PTC165

PTC165i Integrated measuring instrument

Temperature calibrators PTC165 & PTC165i

Premium TC multi-function -35–165°C (-31–329°F)

Premium TCs

The calibrators of the Premium TC series are characterised by their unparalleled performance and outstanding ease of operation. By means of the intuitive menu structure, all necessary inputs can be made quickly and easily. The large touch screen has plenty of room to display the reference, target and devices under test temperatures. At the end of a calibration process, the Premium TC provides the complete calibration certificate. The continuously growing bandwidth of supported temperature ranges supports an increasing number of temperature sensors on the market. They can be calibrated with a resolution of up to 0.001°C / K and thus meet the highest requirements, e.g. of the food and pharmaceuticals industry.

PTC165 & PTC165i highlights

- Patented control technology - Fastest stabilisation times on the market - Time savings of up to 50 %
- Four functions in one calibrator (dry block / calibration bath / infrared / surface)
- Large calibration volume / large calibration insert for simultaneous calibration of many devices under test
- Patented touch screen function for simple and convenient operation
- Automatic generation of the calibration certificate
- Optional as pharmaceutical and food industry version with stainless steel housing
- Accessories: device under test management with barcode scanner
- Available with integrated measuring instrument → PTC165i

Druck
a Baker Hughes business

Druck temperature calibrators

Druck temperature calibrators are used for the verification of the functionality and calibration of temperature measuring devices and temperature sensors with a special focus on long-term reliability and utmost accuracy in combination with easy operation.

Every Druck temperature calibrator is meticulously tested for accuracy and stability. This is attested by our standard calibration certificate, which we issue with every temperature calibrator, or by means of an optional ISO 17025 calibration certificate. This is to guarantee that you receive a perfect product which can be traced back to national and international temperature measurement standards.
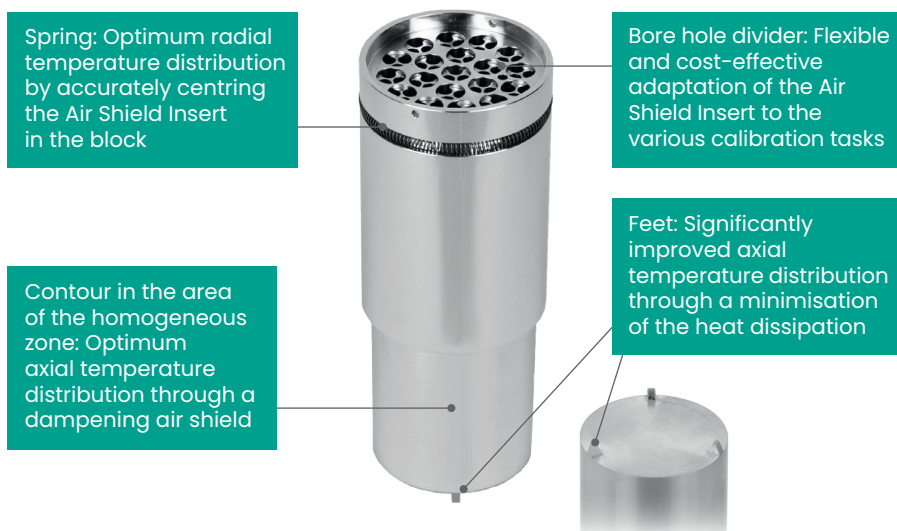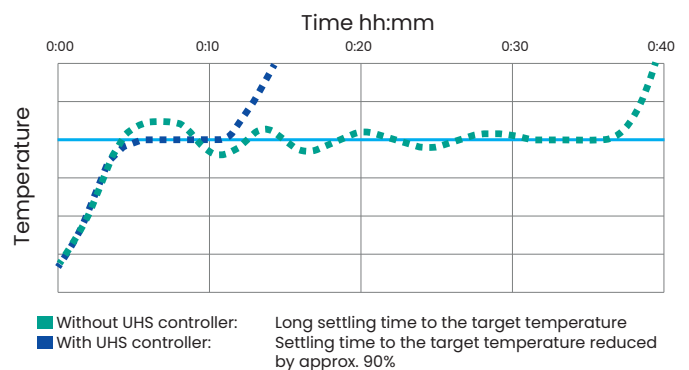
Features

Four functions in one temperature calibrator

- Covering all calibration tasks with only one model: Dry block, infrared and surface calibration as well as calibration by means of a calibration bath
  → Cost savings due to a reduction in the number of versions required

- Quick and easy change between the calibration functions

- Additional calibration functions for your application
  → Dry block for aseptic sensors
  → Air Shield Insert for the best measurement uncertainties
  → Different media for liquid calibration

Dry block calibration	Calibration bath	Infrared calibration	Surface calibration

Temperature control with ultra high speed (UHS) controller

- Temperature regulator with model-based state control

- Special regulation algorithm based on knowledge and experience from space travel

- Unique temperature stability of < 0.001 °C / K

- Anticipatory activation of the heating and cooling elements
  → The settling time to the target temperature is reduced by approx. 90% at each calibration point
 → Time savings of up to 50% with each calibration process

Time hh:mm

Without UHS controller: Long settling time to the target temperature
With UHS controller: Settling time to the target temperature reduced by approx. 90%

Air shield insert

- Patented dry block version with optimum radial and axial temperature distribution

- Automatic centring of the air shield insert in the block
  → User errors due to jiggling or twisting are excluded

Spring: Optimum radial temperature distribution by accurately centring the Air Shield Insert in the block

Bore hole divider: Flexible and cost-effective adaptation of the Air Shield Insert to the various calibration tasks

Feet: Significantly improved axial temperature distribution through a minimisation of the heat dissipation

Contour in the area of the homogeneous zone: Optimum axial temperature distribution through a dampening air shield

Features

Druck OS with touch screen

• Simple operation of the temperature calibrator via the integrated 7" touch screen
  → Intuitive operation of the calibration functions
  → Management of calibration data directly on the calibrator

• Clear display
  → All important information at a glance

• Completely paperless calibration
  → Value calculation and transmission errors are excluded

• Glass surface made of multi-panel safety glass
  → Extremely robust against damage
  → Easy cleaning of the surface
  → Suitable for use in the food industry
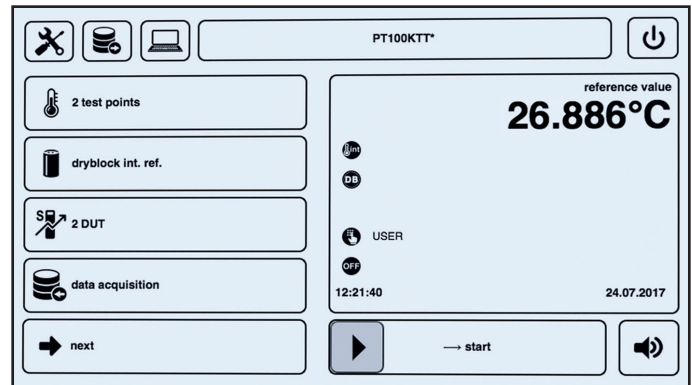
Automatic calibration with camera

In calibration processes for devices under test with their own temperature display, the display of the DUT must be read for each calibration point. The read value is transferred by the user to the calibrator or the calibration certificate, and the subsequent calibration point is only approached after a manual acknowledgement. For this purpose, the user must return to the calibrator at each calibration point. In some cases, this can lead to long delays if the user carries out other tasks in between. With our automatic calibration with a camera, these time-intensive intermediate steps are no longer needed:

• The patented camera system automatically creates a recording of the DUT display at each calibration point. The subsequent calibration point is approached directly afterwards
  → No user interaction is required during the calibration process, as it is implemented automatically
  → All test points are approached without waiting times

• Upon completion of the entire calibration process, the user transmits the data of the created display records to the calibrator or calibration certificate
  → During the entire calibration process, the user is free to carry out other tasks

• The visual records of the device under test display at each calibration point are saved and attached to the calibration certificate as verification

Technical data

PTC165 / PTC165i				
Temperature range	–35...165 °C at ambient temperature 20 °C		–31...329 °F at ambient temperature 68 °F	
	See the respective calibration function for details.			
Dimension for the calibration insert	Ø 60 x 170 mm (calibration insert easily exchangeable)			
Dry block Air Shield Insert Temperature range: –30...160 °C (–22...320 °F)	**External reference temperature sensor**			
Display accuracy	±0.07 °C		±0.126 °F	
Temperature stability	±<0.001...0.005 °C		±0.0018...0.009 °F	
Temperature distribution → Axial → Radial	±0.060 °C ±0.010 °C		±0.108 °F ±0.018 °F	
Influence of load	±0.010 °C		±0.018 °F	
Dry block Temperature range: –30...165 °C (–22...329 °F)	**External reference temperature sensor**		**Internal reference temperature sensor**	
Display accuracy	±0.10 °C	±0.18 °F	±0.27 °C	±0.486 °F
Temperature stability	±0.005 °C	±0.009 °F	±0.010 °C	±0.018 °F
Temperature distribution → Axial → Radial	±0.200 °C ±0.050 °C	±0.36 °F ±0.09 °F	±0.200 °C ±0.050 °C	±0.36 °F ±0.09 °F
Influence of load	±0.080 °C	±0.144 °F	±0.150 °C	**±0.27 °F**
Calibration bath (stirred), direct filling Temperature range: –35...155 °C (–31...311 °F)	**External reference temperature sensor**		**Internal reference temperature sensor**	
Display accuracy	±0.19 °C	±0.342 °F	±0.24 °C	±0.432 °F
Temperature stability	±0.010 °C	±0.018 °F	±0.020 °C	±0.036 °F
Temperature distribution → Axial → Radial	±0.325 °C ±0.080 °C	±0.585 °F ±0.144 °F	±0.325 °C ±0.080 °C	±0.585 °F ±0.144 °F
Influence of load	±0.040 °C	±0.072 °F	±0.200 °C	±0.36 °F
Calibration bath (stirred), tub insert Temperature range: –35...155 °C (–31...311 °F)	**External reference temperature sensor**		**Internal reference temperature sensor**	
Display accuracy	±0.20 °C	±0.36 °F	±0.28 °C	±0.504 °F
Temperature stability	±0.010 °C	±0.018 °F	±0.020 °C	±0.036 °F
Temperature distribution → Axial → Radial	±0.350 °C ±0.080 °C	±0.630 °F ±0.144 °F	±0.350 °C ±0.080 °C	±0.630 °F ±0.144 °F
Influence of load	±0.040 °C	±0.072 °F	±0.300 °C	±0.54 °F
Infrared calibration Temperature range: –35...165°C (–31...329 °F)	**External reference temperature sensor**		**Internal reference temperature sensor**	
Display accuracy	±0.5 °C	±0.9 °F	±0.5 °C	±0.9 °F
Temperature stability	±0.020 °C	±0.036 °F	±0.020 °C	±0.036 °F
Emission factor	0.9994			
Surface calibration Temperature range: –25...150°C (–13...302 °F)	**External reference temperature sensor**			
Display accuracy	±1 °C		±1.8 °F	
Temperature stability	±0.150 °C		±0.27 °F	

PTC165 / PTC165i			
Stabilisation time (with external reference temperature sensor)			
→ to ±0.05ºC → to ±0.005ºC	→ to ±0.09 ºF → to ±0.009 ºF	From 1 min From 5 min	
Heating time			
→ 20 ºC...155 ºC → −35 ºC...155 ºC	→ 68...311 ºF → −31...311 ºF	27 min 34 min	
Cooling time			
→ 165 ºC...30 ºC → 20 ºC...−25 ºC	→ 329...86 ºF → 68...−13 ºF	17 min 35 min	
Resolution of the temperature display		0.1 / 0.01 / 0.001 ºC (selectable)	0.1/0.01/0.001 ºF (selectable)
Hysteresis		±0.010 ºC	±0.018 ºF
Temperature units		ºC / ºF / K (selectable)	
Reference temperature sensor		internal, fixed installation / external (selectable)	
Interfaces		Ethernet, 3 x USB	
Connectivity		OPC UA, serial communication, HTTP. Details and further possibilities on request.	
Dimensions			
→ Width → Height → Depth		210 mm 380 + 50 mm (Handle) 300 mm	
Weight		Approx. 13 kg	
Power supply		100...240 VAC, 50 / 60 Hz	
Power consumption		Approx. 375 W	
Adjustable temperature range		−50...165 ºC	−58...329 ºF
Display		Brilliant color touchscreen (7 inches), multi panel safety glass	
Approvals			
		CE RoHS REACH COMPLIANT	

Temperature calibrator PTC165i: integrated measuring instrument Technical data

Device under test inputs - resistance thermometers		
Number of channels	2	
Connection	4 mm safety socket, 4 per channel	
Connection type	2-, 3-, 4-wire technology	
Resistance range → Pt100 → Pt1000	0...400 Ω 0...4000 Ω	
Accuracy → Pt100 → Pt1000	±0.03 ºC ±0.06 ºC	±0.054 ºF ±0.108 ºF
Device under test inputs - thermocouple		
Number of channels	2	
Connection	2x thermocouple socket (mini)	
Measuring range	–10...100 mV	
Accuracy cold junction	±0.3 ºC	±0.054 ºF
Accuracy → Type K → Type J → Type N → Type E → Type T → Type R → Type S	±0.08 ºC ±0.07 ºC ±0.13 ºC ±0.06 ºC ±0.09 ºC ±0.78 ºC ±0.73 ºC	±0.144 ºF ±0.126 ºF ±0.234 ºF ±0.108 ºF ±0.162 ºF ±1.404 ºF ±1.314 ºF
Standard signal input (current)		
Number of channels	1	
Connection	4 mm safety socket	
Measuring range	0...24 mA	
Accuracy	0.01 % of range	
Standard signal input (voltage)		
Number of channels	1	
Connection	4 mm safety socket	
Measuring range	0...12 VDC	
Accuracy	0.01 % of range	
Switch test		
Number of channels	2	
Transmitter supply		
Output current	Max. 24 mA	
Output voltage	24 VDC	

The integrated measuring instrument in detail

Resistance thermometers, thermocouples and signals from temperature transmitters must be operated with an external measuring instrument which measures the output signals and displays them as temperature during the calibration. This temperature can then be compared to the set calibrator temperature.

Our integrated measuring instrument assumes the tasks of an external measuring instrument. It shows the temperature directly on the calibrator display and enables the fully automatic calibration of two devices under test at the same time.

Your benefits of the integrated measuring instrument at a glance:

- Temperature sensor calibration without additional measuring instrument
- Simultaneous calibration of several temperature sensors
- Fully automatic calibration and certification
- Enables the simplification of your work processes
- Offers great time savings compared to a temperature calibrator without integrated measuring instrument

The following DUTs can be connected to the integrated measuring instrument:

- Resistance thermometer (RTD): Pt100, Pt500 and Pt1000 in 2-,3- or 4-wire circuit
- Thermocouples (TC) of the types K, J, N, E, R, T, B, S, L and U
- 0(4)...20 mA current signals from temperature transmitters (mA), with and without supply voltage
- 0...10 V voltage signals
- Temperature switch (switch) with normally open and normally closed contacts

Inputs RTD A and RTD B for the connection of 2-, 3- or 4-wire resistance thermometers

Supply voltage of the DUT via the temperature calibrator

Connection via 4 mm safety sockets. All adapters are included in the scope of delivery.

TC A and TC B for the connection of thermocouple

Standard signal inputs for current and voltage signals

Input for external reference resistance thermometer

Ordering information

1. Select the model (includes traceable calibration)

2. Select 17025 accredited calibration if required

3. Select any accessories required including additional functions such as bath, infrared, etc.
   (Each model comes with kit for start up)

PTC165 & PTC165i model			
Included in Kit	**Description**		**DRUCK PN**
	Insert	1 x Ø2.0, 3x Ø3.5, 2x Ø4.5, 1x Ø6.0	IOPTC-DB-23
		External reference (-55...255 ºC) straight version	IOPTC-EXSEN-1
	Power lead	World plug and lead set	ISPTC-20

PTC165 & PTC165i certificates - options	
PTC165	
Calibration certificates	**Description**
	Factory traceable calibration (included)
	ISO 17025 accredited calibration
	PTC165i integrated measurement (IM)
	Factory traceable calibration (included)
	ISO 17025 accredited calibration
	Factory traceable calibration (included) — Complete IM calibration
	ISO 17025 accredited calibration — Complete IM calibration

PTC165 & PTC165i Optional Accessories		
Inserts	**Description**	**DRUCK PN**
	1x Ø3.5, 1x Ø6.5, 1x Ø8.5, 1x Ø10.5 mm (AI)	IOPTC-DB-8
	2x Ø3.5, 2x Ø4.5, 2x Ø6.5, 2x Ø8.5, 2x 10.5 mm (AI)	IOPTC-DB-9
	3x Ø3.5, 3x Ø6.5, 3x Ø8.5, 3x 10.5 mm (AI)	IOPTC-DB-10
	2x Ø3.5, 1x Ø4.5, 1x Ø5.0, 1x 5.5, 1x Ø6.5, 1x Ø8.5, 1x Ø9.0, 1x Ø9.5, 1x Ø10.5 mm (AI)	IOPTC-DB-11
	Without bore holes Ø60 x 170 mm (brass)	IOPTC-DB-22
	1 x Ø2.0, 3 x Ø3.5, 2 x Ø4.5, 1 x Ø6.0 mm	IOPTC-DB-23
	Without bore holes Ø60 x 170 mm (AI) air shield	IOPTC-DB-24
	Tub insert; (bath) Ø60 x 170 mm	IOPTC-BT-1
	Infrared insert Ø60 x 170 mm (AI)	IOPTC-INF-1
	Surface insert Ø60 x 170 mm (AI)	IOPTC-SURF-1
	Aseptic sensor insert Ø60 x 170 mm (AI)	IOPTC-ASEN-1
Reference	External reference sensor (-55...255 ºC) straight version	IOPTC-EXSEN-1
Connection	Camera holder for USB camera	IOPTC-CAM-1
	Camera	IOPTC-CAM-2
	Barcode scanner	IOPTC-BAR-1
	Transport case with trolley	ISPTC-22

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