

Temperature dry-well calibrator Industrial series

Models CTD9100-COOL, CTD9100-165, CTD9100-450, CTD9100-650

WIKA data sheet CT 41.28

Applications

- Easy on-site calibration
- Power generation
- Measurement and control laboratories
- Machine building

Special features

- Various temperature ranges
- Measurement uncertainties from 0.15 ... 0.8 K
- Compact design
- Simple operation



Temperature dry-well calibrator CTD9100-650

Description

Versatile in application

Nowadays, fast and simple testing of thermometers is a "must" when it comes to the operational safety of machines and plants.

The portable calibrators of the CTD9100 family are particularly suited for on-site calibrations and extremely user-friendly. Due to their compact design and their low weight, the instruments can be taken and used almost anywhere.

The new instrument concept brings together a stable heat source with precision Pt100 temperature measurement. This enables industrial temperature probes to be calibrated even more efficiently. Regular checking of the temperature probes helps to detect failures at an early stage and to shorten downtimes.

Easy to use

The temperature dry-well calibrators of the CTD9100 series work with temperature-controlled metal blocks and interchangeable inserts.

The calibration temperature, adjusted simply using two buttons on the controller, can be very quickly controlled. The actual and set temperature of the heating block are displayed simultaneously on a large, 4-digit, high-contrast LED display. Thus reading errors are virtually eliminated.

Thermometers with different diameters can be fitted into the calibrator using inserts, drilled to suit. A new block design, with improved temperature homogeneity at the calibrator's lower range, leads to smaller measurement uncertainties. Through the large insertion depth of 150 mm [5.91 in], the heat dissipation error is significantly reduced.

Overview of versions of the models CTD9100

Four instruments for the temperature range from -50 ... +650 °C [-58 ... +1,202 °F]

Model CTD9100-COOL

Temperature range from -50 ... +200 °C [-58 ... +392 °F]

Model CTD9100-165

Temperature range from -35 ... +165 °C [-31 ... +329 °F]

These calibrators work with Peltier elements and can therefore also reach test temperatures below the ambient temperature. Due to their ability to actively cool, they are more commonly used in the biotechnology, pharmaceutical and food industries. The calibrator model CTD9100-165-X has an enlarged insert with Ø 60 mm [2.4 in]. This makes it possible to calibrate several temperature probes simultaneously without having to change the inserts.



Model CTD9100-450

Temperature range from +40 ... +450 °C [+104 ... +842 °F]

The CTD9100-450 is used in the medium temperature range up to 450 °C [842 °F]. It generates its temperature with an electrical resistance heating and has an enlarged insert with Ø 60 mm [2.4 in]. This makes it possible to calibrate several temperature probes simultaneously without having to change the inserts.



Model CTD9100-650

Temperature range from +40 ... +650 °C [+104 ... +1,202 °F]

This is the high-temperature model. This also works with an electrical resistance heating. When it comes to testing at high temperatures, such as for exhaust gases measurements on test benches or in power generation, the model CTD9100-650 is the right choice.



Specifications

Basic information	Model CTD9100-COOL	Model CTD9100-165
Temperature range	-50 ... +200 °C [-58 ... +392 °F]	■ -35 ... +165 °C [-31 ... +329 °F] ■ -30 ... +165 °C [-22 ... +329 °F] ¹⁾
Temperature stability ²⁾	→ See “Accuracy specifications” table	
Metal block		
Immersion depth	150 mm [5.91 in]	
Dimension of the insert	Ø 28 x 150 mm [Ø 1.1 x 5.91 in]	■ Ø 28 x 150 mm [Ø 1.1 x 5.91 in] ■ Ø 60 x 150 mm [Ø 2.36 x 5.91 in] ¹⁾
Dry-well material	Aluminium 3.2315	
Dimensions (W x D x H)		
Calibrator incl. carrying handle	215 x 305 x 425 mm [8.46 x 12.00 x 16.73 in]	
Height of carrying handle	50 mm [1.97 in]	
Weight	11 kg [24.3 lb]	

1) Extension of the model X with a larger diameter

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

Basic information	Model CTD9100-450	Model CTD9100-650
Temperature range	40 ... 450 °C [104 ... 842 °F]	40 ... 650 °C [104 ... 1,202 °F]
Temperature stability ¹⁾	→ See “Accuracy specifications” table	
Metal block		
Immersion depth	150 mm [5.91 in]	
Dimension of the insert	Ø 60 x 150 mm [Ø 2.36 x 5.91 in]	Ø 28 x 150 mm [Ø 1.1 x 5.91 in]
Dry-well material	Aluminium 3.4365	Brass 2.0375
Dimensions (W x D x H)		
Calibrator without carrying handle	150 x 270 x 400 mm [5.91 x 10.63 x 15.75 in]	
Height of carrying handle	50 mm [1.97 in]	
Weight	7.5 kg [16.5 lb]	8 kg [17.6 lb]

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

Accuracy specifications				
Model	CTD9100-COOL	CTD9100-165	CTD9100-450	CTD9100-650
Accuracy ¹⁾	±0.25 K	±0.20 K	±0.30 K	±0.50 K
Temperature stability ²⁾	±0.05 K	±0.05 K	■ ±0.05 K to 100 °C [212 °F] ■ ±0.1 K to 450 °C [842 °F]	■ ±0.05 K to 100 °C [212 °F] ■ ±0.1 K to 600 °C [1,112 °F]
Temperature distribution ¹⁾				
Axial homogeneity	Depending on temperature, temperature probes and their number			
Radial homogeneity ³⁾	Depending on temperature, temperature probes and their number			

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) Maximum temperature difference between the bores (all thermometers inserted to the same depth).

The measurement uncertainty is defined as the total measurement uncertainty ($k = 2$), which includes the following components: Accuracy, Measurement uncertainty of reference, stability and homogeneity.

Temperature control		
Heating time		
Model CTD9100-COOL	From +20 °C to +200 °C [from +68 °F to +392 °F]	Approx. 10 min
Model CTD9100-165	From +20 °C to +165 °C [from +68 °F to +329 °F]	■ Approx. 25 min ■ Approx. 35 min model X ¹⁾
Model CTD9100-450	From +20 °C to +450 °C [from +68 °F to +842 °F]	Approx. 14 min
Model CTD9100-650	From +20 °C to +600 °C [from +68 °F to +1,112 °F]	Approx. 20 min
Cooling time		
Model CTD9100-COOL	From +20 °C to -20 °C [from +68 °F to -4 °F]	Approx. 10 min
Model CTD9100-165	From +20 °C to -20 °C [from +68 °F to -4 °F]	■ Approx. 15 min ■ Approx. 35 min model X ¹⁾
Model CTD9100-450	From +450 °C to +100 °C [from +842 °F to +212 °F]	Approx. 60 min
Model CTD9100-650	From +600 °C to +100 °C [from +1,112 °F to +212 °F]	Approx. 60 min
Stabilisation time ²⁾	Depending on temperature and temperature probe	

- 1) Extension of model X with a larger diameter of 60 mm [2.36 in]
2) Time before reaching a stable value.

Digital display instrument	
Display	2-line, 4-digit LED display
Display range	-199.9 ... +999.9 °C [-199.9 ... +999.9 °F]
Resolution	■ 0.01 to 100 °C [212 °F] ■ 0.1 > 100 °C [> 212 °F]
Units	Adjustable via menu ■ °C ■ °F

Communication	
Interface	RS-485 to USB
Communications protocol	Modbus® RTU
	Details and further possibilities on request
Baud rate	9600

Voltage supply and performance data				
Model	CTD9100-COOL	CTD9100-165	CTD9100-450	CTD9100-650
Operating voltage ¹⁾	AC 100 ... 230 V 50/60 Hz	AC 100 ... 230 V 50/60 Hz	AC 230 V 50/60 Hz	■ AC 230 V, 50/60 Hz ²⁾ ■ AC 100 ... 240 V, 50/60 Hz ³⁾
Power consumption	555 VA	375 VA	2,000 VA	1,000 VA
Fuse	6.3 A slow blow fuse (at AC 250 V)	6.3 A slow blow fuse (at AC 250 V)	10 A slow blow fuse	■ 10 A slow blow (at AC 110 V) ■ 6.3 A slow blow (at AC 230 V)
Power cord	■ Europe ■ USA/Canada ■ Switzerland ■ UK			

- 1) Protective conductor (PE) must be available.
2) Instrument version available with wide-range power supply unit.
3) The auxiliary power AC 115 V must be specified with the order, otherwise AC 230 V will be assumed.

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]
Humidity	< 80 % to 31 °C [88 °F], decreasing linearly to 50 % at 40 °C [104 °F]
Condensation	Non-condensing
Pollution degree per IEC 61010-1	2
Overvoltage category	II
Mounting position	Upright/Vertical standing

Approvals

Logo	Description	Region
	EU declaration of conformity	European Union
	EMC Directive EN 61326 emission (group 1, class B) and immunity (industrial environment)	
	Low Voltage Directive	
	RoHS directive	

Certificates

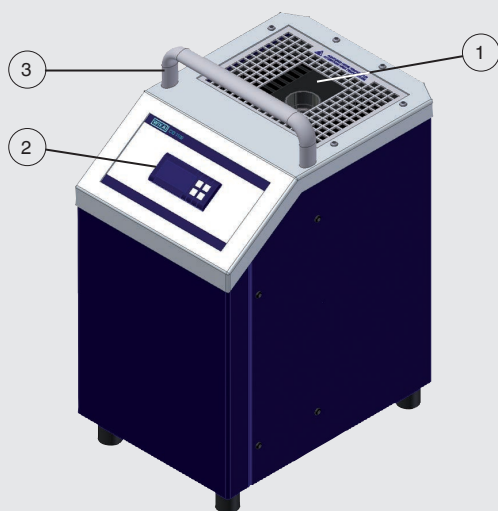
Description	
Calibration ¹⁾	■ 3.1 inspection certificate per EN 10204 ■ DAkkS calibration certificate (traceable and accredited in accordance with ISO/IEC 17025)
Recommended calibration interval	1 year (dependent on conditions of use)

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

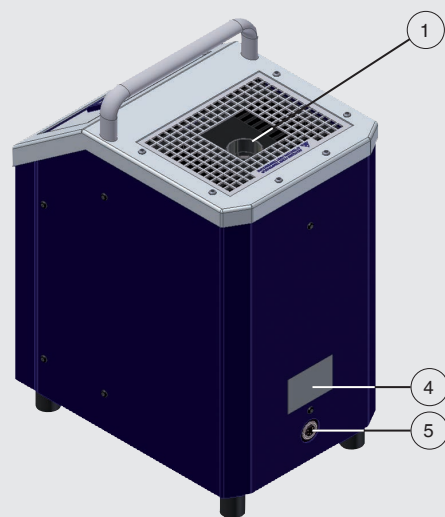
→ For approvals and certificates, see website

Isometric views

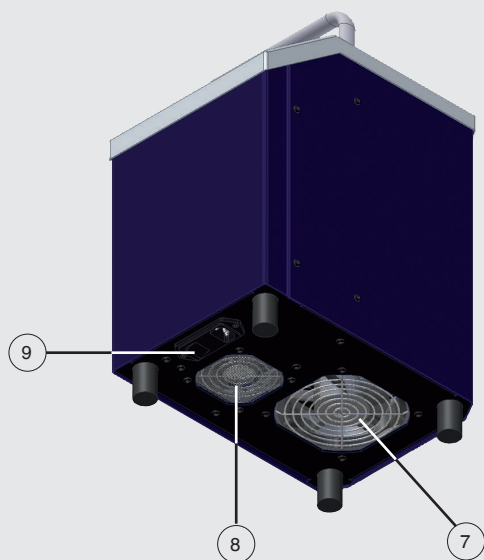
View from the front



View from the rear



View from below

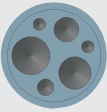


- ① Temperature dry well
- ② Digital display with controller/display with touchscreen
- ③ Carrying handle
- ④ Product label
- ⑤ RS-485 interfaces
- ⑥ Fan 1: ventilation for tank or temperature dry well cooling
- ⑦ Fan 2: ventilation for case cooling
- ⑧ Mains connection socket with main switch and microfuse

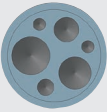
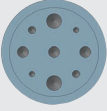
Accessories and spare parts

Accessories for model CTD9100-xxxx ¹⁾		Order code
Description		CTX-A-K1
	Transport case	-TB-
	Castors for transport case	-CC-
	Power cord EU	-EU-
	Switzerland	-CH-
	USA/Canada	-US-
	UK	-UK-
	Insert replacement tool	-RT-
-	Interface cable With integrated RS-485 to USB 2.0 converter	-RC-
	Calibration software Software package for operating the calibrator	-CS-
-	Probe holder For cooling instruments of the CTD9xxx series	-FL-
	Probe holder For CTD9xxx series heating instruments	-FH-
Ordering information for your enquiry:		
1. Order code: CTX-A-K 2. Option:		↓ []

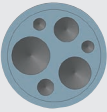
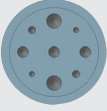
¹⁾ The figures are an example and may change in design, material composition and representation depending on the state of the art.

Inserts for model CTD9100-COOL and CTD9100-165 ¹⁾		Order code
Description		CTA9I-K
	Inserts undrilled Dimension: Ø 28 x 150 mm [Ø 1.1 x 5.91 in] Material: aluminium 3.2315	-N-
	Inserts drilled Dimension: Ø 28 x 150 mm [Ø 1.1 x 5.91 in] Drilling depth: 145 mm [5.71 in] Material: aluminium 3.2315	
	For thermometers to Ø 1.2 mm [0.05 in] Bore diameter: 1 x 1.5 mm [0.06 in]	-1-
	For thermometers to Ø 1.6 mm [0.07 in] Bore diameter: 1 x 2.0 mm [0.08 in]	-2-
	For thermometers to Ø 2.7 mm [0.11 in] Bore diameter: 1 x 3.0 mm [0.12 in]	-3-
	For thermometers to Ø 3.2 mm [0.13 in] Bore diameter: 1 x 3.5 mm [0.14 in]	-4-
	For thermometers to Ø 4.7 mm [0.19 in] Bore diameter: 1 x 5.0 mm [0.20 in]	-5-
	For thermometers to Ø 6.3 mm [0.25 in] Bore diameter: 1 x 6.5 mm [0.26 in]	-6-
	For thermometers to Ø 7.2 mm [0.28 in] Bore diameter: 1 x 7.5 mm [0.30 in]	-7-
	For thermometers to Ø 8.2 mm [0.32 in] Bore diameter: 1 x 8.5 mm [0.33 in]	-8-
	For thermometers to Ø 9.5 mm [0.37 in] Bore diameter: 1 x 10 mm [0.39 in]	-9-
	For thermometers to Ø 3.2 mm [0.13 in] Bore diameter: 1 x 5 mm and 1 x 3.5 mm [1 x 0.20 in and 1 x 0.14 in]	-I-
	For thermometers to Ø 6.3 mm [0.25 in] Bore diameter: 1 x 5 mm and 1 x 6.5 mm [1 x 0.20 in and 1 x 0.26 in]	-X-
	Bore diameter: 1 x 3.2 mm and 1 x 6.3 mm [1 x 0.13 in and 1 x 0.25 in]	-A-
	Bore diameter: 2 x 3.2 mm, 1 x 4.2 mm, 1 x 6.3 mm, 1 x 8.4 mm and 1 x 9.9 mm [2 x 0.13 in, 1 x 0.17 in, 1 x 0.25 in, 1 x 0.33 in and 1 x 0.39 in]	-B-
	Bore diameter: 2 x 3.2 mm, 2 x 4.3 mm, 3 x 6.3 mm and 2 x 8.5 mm [2 x 0.13 in, 2 x 0.17 in, 3 x 0.25 in and 2 x 0.33 in]	-M-
-	Customer-specific, special probes are possible on request.	-?-
	Insert replacement tool	-J-
Ordering information for your enquiry:		
1. Order code: CTA9I-K 2. Option:		↓ []

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

Inserts for models CTD9100-165-X and CTD9100-450 ¹⁾		Order code
Description		CTA9I-M
	Inserts undrilled Dimension: Ø 60 x 150 mm [Ø 2.36 x 5.91 in] Material: aluminium 3.4365	-N-
	Inserts drilled Dimension: Ø 28 x 150 mm [Ø 1.1 x 5.91 in] Drilling depth: 145 mm [5.71 in] Material: aluminium 3.4365	
	For thermometers to Ø 1.2 mm [0.05 in] Bore diameter: 1 x 1.5 mm [0.06 in]	-1-
	For thermometers to Ø 1.6 mm [0.07 in] Bore diameter: 1 x 2.0 mm [0.08 in]	-2-
	For thermometers to Ø 2.7 mm [0.11 in] Bore diameter: 1 x 3.0 mm [0.12 in]	-3-
	For thermometers to Ø 3.2 mm [0.13 in] Bore diameter: 1 x 3.5 mm [0.14 in]	-4-
	For thermometers to Ø 4.7 mm [0.19 in] Bore diameter: 1 x 5.0 mm [0.20 in]	-5-
	For thermometers to Ø 6.3 mm [0.25 in] Bore diameter: 1 x 6.5 mm [0.26 in]	-6-
	For thermometers to Ø 7.2 mm [0.28 in] Bore diameter: 1 x 7.5 mm [0.30 in]	-7-
	For thermometers to Ø 8.2 mm [0.32 in] Bore diameter: 1 x 8.5 mm [0.33 in]	-8-
	For thermometers to Ø 9.5 mm [0.37 in] Bore diameter: 1 x 10 mm [0.39 in]	-9-
	For thermometers to Ø 3.2 mm [0.13 in] Bore diameter: 1 x 5 mm and 1 x 3.5 mm [1 x 0.20 in and 1 x 0.14 in]	-I-
	For thermometers to Ø 6.3 mm [0.25 in] Bore diameter: 1 x 5 mm and 1 x 6.5 mm [1 x 0.20 in and 1 x 0.26 in]	-X-
	Bore diameter: 1 x 3.2 mm and 1 x 6.3 mm [1 x 0.13 in and 1 x 0.25 in]	-A-
	Bore diameter: 2 x 3.2 mm, 1 x 4.2 mm, 1 x 6.3 mm, 1 x 8.4 mm and 1 x 9.9 mm [2 x 0.13 in, 1 x 0.17 in, 1 x 0.25 in, 1 x 0.33 in and 1 x 0.39 in]	-B-
	Bore diameter: 2 x 3.2 mm, 2 x 4.2 mm, 3 x 6.3 mm and 2 x 8.5 mm [2 x 0.13 in, 2 x 0.17 in, 3 x 0.25 in and 2 x 0.33 in]	-M-
-	Customer-specific, special probes are possible on request.	-?-
	Insert replacement tool	-J-
Ordering information for your enquiry:		
1. Order code: CTA9I-M 2. Option:		↓ []

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

Inserts for model CTD9100-650 ¹⁾		Order code
Description		CTA9I-L
	Inserts undrilled Dimension: Ø 28 x 150 mm [Ø 1.1 x 5.91 in] Material: brass 2.0375	-N-
	Inserts drilled Dimension: Ø 28 x 150 mm [Ø 1.1 x 5.91 in] Drilling depth: 145 mm [5.71 in] Material: brass 2.0375	
	For thermometers to Ø 1.2 mm [0.05 in] Bore diameter: 1 x 1.5 mm [0.06 in]	-1-
	For thermometers to Ø 1.6 mm [0.07 in] Bore diameter: 1 x 2.0 mm [0.08 in]	-2-
	For thermometers to Ø 2.7 mm [0.11 in] Bore diameter: 1 x 3.0 mm [0.12 in]	-3-
	For thermometers to Ø 3.2 mm [0.13 in] Bore diameter: 1 x 3.5 mm [0.14 in]	-4-
	For thermometers to Ø 4.7 mm [0.19 in] Bore diameter: 1 x 5.0 mm [0.20 in]	-5-
	For thermometers to Ø 6.3 mm [0.25 in] Bore diameter: 1 x 6.5 mm [0.26 in]	-6-
	For thermometers to Ø 7.2 mm [0.28 in] Bore diameter: 1 x 7.5 mm [0.30 in]	-7-
	For thermometers to Ø 8.2 mm [0.32 in] Bore diameter: 1 x 8.5 mm [0.33 in]	-8-
	For thermometers to Ø 9.5 mm [0.37 in] Bore diameter: 1 x 10 mm [0.39 in]	-9-
	For thermometers to Ø 3.2 mm [0.13 in] Bore diameter: 1 x 5 mm and 1 x 3.5 mm [1 x 0.20 in and 1 x 0.14 in]	-I-
	For thermometers to Ø 6.3 mm [0.25 in] Bore diameter: 1 x 5 mm and 1 x 6.5 mm [1 x 0.20 in and 1 x 0.26 in]	-X-
	Bore diameter: 1 x 3.2 mm and 1 x 6.3 mm [1 x 0.13 in and 1 x 0.25 in]	-A-
	Bore diameter: 2 x 3.2 mm, 1 x 4.2 mm, 1 x 6.3 mm, 1 x 8.4 mm and 1 x 9.9 mm [2 x 0.13 in, 1 x 0.17 in, 1 x 0.25 in, 1 x 0.33 in and 1 x 0.39 in]	-B-
	Bore diameter: 2 x 3.2 mm, 2 x 4.2 mm, 3 x 6.3 mm and 2 x 8.5 mm [2 x 0.13 in, 2 x 0.17 in, 3 x 0.25 in and 2 x 0.33 in]	-M-
-	Customer-specific, special probes are possible on request.	-?-
	Insert replacement tool	-J-
Ordering information for your enquiry:		
1. Order code: CTA9I-L 2. Option:		↓ []

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

Scope of delivery

- Temperature dry-well calibrator model CTD9100
- Power cord 1.5 m [5 ft]
- Operating instructions
- Calibration certificate

Ordering information

Calibrator CTD9100-COOL and CTD9100-450

Model / Unit / Software / Calibration / Transport case / Interface converter / Power cord / Insert / Additional ordering information

Calibrator CTD9100-165

CTD9100-165 / Sleeve diameter / Unit / Software / Calibration / Transport case / Interface converter / Power cord / Insert / Additional ordering information

Calibrator CTD9100-650

CTD9100-650 / Auxiliary power / Unit / Protective conductor / Software / Calibration / Transport case / Interface converter / Power cord / Insert / Additional ordering information

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