

TEP1/K, TEP1/H, TEP1/E

Precision temperature transducers with Pt100 sensor



Immersion sensor temperature TEP1/H

- High measurement accuracy (typ. $\pm 0.1^\circ\text{C}$)
- Low transmitter temperature coef. (5ppm)
- Temperature resolution up to 0.002°C
- Mechanical dimensions TEP1/K adapted to the radiation cover RK5
- Submersible drainage sump pump TEP1/H with fixed cable
- Four-wire connection of external Pt100 sensors to TEP1/E
- Reading of measured temperatures via RS485 at a distance of up to 500 m
- FINET or Modbus RTU protocols on RS485
- Compatible with all FIEDLER AMS telemetry stations

Basic description

The TEP1 converter converts the temperature sensed by the Pt100 sensor into a digital signal transmitted to the connected system via the RS485 bus.

The measuring electronics controlled by a microprocessor is housed in a cylindrical plastic housing with a diameter of 16 mm and ensures accurate measurement and calculation of temperature with a typical error not exceeding 0.1°C in the range from -30°C to $+50^\circ\text{C}$. In the entire operating range from -50°C to $+80^\circ\text{C}$, the typical temperature measurement error is less than 0.3°C . High accuracy and stability of measurement allows the use of high resolution of the measured temperature, which can be set by the user in the connected recording unit. The converter works with minimal noise without fluctuations and with a resolution of 0.002°C .

Converter connection via RS485

The TEP1 converter communicates with the connected recording unit via the RS485 bus under the FINET protocol (Modbus RTU). The converter is also powered from the connected unit via the same communication cable.

Communication address, baud rates and some other parameters of the converter are user-adjustable, which allows you to connect more TEP1 probes to existing and newly built RS485 networks.

Examples of use

- Accurate water temperature measurement
- Accurate air temperature measurement
- Measurement of surface temperatures in botany
- Temperature measurement in industry
- Measurement within development projects

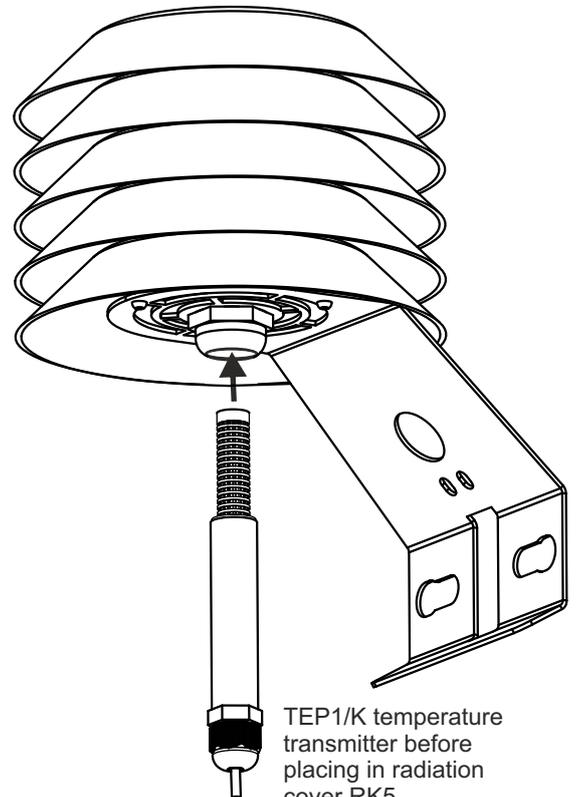
Mechanical design

The TEP1 temperature transmitter is available in 3 basic versions:

TEP1/H - water temperature measurement

TEP1/K - air temperature measurement

TEP1/E - surface temperature measurement by external sensor



TEP1/K temperature transmitter before placing in radiation cover RK5

TEP1/H Water temperature measurement

The TEP1/H probe is intended for measuring the water temperature. The electronics of the probe, including the Pt100 temperature sensor and the output cable, are completely encapsulated in a water-resistant PUR material. The probe can be suspended or otherwise fixed to the required depth below the water surface. The very durable mechanical design results in greater thermal inertia of the probe, which reaches up to tens of sec. The TEP1/H probe is supplied as standard with a 5 m long communication cable.

TEP1/E Surface temperature measurement

The TEP1/E transmitter does not contain a Pt100 temperature sensor, but only a 4-pin M12 connector, through which the sensor located at the opposite end of the cable is connected to the transmitter. This mechanical design is used especially when measuring surface temperatures in botany, construction and everywhere where it is necessary to read the temperature with a non-standard sensor shape (small sensors or sensors equipped with mounts) and where the dimensions and thermal inertia of the transmitter itself would cause an error in temperature measurement.

The maximum cable length between the TEP1/E transmitter and the Pt100 sensor itself can be up to 100 m. The temperature sensors are connected to the transmitters in four wires and therefore the cable length does not affect the measurement accuracy.

Technical parameters

Number of measuring inputs: 1

Temperature sensor type: Pt100, four-wire connection

Maximum cable length to the sensor: 100 m

Measuring range: -50 °C to +100 °C

Measured temperature resolution: 0.001 °C

Transducer measure error: type ± 0.01 °C, max ± 0.1 °C

Measurement error including connected sensors:

type $0.15 + 0.001 * t$ [°C], max $0.25 + 0.002 * t$ [°C]

Measurement time of one channel: <0.5 sec

Output: RS485

Communication protocols: FINET (Modbus RTU)

Range of adjustable addresses: 1 to 240

Output cable: 4-core PUR cable 1 to 100 m (5 m)

Supply voltage: Un: 6 to 16 V DC

Current consumption: <5 mA

Mechanical dimensions: diam. 16 mm, length 110mm

Weight (without cables and sensors): 80 g

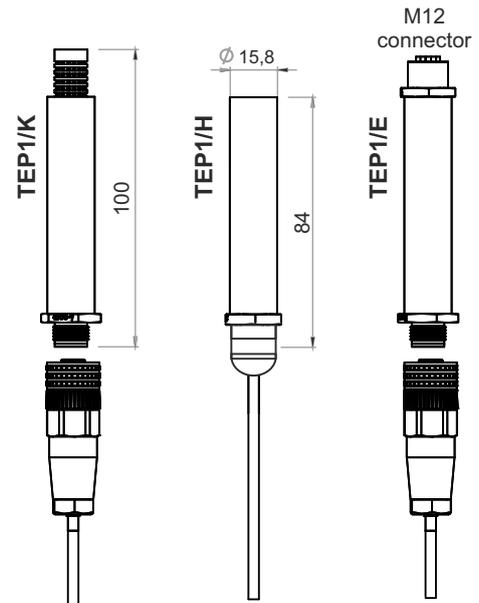
Working temperature: -40 to +70 °C

TEP1/H converter protection: IP68

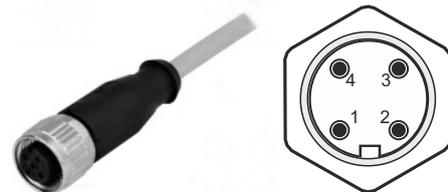
TEP1/K Air temperature measurement

The basic TEP1/K probes are used to measure the air temperature. A Pt100 temperature sensor with a very small time constant measuring 2.5 x 5 mm is mounted on the upper end of the probe, which is usually inserted into the RK5 radiation shield (RK7). A simple plastic cover with very good air permeability is placed over this sensor.

The lower end of the probe is equipped with a circular four-pin M12 connector for quick and easy handling of the probe, through which the probe is powered and through which it communicates via RS485 under the FINET protocol (Modbus RTU).



Connecting connector / cable



Connector	1	2	3	4	
Signal	+Unap	GND	485-A	485-B	
Cable	PUR - black	brown	green	yellow	white
	PVC - gray	brown	white	blue	black

The connecting cable can be ordered in PUR or PVC in lengths of 2 m, 5 m or 10 m, IP67 connector protection.

PUR cable connection of TEP1 / H converter

