

# Standard thermometer

## Models CTP2000 and CTP9000

WIKA data sheet CT 61.10

### Applications

- Comparative calibration in dry well calibrators, tube furnaces and liquid baths

### Special features

- High stability
- Low drift, long service life
- Wide temperature range



Platinum resistance thermometer model CTP2000

## Description

### Calibration with external standard thermometer

The WIKA standard thermometers are particularly suited for applications in industrial laboratories. They enable easy comparative calibration in our baths, in tube furnaces and in dry-well calibrators.

The use of an external reference thermometer is recommended, particularly for the calibration of short temperature probes. Thus the errors due to the radial and axial temperature distribution in the temperature control unit are considerably reduced.

The precision measuring instruments of the CTR series, above all the model CTR3000 multi-functional precision thermometer are suitable as reading instruments.

For calibration, the test items and the standard thermometer are brought to the same temperature in a temperature control 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 measurement uncertainty can be considerably reduced because not only the display of the temperature control unit is taken into consideration.

## Specifications

Platinum resistance thermometer	Model CTP2000
<b>Specific probe data <sup>1)</sup></b>	
Temperature range	-200 ... +450 °C [-328 ... +842 °F]
Resistance at 0 °C [32 °F]	100 Ω
Temperature coefficient	$\alpha = 0.003850 \text{ 1/K}$
Annual drift	< 50 mK (Previous ageing is required. Recommendation = 450 °C [842 °F] over 100 h) < 20 mK (Previous ageing is required. Recommendation = 300 °C [572 °F] over 100 h)
Recommended measuring current	1 mA
Sheath material	Stainless steel
<b>Dimensions</b>	
Probe length	l = 500 mm [19.69 in]
Probe diameter	d = 4 mm [0.16 in]
<b>Cable</b>	
Length	2 m [6.56 ft]; stripped and tin-coated
Connection	4 mm banana plug For 4-wire connection
<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.

Thermocouple	Model CTP9000 with cold junction	Model CTP9000 without cold junction		
<b>Specific probe data <sup>1)</sup></b>				
Temperature range	■ 0 ... 1,300 °C [32 ... 2,372 °F] ■ 0 ... 1,600 °C [32 ... 2,912 °F]			
Thermocouple	Type S per IEC 584, PtRh 90/10 % Pt			
Tolerance	Class 1			
Stability	< 0.5 K after 250 h at 1,300 °C [2,372 °F]			
Sheath material	Ceramic C 799			
<b>Dimensions</b>	<b>0 ... 1,300 °C [32 ... 2,372 °F]</b>	<b>0 ... 1,600 °C [32 ... 2,912 °F]</b>	<b>0 ... 1,300 °C [32 ... 2,372 °F]</b>	<b>0 ... 1,600 °C [32 ... 2,912 °F]</b>
Thermowire dimensions (D x L)	0.5 x 1,320 mm <sup>2)</sup> [0.02 x 51.97 in] <sup>2)</sup>	0.5 x 1,400 mm <sup>2)</sup> [0.02 x 55.12 in] <sup>2)</sup>	0.5 x 620 mm [0.02 x 24.41 in]	0.5 x 700 mm [0.02 x 27.56 in]
Probe length	l = 620 mm [24.41 in]	l = 700 mm [27.56 in]	l = 620 mm [24.41 in]	l = 700 mm [27.56 in]
Probe diameter	d = 7 mm [0.28 in]			
<b>Cable</b>				
Length	2 m [6.56 ft] PVC cable, ends stripped		2 m [6.56 ft] compensating cable type S, ends stripped	
<b>Cold junction</b>				
Material	Stainless steel		-	
Dimensions (D x L)	6 x 250 mm [0.24 x 9.84 in]		-	

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

2) The thermocouple wires are protected against mechanical stress by a metal hose, which leads to the cold junction.

## Optional Approvals

Logo	Description	Country
-	<b>MTSCHS</b> Permission for commissioning	Kazakhstan

## Certificates

Certificate	
<b>Calibration</b>	<ul style="list-style-type: none"> <li>■ Without</li> <li>■ 3.1 calibration certificate per DIN EN 10204</li> <li>■ DKD/DAkkS calibration certificate</li> </ul>
<b>Recommended recalibration interval</b>	1 year (dependent on conditions of use)

Approvals and certificates, see website

## Platinum resistance thermometer model CTP2000

### Features

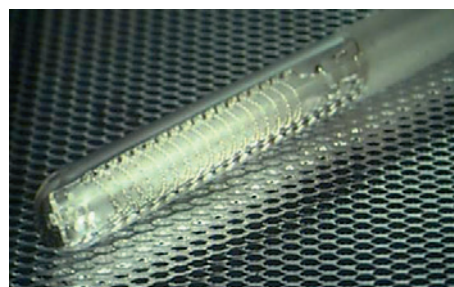
The measuring resistor consists of a platinum winding of highest purity.

All parts are pre-aged in order to remove contamination and distortions.

### Measurement technology

The 4-wire design offers an optimum connection solution for resistance thermometers. The measuring result is affected neither by the lead resistances nor the temperature-dependant fluctuations.

The electrical connections are welded in order to minimise the contact resistance. The connecting wires are bound in a 2 m [6.56 ft] long, shielded connection cable.



Principle of a platinum winding

## Thermocouple model CTP9000

### Features

The standard thermometer is a type S element whose nominal composition consists of 90 % platinum and 10 % rhodium (positive leg) against platinum (negative leg) and belongs to the group of noble thermocouples. It is characterised by its high stability. The quality of the thermowell used is essential for stability at high temperatures. For this reason, the high-purity aluminium oxide ceramic C 799 is used.

The type S thermocouple, besides the low ageing drift, also offers the advantage of a low basic tolerance.

### Measurement technology

During measurement it must be ensured that the compensating cables from the measuring point to the cold junction consist of substitute materials which have, in a limited temperature range, the same thermoelectric properties as the materials of the thermocouple. Therefore, at this transition, there is no thermoelectric voltage. This voltage is only generated at the point where the compensating cables are connected to normal copper leads.



Thermocouple model CTP9000

### Calibration

The standard thermometer should be calibrated once a year. If it is subject to high mechanical stresses, it should be calibrated immediately to guarantee the measurement uncertainty.

## Automated thermometer calibration for model CTR3000 with model CTx9x00

The calibration of temperature probes usually requires considerable effort. This test procedure can be significantly simplified by linking an automated reference thermometer with a temperature source. Such an arrangement allows the creation of individual calibration routines which can be called at any time – calibration just by pushing one button.

The model CTR3000 precision thermometer has four input channels: one for the reference sensor and three for test items.

The stable temperature environment required for the calibration is provided, depending on the test item, in a dry-well calibrator or a micro calibration bath.

One calibration process, two stations – this usually means separate preparation and parametrisation of both instruments. With CTR3000, this preliminary stage can be omitted. The precision thermometer can be linked with a corresponding temperature source from the CTx9x00 series via the respective communication interface using a special feature.

This combination creates a hardware unit for individual and reproducible calibration routines where all measured values of the connected thermometers are recorded and the test temperature is provided automatically. The touchscreen user interface of the calibration instrument makes it easier for the operator to enter information.

Each created routine is saved in the precision thermometer and can be called later on. Since the entire calibration process is automatic, the user only needs to press the Start button. The user does not need to be present until the end of the process which may take several hours in some cases. Nevertheless, the user can monitor the test process on the screen of CTR3000, if required. All calibration phases are logged by a data logger and all data is saved. Subsequently, this information can be downloaded to a USB stick, exported to the XML and CSV format and processed.

All calibration routines can be reproduced for subsequent test processes.



**Model CTB9100 micro calibration bath with model CTR3000 multi-functional precision thermometer**

## Scope of delivery

- Thermometer

## Options

- Transport case
- 3.1 calibration certificate per DIN EN 10204
- DKD/DAkkS calibration certificate

## Ordering information

CTP9000 / Application / Temperature range / Calibration / Calculation of constant / Test points for calibration certificate / Number of test points / Transport case / Cold junction / Further approvals / Additional ordering information

CTP2000 / Calibration / Calculation of constant / Test points for calibration certificate / Number of test points / Transport case / Further approvals / Additional ordering information

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