



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 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

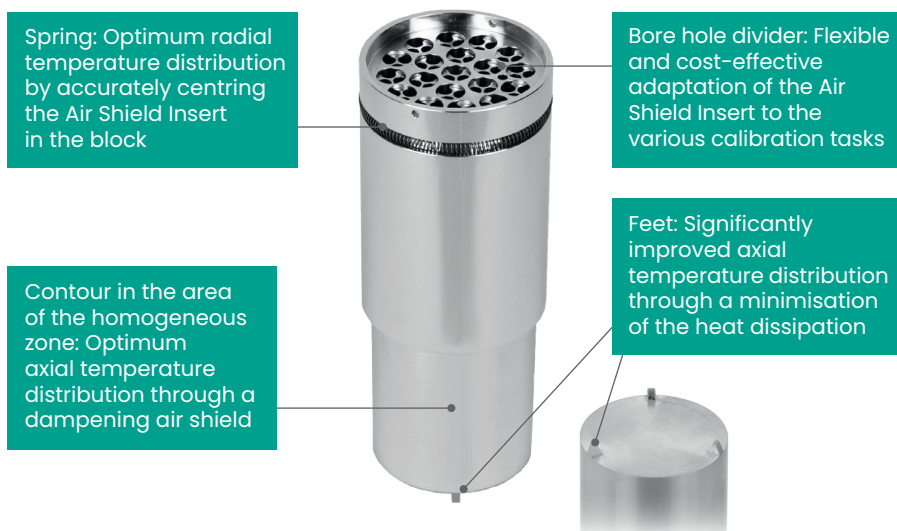
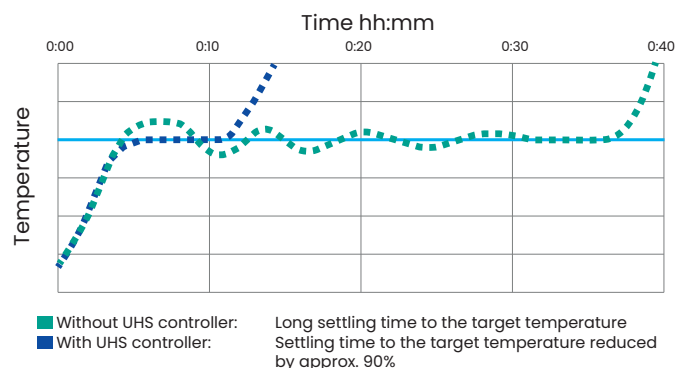
### Four functions in one temperature calibrator

- 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



## 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  $< 0.001\text{ }^{\circ}\text{C} / \text{K}$
- 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



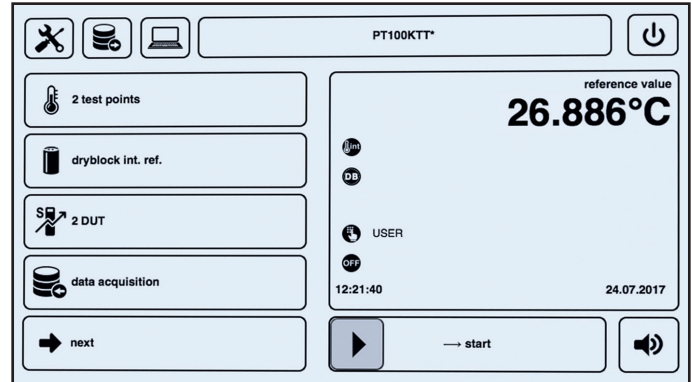
### Air shield insert

- 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

## 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 $\pm 0.05^{\circ}\text{C}$ → to $\pm 0.005^{\circ}\text{C}$	→ to $\pm 0.09^{\circ}\text{F}$ → to $\pm 0.009^{\circ}\text{F}$	From 1 min From 5 min
Heating time		
→ $20^{\circ}\text{C} \dots 155^{\circ}\text{C}$ → $-35^{\circ}\text{C} \dots 155^{\circ}\text{C}$	→ $68 \dots 311^{\circ}\text{F}$ → $-31 \dots 311^{\circ}\text{F}$	27 min 34 min
Cooling time		
→ $165^{\circ}\text{C} \dots 30^{\circ}\text{C}$ → $20^{\circ}\text{C} \dots -25^{\circ}\text{C}$	→ $329 \dots 86^{\circ}\text{F}$ → $68 \dots -13^{\circ}\text{F}$	17 min 35 min
Resolution of the temperature display	0.1 / 0.01 / 0.001 $^{\circ}\text{C}$ (selectable)	0.1 / 0.01 / 0.001 $^{\circ}\text{F}$ (selectable)
Hysteresis	$\pm 0.010^{\circ}\text{C}$	$\pm 0.018^{\circ}\text{F}$
Temperature units	$^{\circ}\text{C}$ / $^{\circ}\text{F}$ / 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	$-50 \dots 165^{\circ}\text{C}$	$-58 \dots 329^{\circ}\text{F}$
Display	Brilliant color touchscreen (7 inches), multi panel safety glass	

**Approvals**

# 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 °C ±0.06 °C	±0.054 °F ±0.108 °F
Device under test inputs - thermocouple		
Number of channels	2	
Connection	2x thermocouple socket (mini)	
Measuring range	-10...100 mV	
Accuracy cold junction	±0.3 °C	±0.054 °F
Accuracy → Type K → Type J → Type N → Type E → Type T → Type R → Type S	±0.08 °C ±0.07 °C ±0.13 °C ±0.06 °C ±0.09 °C ±0.78 °C ±0.73 °C	±0.144 °F ±0.126 °F ±0.234 °F ±0.108 °F ±0.162 °F ±1.404 °F ±1.314 °F
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



## 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 °C) straight version	
	Power lead	World plug and lead set	
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 (Al)		IOPTC-DB-8
	2x Ø3.5, 2x Ø4.5, 2x Ø6.5, 2x Ø8.5, 2x 10.5 mm (Al)		IOPTC-DB-9
	3x Ø3.5, 3x Ø6.5, 3x Ø8.5, 3x 10.5 mm (Al)		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 (Al)		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 (Al) air shield		IOPTC-DB-24
	Tub insert; (bath) Ø60 x 170 mm		IOPTC-BT-1
	Infrared insert Ø60 x 170 mm (Al)		IOPTC-INF-1
	Surface insert Ø60 x 170 mm (Al)		IOPTC-SURF-1
	Aseptic sensor insert Ø60 x 170 mm (Al)		IOPTC-ASEN-1
Reference	External reference sensor (-55...255 °C) 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