

Multi-functional precision thermometer CTR3000

WIKA data sheet CT 60.15

Applications

- Pharmaceutical industry
- Industry (laboratory, workshop and production)
- Temperature sensor and transmitter manufacturers
- Calibration service companies and service industry

Special features

- High accuracy
- Innovative and intuitive user interface
- Versatile applications by measuring thermocouples and resistance thermometers
- Logger and scan functions
- Up to 44 channels possible



Multi-functional precision thermometer,
model CTR3000

Description

Application

The model CTR3000 precision thermometer provides a complete measurement and control interface for users wishing to make high-accuracy temperature measurements or calibrate thermometers. It supports a wide range of thermometer types including 25 Ω SPRTs, 100 Ω PRTs, thermistors and thermocouples.

The CTR3000 is a high-accuracy instrument designed for laboratory and industrial temperature measurement and calibration applications.

Functionality

The instrument will operate with all 3- and 4-wire (S)PRTs (25 Ω , 100 Ω) platinum resistance thermometers as well as most standard international thermocouple types and NTC thermistors. The following temperature measurement units are selectable: $^{\circ}\text{C}$, $^{\circ}\text{F}$, K. Base measuring units mV and Ω are also displayed. The temperature values will be calculated through common conversion of the base measurement.

Due to the wide range of this instrument it makes individual instruments needless and makes the calibration cost-effective.

Features included:

- Dual capability for both thermocouple and resistance thermometer measurements
- Input channels can be expanded up to 44
- Large graphic touchscreen for temperature measurement values as well as configuration settings and statistical results
- Logger and log-data transfer to USB stick or communication interface
- Scan function with a live screen and graph
- Communication interfaces available for automated monitoring and calibration applications

Specifications

Model CTR3000

Multi-functional precision thermometer	
Input	
Input channels	4
Channels 1 + 2	Resistance thermometers with 5-pin DIN connector
Channels 3 + 4	Thermocouple with standard miniature 2-pin thermocouple plug
Scanner box	<ul style="list-style-type: none"> ■ up to 4 modules ■ max. 44 channels (in total) ■ each module has 10 channels
Input connections	5-pin DIN plug or bare wires (resistance thermometer or thermistor) Standard miniature 2-pin thermocouple plug or bare wires (thermocouple)
Data entry format	<ul style="list-style-type: none"> ■ ITS-90 and CvD for calibrated resistance thermometers; or EN 60751 standard conversion for uncalibrated resistance thermometers ■ TC polynomial for calibrated thermocouples; or EN 60584 standard conversion for uncalibrated thermocouple ■ Steinhart and Hart for NTC thermistors
Measuring ranges ¹⁾	
PRT/SPRT	Measuring range 0 ... 500 Ω -200 ... +962 °C (-328 ... 1,764 °F) 3- and 4-wire measurement
Thermocouple	Measuring range ±100 mV -210 ... +2,315 °C (-346 ... 4,199 °F) Type B, E, J, K, N, R, S, T in accordance with EN 60584 and type C, D
Thermistor	0 ... 500 kΩ

1) Depending on sensor type

Accuracies ²⁾	
Resistance thermometer	
Base measurement	0.002 Ω
Temperature accuracy	4-wire ±0.005 K 3-wire ±0.03 K
Temperature conversions	Standard EN 60751, CvD, ITS-90
Sensor currents	1 mA, 2 mA and √2
Keep warm currents	R ₀ < 50 Ω 0 ... 125 Ω 2 mA R ₀ ≥ 50 Ω 0 ... 500 Ω 1 mA
Measurement time	3 seconds update rate
Thermocouple	
Base measurement ³⁾	±% of reading + μV ±0.004 % + 2 μV
Temperature accuracy ⁴⁾	Type B ±0.43 °C Type C ±0.17 °C Type D ±0.17 °C Type E ±0.06 °C Type J ±0.09 °C Type K ±0.10 °C Type N ±0.11 °C Type R ±0.34 °C Type S ±0.34 °C Type T ±0.08 °C
Temperature conversions	Standard EN 60584, polynomial
Measurement time	3 seconds update rate
Cold junction compensation	Internal, external or channel Accuracy internal cold junction compensation ±0.2 K

2) The accuracy in K defines the deviation between the measured value and the reference value. (Only valid for indicating instruments.)

3) In a range of -20 mV ... +100 mV

4) Maximum error

Accuracies ²⁾

Thermistor

Accuracy	0 ... 400 Ω 400 Ω ... 50 k Ω 50 ... 500 k Ω	$\pm 0.006 \Omega$ ± 0.01 % of reading ± 0.02 % of reading
Temperature conversions	Steinhart-Hart, Polynomial	
Sensor currents	0 ... 450 Ω 400 Ω ... 45 k Ω 40 ... 500 k Ω	1 mA 10 μ A 3 μ A
Measurement time	3 seconds update rate	

2) The accuracy in K defines the deviation between the measured value and the reference value. (Only valid for indicating instruments.)

3) In a range of -20 mV ... +100 mV

4) Maximum error

Digital indicator

Display

Screen	Colour TFT display including projective capacitive touchscreen with a resolution of 800 x 480 pixels
Resolution	0.0001 K / 0.00001 Ω / 0.00001 mV
Display units	$^{\circ}$ C, $^{\circ}$ F, K, mV and Ω

Functions

Real-time clock	Integrated clock with date
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Voltage supply

Power supply	AC 90 ... 264 V, 47 ... 63 Hz; universal input on rear panel
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Permissible ambient conditions

Operating temperature	15 ... 25 $^{\circ}$ C (59 ... 77 $^{\circ}$ F)
Relative humidity	0 ... 80 % r. h. (non-condensing)
Storage temperature	-20 ... +50 $^{\circ}$ C (-4 ... +122 $^{\circ}$ F)

Communication

Interfaces	Standard: USB host, USB device and Ethernet Optional: RS-232 or IEEE-488.2
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Case

Dimensions (W x H x D)	314 x 176 x 322 mm (12.4 x 6.9 x 12.7 in)
Weight	6 kg (13.2 lbs)

Approvals

Logo	Description	Country
	EC declaration of conformity <ul style="list-style-type: none">■ EMC directive■ Low voltage directive	European Community

Certificates

Certificate

Calibration ⁵⁾	Standard: 3.1 calibration certificate per DIN EN 10204 Option: DKD/DAkkS calibration certificate
Recommended recalibration interval	1 year (dependent on conditions of use)

5) System calibration with a temperature probe and/or electrical calibration of the CTR3000 itself

Approvals and certificates, see website

Touchscreen and intuitive operator interface

Switching on the instrument, the main screen appears. From here the user can make several settings and can see in this case the measurement in °C of a 4-wire Pt25 connected to channel 1.

“In” the main screen are function buttons located with which the user can select settings really quickly. This is like a shortcut to the menu or an immediate setting. A click on these guides to a menu which opens on the right side or causes a change on the display.

On the right side the user can select the menus to select inputs or settings.

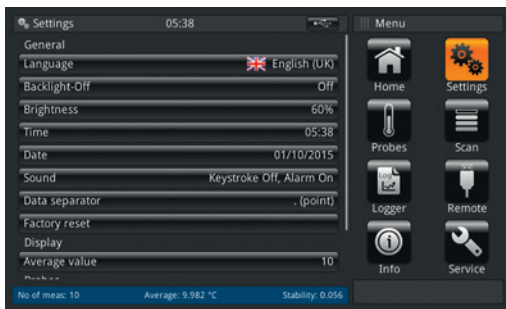
Standard desktop/main screen



- | | |
|---|--|
| ① Home application | ⑫ Selected probe (standard or custom); shortcut |
| ② General settings | ⑬ Freeze the display; function key |
| ③ Probe settings | ⑭ Root 2 for sensor current PRT; function key |
| ④ Scan settings | ⑮ Current displaying of average, stability and number of measurements |
| ⑤ Logger settings | ⑯ Peak displaying |
| ⑥ Remote settings | ⑰ Minus decimal place |
| ⑦ Info display | ⑱ Measured value in the base unit according to probe, e.g. Ω for Pt100 and mV for TC |
| ⑧ Service settings | ⑲ Current measured value |
| ⑨ Unit; shortcut | ⑳ Selected channel; shortcut |
| ⑩ Plus decimal place | ㉑ Current application name |
| ⑪ Clear the peak values (min, max measured since starting the instrument) | |

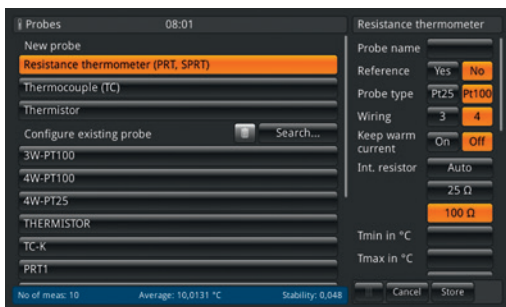
Simple instrument configurations

General settings of the instrument



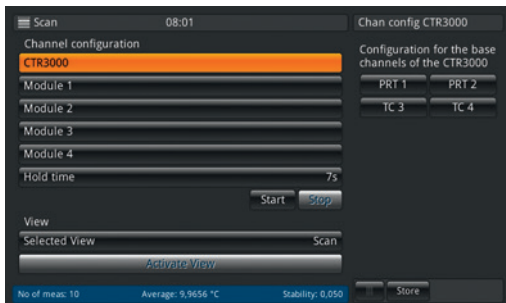
If selecting the menu on the right side, the settings appear on the left side. Selecting e.g. language all available languages will be displayed on the right section and can easily be chosen. In the menu setting all things concerning the instrument can be handled.

Probe settings



In this menu the probe settings can be selected and the reference thermometers can be stored under a unique name.

Scan settings

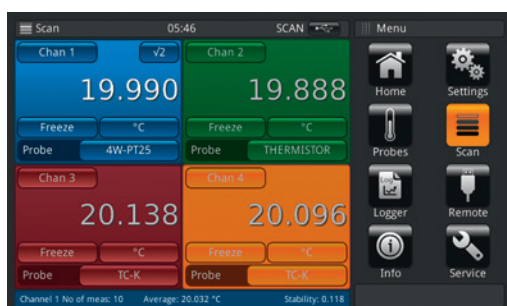


In this menu the user can define a scan by selecting the channels and the hold time. For activating the scan use the start button.

Two views can be selected: scan and graph

Due to the wide range of this instrument it makes individual instruments needless and makes the calibration cost-effective. Logger and scan function with a live screen and graph makes calibration life easy.

Scan view

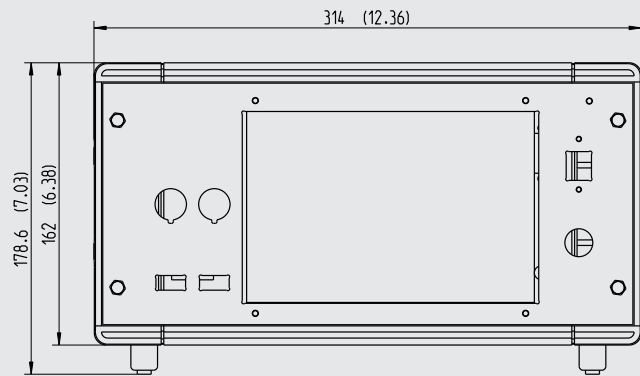


Graphical scan view

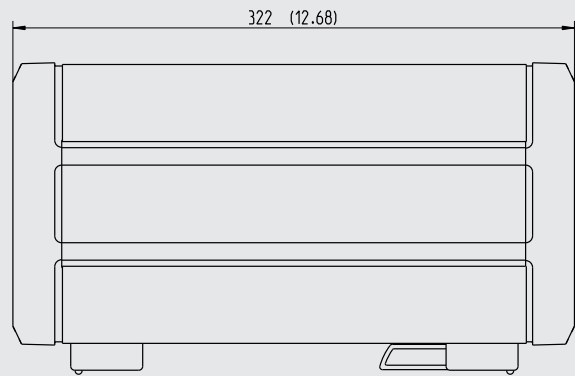


Dimensions in mm (in)

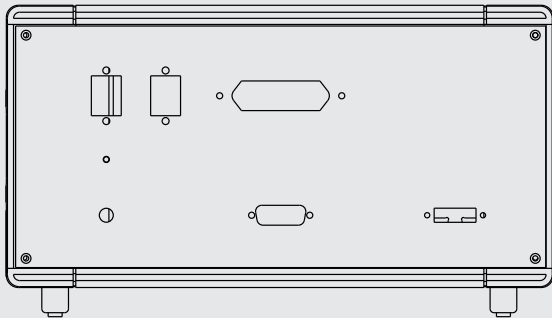
Front view



Side view (left)



Rear view

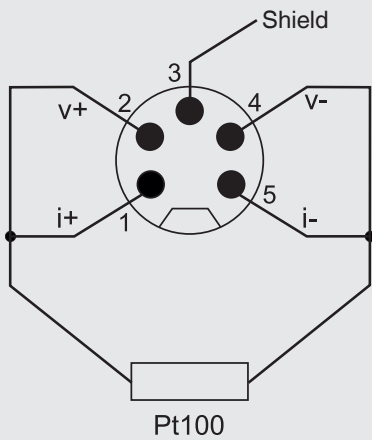


Resistance thermometer connection (5-pin DIN connector)

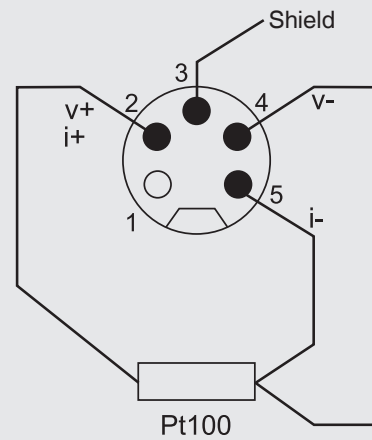
Channel 1 and 2 (PRT1, PRT2)

View towards front panel connector

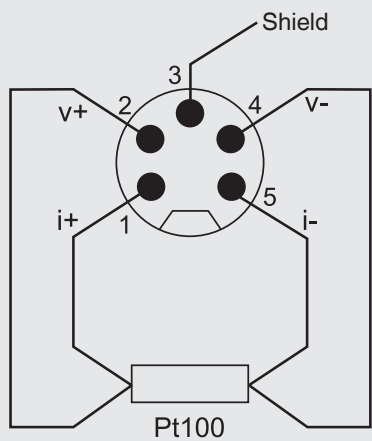
2-wire PRT connection



3-wire PRT connection

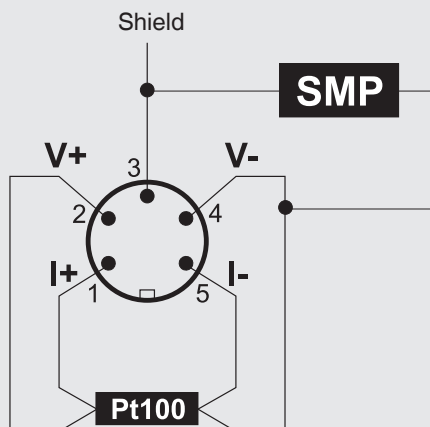


4-wire PRT connection



Options

Viewed from top panel

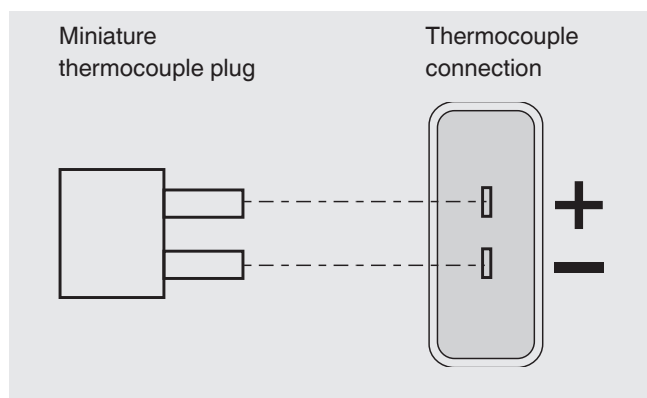


With DIN plug or SMART plug

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 instrument without any further action.

The SMART connector saves time and reduces error. If there are existing calibrated or uncalibrated probes, no problem, CTR3000 automatically registers if a probe is SMART or normal.

Thermocouple connection (miniature connector), channel 3 and 4 (TC3, TC4)



Further details

We are expanding our product range of precision thermometers to a versatile thermometer for the industrial market with the model CTR3000 multi-functional precision thermometer. The ability to measure resistance thermometers, thermocouples and thermistors up to 44 pieces at one time, makes the instrument versatile.

The CTR3000 is new in its class. The instrument closes the gap between the hand-held series CTH6x00 which can handle thermocouples and the desktop instrument like model CTR5000 which can only handle resistance thermometers.

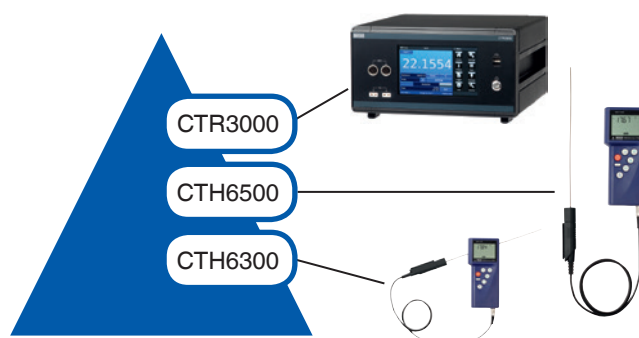
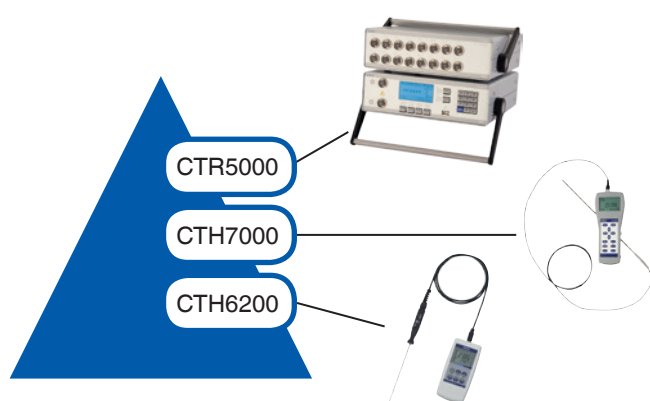


Figure 1: Resistance thermometer measurement

Figure 2: TC and PRT measurement

It is a precision instrument, designed for use in a laboratory or light industrial environment. The instrument can be extended by using scanner boxes to gain additional channels.

The instrument model CTR3000 is compatible with the existing model CTS5000 scanner box for resistance thermometers. In addition, the user interface is easy to handle like other WIKA calibration technology products.

Scope of delivery

- Model CTR3000 multi-functional precision thermometer
incl. power cord
- Choice of model CTP5000/CTP9000 temperature probes

Option

- DKD/DAkkS calibration certificate ¹⁾
- UKAS calibration certificate ¹⁾

1) Only system calibration

Accessories

Temperature probes model CTP5000

- Immersion probe
- Customer-specific probes are available on request

Thermocouple model CTP9000

- Immersion probe type S
- With or without cold junction
- Customer-specific probes are available on request

Multiplexer

- 10-channel multiplexer for resistance thermometers and thermocouples (maximum of 4 multiplexers per CTR3000)

Case

- Transport case, robust

Interface

- Interface card RS-232
- Interface card IEEE

Ordering information

CTR3000 / Interface / Number of multiplexers / Number of resistance thermometers / Number of thermocouples / Transport case / Additional order information

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