Эталонные термометры СТР2000-9000

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Standard thermometer
Models CTP2000 and CTP9000

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 by means of an external standard thermometer

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

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

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

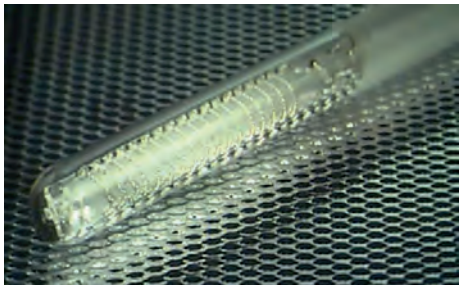
As soon as a stable temperature is reached, the test items are read or their output signals are measured (resistance, thermoelectric voltage, standard signal) and compared with the standard thermometer.
Using this comparison method, the measuring uncertainty can be considerably reduced because not only the display of the temperature conditioning unit is taken into consideration.

Models

Platinum resistance thermometers 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.

Measuring 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 transition resistance. The connecting wires are bound in a 2 m 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 Platinum-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.

Measuring technology
During measurement it must be ensured that the compensating leads 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 leads are connected to normal copper leads.

Thermocouple model CTP9000

Calibration

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

Platinum resistance thermometer

Specifications	Model CTP2000
Temperature range	-200 … +450 °C
Nominal resistance	100 Ω
Temperature coefficient	α = 0.003850 1/K
Stability	< 50 mK after 100 h at 450 °C < 20 mK after 100 h at 300 °C
Dimensions, d x l	4 x 500 mm
Immersion tube material	stainless steel
Sensor connection	4-wire connection
Measuring line	2 m cable stripped and tin-coated
Connector	4 mm banana plug

Thermocouple

Specifications	Model CTP9000
Temperature range	0 ... 1,300 °C
Thermocouple	Type S per IEC 584, PtRh 10 % Pt
Tolerance	Class 1
Stability	< 0.5 after 250 h at 1,300 °C
Wire size, d x l	0.5 x 1,500 mm
Outer dimensions, d x l	7 x 600 mm
Immersion tube material	Ceramic C 799
Measuring line	800 mm with 4 mm banana plug

Scope of delivery

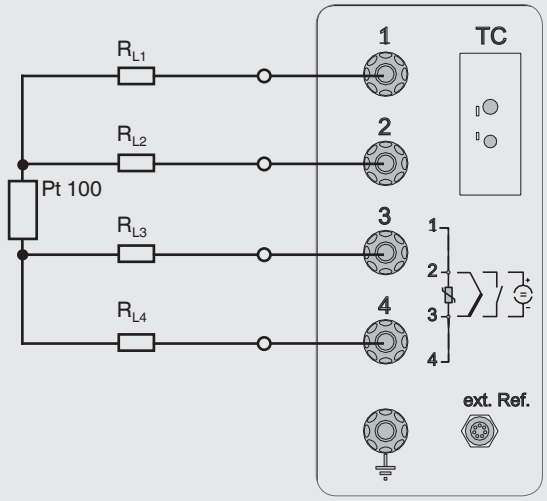
- Thermometer
- Calculation of the characteristic constant and table R(t_{90}) degree by degree

Options

- Transport case
- DKD/DAkkS calibration for 6 temperatures
- Cold junction in the metal tube (CTP9000)
  outer dimensions: d x l = 6 mm x 250 mm
  measuring line: 2 m PVC cable, with 4 mm banana plug

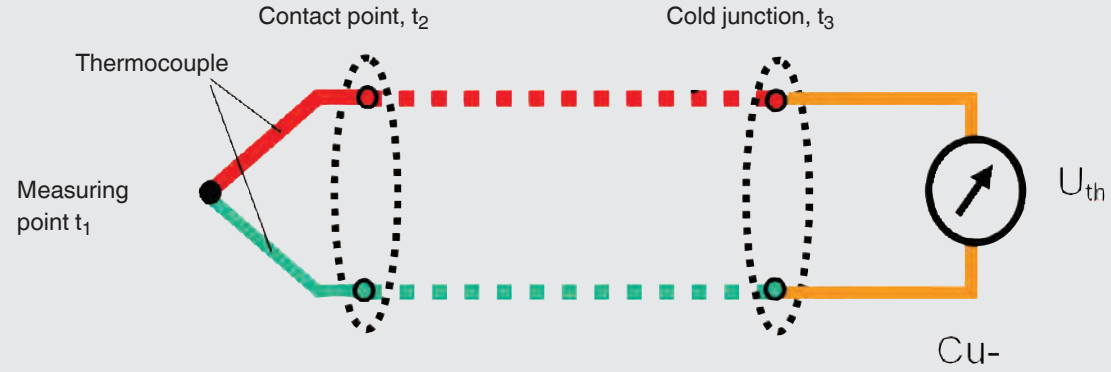
Schematic representation of the connections

Resistance thermometer



(Integrated measuring device CTD9300)

Thermocouples



CTD9100

CTD9100-ZERO

Reference thermometer
Model CTP5000

Applications

- Reference thermometer for measuring very accurate temperature in a range of -196 ... +660 °C (-321 ... +1,220 °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 ... +660 °C (-321 ... +1,220 °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.
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
Specific probe data	
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 not 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
Dimensions	
Probe diameter	d = 6 mm (0.24 in)
Probe length	l = 350 mm (immersion depth max. 300 mm, min. 100 mm) l = 13.78 in (immersion depth max. 11.81 in, min. 3.94 in)
Cable	
Length	2 m (6.56 ft)
Connection	Bare wire, DIN plug or SMART connector

Specifications	Model CTP5000-200
Specific probe data	
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 not 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
Dimensions	
Probe diameter	d = 3 mm (0.12 in)
Probe length	l = 30 mm (1.18 in), fully immersible
Cable	
Length	3 m (9.84 ft)
Connection	Bare wire, DIN plug or SMART connector

Specifications	Model CTP5000-250
Specific probe data	
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 not 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
Dimensions	
Probe diameter	d = 6 mm (0.24 in)
Probe length	l = 350 mm (immersion depth max. 300 mm, min. 100 mm) l = 13.78 in (immersion depth max. 11.81 in, min. 3.94 in)
Cable	
Length	2 m (6.56 ft)
Connection	Bare wire, DIN plug or SMART connector

Specifications	Model CTP5000-450
Specific probe data	
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 not 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
Dimensions	
Probe diameter	d = 6 mm (0.24 in)
Probe length	l = 350 mm (immersion depth max. 300 mm, min. 100 mm) l = 13.78 in (immersion depth max. 11.81 in, min. 3.94 in)
Cable	
Length	2 m (6.56 ft)
Connection	Bare wire, DIN plug or SMART connector

Specifications	Model CTP5000-651
Specific probe data	
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
Dimensions	
Probe diameter	d = 7.5 mm (0.30 in)
Probe length	l = 450 mm (immersion depth max. 350 mm, min. 200 mm) l = 17.72 in (immersion depth max. 13.78 in, min. 7.87 in)
Cable	
Length	2 m (6.56 ft)
Connection	Bare wire, DIN plug or SMART connector

Specifications	Model CTP5000-652
Specific probe data	
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 not 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
Dimensions	
Probe diameter	d = 6 mm (0.24 in)
Probe length	l = 450 mm (immersion depth max. 400 mm, min. 300 mm) l = 17.72 in (immersion depth max. 15.75 in, min. 11.81 in)
Cable	
Length	2 m (6.56 ft)
Connection	Bare wire, DIN plug or SMART connector

Specifications	Model CTP5000-T25
Specific probe data	
Temperature range	-189 … +660 °C (-308 ... +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	±0.001 °C
Basic accuracy	±0.001 °C
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
Dimensions	
Sheath	d = 6.5 ... 7.5 mm (0.26 ... 0.30 in) l = 480 mm (immersion depth max. 400 mm, min. 300 mm) l = 18.90 in (immersion depth max. 15.75 in, min. 11.81 in)
Head	d = 23 mm (0.91 in) l = 90 mm (3.54 in)
Overall length	560 mm (22.05 in)
Cable	
Length	4 m (13.12 ft) PTFE insulated cable
Connection	gold-plated copper spade lugs
Case	
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)

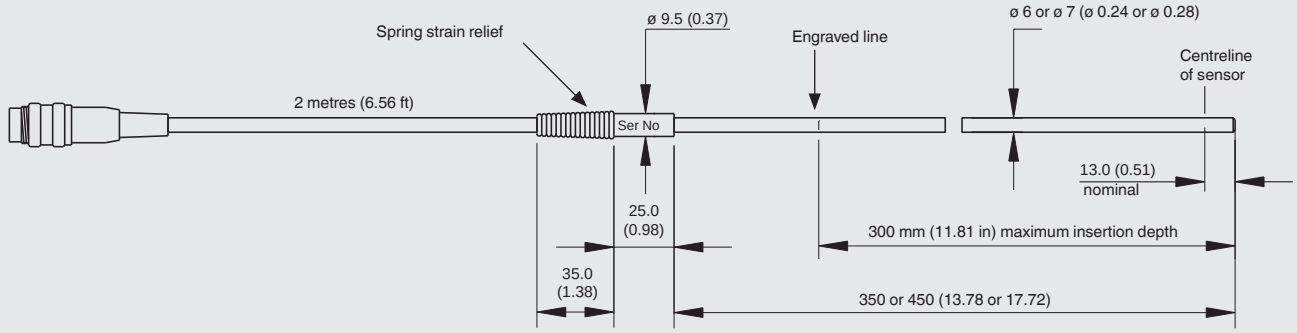
Certificates

Certificate	
Calibration	Standard: without certificate 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

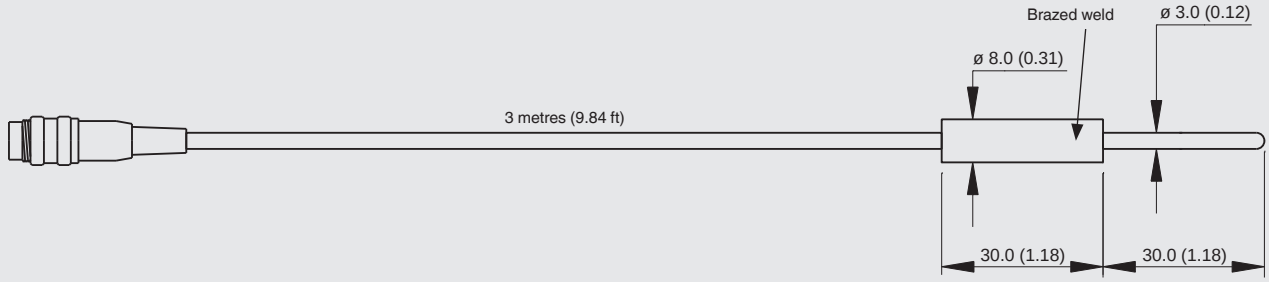
Dimensions in mm (in)

Resistance thermometer



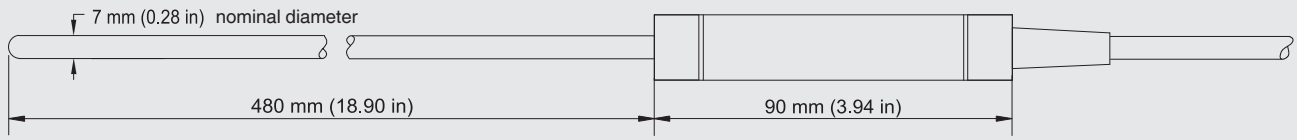
Model	Dimensions	Temperature range	Detector length
CTP5000-170	Pt100, d = 6 mm, l = 350 mm (without spring strain relief, 100 mm handle) Pt100, d = 0.24 in, l = 13.78 in (without spring strain relief, 3.94 in handle)	-196 ... +170 °C (-321 .. +338 °F)	35 mm (1.38 in)
CTP5000-250	Pt100, d = 6 mm, l =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

Resistance thermometer



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

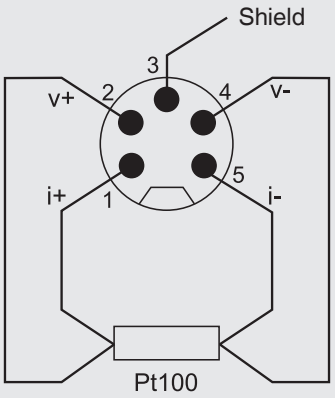
Resistance thermometer



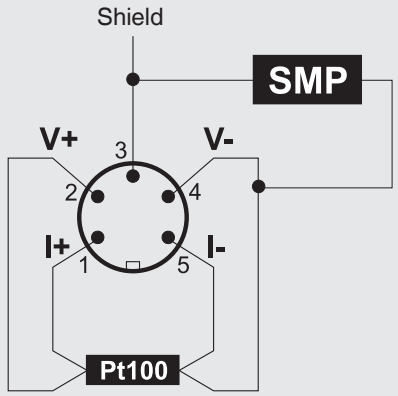
Model	Dimensions	Temperature range	Detector length
CTP5000-T25	Pt25, d = 6.5 ... 7.5 mm, l = 480 mm Pt25, d = 0.26 ... 0.30 in, l = 18.90 in	-189 ... +660 °C (-308 .. +1,220 °F)	45 mm (1.77 in)

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

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