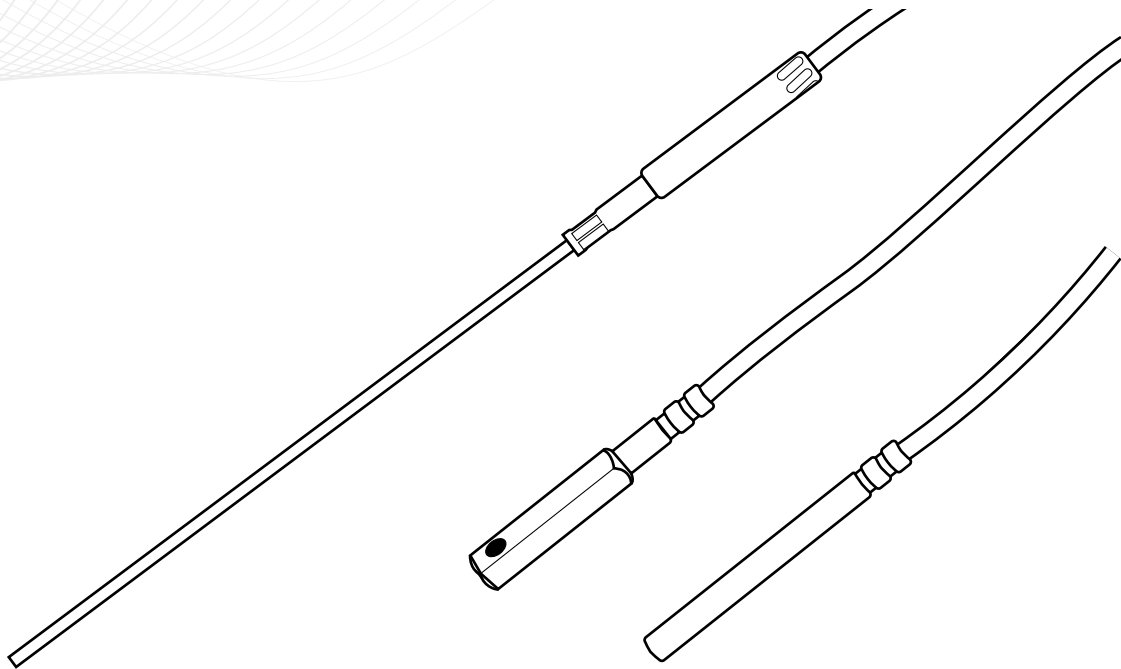


OPERATION- MANUAL



Temperature sensor type ELTF

Operation, assembly and data

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IMPORTANT INFORMATION

- RETAIN FOR LATER USE



Please follow these instructions for proper and safe use of the temperature sensors type ELTF-Te and ELTF-PT. Please retain these instructions for later reference purposes (for example in the system documentation).

- FOR DISPOSAL



The WEEE logo indicates that this product must not be disposed of with residential waste. Further information about disposal and recycling of old electrical and electronic devices and where to find collection points is available from your local disposal company or from the manufacturer from which you bought the product.

RECEIPT OF GOODS

Check the goods on receipt for transport damage or mechanical damage. Damaged temperature sensors must not be used. Compare the information on the temperature sensor with the information on the delivery bill to ensure that the correct material was delivered.

STORAGE

NOTE

Storage should be in a dry place at an ambient temperature of 0°C to 50°C.

To maintain the electrical properties of the connection points and connecting leads thermocouples must not be stored in high humidity or in aggressive environments.

SCOPE OF DELIVERY

The scope of delivery of the article includes:
One temperature sensor type ELTF-PT or ELTF-Te.



CAUTION

Indicates an potential dangerous situation. If it is not avoided, there is a risk of damage or malfunction.



DANGER

Indicates an extremely dangerous situation. If it is not avoided, there is a danger to life or at least a high risk of serious injury.



NOTE

Important information and instructions for safe, effective and environmentally compatible use.



WARNING

Indicates a dangerous situation. If it is not avoided, there is a risk of injury or at least a high risk of damage.

Reservation

We reserve the right to make technical changes. Changes, errors and misprints do not justify any claim for compensation. For safety components and systems, the installation instructions and the relevant standards and regulations must be observed.

eltherm GmbH Ernst-Heinkel-Str. 6-10 57299 Burbach T.: +49 2736 4413-0 F.: +49 2736 4413-50 info@eltherm.com	Document: 86430506500XX		Operation Manual Temperature sensors type ELTF	
	Author:	Julian Engel	Date:	09.02.2023
	Revision: 01	Maximilian Georg	Date:	30.06.2026

DESCRIPTION & TECHNICAL DATA

Description

The eltherm Pt100 temperature sensors and type K & J thermocouples are suitable for a wide range of applications and temperatures. All temperature sensors are an optimal and perfectly matched complement to the eltherm temperature controllers and temperature limiters. Even in demanding operating conditions, our products have a long service life.

Technical data thermocouples ELTF-Te

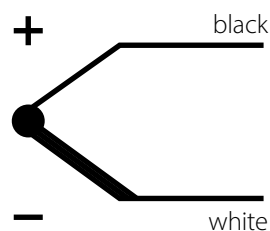
0660003	ELTF-Te.1
Thermocouple	Type J, Fe-CuNi
Dimensions sensor sleeve	3 x 250 mm
Material of sensor sleeve	2.4816
Length of connection cable	5.0 m
Sheath of connection cable	Silicone
Color of connection cable	black
Cross-section of single wires	2 x 0.22 mm ²
Insulation of single wires	Silicone
Color of single wires	black-white
Operating temperature sensor sleeve	-40 up to +520 °C
Operating temperature connection cable	-90 up to +200 °C
Protection class	IP 54
Tolerance	DIN IEC 584.1-2 class I

0670019	ELTF-Te.41
Thermocouple	Type K, NiCr-Ni
Dimensions sensor sleeve	1.5 x 400 mm
Material of sensor sleeve	2.4816
Length of connection cable	5.0 m
Sheath of connection cable	Silicone
Color of connection cable	green
Cross-section of single wires	2 x 0.22 mm ²
Insulation of single wires	Fluoropolymer
Color of single wires	green-white
Operating temperature sensor sleeve	0 up to +1.100 °C
Operating temperature connection cable	-50 up to +180 °C
Protection class	IP 54
Tolerance	DIN IEC 584.1-2 class I

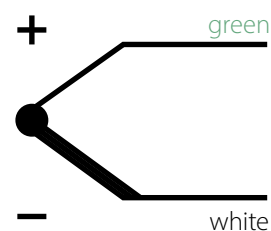
0670021	ELTF-Te.4
Thermocouple	Type K, NiCr-Ni
Dimensions sensor sleeve	1.5 x 300 mm
Material of sensor sleeve	2.4816
Length of connection cable	5.0 m
Sheath of connection cable	Fluoropolymer
Color of connection cable	green
Cross-section of single wires	2 x 0.22 mm ²
Insulation of single wires	Fluoropolymer
Color of single wires	green-white
Operating temperature sensor sleeve	-40 up to +920 °C
Operating temperature connection cable	-90 up to +200 °C
Protection class	IP 54
Tolerance	DIN IEC 584.1-2 class I

Wiring diagrams ELTF-Te

Type J



Type K



Technical data PT100 ELTF-PT

0650000	ELTF-PT.33
Sensor type	Pt100 2-wire
Dimensions sensor sleeve	6 x 6 x 46 mm / Hole 4.1 mm
Material of sensor sleeve	1.4301
Length of connection cable	5.0 m
Sheath of connection cable	Fluoropolymer
Color of connection cable	white
Cross-section of single wires	2 x 0.35 mm ²
Insulation of single wires	Fluoropolymer
Color of single wires	red-white
Operating temperature sensor sleeve	-50 up to +260 °C
Operating temperature connection cable	-50 up to +260 °C
Protection class	IP 65
Tolerance	DIN IEC 60751 "1/3B"

0650001	ELTF-PT.1
Sensor type	Pt100 2-wire
Dimensions sensor sleeve	5 x 50 mm
Material of sensor sleeve	1.4571
Length of connection cable	5.0 m
Sheath of connection cable	PVC
Color of connection cable	black
Cross-section of single wires	2 x 0.25 mm ²
Insulation of single wires	PVC
Color of single wires	red-white
Operating temperature sensor sleeve	-50 up to +80 °C
Operating temperature connection cable	-50 up to +80 °C
Protection class	IP 65
Tolerance	DIN IEC 60751 "B"

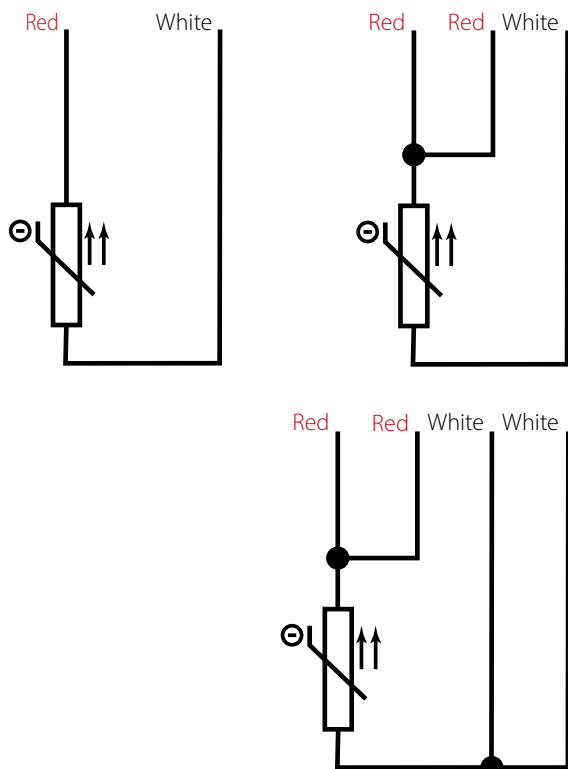
0650002	ELTF-PT.3.1
Sensor type	Pt100 3-wire
Dimensions sensor sleeve	5 x 50 mm
Material of sensor sleeve	1.4571
Length of connection cable	3.0 m
Sheath of connection cable	Fluoropolymer
Color of connection cable	white
Cross-section of single wires	3 x 0.25 mm ²
Insulation of single wires	Fluoropolymer
Color of single wires	red-red-white
Operating temperature sensor sleeve	-50 up to +250 °C
Operating temperature connection cable	-50 up to +250 °C
Protection class	IP 65
Tolerance	DIN IEC 60751 "B"

0650003	ELTF-PT.3
Sensor type	Pt100 2-wire
Dimensions sensor sleeve	5 x 50 mm
Material of sensor sleeve	1.4571
Length of connection cable	3.0 m
Sheath of connection cable	Fluoropolymer
Color of connection cable	white
Cross-section of single wires	2 x 0.35 mm ²
Insulation of single wires	Fluoropolymer
Color of single wires	red-white
Operating temperature sensor sleeve	-50 up to +260 °C
Operating temperature connection cable	-50 up to +260 °C
Protection class	IP 65
Tolerance	DIN IEC 60751 "B"

0650022	ELTF-PT.5
Sensor type	Pt100 4-wire
Dimensions sensor sleeve	4 x 50 mm
Material of sensor sleeve	1.4571
Length of connection cable	5.0 m
Sheath of connection cable	Fluoropolymer
Color of connection cable	white
Cross-section of single wires	4 x 0.22 mm ²
Insulation of single wires	Fluoropolymer
Color of single wires	red-red-white-white
Operating temperature sensor sleeve	-50 up to +260 °C
Operating temperature connection cable	-50 up to +260 °C
Protection class	IP 65
Tolerance	DIN IEC 60751 "1/3 B"

0650040	ELTF-PT.61
Sensor type	Pt100 2-wire
Dimensions sensor sleeve	3 x 200 mm
Material of sensor sleeve	1.4571
Length of connection cable	5.0 m
Sheath of connection cable	Fluoropolymer
Color of connection cable	white
Cross-section of single wires	2 x 0.35 mm ²
Insulation of single wires	Fluoropolymer
Color of single wires	red-white
Operating temperature sensor sleeve	-30 up to +500°C
Operating temperature protective sleeve	-30 up to +180°C
Operating temperature connection cable	-30 up to +250°C
Protection class	IP 65
Tolerance	DIN IEC 60751 "B"

Wiring diagrams ELTF-PT



SPECIAL CONDITIONS



CAUTION

The sensor cables must be shielded when extended; the shielding must be grounded on one side near the controller. The cable must not be laid parallel to lines carrying mains voltage. The total line resistance must not exceed 10 ohms.



CAUTION

- Electrical connection / commissioning must be carried out by a qualified electrician.
- The relevant local safety regulations must be observed.



DANGER

- Before performing any installation, maintenance, or assembly work, disconnect the relevant heating circuits or system components from the power supply!
- Before accessing any system components, ensure that they have cooled down to a safe temperature to prevent burns.



NOTE

The temperature sensor should be checked for compatibility with the control equipment before starting installation.



CAUTION

- Persons involved in installations and testing of electrical trace heating systems should be appropriately qualified to perform the required actions.
- Electrical heat-tracing systems should be installed under the direction of a qualified electrician who has completed supplemental training on electrical heat-tracing systems.
- Critical work, such as making connections or terminations, should be performed only by qualified personnel.
- Compliance with the relevant standards and safety regulations is essential for the safety of people, systems, and equipment.
- Those responsible for planning, installation, and maintenance have a special responsibility and must therefore be familiar with the applicable regulations.
- These instructions should be kept with the system documentation for future use (maintenance, servicing).



NOTE

The temperature sensors should be completely free of physical damage.



NOTE

The suitability of the system components for the operating temperatures and environmental conditions should be checked. Furthermore, it should be checked whether they are protected as required against corrosion and the ingress of moisture and foreign particles.

INSTALLATION

Special installation instructions



CAUTION

- Before and during installation, keep the ends of heating elements and kit parts dry.
- The surface on which the temperature sensor is to be mounted must be free of rust, grease, oil, etc.
- Incorrect installation or damage to the temperature sensors can result in a short circuit or sensor failure.
- Any sharp imperfections, such as welding beads, cement splashes, etc. should be removed.
- Make sure that the crimp terminals are the correct size and are approved for the conductor. Also make sure that the crimping tool is suitable and in good condition.
- Make sure the terminals are the correct size and rating to accept the conductors.



CAUTION

- Ensure that connections and terminations are arranged in such a way that they are protected from external damage and the ingress of water or other contaminants that may adversely affect suitability.
- Avoid damage, tensile stress, kinking and torsion of the connected cables.
- When routing wires out, make sure they exit the insulation without allowing moisture or foreign objects to enter.
- When selecting the mounting location, observe the IP protection class and the permissible operating temperature.



NOTE

Diameter and length of the temperature sensor can influence the temperature measurement.

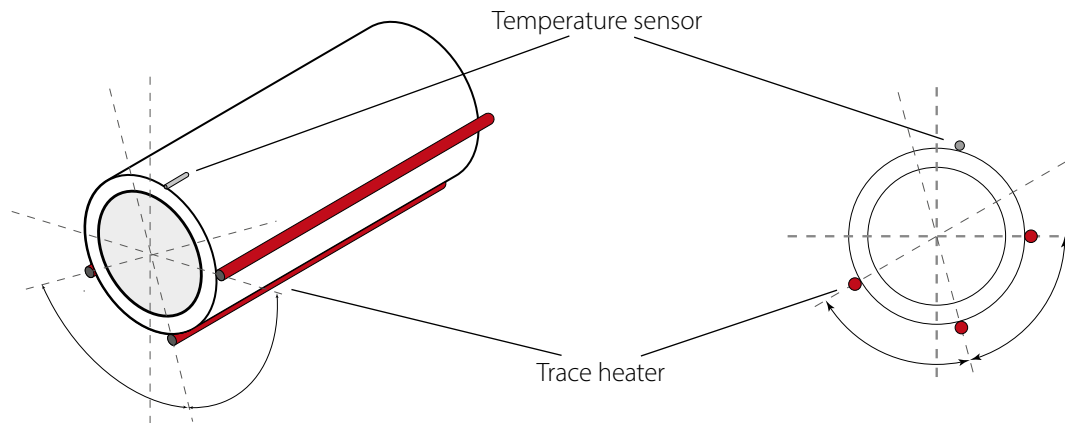
Choice of installation position

If a installation position of the temperature sensor has not already been defined, the following points should be taken into account when determining the installation position:

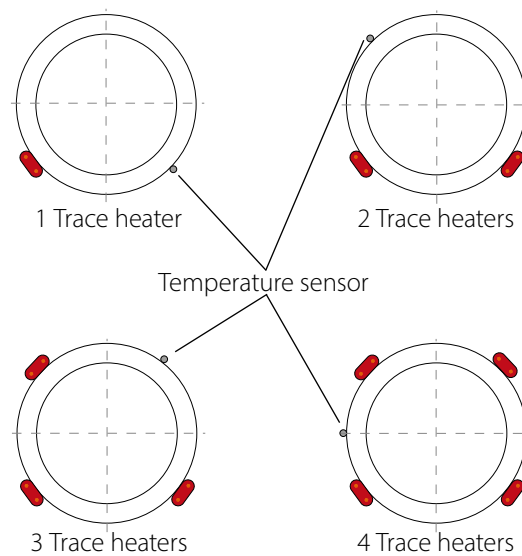
- Temperature sensors should be mounted in locations that are representative of the holding temperature.
- If temperature sensors are used for ambient temperature measurement, they should be mounted at the most unprotected location.
- If two or more trace heaters cross or intersect, sensors should be installed at a distance of 1 m to 1.5 m from the contact or junction point.
- If a system contains heat sinks or heat sources, sensors should be mounted on a section of pipe at a distance of 1 m to 1.5 m from the heat sinks and heat sources.
- If a heating circuit runs through areas with different ambient temperatures, two sensors and associated controls may be required to suitably control the pipe temperatures.
- The temperature sensors should be arranged for temperature control in such a way that direct temperature effects from heating pipes, external heat radiation, solar radiation or heated adjacent buildings are avoided.
- If temperature control as well as temperature limiting is required, temperature sensors for control must be placed at least 90° away from the heating cable with respect to the circumference of the pipeline. The temperature sensor for the upper temperature limit must also be located 90° from the heating pipe, relative to the circumference of the pipe, but not adjacent to other temperature sensors.
- In the case of temperature control with pipe contact sensors, it is recommended to arrange the sensors 90° offset from the heat tracing elements.

i NOTE

In complex systems, the flow behavior of the product under all possible conditions should be evaluated before the installation position of the probes is selected.



When installing multiple trace heaters on a pipe, please refer to the illustration below.



Installation options



CAUTION

- Not each of the following procedures are applicable to every installation. Every aspect of the installation should be reviewed upon completion.
- The sensor should be protected so that no thermal insulation can be trapped between the sensor and the heated surface.
- When installing any type of temperature sensor, be sure to install the sensor cable firmly, protected and without tension.
- When using aluminum tape, be careful not to create a thermal path between the heating cable and the temperature sensor.



NOTE

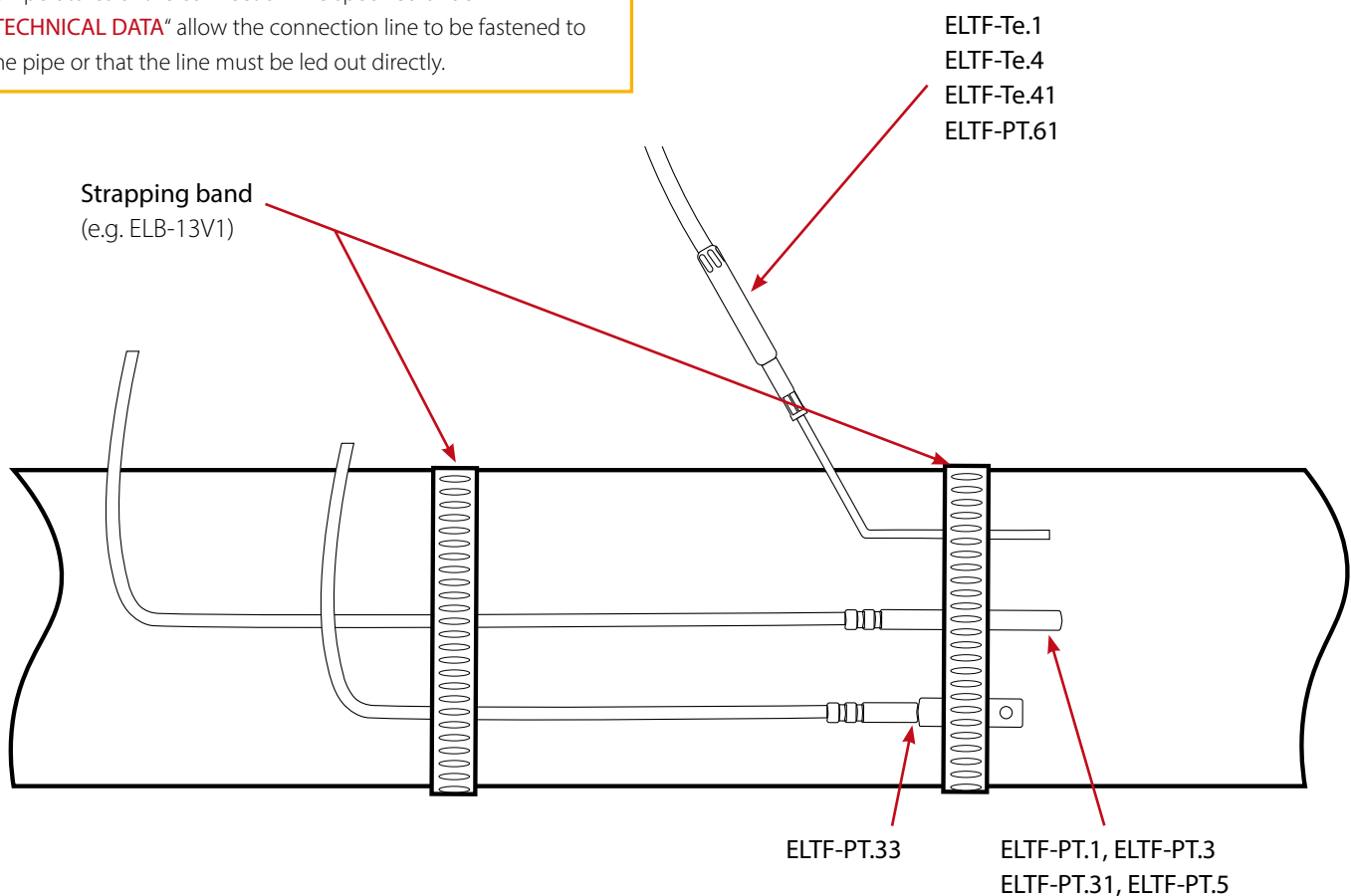
When assembling temperature sensors, make sure that there is effective thermal contact between the surface and the temperature sensor. A suitable thermally conductive sheath made of temperature-resistant metal foil or another suitable material can be used for this purpose.

Fastening all types of temperature sensors to a pipe using strapping band

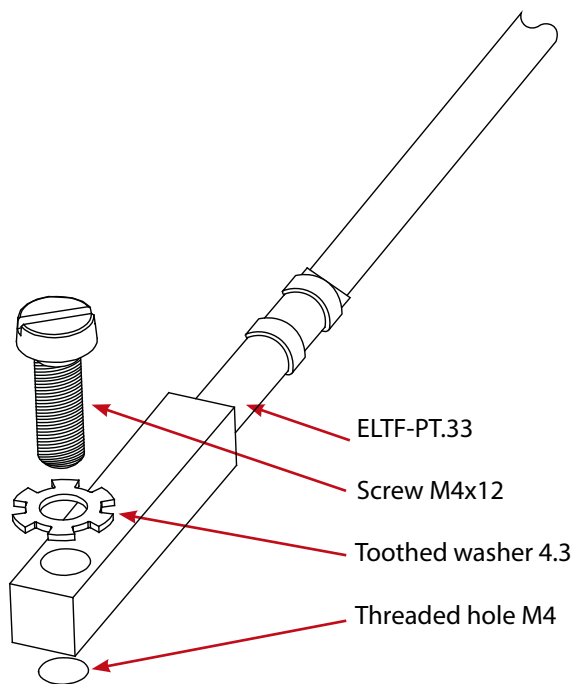


CAUTION

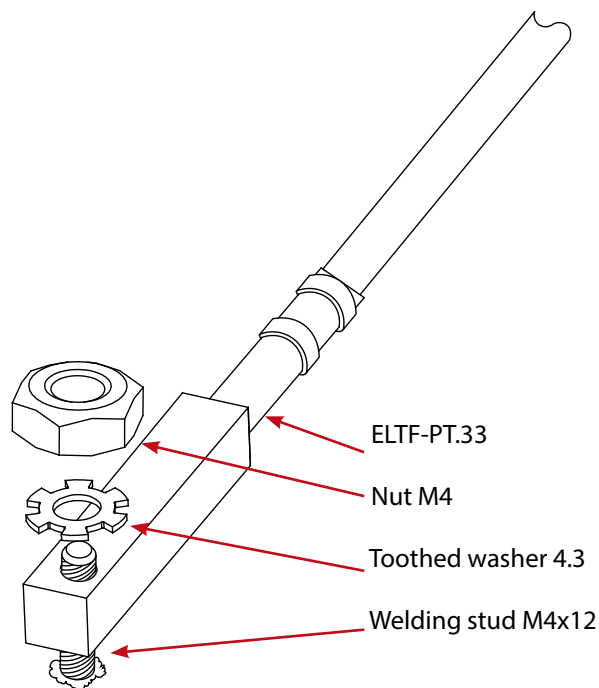
When using this type of fastening, make sure that the maximum temperatures of the connection line specified under **"TECHNICAL DATA"** allow the connection line to be fastened to the pipe or that the line must be led out directly.



Contact sensor ELTF-PT33 with screw M4

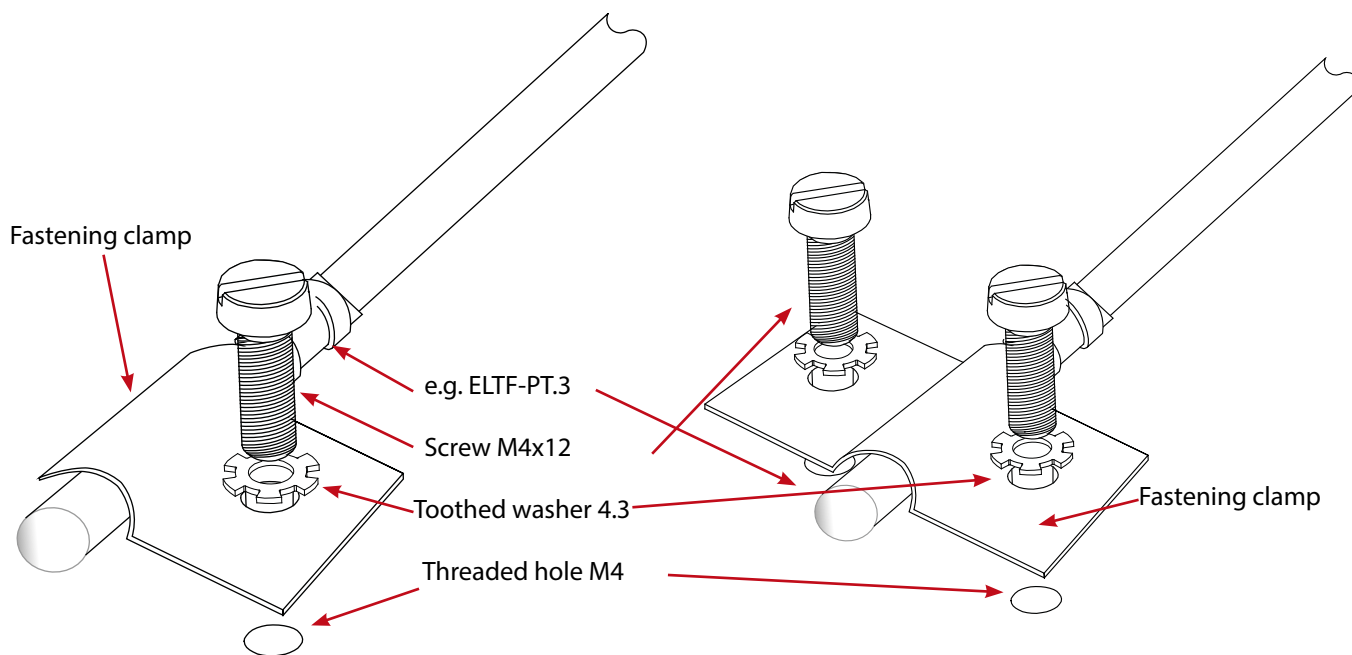


Contact sensor ELTF-PT.33 with welding stud and nut M4

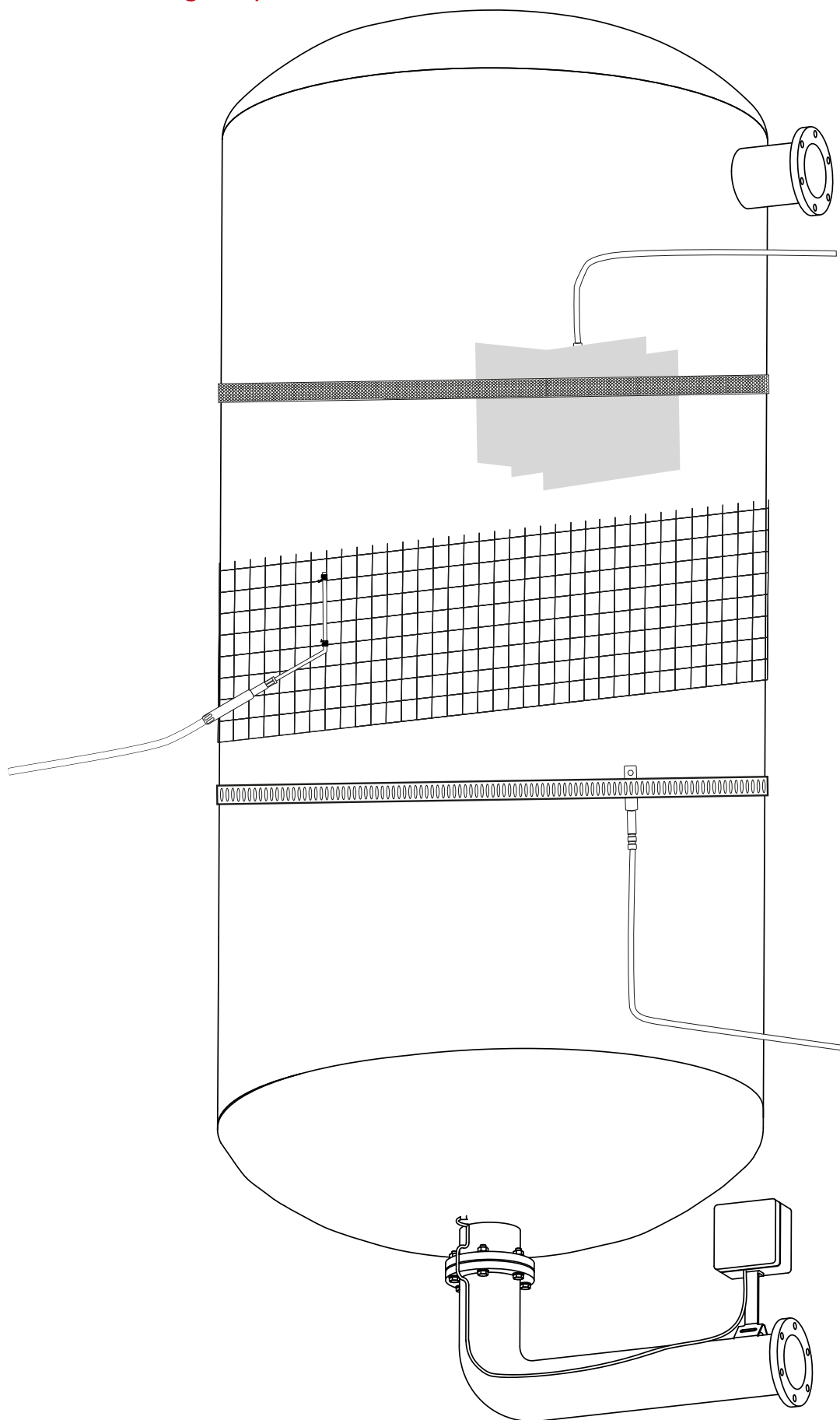


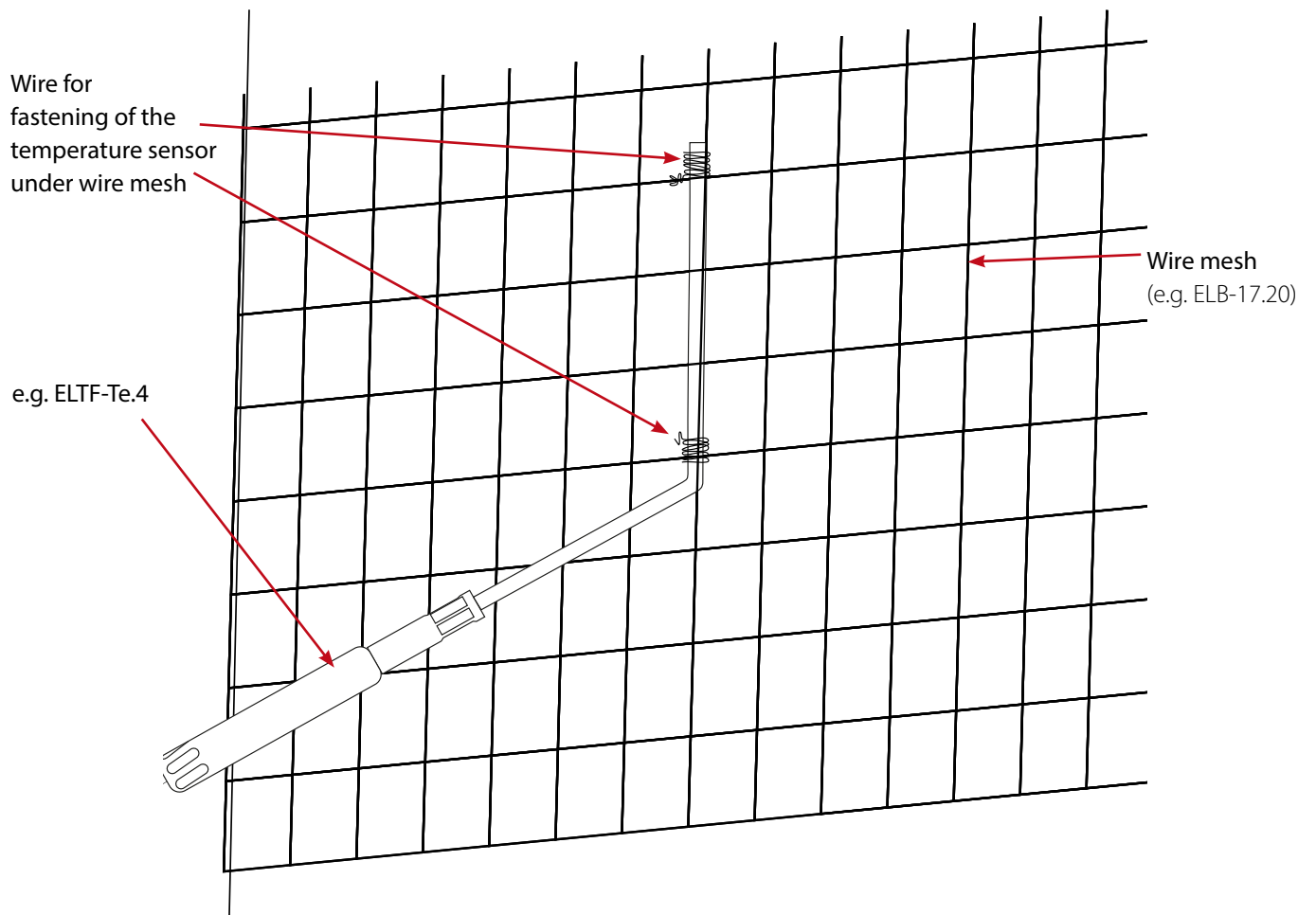
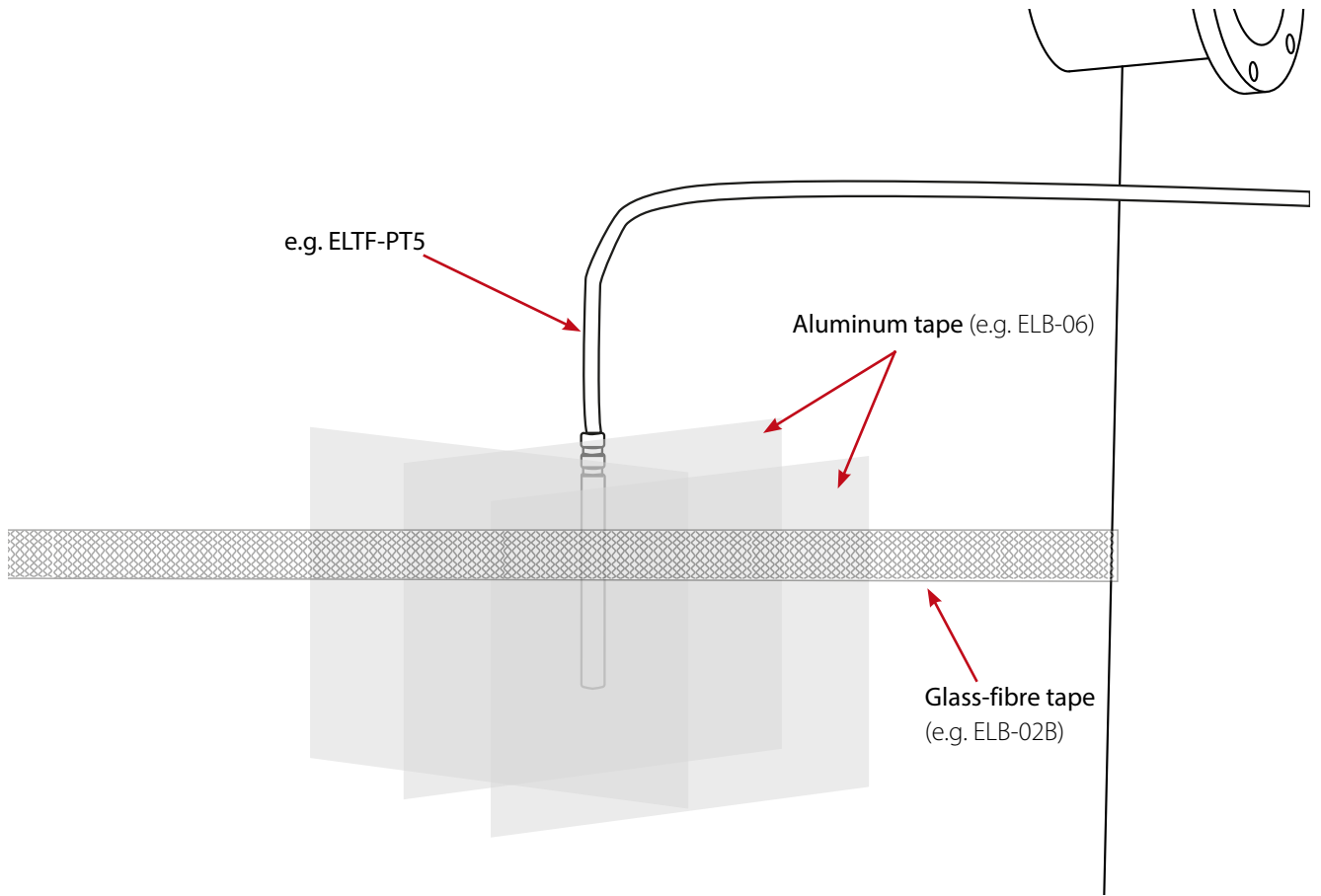
Fastening the temperature sensors with clamps

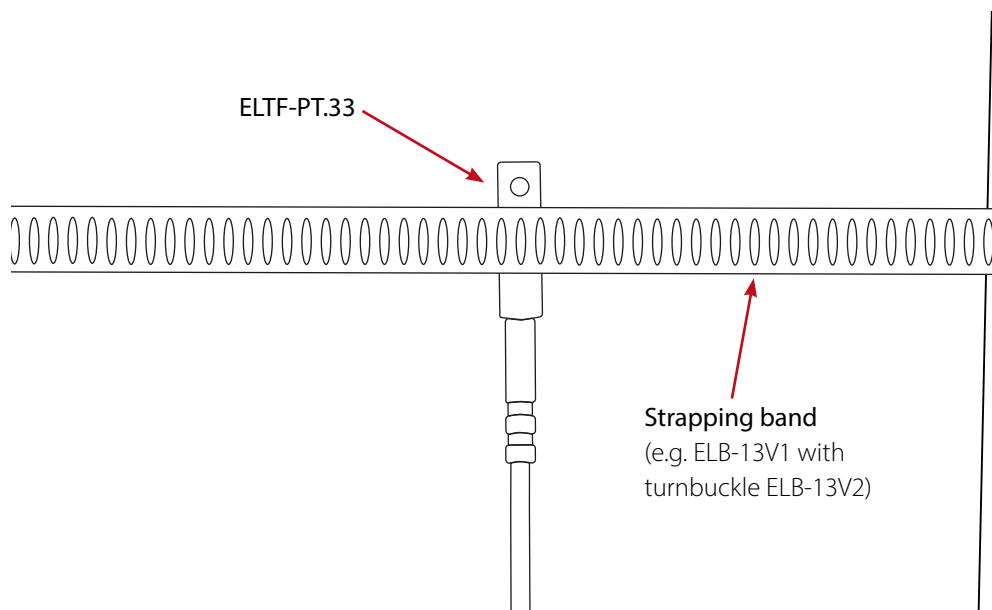
For fastening sensors in round design, fastening clamps in one- or two-hole design with screws or welding studs can be used.



Options for mounting temperature sensors on vessels







Electrical connection

The respective wire designations of the different temperature sensor types can be found under **“TECHNICAL DATA”**.

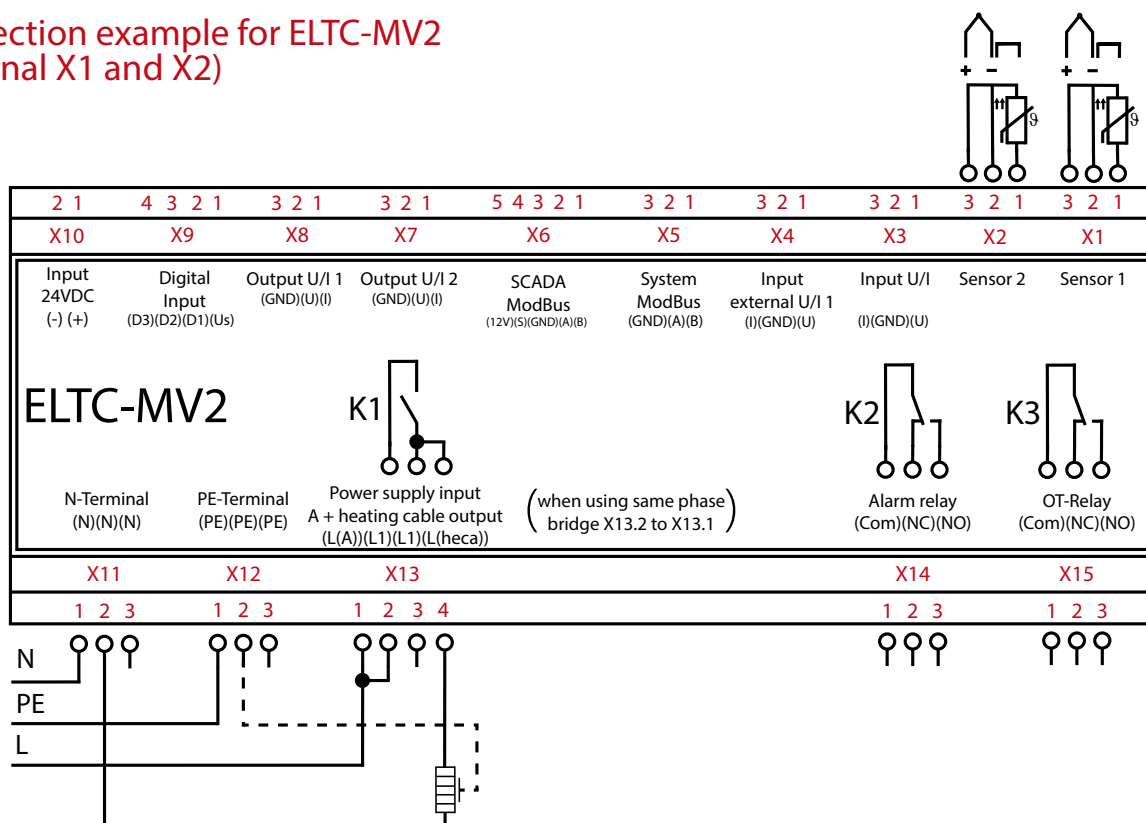
The temperature sensor is to be connected exclusively to the intended measuring connections of a suitable electronic temperature controller. The wiring diagrams can be found in the respective instructions for the control equipment. The respective measuring ranges, resolutions and sensor compatibility of the various control devices are also described there.



CAUTION

After connecting the temperature sensor, check that the wiring has been done properly and that the connecting cable is not damaged.

Connection example for ELTC-MV2 (terminal X1 and X2)



Notes commissioning



WARNING

When setting the control, make sure that the sheath temperature of the heating element does not exceed the highest limit temperature!



CAUTION

The settings of the controller / limiter must be checked during commissioning.



NOTE

The temperature control device and the temperature sensor(s) should be calibrated against the factory settings during commissioning if necessary.

The control should be set to the required temperature and if necessary recalibrated by the factory settings. Perform a functional test by adjusting the temperature settings until it is determined that a heat tracing element has been turned on by the control. All measured data should be recorded.

Notes maintenance



CAUTION

In the case of repair, it is important that the repaired system retains its UV resistance, mechanical properties and weather protection as required. If this cannot be guaranteed, replacement is recommended.



CAUTION

During repair work on heated system parts, temperature sensors must be protected against damage. After completion of the repair work, the temperature sensors should be checked again. Damaged temperature sensors should be replaced immediately.

Maintenance



NOTE

The frequency of an inspection depends on the place of application, the type of heat-tracing system and the type of application.



NOTE

When used for frost protection, an inspection before the onset of winter is recommended.

To ensure the reliable function of the temperature sensor, a check should be carried out at regular intervals.
To do this, check:

- the functionality of the temperature sensor. In case of deviations, carry out a new calibration of the control device.
- check the contacts and terminals to which the temperature sensor is connected for correct seating and possible corrosion.
- the temperature sensor and its connection cable for contamination, damage and correct seating.
- the tightness of cable entries.

Possible errors

Error	Possible cause	Troubleshooting
Temperature sensor type ELTF-PT only		
Incorrect measured value	Heat dissipation error	Use thermally conductive wrapping, e.g. aluminum band type ELB-06
Temperature display too high	Deviation through the measuring line	Reduce measuring line
Temperature sensor type ELTF-Te only		
Only amount of temperature display is correct	Polarity of the thermocouple at the connection reversed	Change polarity
Temperature display deviates too much upwards	The polarity of the compensating line is reversed at the connection head	Change polarity
	Compensating line type does not match thermocouple type	Replace compensating line
Temperature sensor type ELTF-PT and ELTF-Te		
Corrosion of the sensor sleeve / protective sleeve	Material not suitable for medium	Adapt material to medium
Temperature display too low	Moisture penetration in sensor sleeve	Check the protection class of the temperature sensor and replace it with another sensor if necessary
Incorrect measured value	Influence by heat sink or heat source	Change the installation position of the temperature sensor
Inertial time response	Soiling on the sensor sleeve	Clean the sensor sleeve
	Sensor sleeve diameter too large	Use temperature sensor with smaller diameter

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