

# Reference thermometer Model CTP5000

WIKA data sheet CT 61.20

## Applications

- Reference thermometer for measuring very accurate temperature in a range of  $-196 \dots +660 \text{ }^{\circ}\text{C}$  [ $-321 \dots +1,220 \text{ }^{\circ}\text{F}$ ]
- Reference thermometer and a precision instrument for testing, adjusting and calibrating temperature measuring instruments in factories and calibration laboratories
- Comparative calibration in dry well calibrators, tube furnaces and liquid baths

## Special features

- Temperature range:  $-196 \dots +660 \text{ }^{\circ}\text{C}$  [ $-321 \dots +1,220 \text{ }^{\circ}\text{F}$ ]
- High stability
- Low drift, long service life
- Bare wires, DIN connector or SMART plug



Reference thermometer model CTP5000

## Description

The CTP5000 provides a full range platinum resistance thermometers (PRTs) for use in every application from standards calibration to site temperature measurement. If the 'off the shelf' range will not suit the needs the thermometers can be supplied custom manufactured to almost any specification.

WIKA also provide a range of standards resistors for use when calibrating platinum resistance thermometers.

Using calibrated probes with a precise thermometer there is a choice between storing the calibration data into the memory of the instrument or if using ASL SMART probes for ease of convenience, the calibration is stored in an electronic memory chip located in the connector. Therefore moving the SMART probe between channels or instruments is easy as the calibration data is stored in the SMART-probe connector, no need to enter the calibration data into the instrument channel now being used.

For calibration, the test items and the standard thermometer are brought to the same temperature in a temperature conditioning unit.

As soon as a stable temperature is reached, the test items are read or their output signals are measured (resistance, thermoelectric voltage, standard signal) and compared with the standard thermometer.

Using this comparison method, the measuring uncertainty can be considerably reduced because not only the display of the temperature conditioning unit is taken into consideration.

| Specifications                              | Model CTP5000-170   |
|---|---|
| <b>Specific probe data <sup>1)</sup></b>    |   |
| Temperature range                           | -196 ... +170 °C [-321 ... +338 °F]   |
| Resistance at 0 °C [32 °F]                  | 100 Ω   |
| Temperature coefficient                     | 0.00385   |
| R(Ga)/R(tpw)                                | Ratio less than 1.11807   |
| Annual drift                                | ±10 mK  |
| Recommended measurement current             | 1 mA  |
| Self heating error in water at 0 °C [32 °F] | 2 ... 5 mK  |
| Sheath material                             | Metal alloy   |
| <b>Dimensions</b>                           |   |
| Probe diameter                              | d = 6 mm [0.24 in]  |
| Probe length                                | l = 350 mm (immersion depth max. 300 mm, min. 100 mm)<br>l = 13.78 in (immersion depth max. 11.81 in, min. 3.94 in) |
| <b>Cable</b>                                |   |
| Length                                      | 2 m [6.56 ft]   |
| Connection                                  | Bare wire, DIN plug or SMART connector  |

| Specifications                              | Model CTP5000-200                      |
|---|--|
| <b>Specific probe data <sup>1)</sup></b>    |  |
| Temperature range                           | -50 ... +200 °C [-58 ... +392 °F]      |
| Resistance at 0 °C [32 °F]                  | 100 Ω                                  |
| Temperature coefficient                     | 0.00385                                |
| R(Ga)/R(tpw)                                | Ratio less than 1.11807                |
| Annual drift                                | ±10 ... ±20 mK                         |
| Recommended measurement current             | 0.5 mA or 1 mA                         |
| Self heating error in water at 0 °C [32 °F] | 2 ... 5 mK                             |
| Sheath material                             | Stainless steel                        |
| <b>Dimensions</b>                           |  |
| Probe diameter                              | d = 3 mm [0.12 in]                     |
| Probe length                                | l = 30 mm [1.18 in], fully immersible  |
| <b>Cable</b>                                |  |
| Length                                      | 3 m [9.84 ft]                          |
| Connection                                  | Bare wire, DIN plug or SMART connector |

| Specifications                              | Model CTP5000-250   |
|---|---|
| <b>Specific probe data <sup>1)</sup></b>    |   |
| Temperature range                           | -50 ... +250 °C [-58 ... +482 °F]   |
| Resistance at 0 °C [32 °F]                  | 100 Ω   |
| Temperature coefficient                     | 0.00385   |
| R(Ga)/R(tpw)                                | Ratio less than 1.11807   |
| Annual drift                                | ±10 ... ±20 mK  |
| Typical stability                           | ±5 mK   |
| Recommended measurement current             | 0.5 mA or 1 mA  |
| Self heating error in water at 0 °C [32 °F] | typically 2 ... 5 mK at 1 mA  |
| Sheath material                             | Stainless steel   |
| <b>Dimensions</b>                           |   |
| Probe diameter                              | d = 6 mm [0.24 in]  |
| Probe length                                | l = 350 mm (immersion depth max. 300 mm, min. 100 mm)<br>l = 13.78 in (immersion depth max. 11.81 in, min. 3.94 in) |
| <b>Cable</b>                                |   |
| Length                                      | 2 m [6.56 ft]   |
| Connection                                  | Bare wire, DIN plug or SMART connector  |

1) Specifications may deviate; they depend on the use of the thermometer. The specified values are typical values for use in laboratories.

| Specifications                              | Model CTP5000-450   |
|---|---|
| <b>Specific probe data <sup>1)</sup></b>    |   |
| Temperature range                           | -80 ... +450 °C [-112 ... +842 °F]  |
| Resistance at 0 °C [32 °F]                  | 100 Ω   |
| Temperature coefficient                     | 0.00385   |
| R(Ga)/R(tpw)                                | Ratio less than 1.11807   |
| Annual drift                                | ±20 ... ±30 mK  |
| Typical stability                           | ±5 mK   |
| Recommended measurement current             | 0.5 mA or 1 mA  |
| Self heating error in water at 0 °C [32 °F] | typically 5 ... 10 mK at 1 mA   |
| Sheath material                             | Stainless steel   |
| <b>Dimensions</b>                           |   |
| Probe diameter                              | d = 6 mm [0.24 in]  |
| Probe length                                | l = 350 mm (immersion depth max. 300 mm, min. 100 mm)<br>l = 13.78 in (immersion depth max. 11.81 in, min. 3.94 in) |
| <b>Cable</b>                                |   |
| Length                                      | 2 m [6.56 ft]   |
| Connection                                  | Bare wire, DIN plug or SMART connector  |

| Specifications                              | Model CTP5000-651   |
|---|---|
| <b>Specific probe data <sup>1)</sup></b>    |   |
| Temperature range                           | -189 ... +650 °C [-308 ... +1,202 °F]   |
| Resistance at 0 °C [32 °F]                  | 100 Ω ±0.05 Ω   |
| Temperature coefficient                     | 0.003925  |
| R(Ga)/R(tpw)                                | Ratio not less than 1.11807   |
| Annual drift                                | ±10 mK  |
| Typical stability                           | ±5 mK   |
| Recommended measurement current             | 0.5 mA or 1 mA  |
| Self heating error in water at 0 °C [32 °F] | typically 13 mK at 1 mA or 3 mK at 0.5 mA   |
| Sheath material                             | Fused silica  |
| <b>Dimensions</b>                           |   |
| Probe diameter                              | d = 7.5 mm [0.30 in]  |
| Probe length                                | l = 450 mm (immersion depth max. 350 mm, min. 200 mm)<br>l = 17.72 in (immersion depth max. 13.78 in, min. 7.87 in) |
| <b>Cable</b>                                |   |
| Length                                      | 2 m [6.56 ft]   |
| Connection                                  | Bare wire, DIN plug or SMART connector  |

| Specifications                              | Model CTP5000-652  |
|---|--|
| <b>Specific probe data <sup>1)</sup></b>    |  |
| Temperature range                           | -80 ... +650 °C [-112 ... +1,202 °F]   |
| Resistance at 0 °C [32 °F]                  | 100 Ω  |
| Temperature coefficient                     | 0.00385  |
| R(Ga)/R(tpw)                                | Ratio less than 1.11807  |
| Annual drift                                | ±15 mK   |
| Typical stability                           | ±5 mK  |
| Recommended measurement current             | 1 mA   |
| Self heating error in water at 0 °C [32 °F] | 10 ... 15 mK at 1 mA   |
| Sheath material                             | Metal alloy  |
| <b>Dimensions</b>                           |  |
| Probe diameter                              | d = 6 mm [0.24 in]   |
| Probe length                                | l = 450 mm (immersion depth max. 400 mm, min. 300 mm)<br>l = 17.72 in (immersion depth max. 15.75 in, min. 11.81 in) |
| <b>Cable</b>                                |  |
| Length                                      | 2 m [6.56 ft]  |
| Connection                                  | Bare wire, DIN plug or SMART connector   |

1) Specifications may deviate; they depend on the use of the thermometer. The specified values are typical values for use in laboratories.

| Specifications                              | Model CTP5000-T25   |
|---|---|
| <b>Specific probe data <sup>1)</sup></b>    |   |
| Temperature range                           | -196 ... +660 °C [-321 ... +1,220 °F]   |
| Resistance at 0 °C [32 °F]                  | 25 ±0.5 Ω   |
| Calibration                                 | Suitable for calibration per ITS-90 up to a maximum temperature of 660.323 °C [1,220.581 °F] (freezing point aluminium)                                       |
| Temperature coefficient                     | 0.003926  |
| R(Ga)/R(tpw)                                | Ratio not less than 1.11807   |
| R(Me)/R(tpw)                                | Ratio not greater than 0.844235   |
| Reproducibility                             | ±1 mK   |
| Basic accuracy                              | ±1 mK   |
| Annual drift                                | ±5 mK   |
| Typical stability                           | ±1 mK   |
| Recommended measurement current             | 1 mA  |
| Self heating error in water at 0 °C [32 °F] | ±2 ... ±3 mK with 1mA in un-stirred water   |
| Gas filling                                 | Dry air at 1/3 atmosphere   |
| Sheath material                             | Fused quartz  |
| <b>Dimensions</b>                           |   |
| Sheath                                      | d = 6.5 ... 7.5 mm [0.26 ... 0.30 in]<br>l = 480 mm (immersion depth max. 400 mm, min. 300 mm)<br>l = 18.90 in (immersion depth max. 15.75 in, min. 11.81 in) |
| Head  | d = 23 mm [0.91 in]<br>l = 90 mm [3.54 in]  |
| Overall length                              | 560 mm [22.05 in]   |
| <b>Cable</b>                                |   |
| Length                                      | 4 m [13.12 ft] PTFE insulated cable   |
| Connection                                  | gold-plated copper spade lugs   |
| <b>Case</b>                                 |   |
| Dimensions                                  | 680 x 170 x 70 mm [26.77 x 6.69 x 2.76 in]  |
| Weight                                      | 2.4 kg [5.29 lbs.] (including thermometer)  |

1) Specifications may deviate; they depend on the use of the thermometer. The specified values are typical values for use in laboratories.

## Approvals

| Logo | Description                            | Country    |
|------|--|------------|
| -    | MTSCHS<br>Permission for commissioning | Kazakhstan |

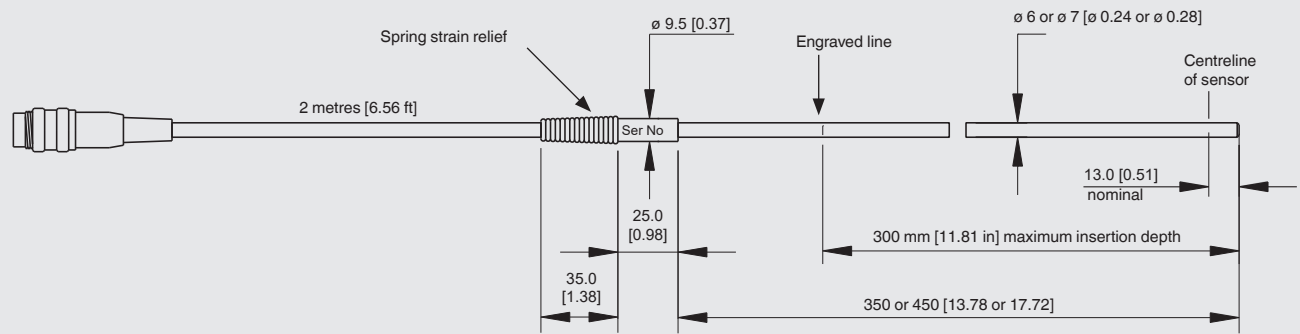
## Certificates

| Certificate                        |   |
|------------------------------------|---|
| Calibration                        | Standard: without certificate<br>Option: 3.1 calibration certificate per DIN EN 10204 or DKD/DAkkS/UKAS calibration certificate |
| Recommended recalibration interval | 1 year (dependent on conditions of use)   |

Approvals and certificates, see website

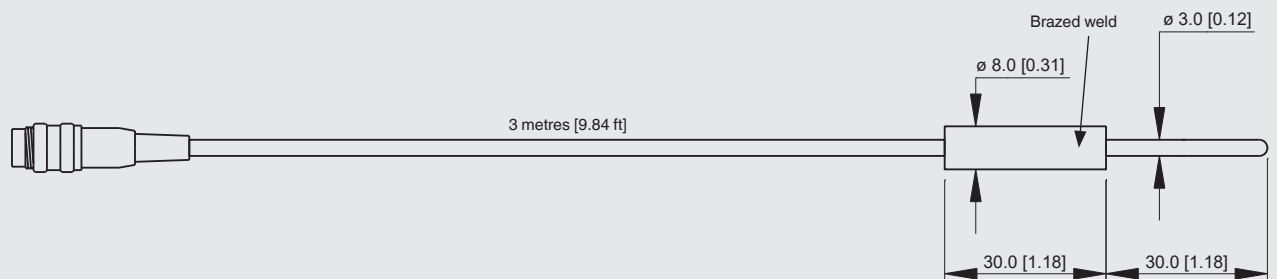
## Dimensions in mm [in]

### Resistance thermometer



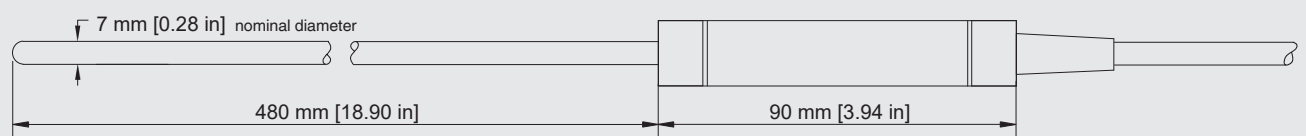
| Model       | Dimensions  | Temperature range    | Detector length |
|-------------|---|----------------------|-----------------|
| CTP5000-170 | Pt100, d = 6 mm, l = 350 mm (without spring strain relief, 100 mm handle)       | -196 ... +170 °C     | 35 mm           |
|             | Pt100, d = 0.24 in, l = 13.78 in (without spring strain relief, 3.94 in handle) | [-321 ... +338 °F]   | [1.38 in]       |
| CTP5000-250 | Pt100, d = 6 mm, l = 350 mm   | -50 ... +250 °C      | 25 mm           |
|             | Pt100, d = 0.24 in, l = 13.78 in  | [-58 ... +482 °F]    | [0.98 in]       |
| CTP5000-450 | Pt100, d = 6 mm, l = 350 mm   | -80 ... +450 °C      | 25 mm           |
|             | Pt100, d = 0.24 in, l = 13.78 in  | [-112 ... +842 °F]   | [0.98 in]       |
| CTP5000-652 | Pt100, d = 6 mm, l = 450 mm (without spring strain relief, 100 mm handle)       | -80 ... +650 °C      | 30 mm           |
|             | Pt100, d = 0.24 in, l = 17.72 in (without spring strain relief, 3.94 in handle) | [-112 ... +1,202 °F] | [1.18 in]       |
| CTP5000-651 | Pt100, d = 7.5 mm, l = 450 mm (125 mm handle)                                   | -189 ... +650 °C     | 50 mm           |
|             | Pt100, d = 0.30 in, l = 17.72 in (4.92 in handle)                               | [-308 ... +1,202 °F] | [1.97 in]       |

### Resistance thermometer



| Model       | Dimensions                      | Temperature range | Detector length |
|-------------|---------------------------------|-------------------|-----------------|
| CTP5000-200 | Pt100, d = 3 mm, l = 30 mm      | -50 ... +200 °C   | 6 mm            |
|             | Pt100, d = 0.12 in, l = 1.18 in | [-58 ... +392 °F] | [0.24 in]       |

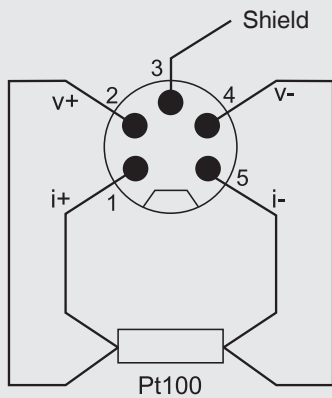
### Resistance thermometer



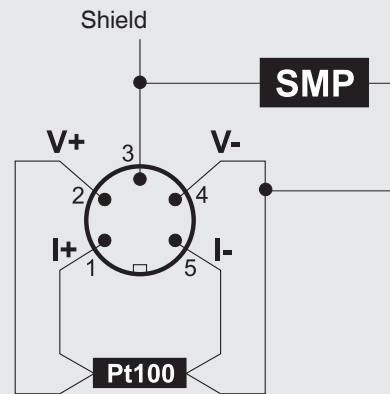
| Model       | Dimensions                               | Temperature range    | Detector length |
|-------------|--|----------------------|-----------------|
| CTP5000-T25 | Pt25, d = 6.5 ... 7.5 mm, l = 480 mm     | -196 ... +660 °C     | 45 mm           |
|             | Pt25, d = 0.26 ... 0.30 in, l = 18.90 in | [-321 ... +1,220 °F] | [1.77 in]       |

## Resistance thermometer connection, 4-wire (5-pin DIN connector)

View towards front panel connector



Viewed from top panel



### Options

#### With bare wires, DIN plug or SMART plug

With ASL's SMART connector on the probes, storing the data is needed only once - in the connector! The calibration data stays with the probe - permanently. It can even be used on another read-out without any further action.

The SMART connector saves time and reduces error. If there are existing calibrated or uncalibrated probes, no problem, ASL read-outs automatically register if a probe is SMART or normal.

### Scope of delivery

- Model CTP5000 reference thermometer in accordance with specification

### Option

- DKD/DAkKS calibration certificate
  - With calculation of coefficients or
  - With calculation of coefficients as well as additional value table print from K to K
- UKAS calibration certificate

### Accessories

#### Temperature probes

- With DIN plug
- With SMART plug
- Probe extension cable

#### Test case

- Carrying case, robust

### Ordering information

Model / Probe / Connection of the probe / Calibration / Calculation coefficients / Test point for the calibration certificate / Additional order information

© 06/2013 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.  
The specifications given in this document represent the state of engineering at the time of publishing.  
We reserve the right to make modifications to the specifications and materials.

