OCTOGON

MANUAL

TEMC

SCREW-IN RESISTANCE TEMPERATURE SENSOR

Operating manual



Document	Version	Date	Applies to
Operating manual	V00x	10/2026	TEMC, Pt100, 4 ... 20 mA HART

This operating manual describes transport, safety, mounting, connection, operation, fault recovery and maintenance of the TEMC screw-in resistance temperature sensor.

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1 General

1.1 For your information

– These operation instructions contain important information on handling the resistance thermometer. Working safely requires that all safety instructions and work instructions are observed.

– Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.

– The operating instructions are part of the product and must be kept in the immediate vicinity of the resistance thermometer and readily accessible to skilled personnel at any time.

– Observe the relevant local accident prevention regulations and general safety regulations for the resistance thermometer's range of use.

– If the serial number gets illegible (e. g. by mechanical damage), the retraceability of the instrument is not possible any more.

– The temperature sensors, described in this operating manual, are carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality inspection in all stages of manufacture.

– The manufacturer's liability is void in the case of any damage caused by using the product contrary to its intended use, non-compliance with these operating instructions, unauthorised modifications to the resistance thermometer or assignment of insufficiently qualified skilled personnel.

1.2 Signs, abbreviations

Sign	Meaning
Warning	A non-observance can cause injuries to persons and/or the demolition of the device. There can be danger to life.
Attention	A non-observance can cause a faulty operation of the device or lead to property damage.
Information	A non-observance can have influence on the operation of the device or cause unintentional reactions of the device.
Danger – electrical power	Should the safety instructions not be observed, there is a risk of serious or fatal injury caused by electrical power.
Warning – hot surface	Possibly a dangerous situation can occur, which results in burns because of hot surfaces or liquids, if not avoided.
U+	Positive supply connection
U–	Negative supply connection

1.3 Device

Feature	Version
Design	screw-in resistance temperature sensor
Sensor	RTD Pt100, class A / B / AA (B1/3 DIN)
Output	4 ... 20 mA with HART, 2-wire current loop
Manufacturer type	METS-WT

2 Transport, packaging, storage

2.1 Transport

Check the instrument for any damage that may have been caused during transportation. If there is any damage, report it immediately.

2.2 Packaging

Do not remove packaging until just before mounting. Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, sending back).

2.3 Storage

For longer term storage avoid the following influences:

- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (putting it hard down)
- Soot, vapour, dust and corrosive gases

If possible store the device in its original package or an equivalent one.

3 Safety instructions

Warning Before installation, commissioning and operation ensure that the appropriate resistance thermometer has been selected in terms of measuring range, design, specific measuring conditions and appropriate wetted parts materials (corrosion).

Information More important safety instructions can be found in the individual chapters.

3.1 Intended use of the product

The resistance thermometer TEMC is used for the measurement of temperatures from −50 … 200 °C in liquid and gaseous media. It can be used for pressures up to 25 bar.

The sensor has been designed and built solely for the intended use described here and may only be used accordingly.

The technical specifications contained in these operating instructions must be observed. Improper handling or operation of the instrument outside of its technical specifications requires the instrument to be taken out of service immediately and an inspection by the manufacturer.

When the instrument is transported from a cold into a warm environment, the formation of condensation may result in the instrument malfunctioning. Before putting it back into operation, wait for the instrument temperature and the room temperature to equalise.

The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

3.2 Personnel qualification

Warning **Risk of injury if qualification is insufficient**

Improper handling can result in considerable injury and damage to equipment.

- The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below.
- Keep unqualified personnel away from hazardous areas.

For installation and starting of the temperature sensor the personnel has to be familiar with the relevant regulations and directives of the country and must have the qualification required. They must have knowledge on measurement and control technology, have to be acquainted with electric circuits, are capable of carrying out the work described and can independently recognise potential hazards. Depending on the operation conditions of the application they have to have the corresponding knowledge, e.g. of aggressive media.

3.3 Special hazards

Warning For hazardous media such as oxygen, acetylene, flammable or toxic gases or liquids, refrigeration plants, compressors, etc., in addition to all standard regulations, the appropriate existing codes or regulations must also be followed.

If you do not observe the appropriate regulation, serious injuries and/or damage can occur!

Warning A protection from electrostatic discharge (ESD) is required.

The proper use of grounded work surfaces and personal wrist straps is required when working with exposed circuitry (PCB, printed circuit boards), in order to prevent static discharge from damaging sensitive electronic components.

Danger – electrical power There is a danger of death caused by electric current. Upon contact with live parts, there is a direct danger of death.

Electrical instruments may only be installed and connected by skilled electrical personnel.

Operation using a defective power supply unit (e.g. short circuit from the mains voltage to the voltage output) can result in life-threatening voltages at the instrument.

Warning Residual media in dismounted instruments can result in a risk to personnel, the environment and equipment. Take sufficient precautionary measures.

Do not use this instrument in safety or Emergency Stop devices. Incorrect use of the instrument can result in injury.

Should a failure occur, aggressive media with extremely high temperature and under high pressure or vacuum may be present at the instrument.

4 Start-up, operation

4.1 Function

The TEMC is fitted directly into the process via thread of the process connection. A change in resistance of the sensor element in the tip of the protecting tube is transformed into an electrical standard signal by a measuring amplifier. The signal changes proportional to the temperature and can be evaluated.

4.2 Before mounting

Information

- Check if a completely assembled temperature sensor is supplied.
- Inspect the temperature sensor for possible damage during transportation. Should there be any obvious damage, inform the transport company and supplier without delay.
- Keep the packaging, as it offers optimal protection during transportation.
- Ensure that the process connection thread and the connection contacts will not be damaged.

4.3 Product label (example)

Field	Meaning	Field	Meaning
OH...	product code	Art.Nr.	part number
Tmax	range maximum	SN	serial number
T	temperature range	Date	date of QC
U+	supply/loop +	OUT	loop signal
U–	supply/loop –	SUP.	range of voltage

4.4 Mechanical connection

Tools: wrench (flats 27), screw driver

The resistance thermometers are designed for screw fitting directly into the process. The insertion length, along with the flow velocity and viscosity of the process media, may reduce the maximum loading on the protecting tube.

Installation on pipes:

- A: on elbows
- B: in small pipes, inclined
- C: perpendicular to flow direction

You have to provide for a sealing element which corresponds to the application. Exceptions may be instruments with self-sealing threads (e. g. NPT thread).

When mounting the instrument, ensure that the sealing faces of the instrument and the measuring point are clean and undamaged.

Screw in or unscrew the instrument only via the flats using a suitable tool and the prescribed torque. The appropriate torque depends on the dimension of the process connection and on the sealing element used (form/material). Do not use the case as working surface for screwing in or unscrewing the instrument.

When screwing the transmitter in, ensure that the threads are not jammed.

If necessary observe information about tapped holes and welding sockets.

4.5 Electrical connection

Attention Connect the instrument to earth via the process connection.

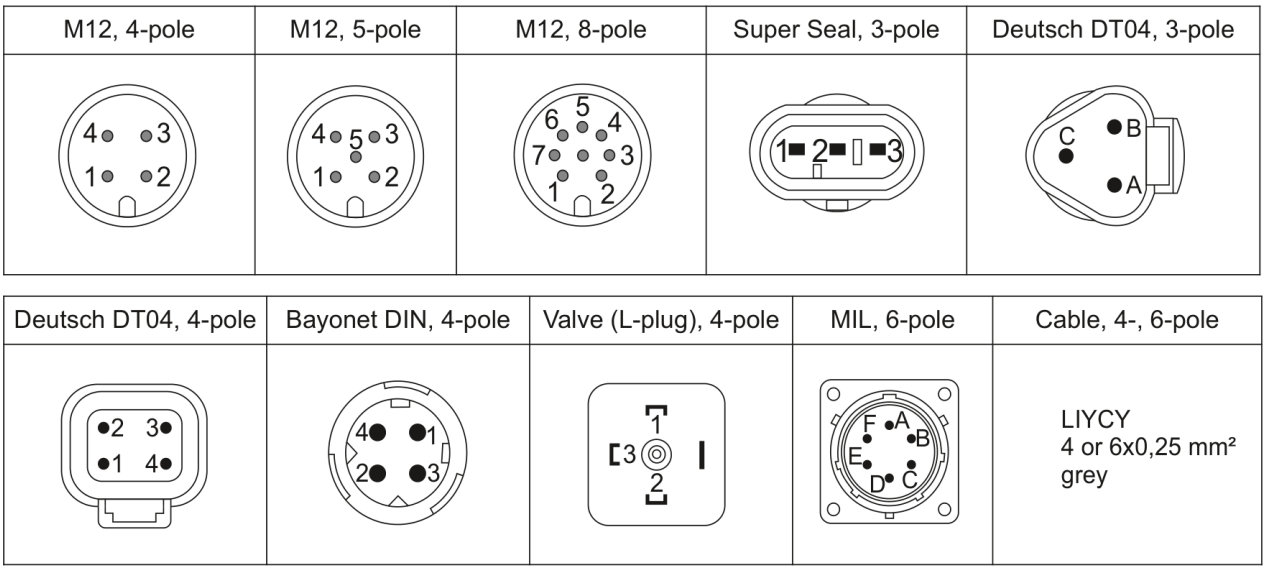
The ingress protection specified only applies while the instrument is connected with the female connectors that provide the corresponding ingress protection.

Ensure that the cable diameter you select fits to the cable gland of the connector. Ensure that the cable gland of the mounted connector is positioned correctly and that the sealings are available and undamaged. Tighten the threaded connection and check the correct position of the sealings to ensure ingress protection.

Make sure that the ends of cables with flying leads do not allow any ingress of moisture.

4.6 Pin assignment

Connection	Current loop 4 ... 20 mA HART U+	U–
M12, 4-pole	1	3
M12, 5-pole	1	3
M12, 8-pole	1	3
Super Seal, 3-pole	1	3
Deutsch DT04, 3-pole	A	B
Deutsch DT04, 4-pole	1	3
Bayonet DIN, 4-pole	1	2
Valve (L-plug), 4-pole	1	2
Cable, 4-pole	yellow	white
Cable, 6-pole	yellow	white
MIL, 6-pole	A	C



View: plug pins of male connector. Cable: LIYCY, 4 or 6 × 0.25 mm², grey.

4.7 Example for connection

Two-wire connection via the current loop 4 ... 20 mA HART:

TEMC	Connection
1 (+)	to + of the supply
3 (–)	to + of the evaluation unit (e. g. SPS)
	– of the supply to – of the evaluation unit

4.8 Functional test

Information The output signal must be proportional to the temperature. If not, this might point to a damage of the sensor element. In that case refer to chapter Fault recovery (section 5).

Warning

- Open process connections only after the system is without pressure.
- Observe the ambient and working conditions outlined in chapter "Technical data" (section 7).
- When touching the temperature sensor, keep in mind that the surfaces of the instrument components might get hot during operation.

4.9 Error detection / error current

The device detects wire break and short circuit (sensor element <> measuring amplifier) as well as temperatures outside of the measuring range and indicates this with an error current in the current loop circuit.

The current output is proportional to the temperature from 3.8 to 20.5 mA. If the measured temperature would result in a current below 3.8 mA the current output is set to 3.6 mA (also for a wire short circuit). If the current would exceed 20.5 mA, the current output is set to 21 mA (also for wire break).

Measuring signal (% of range)	Output current
below –1.25 % or wire short circuit	3.6 mA (error current)
–1.25 %	3.8 mA
0 %	4.0 mA
100 %	20.0 mA
103.125 %	20.5 mA
above 103.125 % or wire break	21.0 mA (error current)

Output current and measured signal.

5 Fault recovery

Warning

- Open pressure connections only after the system is without pressure.
- Residual media in dismounted instruments can result in a risk to personnel, the environment and equipment.
- In case of damage, remove the temperature sensor from service and mark it to prevent it from being used again by accident.

Failure	Potential cause	Procedure
No output signal	Cable break	Check connectors and cable
	Mechanical load too high or overtemperature	Replace the sensor with a suitable design
No/false output signal	Incorrectly wired	Follow pin assignment (see product label / manual)
Erroneous measured values	Sensor drift caused by overtemperature	Replace the sensor with a suitable design
	Sensor drift caused by chemical effect	Replace the sensor with a suitable design
Erroneous measured values (too low)	Entry of moisture into cable or plug	Replace the sensor with a suitable design
Erroneous measured values and response time too long	Wrong mounting geometry, e.g. mounting depth too low or heat dissipation too high	The temperature-sensitive area of the sensor must be inside the medium, surface measurements must be isolated
	Deposits on the sensor	Remove deposits
Measurement signal "comes and goes"	Cable break in connecting cable or loose contact caused by mechanical overload	Replace the sensor with a suitable design, e.g. thicker conductor cross section
Corrosion	Composition of medium not as expected, modified composition or wrong material of protecting tube	Analyse medium and then select a more suitable material
Signal interference	Stray currents caused by electric fields or earth loops	Use of screened connecting cables, and increase the distance to motors and power lines
	Earth circuits	Elimination of potentials, use of supply isolators or galvanically isolated measuring amplifiers

Note: In case of unjustified reclamation an additional charge is possible.

6 Maintenance, dismounting, return, cleaning, disposal

6.1 Maintenance

The screw-in temperature sensors TEMC require no maintenance and contain no components which could be repaired or replaced.

6.2 Dismounting

Warning Residual media in dismounted instruments can result in a risk of personnel, the environment and equipment. Take sufficient precautionary measures.

Warning – hot surface There is a risk of burns. Let the instrument cool down sufficiently before dismounting. During dismounting there is a risk of dangerously hot pressure media escaping.

Only disconnect the resistance thermometer after the system has been depressurised.

6.3 Return

Warning Before the return of an instrument see chapter 6.4.

When returning the instrument, use the original packaging or a suitable package.

To avoid a damage, use for example antistatic plastic film, shock-absorbent material, a marking as highly sensitive measuring instrument.

6.4 Cleaning

Attention

- Before cleaning the instrument disconnect the electrical connection.
- Clean the instrument with a moist cloth.
- Electrical connections must not come into contact with moisture.
- Wash or clean the dismounted instrument before returning it in order to protect personnel and the environment from exposure to residual media.
- Residual media in dismounted instruments can result in a risk to persons, the environment and equipment. Take sufficient precautionary measures.

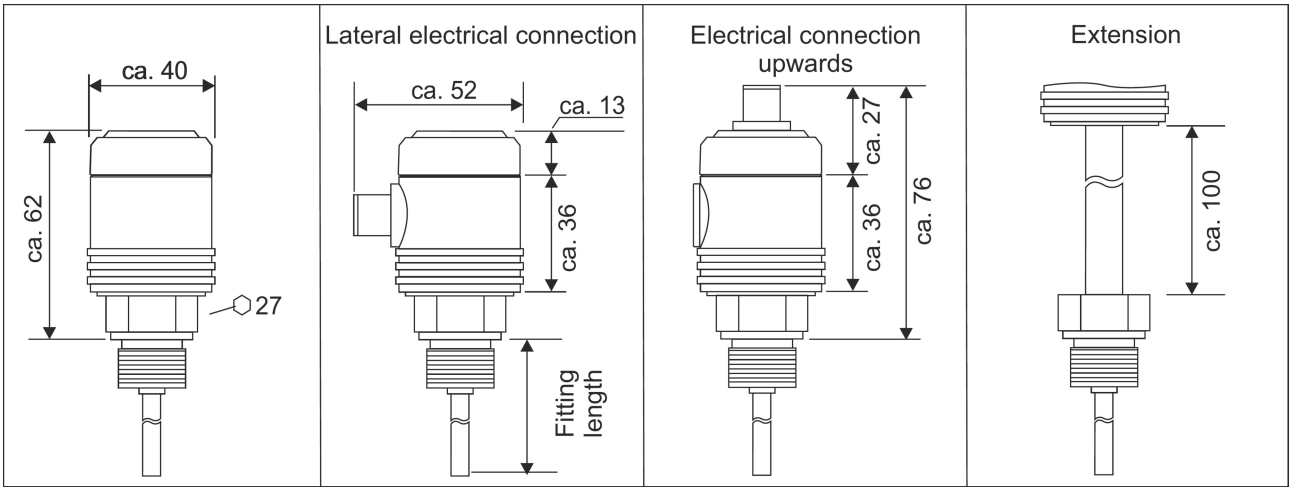
6.5 Disposal

Information Dispose instrument components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the sensor is supplied.

7 Technical data

Item	Value
Input	
Sensor RTD Pt100	–50 ... 250 °C (minimum range: 50 °C)
Output	
Current signal	4 ... 20 mA with superimposed communication signal (HART), 2-wire current loop
Current range	3.8 ... 20.5 mA
Signal on error	3.6 mA (sensor short circuit, underflow); 21 mA (sensor break, sensor open circuit, overflow)
Performance	
Sensor RTD Pt100	Class A / Class B / Class AA (B1/3 DIN)
Measuring amplifier: accuracy	0.3 % of range
Resolution	16 bit
Filter setting	0 ... 99 s
Measuring rate	10 measurements/s
Configuration	via software (HART communication)
Transmission behaviour	temperature linear
Turn-on delay time	< 5 s
Supply	
Voltage HART current loop	12 ... 40 VDC
Load	R = (UB – 12 V) / 21 mA
Reverse battery protection	available (no function, no damage)
Environmental conditions	
Temperature operating range	–20 ... +80 °C (Attention: temperatures above 85 °C can destroy the electronics!)
Medium	–50 ... +250 °C
Storing	–40 ... +100 °C
Condensation	uncritical
Mechanics	
Dimensions	see section 7.1
Process connection	1/4″ / 3/8″ / 1/2″ / 3/4″ / 1″ / 1/4NPT / 3/8NPT / 1/2NPT
Extension	100 mm (option)
Electrical connection	lateral; option: upwards
Plugs and cables	see data sheet
Material protecting tube	stainless steel 1.4571 (standard Ø 6 mm)
Material extension	stainless steel 1.4571
Material process connection	stainless steel 1.4571
Material body / cover	PBT GF30 / PBT GF30
Weight	approx. 140 g (70 mm, 1/2″, M12)
Fitting position	any
System pressure	PN 25
Protection of device	
Ingress protection	at least IP65 (electronics)
PCB	potted

7.1 Dimensions



Dimensions in mm.