 mA	250 mm	1101-7112-0059-900	76,16 €	
TM43-I 300mm	4...20 mA	300 mm	1101-7112-0069-900	77,40 €	
TM 43 - U		IP 54, U-variant			
TM43-U 50mm	0 - 10 V	50 mm	1101-7111-0019-900	72,29 €	
TM43-U 100mm	0 - 10 V	100 mm	1101-7111-0029-900	73,48 €	
TM43-U 150mm	0 - 10 V	150 mm	1101-7111-0039-900	74,55 €	
TM43-U 200mm	0 - 10 V	200 mm	1101-7111-0049-900	74,91 €	
TM43-U 250mm	0 - 10 V	250 mm	1101-7111-0059-900	76,16 €	
TM43-U 300mm	0 - 10 V	300 mm	1101-7111-0069-900	77,40 €	

THERMASGARD® TM 65		Temperature measuring transducer (basic device with quick-locking screws), <i>Premium</i>			
Type / WG01	Output	Inserted Length (EL)	Display	Item No.	Price
TM 65 - I		IP 67, I-variant			
TM65-I 50mm	4...20 mA	50 mm		1101-7122-0019-900	100,18 €
TM65-I 50mm LCD	4...20 mA	50 mm	■	1101-7122-2019-900	151,11 €
TM65-I 100mm	4...20 mA	100 mm		1101-7122-0029-900	100,46 €
TM65-I 100mm LCD	4...20 mA	100 mm	■	1101-7122-2029-900	151,37 €
TM65-I 150mm	4...20 mA	150 mm		1101-7122-0039-900	100,68 €
TM65-I 150mm LCD	4...20 mA	150 mm	■	1101-7122-2039-900	151,62 €
TM65-I 200mm	4...20 mA	200 mm		1101-7122-0049-900	100,89 €
TM65-I 200mm LCD	4...20 mA	200 mm	■	1101-7122-2049-900	151,82 €
TM65-I 250mm	4...20 mA	250 mm		1101-7122-0059-900	101,21 €
TM65-I 250mm LCD	4...20 mA	250 mm	■	1101-7122-2059-900	152,13 €
TM65-I 300mm	4...20 mA	300 mm		1101-7122-0069-900	101,97 €
TM65-I 300mm LCD	4...20 mA	300 mm	■	1101-7122-2069-900	152,87 €
TM65-I 400mm	4...20 mA	400 mm		1101-7122-0089-900	104,02 €
TM65-I 400mm LCD	4...20 mA	400 mm	■	1101-7122-2089-900	154,95 €
TM 65 - U		IP 67, U-variant			
TM65-U 50mm	0 - 10 V	50 mm		1101-7121-0019-900	100,18 €
TM65-U 50mm LCD	0 - 10 V	50 mm	■	1101-7121-2019-900	151,11 €
TM65-U 100mm	0 - 10 V	100 mm		1101-7121-0029-900	100,46 €
TM65-U 100mm LCD	0 - 10 V	100 mm	■	1101-7121-2029-900	151,37 €
TM65-U 150mm	0 - 10 V	150 mm		1101-7121-0039-900	100,68 €
TM65-U 150mm LCD	0 - 10 V	150 mm	■	1101-7121-2039-900	151,62 €
TM65-U 200mm	0 - 10 V	200 mm		1101-7121-0049-900	100,89 €
TM65-U 200mm LCD	0 - 10 V	200 mm	■	1101-7121-2049-900	151,82 €
TM65-U 250mm	0 - 10 V	250 mm		1101-7121-0059-900	101,21 €
TM65-U 250mm LCD	0 - 10 V	250 mm	■	1101-7121-2059-900	152,13 €
TM65-U 300mm	0 - 10 V	300 mm		1101-7121-0069-900	101,97 €
TM65-U 300mm LCD	0 - 10 V	300 mm	■	1101-7121-2069-900	152,87 €
TM65-U 400mm	0 - 10 V	400 mm		1101-7121-0089-900	104,02 €
TM65-U 400mm LCD	0 - 10 V	400 mm	■	1101-7121-2089-900	154,95 €
Extra charge:	Other ranges optional	Cable connection with M12 connector according to DIN EN 61076-2-101		on request	25,40 €

High-performance encapsulation against
vibration, mechanical stress and humidity

Immersion / screw-in / duct temperature measuring transducer,
 calibratable, with multi-range switching
 and active output

One basic device in four variants...



PATENTED



**TMxx +
 TH08-ms/xx**

Immersion / screw-in
 temperature sensor
 with immersion sleeve,
 brass, nickel-plated

**TMxx +
 TH08-VA/xx**

Immersion / screw-in
 temperature sensor
 with immersion sleeve,
 stainless steel, V4A

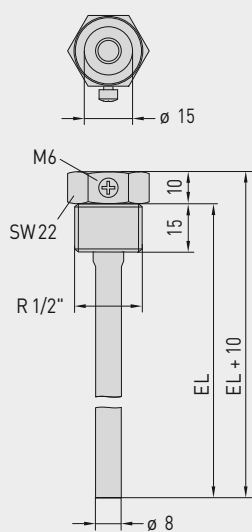
**TMxx +
 TH08-VA/xx/90**

Immersion / screw-in
 temperature sensor with
 immersion sleeve with neck
 tube, stainless steel, V4A

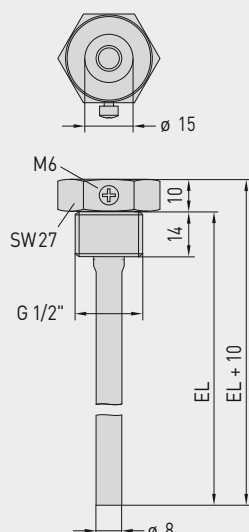
**TMxx +
 MF-15-K**

Duct temperature sensor
 with mounting flange, plastic

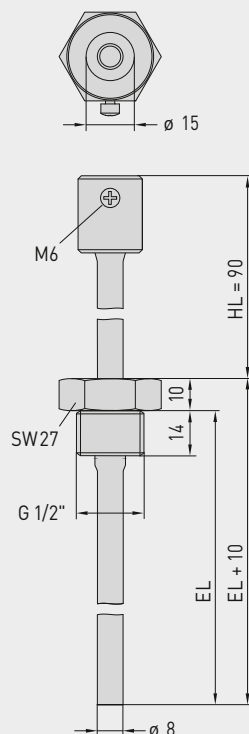
Dimensional drawing
TH08-ms/xx



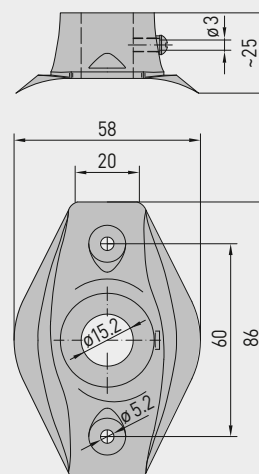
Dimensional drawing
TH08-VA/xx



Dimensional drawing
TH08-VA/xx/90



Dimensional drawing
MF-15-K





... through combination with accessories:



TH08-ms/xx
Immersion sleeve,
brass, nickel-plated,
thread-sealing, conical,
according to DIN 10226



TH08-VA/xx
Immersion sleeve,
stainless steel, V4A,
flat-sealing, cylindrical,
according to DIN 228



TH08-VA/xx/90
Immersion sleeve with neck tube,
stainless steel, V4A,
flat-sealing, cylindrical,
according to DIN 228



MF-15-K
Mounting flange,
plastic

THERMASGARD® TH08 Immersion sleeve Ø 8 mm (Accessories)					
Type / WG01B	p _{max} (static)	T _{max}	Inserted Length (EL)	Item No.	Price
TH08-ms/xx	Brass nickel-plated			without neck tube	
TH08-MS 50MM	10 bar	+150 °C	50 mm	7100-0011-0010-132	9,31 €
TH08-MS 100MM	10 bar	+150 °C	100 mm	7100-0011-0020-132	10,61 €
TH08-MS 150MM	10 bar	+150 °C	150 mm	7100-0011-0030-132	11,20 €
TH08-MS 200MM	10 bar	+150 °C	200 mm	7100-0011-0040-132	11,56 €
TH08-MS 250MM	10 bar	+150 °C	250 mm	7100-0011-0050-132	13,39 €
TH08-MS 300MM	10 bar	+150 °C	300 mm	7100-0011-0060-132	13,76 €
TH08-MS 350MM	10 bar	+150 °C	350 mm	7100-0011-0070-132	13,87 €
TH08-MS 400MM	10 bar	+150 °C	400 mm	7100-0011-0080-132	14,00 €
TH08-VA/xx	Stainless steel, V4A (1.4571)			without neck tube	
TH08-VA 50MM	40 bar	+600 °C	50 mm	7100-0012-0010-132	20,28 €
TH08-VA 100MM	40 bar	+600 °C	100 mm	7100-0012-0020-132	22,41 €
TH08-VA 150MM	40 bar	+600 °C	150 mm	7100-0012-0030-132	24,08 €
TH08-VA 200MM	40 bar	+600 °C	200 mm	7100-0012-0040-132	25,38 €
TH08-VA 250MM	40 bar	+600 °C	250 mm	7100-0012-0050-132	31,55 €
TH08-VA 300MM	40 bar	+600 °C	300 mm	7100-0012-0060-132	32,97 €
TH08-VA 350MM	40 bar	+600 °C	350 mm	7100-0012-0070-132	33,19 €
TH08-VA 400MM	40 bar	+600 °C	400 mm	7100-0012-0080-132	33,78 €
TH08-VA/xx/90	Stainless steel, V4A (1.4571)			with neck tube (90 mm)	
TH08-VA 50/90MM	40 bar	+600 °C	50 mm	7100-0012-0012-132	29,04 €
TH08-VA 100/90MM	40 bar	+600 °C	100 mm	7100-0012-0022-132	30,35 €
TH08-VA 150/90MM	40 bar	+600 °C	150 mm	7100-0012-0032-132	31,84 €
TH08-VA 200/90MM	40 bar	+600 °C	200 mm	7100-0012-0042-132	33,19 €
TH08-VA 250/90MM	40 bar	+600 °C	250 mm	7100-0012-0052-132	34,79 €
TH08-VA 300/90MM	40 bar	+600 °C	300 mm	7100-0012-0062-132	37,71 €
Note:	inner diameter of socket 15.0 mm For further information see last chapter!				
Mounting flange (Accessories)					
Type / WG01B		T _{max}		Item No.	Price
MF					
MF-15-K	Mounting flange, plastic, 56.8x84.3mm, Ø 15.2mm tube gland	+100 °C		7100-0032-0000-000	6,12 €
Note:	For further information see last chapter!				

Mean value / rod / duct temperature measuring transducer, including mounting flange, calibratable, with multi-range switching and active output

Calibratable mean-value temperature measuring transducer **THERMASGARD® MWTM** (rod sensor 0.4...20 m) with eight switchable measuring ranges, continuous output, in an impact-resistant plastic housing with quick-locking screws, optionally with/without display, with bendable sensor rod (fully active), protective tube made from copper, plastic-coated, and anti-kink spring, incl. mounting flange.

Calibratable mean-value temperature measuring transducer **THERMASGARD® MWTM-SD** (rod sensor 3 m / 6 m) with eight switchable measuring ranges, continuous output, in an impact-resistant plastic housing with snap-on lid, with bendable sensor rod (fully active), protective tube made from reinforced thermoplastic hose and anti-kink spring, incl. mounting flange.

The sensor is used to detect the mean temperature (mean value) in gaseous media, e.g. in ventilation and air conditioning ducts over the entire cross section or over a defined length. Laid along a meandering route, it uniformly detects the surrounding temperature, as a duct temperature sensor. For proper mounting of the rod, mounting clamps **MK-05-M** (accessories) are available. The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

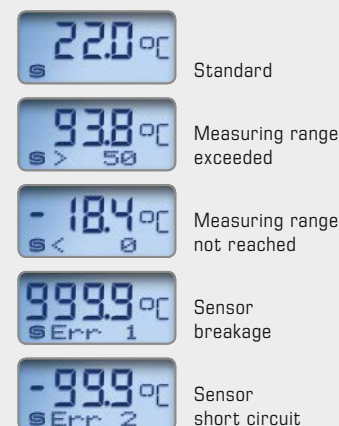
MWTM
Rod length 0.4 m
(IP 65)



TECHNICAL DATA

Power supply:	24 V AC / DC (± 10 %) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a \text{ (ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Sensor:	Pt1000, DIN EN 60751, class B
Measuring ranges:	multi-range switching with 8 switchable measuring ranges, see table (other ranges optional) $T_{\min} -30 \text{ °C}$, $T_{\max} +80 \text{ °C}$ with manual zero point correction (± 10 K)
Output:	0 - 10 V or 4...20 mA
Connection type:	2- or 3-wire connection
Sensors:	active across the entire length (averaging)
Rod material:	protective tube made from copper, plastic-coated (MWTM) (made from reinforced thermoplastic hose for the MWTM-SD), with anti-kink spring and sleeve, stainless steel V4A (1.4571)
Rod dimensions:	$\varnothing = 5.0 \text{ mm}$, nominal length (NL) = 0.4 m / 3 m / 6 m, see table (nominal length optionally up to max. 20 m)
Rod laying:	Observe the admissible values! Bending radius: > 35 mm Vibration load: ≤ 0.5 g Tensile load: < 480 N for the MWTM < 100 N for the MWTM-SD
Housing:	plastic, UV-resistant, material polyamide, 30 % glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016), housing cover for display is transparent!
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 without display) 72 x 64 x 43.3 mm (Tyr 1 with display)
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (optional on request)
Electrical connection:	0.14 - 1.5 mm ² via terminal screws on circuit board
Process connection:	by mounting flange, plastic (galvanised steel optional, see accessories) and mounting clamps MK-05-M
Ambient temperature:	measuring transducer -30...+70 °C
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60730)
Protection type:	IP 54 (according to EN 60529) for the MWTM-SD IP 65 (according to EN 60529) for the MWTM housing tested, TÜV SÜD, report no. 713139052 (Tyr 1)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC directive 2014 / 30 / EU
Optional:	Two-line display with illumination , cutout approx. 36 x 15 mm (W x H), for displaying the ACTUAL temperature and the internal diagnostics (measuring range exceeded, measuring range not reached, sensor breakage, sensor short circuit)
ACCESSORIES	see table

Display and internal diagnostics
THERMASGARD®
Measuring transducer with display





S+S REGELTECHNIK

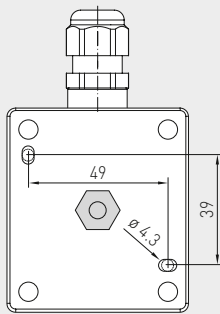
THERMASGARD® MWTM
THERMASGARD® MWTM-SD

Mean value / rod / duct temperature measuring transducer,
including mounting flange, calibratable,
with multi-range switching and active output



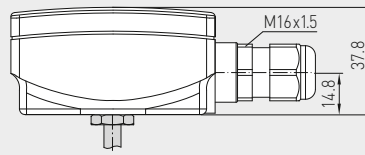
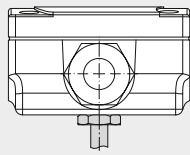
Dimensional drawing

MWTM

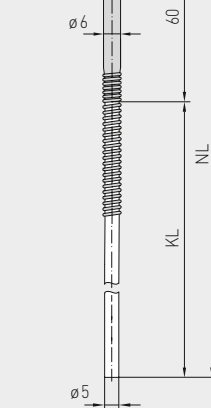
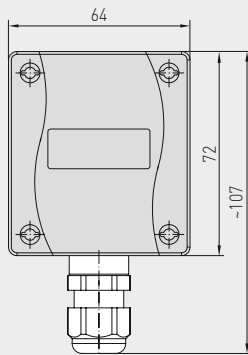
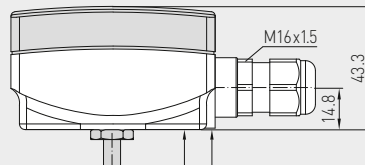
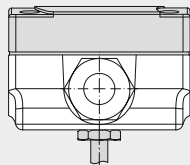


M12 connector
(optional on request)

without display



with display



MWTM
Rod length 3 m / 6 m
(IP65)



MWTM
with Display
(IP65)

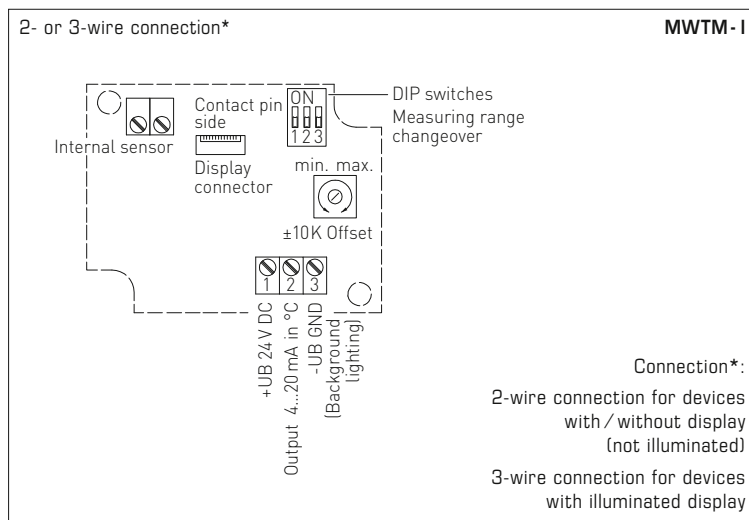
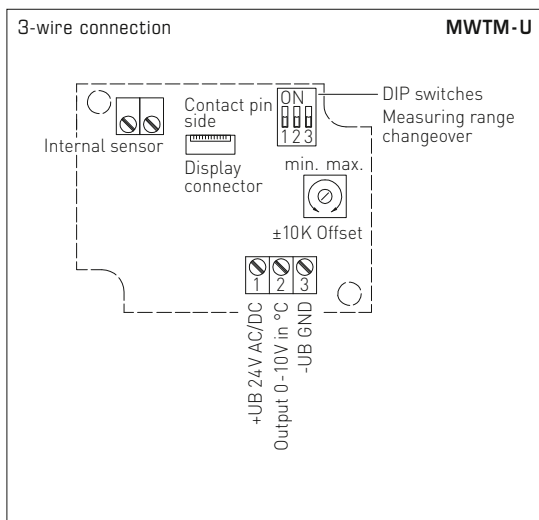


MWTM-SD
Rod length 3 m / 6 m
(IP54)



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20... +150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0... +100 °C	ON	OFF	OFF
0... +150 °C	OFF	OFF	OFF

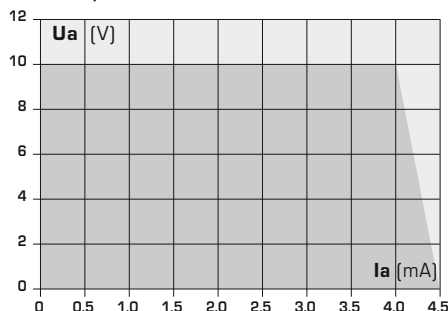
Mean value / rod / duct temperature measuring transducer,
 including mounting flange, calibratable,
 with multi-range switching and active output



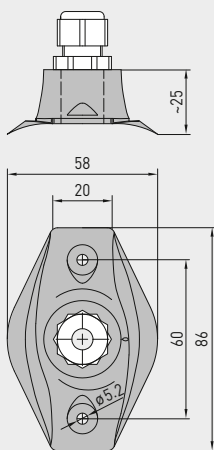
MWTM
 display hinged (optional)



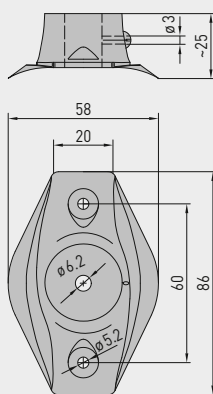
Dependency of output voltage on output current



Dimensional drawing KR D-04



Dimensional drawing MF-06-K



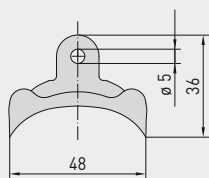
MF-06-K
 Mounting flange, plastic
 (Included in the scope of delivery)



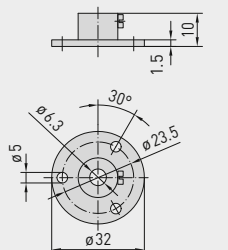
KRD-04
 Capillary tube bushing, plastic (optional)



Dimensional drawing MK-05-M



Dimensional drawing MF-06-M



MF-06-M
 Mounting flange, metal (optional)



MK-05-M
 Mounting clamps, galvanised steel (from 3 m rod length, included in the scope of delivery)





S+S REGELTECHNIK

THERMASGARD® MWTM
THERMASGARD® MWTM-SD

Mean value / rod / duct temperature measuring transducer,
including mounting flange, calibratable,
with multi-range switching and active output



MWTM
Rod length 3 m / 6 m
with/without Display
(IP65)



MWTM-SD
Rod length 3 m / 6 m
without Display
(IP54)

THERMASGARD® MWTM-SD		Mean-value temperature measuring transducer with rod made from reinforced thermoplastic hose, <i>Standard</i>			
Type / WG01B	Sensor	Output	Rod length	Item No.	Price
MWTM-SD-I					IP54, I variant
MWTM-SD-I 3m	Pt1000	4...20 mA	3.0 m	1101-3132-0239-90K	160,46 €
MWTM-SD-I 6m	Pt1000	4...20 mA	6.0 m	1101-3132-0269-90K	170,39 €
MWTM-SD-U					IP54, U variant
MWTM-SD-U 3m	Pt1000	0 - 10 V	3.0 m	1101-3131-0239-90K	157,09 €
MWTM-SD-U 6m	Pt1000	0 - 10 V	6.0 m	1101-3131-0269-90K	166,57 €
Optional:	Cable connection with M12 connector according to DIN EN 61076-2-101			on request	

THERMASGARD® MWTM		Mean-value temperature measuring transducer with rod made from copper, plastic-coated, <i>Premium</i>			
Type / WG01	Sensor	Output	Rod length	Item No.	Price
MWTM-I					IP65, I variant
MWTM-I 0,4m	Pt1000	4...20 mA	0.4 m	1101-3132-0089-900	171,35 €
MWTM-I 3m	Pt1000	4...20 mA	3.0 m	1101-3132-0239-900	222,79 €
MWTM-I 6m	Pt1000	4...20 mA	6.0 m	1101-3132-0269-900	259,70 €
MWTM-U					IP65, U variant
MWTM-U 0,4m	Pt1000	0 - 10 V	0.4 m	1101-3131-0089-900	171,35 €
MWTM-U 3m	Pt1000	0 - 10 V	3.0 m	1101-3131-0239-900	222,79 €
MWTM-U 6m	Pt1000	0 - 10 V	6.0 m	1101-3131-0269-900	259,70 €
Extra charge:	Other ranges optional			25,40 €	
	Two-line display with illumination			49,83 €	
	Per meter sensor cable (from 6m to max. 20m)			on request	
Optional:	Cable connection with M12 connector according to DIN EN 61076-2-101			on request	

ACCESSORIES			
MF-06-K	Mounting flange, plastic (included in the scope of delivery)	7100-0030-1000-000	6,12 €
MF-06-M	Mounting flange, metal (Galvanised steel), Ø 35 mm	7100-0030-5000-100	9,56 €
KRD-04	Capillary tube gland bracket, plastic	7100-0030-7000-000	8,91 €
MK-05-M	Mounting clamps, galvanised steel (6 pieces) (from 3 m rod length, included in the scope of delivery)	7100-0034-0000-000	9,88 €

For further information see last chapter!

Immersion / screw-in / duct temperature measuring transducer, calibratable, with multi-range switching and active output

TM 54
Basic unit

Calibratable temperature measuring transducer **THERMASGARD® TM 54** with eight switchable measuring ranges and continuous output, with connecting head made from aluminium (optionally with **cable gland** or **M12 connector** according to DIN EN 61076-2-101) and straight protective tube.

A basic unit in four variants through combination with accessories, eg, for robust applications with a separate immersion sleeve made from stainless steel.

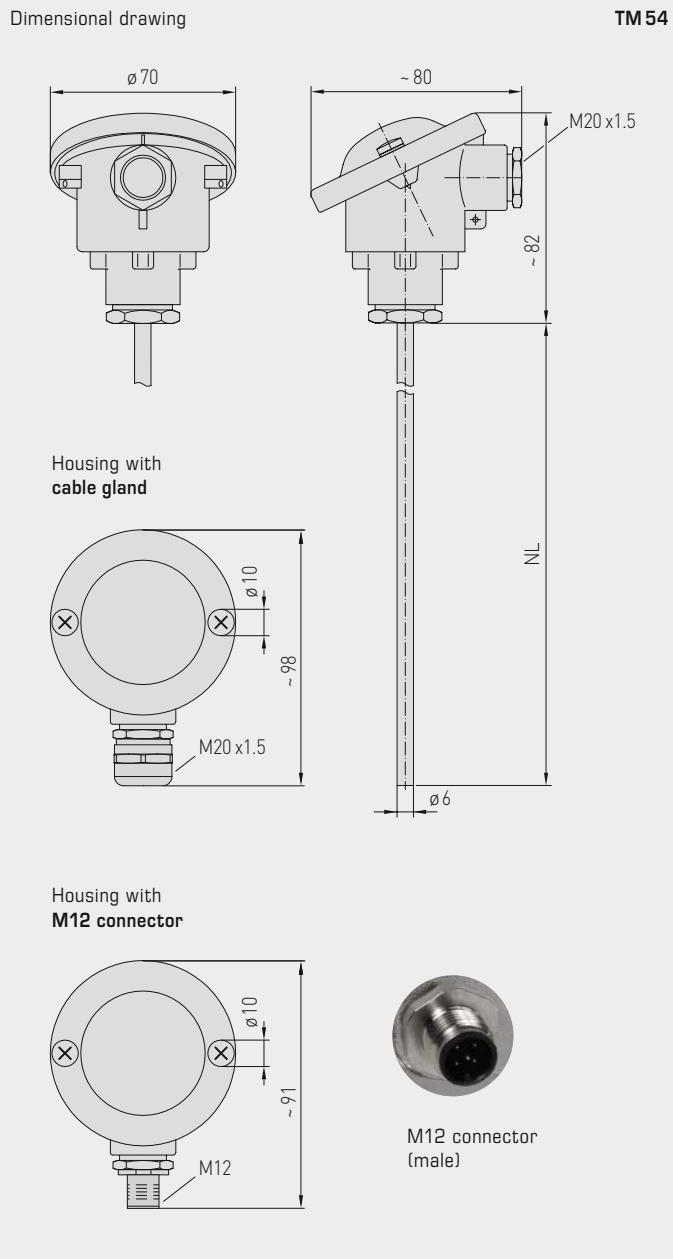
The duct sensor is used to detect temperatures in liquid or gaseous media. It is used in pipes, heating engineering, storage systems, compact district heating stations, warm and cold water systems, oil and lubrication cycle systems, mechanical, apparatus and plant engineering and throughout the industrial sector.

The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.



TECHNICAL DATA

Power supply:	24 V AC / DC (± 10%) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_b \text{ (ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V AC / DC; < 0.55 VA / 24 V DC
Sensor:	Pt1000, DIN EN 60571, class B (Perfect Sensor Protection)
Measuring ranges:	multi-range switching with 8 switchable measuring ranges, see table (other ranges optional) $T_{\text{max}} = +150^\circ\text{C}$ with manual zero point correction (± 10 K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Connection type:	2- or 3-wire connection
Electrical connection:	0.2 - 1.5 mm ² , via push-in terminal
Cable connection:	TM 54 (standard) adjusting screw made of metal (M 20 x 1.5) TM 54-KV (optional) cable gland, brass, nickel-plated (M 20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) TM 54-Q (optional) M12 connector according to DIN EN 61076-2-101 (male, 5-pin, A-code)
Dimensions:	see dimensional drawing
Connecting head:	form B, material aluminium, colour white aluminium (similar to RAL 9006), ambient temperature -30...+70 °C
Protective tube:	stainless steel, V4A (1.4571) Ø = 6 mm, inserted length (EL) = 50 - 400 mm (see table)
Process connection:	by means of immersion sleeve or mounting flange (accessories)
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 54 (according to EN 60 529) TM 54 IP 65 (according to EN 60 529) TM 54-KV / TM 54-Q
Standards:	CE conformity, electromagnetic compatibility according to EN 61 326, EMC directive 2014 / 30 / EU
ACCESSORIES	(see table)
TH-ms / xx	Immersion sleeve, brass, nickel-plated, Ø = 8 mm, $T_{\text{max}} = +150^\circ\text{C}$, $p_{\text{max}} = 10 \text{ bar}$
TH-VA / xx	Immersion sleeve, stainless steel, V4A (1.4571), Ø = 8 mm, $T_{\text{max}} = +600^\circ\text{C}$, $p_{\text{max}} = 40 \text{ bar}$
TH-VA / xx / 90	Immersion sleeve, stainless steel, V4A (1.4571), with neck tube (90 mm), Ø = 8 mm, $T_{\text{max}} = +600^\circ\text{C}$, $p_{\text{max}} = 40 \text{ bar}$
MF-06-M	Mounting flange, metal, galvanised steel, Ø = 32 mm, Ø = 6.3 mm tube gland, $T_{\text{max}} = +700^\circ\text{C}$



TM 54
standard
(IP 54)



TM 54-KV
with cable gland
(IP 65)

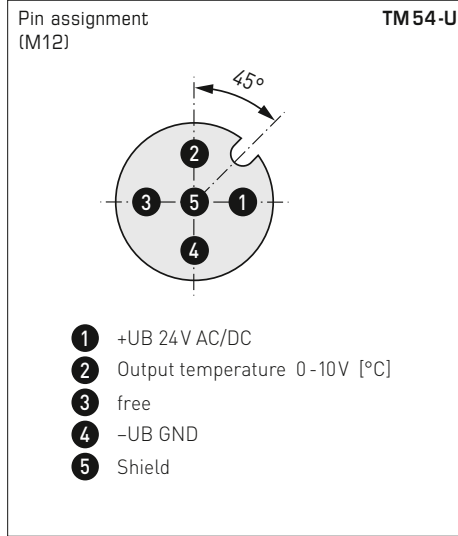
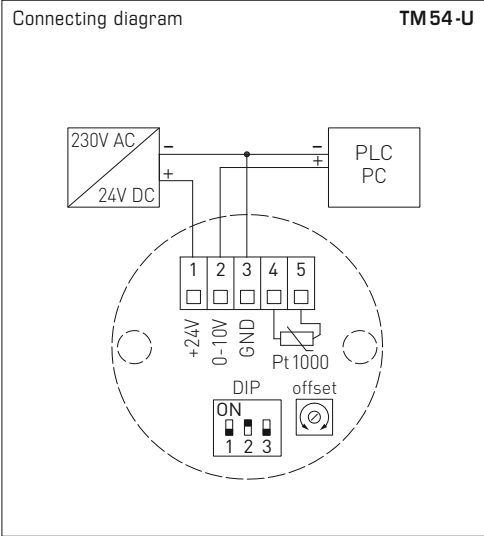


TM 54-Q
with M12 connector
(IP 65)

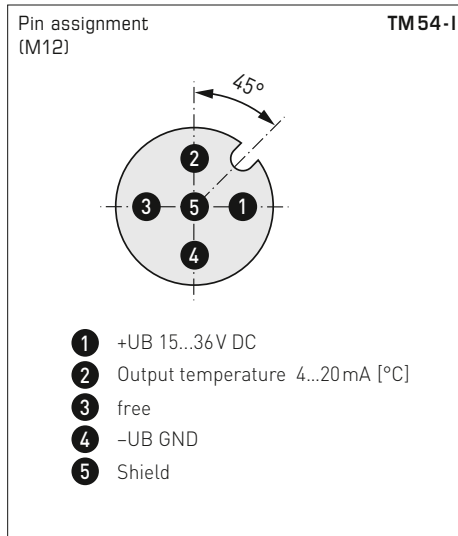
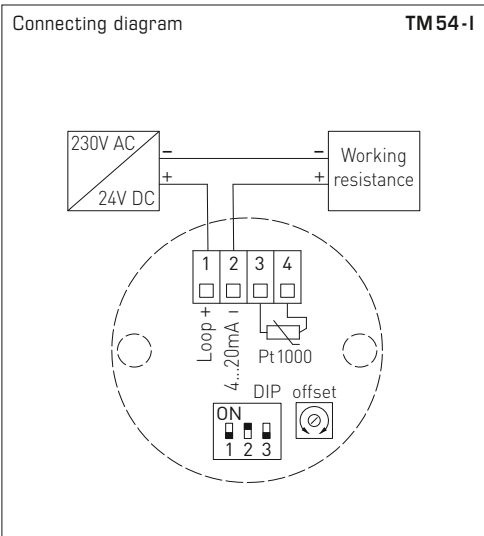
High-performance encapsulation against vibration, mechanical stress and humidity



**Immersion / screw-in / duct temperature measuring transducer,
calibratable, with multi-range switching
and active output**



TM 54-U
Connecting head



TM 54-I
Connecting head



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20... +150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0...+100 °C	ON	OFF	OFF
0...+150 °C	OFF	OFF	OFF



Immersion / screw-in / duct temperature measuring transducer,
calibratable, with multi-range switching
and active output

TM 54
standard
(IP 54)



THERMASGARD® TM 54		Temperature measuring transducer (Basic unit)			
Type / WG01	Sensor	Output	Installation length (EL)	Item No.	Price
TM 54 - I				IP 54, I - variant	
TM54-I 50mm	Pt1000	4...20 mA	50 mm	1101-7152-0019-910	151,87 €
TM54-I 100mm	Pt1000	4...20 mA	100 mm	1101-7152-0029-910	155,45 €
TM54-I 150mm	Pt1000	4...20 mA	150 mm	1101-7152-0039-910	162,45 €
TM54-I 200mm	Pt1000	4...20 mA	200 mm	1101-7152-0049-910	164,67 €
TM54-I 250mm	Pt1000	4...20 mA	250 mm	1101-7152-0059-910	166,71 €
TM54-I 300mm	Pt1000	4...20 mA	300 mm	1101-7152-0069-910	168,42 €
TM54-I 350mm	Pt1000	4...20 mA	350 mm	1101-7152-0079-910	171,85 €
TM54-I 400mm	Pt1000	4...20 mA	400 mm	1101-7152-0089-910	181,43 €
TM 54 - U				IP 54, U - variant	
TM54-U 50mm	Pt1000	0 - 10 V	50 mm	1101-7151-0019-910	151,87 €
TM54-U 100mm	Pt1000	0 - 10 V	100 mm	1101-7151-0029-910	155,45 €
TM54-U 150mm	Pt1000	0 - 10 V	150 mm	1101-7151-0039-910	162,45 €
TM54-U 200mm	Pt1000	0 - 10 V	200 mm	1101-7151-0049-910	164,67 €
TM54-U 250mm	Pt1000	0 - 10 V	250 mm	1101-7151-0059-910	166,71 €
TM54-U 300mm	Pt1000	0 - 10 V	300 mm	1101-7151-0069-910	168,42 €
TM54-U 350mm	Pt1000	0 - 10 V	350 mm	1101-7151-0079-910	171,86 €
TM54-U 400mm	Pt1000	0 - 10 V	400 mm	1101-7151-0089-910	181,43 €
Housing variant:	equipped as standard with pressure screw (IP 54), optional housing variants with cable gland (IP 65) or M12 connector (IP 65) see the next page!				
Extra charge:	other measuring ranges optional				25,40 €

Immersion / screw-in / duct temperature measuring transducer,
calibratable, with multi-range switching
and active output

TM 54 - Q
with M12 connector
(IP 65)



THERMASGARD®		Temperature measuring transducer					
TM 54 - Q		(Basic unit with M12 connector)					
Type / WG01	Sensor	Output	Installation length (EL)	Q	Item No.	Price	
TM 54 - I xx Q				IP 65, I - variant			
TM54-I 50mm Q	Pt1000	4...20 mA	50 mm	●	2001-4111-2100-011	193,80 €	
TM54-I 100mm Q	Pt1000	4...20 mA	100 mm	●	2001-4111-2100-021	197,36 €	
TM54-I 150mm Q	Pt1000	4...20 mA	150 mm	●	2001-4111-2100-031	204,36 €	
TM54-I 200mm Q	Pt1000	4...20 mA	200 mm	●	2001-4111-2100-041	206,59 €	
TM54-I 250mm Q	Pt1000	4...20 mA	250 mm	●	2001-4111-2100-051	208,64 €	
TM54-I 300mm Q	Pt1000	4...20 mA	300 mm	●	2001-4111-2100-061	210,36 €	
TM54-I 350mm Q	Pt1000	4...20 mA	350 mm	●	2001-4111-2100-071	213,79 €	
TM54-I 400mm Q	Pt1000	4...20 mA	400 mm	●	2001-4111-2100-081	223,35 €	
TM 54 - U xx Q				IP 65, U - variant			
TM54-U 50mm Q	Pt1000	0 - 10 V	50 mm	●	2001-4111-1100-011	167,55 €	
TM54-U 100mm Q	Pt1000	0 - 10 V	100 mm	●	2001-4111-1100-021	197,36 €	
TM54-U 150mm Q	Pt1000	0 - 10 V	150 mm	●	2001-4111-1100-031	204,36 €	
TM54-U 200mm Q	Pt1000	0 - 10 V	200 mm	●	2001-4111-1100-041	206,59 €	
TM54-U 250mm Q	Pt1000	0 - 10 V	250 mm	●	2001-4111-1100-051	208,64 €	
TM54-U 300mm Q	Pt1000	0 - 10 V	300 mm	●	2001-4111-1100-061	210,36 €	
TM54-U 350mm Q	Pt1000	0 - 10 V	350 mm	●	2001-4111-1100-071	213,79 €	
TM54-U 400mm Q	Pt1000	0 - 10 V	400 mm	●	2001-4111-1100-081	223,35 €	
Housing variant "Q":		Cable connection with M12 connector (male, 5-pin, A-code)					
Extra charge:		other measuring ranges optional					
						25,40 €	

ACCESSORIES

Special accessories for M12 connector
see chapter Accessories!



Immersion / screw-in / duct temperature measuring transducer,
calibratable, with multi-range switching
and active output

TM 54 - KV
with cable gland
(IP 65)



THERMASGARD®		Temperature measuring transducer			
TM 54 - KV		(Basic unit with cable gland)			
Type / WG01	Sensor	Output	Installation length (EL)	Item No.	Price
TM 54 - I xx KV				IP 65, I - variant	
TM54-I 50mm KV	Pt1000	4...20 mA	50 mm	1101-7172-0019-910	161,31 €
TM54-I 100mm KV	Pt1000	4...20 mA	100 mm	1101-7172-0029-910	164,88 €
TM54-I 150mm KV	Pt1000	4...20 mA	150 mm	1101-7172-0039-910	171,86 €
TM54-I 200mm KV	Pt1000	4...20 mA	200 mm	1101-7172-0049-910	174,10 €
TM54-I 250mm KV	Pt1000	4...20 mA	250 mm	1101-7172-0059-910	176,15 €
TM54-I 300mm KV	Pt1000	4...20 mA	300 mm	1101-7172-0069-910	177,87 €
TM54-I 350mm KV	Pt1000	4...20 mA	350 mm	1101-7172-0079-910	181,29 €
TM54-I 400mm KV	Pt1000	4...20 mA	400 mm	1101-7172-0089-910	190,85 €
TM 54 - U xx KV				IP 65, U - variant	
TM54-U 50mm KV	Pt1000	0 - 10 V	50 mm	1101-7171-0019-910	161,31 €
TM54-U 100mm KV	Pt1000	0 - 10 V	100 mm	1101-7171-0029-910	164,88 €
TM54-U 150mm KV	Pt1000	0 - 10 V	150 mm	1101-7171-0039-910	171,86 €
TM54-U 200mm KV	Pt1000	0 - 10 V	200 mm	1101-7171-0049-910	174,10 €
TM54-U 250mm KV	Pt1000	0 - 10 V	250 mm	1101-7171-0059-910	176,15 €
TM54-U 300mm KV	Pt1000	0 - 10 V	300 mm	1101-7171-0069-910	177,87 €
TM54-U 350mm KV	Pt1000	0 - 10 V	350 mm	1101-7171-0079-910	181,29 €
TM54-U 400mm KV	Pt1000	0 - 10 V	400 mm	1101-7171-0089-910	190,85 €
Housing variant "KV":	Cable connection with cable gland				
Extra charge:	other measuring ranges optional				25,40 €

Immersion / screw-in / duct temperature measuring transducer, calibratable, with multi-range switching and active output

One basic device in four variants ...



TM54 + TH -ms/xx

Immersion / screw-in temperature sensor with immersion sleeve, brass, nickel-plated



TM54 + TH -VA/xx

Immersion / screw-in temperature sensor with immersion sleeve, stainless steel, V4A



TM54 + TH -VA/xx/90

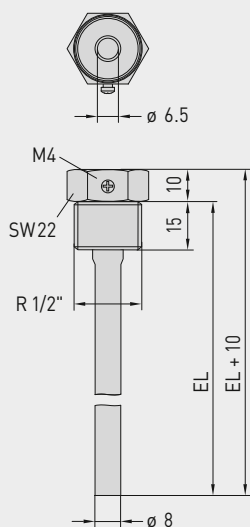
Immersion / screw-in temperature sensor with immersion sleeve with neck tube, stainless steel, V4A



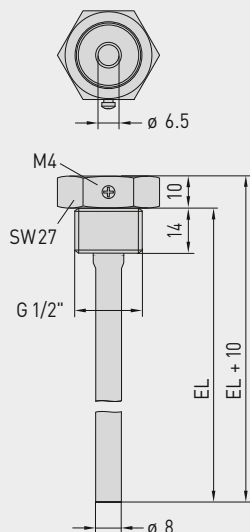
TM54 + MF-06-M

Duct temperature sensor with mounting flange, metal

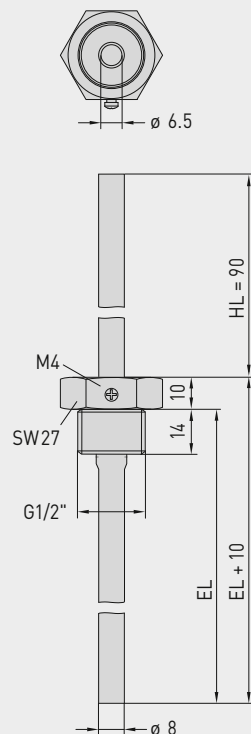
Dimensional drawing TH -ms/xx



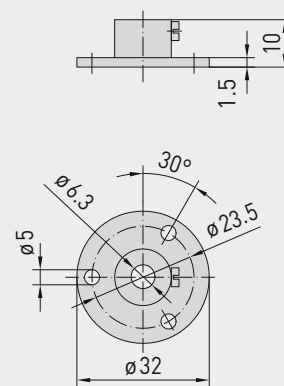
Dimensional drawing TH -VA/xx



Dimensional drawing TH -VA/xx/90



Dimensional drawing MF-06-M





...through combination with accessories:



TH - ms / xx
Immersion sleeve,
brass, nickel-plated,
thread-sealing, conical,
according to DIN 10226



TH - VA / xx
Immersion sleeve,
stainless steel, V4A,
flat-sealing, cylindrical,
according to DIN 228



TH - VA / xx / 90
Immersion sleeve with neck tube,
stainless steel, V4A,
flat-sealing, cylindrical,
according to DIN 228



MF-06-M
Mounting flange,
metal

THERMASGARD® TH Immersion sleeve Ø 8 mm (accessories)					
Type / WG01	p _{max} (static)	T _{max}	Inserted Length (EL)	Item No.	Price
TH - ms / xx Brass nickel-plated					
TH-MS 50MM	10 bar	+150 °C	50 mm	7100-0011-0010-001	9,31 €
TH-MS 100MM	10 bar	+150 °C	100 mm	7100-0011-0020-001	10,61 €
TH-MS 150MM	10 bar	+150 °C	150 mm	7100-0011-0030-001	11,20 €
TH-MS 200MM	10 bar	+150 °C	200 mm	7100-0011-0040-001	11,56 €
TH-MS 250MM	10 bar	+150 °C	250 mm	7100-0011-0050-001	13,39 €
TH-MS 300MM	10 bar	+150 °C	300 mm	7100-0011-0060-001	13,76 €
TH-MS 350MM	10 bar	+150 °C	350 mm	7100-0011-0070-001	13,87 €
TH-MS 400MM	10 bar	+150 °C	400 mm	7100-0011-0080-001	14,00 €
TH - VA / xx Stainless steel, V4A (1.4571)					
without neck tube					
TH-VA 50MM	40 bar	+600 °C	50 mm	7100-0012-0010-001	20,28 €
TH-VA 100MM	40 bar	+600 °C	100 mm	7100-0012-0020-001	22,41 €
TH-VA 150MM	40 bar	+600 °C	150 mm	7100-0012-0030-001	24,08 €
TH-VA 200MM	40 bar	+600 °C	200 mm	7100-0012-0040-001	25,38 €
TH-VA 250MM	40 bar	+600 °C	250 mm	7100-0012-0050-001	31,55 €
TH-VA 300MM	40 bar	+600 °C	300 mm	7100-0012-0060-001	32,97 €
TH-VA 350MM	40 bar	+600 °C	350 mm	7100-0012-0070-001	33,19 €
TH-VA 400MM	40 bar	+600 °C	400 mm	7100-0012-0080-001	33,78 €
TH - VA / xx / 90 Stainless steel, V4A (1.4571)					
with neck tube (90 mm)					
TH-VA 50/90MM	40 bar	+600 °C	50 mm	7100-0012-2010-001	29,04 €
TH-VA 100/90MM	40 bar	+600 °C	100 mm	7100-0012-2020-001	30,35 €
TH-VA 150/90MM	40 bar	+600 °C	150 mm	7100-0012-2030-001	31,84 €
TH-VA 200/90MM	40 bar	+600 °C	200 mm	7100-0012-2040-001	33,19 €
TH-VA 250/90MM	40 bar	+600 °C	250 mm	7100-0012-2050-001	34,79 €
TH-VA 300/90MM	40 bar	+600 °C	300 mm	7100-0012-2060-001	37,71 €
Note:	inner diameter of socket 6.5 mm For further information see last chapter!				
Mounting flange (accessories)					
Type / WG01		T _{max}		Item No.	Price
MF					
MF-06-M	Mounting flange, metal (galvanised steel) Ø 32 mm, tube gland Ø 6.3 mm		+700 °C	7100-0030-5000-100	9,56 €
Note:	For further information see last chapter!				

Duct/smoke gas temperature measuring transducer, including mounting flange, calibratable, with multi-range switching and active output

Calibratable smoke gas temperature measuring transducer **THERMASGARD® RGTM 1** with eight switchable measuring ranges and continuous output, with connecting head made from aluminium (optionally with **cable gland** or **M12 connector** according to DIN EN 61076-2-101), spring-mounted measuring insert and straight protective tube, incl. mounting flange.

The duct sensor is used to detect high temperatures in gaseous media, eg. for exhaust air or smoke gas temperature measurement.

The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

RGTM 1
Basic unit

TECHNICAL DATA

Power supply:	24 V AC / DC (± 10 %) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_b \text{ (Ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant
Load resistance:	10 kOhm (load max. 1 mA) for U variant
Power consumption:	< 1.0 VA / 24 V AC / DC; < 0.55 VA / 24 V DC
Sensor:	Pt1000 (according to DIN EN 60751, class B) (Perfect Sensor Protection)
Measuring ranges:	multi-range switching with 8 switchable measuring ranges, see table (other ranges optional) with manual zero point correction (± 10 K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Connection type:	2- or 3-wire connection
Electrical connection:	0.2 - 1.5 mm ² , via push-in terminal
Cable connection:	RGTM 1 (Standard) adjusting screw made of metal (M 20 x 1.5); RGTM 1-KV (optional) cable gland, brass, nickel-plated (M 20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) RGTM 1-Q (optional) M12 connector according to DIN EN 61076-2-101 (male, 5-pin, A-code)
Dimensions:	see dimensional drawing
Connecting head:	form B, material aluminium, colour white aluminium (similar to RAL 9006), ambient temperature -30...+70 °C
Protective tube:	stainless steel, V4A (1.4571), Ø = 8 mm inserted length (EL) = 200 - 400 mm (see table)
Process connection:	by mounting flange stainless steel V2A (1.4305) (included in the scope of delivery)
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 54 (according to EN 60 529) RGTM 1 IP 65 (according to EN 60 529) RGTM 1-KV / RGTM 1-Q
Standards:	CE conformity, electromagnetic compatibility according to EN 61 326, EMC directive 2014 / 30 / EU



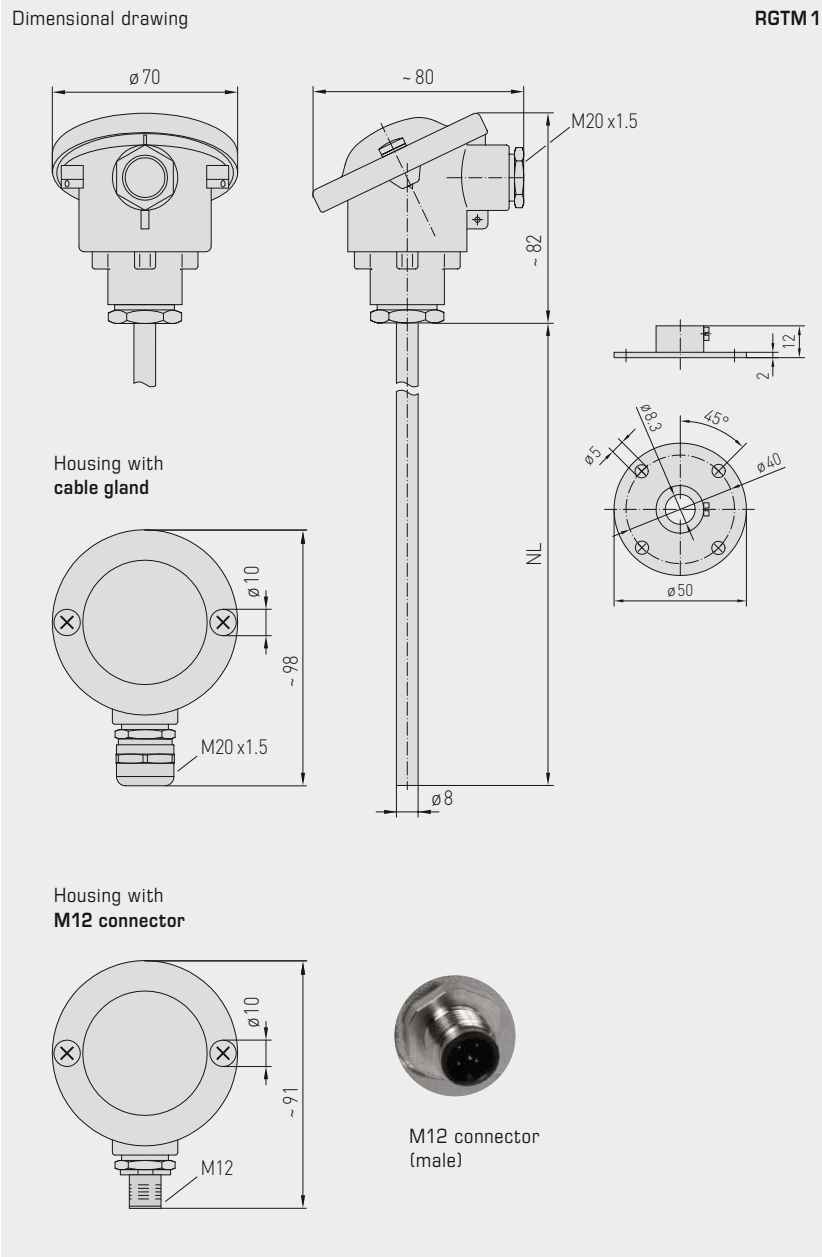
RGTM 1
Measuring insert with ceramic tubelet



S+S REGELTECHNIK

THERMASGARD® RGTM 1

Duct/smoke gas temperature measuring transducer, including mounting flange, calibratable, with multi-range switching and active output



RGTM 1 standard (IP 54)



RGTM 1-KV with cable gland (IP 65)

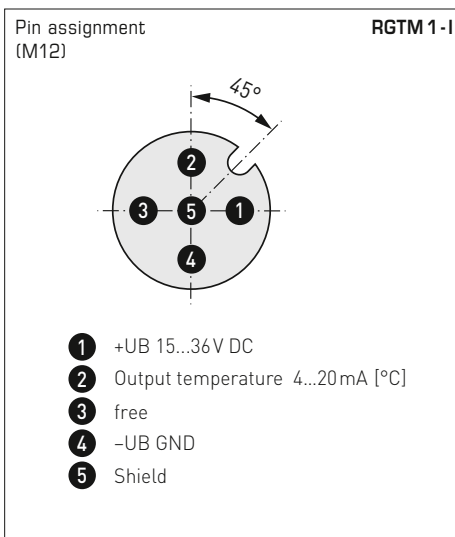
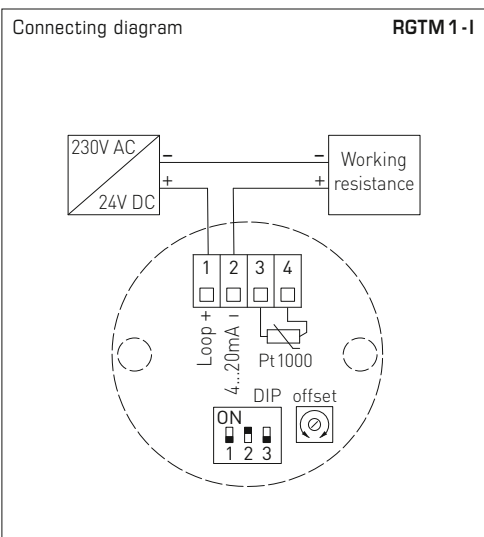
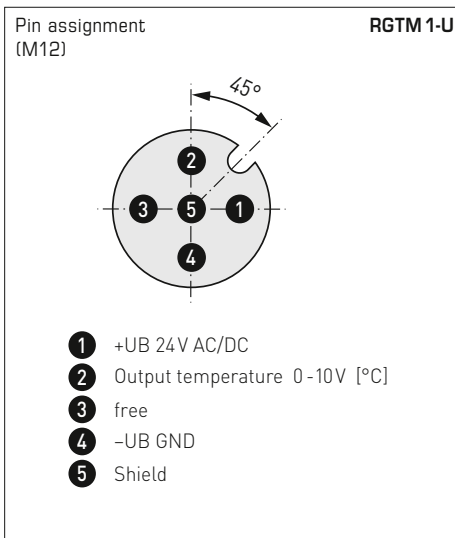
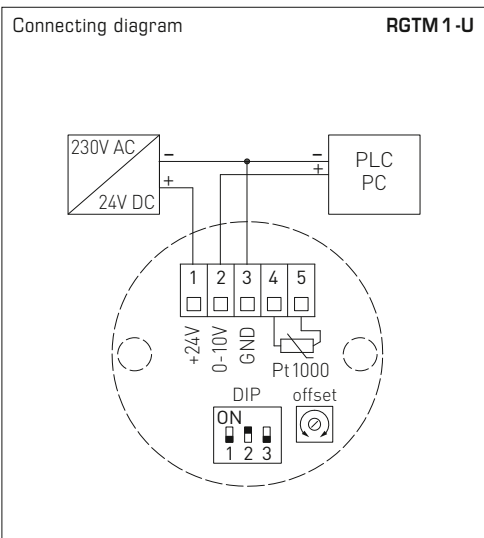


RGTM 1-Q with M12 connector (IP 65)

High-performance encapsulation against vibration, mechanical stress and humidity



Duct/smoke gas temperature measuring transducer, including mounting flange, calibratable, with multi-range switching and active output



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20...+150 °C	ON	ON	ON
0...+50 °C (default)	OFF	ON	ON
0...+100 °C	ON	OFF	ON
0...+200 °C	OFF	OFF	ON
0...+300 °C	ON	ON	OFF
0...+400 °C	OFF	ON	OFF
0...+500 °C	ON	OFF	OFF
0...+600 °C	OFF	OFF	OFF



S+S REGELTECHNIK

Duct/smoke gas temperature measuring transducer,
including mounting flange, calibratable, with multi-range switching
and active output

RGTM 1
standard
(IP 54)



THERMASGARD® RGTM 1		Duct / smoke gas temperature sensor, incl. mounting flange (standard)			
Type / WG01	Sensor	Output	Installation length (EL)	Item No.	Price
RGTM 1 - I				IP 54, I - variant	
RGTM1-I 200mm	Pt1000	4...20 mA	200 mm	1101-3122-0049-810	288,34 €
RGTM1-I 250mm	Pt1000	4...20 mA	250 mm	1101-3122-0059-810	299,80 €
RGTM1-I 300mm	Pt1000	4...20 mA	300 mm	1101-3122-0069-810	302,98 €
RGTM1-I 400mm	Pt1000	4...20 mA	400 mm	1101-3122-0089-810	305,52 €
RGTM 1 - U				IP 54, U - variant	
RGTM1-U 200mm	Pt1000	0 - 10 V	200 mm	1101-3121-0049-810	288,34 €
RGTM1-U 250mm	Pt1000	0 - 10 V	250 mm	1101-3121-0059-810	299,80 €
RGTM1-U 300mm	Pt1000	0 - 10 V	300 mm	1101-3121-0069-810	302,98 €
RGTM1-U 400mm	Pt1000	0 - 10 V	400 mm	1101-3121-0089-810	305,52 €
Housing variant:	equipped as standard with pressure screw (IP 54), optional housing variants with cable gland (IP 65) or M12 connector (IP65) see the next page!				
Extra charge:	other measuring ranges optional				25,40 €

Duct/smoke gas temperature measuring transducer,
including mounting flange, calibratable, with multi-range switching
and active output

RGTM 1 - Q
with M12 connector
(IP 65)



THERMASGARD® RGTM 1 - Q		Duct / smoke gas temperature sensor, incl. mounting flange (with M12 connector)				
Type / WG01	Sensor	Output	Installation length (EL)	Q	Item No.	Price
RGTM 1 - I xx Q				IP 65, I - variant		
RGTM1-I 200mm Q	Pt1000	4...20 mA	200 mm	●	2001-4131-2100-011	330,26 €
RGTM1-I 250mm Q	Pt1000	4...20 mA	250 mm	●	2001-4131-2100-021	341,73 €
RGTM1-I 300mm Q	Pt1000	4...20 mA	300 mm	●	2001-4131-2100-031	344,89 €
RGTM1-I 400mm Q	Pt1000	4...20 mA	400 mm	●	2001-4131-2100-041	347,46 €
RGTM 1 - U xx Q				IP 54, U - variant		
RGTM1-U 200mm Q	Pt1000	0 - 10 V	200 mm	●	2001-4131-1100-011	330,26 €
RGTM1-U 250mm Q	Pt1000	0 - 10 V	250 mm	●	2001-4131-1100-021	341,73 €
RGTM1-U 300mm Q	Pt1000	0 - 10 V	300 mm	●	2001-4131-1100-031	344,89 €
RGTM1-U 400mm Q	Pt1000	0 - 10 V	400 mm	●	2001-4131-1100-041	347,46 €
Housing variant "Q":		Cable connection with M12 connector (male, 5-pin, A-code)				
Extra charge:	other measuring ranges optional					25,40 €

ACCESSORIES

Special accessories for M12 connector
see chapter Accessories!



S+S REGELTECHNIK

Duct/smoke gas temperature measuring transducer,
including mounting flange, calibratable, with multi-range switching
and active output

RGTM 1 - KV
with cable gland
(IP 65)



THERMASGARD® RGTM 1 - KV		Duct / smoke gas temperature sensor, incl. mounting flange (with cable gland)			
Type / WG01	Sensor	Output	Installation length (EL)	Item No.	Price
RGTM 1 - I xx KV				IP 65, I - variant	
RGTM1-I 200mm KV	Pt1000	4...20mA	200 mm	1101-31D2-0049-810	297,78 €
RGTM1-I 250mm KV	Pt1000	4...20mA	250 mm	1101-31D2-0059-810	309,25 €
RGTM1-I 300mm KV	Pt1000	4...20mA	300 mm	1101-31D2-0069-810	312,42 €
RGTM1-I 400mm KV	Pt1000	4...20mA	400 mm	1101-31D2-0089-810	314,97 €
RGTM 1 - U xx KV				IP 65, U - variant	
RGTM1-U 200mm KV	Pt1000	0 - 10 V	200 mm	1101-31D1-0049-810	297,78 €
RGTM1-U 250mm KV	Pt1000	0 - 10 V	250 mm	1101-31D1-0059-810	309,25 €
RGTM1-U 300mm KV	Pt1000	0 - 10 V	300 mm	1101-31D1-0069-810	312,42 €
RGTM1-U 400mm KV	Pt1000	0 - 10 V	400 mm	1101-31D1-0089-810	314,97 €
Housing variant "KV":		Cable connection with cable gland			
Extra charge:	other measuring ranges optional				25,40 €

Screw-in / smoke gas temperature measuring transducer, with neck tube, calibratable, with multi-range switching and active output

RGTM 2
Basic unit

Calibratable smoke gas / screw-in temperature measuring transducer with neck tube
THERMASGARD® RGTM 2 with eight switchable measuring ranges and continuous output, with connecting head made from aluminium (optionally with **cable gland** or **M12 connector** according to DIN EN 61076-2-101), spring-mounted measuring insert and straight protective tube.

The duct sensor is used to detect high temperatures in gaseous or liquid media, eg. for exhaust air or smoke gas temperature measurement.

The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

TECHNICAL DATA

Power supply:	24 V AC / DC (± 10 %) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a \text{ (Ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant
Load resistance:	10 kOhm (load max. 1 mA) for U variant
Power consumption:	< 1.0 VA / 24 V AC / DC; < 0.55 VA / 24 V DC
Sensor:	Pt1000 (according to DIN EN 60 751, class B) (Perfect Sensor Protection)
Measuring ranges:	multi-range switching with 8 switchable measuring ranges, see table (other ranges optional) with manual zero point correction (± 10 K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Connection type:	2- or 3-wire connection
Electrical connection:	0.2 - 1.5 mm ² , via push-in terminal
Cable connection:	RGTM 2 (Standard) adjusting screw made of metal (M 20 x 1.5); RGTM 2-KV (optional) cable gland, brass, nickel-plated (M 20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) RGTM 2-Q (optional) M12 connector according to DIN EN 61076-2-101 (male, 5-pin, A-code)
Dimensions:	see dimensional drawing
Connecting head:	form B, material aluminium, colour white aluminium (similar to RAL 9006), ambient temperature -30...+70 °C
Protective tube:	stainless steel, V4A (1.4571), G ½" straight pipe thread, wrench size 27 mm, $p_{max} = 40 \text{ bar}$, $\varnothing = 8 \text{ mm}$ length of neck tube (HL) = 80 mm inserted length (EL) = 100 - 400 mm (see table)
Process connection:	screwed socket with G ½"
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 54 (according to EN 60 529) RGTM 2 IP 65 (according to EN 60 529) RGTM 2-KV / RGTM 2-Q
Standards:	CE conformity, electromagnetic compatibility according to EN 61 326, EMC directive 2014 / 30 / EU



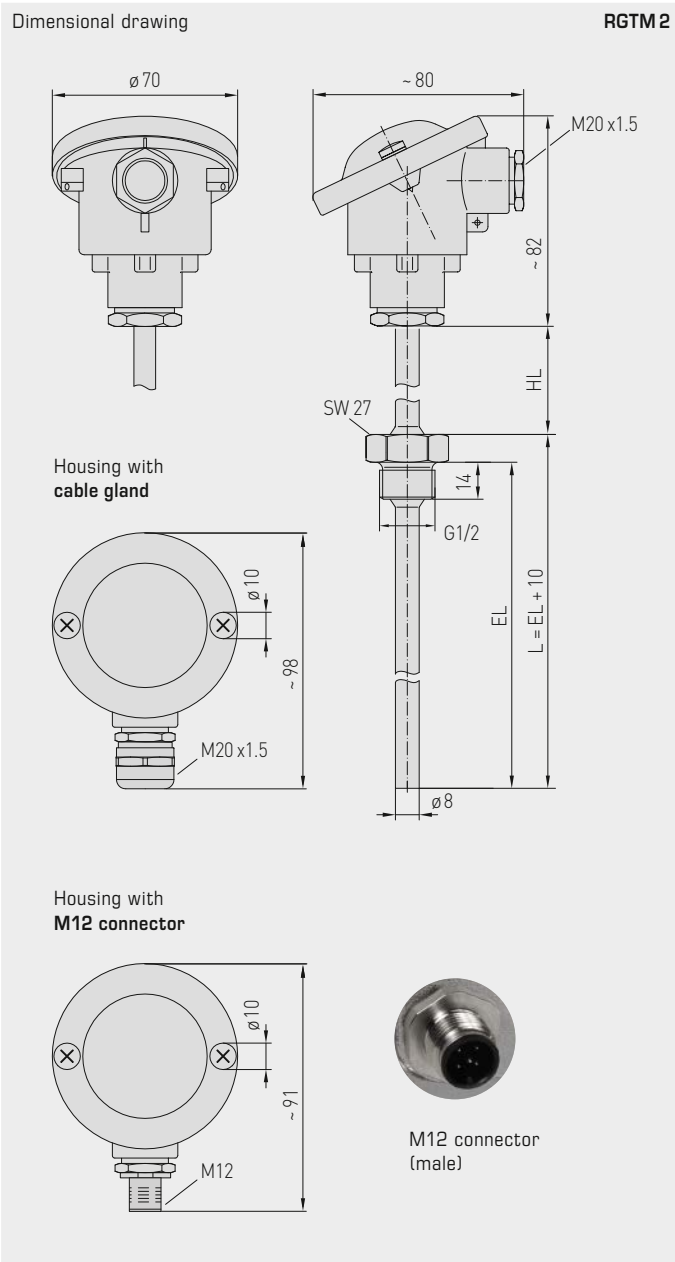
RGTM 2
Measuring insert with ceramic tubelet



S+S REGELTECHNIK

THERMASGARD® RGTM 2

Screw-in/smoke gas temperature measuring transducer, with neck tube, calibratable, with multi-range switching and active output



RGTM 2 standard (IP 54)



RGTM 2-KV with cable gland (IP 65)

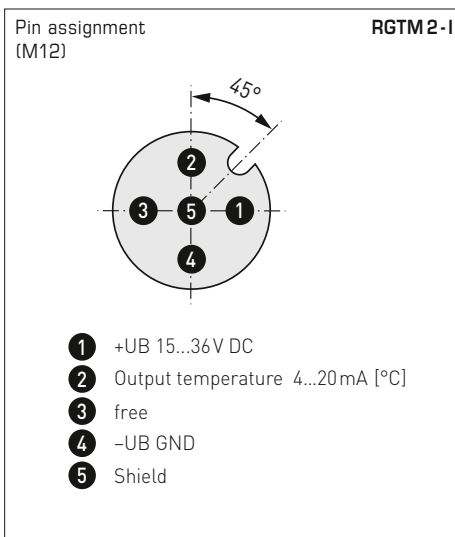
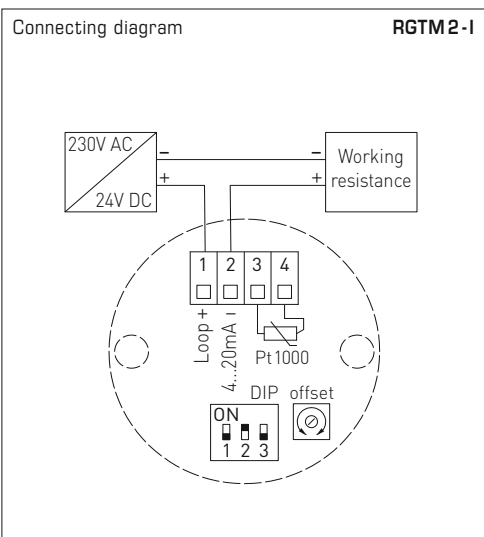
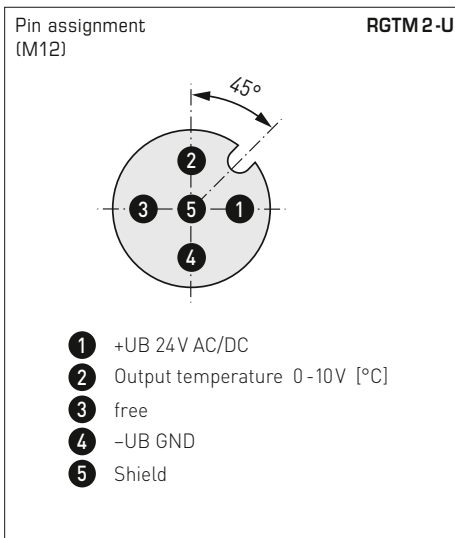
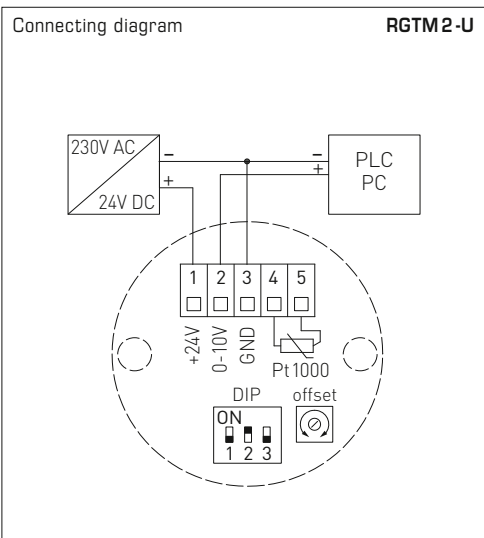


RGTM 2-Q with M12 connector (IP 65)

High-performance encapsulation against vibration, mechanical stress and humidity



Screw-in / smoke gas temperature measuring transducer,
with neck tube, calibratable, with multi-range switching
and active output



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20...+150 °C	ON	ON	ON
0...+50 °C (default)	OFF	ON	ON
0...+100 °C	ON	OFF	ON
0...+200 °C	OFF	OFF	ON
0...+300 °C	ON	ON	OFF
0...+400 °C	OFF	ON	OFF
0...+500 °C	ON	OFF	OFF
0...+600 °C	OFF	OFF	OFF



S+S REGELTECHNIK

Screw-in / smoke gas temperature measuring transducer,
with neck tube, calibratable, with multi-range switching
and active output

RGTM 2
standard
(IP 54)



THERMASGARD® RGTM 2		Screw-in / smoke gas temperature measuring transducer with neck tube (standard)			
Type / WG01	Sensor	Output	Installation length (EL)	Item No.	Price
RGTM 2 - I				IP 54, I - variant	
RGTM2-I 100/80mm	Pt1000	4...20 mA	100 mm	1101-2162-0029-810	280,08 €
RGTM2-I 150/80mm	Pt1000	4...20 mA	150 mm	1101-2162-0039-810	285,16 €
RGTM2-I 200/80mm	Pt1000	4...20 mA	200 mm	1101-2162-0049-810	287,70 €
RGTM2-I 250/80mm	Pt1000	4...20 mA	250 mm	1101-2162-0059-810	299,16 €
RGTM2-I 300/80mm	Pt1000	4...20 mA	300 mm	1101-2162-0069-810	302,98 €
RGTM2-I 400/80mm	Pt1000	4...20 mA	400 mm	1101-2162-0089-810	304,26 €
RGTM 2 - U				IP 54, U - variant	
RGTM2-U 100/80mm	Pt1000	0 - 10 V	100 mm	1101-2161-0029-810	280,08 €
RGTM2-U 150/80mm	Pt1000	0 - 10 V	150 mm	1101-2161-0039-810	285,16 €
RGTM2-U 200/80mm	Pt1000	0 - 10 V	200 mm	1101-2161-0049-810	287,70 €
RGTM2-U 250/80mm	Pt1000	0 - 10 V	250 mm	1101-2161-0059-810	299,16 €
RGTM2-U 300/80mm	Pt1000	0 - 10 V	300 mm	1101-2161-0069-810	302,98 €
RGTM2-U 400/80mm	Pt1000	0 - 10 V	400 mm	1101-2161-0089-810	304,26 €
Housing variant:	equipped as standard with pressure screw (IP 54), optional housing variants with cable gland (IP 65) or M12 connector (IP 65) see the next page!				
Extra charge:	other measuring ranges optional				25,40 €

Screw-in / smoke gas temperature measuring transducer,
with neck tube, calibratable, with multi-range switching
and active output

RGTM 2 - Q
with M12 connector
(IP 65)



THERMASGARD®		Screw-in / smoke gas temperature measuring transducer with neck tube				
RGTM 2 - Q		(with M12 connector)				
Type / WG01	Sensor	Output	Installation length (EL)	Q	Item No.	Price
RGTM 2-I xx Q				IP 65, I - variant		
RGTM2-I 100/80mm Q	Pt1000	4...20 mA	100 mm	●	2001-4141-2100-011	322,00 €
RGTM2-I 150/80mm Q	Pt1000	4...20 mA	150 mm	●	2001-4141-2100-021	327,10 €
RGTM2-I 200/80mm Q	Pt1000	4...20 mA	200 mm	●	2001-4141-2100-031	330,81 €
RGTM2-I 250/80mm Q	Pt1000	4...20 mA	250 mm	●	2001-4141-2100-041	341,08 €
RGTM2-I 300/80mm Q	Pt1000	4...20 mA	300 mm	●	2001-4141-2100-051	344,89 €
RGTM2-I 400/80mm Q	Pt1000	4...20 mA	400 mm	●	2001-4141-2100-061	346,19 €
RGTM 2-U xx Q				IP 65, U - variant		
RGTM2-U 100/80mm Q	Pt1000	0 - 10 V	100 mm	●	2001-4141-1100-011	322,00 €
RGTM2-U 150/80mm Q	Pt1000	0 - 10 V	150 mm	●	2001-4141-1100-021	327,10 €
RGTM2-U 200/80mm Q	Pt1000	0 - 10 V	200 mm	●	2001-4141-1100-031	330,81 €
RGTM2-U 250/80mm Q	Pt1000	0 - 10 V	250 mm	●	2001-4141-1100-041	341,08 €
RGTM2-U 300/80mm Q	Pt1000	0 - 10 V	300 mm	●	2001-4141-1100-051	344,89 €
RGTM2-U 400/80mm Q	Pt1000	0 - 10 V	400 mm	●	2001-4141-1100-061	346,19 €
Housing variant "Q":		Cable connection with M12 connector (male, 5-pin, A-code)				
Extra charge:		other measuring ranges optional				25,40 €

ACCESSORIES

Special accessories for M12 connector
see chapter Accessories!



S+S REGELTECHNIK

Screw-in / smoke gas temperature measuring transducer,
with neck tube, calibratable, with multi-range switching
and active output

RGTM 2 - KV
with cable gland
(IP 65)



THERMASGARD®		Screw-in / smoke gas temperature measuring transducer with neck tube (with cable gland)			
Type / WG01	Sensor	Output	Installation length (EL)	Item No.	Price
RGTM 2 - I xx KV				IP 65, I - variant	
RGTM2-I 100/80mm KV	Pt1000	4...20 mA	100 mm	1101-21D2-0029-810	289,51 €
RGTM2-I 150/80mm KV	Pt1000	4...20 mA	150 mm	1101-21D2-0039-810	294,59 €
RGTM2-I 200/80mm KV	Pt1000	4...20 mA	200 mm	1101-21D2-0049-810	297,14 €
RGTM2-I 250/80mm KV	Pt1000	4...20 mA	250 mm	1101-21D2-0059-810	308,61 €
RGTM2-I 300/80mm KV	Pt1000	4...20 mA	300 mm	1101-21D2-0069-810	312,42 €
RGTM2-I 400/80mm KV	Pt1000	4...20 mA	400 mm	1101-21D2-0089-810	313,69 €
RGTM 2 - U xx KV				IP 65, U - variant	
RGTM2-U 100/80mm KV	Pt1000	0 - 10 V	100 mm	1101-21D1-0029-810	289,51 €
RGTM2-U 150/80mm KV	Pt1000	0 - 10 V	150 mm	1101-21D1-0039-810	294,59 €
RGTM2-U 200/80mm KV	Pt1000	0 - 10 V	200 mm	1101-21D1-0049-810	297,14 €
RGTM2-U 250/80mm KV	Pt1000	0 - 10 V	250 mm	1101-21D1-0059-810	308,61 €
RGTM2-U 300/80mm KV	Pt1000	0 - 10 V	300 mm	1101-21D1-0069-810	312,42 €
RGTM2-U 400/80mm KV	Pt1000	0 - 10 V	400 mm	1101-21D1-0089-810	313,69 €
Housing variant "KV":		Cable connection with cable gland			
Extra charge:	other measuring ranges optional				25,40 €

Sleeve sensor with temperature measuring transducer, calibratable, with multi-range switching and active output

Calibratable temperature measuring transducer with sleeve sensor **THERMASGARD® HFTM** with eight switchable measuring ranges, continuous output, housing made from impact-resistant plastic with quick-release screws, optionally **with/without display**, with **cable gland** or **M12 connector** according to DIN EN 61076-2-101.

The temperature transmitter with remote sensor is used to detect temperatures in liquid and gaseous media e.g. if installed in an immersion sleeve or as a duct sensor. A direct, permanent use in liquids is possible in combination with immersion sleeves **THE** (see chapter Accessories).

The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

TECHNICAL DATA

Power supply:	24 V AC / DC (± 10%) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a \text{ (ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant, see working resistance diagram
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Sensor:	Pt1000, DIN EN 60751, class B (Perfect Sensor Protection at IP68) sensor external
Measuring ranges:	multi-range switching with 8 switchable measuring ranges see table (other measuring ranges optional) with manual zero point correction (± 10 K)
Deviation in temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Connection type:	2- or 3-wire connection
Electrical connection:	0.14 - 1.5 mm², via screw terminals
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector (male, 5-pin, A-code) according to DIN EN 61076-2-101
Housing:	plastic, UV-resistant, material polyamide, 30 % glass-globe reinforced, with quick-release screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016), cover for display is transparent!
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 without display) 72 x 64 x 43.3 mm (Tyr 1 with display)
Sensor protection:	sensor sleeve, stainless steel V4A (1.4571), Ø = 6 mm, nominal length NL = 50 mm (optional 30...400 mm)
Sensor cable:	Silicone, SiHF, 2x0.25mm²; cable length (KL) = 1.5m (other lengths and jacket materials, e.g. PTFE or glass fibre with steel mesh, available on request)
Ambient temperature:	measuring transducer -30...+70 °C
Permitted humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60730)
Protection type housing:	IP 65 (according to EN 60529) Housing tested, TÜV SÜD, Report No.713139052 (Tyr 1)
Protection type sensor:	IP 65 (according to EN 60529) sleeve humidity-tight (standard) IP 68 (according to EN 60529) sleeve water-tight (optional) IP 54 (according to EN 60529) with glass fibre cable (optional)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC Directive 2014 / 30 / EU
Optional:	display with illumination , two-line, cut-out approx. 36x15 mm (B x H), to display the actual temperature and internal diagnostics (measuring range exceeded, measuring range not reached, sensor breakage, sensor short circuit)

ACCESSORIES (see table)

HFTM
with cable gland

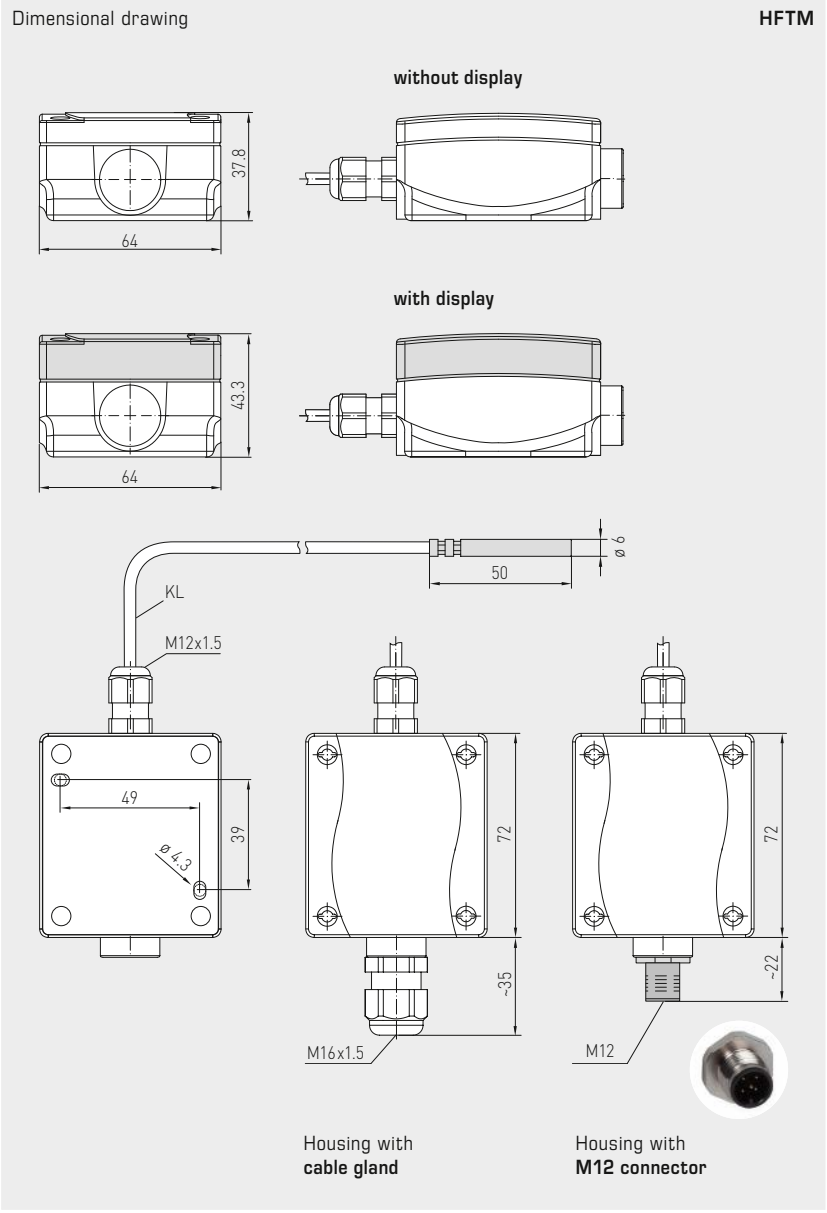


HFTM-Q
with M12 connector





Sleeve sensor with temperature measuring transducer, calibratable, with multi-range switching and active output



HFTM with cable gland and display



HFTM-Q with M12 connector and display



Display and internal diagnostics
THERMASGARD®
Measuring transducer with display

22.0°C Standard

93.8°C Measuring range exceeded

-18.4°C Measuring range not reached

9999°C Sensor breakage

-99.9°C Sensor short circuit



IP65 (standard) humidity-tight



IP68 (optional) water-tight Perfect Sensor Protection

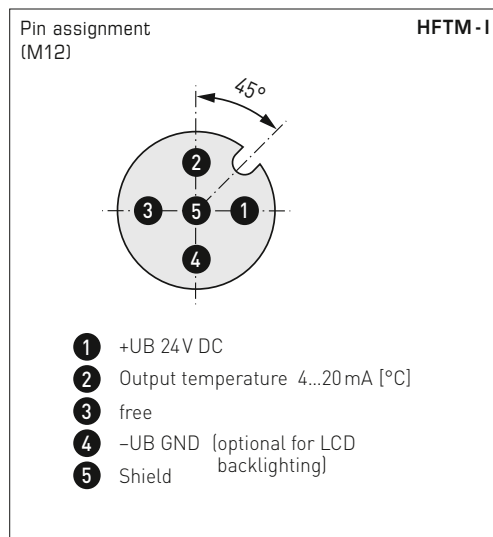
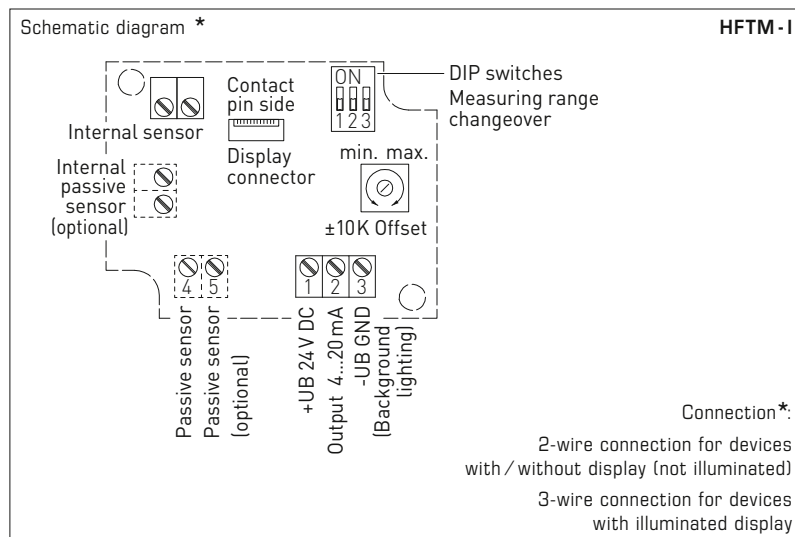
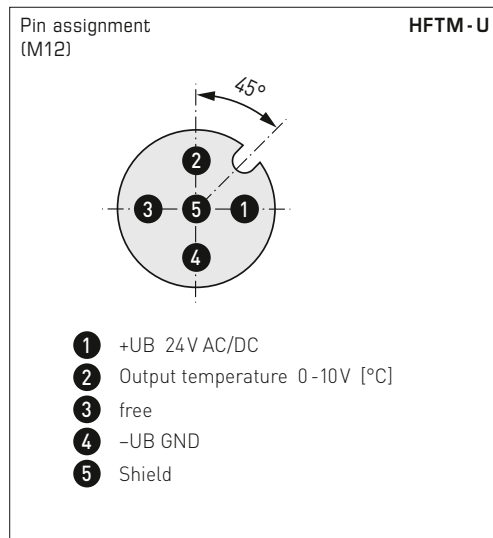
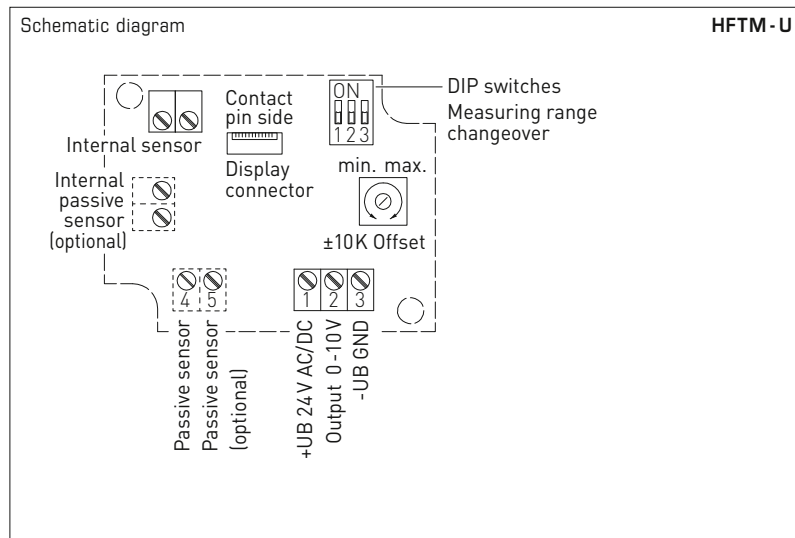


IP54 (optional) with glass fibre cable

High-performance encapsulation against vibration, mechanical stress and humidity

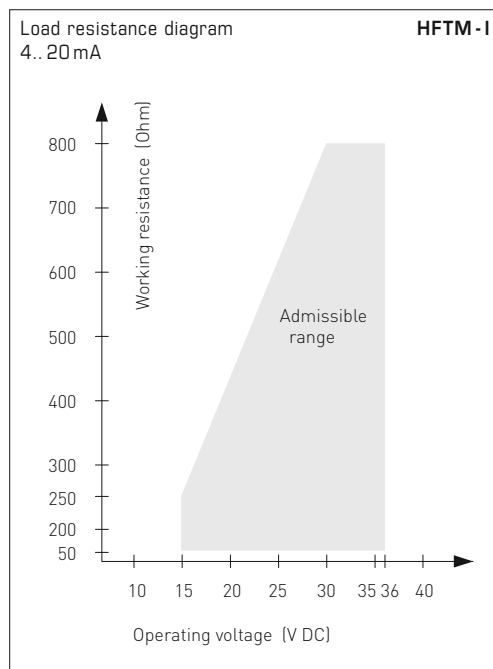
PS-PROTECTION PERFECT SENSOR PROTECTION

Sleeve sensor with temperature measuring transducer, calibratable, with multi-range switching and active output



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20... +150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0... +100 °C	ON	OFF	OFF
0... +150 °C	OFF	OFF	OFF

HFTM-xx
with display, hinged



Sleeve sensor with temperature measuring transducer, calibratable, with multi-range switching and active output

HFTM-Q
with M12 connector

HFTM
with cable gland

THERMASGARD® HFTM		Sleeve sensor with temperature measuring transducer (with cable gland)				
Type / WG01	Sensor	Output	Type	Display	Item No.	Price
HFTM						
HFTM-I	Pt1000	4...20 mA	Remote sensor		1101-1152-0219-920	104,51 €
HFTM-I LCD	Pt1000	4...20 mA	Remote sensor	■	1101-1152-2219-920	155,45 €
HFTM-U	Pt1000	0-10 V	Remote sensor		1101-1151-0219-920	104,51 €
HFTM-U LCD	Pt1000	0-10 V	Remote sensor	■	1101-1151-2219-920	155,45 €
Housing variant:	Cable connection with cable gland					
Extra charge:	other measuring ranges optional					25,40 €
	Protection type IP68 (Sensor sleeve watertight compound-filled)					3,40 €
	2-wire connecting leads, per running meter (silicone/PTFE/glass fibre)					on request
	Other lengths of protection sleeve optional					on request

THERMASGARD® HFTM-Q		Sleeve sensor with temperature measuring transducer (with M12 connector)				
Type / WG01I	Sensor	Output	Type	Display	Item No.	Price
HFTM-Q						
HFTM-I Q	Pt1000	4...20 mA	Remote sensor	●	2001-2111-2100-001	146,43 €
HFTM-I Q LCD	Pt1000	4...20 mA	Remote sensor	● ■	2001-2112-2100-001	197,36 €
HFTM-U Q	Pt1000	0-10 V	Remote sensor	●	2001-2111-1100-001	146,43 €
HFTM-U Q LCD	Pt1000	0-10 V	Remote sensor	● ■	2001-2112-1100-001	197,36 €
Housing variant "Q":	Cable connection with M12 connector (male, 5-pin, A-code)					
Extra charge:	see table above!					

ACCESSORIES	
THE-xx	Immersion sleeve , stainless steel V4A (1.4571) or nickel-plated brass, Ø = 9 mm see chapter Accessories!
	Special accessories for M12 connector see chapter Accessories!

**Sleeve sensor with temperature measuring transducer,
calibratable, with multi-range switching and
active output**

Calibratable temperature measuring transducer with sleeve sensor **THERMASGARD® HFTM - VA** with eight switchable measuring ranges, continuous output, rugged housing made from **stainless steel V4A** with **cable gland** or **M12 connector** according to DIN EN 61076-2-101.

The temperature transmitter with remote sensor is used to detect temperatures in liquid and gaseous media e.g. if installed in an immersion sleeve or as a duct sensor. The measuring transducer is factory-calibrated. Adjustment / fine adjustment by the user is possible (zero point offset is adjustable). A direct, permanent use in liquids is possible in combination with immersion sleeves **THE** (see chapter Accessories).

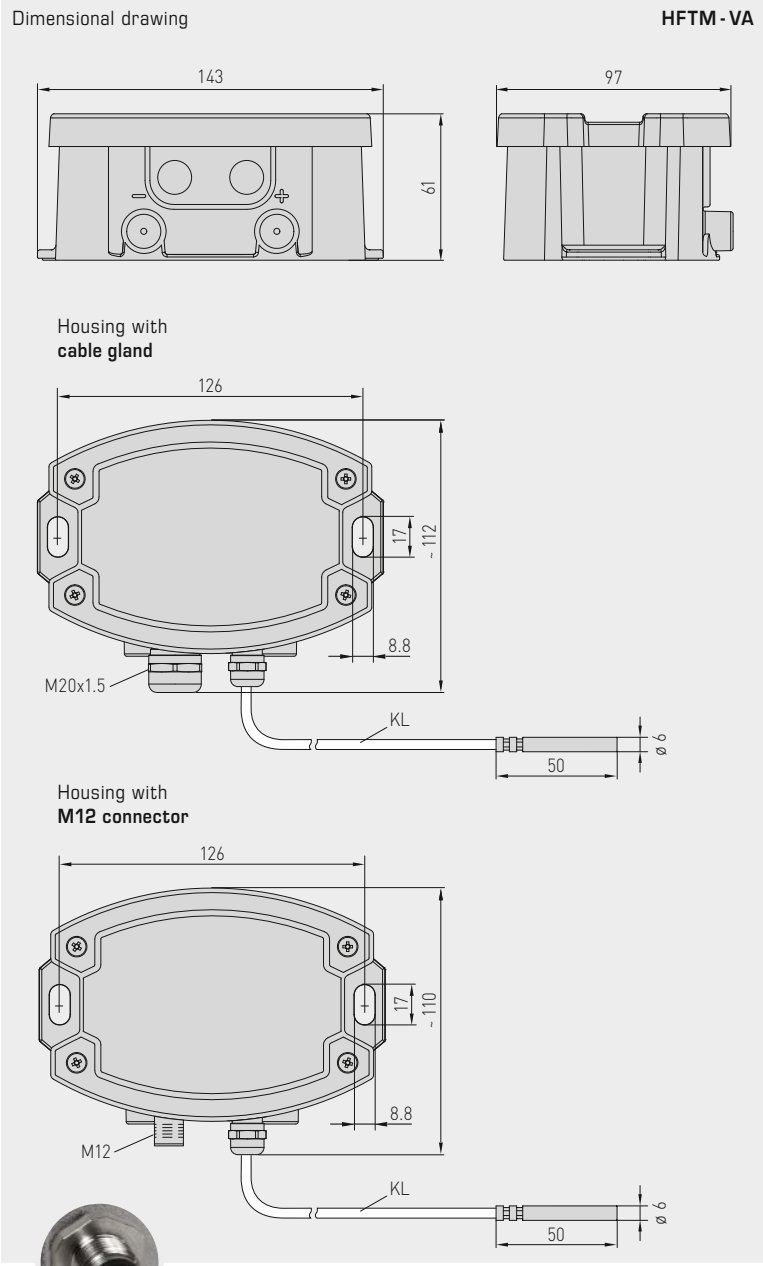
The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

TECHNICAL DATA

Power supply:	24 V AC / DC (± 10 %) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a \text{ (ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant, see working resistance diagram
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Sensor:	Pt1000, DIN EN 60751, class B (Perfect Sensor Protection with IP68) Sensor external
Measuring ranges:	multi-range switching with 8 switchable measuring ranges, see table (other ranges optional) with manual zero point correction (± 10 K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4... 20 mA
Connection type:	2-wire connection
Electrical connection:	0.14 - 1.5 mm ² , via screw terminals
Cable connection:	cable gland, stainless steel V2A (1.4305) (M20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) or M12 connector (male, 5-pin, A-code) according to DIN EN 61076-2-101
Housing:	stainless steel V4A (1.4571), with non-distortion cover bolting, impact-resistant, high EMI shielding, corrosion, temperature, weather- and UV-resistant
Housing dimensions:	143 x 97 x 61 mm (Tyr 2E)
Sensor protection:	sensor sleeve, stainless steel V4A (1.4571), Ø = 6 mm, nominal length NL = 50 mm (optional 30...400 mm)
Sensor cable:	Silicone, SiHF, 2x0.25mm ² ; cable length (KL) = 1.5m (other lengths and jacket materials, e.g. PTFE or glass fibre with steel mesh, available on request)
Ambient temperature:	measuring transducer -30...+70 °C
Permitted humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60730)
Protection type housing:	IP 65 (according to EN 60529) Housing tested, TÜV SÜD, Report No. 713160960B (Skadi2)
Protection type sensor:	IP 65 (according to EN 60529) sleeve humidity-tight (standard) IP 68 (according to EN 60529) sleeve water-tight (optional) IP 54 (according to EN 60529) with glass fibre cable (optional)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC Directive 2014 / 30 / EU
ACCESSORIES	(see table)



Sleeve sensor with temperature measuring transducer, calibratable, with multi-range switching and active output



HFTM - VA with cable gland



HFTM - VAQ with M12 connector



M12 connector (male)



IP65 (standard) humidity-tight



IP68 (optional) water-tight Perfect Sensor Protection

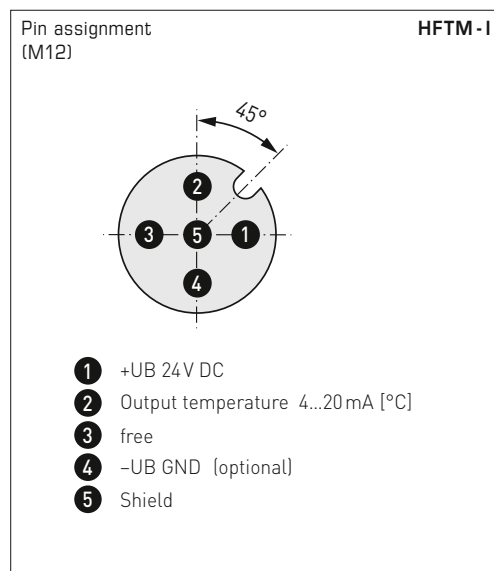
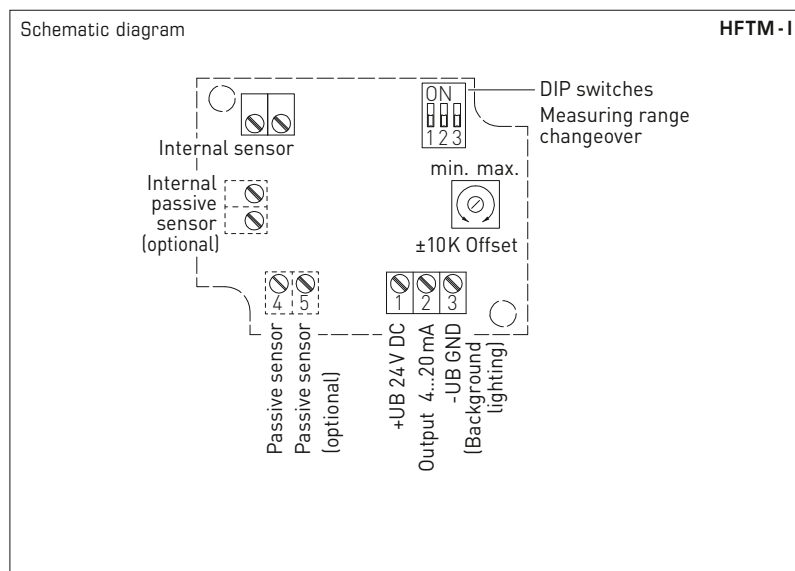
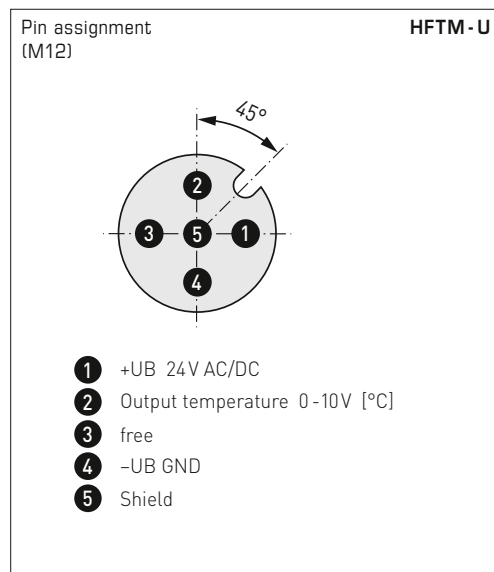
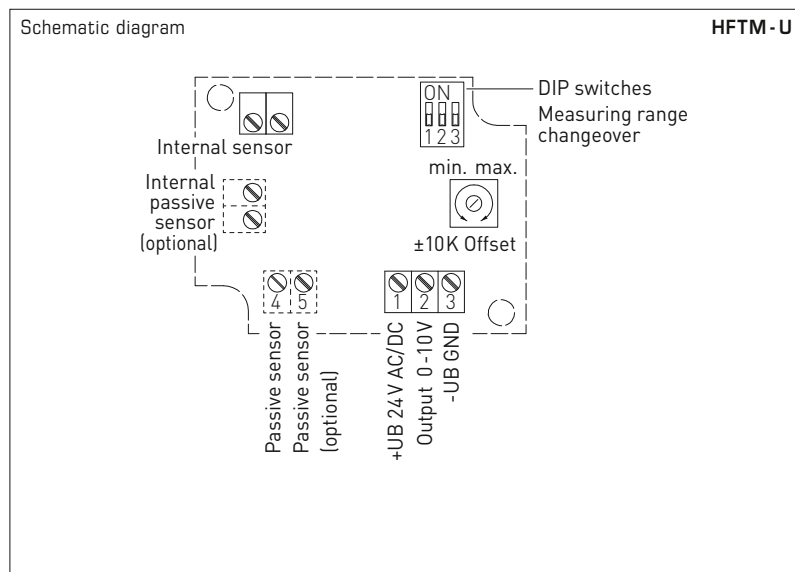


IP54 (optional) with glass fibre cable

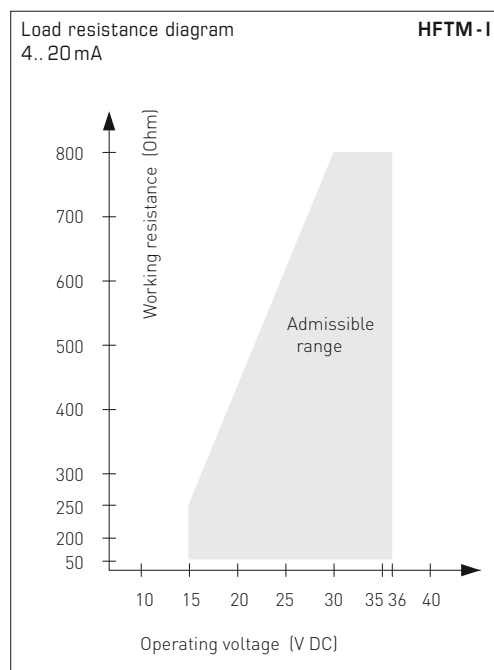
High-performance encapsulation against vibration, mechanical stress and humidity



Sleeve sensor with temperature measuring transducer, calibratable, with multi-range switching and active output



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20...+ 150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0...+100 °C	ON	OFF	OFF
0...+150 °C	OFF	OFF	OFF





Sleeve sensor with temperature measuring transducer, calibratable, with multi-range switching and active output

HFTM - VAQ
with M12 connector

HFTM - VA
with cable gland



THERMASGARD® HFTM - VA		Sleeve sensor with temperature measuring transducer, ID (Stainless steel housing with cable gland)			
Type / WG02I	Sensor	Output	Type	Item No.	Price
HFTM - VA					
HFTM-I VA	Pt1000	4...20 mA	Remote sensor	2001-2141-2200-001	383,32 €
HFTM-U VA	Pt1000	0-10 V	Remote sensor	2001-2141-1200-001	383,32 €
Housing variant:	Cable connection with cable gland				
Extra charge:	other measuring ranges optional				25,40 €
	Protection type IP68 (Sensor sleeve watertight compound-filled)				3,40 €
	2-wire connecting leads, per running meter (silicone/PTFE/glass fibre)				on request
	Other lengths of protection sleeve optional				on request

THERMASGARD® HFTM - VAQ		Sleeve sensor with temperature measuring transducer, ID (Stainless steel housing with M12 connector)			
Type / WG01I	Sensor	Output	Type	● = Q Item No.	Price
HFTM - VAQ					
HFTM-I VAQ	Pt1000	4...20 mA	Remote sensor	● 2001-2141-2100-001	421,87 €
HFTM-U VAQ	Pt1000	0-10 V	Remote sensor	● 2001-2141-1100-001	421,87 €
Housing variant "Q":	Cable connection with M12 connector (male, 5-pin, A-code)				
Extra charge:	see table above!				

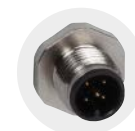
ACCESSORIES	
THE-xx	Immersion sleeve , stainless steel V4A (1.4571) or nickel-plated brass, Ø = 9 mm see chapter Accessories!
	Special accessories for M12 connector see chapter Accessories!

Surface contact / tube contact temperature measuring transducers, including strap, compact variant, calibratable, with multi-range switching and active output

ALTM 1

Calibratable surface-contact temperature measuring transducer (compact variant) **THERMASGARD® ALTM 1** with eight switchable measuring ranges, continuous output, in an impact-resistant plastic housing with quick-locking screws, optionally with /without display, incl. strap.

The surface-contact sensor is used to detect the temperature on lines, pipes (e.g., cold and warm water) or on heating sections for heating control. The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

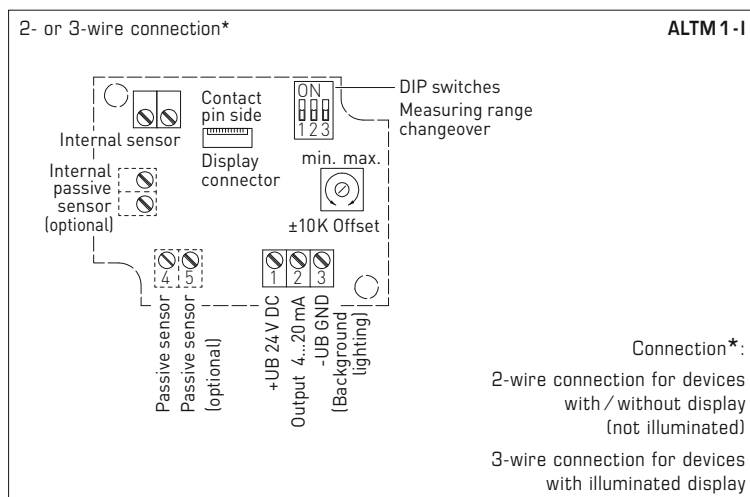
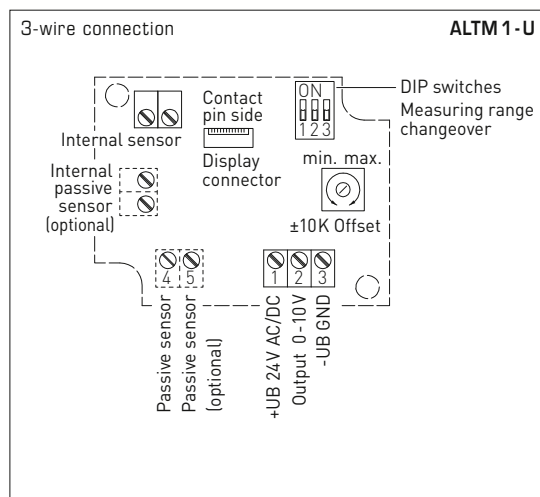
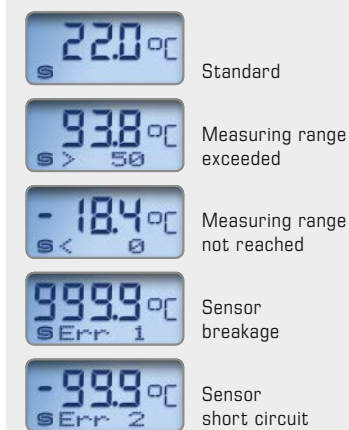


M12 connector
(optional on request)

TECHNICAL DATA

Power supply:	24 V AC / DC (± 10%) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a(\text{ohm}) = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Sensor:	Pt1000, DIN EN 60751, class B (Perfect Sensor Protection)
Measuring ranges:	multi-range switching with 8 switchable measuring ranges, see table (other ranges optional) compact variant: T_{max} up to +100 °C , operating range -50...+100 °C with manual zero point correction (± 10 K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Connection type:	2- or 3-wire connection
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016), housing cover for display is transparent!
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 without display) 72 x 64 x 43.3 mm (Tyr 1 with display)
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (optional on request)
Electrical connection:	0.14 - 1.5 mm ² via terminal screws
Process connection:	endless strap with metal tightener, (included in the scope of delivery) Ø = 13 - 92 mm (1/4 - 3"), length L = 300 mm
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Ambient temperature:	measuring transducer -30...+70 °C
Humidity:	< 95% RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP65 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC directive 2014 / 30 / EU
Optional:	Two-line display with illumination , cutout approx. 36 x 15 mm (W x H), for displaying the ACTUAL temperature and the internal diagnostics (measuring range exceeded, measuring range not reached, sensor breakage, sensor short circuit)

Display and internal diagnostics
THERMASGARD®
Measuring transducer with display





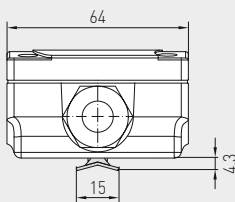
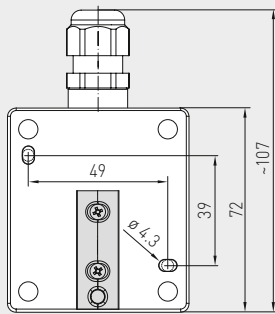
S+S REGELTECHNIK

THERMASGARD® ALTM 1

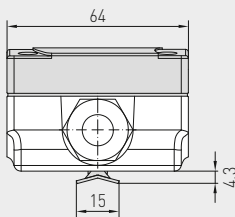
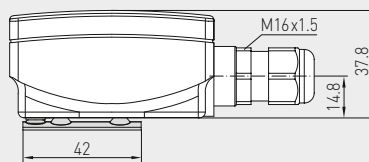
Surface contact / tube contact temperature measuring transducers, including strap, compact variant, calibratable, with multi-range switching and active output

Dimensional drawing

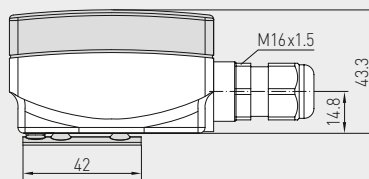
ALTM 1



without display



with display



ALTM 1
with display

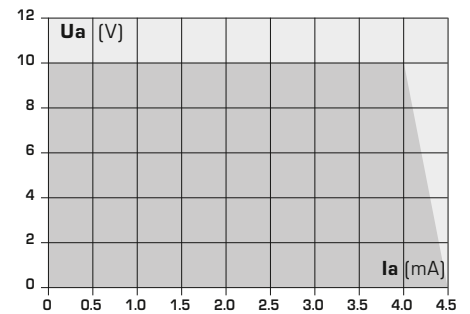


High-performance encapsulation against vibration, mechanical stress and humidity

PS-PROTECTION
PERFECT SENSOR PROTECTION

Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20... +150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0... +100 °C	ON	OFF	OFF
0... +150 °C	OFF	OFF	OFF

Dependency of output voltage on output current



THERMASGARD® ALTM 1 Surface contact / tube contact temperature measuring transducers (compact)						
Type / WG01	Sensor	Output	Type	Display	Item No.	Price
ALTM 1-I					IP65, I-variant	
ALTM1-I	Pt1000	4...20 mA	Compact		1101-1112-0219-920	105,03 €
ALTM1-I LCD	Pt1000	4...20 mA	Compact	■	1101-1112-2219-920	155,96 €
ALTM 1-U					IP65, U-variant	
ALTM1-U	Pt1000	0-10 V	Compact		1101-1111-0219-920	105,03 €
ALTM1-U LCD	Pt1000	0-10 V	Compact	■	1101-1111-2219-920	155,96 €
Extra charge:	Other ranges optional Cable connection with M12 connector according to DIN EN 61076-2-101					25,40 € on request

ACCESSORIES			
WLP-1	Heat-conductive paste, silicone-free	7100-0060-1000-000	3,38 €

Surface contact / tube contact temperature measuring transducers, incl. strap, with detached sensor head, calibratable, with multi-range switching and active output

Calibratable tube contact temperature measuring transducer **THERMASGARD® ALTM 2** with eight switchable, measuring ranges, external sensor, continuous output, housing made from impact-resistant plastic with quick-release screws, optionally **with/without display**, with **cable gland** or **M12 connector** according to DIN EN 61076-2-101.

The surface-contact sensor is used for temperature detection on lines, pipes (e.g. cold and hot water) or on heating sections for heating system control.

The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

ALTM 2
with cable gland



ALTM 2-Q
with M12 connector



TECHNICAL DATA

Power supply:	24 V AC / DC (± 10%) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a \text{ (ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant, see working resistance diagram
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Sensor:	Pt1000, DIN EN 60751, class B (Perfect Sensor Protection at IP68) sensor external
Measuring ranges:	multi-range switching with 8 switchable measuring ranges see table (other measuring ranges optional) T_{max} above +100 °C , operating range -50...+150 °C with manual zero point correction (± 10 K)
Deviation in temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Connection type:	2- or 3-wire connection
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector (male, 5-pin, A-code) according to DIN EN 61076-2-101
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, with quick-release screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016), cover for display is transparent!
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 without display) 72 x 64 x 43.3 mm (Tyr 1 with display)
Sensor cable:	Silicone, SiHF, 2 x 0,25 mm ² ; cable length (KL) = 1.5m (other lengths and jacket materials, e.g. PTFE or glass fibre with steel mesh, available on request)
Sensor protection:	pipe feeder made of stainless steel V4A (1.4571), Ø = 6 mm, L = 50 mm
Electrical connection:	0.14 - 1.5 mm ² , via screw terminals
Process connection:	endless strap with metal tightener (included in the scope of delivery) Ø = 13 - 92 mm (1/4 - 3"), L = 300 mm
Ambient temperature:	measuring transducer -30...+70 °C
Permitted humidity:	< 95% RH, non-precipitating air
Protection class:	III (according to EN 60730)
Protection type housing:	IP 65 (according to EN 60529) Housing tested, TÜV SÜD, Report No.713139052 (Tyr 1)
Protection type sensor:	IP 65 (according to EN 60529) sleeve humidity-tight (standard) IP 68 (according to EN 60529) sleeve water-tight (optional)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC Directive 2014 / 30 / EU
Optional:	display with illumination , two-line, cut-out approx. 36x15 mm (B x H), to display the actual temperature and internal diagnostics (measuring range exceeded, measuring range not reached, sensor breakage, sensor short circuit)
ACCESSORIES	(see table)



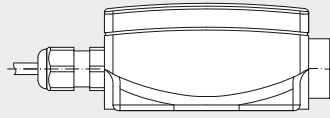
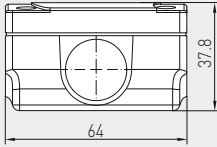
Surface contact / tube contact temperature measuring transducers, incl. strap, with detached sensor head, calibratable, with multi-range switching and active output



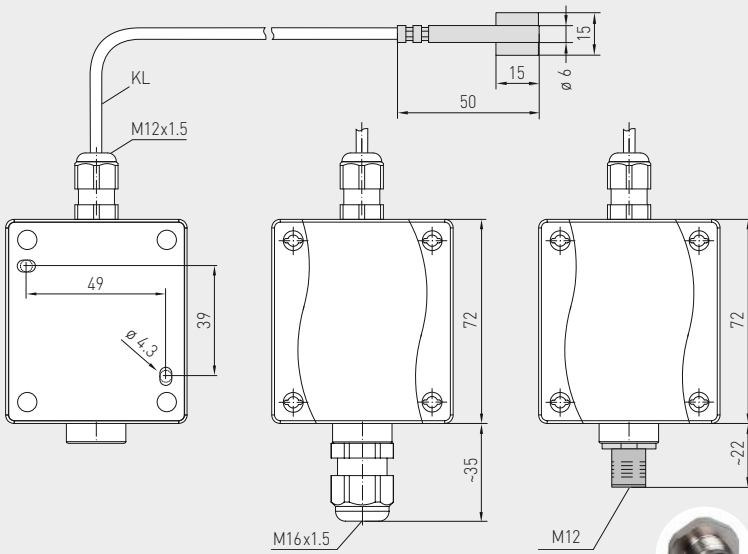
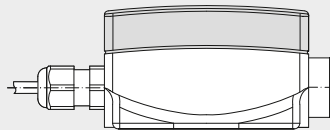
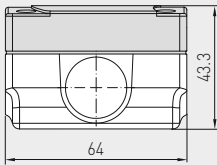
Dimensional drawing

ALTM 2

without display



with display



Housing with cable gland

Housing with M12 connector

ALTM 2 with cable gland and display



ALTM 2-Q with M12 connector and display



Display and internal diagnostics

THERMASGARD® Measuring transducer with display



Standard



Measuring range exceeded



Measuring range not reached



Sensor breakage



Sensor short circuit



IP65 (standard) humidity-tight

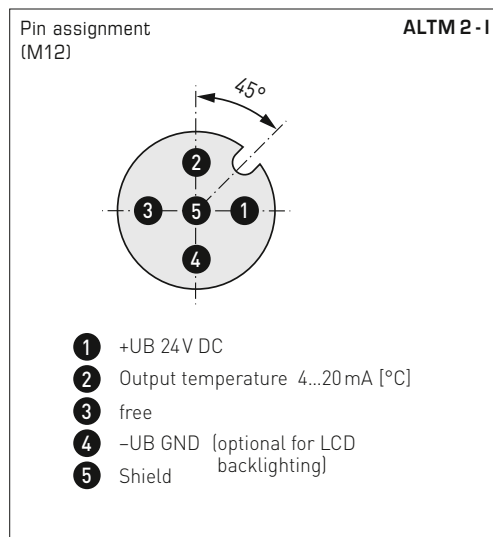
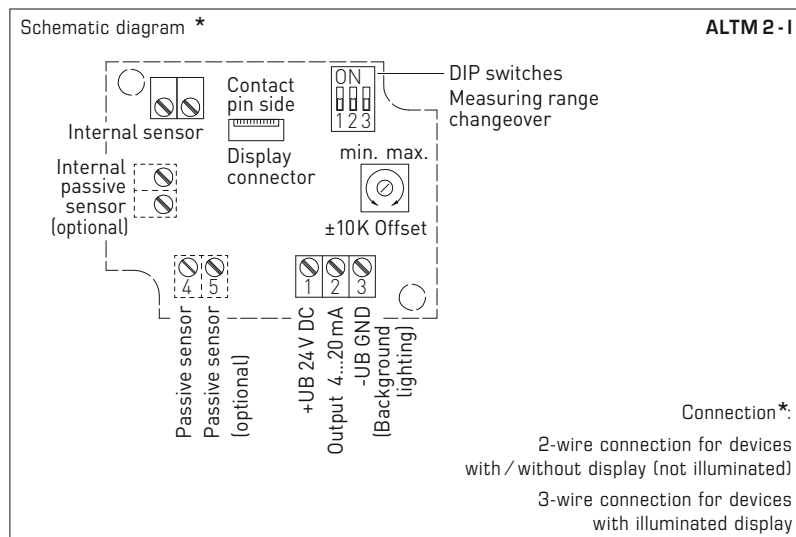
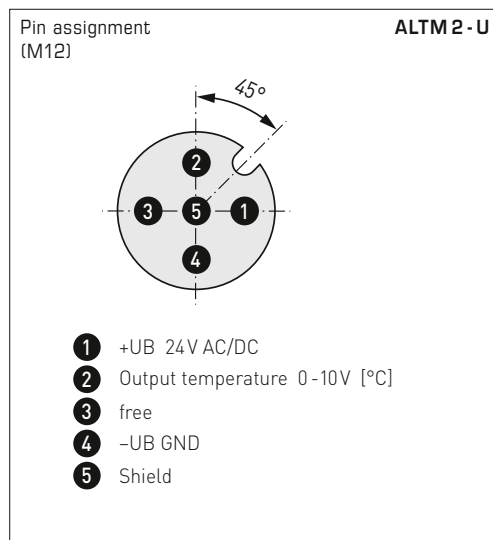
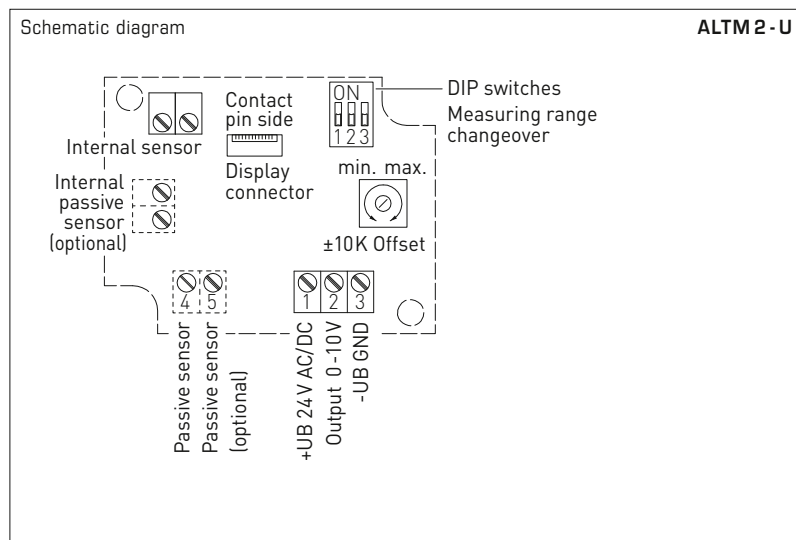


IP68 (optional) water-tight Perfect Sensor Protection

* High-performance encapsulation against vibration, mechanical stress and humidity

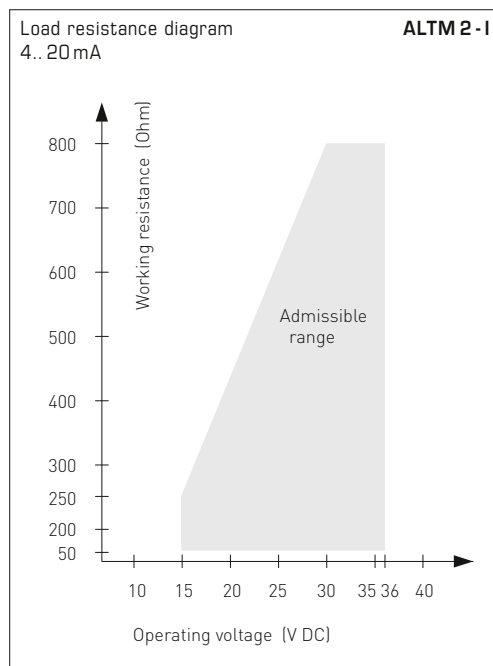


Surface contact / tube contact temperature measuring transducers, incl. strap, with detached sensor head, calibratable, with multi-range switching and active output



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20... +150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0... +100 °C	ON	OFF	OFF
0... +150 °C	OFF	OFF	OFF

ALTM 2-xx
with display, hinged





S+S REGELTECHNIK

Surface contact / tube contact temperature measuring transducers,
incl. strap, with detached sensor head, calibratable,
with multi-range switching and active output

ALTM 2 - Q
with M12 connector



ALTM 2
with cable gland

THERMASGARD® ALTM 2		Surface contact / tube contact temperature measuring transducers (with cable gland)				
Type / WG01	Sensor	Output	Type	Display	Item No.	Price
ALTM 2						
ALTM2-I	Pt1000	4...20 mA	Remote sensor		1101-1122-0219-920	112,02 €
ALTM2-I LCD	Pt1000	4...20 mA	Remote sensor	■	1101-1122-2219-920	162,96 €
ALTM2-U	Pt1000	0-10 V	Remote sensor		1101-1121-0219-920	112,02 €
ALTM2-U LCD	Pt1000	0-10 V	Remote sensor	■	1101-1121-2219-920	162,96 €
Housing variant:	Cable connection with cable gland					
Extra charge:	other measuring ranges optional					25,40 €
	Protection type IP68 (Sensor sleeve watertight compound-filled)					3,40 €
	2-wire connecting leads, per running meter (silicone / PTFE / glass fibre)					on request

THERMASGARD® ALTM 2 - Q		Surface contact / tube contact temperature measuring transducers (with M12 connector)				
Type / WG01	Sensor	Output	Type	Display ● = Q	Item No.	Price
ALTM 2 - Q						
ALTM2-I Q	Pt1000	4...20 mA	Remote sensor	●	2001-2121-2100-001	153,95 €
ALTM2-I Q LCD	Pt1000	4...20 mA	Remote sensor	● ■	2001-2122-2100-001	204,87 €
ALTM2-U Q	Pt1000	0-10 V	Remote sensor	●	2001-2121-1100-001	153,95 €
ALTM2-U Q LCD	Pt1000	0-10 V	Remote sensor	● ■	2001-2122-1100-001	204,87 €
Housing variant "Q":	Cable connection with M12 connector (male, 5-pin, A-code)					
Extra charge:	see table above!					

ACCESSORIES			
WLP-1	Heat-conductive paste, silicone-free		7100-0060-1000-000 3,38 €
Special accessories for M12 connector see chapter Accessories!			

**Surface contact / tube contact temperature measuring transducers,
incl. strap, with detached sensor head, calibratable,
with multi-range switching and active output**

Calibratable tube contact temperature measuring transducer **THERMASGARD® ALTM 2 - VA** with eight switchable measuring ranges, external sensor, continuous output, rugged housing made from **stainless steel V4A**, with **cable gland** or **M12 connector** according to DIN EN 61076-2-101.

The surface-contact sensor is used for temperature detection on lines, pipes (e.g. cold and hot water) or on heating sections for heating system control.

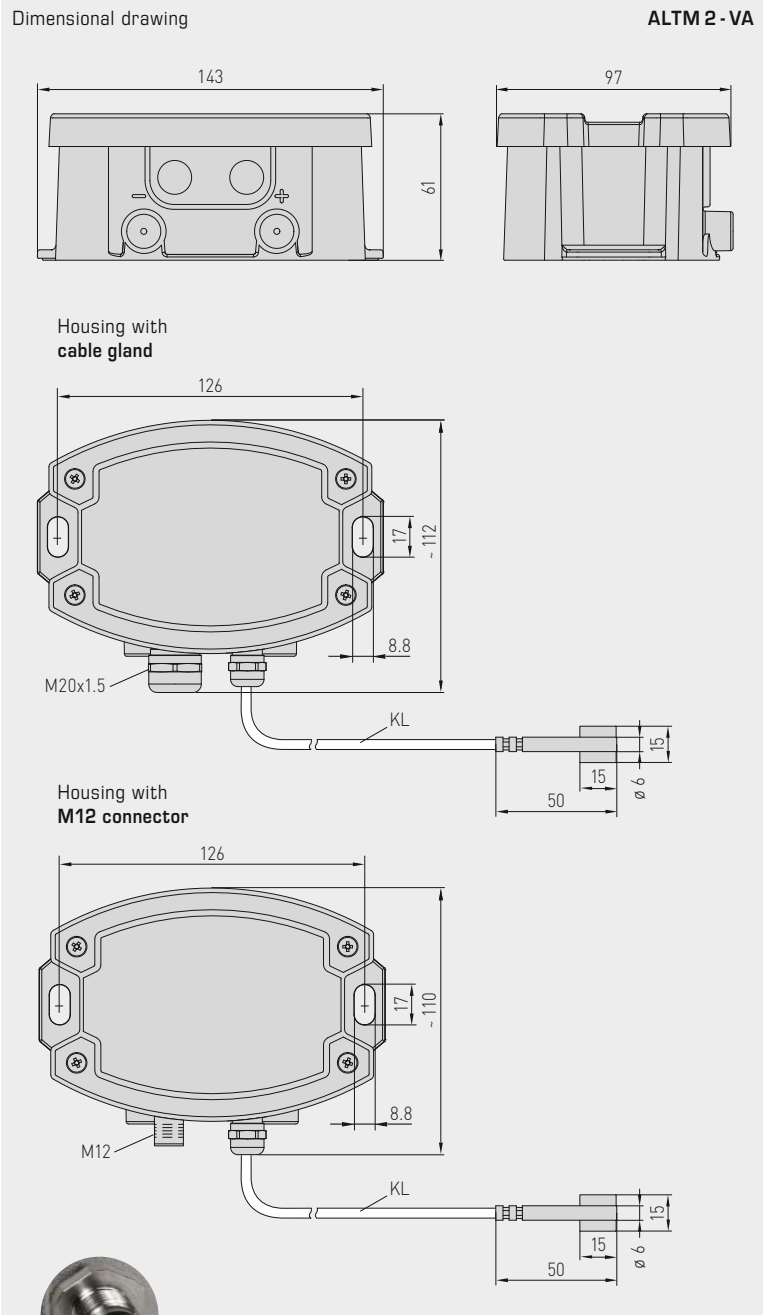
The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

TECHNICAL DATA

Power supply:	24 V AC / DC (± 10 %) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a \text{ (ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant, see working resistance diagram
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Sensor:	Pt1000, DIN EN 60751, class B (Perfect Sensor Protection with IP68) Sensor external
Measuring ranges:	multi-range switching with 8 switchable measuring ranges see table (other ranges optional) T_{max} above +100 °C , operating range -50...+150 °C with manual zero point correction (± 10 K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4... 20 mA
Connection type:	2-wire connection
Cable connection:	cable gland, stainless steel V2A (1.4305) (M20 x 1.5; with strain relief, exchangeable, inner diameter 6 - 12 mm) or M12 connector (male, 5-pin, A-code) according to DIN EN 61076-2-101
Housing:	stainless steel V4A (1.4571), with non-distortion cover bolting, impact-resistant, high EMI shielding, corrosion, temperature, weather- and UV-resistant
Housing dimensions:	143 x 97 x 61 mm (Tyr 2E)
Sensor cable:	Silicone, SiHF, 2 x 0,25 mm ² ; cable length (KL) = 1.5m (other lengths and jacket materials, e.g. PTFE or glass fibre with steel mesh, available on request)
Sensor protection:	pipe feeder, made of stainless steel V4A (1.4571), Ø = 6 mm, L = 50 mm
Electrical connection:	0.14 - 1.5 mm ² , via screw terminals
Process connection:	endless strap with metal tightener (included in the scope of delivery) Ø = 13 - 92 mm (1/4 - 3"), L = 300 mm
Ambient temperature:	measuring transducer -30...+70 °C
Permitted humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type housing:	IP 65 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713160960B (Skadi2)
Protection type sensor:	IP 65 (according to EN 60 529) sleeve humidity-tight (standard) IP 68 (according to EN 60 529) sleeve water-tight (optional)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC Directive 2014 / 30 / EU
ACCESSORIES	(see table)



Surface contact / tube contact temperature measuring transducers, incl. strap, with detached sensor head, calibratable, with multi-range switching and active output



ALTM 2 - VA
with cable gland



ALTM 2 - VAQ
with M12 connector



M12 connector
(male)



IP65 (standard)
humidity-tight

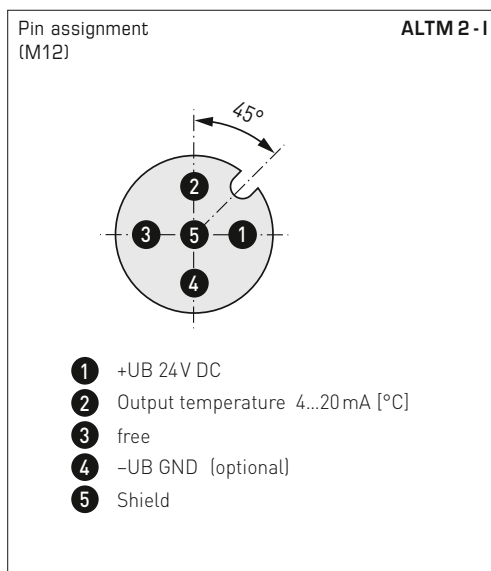
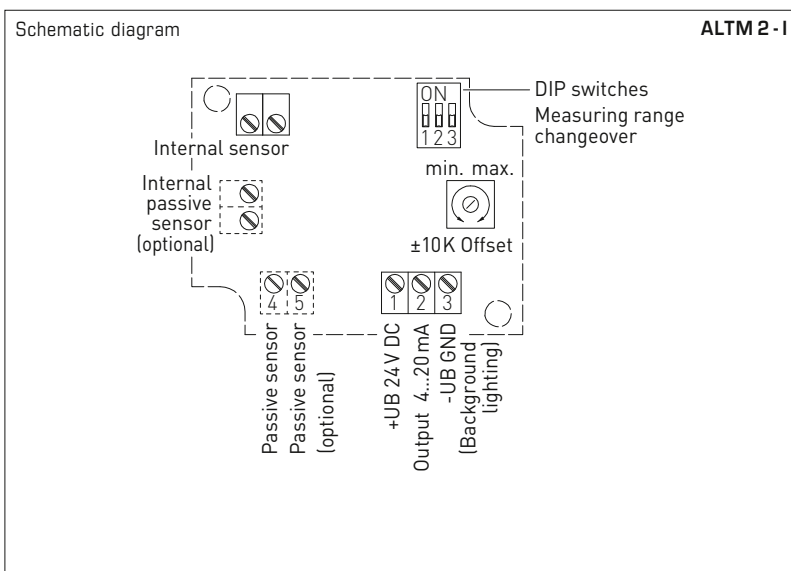
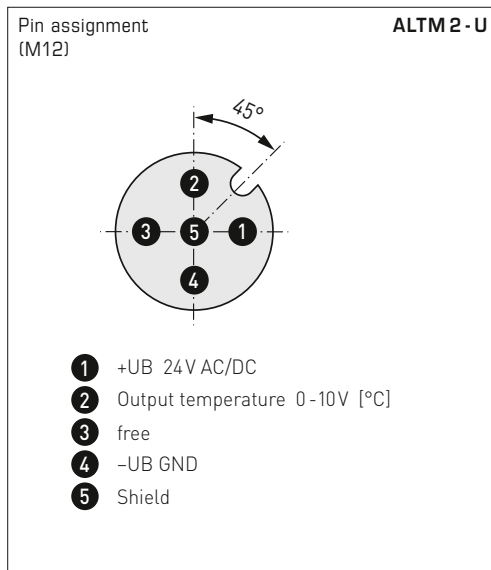
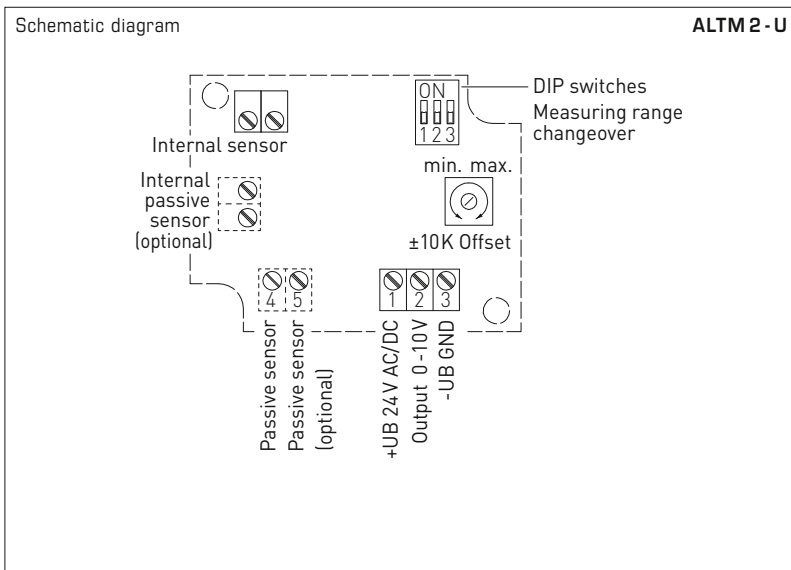


IP68 (optional)
water-tight
Perfect Sensor Protection

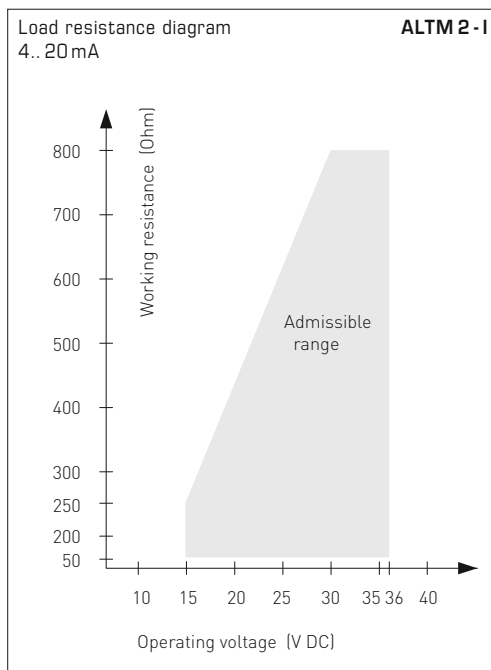
High-performance encapsulation against vibration, mechanical stress and humidity



Surface contact / tube contact temperature measuring transducers, incl. strap, with detached sensor head, calibratable, with multi-range switching and active output



Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20...+ 150 °C	ON	ON	ON
-50... + 50 °C	OFF	ON	ON
-20... + 80 °C	ON	OFF	ON
-30... + 60 °C	OFF	OFF	ON
0... + 40 °C	ON	ON	OFF
0... + 50 °C (default)	OFF	ON	OFF
0...+ 100 °C	ON	OFF	OFF
0...+ 150 °C	OFF	OFF	OFF





S+S REGELTECHNIK

Surface contact / tube contact temperature measuring transducers,
incl. strap, with detached sensor head, calibratable,
with multi-range switching and active output

ALTM 2 - VAQ
with M12 connector



ALTM 2 - VA
with cable gland



THERMASGARD® ALTM 2 - VA					
Surface contact / tube contact temperature measuring transducers, <i>ID</i> (Stainless steel housing with cable gland)					
Type / WG02I	Sensor	Output	Type	Item No.	Price
ALTM 2 - VA					
ALTM2-I VA	Pt1000	4...20 mA	Remote sensor	2001-2151-2200-001	394,61 €
ALTM2-U VA	Pt1000	0-10 V	Remote sensor	2001-2151-1200-001	394,61 €
Housing variant:	Cable connection with cable gland				
Extra charge:	other measuring ranges optional Protection type IP68 (Sensor sleeve watertight compound-filled) 2-wire connecting leads, per running meter (silicone / PTFE / glass fibre)				25,40 € 3,40 € on request

THERMASGARD® ALTM 2 - VAQ						
Surface contact / tube contact temperature measuring transducers, <i>ID</i> (Stainless steel housing with M12 connector)						
Type / WG02I	Sensor	Output	Type	● = Q	Item No.	Price
ALTM 2 - VAQ						
ALTM2-I VAQ	Pt1000	4...20 mA	Remote sensor	●	2001-2151-2100-001	433,15 €
ALTM2-U VAQ	Pt1000	0-10 V	Remote sensor	●	2001-2151-1100-001	204,87 €
Housing variant "Q":	Cable connection with M12 connector (male, 5-pin, A-code)					
Extra charge:	see table above!					

ACCESSORIES

Special accessories for M12 connector
see chapter Accessories!

Pendulum room temperature measuring transducers, calibratable, with multi-range switching and active output

Calibratable room pendulum temperature measuring transducer (with sleeve) **THERMASGARD® RPTM 1** with eight switchable measuring ranges, continuous output, in an impact-resistant plastic housing with quick-locking screws, optionally with/without display, cable sensor with stainless steel sleeve and plastic sinter filter (exchangeable).

The pendulum sensor has been specially designed to detect the temperature in larger rooms or halls. The resistance thermometer achieves a very good representative measurement result due to its positioning in the room. The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

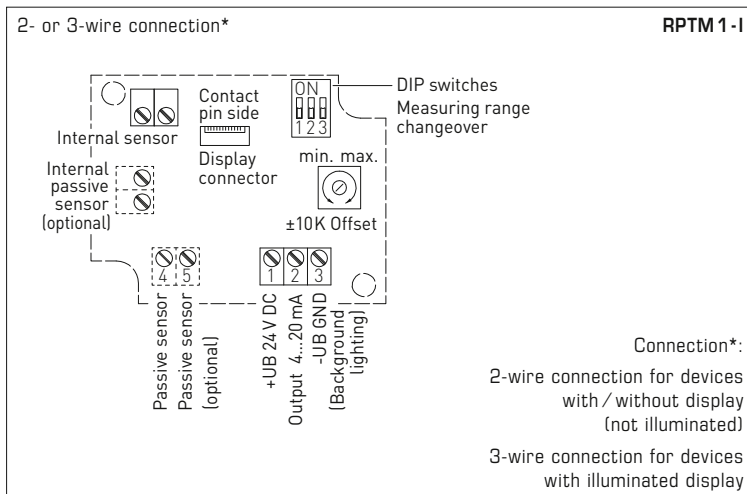
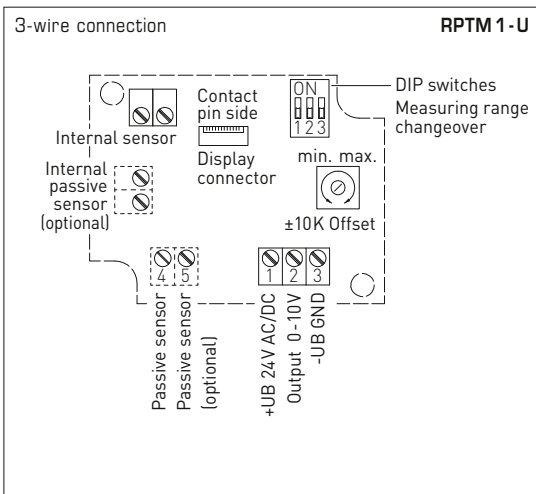
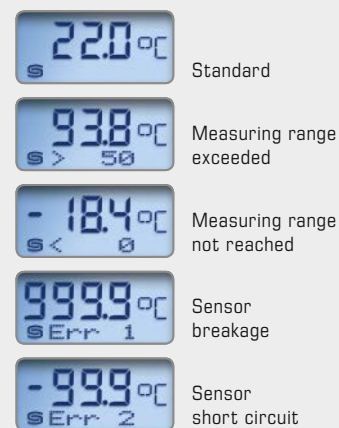
RPTM 1



TECHNICAL DATA

Power supply:	24 V AC / DC (± 10%) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a(\text{ohm}) = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Sensor:	Pt1000, DIN EN 60751, class B
Sensor protection:	plastic sinter filter, Ø 16 mm, L = 35 mm, exchangeable (optional metal sinter filter, Ø 16 mm, L = 32 mm)
Measuring ranges:	multi-range switching with 8 switchable measuring ranges see table (other ranges optional) T_{min} -5 °C, T_{max} +60 °C, with manual zero point correction (± 10 K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Ambient temperature:	measuring transducer -5...+60 °C
Connection type:	2- or 3-wire connection
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016), housing cover for display is transparent!
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 without display) 72 x 64 x 43.3 mm (Tyr 1 with display)
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (on request)
Electrical connection:	0.14 - 1.5 mm ² , via terminal screws
Connection cable:	PVC, H03VV-F, 2 x 0.5 mm ² , KL = approx. 1.5 m (other lengths optional)
Protective tube:	stainless steel V2A (1.4301), Ø = 16 mm, NL = 142 mm
Humidity:	< 95% RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 67 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1) IP 65 (according to EN 60 529) Pendulum with sleeve
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC directive 2014 / 30 / EU
Optional:	Two-line display with illumination , cutout approx. 36 x 15 mm (W x H), for displaying the ACTUAL temperature and the internal diagnostics (measuring range exceeded, measuring range not reached, sensor breakage, sensor short circuit)

Display and internal diagnostics
THERMASGARD®
Measuring transducer with display





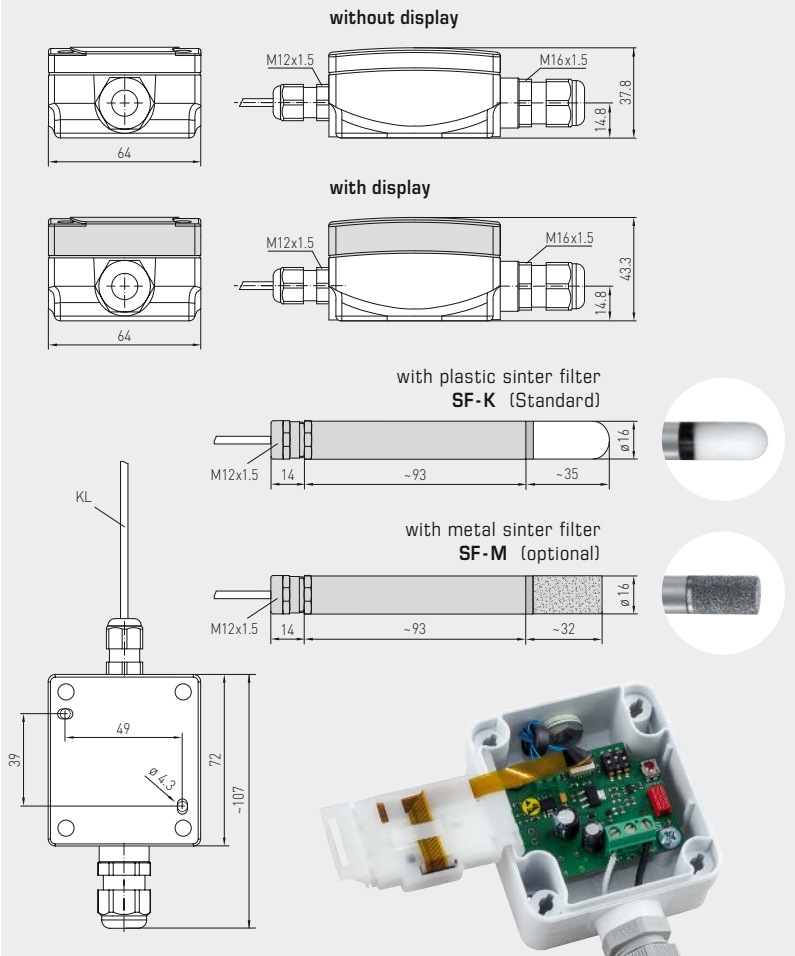
S+S REGELTECHNIK

THERMASGARD® RPTM 1

Pendulum room temperature measuring transducers, calibratable, with multi-range switching and active output

Dimensional drawing

RPTM 1



RPTM 1
with display

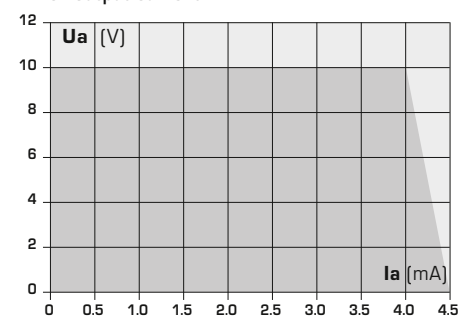
M12 connector
(optional on request)



Measuring ranges [adjustable]	DIP 1	DIP 2	DIP 3
-20...+150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0...+100 °C	ON	OFF	OFF
0...+150 °C	OFF	OFF	OFF

[observe max. permissible temperature ranges!]

Dependency of output voltage on output current



THERMASGARD® RPTM 1 Pendulum room temperature measuring transducer (with stainless steel sleeve)					
Type / WG01	Sensor	Output	Type	Item No.	Price
RPTM 1-I					
RPTM1-I	Pt1000	4...20 mA	Remote sensor	1101-1162-0219-910	151,76 €
RPTM 1-U					
RPTM1-U	Pt1000	0-10 V	Remote sensor	1101-1161-0219-910	151,76 €
Extra charge:	Other ranges optional				25,40 €
	Two-line display with illumination				49,83 €
	2-wire connecting leads, per running meter (PVC)				on request
	Cable connection with M12 connector according to DIN EN 61076-2-101				on request
ACCESSOIRES					
SF-M	Metal sinter filter, Ø 16 mm, L = 32 mm, exchangeable, stainless steel V4A (1.4404)			7000-0050-2200-100	42,33 €

Pendulum room temperature measuring transducers, calibratable, with multi-range switching and active output

RPTM 2

Calibratable room pendulum temperature measuring transducer (with globe) **THERMASGARD® RPTM 2** with eight switchable measuring ranges, continuous output in an impact-resistant plastic housing with quick-locking screws, optionally with/without display, cable sensor with a black plastic globe.

The pendulum sensor has been specially designed to detect the temperature in larger rooms or halls. The resistance thermometer (globe thermometer) achieves a very good, representative measurement result due to its positioning in the room. The dark radiation sensor determines the effective radiation heat at the measured location. This is relevant for calculating the thermal comfort (operative room temperature) taking into account the co-action of thermal radiation and thermal convection. The ratio of globe temperature / air temperature is approx. 70% / 30%. The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

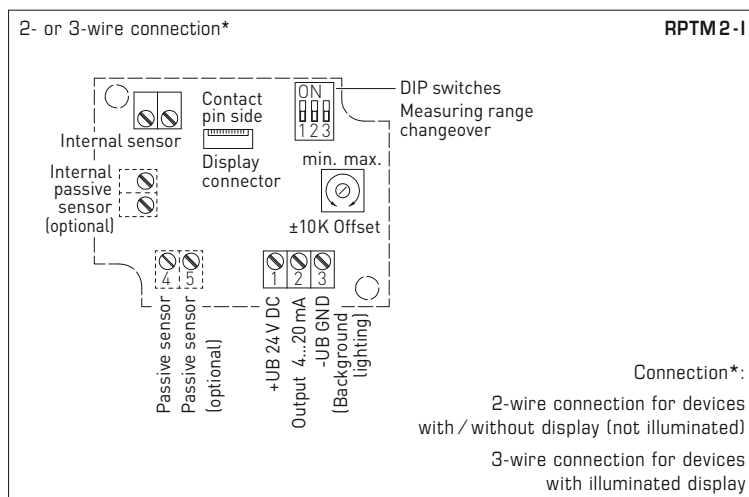
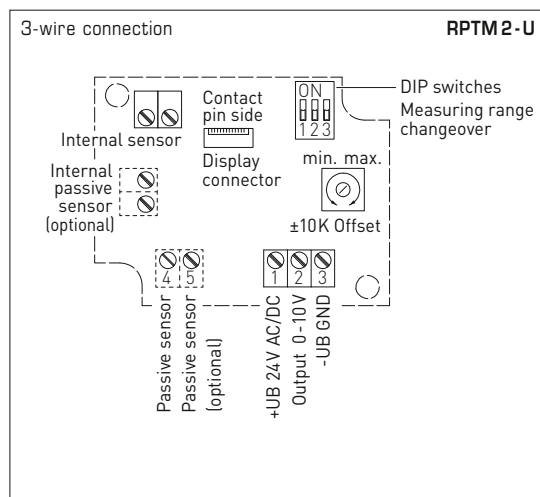
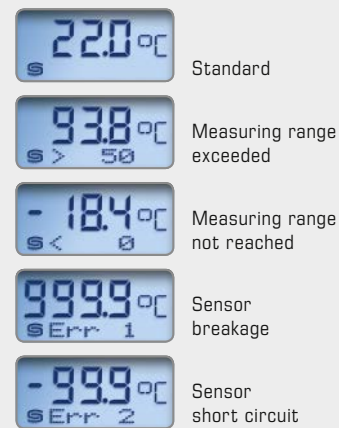


TECHNICAL DATA

Power supply:	24 V AC / DC (± 10 %) for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a \text{ (ohm)} = (U_b - 14 \text{ V}) / 0.02 \text{ A}$ for I variant
Load resistance:	$R_L > 5 \text{ kOhm}$ for U variant
Power consumption:	< 1.0 VA / 24 V DC; < 2.2 VA / 24 V AC
Sensor:	Pt1000, DIN EN 60751, class B
Measuring ranges:	multi-range switching with 8 switchable measuring ranges see table (other ranges optional) T_{min} -5 °C, T_{max} +60 °C, with manual zero point correction (± 10 K)
Deviation, temperature:	typically ± 0.2 K at +25 °C
Output:	0 - 10 V or 4...20 mA
Ambient temperature:	measuring transducer -5...+60 °C
Connection type:	2- or 3-wire connection
Housing:	plastic, UV-resistant, material polyamide, 30 % glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016), housing cover for display is transparent!
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1 without display) 72 x 64 x 43.3 mm (Tyr 1 with display)
Cable connection:	cable gland , plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (on request)
Electrical connection:	0.14 - 1.5 mm ² , via terminal screws
Connection cable:	PVC, H03VV-F, 2 x 0.5 mm ² , KL = approx. 1.5 m (other lengths optional)
Globe:	plastic, colour black, Ø = 50 mm
Humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 67 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1) IP 65 (according to EN 60 529) Pendulum with globe
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, according to EMC directive 2014 / 30 / EU
Optional:	Two-line display with illumination , cutout approx. 36 x 15 mm (W x H), for displaying the ACTUAL temperature and the internal diagnostics (measuring range exceeded, measuring range not reached, sensor breakage, sensor short circuit)

Display and internal diagnostics

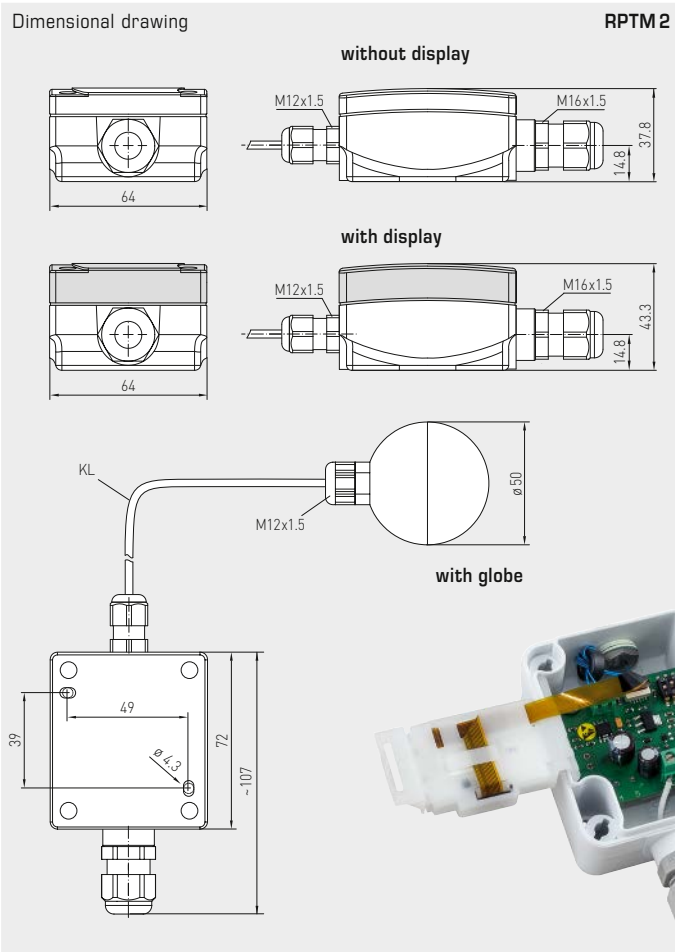
THERMASGARD®
Measuring transducer with display





S+S REGELTECHNIK

Pendulum room temperature measuring transducers,
calibratable, with multi-range switching
and active output



RPTM 2
with display



M12 connector
(optional on request)

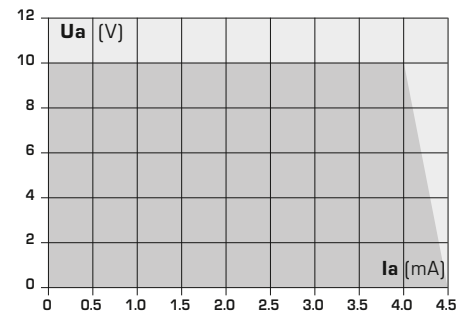


Measuring ranges (adjustable)	DIP 1	DIP 2	DIP 3
-20...+150 °C	ON	ON	ON
-50... +50 °C	OFF	ON	ON
-20... +80 °C	ON	OFF	ON
-30... +60 °C	OFF	OFF	ON
0... +40 °C	ON	ON	OFF
0... +50 °C (default)	OFF	ON	OFF
0...+100 °C	ON	OFF	OFF
0...+150 °C	OFF	OFF	OFF

(observe max. permissible temperature ranges!)



Dependency of output voltage
on output current



THERMASGARD® RPTM 2 Pendulum room temperature measuring transducers (with globe)					
Type / WG01	Sensor	Output	Type	Item No.	Price
RPTM 2-I					
RPTM2-I	Pt1000	4...20 mA	Remote sensor	1101-1172-0219-910	152,76 €
RPTM 2-U					
RPTM2-U	Pt1000	0-10 V	Remote sensor	1101-1171-0219-910	152,76 €
Extra charge:	Other ranges optional				25,40 €
	Two-line display with illumination				49,83 €
	2-wire connecting leads, per running meter (PVC)				on request
	Cable connection with M12 connector according to DIN EN 61076-2-101				on request



Temperature

THERMASREG® Temperature controllers – everything under control from hot to cold

Our temperature controllers and thermostats are known for their rugged, long-life and reliable measuring technology, widely field-proven in everyday use.

Well engineered and manufactured in customized versions, these devices have a perfect fit in high-end installations.

Application Areas

- Office and administration buildings
- Schools, hotels and public authorities
- Power plants and district heating plants
- Industrial buildings and production facilities
- Foodstuff industry
- Heating and ventilation systems





THERMASREG® TEMPERATURE CONTROLLERS, THERMOSTATS

Room temperature controllers

RTR-B	Room temperature controller	329
RTR-S	Room temperature controller, fan coil controller	331
TET	Top hat rail thermostat	365

Surface contact thermostats

ALTR060	Surface-contact thermostat	350
ALTR090	Surface-contact thermostat	350
ALTR 1	Surface-contact thermostat	351
ALTR 3	Surface-contact thermostat	351
ALTR 5	Surface-contact thermostat	351
ALTR 7	Surface-contact thermostat	351

Built-in controllers, duct controllers

ETR	Built-in temperature controller, one-step / two-step	341
KTR	Duct temperature controller, one-step / two-step	347
TRxx-F	Temperature controller with remote sensor	337
FST-K	Duct frost protection thermostat, mechanical, one-step, switching	359

Wet room temperature controllers

TR 040	Temperature controller	334
TR 060	Temperature controller	334
TR 22	Temperature controller	335
TR 04040	Temperature controller, two-step	336

Frost protection thermostats

FST	Frost protection thermostat, mechanical, one-step, switching	355
FST-K	Duct frost protection thermostat, mechanical, one-step, switching	359
FS-20	2-phase frost protection thermostat, with control and cascading input, two-step, switching	363

Immersion sleeves and accessories

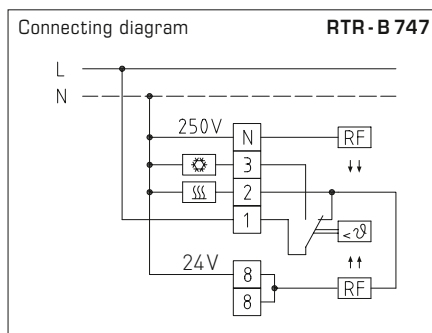
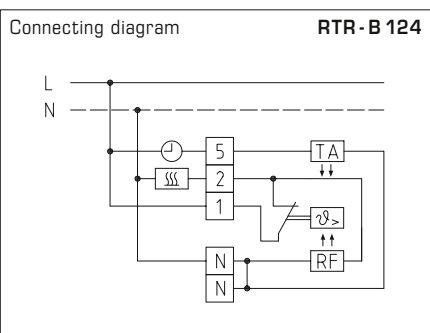
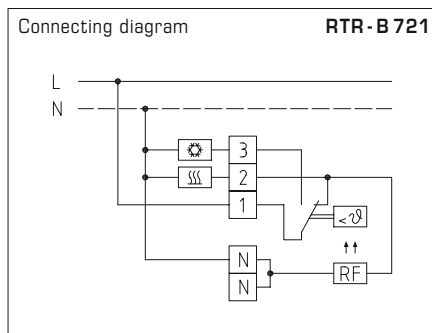
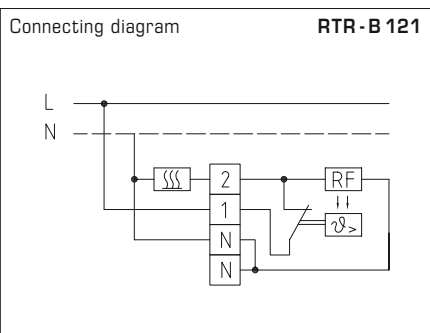
see chapter Accessories	644
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Room temperature controllers, mechanical, on-wall

One-step mechanical single room controller **THERMASREG® RTR-B** in bi-metal technology with thermal feedback for monitoring or controlling temperatures in dry rooms, or for activating any kind of heating system as room thermostat. For currentless open radiator valves, the cooling output from the changeover contact (normally open contact) must be connected. At breaker contacts, a maximum of 10 valve actuators can be connected and at normally open contacts a maximum of 5 valve actuators.

TECHNICAL DATA

Switching capacity: (Contact load)	230 V AC, 50-60 Hz heating: 10 mA...10 (4) A, DC 30 W cooling: 10 mA...5 (2) A
Sensor element:	bi-metal
Control range:	+5...+30 °C
Output:	breaker or changeover contact
Operating difference:	approx. 0.5 K
Housing:	plastic, material ABS, colour pure white (similar to RAL 9010)
Dimensions:	75 x 75 x 25 mm (E1)
Electrical connection:	0.14-2.5 mm ² via terminal screws
Installation:	wall mounting or on in-wall flush box Ø55 mm, base with 4-hole for mounting on vertically or horizontally installed in-wall flush boxes for cable entry from the back, with predetermined breaking point for on-wall cable entry from top / bottom in case of plain on-wall installation
Protection class:	II (according to EN 60 730)
Protection type:	IP 30 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU

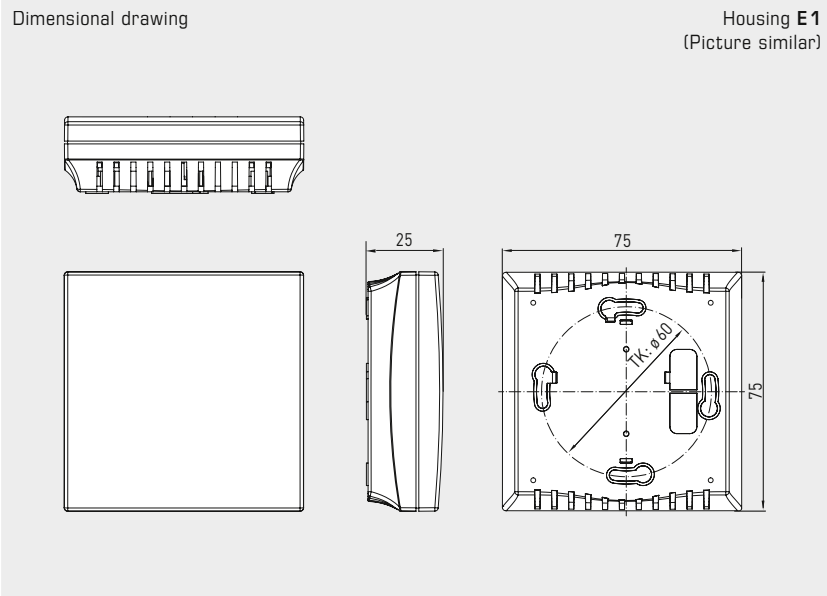




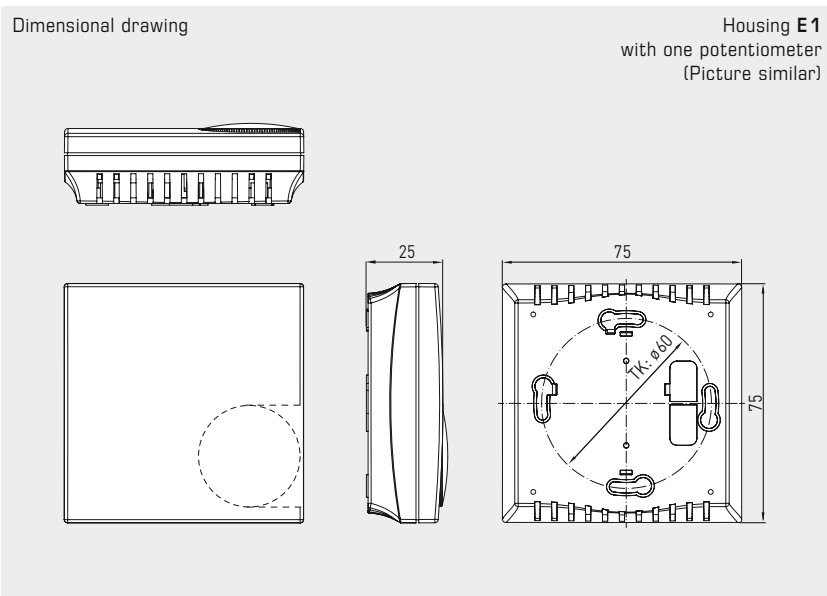
S+S REGELTECHNIK

THERMASREG® RTR-B

Room temperature controllers, mechanical, on-wall



RTR-B 747
with internal setting



RTR-B 121
RTR-B 124
RTR-B 721
with external setting



THERMASREG® RTR-B Room temperature controllers

Type / WG01	Temperature Range	Function	Output	Item No.	Price
RTR-B 121 / B 124 / B 721				External setting	
RTR-B 121	+5...+30 °C	Heating	Breaker	1102-4011-2100-000	37,79 €
RTR-B 124	+5...+30 °C	Heating, temperature reduction -5 K	Breaker	1102-4011-2400-000	39,94 €
RTR-B 721	+5...+30 °C	Heating, cooling	Changeover contact	1102-4017-2100-000	41,59 €
RTR-B 747				Internal setting	
RTR-B 747	+5...+30 °C	Heating, cooling	Changeover contact	1102-4017-4700-000	45,37 €



Room temperature controllers, continuous, on-wall, general

Electronic room temperature controllers, climate controllers **THERMASREG® RTR-S** for monitoring or controlling temperatures with output 0 - 10V for heating and cooling, optional as continuous climate controller with manual ventilator speed regulation, setpoint adjustment, and LED status indicators. Application in dry individual rooms heated or cooled by radiators, cooling ceilings, or ventilation, or air conditioning systems, or as remote control unit for air conditioners, e.g. in hotels, offices, or hospitals or as room thermostat.

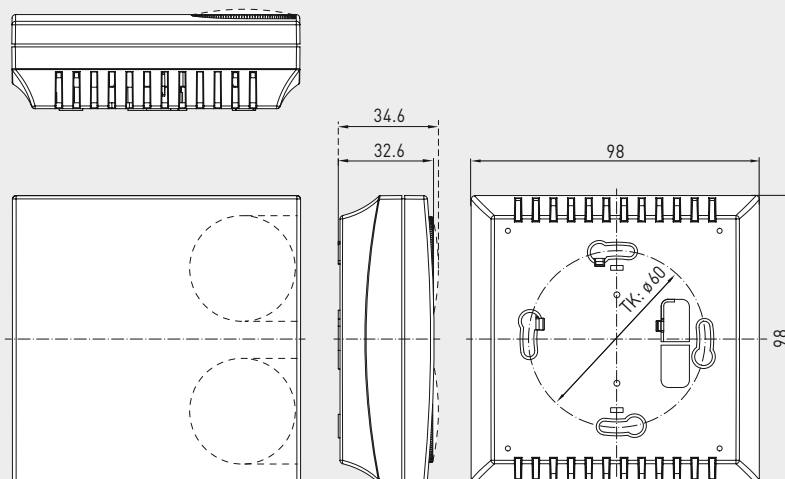
TECHNICAL DATA

Power supply:	24 V AC / DC (± 10%)
Temperature sensor:	internal or external (selectable via jumper) Pt 1000 according to DIN EN 60751, class B
Control range:	+5...+30 °C, adjustable via setpoint potentiometer with numerical scale or +21 °C (± 8 K), adjustable via setpoint potentiometer with swelling arrow (central position / + / -)
Output:	1 x heating, 1 x cooling, 0 - 10 V or 10 - 0 V repluggable, max. 5 mA
Proportional band:	internally adjustable via potentiometer heating +0.5...+3 K (1 K factory setting) cooling +0.5...+3 K (2 K factory setting)
Neutral zone:	internally adjustable via potentiometer, +1...+5 K (1 K factory setting)
Control mode:	PI
Housing:	plastic, material ABS, colour pure white (similar to RAL 9010)
Dimensions:	98 x 98 x 33 mm (Baldur 2)
Installation:	wall mounting or on in-wall flush box Ø 55 mm, base with 4-hole for mounting on vertically or horizontally installed in-wall flush boxes for cable entry from the back, with predetermined breaking point for on-wall cable entry from top/bottom in case of plain on-wall installation
Electrical connection:	0.14 - 2.5 mm ² via terminal screws
Humidity:	max. 90% RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 30 (according to EN 60 529)
Standards:	CE conformity, electromagnetic compatibility according to EN 61 326, EMC directive 2014 / 30 / EU

Dimensional drawing

Housing **Baldur 2**

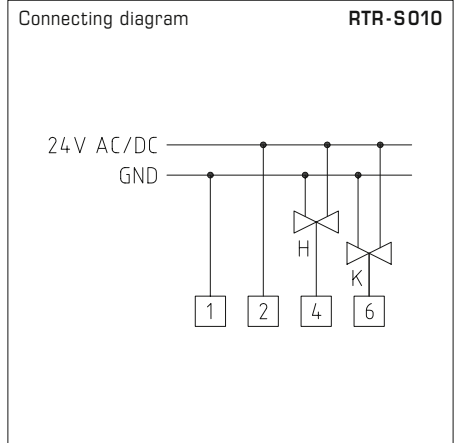
(one or two potentiometers possible)





RTR-S010
(BalduR2)

Continuous room temperature controller for 2-channel single room control



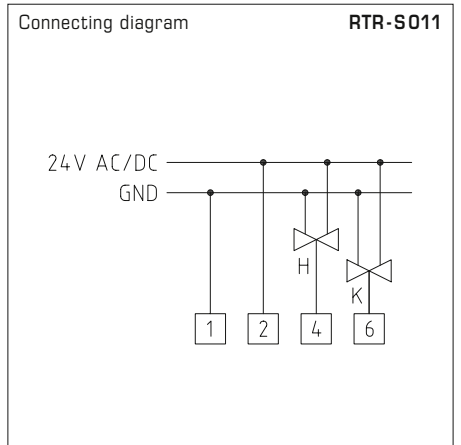
THERMASREG® RTR-S010 Room temperature controller

Type / WG01	Sensor internal/external	Output Heating	Output Cooling	Item No.	Price
RTR-S010				External setting	
RTR-S 010	Pt1000	0 - 10 V	0 - 10 V	1102-40B0-1000-000	181,10 €
Features:	+5...+30 °C, via setpoint device, numerical scale				



RTR-S011
(BalduR2)

Continuous room temperature controller for 2-channel single room control



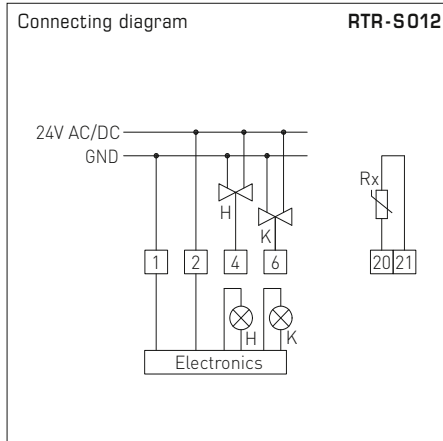
THERMASREG® RTR-S011 Room temperature controller

Type / WG01	Sensor internal/external	Output Heating	Output Cooling	Item No.	Price
RTR-S011				External setting	
RTR-S 011	Pt1000	0 - 10 V	0 - 10 V	1102-40B0-1100-000	181,10 €
Features:	+21 °C (± 8 K), via setpoint device, swelling arrow (central position / + / -)				

Room temperature controllers, continuous, on-wall, different versions



RTR-S 012
(Baldur 2)
Continuous room temperature controller for 2-channel single room control, with LED operating mode indicator

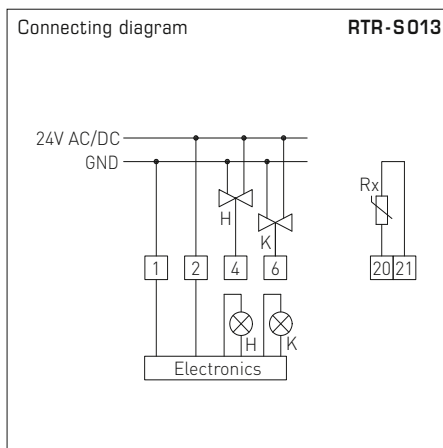


THERMASREG® RTR-S 012 Room temperature controller

Type/WG01	Sensor internal/external	Output Heating	Output Cooling	Item No.	Price
RTR-S 012				External setting	
RTR-S 012	Pt1000	0 - 10V	0 - 10V	1102-4080-1200-000	188,80 €
Features:		+5...+30 °C, via setpoint device, numerical scale, LED red: operating mode heating, LED blue: operating mode cooling			



RTR-S 013
(Baldur 2)
Continuous room temperature controller for 2-channel single room control, with LED operating mode indicator



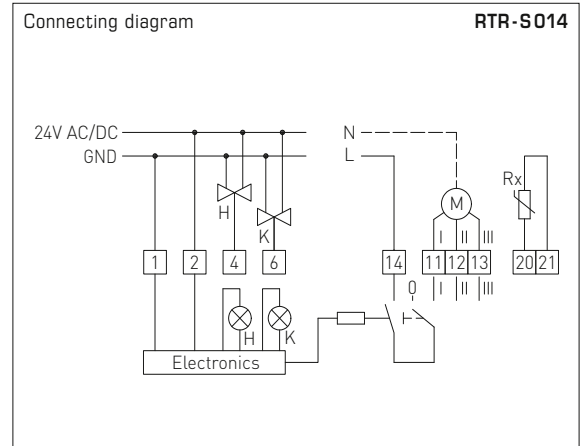
THERMASREG® RTR-S 013 Room temperature controller

Type/WG01	Sensor internal/external	Output Heating	Output Cooling	Item No.	Price
RTR-S 013				External setting	
RTR-S 013	Pt1000	0 - 10V	0 - 10V	1102-4080-1300-000	188,80 €
Features:		+21 °C (±8K) via setpoint device, swelling arrow (central position / + / -), LED red: operating mode heating, LED blue: operating mode cooling			



RTR-S014
(BalduR2)

Continuous room temperature controller for 2-channel single room control with LED operating mode indicator and 3-speed selector switch for ventilators



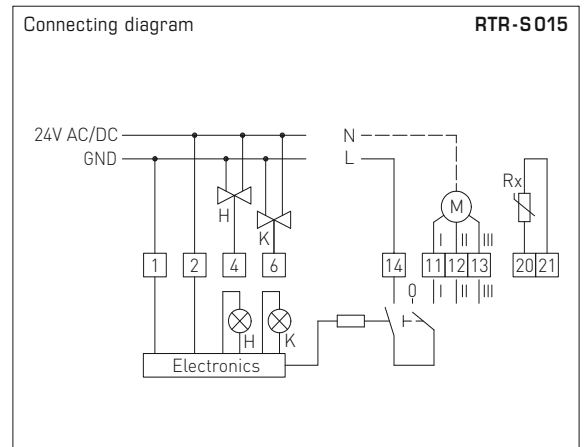
THERMASREG® RTR-S014 Room temperature controller

Type / WG01	Sensor internal / external	Output Heating	Output Cooling	Item No.	Price
RTR-S014				External setting	
RTR-S 014	Pt1000	0 - 10 V	0 - 10 V	1102-40B0-1400-000	196,51 €
Features: +5...+30 °C, via setpoint device, numerical scale, internal / external sensor selectable LED red: operating mode heating, LED blue: operating mode cooling, 4-step turn switch for ventilator speed (0 / I / II / III)					



RTR-S015
(BalduR2)

Continuous room temperature controller for 2-channel single room control with LED operating mode indicator and 3-speed selector switch for ventilators



THERMASREG® RTR-S015 Room temperature controller

Type / WG01	Sensor internal / external	Output Heating	Output Cooling	Item No.	Price
RTR-S015				External setting	
RTR-S 015	Pt1000	0 - 10 V	0 - 10 V	1102-40B0-1500-000	196,51 €
Features: +21 °C (±8 K) via setpoint device, swelling arrow (central position / + / -), LED red: operating mode heating, LED blue: operating mode cooling, 4-step turn switch for ventilator speed (0 / I / II / III)					

**Temperature controllers, one-step,
with switching output**

Mechanical temperature controllers/wet room temperature controllers **THERMASREG® TR 040 / TR 060** with switching output (one-step) and stainless steel capillary (spiral coil sensor), working without external voltage. They are used for monitoring and controlling temperatures in heat generation plants, in heating, ventilation and air conditioning systems, for ventilation, cooling and climate control in halls, cold storage rooms, greenhouses, nurseries, stables, breeding rooms, as industrial room thermostat or surface-mounted thermostat in industrial applications as well as in wet room and outdoor areas.

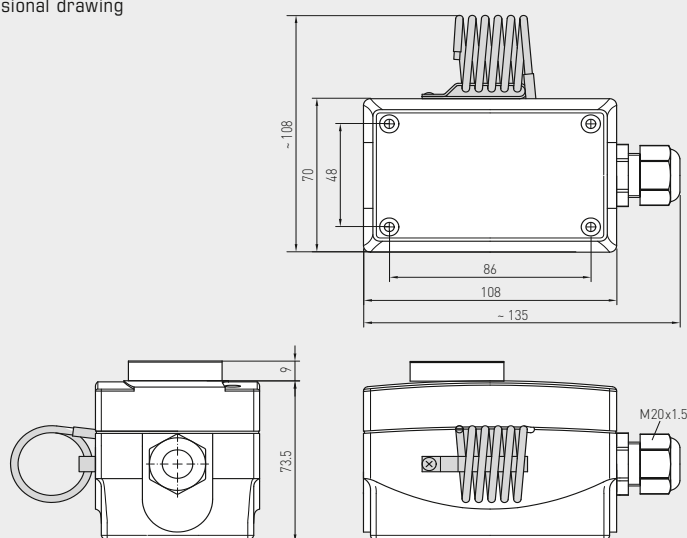
TECHNICAL DATA

Switching capacity: (Contact load)	24...250V AC +10%, 16A, cos φ = 1.0 24...250V AC +10%, 1.5A, cos φ = 0.6 at 24V AC min. 150mA
Contact:	dust-proof switch block unit as potential-free, single-pole or two-pole changeover contact
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016)
Housing dimensions:	108 x 70 x 73.5 mm (Thor 2)
Cable gland:	M20 x 1.5; including strain relief
Housing temperature:	-35...+65 °C
Capillary:	stainless steel V2A (1.4303)
Tolerance:	T _{min} ± 3K; T _{max} ± 3K; at +20°C ± 1K
Electrical connection:	0.14 - 2.5 mm ² via terminal screws
Routing:	admissible vibration load ≤ ½g
Protection class:	I (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU

FUNCTION

- Heating:** The preset setpoint (scale value) is equivalent to the switch-off value of the heating. The switch-on value is lower by the amount of operating difference. Contact 2-3 breaks when temperature rises to the preset value.
- Cooling:** The preset setpoint (scale value) is equivalent to the switch-on value of the cooling. The switch-off value is lower by the amount of operating difference. Contact 1-2 closes when temperature rises to the preset value.

Dimensional drawing



**TR 040
TR 060**

**TR 040
TR 060**
(one-step)
TR

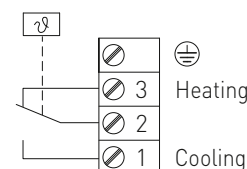


**TR 040 U
TR 060 U**
(one-step)
TW



Connecting diagram

**TR 040
TR 060**



THERMASREG® TR 040 / TR 060 Temperature controllers, one-step

Type / WG01	Temperature Range	Thermal Operating Difference (fixed) approx.	Max. Capillary Temperature	Item No.	Price
TR 040 / 060					TR (External setting)
TR-040	0...+40 °C	2K	+65 °C	1102-1050-1100-200	78,75 €
TR-060	0...+60 °C	2K	+75 °C	1102-1050-1100-300	78,75 €
TR 040 U / 060 U					TW (Internal setting)
TR-040 U	0...+40 °C	2K	+65 °C	1102-1050-2100-200	77,48 €
TR-060 U	0...+60 °C	2K	+75 °C	1102-1050-2100-300	77,48 €



Mechanical temperature controller / wet room temperature controller **THERMASREG® TR 22** with switching output (one-step) and copper capillary, working without external voltage. It is used for monitoring and controlling temperatures in heat generation plants, in heating, ventilation and air conditioning systems, for ventilation, cooling and climate control in halls, cold storage rooms, greenhouses, nurseries, stables, breeding rooms, as industrial room thermostat or surface-mounted thermostat in industrial applications as well as in wet room and outdoor areas.

TR 22
(one-step)
TR

TECHNICAL DATA

Switching capacity: (Contact load)	24...250V AC +10%, 16A, cos φ = 1.0 24...250V AC +10%, 1.5A, cos φ = 0.6 at 24V AC min. 150mA
Contact:	dust-proof switch block unit as potential-free single-pole changeover contact
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016)
Housing dimensions:	108 x 70 x 73.5 mm (Thor 2)
Cable gland:	M20 x 1.5; including strain relief
Housing temperature:	-35...+65 °C
Design principle:	torsion meter with liquid filling
Capillary:	copper
Tolerance:	T _{min} ± 3K; T _{max} ± 3K
Routing:	admissible vibration load ≤ ½g
Electrical connection:	0.14 - 2.5 mm² via terminal screws
Protection class:	I (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU

FUNCTION

Heating: The preset setpoint (scale value) is equivalent to the switch-off value of the heating. The switch-on value is lower by the amount of operating difference. Contact 2 - 3 breaks when temperature rises to the preset value.

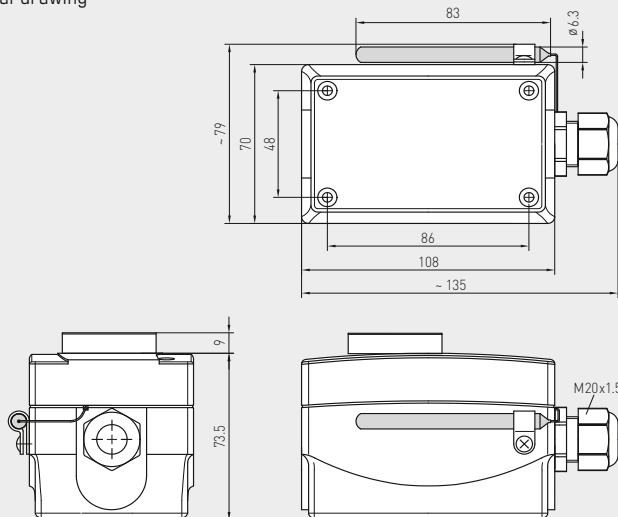
Cooling: The preset setpoint (scale value) is equivalent to the switch-on value of the cooling. The switch-off value is lower by the amount of operating difference. Contact 1 - 2 closes when temperature rises to the preset value.



TR 22 U
(one-step)
TW



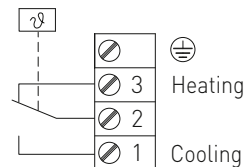
Dimensional drawing



TR 22

Connecting diagram

TR 22



THERMASREG® TR 22 Temperature controllers, one-step

Type / WG01	Temperature Range	Thermal Operating Difference (fixed) approx.	Max. Capillary Temperature	Item No.	Price
TR 22				TR (External setting)	
TR-22	-35...+35 °C	3K (± 1K)	+60 °C	1102-1050-1100-100	78,75 €
TR 22 U				TW (Internal setting)	
TR-22 U	-35...+35 °C	3K (± 1K)	+60 °C	1102-1050-2100-100	77,48 €

**Temperature controllers, two-step,
with switching output**

Mechanical temperature controller/wet room temperature controller **THERMASREG® TR 04040** with two independently switching outputs, which are separately adjustable (e.g. for switching between day and night time) and stainless steel capillary (spiral coil sensor), working without external voltage. It is used for monitoring and controlling temperatures in heat generation plants, in heating, ventilation and air conditioning systems, for ventilation, cooling and climate control in halls, cold storage rooms, greenhouses, nurseries, stables, breeding rooms, as industrial room thermostat or surface-mounted thermostat in industrial applications as well as in wet room and outdoor areas.

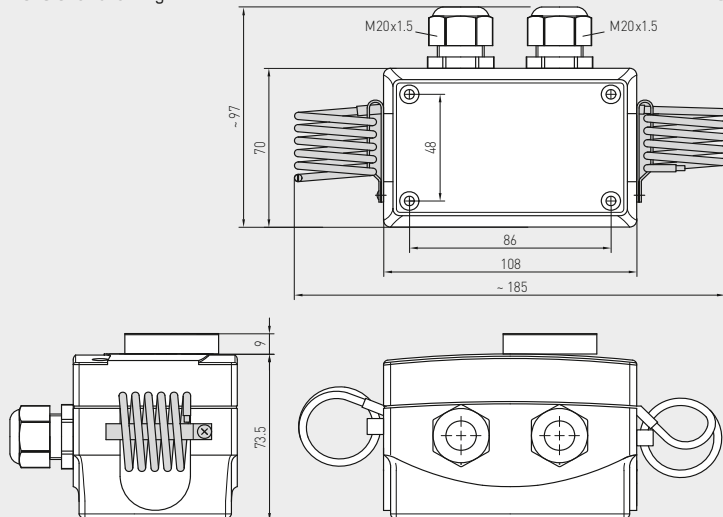
TECHNICAL DATA

Switching capacity: (Contact load)	24...250V AC +10%, 16A, cos φ = 1.0 24...250V AC +10%, 1.5A, cos φ = 0.6 at 24V AC min. 150mA
Contact:	dust-proof switch block unit as potential-free single-pole changeover contact (two changeover contacts, separately adjustable)
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016)
Housing dimensions:	108 x 70 x 73.5 mm (Thor 2)
Cable gland:	2x M20 x 1.5; including strain relief
Housing temperature:	-10...+65 °C
Capillary:	stainless steel V2A (1.4303)
Tolerance:	T _{min} ± 3K; T _{max} ± 3K; at +20 °C ± 1K
Electrical connection:	0.14 - 2.5 mm ² via terminal screws
Routing:	admissible vibration load ≤ ½g
Protection class:	I (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU

FUNCTION

Heating: Contacts 2-3 and 5-6 break when temperature rises to the preset value.
Cooling: Contacts 2-1 and 5-4 break when temperature drops to the preset value.

Dimensional drawing **TR 04040**



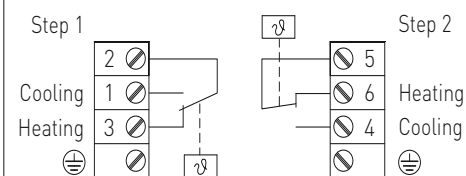
TR 04040



TR 04040 U



Connecting diagram **TR 04040**



THERMASREG® TR 04040 Temperature controllers, two-step

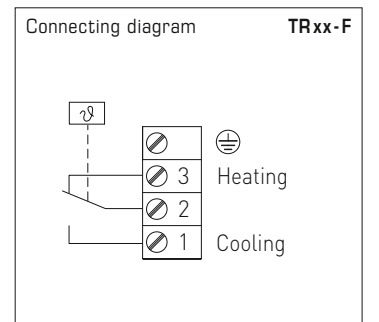
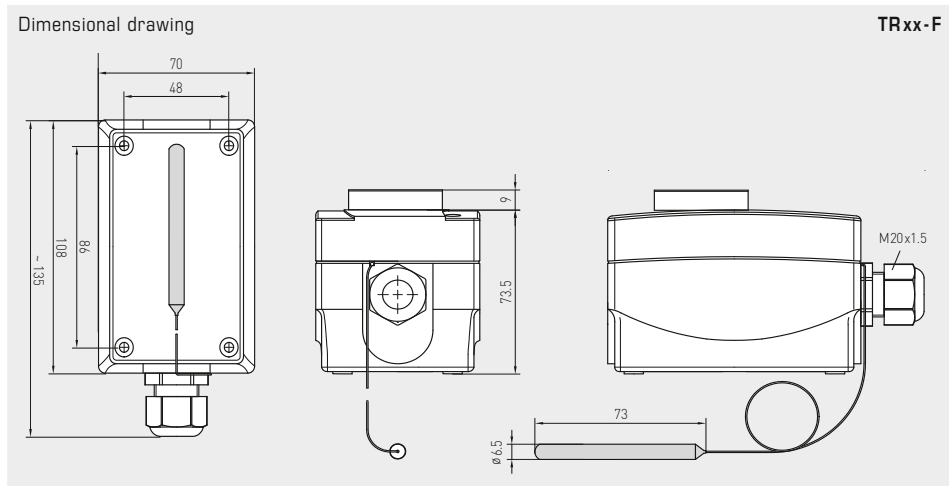
Type / WG01	Temperature Range (adjustable)		Thermal Operating Difference (fixed) approx.		Max. Capillary Temperature	Item No.	Price
	1.	2.	1.	2.			
TR 04040						TR+TW (External/Internal setting)	
TR-04040	0...+40 °C	0...+40 °C	2K	2K	+65 °C	1102-1050-1200-200	115,84 €
TR 04040 U						TW+TW (Internal setting)	
TR-04040 U	0...+40 °C	0...+40 °C	2K	2K	+65 °C	1102-1050-2200-200	115,84 €



Mechanical temperature controller THERMASREG® TR xx-F with remote sensor and switching output (one-step), working as capillary thermostat / capillary controller without external voltage. This capillary controller is used for monitoring and to control temperatures of non-aggressive liquid or gaseous media in heating, ventilation and air conditioning technology as well as in mechanical and apparatus engineering, for installation in immersion sleeves or air conditioning ducts.

TECHNICAL DATA	
Switching capacity: (Contact load)	24...250 V AC +10%, 16 A, cos φ = 1.0 24...250 V AC +10%, 1.5 A, cos φ = 0.6 at 24 V AC min. 150 mA
Contact:	dust-proof switch block unit as potential-free single-pole changeover contact
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016)
Housing dimensions:	108 x 70 x 73.5 mm (Thor 2)
Cable gland:	M20 x 1.5; including strain relief
Housing temperature:	-10...+65 °C
Design principle:	torsion meter with liquid filling
Sensor:	copper tube, length of capillary = 1 m with PVC protective hose, Ø 6.8 mm
Tolerance:	T _{min} ± 3 K; T _{max} ± 3 K
Inserted length:	immersion sleeves EL = 150 mm (accessories see table)
Routing:	bending radius > 35mm admissible vibration load ≤ ½g admissible tensile load < 100N
Electrical connection:	0.14 - 2.5 mm² via terminal screws
Protection class:	I (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU

FUNCTION
Heating: wire contacts 2 - 3
Cooling: wire contacts 2 - 1



THERMASREG® TR xx - F Temperature controllers, one-step					
Type / WG01	Temperature Range	Thermal Operating Difference (fixed) approx.	Max. Capillary Temperature	Item No.	Price
				TR (External setting)	
TRxx-F					
TR-1-F	-35... +35 °C	3 K (± 1 K)	+60 °C	1102-1056-1110-100	79,81 €
TR-060-F	0... +60 °C	3 K (± 1 K)	+75 °C	1102-1050-1110-300	79,81 €
TR-090-F	0... +90 °C	3 K (± 1 K)	+120 °C	1102-1050-1110-400	79,81 €
TR-0120-F	0...+120 °C	5 K (± 1 K)	+135 °C	1102-1050-1110-500	79,81 €
TR-50140-F	+50...+140 °C	5 K (± 1 K)	+150 °C	1102-1050-1110-600	79,81 €
Extra charge:	U = Internal setting (TW), e.g. TR-090-F-U				9,95 €
ACCESSORIES					
THR-MS-08/150	Brass immersion sleeve, EL = 150 mm, Ø 8 x 0.5 mm			7100-0011-3404-000	15,55 €
THR-VA-09/150	Stainless steel immersion sleeve V2A (1.4301), EL = 150 mm, Ø 9 x 1.0 mm			7100-0012-3032-000	40,99 €

For further information, see the last chapter!

Equipment sensor/controller, including immersion sleeve,
EC type-tested, TÜV tested,
with switching output

DIN-tested German quality product. Temperature control and limiting device for heat generation plants in accordance with DIN EN 14597. Safety temperature limiter (STB) with EC type test (module B) according to directive 2014/68/EU.

Mechanical temperature control device/rod thermostat THERMASREG® ETR with switching output, used for monitoring, controlling or limiting the temperatures of liquid or gaseous media as a boiler controller or in heating, air conditioning technology as well as in mechanical and apparatus engineering and in heat generation plants. It is available as one-step or two-step device, as adjustable temperature controller TR, temperature monitor TW, or as safety temperature limiter STB.



TECHNICAL DATA

Switching capacity: (Contact load)	24 ... 250 V AC + 10 %, 10 A, cos φ = 1.0 24 ... 250 V AC + 10 %, 1.5 A, cos φ = 0.6 at 24 V AC min. 150 mA
Contact:	dust-proof switch block unit as potential-free single-pole or two-pole changeover contact
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016)
Housing dimensions:	108 x 70 x 73.5 mm (Thor2)
Cable gland:	M20 x 1.5; including strain relief
Measuring element:	torsion meter with liquid filling, liquid expansion temperature feeler
Mounting position:	arbitrary
Ambient temperature:	-10...+65 °C at the switch block housing
Tolerance:	T _{min} ± 5 K; T _{max} ± 3 K
Immersion sleeves:	THR-ms-08/xx , Single sleeve brass, nickel-plated, Ø = 8 mm, R ½" straight pipe thread, wrench size 22, p _{max} = 10 bar, T _{max} = +150 °C THR-VA-09/xx , Single sleeve stainless steel V4A (1.4571), Ø = 9 mm, G ½" straight pipe thread, wrench size 22, p _{max} = 25 bar, T _{max} = +150 °C THR-VA-17/xx , Double sleeve stainless steel V4A (1.4571), Ø = 17 mm, G ½" straight pipe thread, wrench size 22, p _{max} = 25 bar, T _{max} = +150 °C (Depending on the type, the relevant immersion sleeve is included in the scope of delivery, see table)
Operating medium:	Water, oil, air and exhaust gas
Inserted length:	100 mm / 150 mm / 200 mm (see table)
Process connection:	screwed socket
Electrical connection:	0.14 - 2.5 mm ² via terminal screws
Protection class:	I (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014/30/EU, low-voltage directive 2014/35/EU
Tests:	EC type test (module B) according to directive 2014/68/EU , certificate No.: IS-TAF-MUC 18 03 2652130 002, DIN EN 14597, register Nos.: STB 1201, TR/STB 1202
FUNCTION	TW, TR: Contact 2-3 breaks when temperature rises to the preset value. STB: Contact 2-1 or 5-4 (two-step) breaks when temperature rises to the preset value. Restart is possible only after cooling off by approx. 15 K - 20 K by pressing the reset button.





Configuration variants:

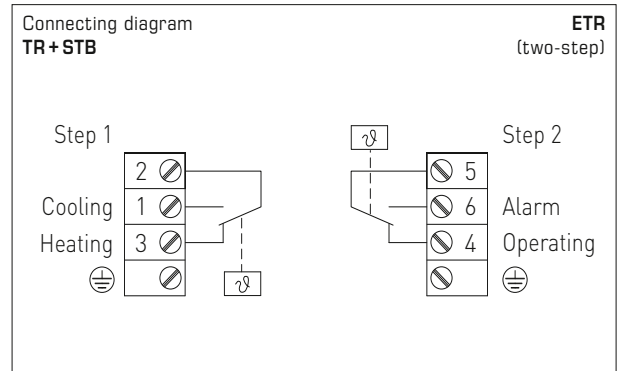
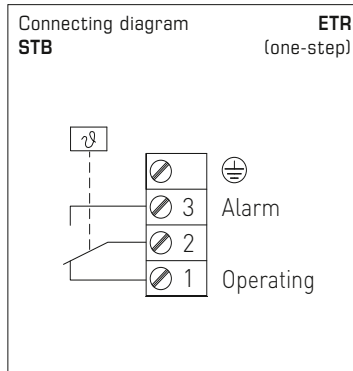
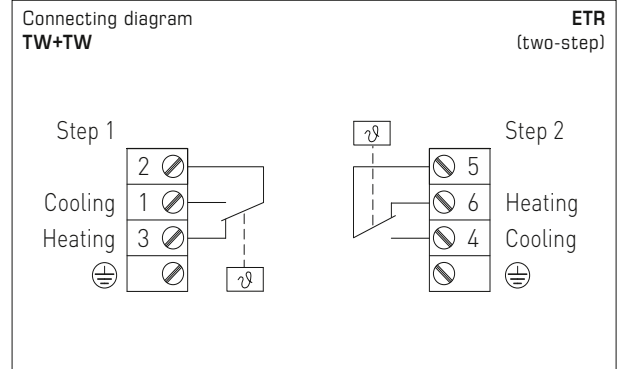
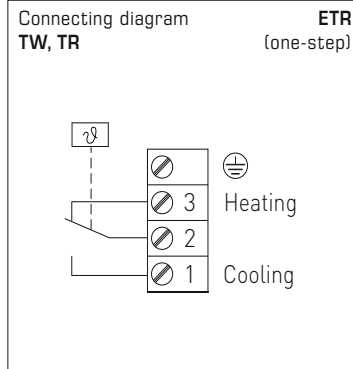
TW
Temperature monitor
(internal setting)

TR
Temperature controller
(external setting)

STB
Safety temperature limiter
(internal setting)

TW+TW
Double temperature monitor
(internal setting)

TR + STB
Temperature controller
(external setting) +
Safety temperature limiter
(internal setting)

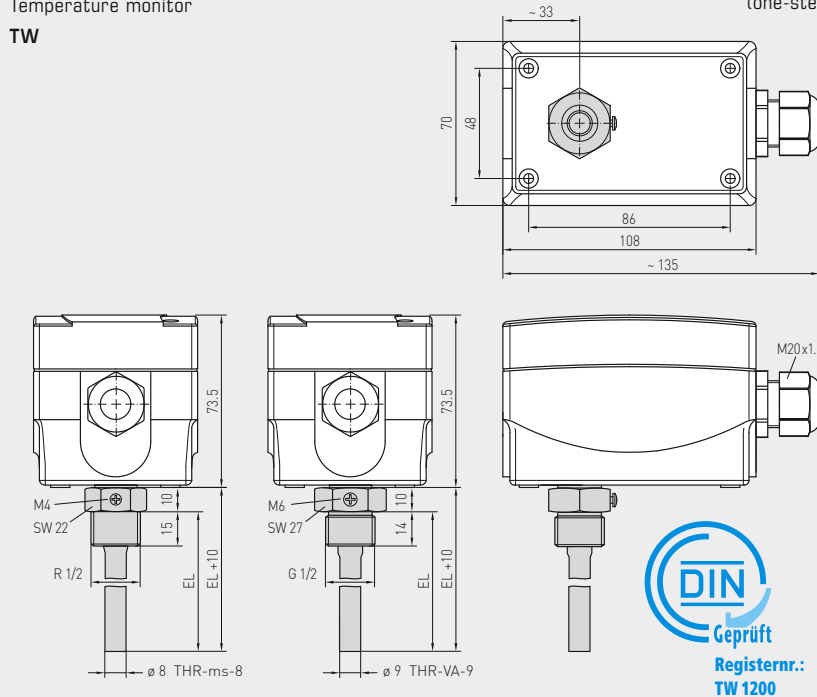


CERTIFICATE ZERTIFIKAT... EU Type examination (module B) - production type - according to Directive 2014/68/EU... Certificate No.: Z-IS-TAF-MUC-18-03-2652130-002... TÜV SÜD Industrie Service GmbH

page 3 of certificate no. IS-TAF-MUC-18-03-2652130-002... Technical data table with columns Type, Code, Technical data... The conditions listed below have to be considered:

Dimensional drawing
Temperature monitor
TW

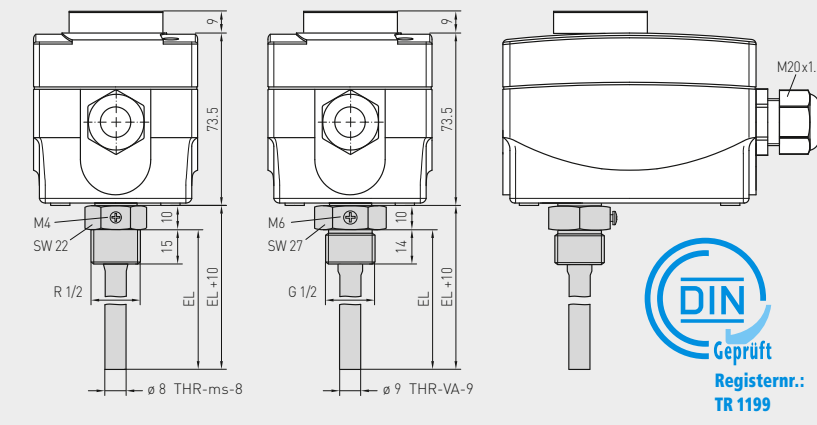
ETR-xx U
(one-step)



ETR-060 U
ETR-090 U
(one-step)
TW

Dimensional drawing
Temperature controller
TR

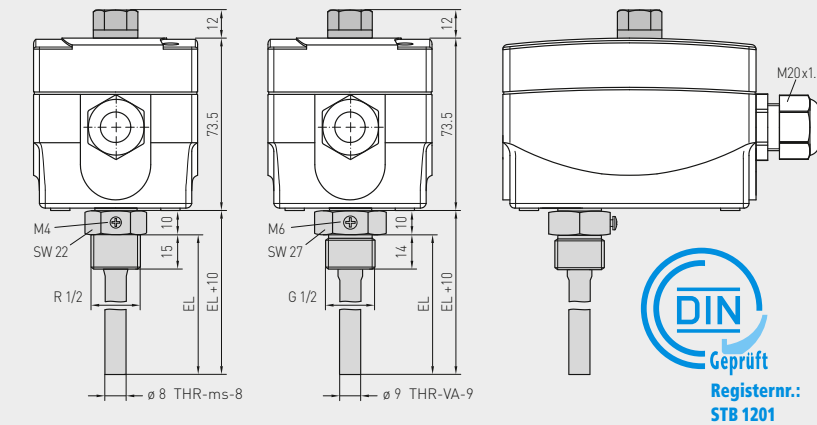
ETR-xx
(one-step)



ETR-1
ETR-060
ETR-090
ETR-0120
ETR-50140
(one-step)
TR

Dimensional drawing
Safety temperature limiter
STB

ETR-Rxx
(one-step)



ETR-R6585
ETR-R90110
(one-step)
STB
selectable



THERMASREG® ETR Equipment sensor / controller, one-step, including immersion sleeve

Type / WG02	Inserted Length (EL)	Temperature Ranges (adjustable)	Thermal Operating Difference (fixed) approx.	Maximum Capillary Temp.	Item No.	Price
ETR-060 U						TW
ETR-060 U MS/100	100 mm	0...+60 °C	3K	+75 °C	1102-2010-2100-380	70,83 €
ETR-060 U MS/150	150 mm	0...+60 °C	3K	+75 °C	1102-2010-2100-310	73,21 €
ETR-060 U MS/200	200 mm	0...+60 °C	3K	+75 °C	1102-2010-2100-320	77,40 €
ETR-060 U VA/100	100 mm	0...+60 °C	3K	+75 °C	1102-2010-2100-390	98,46 €
ETR-060 U VA/150	150 mm	0...+60 °C	3K	+75 °C	1102-2010-2100-330	100,82 €
ETR-060 U VA/200	200 mm	0...+60 °C	3K	+75 °C	1102-2010-2100-340	105,03 €
ETR-090 U						TW
ETR-090 U MS/100	100 mm	0...+90 °C	3K	+120 °C	1102-2010-2100-480	70,83 €
ETR-090 U MS/150	150 mm	0...+90 °C	3K	+120 °C	1102-2010-2100-410	73,21 €
ETR-090 U MS/200	200 mm	0...+90 °C	3K	+120 °C	1102-2010-2100-420	77,40 €
ETR-090 U VA/100	100 mm	0...+90 °C	3K	+120 °C	1102-2010-2100-490	98,46 €
ETR-090 U VA/150	150 mm	0...+90 °C	3K	+120 °C	1102-2010-2100-430	100,82 €
ETR-090 U VA/200	200 mm	0...+90 °C	3K	+120 °C	1102-2010-2100-440	105,03 €
ETR-1						TR
ETR-1 MS/100	100 mm	-35...+35 °C	3K	+75 °C	1102-2010-1100-180	70,83 €
ETR-1 MS/150	150 mm	-35...+35 °C	3K	+75 °C	1102-2010-1100-110	73,21 €
ETR-1 MS/200	200 mm	-35...+35 °C	3K	+75 °C	1102-2010-1100-120	77,40 €
ETR-1 VA/100	100 mm	-35...+35 °C	3K	+75 °C	1102-2010-1100-190	98,46 €
ETR-1 VA/150	150 mm	-35...+35 °C	3K	+75 °C	1102-2010-1100-130	100,82 €
ETR-1 VA/200	200 mm	-35...+35 °C	3K	+75 °C	1102-2010-1100-140	105,03 €
ETR-060						TR
ETR-060 MS/100	100 mm	0...+60 °C	3K	+75 °C	1102-2010-1100-380	70,83 €
ETR-060 MS/150	150 mm	0...+60 °C	3K	+75 °C	1102-2010-1100-310	73,21 €
ETR-060 MS/200	200 mm	0...+60 °C	3K	+75 °C	1102-2010-1100-320	77,40 €
ETR-060 VA/100	100 mm	0...+60 °C	3K	+75 °C	1102-2010-1100-390	98,46 €
ETR-060 VA/150	150 mm	0...+60 °C	3K	+75 °C	1102-2010-1100-330	100,82 €
ETR-060 VA/200	200 mm	0...+60 °C	3K	+75 °C	1102-2010-1100-340	105,03 €
ETR-090						TR
ETR-090 MS/100	100 mm	0...+90 °C	3K	+120 °C	1102-2010-1100-480	70,83 €
ETR-090 MS/150	150 mm	0...+90 °C	3K	+120 °C	1102-2010-1100-410	73,21 €
ETR-090 MS/200	200 mm	0...+90 °C	3K	+120 °C	1102-2010-1100-420	77,40 €
ETR-090 VA/100	100 mm	0...+90 °C	3K	+120 °C	1102-2010-1100-490	98,46 €
ETR-090 VA/150	150 mm	0...+90 °C	3K	+120 °C	1102-2010-1100-430	100,82 €
ETR-090 VA/200	200 mm	0...+90 °C	3K	+120 °C	1102-2010-1100-440	105,03 €
ETR-0120						TR
ETR-0120 MS/100	100 mm	0...+120 °C	5K	+135 °C	1102-2010-1100-580	70,83 €
ETR-0120 MS/150	150 mm	0...+120 °C	5K	+135 °C	1102-2010-1100-510	73,21 €
ETR-0120 MS/200	200 mm	0...+120 °C	5K	+135 °C	1102-2010-1100-520	77,40 €
ETR-0120 VA/100	100 mm	0...+120 °C	5K	+135 °C	1102-2010-1100-590	98,46 €
ETR-0120 VA/150	150 mm	0...+120 °C	5K	+135 °C	1102-2010-1100-530	100,82 €
ETR-0120 VA/200	200 mm	0...+120 °C	5K	+135 °C	1102-2010-1100-540	105,03 €
ETR-50140						TR
ETR-50140 MS/100	100 mm	+50...+140 °C	5K	+150 °C	1102-2010-1100-680	70,83 €
ETR-50140 MS/150	150 mm	+50...+140 °C	5K	+150 °C	1102-2010-1100-610	73,21 €
ETR-50140 MS/200	200 mm	+50...+140 °C	5K	+150 °C	1102-2010-1100-620	77,40 €
ETR-50140 VA/100	100 mm	+50...+140 °C	5K	+150 °C	1102-2010-1100-690	98,46 €
ETR-50140 VA/150	150 mm	+50...+140 °C	5K	+150 °C	1102-2010-1100-630	100,82 €
ETR-50140 VA/200	200 mm	+50...+140 °C	5K	+150 °C	1102-2010-1100-640	105,03 €
ETR-R6585						STB
ETR-R6585 MS/100	100 mm	+65...+85 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-780	85,35 €
ETR-R6585 MS/150	150 mm	+65...+85 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-710	87,73 €
ETR-R6585 MS/200	200 mm	+65...+85 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-720	95,74 €
ETR-R6585 VA/100	100 mm	+65...+85 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-790	103,41 €
ETR-R6585 VA/150	150 mm	+65...+85 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-730	105,78 €
ETR-R6585 VA/200	200 mm	+65...+85 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-740	110,12 €
ETR-R90110						STB
ETR-R90110 MS/100	100 mm	+90...+110 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-880	85,35 €
ETR-R90110 MS/150	150 mm	+90...+110 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-810	87,73 €
ETR-R90110 MS/200	200 mm	+90...+110 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-820	95,74 €
ETR-R90110 VA/100	100 mm	+90...+110 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-890	103,41 €
ETR-R90110 VA/150	150 mm	+90...+110 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-830	105,78 €
ETR-R90110 VA/200	200 mm	+90...+110 °C	+0 / -15...20 K	+120 °C	1102-2010-6100-840	110,12 €

Type designation:

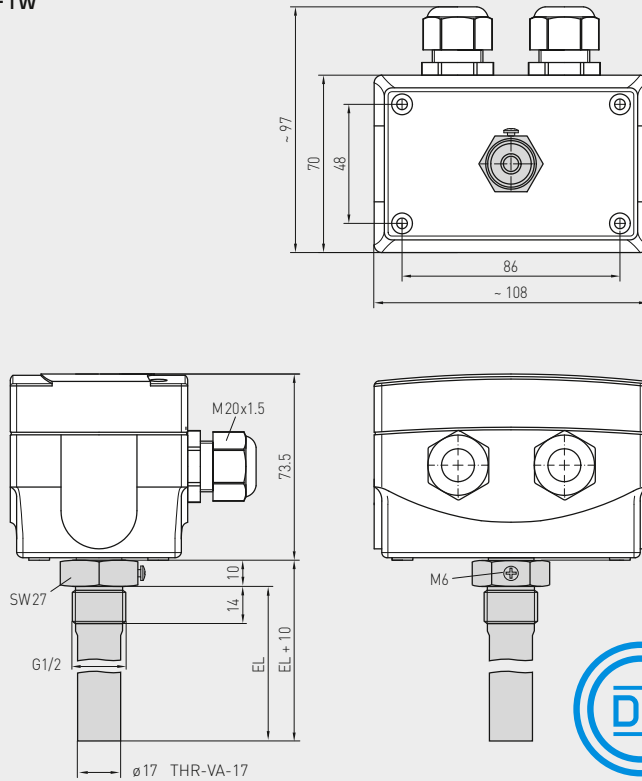
ETR-xx_immersion sleeve material / inserted length (mm)

MS = Brass nickel-plated, VA = Stainless steel V4A (1.4571)

For further information and accessories see next page...

Dimensional drawing
Double temperature monitor
TW + TW

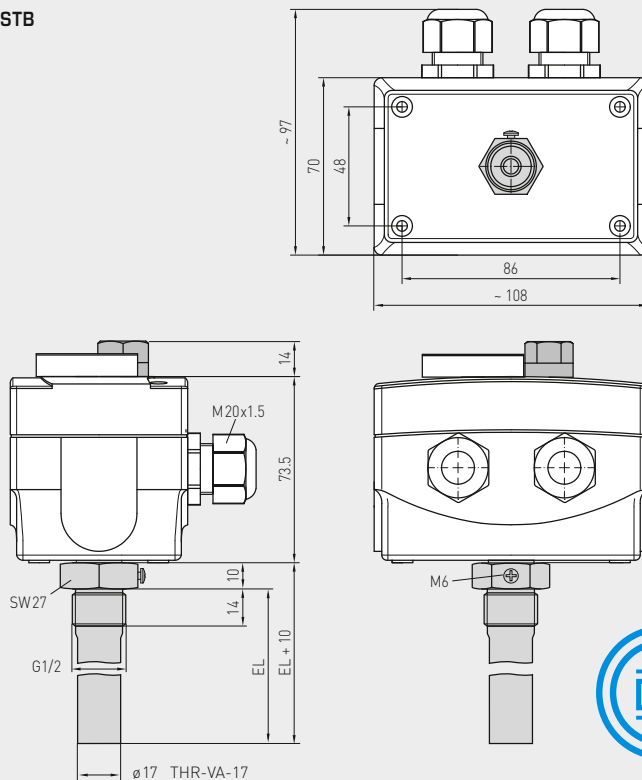
ETR-xx U
(two-step)



ETR-090090 U
(two-step)
TW + TW

Dimensional drawing
Temperature controller +
safety temperature limiter
TR + STB

ETR-xx Rxx
(two-step)



ETR-060 R 85
ETR-090 R 110
(two-step)
TR + STB
selectable



THERMASREG® ETR Equipment sensor / controller, two-step, including immersion sleeve								
Type / WG02	Inserted Length (EL)	Temperature Ranges (adjustable)		Thermal Operating Difference (fixed) approx.		Maximum Capillary Temp.	Item No.	Price
		1.	2.	1.	2.			
ETR-090090 U							TW + TW	
ETR-090090 U VA/150	150 mm	0...+90 °C	0...+90 °C	3K	3K	+120 °C	1102-2010-2205-130	146,41 €
ETR-090090 U VA/200	200 mm	0...+90 °C	0...+90 °C	3K	3K	+120 °C	1102-2010-2205-140	159,14 €
ETR-060R85							TR + STB	
ETR-060R85 VA/150	150 mm	0...+60 °C	+65...+85 °C	3K	+0 / -15...20K	+120 °C	1102-2010-7205-230	146,41 €
ETR-060R85 VA/200	200 mm	0...+60 °C	+65...+85 °C	3K	+0 / -15...20K	+120 °C	1102-2010-7205-240	159,14 €
ETR-090R110							TR + STB	
ETR-090R110 VA/150	150 mm	0...+90 °C	+90...+110 °C	3K	+0 / -15...20K	+135 °C	1102-2010-7205-330	146,41 €
ETR-090R110 VA/200	200 mm	0...+90 °C	+90...+110 °C	3K	+0 / -15...20K	+135 °C	1102-2010-7205-340	159,14 €

Type designation:	ETR-xx_immersion sleeve material / inserted length (mm) MS = Brass nickel-plated, VA = Stainless steel V4A (1.4571)		
Extra charge:	U = Internal setting, unless included in a certain type /2 = 2 steps, unless included in a certain type		9,95 € on request
Features:	TR = Temperature controller (external setting) TW = Temperature monitor (internal setting) STB = Safety temperature limiter (internal setting), selectable , with external switchpoint confirmation and restart interlock, restart by reset button at approx. 15...20K below switching temperature (+0K / - 15...20K); with EC type test (module B) according to directive 2014 / 68 / EU		
Note:	To ensure accurate responsiveness series ETR devices must only be used in connection with the immersion sleeves included in the scope of delivery while applying heat-conductive paste		

ACCESSORIES			
WLP-1	Heat-conductive paste, silicone-free	7100-0060-1000-000	3,38 €
For further information see last chapter!			

THERMASGARD® THR Immersion sleeve Ø 8 / 9 / 17 mm								
Type / WG01	p _{max} (static)	T _{max}	Time Constant for Medium:			Inserted Length (EL)	Item No. Ø	Price
			Air	Water	Oil			
THR-ms-08 / xx							Brass nickel-plated	
							Ø 8 x 0.5 mm	
THR-MS-08/100	10 bar	+150 °C	106 s	18 s	53 s	100 mm	7100-0011-3022-000	15,42 €
THR-MS-08/150	10 bar	+150 °C	106 s	18 s	53 s	150 mm	7100-0011-3404-000	15,55 €
THR-MS-08/200	10 bar	+150 °C	106 s	18 s	53 s	200 mm	7100-0011-3403-000	18,47 €
THR-VA-09 / xx							Stainless steel V4A (1.4571)	
							Ø 9 x 1.0 mm	
THR-VA-09/100	25 bar	+150 °C	92 s	17 s	41 s	100 mm	7100-0012-3022-000	39,72 €
THR-VA-09/150	25 bar	+150 °C	92 s	17 s	41 s	150 mm	7100-0012-3032-000	40,99 €
THR-VA-09/200	25 bar	+150 °C	92 s	17 s	41 s	200 mm	7100-0012-3042-000	43,92 €
THR-VA-17 / xx							Stainless steel V4A (1.4571)	
							Ø 17 x 1.0 mm	
THR-VA-17/150	25 bar	+150 °C	-	45 s	55 s	150 mm	7100-0012-3033-000	40,99 €
THR-VA-17/200	25 bar	+150 °C	-	45 s	55 s	200 mm	7100-0012-3404-000	43,92 €
Ordering example:	THR - ms - 08 / 100 (Brass immersion sleeve, Ø = 8 mm, EL = 100 mm) THR - VA - 09 / 150 (Stainless steel immersion sleeve, Ø = 9 mm, EL = 150 mm) THR - VA - 17 / 200 (Stainless steel immersion sleeve, Ø = 17 mm, EL = 200 mm)							
Note:	inner diameter of socket 15.0 mm							

Duct temperature controllers, including mounting flange,
EC type-tested, TÜV tested,
with switching output

DIN-tested German quality product. Temperature control and limiting device for heat generation plants in accordance with DIN EN 14597. Safety temperature limiter (STB) with EC type test (module B) according to directive 2014 / 68 / EU.

Mechanical temperature control device / rod thermostat THERMASREG® KTR with switching output, used for monitoring, controlling or limiting the temperatures of gaseous media as a boiler controller or in heating, air conditioning technology as well as in mechanical and apparatus engineering and in heat generation plants. It is available as one-step or two-step device, as adjustable temperature controller TR, temperature monitor TW, or as safety temperature limiter STB.



TECHNICAL DATA

Switching capacity: (Contact load)	24...250 V AC +10%, 10 A, cos φ = 1.0 24...250 V AC +10%, 1.5 A, cos φ = 0.6 at 24 V AC min. 150 mA
Contact:	dust-proof switch block unit as potential-free, single-pole or two-pole changeover contact
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016)
Housing dimensions:	108 x 70 x 73.5 mm (Thor 2)
Cable gland:	M20 x 1.5; including strain relief
Measuring element:	torsion meter with liquid filling, liquid expansion temperature feeler
Mounting position:	arbitrary
Ambient temperature:	-10...+65 °C at the switch block housing
Tolerance:	T _{min} ± 5 K; T _{max} ± 3 K
Operating medium:	Air
Protective tube:	metal, material CuZn37 (2.0321), Ø 14 mm, NL = 205 mm
Inserted length:	approx. 205 mm (with flange); approx. 184 mm (without flange)
Process connection:	by mounting flange (included in the scope of delivery)
Electrical connection:	0.14 - 2.5 mm ² via terminal screws
Protection class:	I (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU
Tests:	EC type test (module B) according to directive 2014 / 68 / EU, certificate No.: IS-TAF-MUC 18 03 2652130 002, DIN EN 14597, register Nos.: STB 1201, TR / STB 1202

FUNCTION	TW, TR: Contact 2 - 3 breaks when temperature rises to the preset value.
	STB: Contact 2 - 1 or 5 - 4 (two-step) breaks when temperature rises to the preset value. Restart is possible only after cooling off by approx. 15 K - 20 K by pressing the reset button.





Configuration variants:

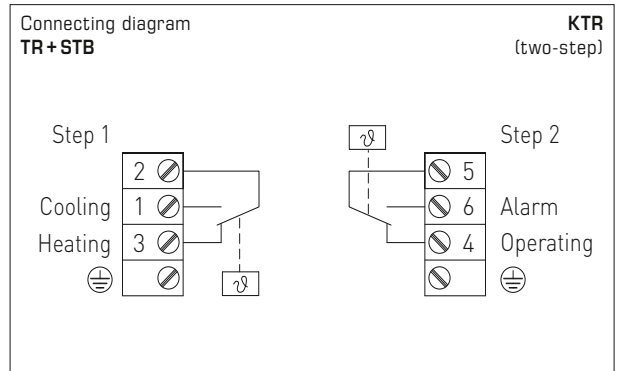
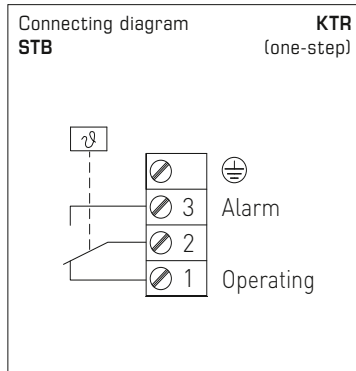
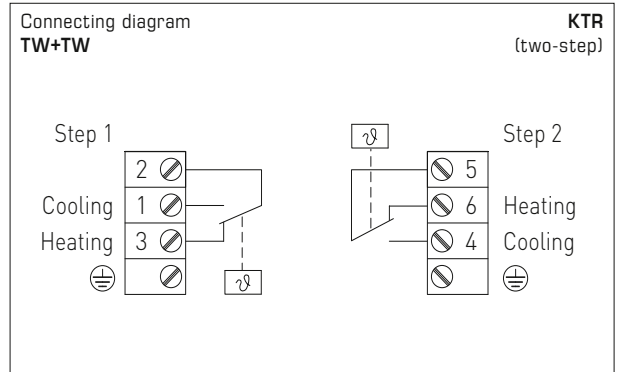
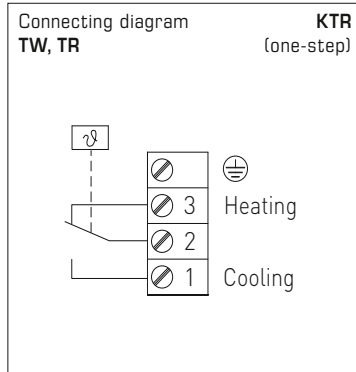
TW
Temperature monitor
(internal setting)

TR
Temperature controller
(external setting)

STB
Safety temperature limiter
(internal setting)

TW+TW
Double temperature monitor
(internal setting)

TR + STB
Temperature controller
(external setting) +
Safety temperature limiter
(internal setting)

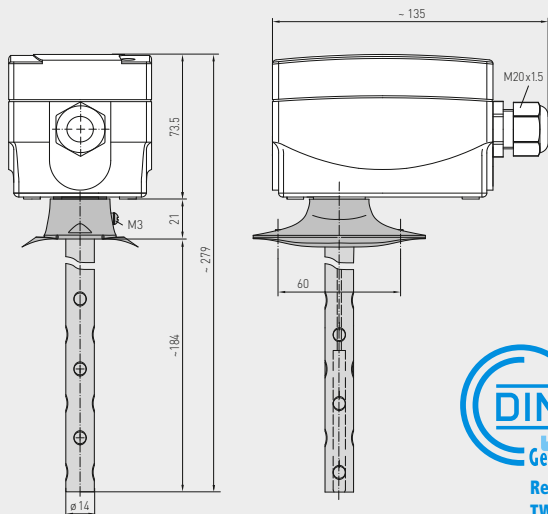


CERTIFICATE ZERTIFIKAT valid until: 25.02.2028 gültig bis: 25.02.2028 EU Type examination (module B) - production type - according to Directive 2014/68/EU Certificate No.: Z-IS-TAF-MUC-18-03-2652130-002 Name and address of manufacturer: S+S Regeltechnik GmbH Pirmas Str. 20 90411 Nürnberg Evaluation report No.: C-T 1382-01/18 dated 2018-02-26 Scope of examination: Safety temperature limiter as safety accessory type: ETR and KTR (see page 3) basis of examination and details see page 3 Manufacturing plant: S+S Regeltechnik GmbH Pirmas Str. 20 90411 Nürnberg München, 26.02.2018 TÜV SÜD Industrie Service GmbH Certification Body for pressure equipment

page 3 of certificate no. IS-TAF-MUC-18-03-2652130-002 Technical data table: Type, Code, Technical data. ETR-R6585, ETR-R90110, KTR-R6585, KTR-R90110, ETR-060R85, TR/STB, ETR-090R110, TR/STB, KTR-060R85, TR/STB, KTR-090R110, TR/STB. The conditions listed below have to be considered: 1 To keep the specified response time the types ETR... shall be used with the provided tube and thermal conducting paste 2 Possible risks caused by external fire or by traffic, wind and earthquake loading shall be examined separately depending from the installation situation of the pressure equipment

Dimensional drawing
Temperature monitor
TW

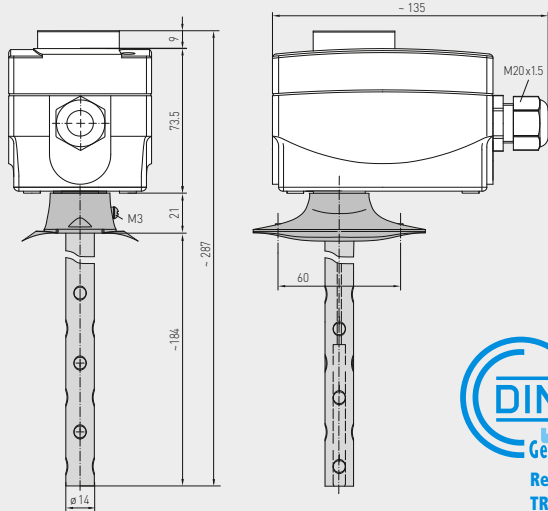
KTR-xxU
(one-step)



KTR-060U
KTR-090U
(one-step)
TW

Dimensional drawing
Temperature controller
TR

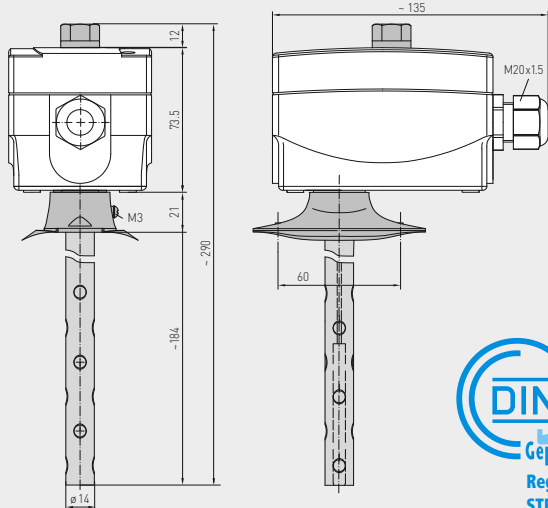
KTR-xx
(one-step)



KTR-1
KTR-060
KTR-090
KTR-0120
KTR-50140
(one-step)
TR

Dimensional drawing
Safety temperature limiter
STB

KTR-Rxx
(one-step)

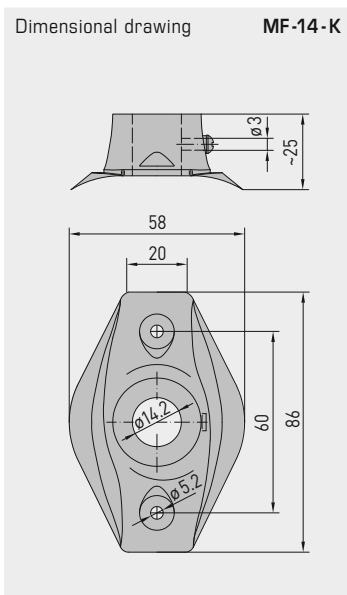


KTR-R6585
KTR-R90110
(one-step)
STB
adjustable



THERMASREG® KTR Duct temperature controllers, one-step						
Type / WG02	Ø mm	Temperature Ranges (adjustable)	Thermal Operating Difference (fixed) approx.	Maximum Capillary Temp.	Item No.	Price
KTR-060 U / 090 U					TW	
KTR-060 U	14	0...+60 °C	3K	+75 °C	1102-3010-2100-350	76,50 €
KTR-090 U	14	0...+90 °C	3K	+120 °C	1102-3010-2100-450	76,50 €
KTR-xx					TR	
KTR-1	14	-35...+35 °C	3K	+75 °C	1102-3010-1100-150	76,50 €
KTR-060	14	0...+60 °C	3K	+75 °C	1102-3010-1100-350	76,50 €
KTR-090	14	0...+90 °C	3K	+120 °C	1102-3010-1100-450	76,50 €
KTR-0120	14	0...+120 °C	5K	+135 °C	1102-3010-1100-550	76,50 €
KTR-50140	14	+50...+140 °C	5K	+150 °C	1102-3010-1100-650	76,50 €
KTR-R6585 / R90110					STB	
KTR-R6585	14	+65...+85 °C	+0 / -15...20K	+120 °C	1102-3010-6100-750	90,70 €
KTR-R90110	14	+90...+110 °C	+0 / -15...20K	+120 °C	1102-3010-6100-850	90,70 €
Extra charge:	U	= Internal setting, unless included in a certain type				9,95 €
	/2	= 2 steps, unless included in a certain type				on request
Equipment:	FT	= Manual reset when temperature drops				
	ST	= Manual reset when temperature rises				
	TR	= Temperature controller (external setting)				
	TB	= Temperature limiter (internal setting)				
	TW	= Temperature monitor (internal setting)				
	STB	= Safety temperature limiter (internal setting), selectable , with external switchpoint confirmation and restart interlock, restart by reset button at approx. 15...20 K below switching temperature (+ 0 K / - 15...20 K) with EC type test (module B) according to directive 2014 / 68 / EU				

ACCESSORIES			
MF-14-K	Mounting flange, plastic	7100-0030-2000-000	9,56 €
For further information see last chapter!			

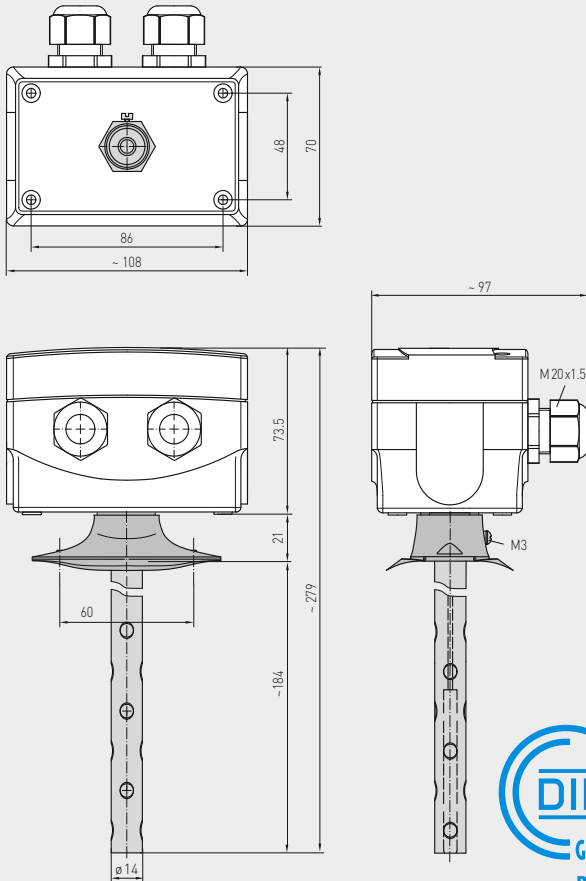


MF-14-K
Mounting flange,
plastic



Dimensional drawing
Double temperature monitor
TW + TW

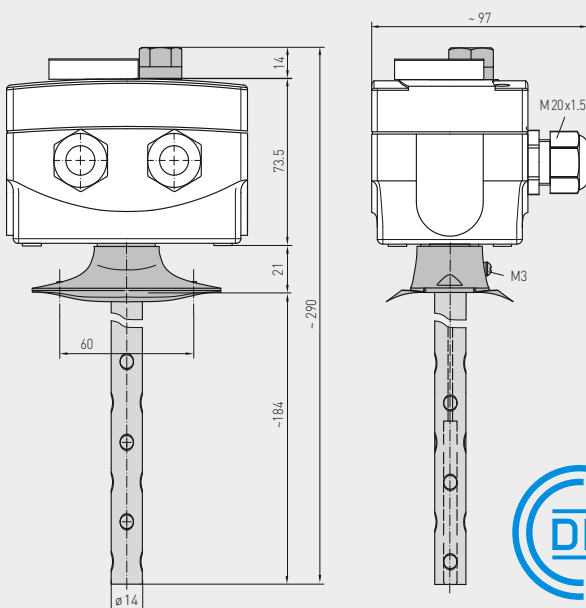
KTR-xxU
(two-step)



KTR-090090U
(two-step)
TW + TW

Dimensional drawing
Temperature controller +
safety temperature limiter
TR + STB

KTR-xxRxx
(two-step)



KTR-060R85
KTR-090R110
(two-step)
TR + STB
adjustable



THERMASREG® KTR Duct temperature controllers, two-step

Type / WG02	Ø mm	Temperature Ranges (adjustable)		Thermal Operating Difference (fixed) approx.		Maximum Capillary Temp.	Item No.	Price
		1.	2.	1.	2.			
KTR-090090 U							TW+TW	
KTR-090090 U	14	0...+90°C	0...+90°C	3K	3K	+120°C	1102-3010-2205-150	113,75 €
KTR-060R85							TR+STB	
KTR-060R85	14	0...+60°C	+65...+85°C	3K	+0/-15...20K	+120°C	1102-3010-7205-250	113,75 €
KTR-090R110							TR+STB	
KTR-090R110	14	0...+90°C	+90...+110°C	3K	+0/-15...20K	+135°C	1102-3010-7205-350	113,75 €

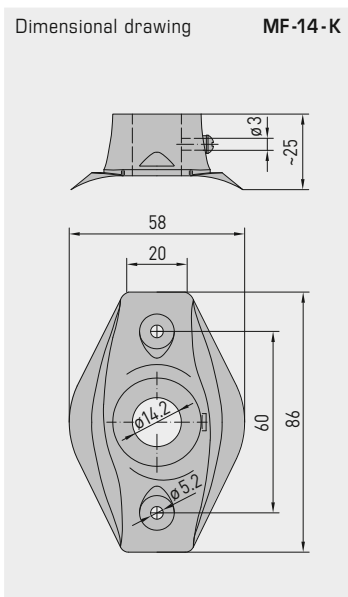
Extra charge: U = Internal setting, unless included in a certain type **9,95 €**
 /2 = 2 steps, unless included in a certain type on request

Features: TR = Temperature controller (external setting)
 TW = Temperature monitor (internal setting)
 STB = Safety temperature limiter (internal setting), selectable, with external switchpoint confirmation and restart interlock, restart by reset button at approx. 15...20 K below switching temperature (+ 0 K / - 15...20 K) with EC type test (module B) according to directive 2014/68/EU

ACCESSORIES

MF-14-K	Mounting flange, plastic	7100-0030-2000-000	9,56 €
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For further information see last chapter!



MF-14-K
Mounting flange, plastic



Surface contact temperature controllers, including tension spring

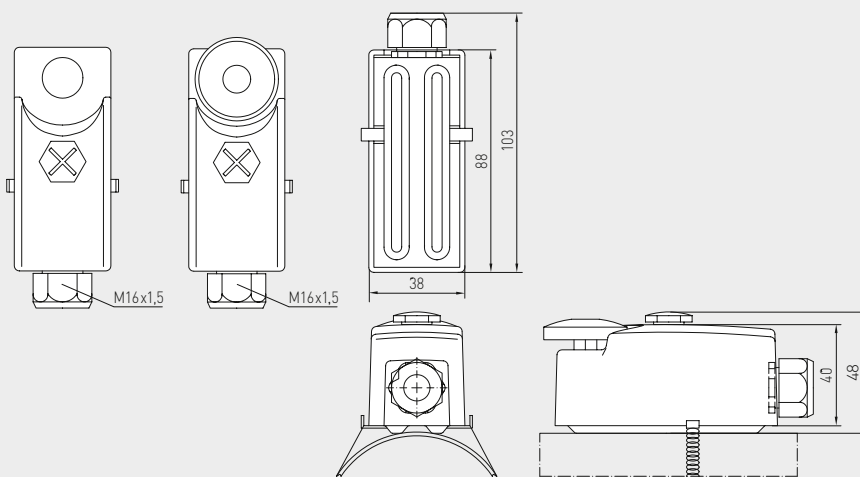
Mechanical temperature controllers / contact thermostats **THERMASREG® ALTR** with switching output (two-position controller) for monitoring, controlling and limitation of temperatures at pipes or vessels, e.g. in connection with hot-water or floor heating systems. The contact temperature controller ALTR is built as one-step device, as adjustable temperature controller **TR** (with external setting) or as adjustable temperature monitor **TW** (with internal setting).

TECHNICAL DATA

Switching capacity: (Contact load)	16 (4) A; 24...250 V AC at 24 V AC min. 150 mA
Max. sensor temperature:	+110 °C
Contact:	dust-proof switch block unit as potential-free single-pole changeover contact
Housing:	ABS (acrylonitrile butadiene styrene), fibre-glass reinforced, base: steel, galvanised, top: grey, M 16 x 1.5
Housing temperature:	-35...+65 °C
Tolerance:	T _{min} ± 5 K; T _{max} ± 5 K
Sensor element:	bi-metal
Housing dimensions:	38 x 48 x 103 mm
Process connection:	by metal tension spring, 220 mm long (included in the scope of delivery)
Electrical connection:	0.14 - 1.5 mm ² via terminal screws
Protection class:	I (according to EN 60 730)
Protection type:	IP 40 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU

FUNCTION **Heating:** wire contacts C - 1
Cooling: wire contacts C - 2

Dimensional drawing ALTR 060 / 090



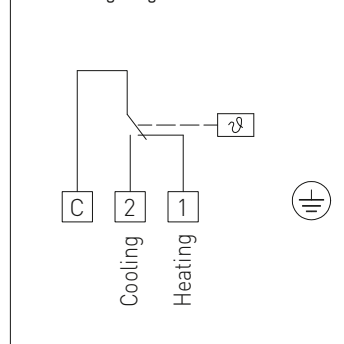
ALTR 060 / 090



ALTR 060 / 090 U



Connecting diagram ALTR 060 / 090



THERMASREG® ALTR 060 / 090 Surface contact temperature controllers

Type / WG01	Temperature Range	Thermal Operating Difference (fixed) approx.	Max. Capillary Temperature	Item No.	Price
ALTR 060 / 090					TR (External setting)
ALTR-060	0...+60 °C	8 K (± 1 K)	+110 °C	1102-1040-1100-300	31,84 €
ALTR-090	0...+90 °C	8 K (± 1 K)	+110 °C	1102-1040-1100-400	31,84 €
ALTR 060 / 090 U					TW (Internal setting)
ALTR-060 U	0...+60 °C	8 K (± 1 K)	+110 °C	1102-1040-2100-300	31,84 €
ALTR-090 U	0...+90 °C	8 K (± 1 K)	+110 °C	1102-1040-2100-400	31,84 €



Mechanical temperature controllers / contact thermostats **THERMASREG® ALTR** with switching output (two-position controller) for monitoring, controlling and limitation of temperatures at pipes or vessels, e.g. in connection with hot-water or floor heating systems. The contact temperature controller ALTR is built as one-step device, as adjustable temperature controller **TR** (with external setting) or as adjustable temperature monitor **TW** (with internal setting).

TECHNICAL DATA

Switching capacity:	24 ... 250 V AC + 10%, 16 A, cos φ = 1.0 (Contact load) 24 ... 250 V AC + 10%, 1.5 A, cos φ = 0.6 at 24 V AC min. 150 mA
Contact:	dust-proof switch block unit as potential-free single-pole changeover contact
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016)
Housing dimensions:	108 x 70 x 73.5 mm (Thor 2)
Cable gland:	M20 x 1.5; including strain relief
Housing temperature:	-35...+65 °C
Tolerance:	T _{min} ± 5 K; T _{max} ± 5 K
Design principle:	torsion meter with liquid filling
Process connection:	endless strap with metal tightener (included in the scope of delivery), Ø = 13 - 92 mm (1/4 - 3"), L = 300 mm
Electrical connection:	0.14 - 2.5 mm ² via terminal screws
Protection class:	I (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU

FUNCTION

Heating: The preset setpoint (scale value) is equivalent to the switch-off value of the heating. The switch-on value is lower by the amount of operating difference. Contact 2-3 breaks when temperature rises to the preset value.

Cooling: The preset setpoint (scale value) is equivalent to the switch-on value of the cooling. The switch-off value is lower by the amount of operating difference. Contact 1-2 closes when temperature rises to the preset value.

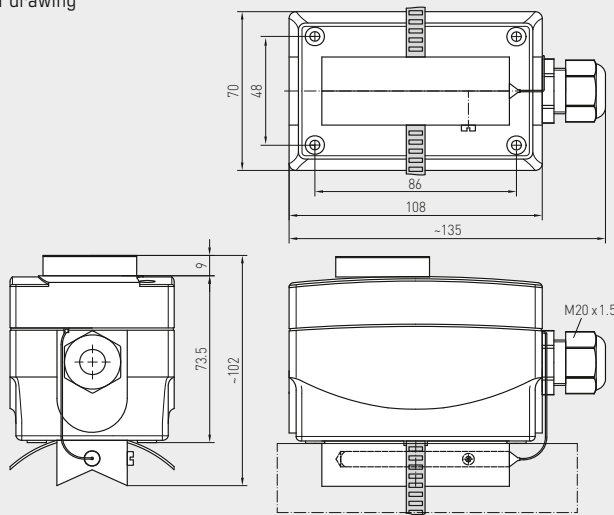
ALTR 1/3/5/7



ALTR 1/3/5/7U



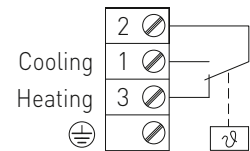
Dimensional drawing



ALTR 1/3/5/7

Connecting diagram

ALTR 1/3/5/7



THERMASREG® ALTR 1 / 3 / 5 / 7 Surface contact temperature controllers

Type/WG01	Temperature Range	Thermal Operating Difference (fixed) approx.	Max. Capillary Temperature	Item No.	Price
ALTR 1/3/5/7					
TR (External setting)					
ALTR-1	-35... +35 °C	5K (± 1 K)	+60 °C	1102-1030-1100-100	100,68 €
ALTR-3	0... +60 °C	5K (± 1 K)	+75 °C	1102-1030-1100-300	100,68 €
ALTR-5	0... +90 °C	5K (± 1 K)	+120 °C	1102-1030-1100-400	100,68 €
ALTR-7	0... +120 °C	5K (± 1 K)	+130 °C	1102-1030-1100-500	100,68 €
Extra charge:	U = Internal setting (TW), e.g. ALTR-1 U				9,95 €

Frost protection thermostats, mechanical, one-step, with switching output

The mechanical frost protection thermostat / frost monitor **THERMASREG® FST** with switching output, fully-active sensor rod, with automatic reset, or with mechanical locking and manual reset, is available with capillaries in lengths of 0.6 m, 1.8 m, 3 m, 6 m, or 12 m. This frost protection monitor is used for air- and water-side temperature monitoring at heat exchangers, water circulation systems, and heating registers to prevent freezing up and to avoid frost damages, e. g. in ventilation and air conditioning ducts. All devices are self-secure with sensor breakage detection. In case of damage to the capillary tube – membrane system, the relay automatically switches to heating function. **FST-3** can also be used for monitoring liquids. The sensor tube can be installed inside an immersion sleeve. Mounting clamps **MK-05-K** are included in the delivery.

FST - 1D / 5D / 7D / 8D

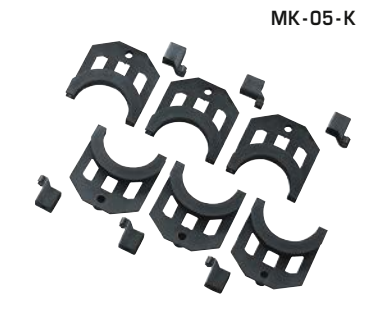
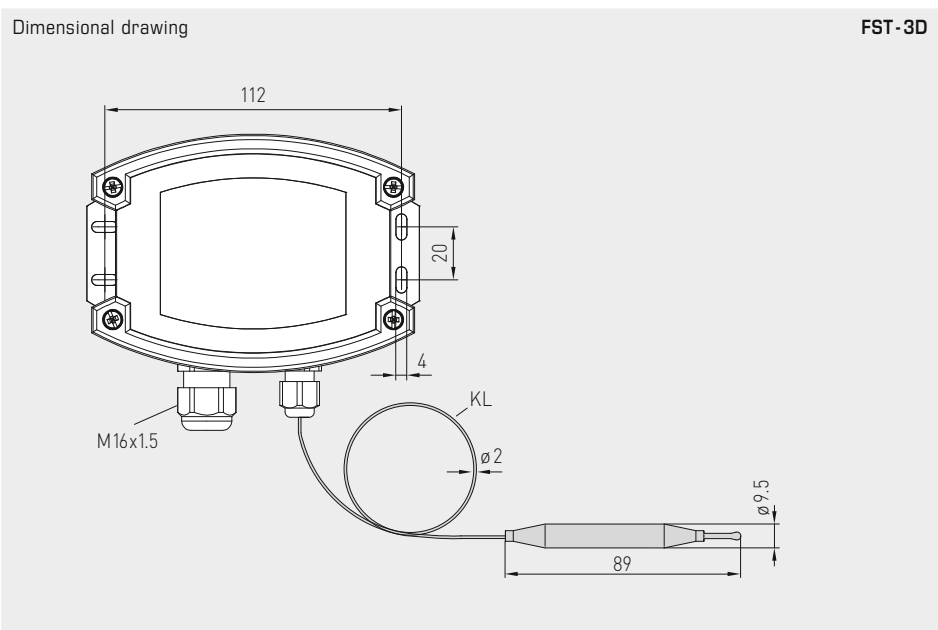
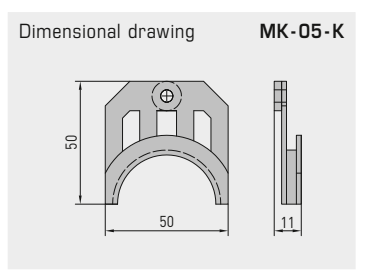
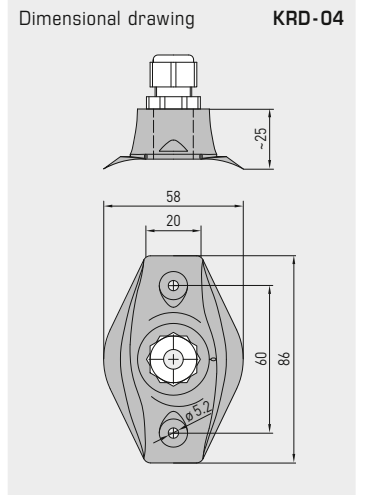
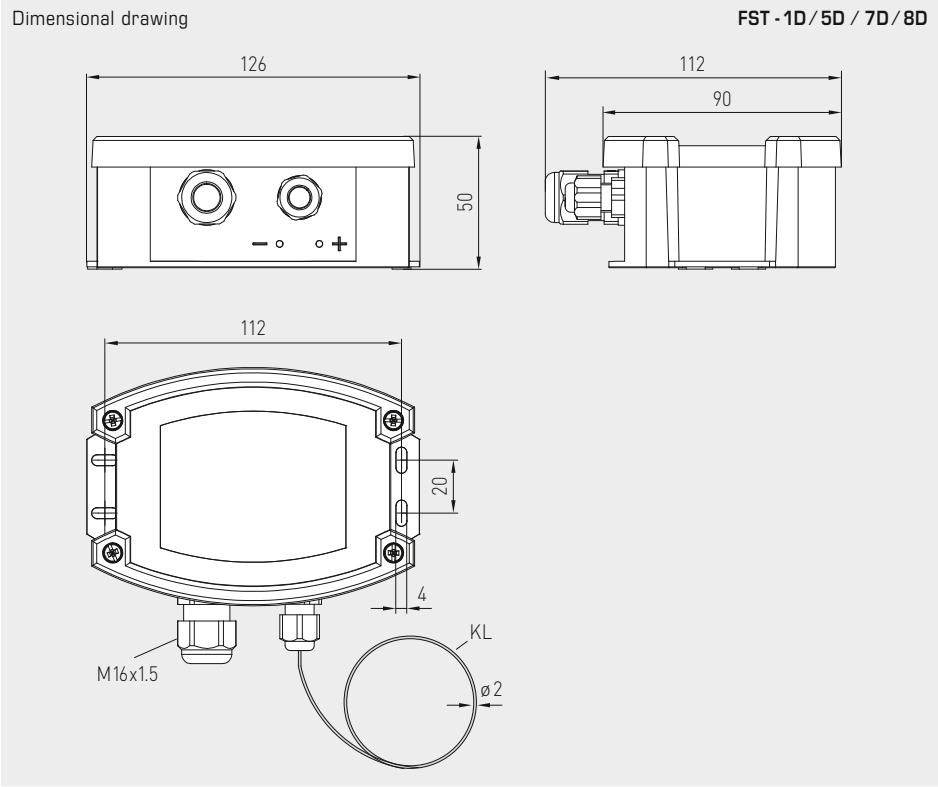


TECHNICAL DATA

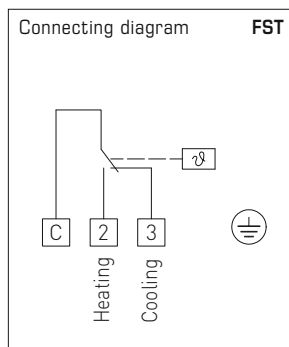
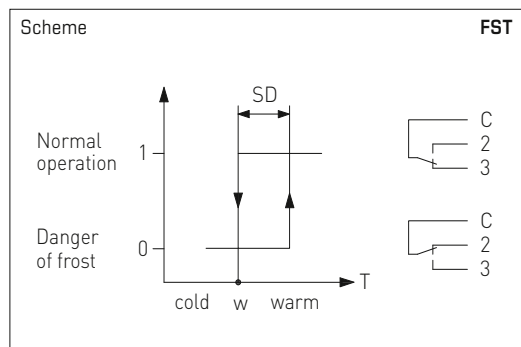
Switching capacity:	10 (2) A, AC 250 V; because of gold-plated switching contacts also switching of signal voltages < 24 V
Setting range:	-10...+15 °C / +14 °F...+59 °F, factory setting to w = +5 °C (+41 °F)
Operating difference:	2 ± 1 K (3.6 ± 1.8 °F)
Reproducibility:	± 0.5 K (± 0.9 °F)
Contact:	dust-proof micro switch as single-pole potential-free changeover contact
Sensor responding length:	approx. 40 cm
Length of capillary tube:	see table of types (0.6...12 m)
Resetting:	FST-xD automatic FST-xD-HR manual
Permissible medium:	FST-1D/5D/7D/8D air FST-3D water
Ambient temperatures:	maximum operating temperature: +70 °C (+158 °F) minimum operating temperature: w + min. +2 °C (min. +3.6 °F) storage / transport: -30...+70 °C (-22...+158 °F) capillary: max. +150 °C (+302 °F)
Process connection:	by mounting clamps MK-05-K (included in the scope of delivery)
Housing:	plastic, UV-resistant, material polyamide, 30 % glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016)
Housing dimensions:	126 x 90 x 50 mm (Tyr2)
Cable gland:	M16 x 1.5; including strain relief
Other materials:	mechanical sheet metal parts: galvanised steel capillary tube: copper capillary tube filling: R 507 switching contacts: Ag / Ni (90% / 10%) gold-plated (3 µm)
Installation length:	arbitrary
Routing:	bending radius > 35mm admissible vibration load ≤ ½g admissible tensile load < 100N
Electrical connection:	0.14 - 2.5 mm²
Protection class:	I (according to EN 60 730-1)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE conformity, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU
FUNCTION	Contact C-2: danger of frost / sensor breakage Contact C-3: normal operation
For further information and accessories see next page...	

FST-3D





Frost protection thermostats, mechanical, one-step, with switching output



FST - 1D / 5D / 7D / 8D - HR
(manual rest)



FUNCTION

The switch inside frost protection thermostat **FST** responds (closes contact C-2) when temperature falls below the preset temperature setpoint over a capillary tube length of at least 40cm. Simultaneously contact C-3 breaks and can be used as a signal contact. Resetting (closing contact C-3) happens automatically when temperature rises above the preset setpoint value again (on type **FST-xR** resetting must be done manually by pressing the reset button).

The **FST** is "intrinsically safe", i.e., in the event of damage to the capillary tube-membrane system, it automatically switches to the heating function. Contact C-2 closes and therefore can be used as operating contact. The air temperature is detected over the entire sensor length (capillary tube). The gas-filled (R507) membrane system and the capillary tube constitute one measuring unit, which is mechanically coupled to the microswitch.

Capillary tube: The capillary tube is laid uniformly at the hot side of the air heater to be protected (in case of air coolers in front of the air cooler) at a distance of approx. 5cm cross-wise to the heat exchanger tubes over the entire area. For test purposes, it is recommended to make a loop of approx. 20cm directly underneath the housing and before entering the air duct. To avoid damaging the capillary tube, a minimum bending radius of 20mm must be observed. Installation is facilitated by using the mounting clamps available under accessories.

Frost simulation: The frost situation can be simulated and functioning of the device can be tested by dipping the capillary tube testing loop into a pot filled with ice water.

FST-3D-HR
(manual rest)



WS-03

Weather and sun protection hood (optional)





FST-xD
TW = temperature monitor
(automatically switching)



FST-xD-HR
TB = temperature limiter
(manual reset)



THERMASREG® FST Frost protection thermostats, mechanical						
Type / WG03B	Temperature Range	Thermal Operating Difference (fixed) approx.	Length of Capillary	Permissible Medium	Item No.	Price
FST-xx D					TW	
FST-1D *	-10...+15°C	2K (± 1 K)	6.0 m	air	1102-1021-0102-000	87,15 €
FST-3D *	-10...+15°C	2K (± 1 K)	1.8 m	air / water	1102-1023-0102-000	88,92 €
FST-5D *	-10...+15°C	2K (± 1 K)	3.0 m	air	1102-1022-0102-000	84,78 €
FST-7D *	-10...+15°C	2K (± 1 K)	12.0 m	air	1102-1025-0102-000	150,22 €
FST-8D	-10...+15°C	2K (± 1 K)	0.6 m	air	1102-1024-0102-000	82,50 €
FST-xx D- HR					TB	
FST-1D-HR *	-10...+15°C	2K (± 1 K)	6.0 m	air	1102-1021-1102-000	104,70 €
FST-3D-HR *	-10...+15°C	2K (± 1 K)	1.8 m	air / water	1102-1023-1102-000	107,30 €
FST-5D-HR *	-10...+15°C	2K (± 1 K)	3.0 m	air	1102-1022-1102-000	104,33 €
FST-7D-HR *	-10...+15°C	2K (± 1 K)	12.0 m	air	1102-1025-1102-000	165,50 €
FST-8D-HR	-10...+15°C	2K (± 1 K)	0.6 m	air	1102-1024-1102-000	97,77 €
Features:	FST-xD	TW = temperature monitor (automatically switching)				
	FST-xD-HR	TB = temperature limiter (manual reset)				

ACCESSORIES			
KRD-04	Capillary tube gland bracket	7100-0030-7000-000	8,91 €
MK-05-K	Mounting clamps (6 pieces) plastic (*= included in the scope of delivery)	7100-0034-1000-000	9,88 €
TH-MS-01	Immersion sleeves, brass, for FST-3	7100-0011-5402-000	15,55 €
TH-VA-02	Immersion sleeves, stainless steel V2A (1.4301), for FST-3	7100-0012-5402-000	40,74 €
WS-03	Weather and sun protection hood, 200 x 180 x 150 mm, stainless steel V2A (1.4301)	7100-0040-6000-000	44,74 €

For further information see last chapter!

**Duct frost protection thermostat,
incl. mounting flange, mechanical, one-step,
with switching output**

Mechanical frost protection thermostat / frost monitor **THERMASREG® FST-K** with switching output, duct tube monitored across the entire length, with automatic reset or with mechanical locking, with/without optional manual reset.

The frost protector is suitable for air side temperature monitoring at heat exchangers and heating registers to prevent freezing up and to avoid frost damage, e.g. in ventilation and air conditioning ducts. The FST-K is intrinsically safe and is equipped with sensor breakage detection. In the event of damage to the capillary membrane system, the frost sensor automatically switches to the heating function. The scope of delivery includes the mounting flange **MF-14-K**.

TECHNICAL DATA

Switching capacity:	10 (2) A, AC 250 V; because of gold-plated switching contacts also switching of signal voltages < 24 V
Setting range:	-10...+15 °C / +14 °F...+59 °F, factory setting to $w = +5 °C (+41 °F)$
Operating difference:	$2 \pm 1 K (3.6 \pm 1.8 °F)$
Reproducibility:	$\pm 0.5 K (\pm 0.9 °F)$
Contact:	dust-proof micro switch as single-pole potential-free changeover contact
Resetting:	FST-K automatic FST-K-HR manual (by hand)
Permissible medium:	Air
Ambient temperatures:	maximum operating temperature: +70 °C (+158 °F) minimum operating temperature: $w + \text{min. } +2 °C (\text{min. } +3.6 °F)$ storage / transport: -30...+70 °C (-22...+158 °F)
Housing:	plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, colour traffic white (similar to RAL 9016)
Housing dimensions:	108 x 70 x 73.5 mm (Thor 2)
Cable gland:	M 20 x 1.5; with strain relief
Process connection:	by mounting flange, plastic (included in the scope of delivery)
Electrical connection:	0.14 - 2.5 mm ² , via screw terminals
Protective tube:	metal , material CuZn37 (2.0321), Ø 14 mm, NL = 205 mm
Other materials:	mechanical sheet metal parts: galvanised steel capillary tube: copper capillary tube filling: R 507 switching contacts: Ag / Ni (90% / 10%) gold-plated (3 µm)
Protection class:	I (according to EN 60 730-1)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE conformity, EMC Directive 2014 / 30 / EU, Low Voltage Directive 2014 / 35 / EU
FUNCTION	Contact C-2: danger of frost / sensor breakage Contact C-3: normal operation
For further information and accessories see next page...	

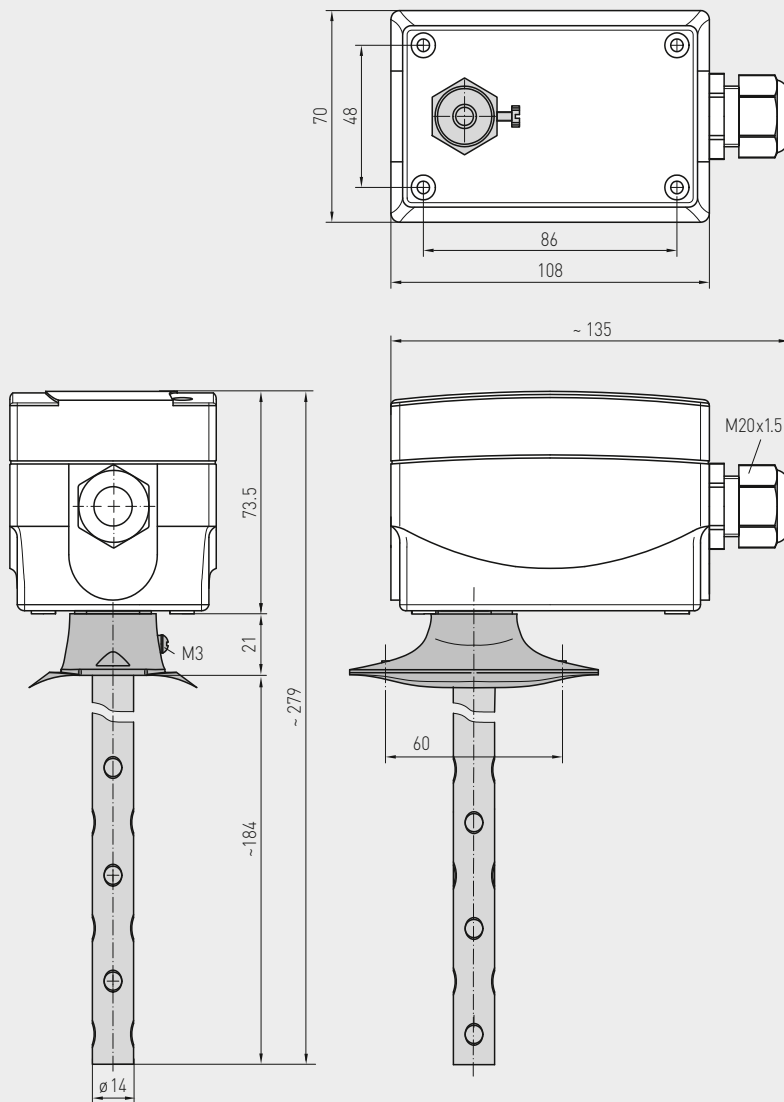


Duct frost protection thermostat, incl. mounting flange, mechanical, one-step, with switching output



Dimensional drawing

FST-K



FST-K



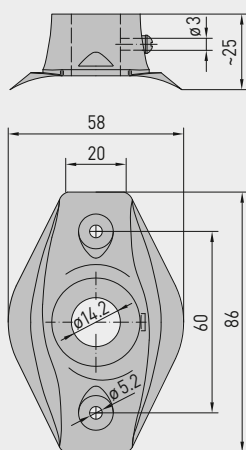
FST-K-HR with manual reset



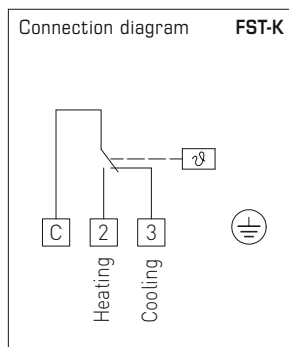
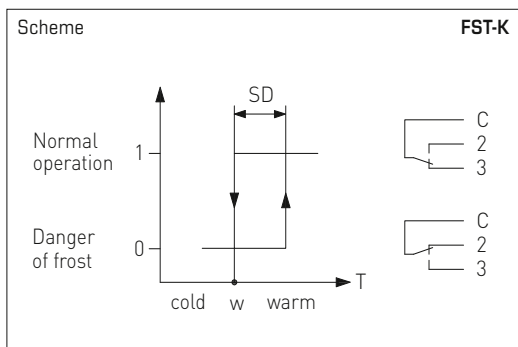
Dimensional drawing

MF-14-K

MF-14-K
Mounting flange,
plastic



Duct frost protection thermostat,
incl. mounting flange, mechanical, one-step,
with switching output



FUNCTION

The switch in the **FST-K** duct frost protection thermostat responds if the temperature across the entire length of the duct tube falls below the preset temperature setpoint (closes contact C-2). Contact C-3 opens at the same time and can be used as a signal contact. Resetting occurs automatically (contact closes C-3) if the temperature rises above the preset setpoint again (on type **FST-K-HR**, resetting must be performed manually using the reset button).

The **FST-K** is "intrinsically safe", i.e., in the event of damage to the capillary tube-membrane system, it automatically switches to the heating function. Contact C-2 closes and can therefore be used as an operating contact. The air temperature is detected over the entire length of the sensor (capillary tube). The gas-filled (R507) membrane system and the capillary tube constitute one measuring unit, which is mechanically coupled to the microswitch.



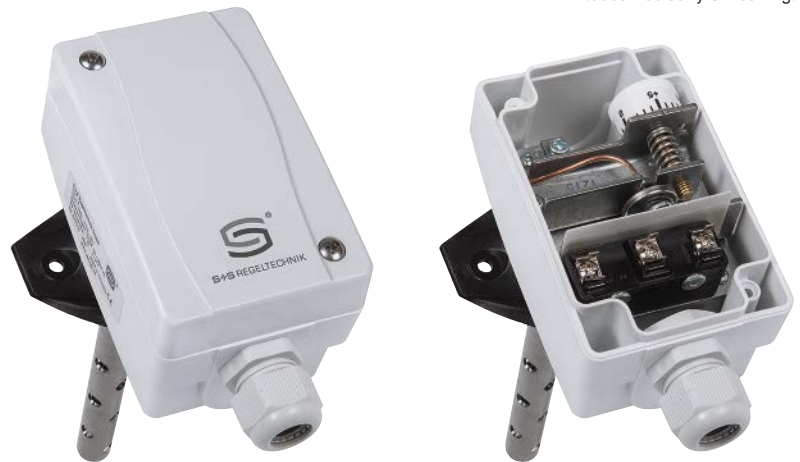
S+S REGELTECHNIK

THERMASREG® FST-K

Duct frost protection thermostat,
incl. mounting flange, mechanical, one-step,
with switching output

FST-K

TW = temperature monitor
(automatically switching)



FST-K-HR

TB = temperature limiter
(manual reset)



THERMASREG® FST-K Duct frost protection thermostat, mechanical

Type / WG02	Temperature Range	Thermal Operating Difference (fixed) approx.	Function	Permissible Medium	Item No.	Price
FST-K					TW	
FST-K	-10...+15°C	2K (± 1K)	TW	air	1102-1064-0100-001	120,11 €
FST-K-HR					TB	
FST-K HR	-10...+15°C	2K (± 1K)	TB	air	1102-1064-1100-000	135,40 €
Equipment:	FST-K FST-K-HR	TW = temperature monitor (automatically switching) TB = temperature limiter (manual reset)				

ACCESSORIES

MF-14-K	Mounting flange, plastic	7100-0030-2000-000	9,56 €
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For further information see last chapter!

**2-phase frost protection thermostat,
with control and cascading input,
with active and switching output**

FS-20

Electronic frost protection thermostat / frost monitor **THERMASREG® FS-20** with switching relay output, continuous temperature and valve output (summation output 0–10V) and control and cascading output (0–10V), optionally with connection for heating element, in an impact-resistant plastic housing with quick-locking screws, with display by default, with fully active sensorrod made from copper.

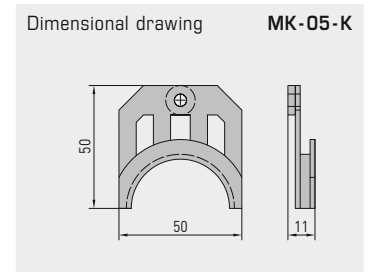
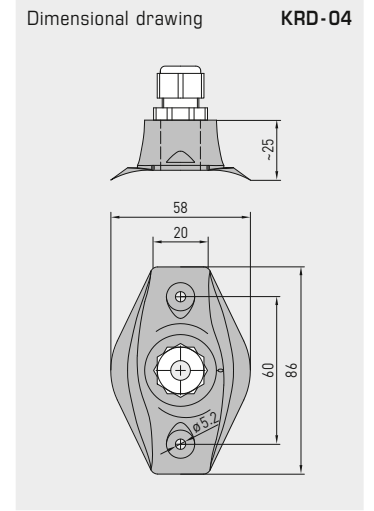
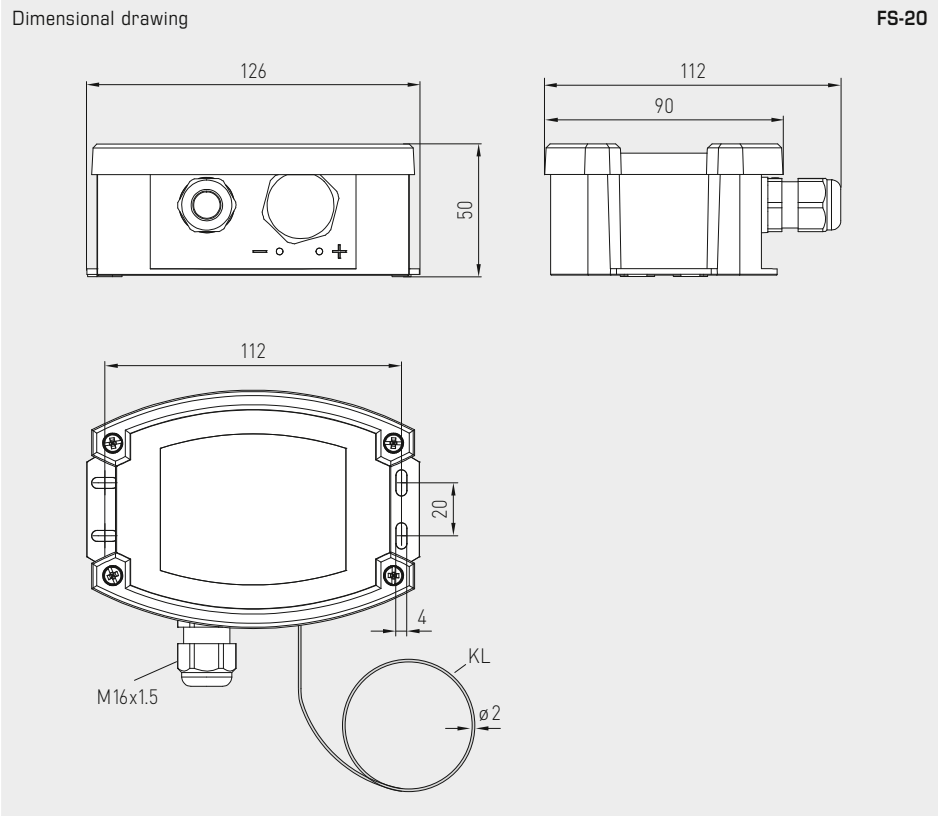
The frost monitor is used to monitor air conditioning systems, heat exchangers, heating registers and similar systems, and protects against frost damage and freezing. Falling below the limit value is detected at the coldest measuring point of the capillary tube, the sensor rod is active along its entire length. Uses internal diagnostics to detect capillary breakage, power failure or electric damage to the sensor as an error and the relay automatically switches to frost.

The innovative 2-phase frost protection thermostat enables simple combination of several devices (cascading) for demand-oriented, comprehensive frost monitoring. The delivery scope includes the mounting clamps **MK-05-K** for expert attachment of the sensor rod.



TECHNICAL DATA

Power supply:	24 V AC / DC (± 10 %)
Load resistance:	$R_L > 50 \text{ k}\Omega$
Measuring range:	0...+15 °C
Input:	1 x 0-10V control input DDC 1 x 0-10V ascading input
Output:	1 x 0-10V output temperature (corresponding to 0...+15 °C) 1 x 0-10V output valve (frost signal with control voltage and cascading) 1 x potential-free changeover contact (24 V), range of adjustment 0...+15 °C
Current consumption:	max. 100 mA at 24 V DC (FS-20 without heating element) max. 200 mA at 24 V DC (FS-20 xx HE with heating element)
Accuracy:	typically ± 1 K (at +10 °C)
Hysteresis of the switch step:	2K
Turn-on/run-in time:	< 1 min
Response time:	$t_{90} < 5 \text{ s}$
Sensor and capillary tube:	Copper sensor rod, length of 3 m or 6 m, active along the entire sensor length, min. response length of 25 cm
Ambient temperatures:	Sensor and capillary tube: -20...+60 °C (capillary tube at a distance of > 20 cm from the housing) Housing: -15...+50 °C Storage/transport: -30...+70 °C
Housing:	plastic, UV-resistant, material polyamide, 30 % glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016), housing cover for display is transparent!
Housing dimensions:	126 x 90 x 50 mm (Tyr2)
Cable gland:	M 16 x 1.5; including strain relief, exchangeable, max. inner diameter 10.4 mm
Process connection:	by mounting clamps MMK-05-K (included in the scope of delivery)
Electrical connection:	0.14 - 1.5 mm ² , via screw terminals
Routing:	bending radius > 35mm admissible vibration load ≤ ½g admissible tensile load < 100N
Permitted humidity:	< 95 % RH, non-precipitating air
Protection class:	III (according to EN 60 730)
Protection type:	IP 65 (according to EN 60 529)
Standards:	CE-conformity, electromagnetic compatibility according to EN 61 326, EMC directive 2014 / 30 / EU
Equipment:	display with illumination , three-line, cutout approx. 70 x 40 mm (W x H), for displaying the actual temperature, measuring range overrange/underrange of the set switch point (frost protection temperature), and alarm indicator for "frost" or "error" (capillary breakage, overvoltage/undervoltage)
Internal diagnostics:	Error 1 in case of cable / capillary breakage Error 2 in case of undervoltage / overvoltage (relay automatically switches to frost)



WS-03
Weather and sun protection hood (optional)



**2-phase frost protection thermostat,
with control and cascading input,
with active and switching output**

FUNCTION

The filling used in the copper capillary tube in the frost protection monitor generates a pressure signal that is proportional to the lowest temperature on the entire capillary tube (but min. 200mm). This is converted into an electrical signal by a sensor and electronically amplified. The standard signal 0-10V generated as a result corresponding to 0...+15°C is issued. This voltage is available at the "Temp." terminal.

The internal potentiometer can be used to specify a **frost switchpoint "FS"** for the potential-free changeover contact in the range from 0°C (left limit stop) to +15°C (right limit stop). If this switchpoint "FS" is undershot, the relay output switches to the "frost protection" position (contact "W" connected to contact "Ö"). If the temperature rises by more than 2K above the set switchpoint "FS", the device switches back to normal operating mode if **"Reset Auto"** is selected. The relay drops out to the initial position (contact "W" connected to contact "S"). If the **"Reset Hand"** operating mode is selected, the relay output does not automatically switch even if the set switchpoint "FS" +2K is exceeded, but must be manually reset from the **reset button**.

In addition, a second voltage output "AV", mapped by 0-10V, is available. At a voltage of 0V if the measured temperature is at least 6K above the set switchpoint "FS". If the measured temperature falls below the set switchpoint "FS"+6K, the voltage output "AV" increases in a linear fashion from 0V to 10V. The increase here amounts to 1.67 V for every degree Kelvin by which the temperature approaches the preset switchpoint "FS". The output voltage 10V is therefore issued at "FS" = measured temperature. If you increase "SE", the output voltage "AV" is increased by this amount. The "AV" output therefore represents a summation output for the input variables "SE" and "Frost signal". In this case, the "Frost signal" variable describes the output behaviour of "AV" at "SE" = 0V. The maximum output voltage is restricted to 10V.

Several frost protection devices can be connected to each other via the **cascading input "KE"** to cover a larger channel cross-section for frost monitoring. The AV output of the first device is connected to the KE input of the second device. The internal device logic decides on the priority frost signal of both devices for controlling the heating register valve.

In the event of capillary breakage, electrical sensor damage (cable breakage), voltage failure, falling short of the permissible voltage level or exceeding it, the relay output is automatically switched to "Frost protection" (contact "W" connected to contact "Ö").

NOTE

The capillary tube must be securely seated in the socket and must not twist.
A redundant setup to protect critical systems is **absolutely necessary**.

Display readout
FS-20

Normal operation
Actual temperature and set switchpoint temperature

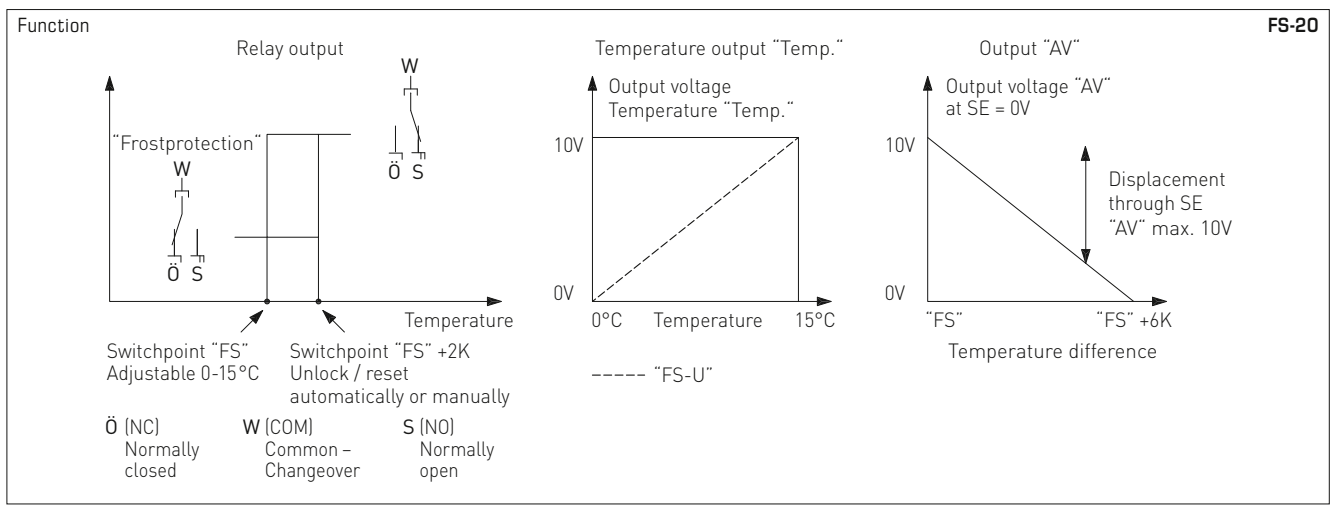
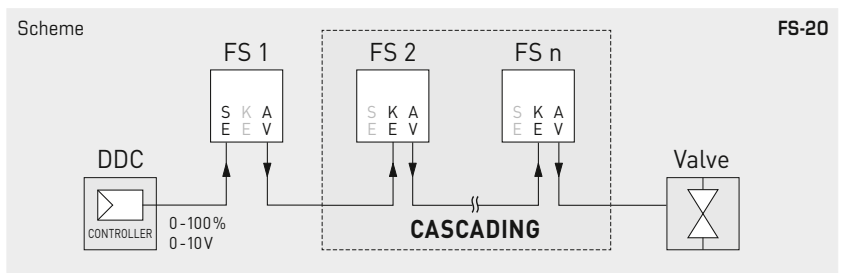
Frost protection alarm
Actual temperature is below switchpoint temperature

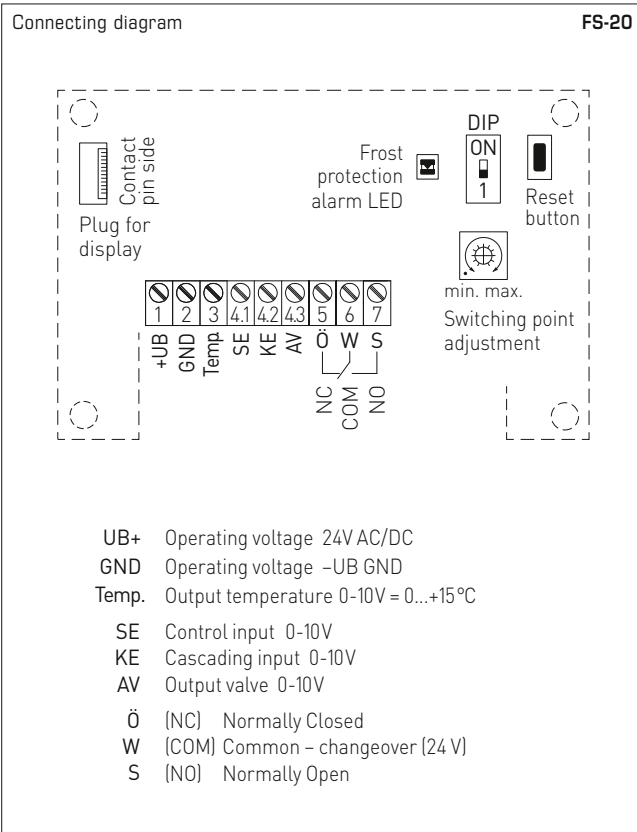
Measuring range exceeded
Actual temperature rises above +15°C

Measuring range underranged
Actual temperature falls below 0°C

1 ERROR Error message 1 in case of cable/capillary breakage

2 ERROR Error message 2 in case of undervoltage/overvoltage





DIP switch FS-20	
Resetting after frost protection (Mode adjustable)	DIP 1
Reset Hand (manually) Alarm remains saved	ON
Reset Auto (automatically) Alarm is reset automatically (default)	OFF

THERMASREG® FS-20 Two-phase frost protection thermostats

Type/WG02	Measuring Range	Output	Sensor length	Display	Item No.	Price
FS-20						
FS20-UW 3m LCD	0...+15°C	2 x 0-10V, 1 x changeover contact	3,0m	■	1102-1012-2102-030	256,02 €
FS20-UW 6m LCD	0...+15°C	2 x 0-10V, 1 x changeover contact	6,0m	■	1102-1011-2102-030	300,76 €
FS-20 xx HE with heating element						
FS20-UW-HE 3m LCD	0...+15°C	2 x 0-10V, 1 x changeover contact	3,0m	■	1102-1012-2112-030	278,63 €
FS20-UW-HE 6m LCD	0...+15°C	2 x 0-10V, 1 x changeover contact	6,0m	■	1102-1011-2112-030	324,47 €

ACCESSORIES			
KRD-04	Capillary tube gland bracket		7100-0030-7000-000 8,91 €
MK-05-K	Mounting clamps (6 pieces) plastic (included in the scope of delivery)		7100-0034-1000-000 9,88 €
WS-03	Weather and sun protection hood, 200x180x150 mm, stainless steel V2A (1.4301)		7100-0040-6000-000 44,74 €

For further information see last chapter!

Temperature controller for top hat rail installation for remote sensor, with multi-range switching and switching output

Electronic top hat rail thermostat / top hat rail temperature controller **THERMASREG® TET** for installation in distributor boxes or control cabinets, with switching output, multi-range switching, and adjustable hysteresis. It is used for electronic control and monitoring of temperatures by remote sensors in the residential sector (e.g. in connection with floor heating systems), in halls and greenhouses and in the industrial sector.

This controller is provided with sensor breakage detection and a switch-off function.

TECHNICAL DATA

Power supply:	24 V DC, +10% / -15%; 24 V AC or 230 V AC, +10% / -15%, 50 - 60 Hz
Power consumption:	2.5 VA
Control range:	-10...+30 °C; +20...+80 °C; +60...+120 °C, selectable
Input:	Pt1000
Output:	relay as single-pole, potential-free changeover contact (1x)
Switching capacity: (Contact load)	max. 6 A 250 V AC U _e / I _e AC-15, 120 V / 3.5 A, 240 V / 3 A U _e / I _e DC-13, 24 V / 2.5 A EN 60947-5-1, VDE 0435
Operating Difference:	adjustable
Lifetime:	changeover contact mechanical: 5 x 10 ⁶ changeover contact electrical: 1 x 10 ⁵
Ambient conditions:	-20...+60 °C, non-precipitating air
Operating mode indicator:	LED
Housing:	plastic, colour black-grey (similar to RAL 7021) and light grey (similar to RAL 7035), width: 45 mm, 3TE
Electrical connection:	0.14 - 2.5 mm ² via terminal screws
Mounting:	on DIN top hat rail
Humidity:	< 90 % RH, non-precipitating air
Protection class:	II (according to EN 60730)
Protection type:	IP 20 at front side (according to EN 60529)
Standards:	CE conformity, electromagnetic compatibility according to EN 61326, EMC directive 2014 / 30 / EU, low-voltage directive 2014 / 35 / EU

FUNCTION

The range of interpretation is selected at the lower potentiometer.

Three measuring ranges can be chosen: -10...+30 °C; +20...+80 °C; +60...+120 °C.

The temperature to be monitored is determined by the potentiometer »Setpoint« and the switchpoints (hysteresis) are defined at the potentiometer »Hyst.«

When temperature at the Pt1000 exceeds the value of »Setpoint + Hyst.«, the output relay switches to rest position (switched off).

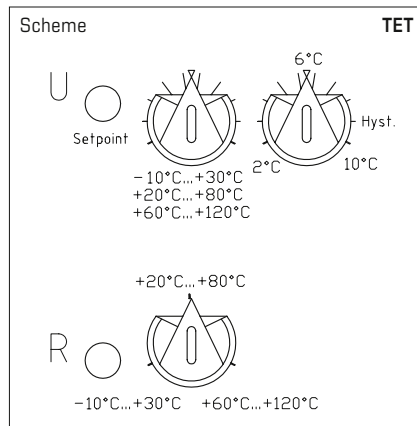
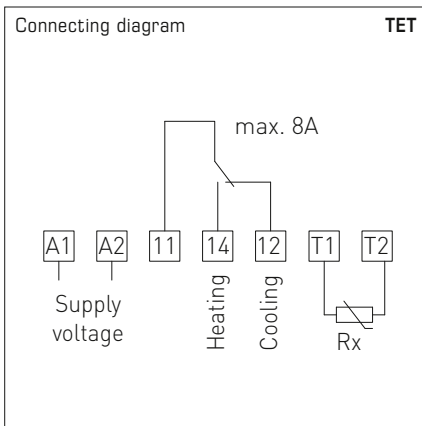
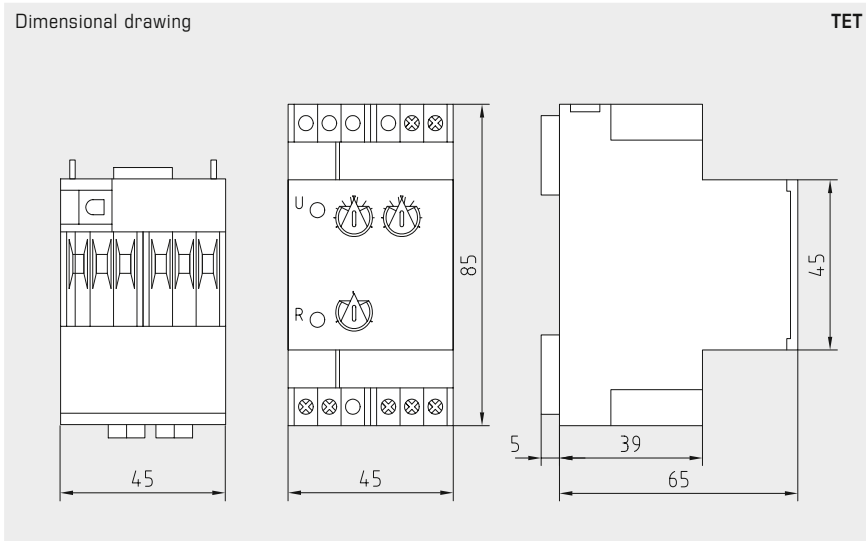
When temperature falls below »Setpoint - Hyst.«, the output relay is reactivated.

The following conditions result in a drop of the relay to rest position:

Excess temperature, short circuit, or wire breakage at the Pt 1000 sensor, failure of power supply.

Measuring input and power supply have no electric connection i.e. are galvanically isolated.

TET



THERMASREG® TET Temperature controller for top hat rail installation						
Type / WG01	Supply Voltage	Input Sensor	Output	Item No.	Price	
TET						
TET-230VAC	230 V AC, 2,5 VA	Pt1000	1 x changeover contact (potential-free)	1 102-6021-0000-000	201,83 €	
TET-24VAC	24 V AC, 2,5 VA	Pt1000	1 x changeover contact (potential-free)	1 102-6022-0000-000	201,83 €	
TET-24VDC	24 V DC, 2,5 VA	Pt1000	1 x changeover contact (potential-free)	1 102-6023-0000-000	201,83 €	