

### Features

- Temperature accuracy up to  $\pm 0.1$  °C ( $\pm 0.18$  °F)
- Temperature measurement range  $-70 \dots +180$  °C ( $-94 \dots +356$  °F)
- Modbus® RTU over RS-485
- Compatible with Vaisala Indigo products and Insight PC software
- Traceable 2-point calibration certificate with calibration points at  $+20$  and  $+70$  °C ( $+68$  and  $+158$  °F)

Vaisala Temperature Probe TMP1 is designed for demanding temperature measurements in industrial applications such as pharmaceutical industry and calibration laboratories, where accuracy and robustness are essential.

### Flexible connectivity

The probe can be used as a standalone digital Modbus RTU transmitter over an RS-485 serial bus, and it can also be connected to Indigo transmitters and the Indigo80 handheld indicator. For easy-to-use access to field calibration, device analytics, and configuration functionality, the probe can be connected to Vaisala Insight software for Windows®. For more information, see [www.vaisala.com/insight](http://www.vaisala.com/insight).

### Vaisala Indigo product family

Indigo transmitters extend the capabilities of Indigo-compatible measurement probes. The transmitters can display measurements on the spot as

well as transmit them to automation systems through analog signals, digital outputs, and relays. Cable length between probe and transmitter can be extended to up to 30 meters.

The Indigo80 handheld indicator is ideal for spot-checking and process monitoring, as well as for configuring, troubleshooting, calibrating, and adjusting the probe. For more information, see [www.vaisala.com/indigo](http://www.vaisala.com/indigo).

### Relative humidity measurements in high humidities

When the TMP1 probe is connected to a control system in parallel with HMP7 Relative Humidity and Temperature Probe, it is possible to have relative

humidity measurement in actual process temperature while using probe heating in the relative humidity probe. Probe heating helps to avoid condensation in situations where the dew point temperature of the process is close to the ambient temperature.

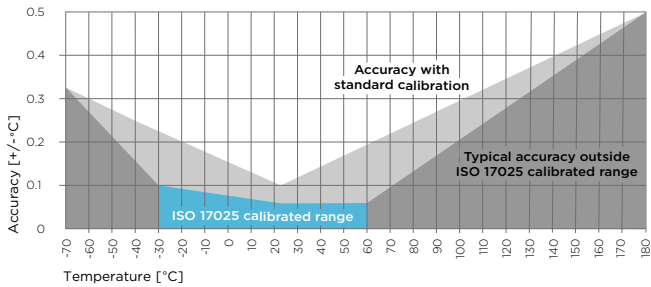
When the humidity probe is heated above dew point temperature, condensation can be avoided and the relative humidity in the actual process temperature can be back-calculated based on the true process temperature measurement received from TMP1.

# Technical data

## Measurement performance

|   |   |
|---|---|
| Measurement range                                   | -70 ... +180 °C (-94 ... +356 °F)       |
| Sensor  | Pt100 RTD Class F0.1 IEC 60751          |
| <b>Standard calibration <sup>1)</sup></b>           |   |
| Accuracy at +23 °C (+73.4 °F)                       | ±0.1 °C (±0.18 °F)                      |
| Factory calibration uncertainty <sup>2)</sup>       | ±0.1 °C (±0.18 °F) at +23 °C (+73.4 °F) |
| <b>Optional ISO 17025 calibration <sup>3)</sup></b> |   |
| Accuracy at +23 °C (+73.4 °F) <sup>1)</sup>         | ±0.06 °C (±0.108 °F)                    |
| Calibration uncertainty <sup>2)</sup>               | ±0.03 °C (±0.054 °F)                    |

- 1) Defined against calibration reference. Including non-linearity, hysteresis, and repeatability.
- 2) Defined as ±2 standard deviation limits. Small variations possible; see calibration certificate.
- 3) Accuracy depends on selected calibration points. Accuracy with ISO 17025 calibration is defined here using a 5-point calibration in the following points: -30, -10, 0, +30, and +60 °C. For more information on calibration services offered by Vaisala, see [vaisala.com/calibration](https://vaisala.com/calibration).



TMP1 temperature measurement accuracy over full range

## Operating environment

|                                     |                                   |
|-------------------------------------|-----------------------------------|
| Operating temperature of probe body | -40 ... +80 °C (-40 ... +176 °F)  |
| Operating temperature of probe head | -70 ... +180 °C (-94 ... +356 °F) |
| Operating environment               | Suitable for outdoor use          |
| <b>IP rating</b>                    |                                   |
| Probe body                          | IP66                              |
| Probe head and cable                | IPX8/IPX9                         |

## Inputs and outputs

|                     |   |
|---------------------|---|
| Operating voltage   | 15 ... 30 V DC  |
| Current consumption | 10 mA typical   |
| Digital output      | RS-485, non-isolated                                      |
| Protocols           | Modbus RTU  |
| Output parameters   | Temperature (°C)<br>Water vapor saturation pressure (hPa) |

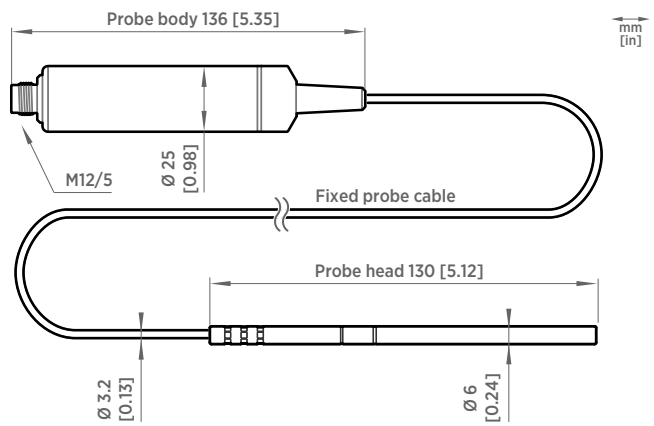
## Compliance

|                               |   |
|-------------------------------|---|
| EU directives and regulations | EMC Directive (2014/30/EU)<br>RoHS Directive (2011/65/EU) amended by 2015/863 |
| EMC compatibility             | EN 61326-1, industrial environment  |
| Type approvals                | DNV GL certificate no. TAA00002YT   |
| Compliance marks              | CE, China RoHS, RCM   |



## Mechanical specifications

|                    |                                 |
|--------------------|---------------------------------|
| Connector          | M12 5-pin A-coded male          |
| Weight             | 224 g (7.9 oz)                  |
| Probe cable length | 2 m (6.56 ft) or 10 m (32.8 ft) |
| <b>Materials</b>   |                                 |
| Probe              | AISI 316L                       |
| Probe body         | AISI 316L                       |
| Cable jacket       | FEP                             |



TMP1 probe dimensions

## Accessories

|   |           |
|---|-----------|
| Duct installation kit for T probe         | 215003    |
| Swagelok® for 6 mm probe, 1/8" ISO thread | SWG6ISO18 |
| Swagelok® for 6 mm probe, 1/8" NPT thread | SWG6NPT18 |
| Indigo USB adapter <sup>1)</sup>          | USB2      |

<sup>1)</sup> Vaisala Insight software for Windows available at [www.vaisala.com/insight](https://www.vaisala.com/insight).