

Micro calibration bath Premium version Model CTB9350-165

WIKA data sheet CT 46.40

Applications

- Bio and pharmaceutical industries
- Food industry
- Power plants and plant construction
- Measurement and control laboratories in the chemical industry
- Demanding calibrations in production and laboratory

Special features

- Easy operation via intuitive, user-friendly menus
- Large, easy-to-read touchscreen
- Short response times due to optimised control
- Multi-function instrument with four controller parameter sets
- Creation of calibration tasks incl. preparation of a certificate



Micro calibration bath, model CTB9350-165

Description

Whether in laboratories, workshops or on-site, the model CTB9350-165 micro calibration bath can meet any calibration requirement. This micro calibration bath can be used in the range $-35 \dots +165 \text{ }^{\circ}\text{C}$ [$-31 \dots +329 \text{ }^{\circ}\text{F}$], not only covering the conventional functions.

In dry-well temperature calibrators, as a result of their low insertion depth and the resulting heat conduction errors, short probes lead to a significant increase in measurement uncertainty. Even when comparing the test items with an external reference thermometer, they cannot be too short. If the stem length is very short, a micro calibration bath is definitely preferable to a temperature dry-well calibrator.

If several probes are to be calibrated at the same time, the micro calibration bath has additional advantages: Thermometers with differing stem diameters can be calibrated together, without the need to provide exactly the correct inserts.

This approach is particularly useful for on-site calibration, when there is a wide variety of test items and their stem diameters are either varied or unknown.

The CTB9350-165 can be fitted with an integrated measuring instrument. This enables the measurement of resistances, thermoelectric voltages and also current signals of thermometers with a $0/4 \dots 20 \text{ mA}$ transmitter and their direct display in the selected unit.

It is operated via a large colour touchscreen. Test tasks can be created and automated via the user interface, saving the user a lot of time. Operation is intuitive and fast.

Specifications for micro calibration bath

Basic information		
Application with	Internal control and direct filling or insert for liquids	External reference and direct filling or insert for liquids
Temperature range	-35 ... +165 °C [-31 ... +329 °F]	
Accuracy ¹⁾	±0.150 K	±0.100 K
Temperature stability ²⁾	±0.020 K	±0.010 K
Metal block		
Dimension for calibration insert	Ø 60 x 170 mm [Ø 2.36 x 6.69 in]	
Functions		
Menu functions	<ul style="list-style-type: none"> ■ Calibration without certificate ■ Calibration with certificate ■ Remote control ■ Data export to a USB stick 	
User settings	User-defined data is indicated on the test certificate	
Dimensions (W x D x H)		
Instrument without carrying handle	210 x 300 x 430 mm [8.27 x 11.81 x 16.93 in]	
Height of carrying handle	50 mm [1.97 in]	
Weight	13 kg [28.67 lb]	

1) Is defined as the measuring deviation between the measured value and the reference value.

2) Maximum temperature difference at a stable temperature over 30 minutes.

Digital display instrument	
Display	Bright colour touchscreen (7"), laminated safety glass
Display range	-50 ... +165 °C [-58 ... +329 °F]
Resolution	0.001 °C
Units	Adjustable via menu <ul style="list-style-type: none"> ■ °C ■ °F ■ K
Menu languages	Adjustable via menu <ul style="list-style-type: none"> ■ English ■ German

Accuracy specifications		
Application with	Internal control and direct filling or insert for liquids	External reference and direct filling or insert for liquids
Temperature range	-35 ... +165 °C [-31 ... +329 °F]	
Accuracy ¹⁾	±0.150 K	±0.100 K
Temperature stability ²⁾	±0.020 K	±0.010 K
Influence due to loading ¹⁾	±0.100 K	±0.020 K
Temperature distribution ³⁾		
Axial homogeneity	±0.100 K	±0.100 K
Radial homogeneity	±0.080 K	±0.080 K
Hysteresis	±0.025 K	±0.013 K

1) Is defined as the measuring deviation between the measured value and the reference value.

2) Maximum temperature difference at a stable temperature over 30 minutes.

3) Determined in accordance with current calibration guideline in a standard insert.

Temperature control		
Heating time	14 min	From 20 °C to 165 °C [from 68 °F to 329 °F]
	16 min	From -35 °C to +165 °C [from -31 °F to +329 °F]
Cooling time	13 min	From +20 °C to -30 °C [from +68 °F to -22 °F]
	11 min	From 165 °C to 20 °C [from 329 °F to 68 °F]
Stabilisation time	Dependent on temperature and temperature probe	

Electrical connection	
Operating voltage ¹⁾	AC 100 ... 240 V, 50/60 Hz
Power consumption	375 W
Electrical safety	Overvoltage category (installation category) II, Pollution degree 2 in accordance with IEC 61010-1
Fuse	6.3 AH 250 V slow blow fuse
Power cord	<ul style="list-style-type: none"> ■ For Europe ■ For USA/Canada ■ For Switzerland ■ For UK

1) AC 115 V auxiliary power must be specified on the order, otherwise an AC 230 V one will be delivered.

Operating conditions	
Place of use	For indoor use only
Altitude	Up to 2,000 m [6,562 ft] above sea level
Operating temperature	0 ... 50 °C [32 ... 122 °F] The ambient temperature influences the heating/cooling behaviour
Storage and transport temperature range	-10 ... +60 °C [14 ... 140 °F]
Relative humidity, condensation	< 80 % to 31 °C [88 °F], decreasing linearly to 50 % at 40 °C [104 °F] (non-condensing)
Mounting position	Upright/Vertical standing

Communication	
Interface	<ul style="list-style-type: none"> ■ 3 x USB ■ Ethernet
Connectivity	<ul style="list-style-type: none"> ■ OPC UA ■ Serial communication ■ HTTP → Details and further possibilities on request
Baud rate	2400
Measuring rate	1 measured value per second
Internal program	Test items, test tasks and test points can be applied without limit

Specifications for integrated measuring instrument

Output signal	
Analogue output	
Voltage supply	DC 24 V (can be activated via menu)
Load	Max. 24 mA
Switching function	NC, NO

Electrical connection		
Number of channels		
Resistance thermometer	2	
Thermocouple	2	
Current signal	1	
Voltage signal	1	
Switch test	2	
Connection type		
Resistance thermometer	4 x 4 mm banana sockets	
Thermocouple	2 x thermocouple terminals (mini)	
Current and voltage signal	4 mm banana sockets	
Pin assignment		
Resistance thermometer	<ul style="list-style-type: none"> ■ 2-wire connection ■ 3-wire connection ■ 4-wire connection 	
Measuring range		
Resistance thermometer	Pt100	0 ... 400 Ω
	Pt1000	0 ... 4,000 Ω
Thermocouple	-10 ... +100 mV	
Current signal	DC 0 ... 24 mA	
Voltage signal	DC 0 ... 12 V	

Accuracies	Measuring range		Accuracy
Resistance thermometer			
Pt100	-200 ... +850 °C	[-328 ... +1,562 °F]	±0.03 K
Pt500	-200 ... +850 °C	[-328 ... +1,562 °F]	±0.12 K
Pt1000	-200 ... +850 °C	[-328 ... +1,562 °F]	±0.06 K
Ni100	-60 ... +180 °C	[-76 ... +356 °F]	±0.02 K
Ni500	-60 ... +200 °C	[-76 ... +392 °F]	±0.08 K
Ni1000	-60 ... +200 °C	[-76 ... +392 °F]	±0.04 K
Cold junction	-200 ... +1,820 °C	[-328 ... +3,308 °F]	±0.3 K
Thermocouple			
Type K	-160 ... +1,260 °C	[-256 ... +2,300 °F]	±0.08 K
Type J	-190 ... +1,200 °C	[-310 ... +2,192 °F]	±0.07 K
Type N	0 ... 1,300 °C	[32 ... 2,372 °F]	±0.13 K
Type E	-200 ... +1,000 °C	[-328 ... +1,832 °F]	±0.06 K
Type T	-130 ... +400 °C	[-202 ... +752 °F]	±0.09 K
Type R	160 ... 1,760 °C	[320 ... 3,200 °F]	±0.78 K
Type S	170 ... 1,760 °C	[338 ... 3,200 °F]	±0.73 K
Type B	920 ... 1,820 °C	[1,688 ... 3,308 °F]	±0.5 K

Accuracies	Measuring range	Accuracy
Direct current	0 ... 24 mA	0.01 % of end value
DC voltage	0 ... 12 V	0.01 % of end value

Approvals

Logo	Description	Region
CE	EU declaration of conformity	European Union
	EMC directive ¹⁾ EN 61326 emission (group 1, class A) and immunity (industrial environment)	
	Low Voltage Directive EN 61010, safety requirements for electrical equipment for measurement, control and laboratory use	
	RoHS directive	

1) **WARNING!**

This is class A equipment for emitted interference and is intended for use in industrial environments. In other environments, e.g. residential or commercial installations, it can interfere with other equipment under certain conditions. In such circumstances the operator is expected to take the appropriate measures.

Certificates

Certificates	
Calibration	
Integrated measuring instrument	<ul style="list-style-type: none"> ■ Without ■ 3.1 inspection certificate per EN 10204 for Pt, TC, mA and V ■ DAkkS calibration certificate for Pt, TC, mA and V
Instrument ¹⁾	<ul style="list-style-type: none"> ■ 3.1 inspection certificate per EN 10204 ■ DAkkS calibration certificate as micro calibration bath (traceable and accredited in accordance with ISO/IEC 17025)
Recommended calibration interval	1 year (dependent on conditions of use)

1) Calibration is carried out, as standard, at 6 temperatures evenly distributed over the temperature range. On request, special points are also possible.

→ For approvals and certificates, see website

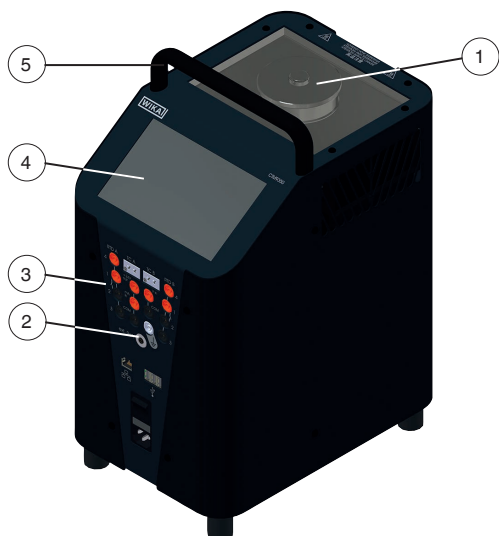
Calibration fluids ¹⁾

Calibration fluid	Calibration range	Flash point ²⁾	Usable
Distilled water	5 ... 90 °C [51 ... 194 °F]	-	-
Silicone oil DC 200.05	-40 ... +130 °C [-40 ... +266 °F]	133 °C [271.4 °F]	From -35 ... +130 °C [-31 ... +266 °F] very well usable
Silicone oil DC 200.10	-35 ... +160 °C [-31 ... +320 °F]	163 °C [325,4 °F]	From -35 ... +160 °C [-31 ... +320 °F] well usable
Silicone oil DC 200.20	7 ... 220 °C [45 ... 428 °F]	232 °C [450 °F]	-
Silicone oil DC 200.50	25 ... 270 °C [77 ... 518 °F]	280 °C [536 °F]	-

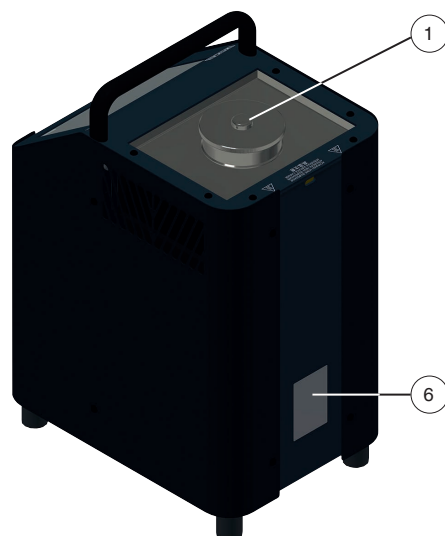
1) Other liquids could be used as agreed, provided that the temperature range and viscosity are suitable for the application.

2) FP = flash point with open cup

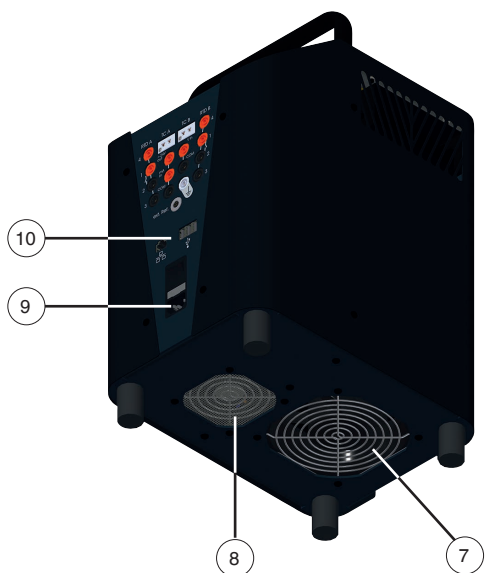
Isometric views



Front view



Rear view



Bottom view

- ① Liquid bath
- ② Connection for external reference probe
- ③ Integrated measuring instrument
- ④ Display with touchscreen
- ⑤ Carrying handle
- ⑥ Product label
- ⑦ Fan 1: Ventilation for tank cooling
- ⑧ Fan 2: Ventilation for case cooling
- ⑨ Mains connection socket with main switch and fuse
- ⑩ Interfaces for PC and network

Additional features of the CTB9350-165

Easy calibration, with automatic certificate generation

The operation of the instrument using the large touchscreen is very simple and intuitive. The micro calibration bath's software makes it easy to create calibration tasks to simplify the calibration process for the user as much as possible. With this, automatic calibrations can be performed after adding a test item and the desired measuring points. The measured value can be recorded with the integrated measuring instrument, manually or with an optional USB camera. At the end of the process, the instrument's own software creates a calibration certificate.

Increase productivity

Since, in a large number of processes, the time factor is important, an actual time calculation is carried out and the change time is displayed each time the temperature values change. This gives the user a better overview of the heating and cooling times.

Stable, homogeneous bath temperature

Due to a controller, which has been specifically developed for temperature calibration, and a special heating block for temperatures to 165 °C [329 °F], a high control accuracy and a homogeneous temperature distribution within the block is achieved. Important features in this context are control algorithms, which have been optimised for the calibration processes, and a heating block with a heating power that increases towards the upper end. The small resulting temperature fluctuations and the good axial temperature distribution lead to a considerably reduced total measurement uncertainty during calibration.

The micro calibration bath can be used with suitable calibration fluids. Permitted liquids are silicone oils, mineral oils and water.

Accessories and their applications

The function of the micro calibration bath is determined by the insert for liquids and probe basket and/or reference thermometer. The insert for liquids and the probe basket are inserted into the tank opening.

Insert for liquids and probe basket for tank

Angled probes, large-diameter probes or probes with special designs cannot be calibrated with a dry-well calibrator. For these applications, micro calibration baths have a great advantage.

They feature a liquid tank. The liquid in the tank is circulated using a magnetic stirrer, and thus provides very good temperature distribution within the bath. The insert for liquids enables easy replacement and cleaning of the instrument. The liquids used are selected depending upon the desired calibration temperature.



Insert for liquids and probe basket for tank

Reference thermometer

On request, the external reference thermometer can be ordered for the micro calibration bath. It enables better accuracy and stability of the measurement in the bath. The angled design leaves enough space for the test items.



Reference thermometer

Accessories and spare parts

Description ¹⁾		Order code
		CTX-A-B6
	Transport case with trolley frame	-3-
-	Drain pump	-C-
	External reference probe up to max. 255 °C [528 °F]	-E-
	Power cord For the EU	-L-
	For Switzerland	-M-
	For USA/Canada	-O-
	For UK	-N-
	Electrical connection set Consisting of: <ul style="list-style-type: none"> ■ Clamp connectors (4 x red, 4 x black and 1 x white) ■ 2 x thermocouple adapters ■ 2 x split ferrite cores ■ 2 x ferrite keys 	-P-
	PC and network cable	-Q-
	DC 200.10 silicone oil In 1-litre plastic bottle For temperature range -35 ... +160 °C [-31 ... +320 °F]; FP = 163 °C [325.4 °F]	-H-
	Replaceable insert for liquids New adjustment required	-I-
	Screw-on lid Material: stainless steel	-J-
	Screw-on lid with 6 G 1/4 bores Material: plastic	-K-
Ordering information for your enquiry:		
1. Order code: CTX-A-KE		↓
2. Option:		[]

1) The figures are an example and may change depending on the state of the art in design, material composition and representation

Scope of delivery

- Temperature multi-function calibrator model CTB9350-165
- Power cord, 1.5 m [5 ft] with safety plug
- PC and network cable
- USB stick with backup function
- Protective packaging / Transport protection
- Probe basket
- Drain pump
- Transport cover
- Magnetic stirrer with magnetic lifter
- Operating cover with five silicone plugs
- Operating instructions
- Calibration certificate

Ordering information

Model / Temperature range / Integrated measuring instrument / Insert for liquids / Calibration / Transport case / Power cord / Further approvals / Additional ordering information

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