S Plus S REGELTECHNIK
TM 65 Temperature
Sensor

S Plus S REGELTECHNIK TM 65 Temperature Sensor Instruction Manual

Contents

S Plus S REGELTECHNIK TM 65 Temperature Sensor

Specifications:

- Power Supply: <1.2 W / 24 V DC; <1.8 VA / 24 V AC
- Sensor: Pt1000, DIN EN 60751, Class B (Perfect Sensor Protection)
- Communication: Modbus (RTU-Mode), Address Range 0…247 adjustable
- Data Points: 0.3 s / 1 s / 10 s
- Dimensions: 108 x 78.5 x 43.3 mm (Without Display) / 108 x 78.5 x 45.8 mm (With Display)
- Protection: IP65 (EN 60529)
- Humidity: <95% RH, non-condensing air

Product Usage Instructions

Installation:

1. Ensure power supply matches specifications.
2. Mount the transducer using the provided M20x1.5 cable gland or optional M12 connector.
3. Make sure the transducer is securely fastened to avoid vibration and mechanical stress.

Calibration:

1. Set the address range of the Modbus communication as needed.
2. Adjust the sensor offset if required, following the manual instructions.

Operation:

1. Monitor the displayed temperature readings on the programmable three-line LCD display.
2. Interpret any error messages or values shown on the display for sensor status.

FAQ:

1. **What is the communication protocol used by the transducer?**
   The transducer uses Modbus (RTU-Mode) with an adjustable address range of 0 to 247.
2. **How should I connect the transducer for power?**
   The transducer can be powered with <1.2 W at 24 V DC or <1.8 VA at 24 V AC.
3. **What is the protection rating of the transducer?**
   The transducer has an IP65 protection rating according to EN 60529, making it suitable for various environments.

Operating and Mounting Instructions
Immersion / screw-in / duct temperature measuring transducer, calibratable, with W-Modbus (Wireless)

High-performance encapsulation against vibration, mechanical stress and humidity

PS – PROTECTION
PERFECT SENSOR PROTECTION
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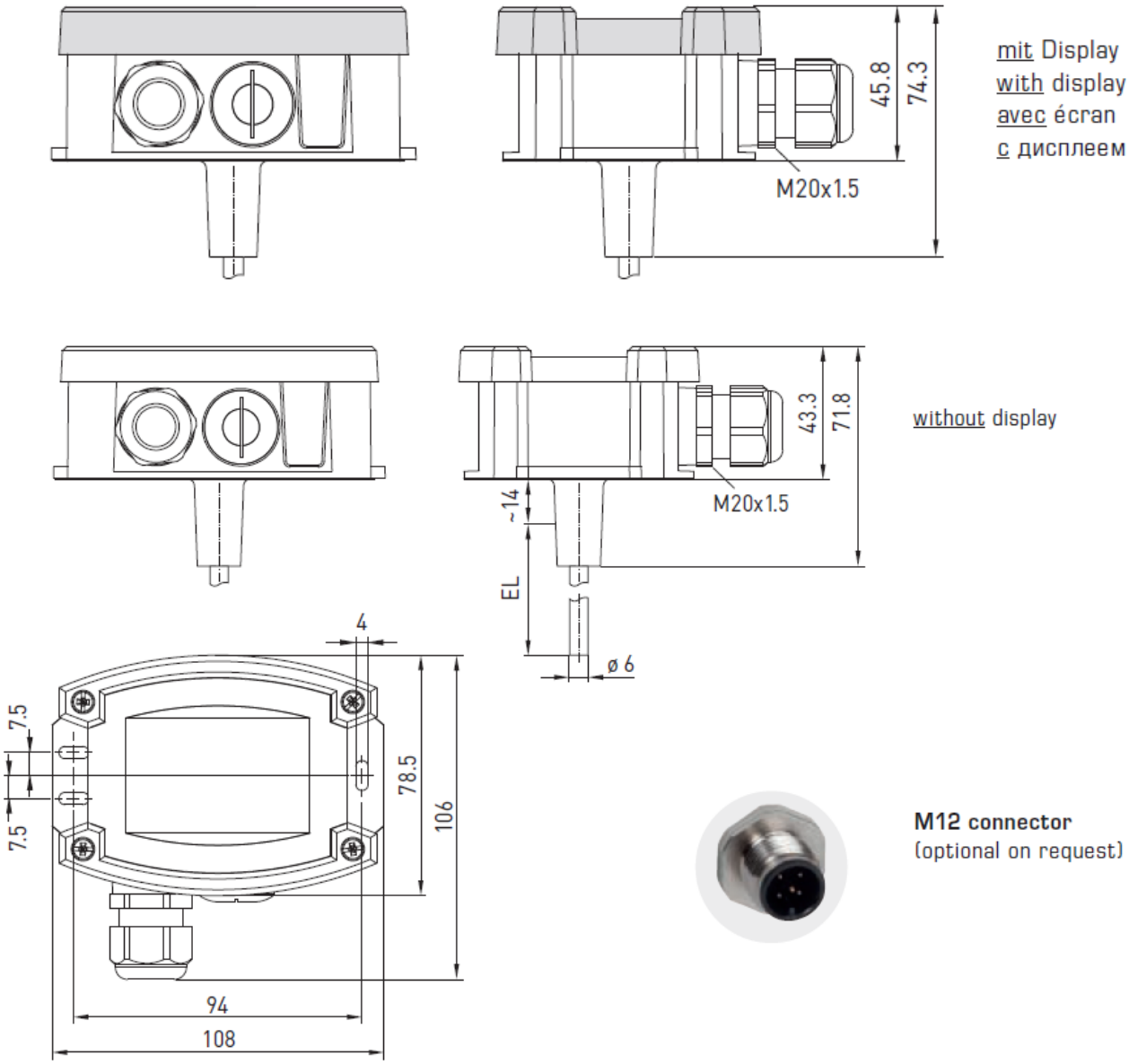
Dimensional drawing



Patented quality product (Immersion sensor patent no. DE 10 2012 017 500.0)
Calibratable temperature measuring transducer with sensor tube THERMASGARD® TM 65 – wModbus, with W-Modbus (Wireless), in an impact-resistant plastic housing with quick-locking screws, stainless steel-protective tube (50 – 400 mm / 2 – 16 in), optionally with / without display, measures temperature (–50…+150 °C / – 58…+ 302 °F). International system of units SI (default) can be changed to imperial (via Modbus). The W-Modbus (Wireless) replaces the RTU cable, the BMS connection is wireless and is established via a W-Modbus gateway.

The duct sensor is used to detect the temperature in liquid or gaseous media. Use the stainless steel immersion sleeves for aggressive media. It is used in heating engineering, ventilation and air conditioning ducts, pipes, storage systems, compact district heating stations, warm and cold water systems, oil and lubrication cycle systems, machine and systems engineering and the entire industry sector. Innovative W-Modbus sensor with DIP switch for setting the bus address in current-free state, internal LEDs for displaying the connection quality and telegram status, push-in terminal and large three-line display (illuminated, individually programmable in the 7-segment range and dot-matrix range). Uses internal diagnostics to detect sensor breakage or sensor short circuit as errors. The error messages can be retrieved via Modbus and are shown on the display. The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

TECHNICAL DATA

- Voltage supply: 24 V AC (± 20 %); 15…36 V DC
- Power consumption: < 1.2 W / 24 V DC; < 1.8 VA / 24 V AC

- System of units: SI (default) or Imperial (switchable via Modbus)
- Data points: Temperature [°C] [°F]
- Sensor: Pt1000, DIN EN 60751, class B (Perfect Sensor Protection)
- Measuring range: – 50…+ 150 °C / – 58…+ 302 °F
- Deviation, temperature: typically ± 0.2 K at +25 °C / ± 0.4 °F at +77 °F
- Zero point offset: ± 10 °C / ± 18 °F
- Ambient temperature: Measuring transducer –30…+70 °C / –22…+158 °F
- Medium: depending on selected immersion sleeve
- Communication: W-Modbus (Wireless Modbus, frequency 2.4 GHz ISM, transmission power 100 mW, AES-128 encrypted)
- Range: max. 500 m / 1640 ft (open field), approx. 50 – 70 m / 164 – 230 ft (inside buildings) between two wireless nodes
- Bus protocol: Modbus (RTU mode), address range 0…247 selectable
- Signal filtering: 0.3 s / 1 s / 10 s
- Protective tube: stainless steel, V4A (1.4571), Ø = 6 mm / 0.24 in, inserted length (EL) = 50 – 400 mm / 2 – 16 in (see table)
- 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: 108 x 78.5 x 43.3 mm / 4.25 x 3.09 x 1.70 in (Tyr 3 without display) 108 x 78.5 x 45,8 mm / 4.25 x 3.09 x 1.80 in (Tyr 3 with display)
- Cable connection: cable gland, plastic (M 20 x 1.5; with strain relief, exchangeable, inner diameter 8 – 13 mm / 0.3 – 0.5 in) or M12 connector according to DIN EN 61076-2-101 (optional on request)
- Electrical connection: 0.2 – 1.5 mm² / 24 – 16 AWG, using push-in terminals
- Permissible air 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 61326, according to EMC Directive 2014 / 30 / EU, Radio Directive 2014 / 53 / EU, ETSI EN 300 328 V2.2.2
- Features: Display with illumination, three-line, programmable, cutout approx. 51 x 29 mm / 2.0 x 1.1 in (W x H), for displaying the actual temperature, error message or an individually programmable display value
- Internal diagnostics: Error 1 at sensor breakage Error 2 at sensor short circuit

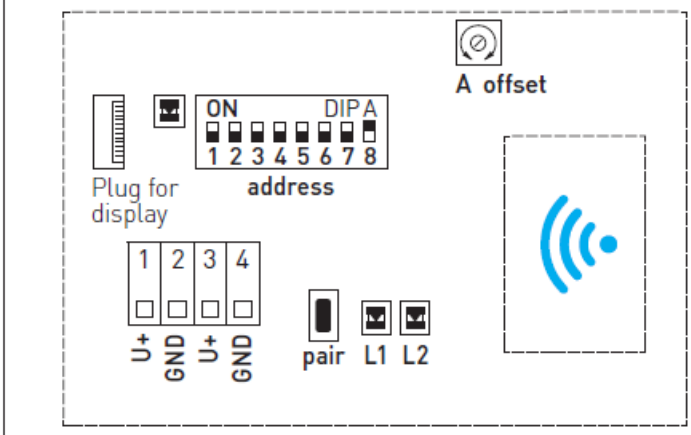
Switchable system of units

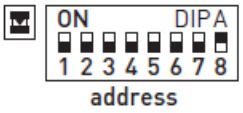
Measurements / Data points	**SI** (default) → **Imperial**
Temperature	[°C] → [°F]

Measuring ranges	**SI** (default) →	**Imperial**
	–50…+150 °C →	–58…+302 °F

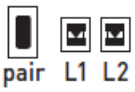
Schematic diagram

THERMASGARD®
xx-wModbus

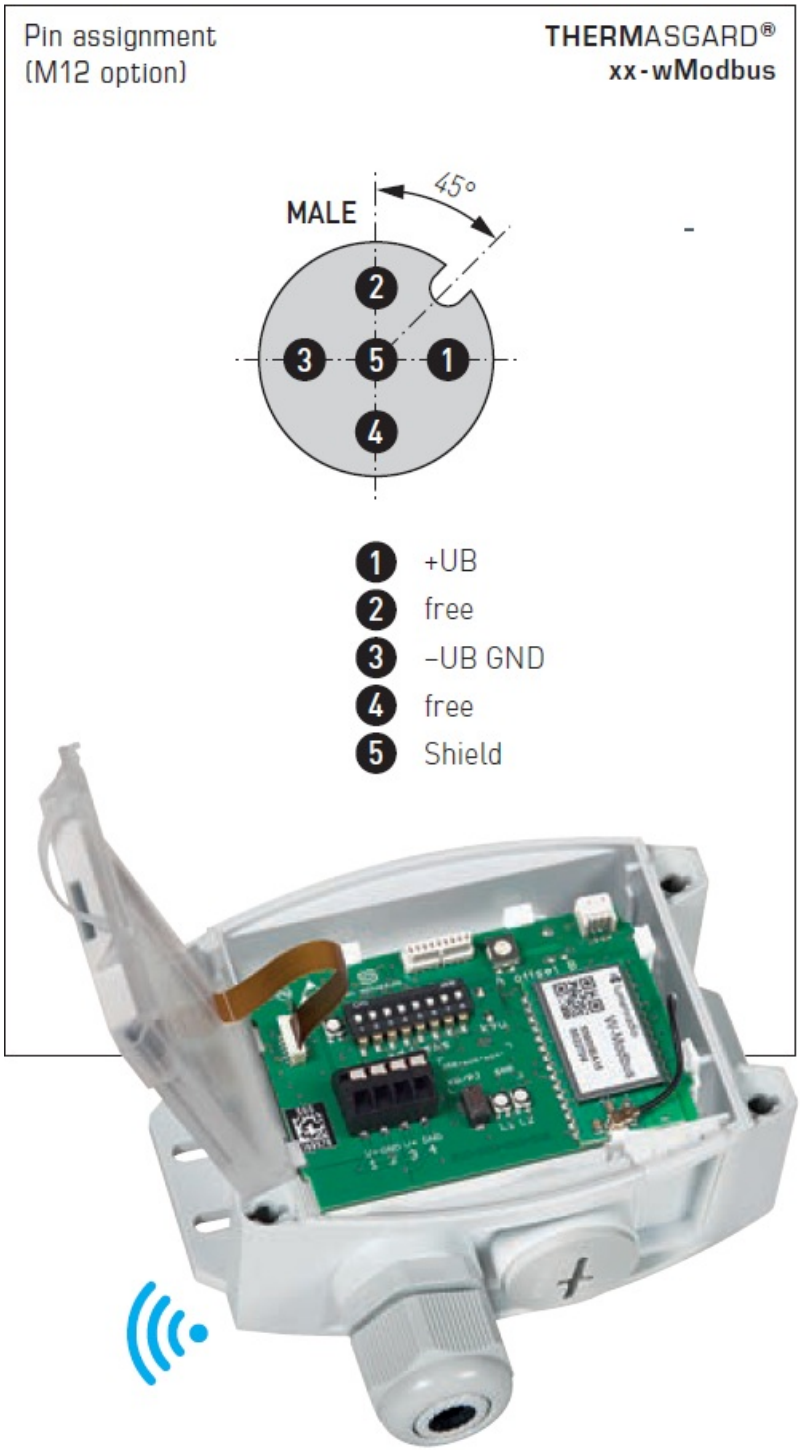




LED: Telegram Status
DIP A: Bus address



Button: Teach-in (pair)
LED 1: Network Status
LED 2: Connection quality



Manual offset adjustment
The sensors are pre-set and calibrated at the factory. For subsequent adjustment of the measured value, there is an offset potentiometer (A) available. Range of adjustment approx. ± 10 °C / ± 18 °F

Type / WG01	Output	Installation length (EL)	Display	Item no.
TM65 – wModbus				

TM65-wModbus 50MM	W-Modbus (Wireless)	**50 mm / 2.0 in**	1101-723F-0010-000
TM65-wModbus 50MM **LCD**	W-Modbus (Wireless)	**50 mm / 2.0 in**	■ 1101-723F-4010-000
TM65-wModbus 100MM	W-Modbus (Wireless)	**100 mm / 4.0 in**	1101-723F-0020-000
TM65-wModbus 100MM **LCD**	W-Modbus (Wireless)	**100 mm / 4.0 in**	■ 1101-723F-4020-000
TM65-wModbus 150MM	W-Modbus (Wireless)	**150 mm / 6.0 in**	1101-723F-0030-000
TM65-wModbus 150MM **LCD**	W-Modbus (Wireless)	**150 mm / 6.0 in**	■ 1101-723F-4030-000
TM65-wModbus 200MM	W-Modbus (Wireless)	**200 mm / 8.0 in**	1101-723F-0040-000
TM65-wModbus 200MM **LCD**	W-Modbus (Wireless)	**200 mm / 8.0 in**	■ 1101-723F-4040-000
TM65-wModbus 250MM	W-Modbus (Wireless)	**250 mm / 10 in**	1101-723F-0050-000
TM65-wModbus 250MM **LCD**	W-Modbus (Wireless)	**250 mm / 10 in**	■ 1101-723F-4050-000
TM65-wModbus 300MM	W-Modbus (Wireless)	**300 mm / 12 in**	1101-723F-0060-000
TM65-wModbus 300MM **LCD**	W-Modbus (Wireless)	**300 mm / 12 in**	■ 1101-723F-4060-000
TM65-wModbus 350MM	W-Modbus (Wireless)	**350 mm / 14 in**	1101-723F-0070-000
TM65-wModbus 350MM **LCD**	W-Modbus (Wireless)	**350 mm / 14 in**	■ 1101-723F-4070-000
TM65-wModbus 400MM	W-Modbus (Wireless)	**400 mm / 16 in**	1101-723F-0080-000
TM65-wModbus 400MM **LCD**	W-Modbus (Wireless)	**400 mm / 16 in**	■ 1101-723F-4080-000

Optional:	Cable connection with **M12 connector** according to DIN EN 61076-2-101 on request
Note:	System of units **SI** (default) or **imperial** (can be changed via Modbus).

ACCESSORIES		
GW-wModbus	**Gateway** with W-Modbus (Wireless), for wireless connection to Modbus networks, with "Gateway" (master) and "**Node**" operating modes (max. 1 wired node)	1801-1211-1101-000
GW-wModbus Pro	"**Node Pro**" (max. 16 wired nodes)	1801-1211-1101-100

Devices are to be connected under dead-voltage condition. Devices must only be connected to safety extra-low voltage. Consequential damages caused by a fault in this device are excluded from warranty or liability. These devices must be installed and commissioned by authorised specialists. The technical data and connecting conditions shown on the device labels and in the mounting and operating instructions delivered together with the device are exclusively valid. Deviations from the catalogue representation are not explicitly mentioned and are possible in terms of technical progress and continuous improvement of our products.

In case of any modifications made by the user, all warranty claims are forfeited. Operating this device close to

other devices that do not comply with EMC directives may influence functionality. This device must not be used for monitoring applications, which serve the purpose of protecting persons against hazards or injury, or as an EMERGENCY STOP switch for systems or machinery, or for any other similar safety-relevant purposes. Dimensions of enclosures or enclosure accessories may show slight tolerances on the specifications provided in these instructions. Modifications of these records are not permitted. In case of a complaint, only complete devices returned in original packing will be accepted.

Notes regarding mechanical mounting and attachment:
Mounting shall take place while observing all relevant regulations and standards applicable for the place of measurement (e.g. such as welding instructions, etc.).

Particularly the following shall be regarded:

- VDE / VDI directive technical temperature measurements, measurement set – up for temperature measurements.
- The EMC directives must be adhered to.
- It is imperative to avoid parallel laying of current-carrying lines.
- We recommend to use shielded cables with the shielding being attached at one side to the DDC / PLC.

Before mounting, make sure that the existing thermometer‘s technical parameters comply with the actual conditions at the place of utilization, in particular in respect of:

- Measuring range
- Permissible maximum pressure, flow velocity
- Installation length, tube dimensions
- Oscillations, vibrations, shocks are to be avoided (< 0.5 g)

Attention! In any case, please observe the mechanical and thermal load limits of protective tubes according to DIN 43763 respectively according to specific S+S standards!

Notes regarding process connection of built-in sensors:
If possible, select material of protective tube to match the material of piping or tank wall, in which the thermometer will be installed!
Note values for maximum temperatures Tmax and maximum pressures pmax!

Screw-in threads:
Ensure appropriate support of the gasket or sealing material when mounting!
Observe the permissible reference values for the tightening torque!

Flange mounting:
In case of flange mounting, screws in the flange part must be equally tightened. The lateral pressure screw must clamp securely, otherwise the feeler shaft might slip through.

Welding sleeves:
Specific welding instructions shall be observed. On principle, unevenness or the like that might influence the system‘s ”CIP ability“ must not develop at welds. For high-pressure lines, pressure test certifications and inspections are required.

Notes on commissioning:
This device was calibrated, adjusted and tested under standardised conditions. When operating under deviating conditions, we recommend performing an initial manual adjustment on-site during commissioning and

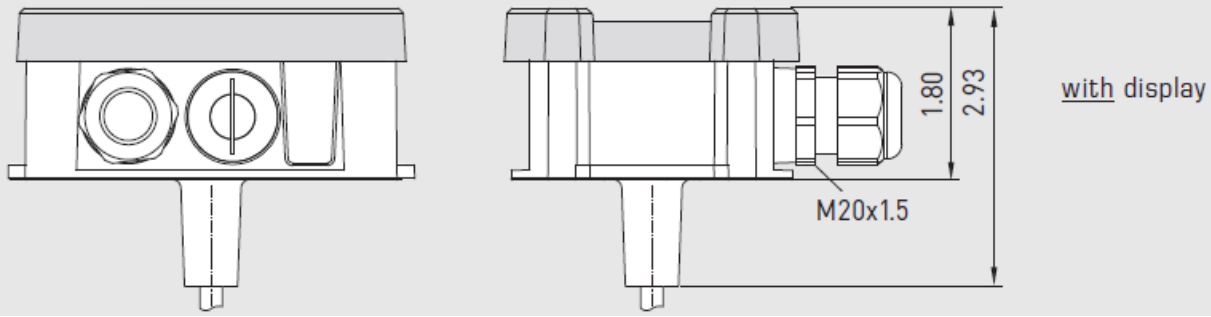
subsequently at regular intervals.
Commissioning is mandatory and may only be performed by qualified personnel!
S+S Regeltechnik GmbH hereby declares that the radio equipment type TM 65-wModbus complies with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address:
www.spluss.de/1101723F0010000/
Our “General Terms and Conditions for Business“ together with the “General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry“ (ZVEI conditions) including supplementary clause “Extended Retention of Title“ apply as the exclusive terms and conditions.

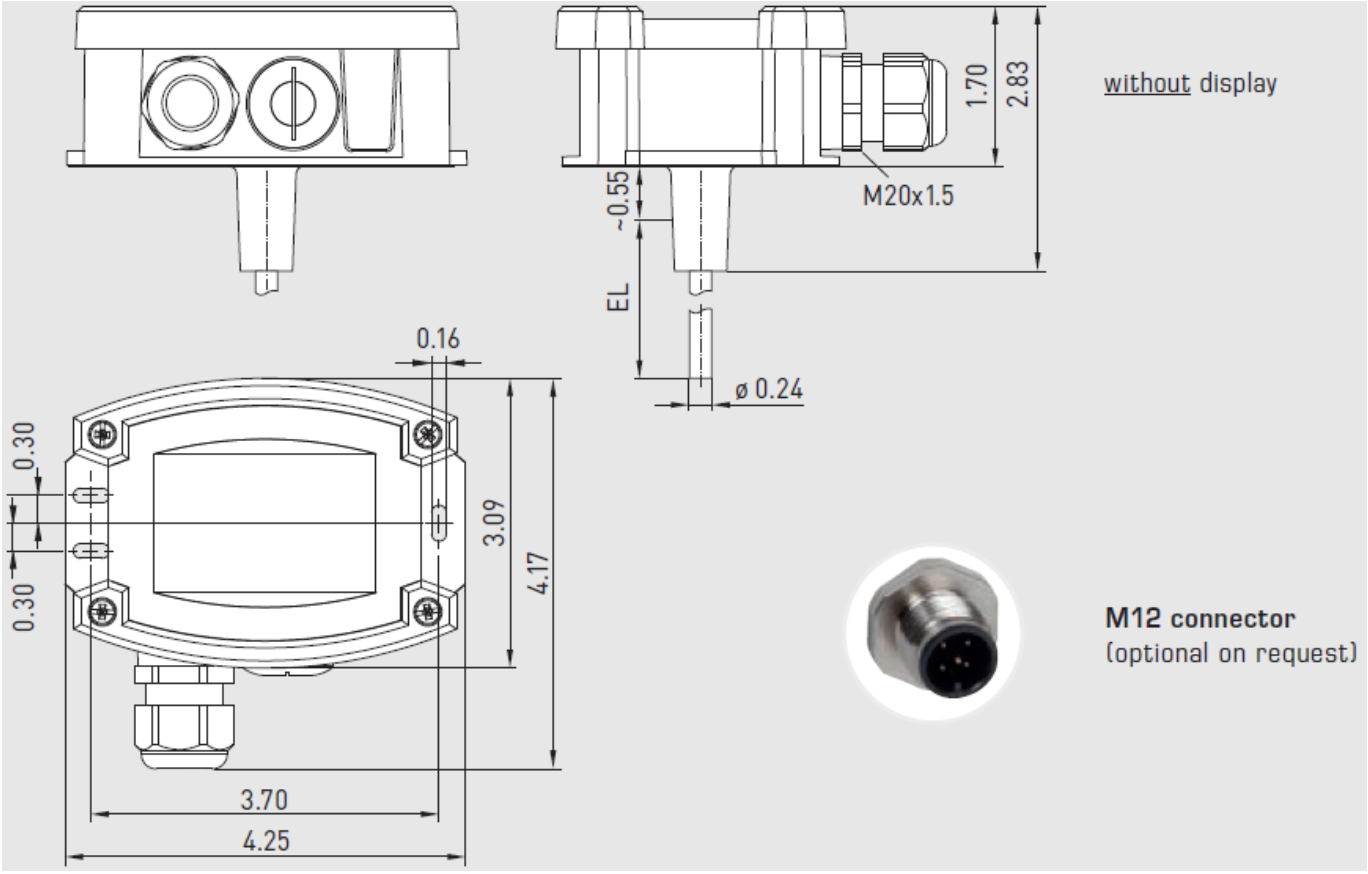
In additionIn addition, the following points are to be observed:

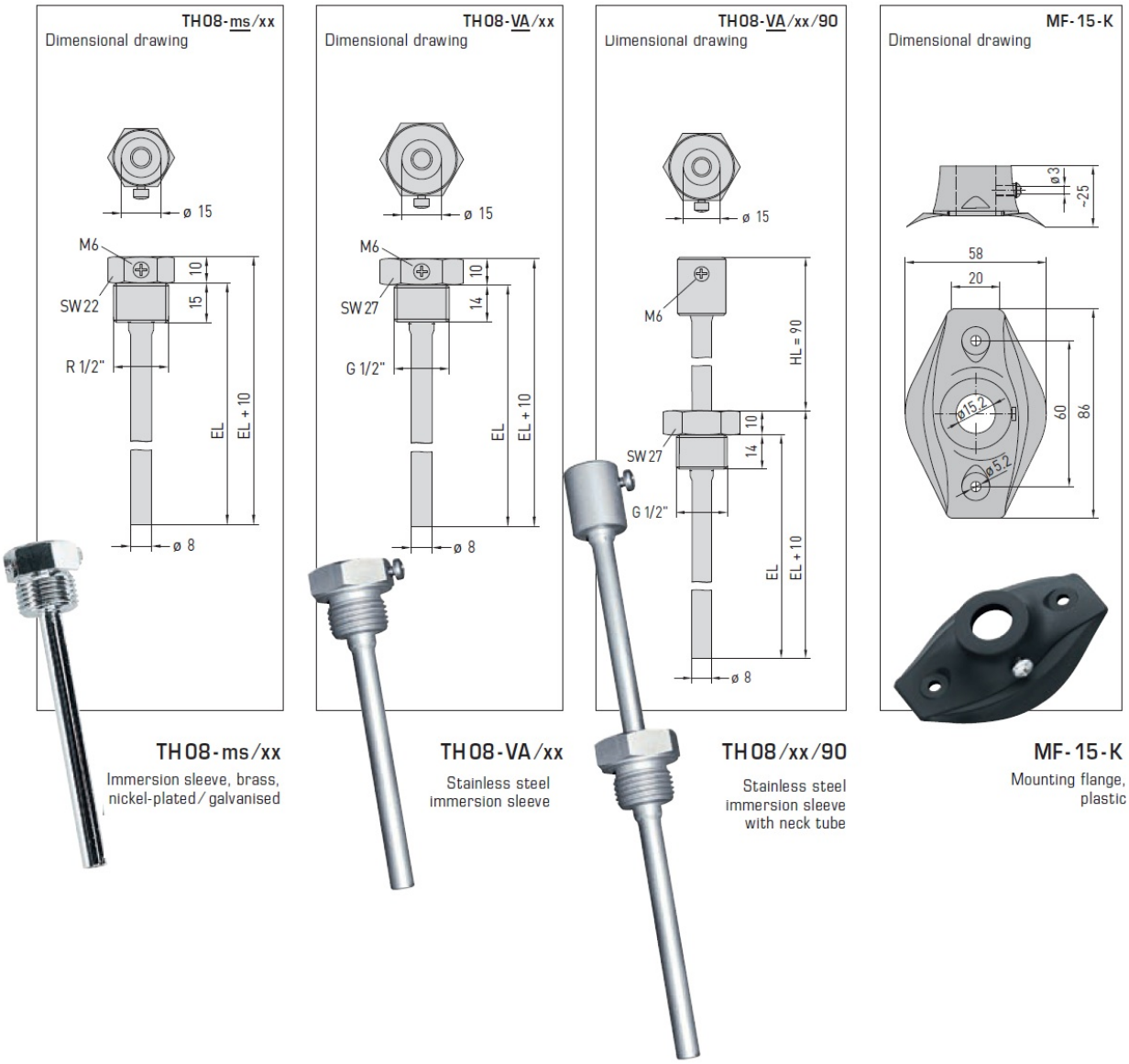
- These instructions must be read before installation and putting in operation and all notes provided therein are to be regarded!
- A suitable weather and sun protection hood must be used when installed outdoors.
- Devices must only be connected to safety extra-low voltage and under dead-voltage condition. To avoid damages and errors the device (e.g. by voltage induction) shielded cables are to be used, laying parallel with current-carrying lines is to be avoided, and EMC directives are to be observed.
- This device shall only be used for its intended purpose. Respective safety regulations issued by the VDE, the states, their control authorities, the TÜV and the local energy supply company must be observed. The purchaser has to adhere to the building and safety regulations and has to prevent perils of any kind.
- No warranties or liabilities will be assumed for defects and damages arising from improper use of this device.
- Consequential damages caused by a fault in this device are excluded from warranty or liability.
- These devices must be installed and commissioned by authorised specialists.
- The technical data and connecting conditions of the mounting and operating instructions delivered together with the device are exclusively valid. Deviations from the catalogue representation are not explicitly mentioned and are possible in terms of technical progress and continuous improvement of our products.
- In case of any modifications made by the user, all warranty claims are forfeited.
- This device must not be installed close to heat sources (e.g. radiators) or be exposed to their heat flow. Direct sun irradiation or heat i rradiation by similar sources (powerful lamps, halogen spotlights) must absolutely be avoided.
- Operating this device close to other devices that do not comply with EMC directives may influence functionality.
- This device must not be used for monitoring applications, which serve the purpose of protecting persons against hazards or injury, or as an EMERGENCY STOP switch for systems or machinery, or for any other similar safety-relevant purposes.
- Dimensions of housing or housing accessories may show slight tolerances on the specifications provided in these instructions.
- Modifications of these records are not permitted.
- In case of a complaint, only complete devices returned in original packing will be accepted.

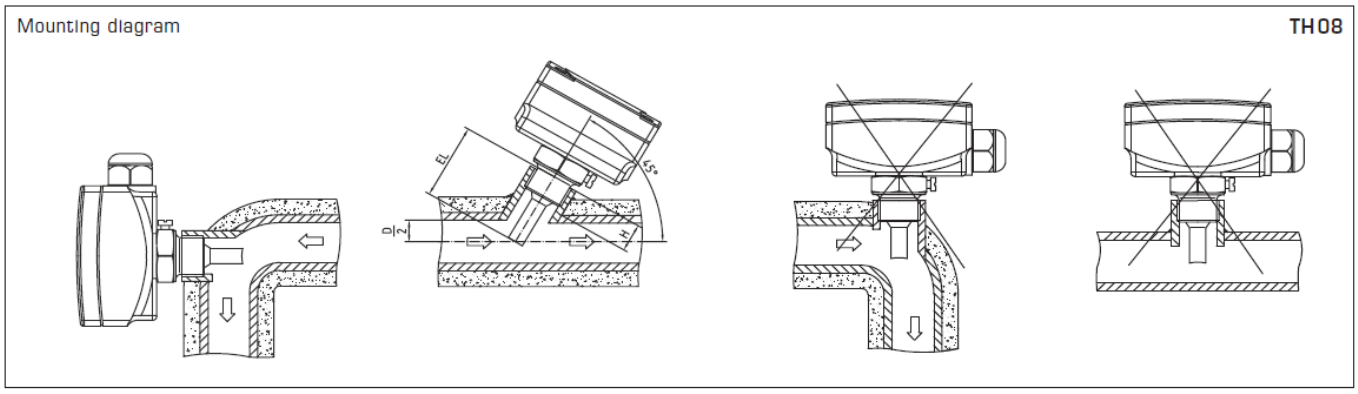
Commissioning is mandatory and may only be performed by qualified personnel!
These instructions must be read before installation and commissioning and all notes provided therein are to be regard!

Dimensional drawing









Documents / Resources

S Plus S REGELTECHNIK TM 65 Temperature Sensor [pdf] Instruction Manual
TM 65, TM 65 Temperature Sensor, Temperature Sensor, Sensor

References

- S+S Regeltechnik | Ihr sensorik Partner
- Immersion/ screw-in/ duct temperature measuring transducer TM65-wModbus 50MM
- User Manual