

TC-125 DIGITAL THERMOMETER issue 6.0



The **TC-125** digital thermometer is an instrument for measuring the original temperature of rocks in mine excavations. The original rocks temperature at the specific depth constitutes a preliminary criterion of a temperature hazard assessment. The original temperature of rocks surrounding the mining excavation is necessary in order to apply the proper measures of temperature hazard prevention.

This thermometer has versatile applications in mines for the following measurements:

- Original rocks temperature – required based on mine regulations (in this case is applied 2 m long folded probe).
- Temperature measurement in sealed excavations with probes installed behind the insulation dam.
- Continuous temperature monitoring in the site of rescue team operation (possible measurement at the max. distance of 3 km).
- Rock mass temperature control for fire prevention; installation of a series of probes in holes and cyclic temperature change verification.

TC-125 is connected to the probe by means of a twin-core wire. The distance of the probe from the instrument is determined by the total resistance of a measurement line and possibly the level of interferences which may be generated on the long section of the wire.

The **TC-125** thermometer may cooperate with a few dedicated versions of measurement probes:

- KTY probe type equipped with a simple resistance sensor – without transmitter system and measurement line resistance correction system.
- PTY probe type equipped with a simple resistance sensor – without transmitter system and measurement line resistance correction system. As compared to KTY probe type, this sensor is characteristic for higher measurement accuracy.
- KT probe type equipped with resistance sensor with the transmitter system and measurement line resistance correction system.
- PT probe type equipped with resistance sensor with the transmitter system and measurement line resistance correction system.

Probes with transmitter systems and measurement line resistance correction systems (KT and PT type) are dedicated to measurements in points considerably distant from **TC-125** (max. 3000 m).

Probes without such systems (KTY and PTY type) are dedicated to measurements in points close to **TC-125** where connection line resistance does not affect a measurement result. All the sensors cooperating with **TC-125** do not have their own power supply. They are supplied with power from **TC-125** during the measurement only.

The operating rule of **TC-125** is based on the resistance measurement of a sensor located at the end of the measurement line. KT and PT type probes contain electronic systems enabling controlling the resistance impact of a considerably long measurement line. After initiating a measurement cycle, the probe control system sends digital data specifying a probe type, its own ID number, and then it performs the resistance measurement of the connection line. Then, a temperature sensor is connected to the line, and the control system embedded in the probe switches off. **TC-125** measures the total resistance of the sensor and the measurement line, subtracts the previously measured resistance of the connection line and, depending on a sensor type, converts the measured sensor resistance to temperature. As far as the simplest probes are concerned (KTY and PTY type), the resistance of the entire probe system is measured, including the resistance of connection lines. In such a case, as the length of the lines used increases, a measurement error also grows up.

The **TC-125** thermometer is additionally equipped with a barometric pressure sensor.

All the temperature measurement results are saved on the SD memory card, including the measurement date and time.

The OLED type display used guarantees good results legibility in all the lighting conditions. IP54 housing enables its usage in high dust and humidity level areas.

The set of **TC-125** includes a leather casing.

The design of the **TC-125** digital thermometer meets the requirements of the **PN-EN60079-0** Standard “Explosive atmospheres – Part 0: Devices. Essential requirements”, **PN-EN60079-11** “Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i” and **PN-EN 50303** “M1 category and group I devices intended for continuous operation in methane and/or coal dust hazard atmospheres” and enables the use of the thermometer in mining in explosion hazard areas, in the gas sector and chemical industry.

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Technical data:

1. Temperature measurement:

- Measurement range 0 ÷ +125 °C
- Resolution of indications
 - ✓ For KT and KTY probe types 1°C
 - ✓ For PT and PTY probe types
 - range 0 ÷ +100 °C 0,1°C
 - above +100 °C 1°C
- Accuracy of indications
 - ✓ For KT and KTY probe types
 - in 20°C ±2°C
 - in 120°C ±5°C
 - ✓ For PT probe types
 - in 20°C ±1°C
 - in 120°C ±2°C
 - ✓ For PTY probe types ±0,3 + 0,005 |t| °C
- Measurement time: approx. 10 sec
- Connection line length:
 - ✓ For KT and PT probe types max. 3000 m (resistance 200Ω/km)
 - ✓ For KTY probe types max. 10 m
 - ✓ For PTY probe types max. 4 m

2. The measurement of barometric pressure:


- Measurement range 800 ÷ 1260 hPa
- Resolution of indications 0,1 hPa
- Accuracy of indications
 - ✓ ±1 hPa (for P = 800 to 1100 hPa, T = 25 °C)
 - ✓ ±2 hPa (for P = 800 to 1100 hPa, T = 0 to +50 °C)

3. Power supply:

- Power supply autonomy: min. 48 hours of continuous work
- Battery discharge signalisation: indicator
- Supply current source: battery Li-Ion 2200 mAh
- Charging: max. 4 hours

4. Gauge working conditions:

- Ambient temperature: 0 ÷ 50 °C
- Relative humidity: 0 ÷ 100 % RH
- Atmospheric pressure: 800 ÷ 1260 hPa
- IP rating: IP54
- Explosion-proof construction property:

 I M1 Ex ia I Ma
II 1G Ex ia IIB T4 Ga

- EU-type examination certificate number: JSHP 22 ATEX 0057X

5. Other information:

- Display type: OLED graphical 1.3"
- Backlight: Does not require
- Internal memory: uSD card
- Internal clock
- Internal charging system
- Dimensions: 52 x 190 x 35 mm (without a casing and connection terminals)
- Weight: 275 g (without a casing)
- Standard equipment: Leather casing, power adapter for charging a battery

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