OCTOGON

MANUAL

TLMB

SCREW-IN TEMPERATURE SWITCH

Operating manual



Document	Version	Date	Applies to
Operating manual	V00x	10/2026	TLMB, Pt100, relay changeover contact

This operating manual describes transport, safety, mounting, connection, switch point adjustment, trouble shooting, configuration via HART and maintenance of the TLMB screw-in temperature switch.

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1 General

1.1 For information

– These operation instructions contain important information on handling the temperature switch. 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 temperature switch and readily accessible to skilled personnel at any time.

– Observe the relevant local accident prevention regulations and general safety regulations for the temperature switch 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 switches, 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 temperature switch 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 temperature switch
Sensor	RTD Pt100, 3-wire
Output	relay, changeover contact
Adjustment	switching point with magnet; hysteresis, switching delay, switching point, damping with HART tool
Manufacturer type	METL-L

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 For your safety

Warning Before installation, commissioning and operation ensure that the appropriate temperature switch 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 temperature switch TLMB 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 switch 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 Starting, operation

4.1 Function

The TLMB 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 signal by a measuring amplifier. This signal activates the output relay when the adjusted temperature is reached.

4.2 Before mounting

Information

- Check if a completely assembled temperature switch is supplied.
- Inspect the temperature switch 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
NT...	product code	Art.Nr.	part number
Tmax	range maximum	SN	serial number
T	switching temperature	Date	date of QC
U+	supply +	SUP.	range of voltage
U–	supply –		

4.4 Mechanical connection

Tools: wrench (flats 27), screw driver

The temperature switches 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.

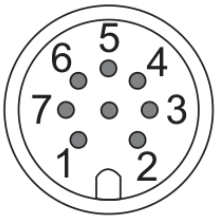
4.5 Electrical connection

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.

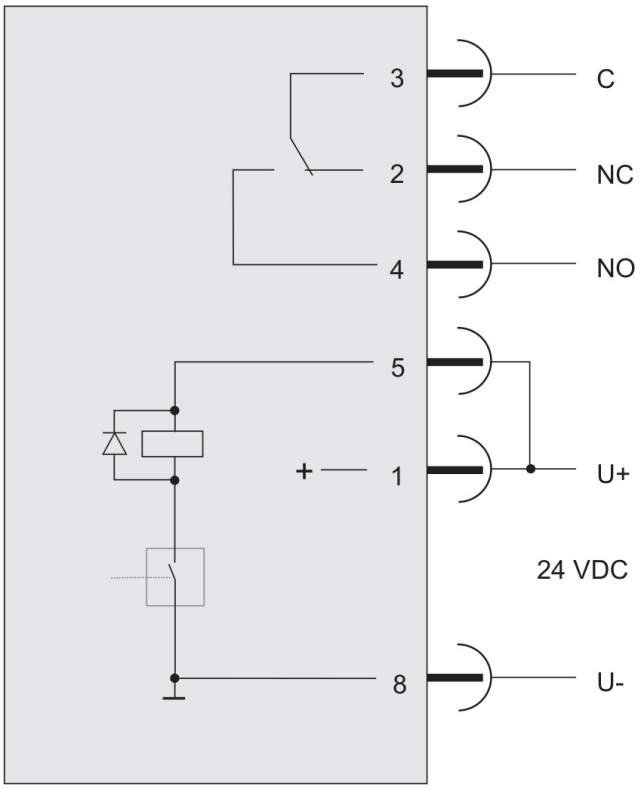
Route the cable without applying a force or turning moment to the device.

4.6 Plug



M12, 8-pole. View: plug pins of male connector (on device).

Pin assignment

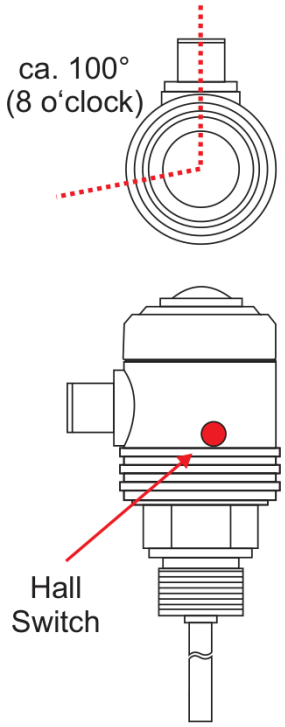


Connection for standard use
(Configuration via HART not possible)

4.7 Example of connection

TLMB	Connection
3 (C)	to the evaluation unit
2 (NC)	to the evaluation unit
4 (NO)	to the evaluation unit
1 (+) and 5 (+)	together to + of the supply 24 VDC
8 (–)	to – of the supply 24 VDC

4.8 Adjustment of switch point



To adjust the switch point (to teach) proceed as follows:

- Apply the temperature switch with that temperature, where the switching contact has to operate.
- When the temperature is reached, activate the Hall effect device with the magnet. Position of the Hall effect device: On topview of the device the M12-connector points upwards. The Hall effect device is located at turning left 100° (approx. 8 o'clock). See also the drawing above.
- When the Hall effect device was activated successfully, the red LED below the lens at the top of the device flashes 3 times. This indicates that the new switching value was transferred correctly.
- In normal operation the LED indicates the state of the switching contact:
  - LED lights: switching relay active
  - LED off: switching relay inactive

4.9 Functional test

Information The output switching relay has to operate at the adjusted temperature value. If not, this might point to a damage of the temperature sensor or a misadjusted/faulty electronics. In that case refer to chapter "Troubleshooting" (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 8).
- When touching the temperature switch, keep in mind that the surfaces of the instrument components might get hot during operation.

5 Troubleshooting

Warning

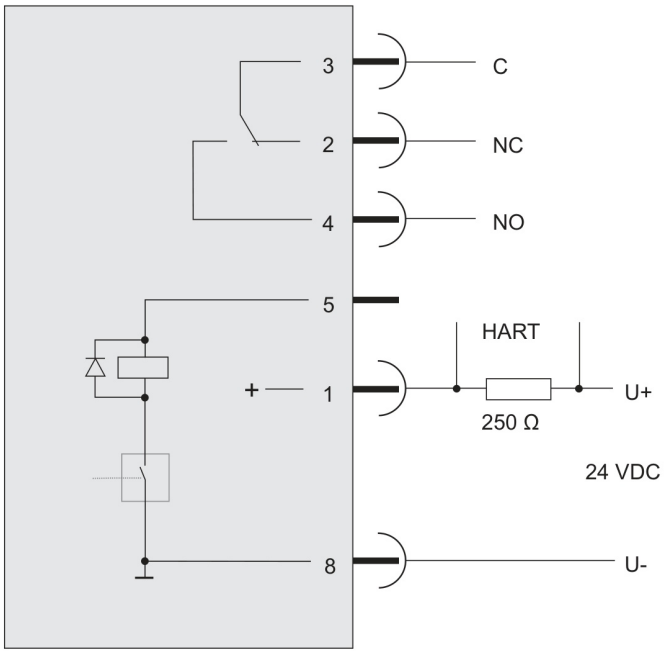
- Open pressure connections only after the system is without pressure.
- Residual media in dismounted instruments can result in a risk to personnel, the environment and equipment.
- Remove the temperature switch from service and mark it to prevent it from being used again accidentally.

Failure	Possible 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 instrument label / operating instructions)
Erroneous measured values	Sensor drift caused by overtemperature	Replace the sensor with a suitable design
	Sensor drift caused by chemical attack	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, surfaces 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 or modified or wrong material of protecting tube	Analyse medium and then select a more suitable material
Signal span erratic/incorrect	Electromagnetic interference source in the vicinity, e. g. inverter drive	Use of screened connecting cables, 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 Configuration via HART

Pin assignment



Connection for configuration via HART
(Relay is without function)

7 Maintenance, dismounting, return, cleaning, disposal

7.1 Maintenance

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

7.2 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 temperature switch once the system has been depressurised.

7.3 Return

Warning Before the return of an instrument see chapter 7.4.

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.

7.4 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.

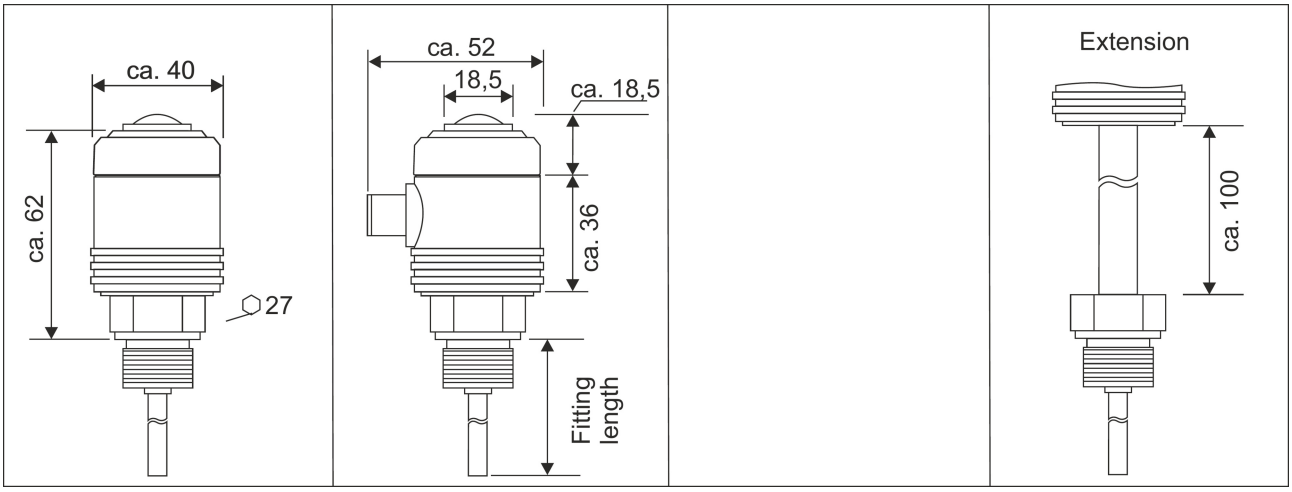
7.5 Disposal

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.

8 Technical data

Item	Value
Input	
Sensor: type	RTD Pt100
Sensor: range	–50 ... 200 °C
Sensor: connection	3-wire
Output	
Relay: type	Changeover contact
Switching capacity	1 A, 30 VDC (resistive load); 0.3 A, 125 VAC (resistive load)
Switching power	30 W or 37.5 VA (resistive load)
Switching cycles	> 100000
Performance	
Sensor: RTD Pt100	Class A
Switching amplifier: accuracy	±0.5 °C
Switching delay	0 s (standard), with HART configuration: 0 ... 99.9 s
Hysteresis	0.1 °C (standard), with HART configuration: > 0.1 °C
Damping	0 s (standard), with HART configuration: 0 ... 99.9 s
Measuring rate	10 measurements/s
Response time	20 ms
Switching point	100 °C (standard)
Adjustment	switching point with magnet (recalibration)
Turn-on delay time	< 5 s
Indication: LED	red, 360°
Relay active	LED lights
Relay inactive	LED off
Programmable features	
Switching amplifier: with magnet	switching point adjustment (recalibration)
Switching amplifier: with HART tool	hysteresis, switching delay, switching point, damping
Supply	
Voltage	24 ... 30 VDC
Current consumption	approx. 20 mA maximum
Reverse battery protection	available (no function, no damage)
Ambient conditions	
Temperature: operating range	–40 ... +80 °C (ambient)
Temperature: medium	–50 ... +200 °C
Temperature: storing	–40 ... +100 °C
Condensation	uncritical
Mechanics	
Dimensions	see section 8.1
Process connection	1/4" / 3/8" / 1/2" / 3/4" / 1" / 1/4NPT / 3/8NPT / 1/2NPT
Protecting tube	Ø 6 mm (standard), 9 mm, other on request
Extension	100 mm (option)
Electrical connection	M12x1, 8-pole
Material protecting tube	stainless steel 1.4571
Material extension	stainless steel 1.4571
Material process connection	stainless steel 1.4571
Material body / cover	PBT GF30 / PBT GF30
Material lens	PMMA
Weight	approx. 140 g
Fitting position	any
System pressure	PN 25
Protection of device	
Ingress protection	at least IP 65 (electronics)
PCB	potted

8.1 Dimensions



Dimensions in mm.