

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

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 $-30 \dots +165 \text{ }^{\circ}\text{C}$ [$-22 \dots +329 \text{ }^{\circ}\text{F}$], 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.



Fig. left: with integrated measuring instrument

Fig. right: without integrated measuring instrument

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.

Easy calibration, with automatic certificate generation

The instruments 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.

Specifications for micro calibration bath

Basic information			
Version	Application with internal control and direct filling or insert for liquids Application with external reference and direct filling or insert for liquids		
Temperature range	-30 ... +165 °C [-22 ... +329 °F]		
Temperature stability	→ See table “Accuracy specifications”		
Temperature control			
Use	Insert for liquids and external references	Without	With
Heating time	From +20 °C to +160 °C [from +68 °F to +320 °F]	14 min	35 min
	From -30 °C to +160 °C [from -22 °F to +320 °F]	16 min	45 min
Cooling time	From +20 °C to -30 °C [from +68 °F to -22 °F]	13 min	45 min
	From +160 °C to +30 °C [from +329 °F to +86 °F]	11 min	27 min
Stabilisation time	Dependent on temperature and temperature probe		
Metal block			
Dimension for calibration insert	Ø 60 x 170 mm [Ø 2.36 x 6.69 in]		
Dry-well material	Aluminium		
Digital display instrument			
Display	Bright colour touchscreen (7”), laminated safety glass		
Display range	-199.9 ... +999.9 °C [-199.9 ... +999.9 °F]		
Resolution	0.001 °C		
Units	°C, °F, K		
Menu languages	English German		
Functions			
Menu functions	Calibration without certificate Calibration with automatic certificate generation Remote controls Data export to a USB stick		
User settings	User-defined data is indicated on the test certificate		

Basic information	
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]

Accuracy specifications		
Application with	Internal control and direct filling or insert for liquids	External reference and direct filling or insert for liquids
Temperature range	-30 ... +165 °C [-22 ... +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	Determined in accordance with current calibration guideline in a standard insert sleeve.	
Axial homogeneity	±0.100 K	±0.100 K
Radial homogeneity	±0.080 K	±0.080 K
Hysteresis	±0.025 K	±0.013 K

1) Defined the measuring deviation between the measured value and the reference value.

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

Communication	
Interface	3 x USB Ethernet
Connectivity	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

Voltage supply and performance data	
Operating voltage ¹⁾	AC 90 ... 240 V, 50/60 Hz → The operating voltage AC 115 V must be specified on the order, otherwise an AC 230 V one will be delivered.
Power consumption	375 W
Fuse	Micro fuse, 6.3 AH 250 V slow blow fuse
Power cord	■ Europe ■ USA/Canada ■ Switzerland ■ UK ■ China

Operating conditions	
Place of use	For indoor use only
Altitude	≤ 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]

Operating conditions	
Humidity	< 80 % relative humidity to 31 °C [88 °F] Decreasing linearly to 50 % relative humidity at 40 °C [104 °F]
Condensation	Non-condensing
Electrical safety	
Overvoltage category	II
Pollution degree	2 per IEC-61010-1

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	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

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

Approvals

Logo	Description	Region
	EU declaration of conformity	European Union
	EMC directive 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	

Certificates

Description	
Calibration	
Integrated measuring instrument	■ Without ■ 3.1 inspection certificate per EN 10204 for RTD, TC, mA and V ■ DAkkS calibration certificate for RTD, TC, mA and V
Instrument ¹⁾	■ Without ■ 3.1 inspection certificate per EN 10204 ■ DAkkS calibration certificate (traceable and accredited in accordance with ISO/IEC 17025)
Recommended calibration interval	1 year (dependent on conditions of use)

1) The calibration is performed for the configured function. This can be: insert for liquids (internal or external) or direct filling (internal or external). At least one function must be calibrated.

→ For approvals and certificates, see website

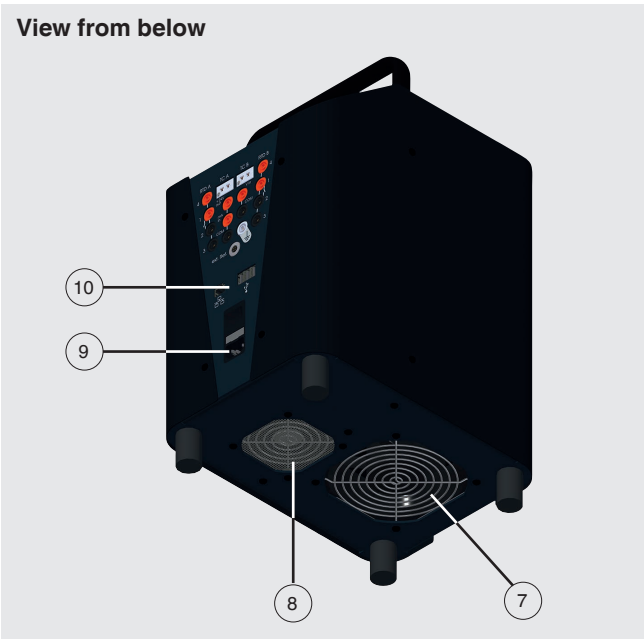
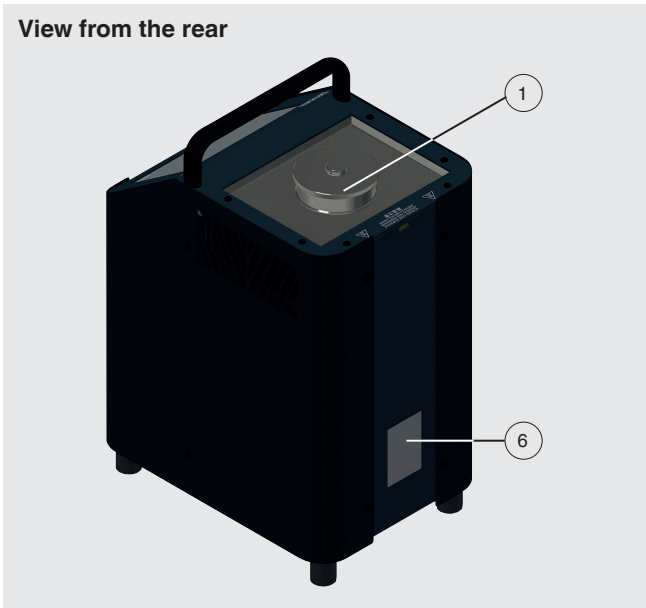
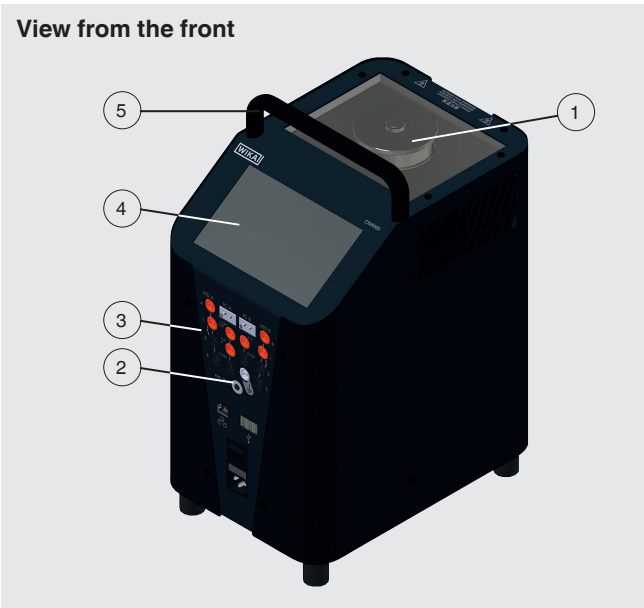
Calibration fluids 1)

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



- ① Liquid bath
- ② Connection for external reference sensor
- ③ Integrated measuring instrument
- ④ Digital display / 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 connector socket with main switch and microfuse
- ⑩ Interfaces for PC and network

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.

Description ¹⁾	
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.	
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.	

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

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] Dimensions: Ø 3 x 300 mm [Ø 0.12 x 11.81 in] Angled: 190 mm [7.48 in] – length from the sensor tip	-E-
	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-

Description ¹⁾		Order code
		CTX-A-B6
	Screw-on lid with 6 G 1/4 bores Material: plastic	-K-
	Power cord For the EU	-L-
	For Switzerland	-M-
	For UK	-N-
	For USA/Canada	-O-
	Electrical connection set Consisting of: 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-
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

- Micro calibration bath 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
- Operating instructions
- Calibration certificate

Incl. accessories for use as a calibration bath

- Probe basket
- Drain pump
- Transport cover
- Magnetic stirrer with magnetic lifter
- Operating cover with five silicone plugs
- Calibration liquid

Ordering information

Model / Temperature range / Integrated measuring instrument / Calibration integrated measuring instrument / Type of use
calibration liquid / The calibration of the functions with insert for liquids or direct filling depends on the preselection / Transport
case / Power cord / Additional accessories / Further approvals / Additional ordering information

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