Standard platinum resistance thermometer (SPRT) Model CTP5000-T25

Applications

- Reference thermometer for very accurate temperature measurements in a range of -196 … +660 °C [-321 ... +1,220 °F]
- Precision standard platinum resistance thermometer (SPRT) designed to realise the international temperature scale ITS-90 over the range -196 … +660 °C [-321 ... +1,220 °F]
- Comparative calibration in tube furnaces and liquid baths

Standard platinum resistance thermometer, model CTP5000-T25

Special features

- Resistance at 0 °C (Rtpw): 25 Ω ±0.5 Ω
- R(Ga)/R(tpw): Ratio not less than 1.11807
- R(Me)/R(tpw): Ratio not greater than 0.844235
- Reproducibility: ±1 mK
- Self-heating: ±2 ... ±3 mK with 1 mA and the thermometer in unstirred water

Description

The model CTP5000-T25 standard platinum resistance thermometer (with model Tinsley 5187SA design) is the result of many years' practical experience and cooperation with the National Physical Laboratory, Teddington, UK, where primary resistance and thermometry standards are maintained.

This four-terminal standard platinum resistance thermometer (SPRT) is designed to realise, with the highest accuracy, the **I**nternational **T**emperature **S**cale ITS-90 over the range -196 … +660 °C [-321 ... +1,220 °F] and is suitable for ITS-90 calibration up to a maximum temperature of 660.323 °C [1,220.581 °F] (aluminium freezing point).

The resistance element is of pure platinum coiled and mounted in a strain-free construction. The former is of fused silica and great care is taken to ensure freedom from contamination. All the joints are welded, the four leads from the element to the seal in the thermometer head are heavier gauge platinum, thereby avoiding the generation of thermal e.m.f.'s at the junction with the element.

The leads are brought through a hermetic seal at the head of the thermometer and joined via low-loss terminals to copper flex in a specially constructed cable with four conductors. The cable is made with PTFE insulation to ensure low dielectric loss so that the thermometer may be used with either DC or AC measuring systems.

The terminations are gold-plated copper spade lugs. The thermometer tube is specially treated to avoid radiation loss by the piping effect in its walls. Each thermometer is supplied with a purpose-made carrying case.

Data sheets showing similar products and accessories:
Reference thermometer; model CTP5000; see data sheet CT 61.20
DC resistance thermometry bridge; model CTR6000; see data sheet CT 60.30
AC resistance thermometry bridge; model CTR6500; see data sheet CT 60.40
Primary-standard resistance thermometry bridge; model CTR9000; see data sheet CT 60.80

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Stainless steel protection sheath

To avoid damage, the thermometer may be supplied with a protective stainless steel sheath, outside diameter 8 ... 9 mm [0.31 ... 0.35 in], fitted into the thermometer head by means of three screws.

The thermometer is calibrated without the sheath and when it is in position the response time is increased to about 20 seconds.

Specifications

Specifications	Model CTP5000-T25
Specific probe data [1]	
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
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)

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** Permission for commissioning	Kazakhstan

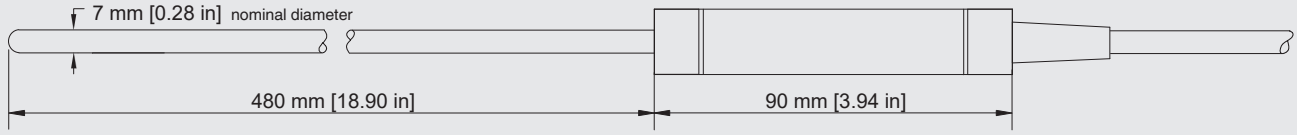
Certificates

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-T25	Pt25, d = 6.5 ... 7.5 mm, l = 480 mm Pt25, d = 0.26 ... 0.30 in, l = 18.90 in	-196 ... +660 °C [-321 ... +1,220 °F]	45 mm [1.77 in]

Four typical calibration ranges for calibration in accordance with the international temperature scale (ITS-90)

Fixed point	Temperature °C [°F]		Uncertainty in mK			
			Range 1	Range 2	Range 3	Range 4
TP argon	-189.3442	[-308.8196]	--	2	2	2
TP mercury	-38.8344	[-37.9019]	0.5	0.5	1	2
TP water	0.01	[32.02]	0.5	0.5	1	2
MP gallium	29.7646	[85.5763]	0.5	--	--	--
FP indium	156.5985	[313.8773]	--	1	--	--
FP tin	231.928	[449.470]	--	1	1	2
FP zinc	419.527	[787.149]	--	--	1	2
FP aluminium	660.323	[1,220.581]	--	--	--	3

The CTP5000-T25 thermometer is suitable for calibration to a maximum temperature of 660.232 °C (1,220.581 °F).
(TP = Triple point, MP = Melting point, FP = Freezing point)
Uncertainty typical for NMIs, not for accreditated laboratories.

Scope of delivery

- Model CTP5000-T25 standard platinum resistance thermometer (SPRT) in accordance with specification
- Carrying case, robust

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

Ordering information

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

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The specifications given in this document represent the state of engineering at the time of publishing.
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03/2018 EN