Multi-functional precision thermometer
Model 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: °C, °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

WIKA

Part of your business

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	■ 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	■ 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
Display-update rate	500 ms
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 … +1,820 °C (-346 ... +3,308 °F) Type B, E, J, K, N, R, S, T in accordance with EN 60584
Thermistor	0 ... 500 kΩ

1) Depending on sensor type

Accuracies [2]			
Resistance thermometer			
Temperature accuracy	4-wire 3-wire	±0.005 K ±0.03 K	
Temperature conversions	Standard EN 60751, CvD, ITS-90		
Sensor currents	1 mA, 2 mA and √2		
Keep warm currents	$R_0 < 50\ \Omega$ $R_0 \geq 50\ \Omega$	0 ... 125 Ω 0 ... 500 Ω	2 mA 1 mA
Measurement time	3 seconds update rate		
Thermocouple			
Base measurement [3]	±% of reading + µV ±0.004 % + 2 µV		
Temperature accuracy	Type B Type E Type J Type K Type N Type R Type S Type T	±0.09 °C + ±0.025 % of reading ±0.05 °C + ±0.031 % of reading ±0.07 °C + ±0.030 % of reading ±0.09 °C + ±0.035 % of reading ±0.08 °C + ±0.035 % of reading ±0.27 °C + ±0.020 % of reading ±0.27 °C + ±0.020 % of reading ±0.09 °C + ±0.025 % of reading	
Temperature conversions	Standard EN 60584, polynomial		
Measurement time	3 seconds update rate		
Cold junction compensation	Internal, external or channel Accuracy internal cold junction compensation ±0.15 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

Accuracies [2]

Thermistor

Accuracy	0 ... 400 Ω 400 Ω ... 50 kΩ 50 ... 500 kΩ	±0.006 Ω ±0.01 % of reading ±0.02 % of reading
Temperature conversions	Steinhart-Hart, Polynomial	
Sensor currents	0 ... 450 Ω 400 Ω ... 45 kΩ 40 ... 500 kΩ	1 mA 10 µA 3 µA
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

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	°C, °F, K, mV and Ω

Functions

Real-time clock	Integrated clock with date

Voltage supply

Power supply	AC 100 ... 240 V, 50/60 Hz, 0.6 A; universal input on rear panel

Permissible ambient conditions

Operating temperature	0 ... 50 °C (32 ... 122 °F) Maximum achievable accuracy within 17 ... 23 °C (63 ... 73 °F)
Relative humidity	0 … 70 % r. h. (non-condensing)
Storage temperature	-20 ... +50 °C (-4 ... +122 °F)

Communication

Interfaces	Standard: USB host, USB device and Ethernet Optional: RS-232

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
CE	**EU declaration of conformity** ■ EMC directive ■ RoHS directive	European Union

Certificates

Certificate	
Calibration [4]	Standard: 3.1 calibration certificate per DIN EN 10204 Option: DKD/DAkkS calibration certificate
Recommended recalibration interval	1 year (dependent on conditions of use)

4) 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.

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

"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.

Standard desktop/main screen

1. Home application
2. General settings
3. Probe settings
4. Scan settings
5. Logger settings
6. Remote settings
7. Info display
8. Service settings
9. Unit; shortcut
10. Plus decimal place
11. Clear the peak values (min, max measured since starting the instrument)

12. Selected probe (standard or custom); shortcut
13. Freeze the display; function key
14. Root 2 for sensor current PRT; function key
15. Current displaying of average, stability and number of measurements
16. Peak displaying
17. Minus decimal place
18. Measured value in the base unit according to probe, e.g. Ω for Pt100 and mV for TC
19. Current measured value
20. Selected channel; shortcut
21. Current application name

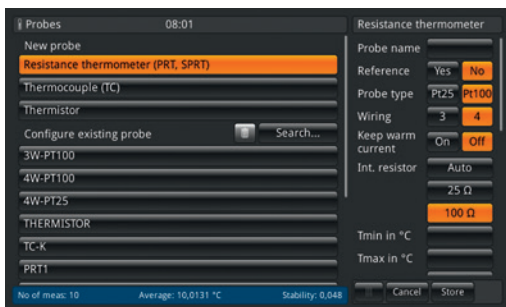# Simple instrument configurations

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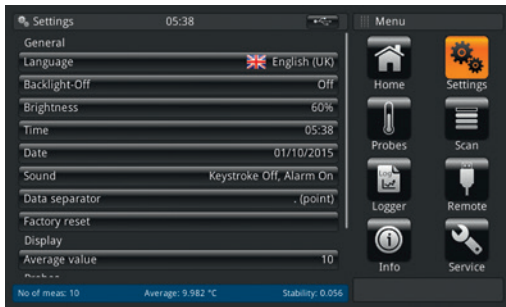
If selecting the menu on the right side, the settings appear on the left side. Selecting e.g. language all available languages will be displayed on the right section and can easily be chosen.
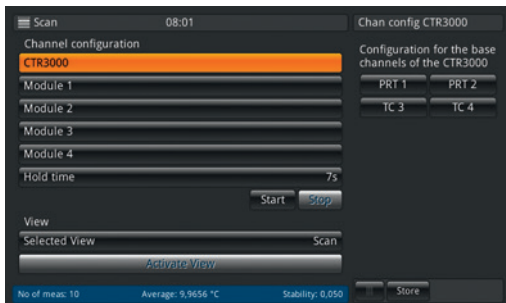
In the menu setting all things concerning the instrument can be handled.

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.
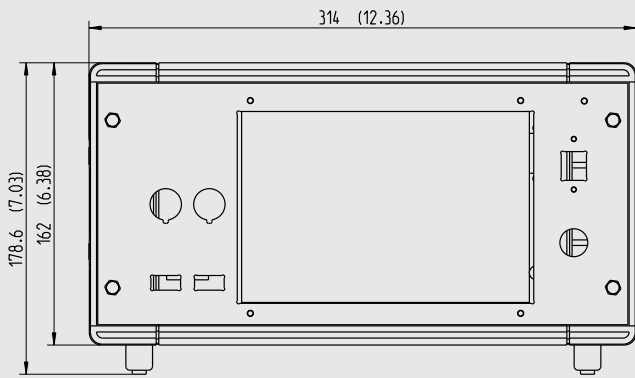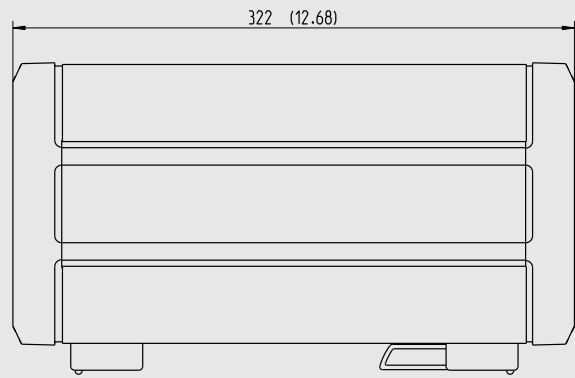
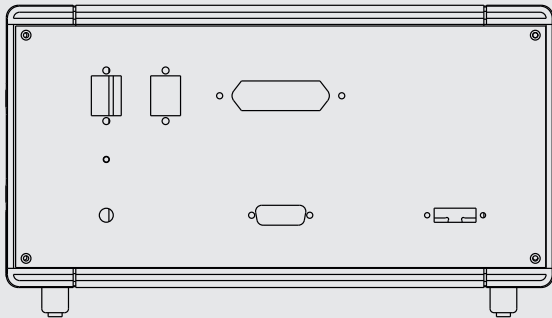**Scan view**

Graphical scan view
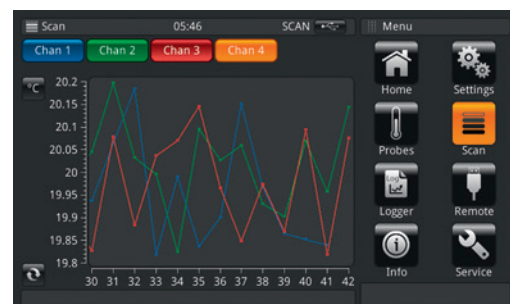
Dimensions in mm (in)

Front view

314 (12.36)

178.6 (7.03)
162 (6.38)

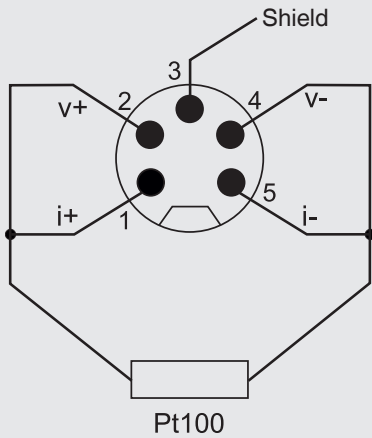**Side view (left)**

322 (12.68)

Rear view

Resistance thermometer connection (5-pin DIN connector)
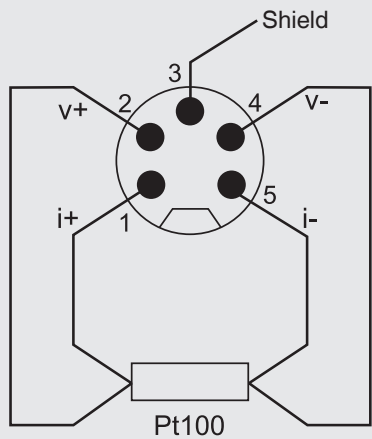## Channel 1 and 2 (PRT1, PRT2)
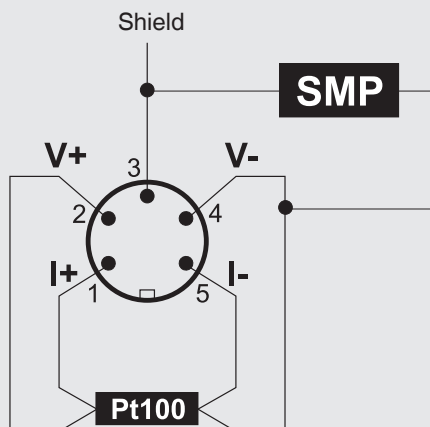**View towards front panel connector**

2-wire PRT connection

Shield

3

v+ 2 · · 4 v−

· ·

i+ 1 · 5 i−

Pt100

3-wire PRT connection

Shield

3

v+ 2 · · 4 v−
i+

○ ·

1 5 i−

Pt100
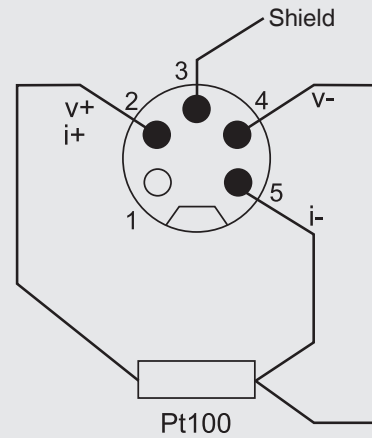
4-wire PRT connection

Shield

3

v+ 2 · · 4 v−

· · ·

i+ 1 5 i−

Pt100

Options

Viewed from top panel

Shield

SMP

V+ **V−**

3

2 · · 4

· ·

I+ · **I−**

1 5

Pt100

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)

Miniature thermocouple plug

Thermocouple connection

＋

−
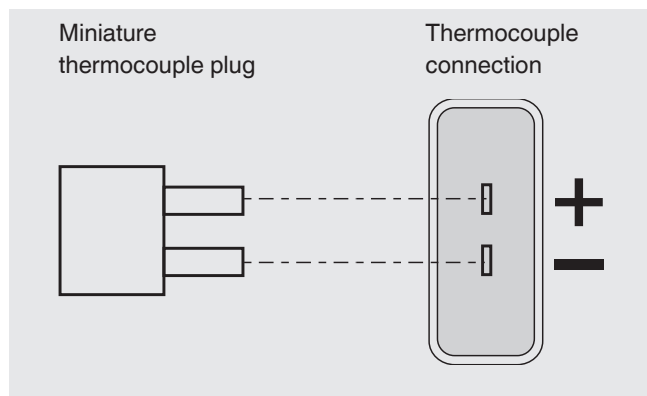
Further details

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.

CTR5000

CTH7000

CTH6200

Resistance thermometer measurement

CTR3000

CTH6500

CTH6300
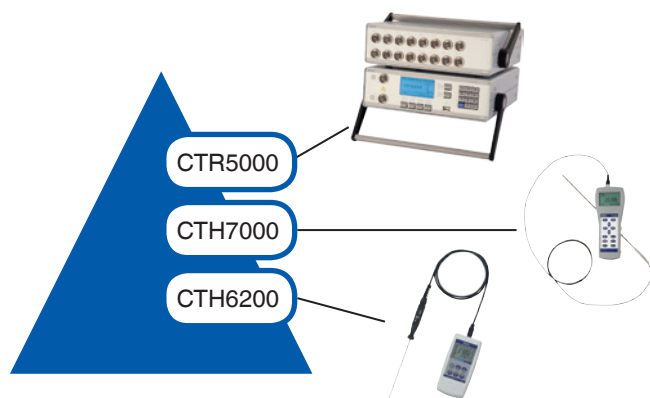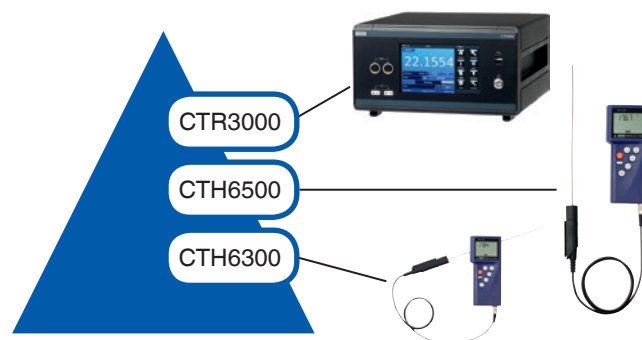
TC and PRT measurement

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
- Test report for electrical inputs
- 3.1 calibration certificate per DIN EN 10204 (only system calibration [1])

Option

- DKD/DAkkS calibration certificate (only system calibration [1])

1) System calibration means the calibration of an thermometer as a measuring chain with the CTR3000

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
- 8- or 16-channel multiplexer model CTS5000 for resistance thermometers (maximum of 4 multiplexers per CTR3000)

Case
- Transport case, robust

Interface
- Interface card RS-232

Multiplexer model CTS5000

Ordering information

CTR3000 / Interface / Number of multiplexers / Number of resistance thermometers / Number of thermocouples CTP9000 / Calibration / Transport case / Additional approvals / Additional order information

08/2017 EN

WIKA

WIKA Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Tel.   +49 9372 132-0
Fax   +49 9372 132-406
info@wika.de
www.wika.de