











# Operating manual

## Multifunction temperatur calibrator Thermator II

| Table of contents   | page |
|---|------|
| 0 About this operating manual .....   | 4    |
| 1 Device description .....  | 5    |
| 1.1 Delivery, unpacking and accessories .....   | 5    |
| 1.2 Intended use.....   | 6    |
| 1.3 Warranty.....   | 7    |
| 1.4 Exclusion of liability .....  | 7    |
| 2 Safety Instructions .....   | 8    |
| 2.1 Safety instructions for the application of calibration liquids.....   | 10   |
| 3 Construction, Function and Test Task .....  | 11   |
| 3.1 Construction .....  | 11   |
| 3.2 Function.....   | 12   |
| 3.3 Test tasks.....   | 13   |
| 4 Commissioning and operation .....   | 14   |
| 4.1 Operating conditions.....   | 14   |
| 4.2 Electrical connection.....  | 15   |
| 4.3 Preparing of the calibrator .....   | 16   |
| 4.3.1 Dry block calibrator.....   | 17   |
| 4.3.2 Calibrator for infrared thermometer .....   | 18   |
| 4.3.3 Calibrator for surface temperature sensors .....  | 19   |
| 4.3.4 Micro bath calibrator.....  | 20   |
| 4.3.5 Integrated measuring instrument.....  | 24   |
| 4.4 Switching on, cool down and switching off .....   | 24   |
| 5 User interface .....  | 26   |
| 5.1 Main window.....  | 26   |
| 5.2 Display range .....   | 27   |
| 5.3 Toolbar .....   | 28   |
| 6 Test Task.....  | 29   |
| 6.1 Select Test Task.....   | 29   |
| 6.2 Configure Test Task .....   | 29   |
| 6.2.1  Name of Test Task .....           | 29   |
| 6.2.2  Data Acquisition .....            | 30   |
| 6.2.3  Functionality .....               | 30   |
| 6.2.4  Test Points .....                 | 32   |
| 6.2.5  Alarm Settings .....              | 34   |
| 6.2.6  Barcode .....                     | 34   |
| 7 Calibrator Setup.....   | 35   |
| 7.1  Configure network .....             | 35   |
| 7.2  Configure Presentation Format ..... | 36   |
| 8 Testing process / Calibration .....   | 37   |
| 8.1 Before the testing process.....   | 37   |
| 8.2 Start testing process.....  | 37   |
| 8.3 Cancel testing process .....  | 38   |
| 8.4 After the testing process.....  | 38   |
| 9 Manage measurement logs .....   | 39   |
| 10 Troubleshooting.....   | 40   |

|        |                                   |    |
|--------|-----------------------------------|----|
| 11     | Maintenance and cleaning.....     | 41 |
| 11.1   | Maintenance.....                  | 41 |
| 11.2   | Cleaning.....                     | 42 |
| 11.3   | Recalibration.....                | 44 |
| 11.4   | Adjustment.....                   | 44 |
| 12     | Decommissioning and disposal..... | 45 |
| 13     | Technical data.....               | 46 |
| 13.1   | Characteristics Thermator II..... | 47 |
| 13.2   | General characteristics.....      | 49 |
| 13.3   | Heating up and cooling times..... | 50 |
| 13.3.1 | Thermator II.....                 | 50 |

**Please keep this operating manual for future reference.**

**If the device is resold, please provide the operating manual along with it.**

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## 0 About this operating manual

- The operating manual is aimed at specialists and semi-skilled personnel.
- Before each step, read through the relevant advice carefully and keep to the specified order.
- Thoroughly read and understand the information in the section "Safety Instructions".
- For calibrators with a cooling function, the term "Cooling" is also used for temperatures below room temperature, in the meaning of "Heating".

If you have any problems or questions, please contact your supplier or contact us directly at:

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info@testotis.com • www.testotis.com

### Hazard signs and other symbols used:



**CAUTION! Electric current!**

This sign indicates dangers which could arise from handling of electric current.



**WARNING! / CAUTION! Risk of injury!**

This sign indicates dangers that cause personal injuries that can lead to health defects or cause considerable damage to property.



**CAUTION! High temperature!**

This sign indicates dangers resulting from high temperature that can lead to health defects or considerable damage to property.



**CAUTION! Material damage!**

This sign indicates actions which could lead to possible damage to material or environmental damage.



**ADHERE TO OPERATING MANUAL!**



**NOTICE!**

This symbol indicates important notices, tips or information.



**NO DOMESTIC WASTE!**

The device must not be disposed of together with domestic waste.



Pay attention to and comply with information that is marked with this symbol.



Follow the specified instructions and steps. Adhere to the given order.



Check the specified points or notices.



Reference to another section, document or source.



Item.

## 1 Device description

The Thermator series of calibrators test and calibrate different temperature measuring instruments and temperature sensors.

The calibrator can be very easily operated using the touch-sensitive screen or touch screen. Pre-defined or self-defined testing tasks, by which the testing process is governed, are employed for this purpose.

The portable instruments are of compact and robust construction and thus allow use directly on-site or in a laboratory. The calibrators meet the requirements of EN 61326-1, class A (industrial sector).

This Thermator series is used for service purposes and for different industrial and laboratory tasks.

### **Type plate:**

You find the type plate on the rear of the device.

It includes the type designation, the serial number and the key electric specifications.

### 1.1 Delivery, unpacking and accessories

All units have been carefully checked for their operational reliability before shipment.

- Immediately after receipt, please check the outer packaging for damages or any signs of improper handling.
- Report any possible damages to the forwarder and your responsible sales representative. In such a case, state a description of the defect, the type and the serial number of the device.  
Report any in-transit damage immediately. Damage reported at a later date shall not be recognized.

**Unpacking:**

- ↪ Carefully unpack the unit to prevent any damage.
- ↪ Check the completeness of the delivery based on the delivery note.



Save the packaging!

Temperature calibrators are delivered in special protective packaging.

- ↪ Save the packaging for returning the instrument safely to the manufacturer for recalibration or repair.

**Scope of delivery and accessories:**

| Scope of delivery  | Accessories (optional)  |
|--|---|
| <input type="checkbox"/> Thermator according to the order data.<br><input type="checkbox"/> Test certificate.<br><input type="checkbox"/> Mains cable.<br><input type="checkbox"/> Sleeve exchange tool.<br><input type="checkbox"/> Protective packaging / transport protection.<br><input type="checkbox"/> Sensor cage*.<br><input type="checkbox"/> Transport cover*.<br><input type="checkbox"/> Magnetic stirrer with magnet lifter*.<br><input type="checkbox"/> Work cover with 5 Silicone plugs*. | <input type="checkbox"/> Transport case.<br><input type="checkbox"/> Adapter sleeve(s).<br><input type="checkbox"/> Infrared insert*.<br><input type="checkbox"/> Surface insert and exchange tool*.<br><input type="checkbox"/> Tub insert*.<br><input type="checkbox"/> External reference sensor TF 255-3-300.<br><input type="checkbox"/> DAkkS certificate.<br><input type="checkbox"/> Works certificate. |

**IMPORTANT!**

- ↪ Use the type plate to check if the delivered unit corresponds to your order.
- ↪ In particular, for devices with electrical components, check to see if the correct power supply voltage is specified.

**1.2 Intended use**

The Thermator series of calibrators may only be used for testing and calibration of suitable temperature measuring instruments, temperature sensors and for measuring temperatures.

The calibrators may not be used for warming up or heating other parts or gases.

The calibrators have been designed for indoor use only.

The micro baths may only be used with suitable media. Permitted liquids are silicone oils, mineral oils and water (→ § 2.1 "Safety instructions for the application of calibration liquids"). Hazardous media (flammable or explosive liquids or gases) may not be used.

The operational safety of the device supplied is only guaranteed by intended use. The specified limits (→ § 13 "Technical data") may under no circumstances be exceeded.

---

**CAUTION! Risk of burns!**

The calibrator can become very hot when in operation. Touching hot parts can result in serious injuries.



- ↪ Never touch the metal block, the tank, the adapter sleeve or the test specimen at temperatures above 35 °C or below 10 °C.
- ↪ Allow the calibrator to cool before you remove the test specimen, clean the tank, change the adapter sleeve or the calibration insert or switch off the calibrator.

---

**CAUTION! Material damage!**

The opening in the metal block of the calibrator is only intended to be used with adapter sleeves or calibration inserts.



Using heat transfer media (oil, thermal paste or other media) can lead to incorrect measurements and damage to the calibrator.

- ↪ Never fill the metal block opening with a heat transfer medium.
- ↪ Only micro baths are suitable for use with heat transfer medium.

---

It is your responsibility to select the instrument which is suitable for your specific application, to connect it correctly, to carry out tests and to maintain all the components.

### 1.3 Warranty

The calibrator is under guarantee for 12 months as from the date of delivery for construction errors or material defects. The guarantee is limited to repair or replacing the calibrator.

Opening the calibrator, unauthorised repairs or incorrect use or installation of the calibrator automatically result in the warranty being rendered null and void.

### 1.4 Exclusion of liability

We accept no liability for any damage or malfunctions resulting from incorrect installation, inappropriate use of the device or failure to follow the instructions in this operating manual.

## 2 Safety Instructions



Before you install the Thermator, read through this operating manual carefully. If the instructions contained within are not followed, in particular the safety guidelines, this could result in danger for people, the environment, and the device and the system it is connected to.

The Thermator corresponds to the state-of-the-art technology. This concerns the accuracy, the operating mode and the safe operation of the device.

In order to guarantee that the device operates safely, the operator must act competently and be conscious of safety issues.

The producer provides support for the use of its products either personally or via relevant literature. The customer verifies that our product is fit for purpose based on our technical information. The customer performs customer-specific and application-specific tests to ensure that the product is suitable for the intended use. With this verification all hazards and risks are transferred to our customers; our warranty is not valid.

### Qualified personnel:

- ⚠ The personnel in charge of the installation, operation and maintenance of the Thermator must hold a relevant qualification. This can be based on training or relevant instructions. Personnel must be aware of this operating manual and have access to it at all times.

### General safety instructions:

- ⚠ In all work, the existing national regulations for accident prevention and safety in the workplace must be complied with. Any internal regulations of the operator must also be complied with, even if these are not mentioned in this manual.
- ⚠ Ensure that the complete operating instructions are always available in excellent condition at the calibrator installation site.
- ⚠ Degree of protection according to EN 60529:  
Ensure that the ambient conditions at the site of use does not exceed the requirements for the stated protection rating (→ § 13.2 "General characteristics").
- ⚠ Structural safety in accordance with EN 61010-1:  
The calibrator must be installed in such a way that the requirements for structural safety are met.
- ⚠ Only use the Thermator if it is in perfect condition. Damaged or faulty devices must be checked without delay and, if necessary, replaced.  
If problems cannot be cleared, immediately shut down the calibrator and ensure that it cannot be started up accidentally.
- ⚠ Never leave the calibrator unattended when it is in operation or in the cooling phase.
- ⚠ Do not remove or destroy type plates or other markings on the device, or the warranty is rendered null and void.



**Special safety instructions:****⚠ Thermal fuse!**

The calibrator is equipped with a temperature fuse that works independently. If there is an over-temperature in the inside of the housing, the power supply to the heating system is cut off. The calibrator cannot then be started any more.

↳ After it has cooled, send the calibrator for inspection to the producer.

**⚠ Risk of injury from hazardous gases!**

When liquids are heated, the evaporation can result in dangerous gases being formed.

**⚠ The calibrator may not be used in an explosion-endangered atmosphere (ignitable or explosive atmosphere).**

↳ Remove all the easily flammable media from the vicinity of the calibrator.

↳ Ensure that the calibrator cannot come in contact with easily flammable or explosive media.

**⚠ Operate the calibrator only in the temperature range permissible for the test sample.****⚠ Ensure that the test sample is securely fixed in the calibrator.**

↳ Use only suitable adapter sleeves or calibration inserts.

When doing so, also ensure that the structural safety of the calibrator is retained.

**⚠ Expert mode!**

When selecting the function, test sample and testing tasks, you can switch into the expert mode for administration and configuration. The settings that are made in this mode require detailed knowledge of the calibration and method of working of calibrators.

If the settings are incorrect, the calibrator can get damaged!

**IMPORTANT NOTICE!**

The transport cover is equipped with a safety valve, which is activated once the pressure reaches ~1.5 bar. This can result in hot steam being released.



↳ Always unscrew the transport cover before putting the micro bath into service, in order to avoid excessive pressure.

↳ Wait until the micro calibration bath has cooled down before screwing on the transport cover.

Further warnings that are specifically relevant to individual operating procedures or activities can be found at the beginning of the relevant sections of this operating manual.

## 2.1 Safety instructions for the application of calibration liquids

- ⚠ Before using calibration liquids, read the entire safety data sheet thoroughly. Pay particular attention to the information on the physical and chemical properties.
- ⚠ Only use calibration liquids that are suitable for the required temperature range and which are not flammable.
- ⚠ Always wear safety goggles for the eyes when handling calibration liquids.

We recommend the following calibration liquids for the various temperature ranges:

| Calibration liquid                  | Calibration Range |       | Flashpoint |
|-------------------------------------|-------------------|-------|------------|
| Distilled water                     | 2...95°C          |       | none       |
| <b>Silicone oil from XIAMETER®:</b> |                   |       |            |
| PMX-200 SILICONE FLUID 5 CS         | -40°C             | 123°C | 133°C      |
| PMX-200 SILICONE FLUID 10 CS        | -35°C             | 155°C | 165°C      |
| PMX-200 SILICONE FLUID 20 CS        | 7°C               | 220°C | 230°C      |
| PMX-200 SILICONE FLUID 50 CS        | 50°C              | 270°C | 280°C      |

### Water:

- ⚠ Only use distilled water, otherwise excessive limescale and soiling will build up in the calibrator tank.

### Silicone oil:

- ⚠ Use only the silicone oil recommended here.
- ⚠ Always read the safety data sheet supplied with the silicone oil before using it.
- ⚠ Always ensure adequate ventilation when working with silicone oil, since hazardous substances can be released.
- ⚠ Prevent silicone oil from coming into contact with your eyes.
- ⚠ Since silicone oil is hygroscopic, always use the transport cover to close the calibration bath after use.

### Mineral oil:

- ⚠ The Thermator is supplied only with silicone oil.
- ⚠ Using mineral oil is possible, but must be done on your own responsibility. The danger and the risk must be borne by the customer and our warranty will be rendered null and void.
- ⚠ Please follow the safety data sheet of the mineral oil used.
- ⚠ The safety instructions for silicone oil apply analogously for mineral oils as well. The same also applies to the corresponding sections for silicone oil in this operating manual.

## 3 Construction, Function and Test Task

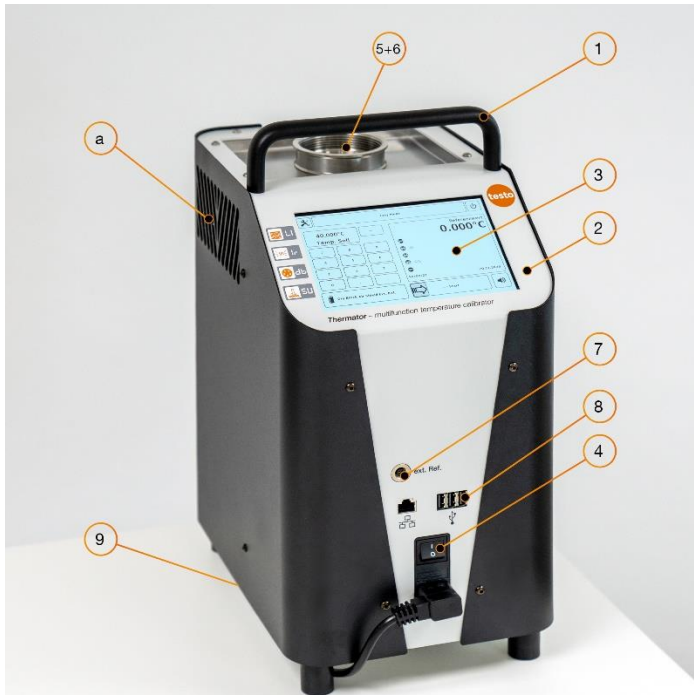
### 3.1 Construction

The most important components of the Thermator at a glance:

- ① Carrying handle.
- ② Steel housing.
- ③ Touch screen for operation and measurement value display.
- ④ Main switch with fuse and mains plug socket.
- ⑤ Tank.
- ⓐ Calibrator ventilation:  
Exhaust through lateral housing grilles.
- ⑥ Metal block (Dry block).
- ⑦ Connection for external reference.
- ⑧ Ports for PC and network.
- ⑨ Ports for PC and network.

Calibrator, bottom view:

- ⑨ Calibrator ventilation
  - ⓑ Inlet air for housing cooling.
  - ⓒ Inlet air for tank / metal block cooling.



## 3.2 Function

The calibrators can be used with dry block, infrared, surface or micro bath function. The function is determined by the used measuring insert.

### Method of working:

Adapter sleeves or calibration inserts that are suitable for the temperature sensors or temperature measuring instruments to be tested are inserted in the calibrator (→ § 4.3 "Preparing of the calibrator").

They give the test specimen a secure fit and ensure optimum heat transfer.

Once all preparations have been made, the calibrator can be switched on (→ § 4.4).

The calibrator heats or cools the metal block or tank to the set temperature. As soon as this temperature has been reached and is stable, the calibrator signals accordingly.

The calibration of the test specimen can now be carried out. Then, the next Test Point is approached or the testing procedure is ended.


### Functionality:


The measuring inserts (→ p. 16) of the calibrator have different characteristic values, which were determined in our laboratory through calibration. These characteristic values are defined at the factory and stored in the calibrator as a protected function.

To be able to use a measuring insert, the relevant function (→ § 6.2.3) must be selected.

### IMPORTANT! Protected list entries!



The functions, test specimens and test tasks marked with the  symbol are factory-defined. They can be neither deleted nor configured.

They serve as templates for your own functions, test specimens and test tasks, which are marked with the  symbol.

### 3.3 Test tasks

Test tasks are containers for defined test conditions. They are helpful for recurring testing processes, for standardising test sequences and for generating measurement logs.

All the required settings and configurations for the calibration of a test specimen are compiled in a test task. The parameters of the testing task are saved and linked to the selected function and test specimen (→ § 6).

The operation concept of the calibrator is based on pre-installed and self-defined test tasks. They are a central component of the function and operation of the Thermator.

The emphasis of the operating manual is on the use of test tasks during operation of the calibrator.

The calibrator is shipped with functions, test samples and testing tasks defined in the factory, in which the basic settings of the calibrator are stored. If desired, customer-specific test tasks can also be pre-set.

These protected test tasks can be neither deleted nor edited. They serve as templates for your own self-defined test tasks. They can be copied and can then be configured.

You can define your own test tasks for different test specimens or test sequences. These test tasks are directly saved in the calibrator and can then be easily activated. This makes quick access to recurring test tasks possible.

Upon switching on the calibrator, the first test task of the selection list is loaded automatically, with the relevant parameters.

#### **IMPORTANT! The function and test specimen are independent!**



During the configuration of test tasks (→ § 6) when selecting the function or the test sample, you can switch to the respective expert mode for administration and configuration.

↳ Note that changes to existing functions and test specimens always affect all test tasks linked to them.

## 4 Commissioning and operation

### **CAUTION! Risk of injury or material damage!**



The calibrator can become very hot during operation. If the calibrator is operated without supervision, third-party persons in the vicinity could get injured. Moreover, flammable material could get into the calibrator and cause significant damage to property.

↳ Never leave the calibrator unattended when it is in operation or in the cooling phase.

For safe operation of the Thermator, a proper commissioning procedure is necessary.

Commissioning includes the installation, the electrical connections, the preparation for the test task as well as correct switching on and off of the calibrator.

Further, a visual inspection for damage is required before use.

The required steps are described in the following sections.



### **IMPORTANT!**

Please also follow the instructions for intended use (→ § 1.2), the safety instructions (→ § 2) and the information on the ambient conditions (→ p. 49).

### 4.1 Operating conditions

Select a safe installation site for commissioning the calibrator.

#### **Installation site and operating position:**

- Only suitable for indoor use, do not use outdoors.
- Operate only in the vertical position on an even surface. The surface must be stable, clean, and dry.

If the operation positions do not conform to the above, the structural safety and the specified properties of the calibrator are not guaranteed.

- At higher testing temperatures, please use a sufficiently big, fire-resistant supporting surface.
- Sufficient clearance around the calibrator  
On the front side > 1 m, behind and to the sides > 0.5 m. Head clearance and sufficient clear space above the calibrator.
- Sufficient ventilation must be ensured.
- Do not operate in the vicinity of flammable materials.
- Do not install in a cupboard or other similar location.
- The ventilation openings must not be blocked or covered.
- The calibrator must be installed so that it can be switched off at any time.

#### **IMPORTANT! "KILL" switch!**



The plug of the mains connecting cable serves as a "KILL" switch.

- ↳ Ensure that the plug is always easily accessible and easy to reach.
- ↳ In an emergency, pull the plug, so that the calibrator is isolated from the mains.

## 4.2 Electrical connection

Check the following points before you connect the calibrator:

- Operate the calibrator only with the approved supply voltage (→ § 13.2). Ensure that the mains voltage is the same as that specified on the type plate.
- Connect the calibrator only to a properly installed and earthed 3-pole outlet.
- Do not use any extension cables or adapter plugs.

**IMPORTANT! Mains connecting cable!**

The mains connecting cable may only be replaced by an equivalent cable.



↪ Use only original supplied by cables or approved cables of the same type with the correct design as replacements (→ "Electrical characteristics").

### **ConnectThermator:**

- ↪ Connect the mains connecting cable with the connector plug of the Thermator.
- ↪ Insert the plug of the mains connecting cable in a suitable outlet.

### 4.3 Preparing of the calibrator

The preparations for the test task must be carried out with the calibrator switched off and cooled to ambient temperature.

#### CAUTION! Risk of burns!

The calibrator can become very hot when in operation. Touching hot parts can result in serious burn injuries.



- ✚ Never touch the metal block, the tank, the adapter sleeve or the test specimen at temperatures above 35 °C or below 10 °C.
- ✚ Allow the calibrator to cool before you remove the test specimen, clean the tank, change the adapter sleeve or the calibration insert or switch off the calibrator.

#### IMPORTANT! Empty the tank and clean it!

With micro bath calibrators, the tank must be emptied and cleaned to prevent the adapter sleeve or the calibration insert from getting stuck.

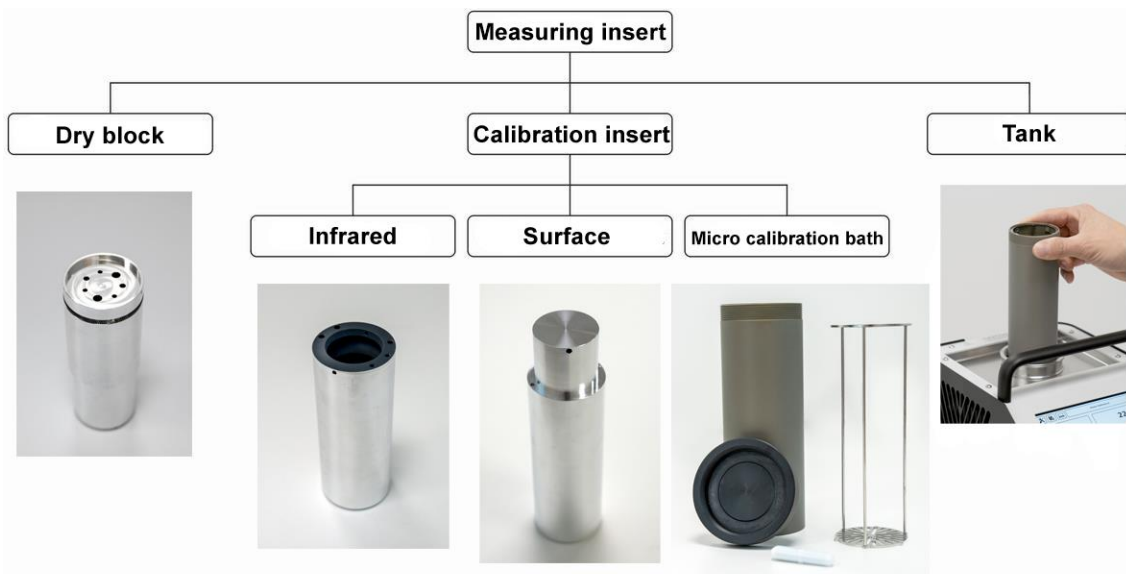


- ✚ Empty and clean the tank before you insert another adapter sleeve or calibration insert.

#### Measuring insert:

The function of the calibrator is determined by the measuring insert. The required measuring insert is inserted in the opening of the metal block or the tank.

It is thus easily possible to switch between the dry block, infrared, surface and micro bath functions.



Each measuring insert has its own characteristic values, which are defined at the factory.

These characteristic values are influenced by different factors, such as: Diameter, type and material of the measuring insert, number and diameter of the bore holes or the physical properties of the calibration liquid.

These characteristic values are stored as protected functions for the accompanying measuring inserts of the calibrator (→ § 6.2.3).

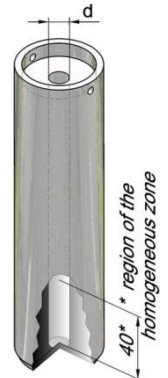


### 4.3.1 Dry block calibrator

Adapter sleeves with single or multiple holes are used for the calibration of straight temperature sensors.

To achieve the specified accuracy of the calibrators (→ § 13.2) the temperature sensor (test specimen) and the adapter sleeve must be matched to one another:

- The borehole of the adapter sleeve may be a maximum of 0.5 mm larger than the diameter of the test specimen.
- The measurement element of the test specimen must be located in the homogeneous temperature zone of the adapter sleeve.



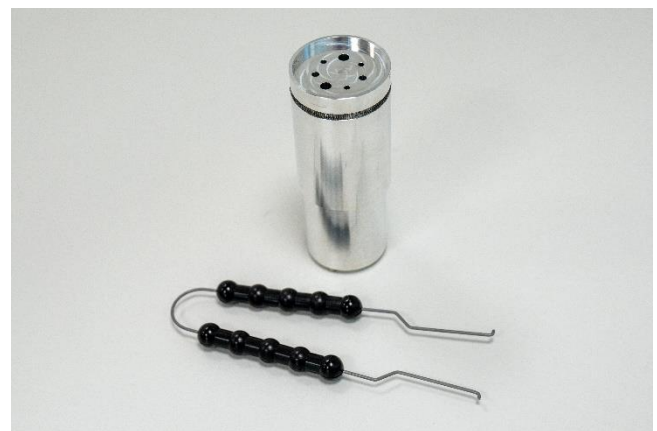
#### Inserting:

**⚠** Only use the supplied adapter sleeves made of the appropriate material. If in doubt, contact Testo Industrial Services for clarification.

↪ The appropriate adapter sleeve is inserted into the metal block with the aid of the sleeve exchange tool.

↪ **Only Air Shield Insert:**  
Push the adapter sleeve down to the stop.

↪ Center the adapter sleeve so that there is an even air gap between the adapter sleeve and the block.



Dry block insert with removal tool

#### External reference sensor (optional):

↪ Align the adapter sleeve so that the hole for the external reference sensor is located at 12 o'clock.

#### Removing and cleaning:

↪ Let the calibrator cool before you remove the adapter sleeve.

↪ Pull the adapter sleeve out of the metal block with the help of the sleeve exchange tool.

↪ Clean the adapter sleeve and the metal block.  
This prevents the adapter sleeve from getting stuck in the metal block.

### 4.3.2 Calibrator for infrared thermometer

A special infrared insert is used for the contact-less measurement infrared thermometers. This makes calibration fast and easy.

The infrared insert has a special design and surface coating on the inside. As a result, an emissivity of 0.9994 (black body) is reached.

The additional holes in the border (2 x 3.5 mm • 1 x 4.5 mm) are for external reference sensors. In this manner, the exact temperature on the inside of the infrared insert can be measured.



#### IMPORTANT! Size of the measuring spot!



The measuring spot of the infrared thermometer must project itself to the floor of the infrared insert during the calibration. The measuring spot must be smaller than the inner diameter and must not touch the wall of the infrared insert.

#### Inserting:

- ↪ The infrared insert is inserted into the metal block with the aid of the sleeve exchange tool.
- ↪ Center the infrared insert so that there is an even air gap between the infrared insert and the block.

#### External reference sensor (optional):

- ↪ Align the infrared insert so that the hole for the external reference sensor is located at 12 o'clock.

#### Removing and cleaning:

- ↪ Let the calibrator cool before you remove the infrared insert.
- ↪ Pull the infrared insert out of the metal block with the help of the sleeve exchange tool.
- ↪ Clean the infrared insert and the metal block.  
This prevents the infrared insert from getting stuck in the metal block.



Infrared insert

#### FORMATION OF ICE AND DEW!



At temperatures  $< 0\text{ }^{\circ}\text{C}$  and higher humidity levels ice or condensation can form in the infrared insert. This can result in the calibration of the infrared thermometer being distorted.

The forming of ice or condensation can be significantly reduced by covering the measuring opening of the infrared insert.

- ↪ Keep the measuring opening closed for as long as possible.
- ↪ Only open the measuring opening briefly for measuring.
- ↪ Existing ice or condensation can be removed by heating the infrared insert.

### 4.3.3 Calibrator for surface temperature sensors

A special surface insert is used for calibrating surface temperature sensors. This makes calibration fast and easy.

The surface insert is hollow from the bottom and longer than the adapter sleeve. For reference sensors, three boreholes are located directly under the surface (1 x 3mm • 1 x 3,1mm • 1 x 4,5mm). Thus, the exact surface temperature of the insert can be measured.

The two threaded boreholes in the border are for the accompanying exchange tool.

#### Inserting:

- ↪ The surface insert is inserted into the metal block with the aid of the exchange tool.
- ↪ Center the surface insert so that there is an even air gap between the surface insert and the block.



Surface insert I

#### External reference sensor (optional):

- ↪ Align the surface insert so that the hole for the external reference sensor is located at 12 o'clock.

#### Removing and cleaning:

- ↪ Let the calibrator cool before you remove the surface insert.
- ↪ Pull the surface insert out of the metal block with the help of the exchange tool.
- ↪ Clean the surface insert and the metal block.  
This prevents the surface insert from getting stuck in the metal block.

Using a multifunction calibrator, the calibration temperature is generated in a specially constructed surface insert and measured directly under the surface with an external reference thermometer.

The reference thermometer also determines the temperature of the cold spots by integrating the temperature over the sensitive length of the reference thermometer and can therefore offer a true temperature calibration of surface temperature test specimens.

The surface insert is constructed in such a way that the included external reference delivers the best possible results because the depth of the boreholes is adapted to the sensitive length. If you need to make your own external reference for a comparison calibration, ensure that the sensitive length is known and that it is situated in the middle of the calibration surface.

#### 4.3.4 Micro bath calibrator



#### CAUTION! Risk of injury - Wear safety goggles!

Calibration liquid can be ejected when working with the micro bath calibrator.

↳ Always wear safety goggles for the eyes when handling calibration liquids.

The micro bath is used for calibrating sensors with special shapes or dimensions. Direct contact between the sensor and the calibration liquid ensures excellent heat transfer.

The calibration liquid is poured directly into the tank or into a tub insert (→ p. 21).

The micro bath includes the transport cover, the work cover, the sensor cage, the magnetic stirrer, the drain syringe, the magnetic lifter and as an accessory, the tub insert. The individual components are described below.

#### Transport cover:

The transport cover serves for secure closing of the micro bath. It prevents spillage of the calibration liquid during transport.

#### CAUTION! Safety valve!



The transport cover is equipped with a safety valve, which is activated once the pressure reaches ~1.5 bar. This can result in hot steam being released.



↳ Always unscrew the transport cover before putting the micro bath into service, in order to avoid excessive pressure.

#### Work cover:

The work cover fulfils various tasks during the operation.

- It reduces the evaporation of the calibration liquid to a minimum.
- It reduces the cooling on the surface of the calibration liquid.
- It ensures stable positioning of the test specimens in the micro bath.

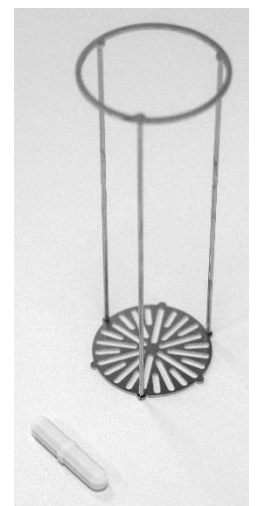


The work cover is screwed on to the micro bath and has five openings for test specimens. The unused openings can be closed with suitable silicon plugs.

#### Sensor cage and magnetic stirrer:

The sensor cage protects the magnetic stirrer. It prevents the sensors from blocking the magnetic stirrer. The function of stirring is ensured by the sensor cage.

The magnetic stirrer ensures a uniform temperature distribution in the calibration liquid. The speed of the magnetic stirrer is set in the window "Configure function" (→ § 6.2.3.2).



#### IMPORTANT! Limited life part!

The magnetic stirrer is a limited life part.

↳ Replace worn-out magnetic stirrers. (→ § 11.1 "Maintenance").

**Drain syringe and magnetic lifter:**

The drain syringe is used for pumping out the calibration liquid from the tank of the micro bath. The magnetic stirrer is removed with the help of the magnetic lifter.

Both the activities are required before another adapter sleeve or calibration insert is inserted in the calibrator.

**Tub insert (optional / accessories):**

We recommend using a tub insert if you

- frequently change between dry block, infrared, surface and micro bath function.
- frequently work with different calibration liquids.

The tub insert is placed into the tank with the help of the sleeve exchange tool.

Just like the tank, the tub insert can be closed with the associated cover. Both threaded covers are leakproof, so the calibration liquid can be left in the tank or the tub insert during transport.

**4.3.4.1 Notes on calibration liquid**

Different calibration liquids supply varying calibration results due to their specific characteristics. Adjustment to the respective calibration liquid has to be carried out by the manufacturer.

In order to achieve the best possible accuracy of a micro bath, it has to be filled with a suitable calibration liquid.

The calibration liquid is poured directly into the tank or a tub insert.

**When using water as the calibration liquid:**

- ↪ Only use distilled water, otherwise excessive limescale and soiling will build up in the tank.

**When using silicone oil as the calibration liquid:**

- ↪ Wear safety goggles for the eyes without fail when working with silicone oil!
- ↪ Use only the silicone oil recommended here.
- ↪ Always read the safety data sheet supplied with the silicone oil before using it.
- ↪ Always ensure adequate ventilation when working with silicone oil, since hazardous substances can be released.
- ↪ Spilled or leaked silicone oil results in an extreme danger of slipping. Clean the affected ranges by suitable means.
- ↪ Since silicone oil is hygroscopic, always use the associated transport cover to close the tank or the tub insert after use.

**IMPORTANT NOTICE!**

Only use clean calibration liquid. Checking temperature sensors and other temperature detection means can lead to a contamination of the calibration liquid. This contamination can lead to smeary gel effect on the bottom of the tank due to the rotation of the magnetic stirrers.

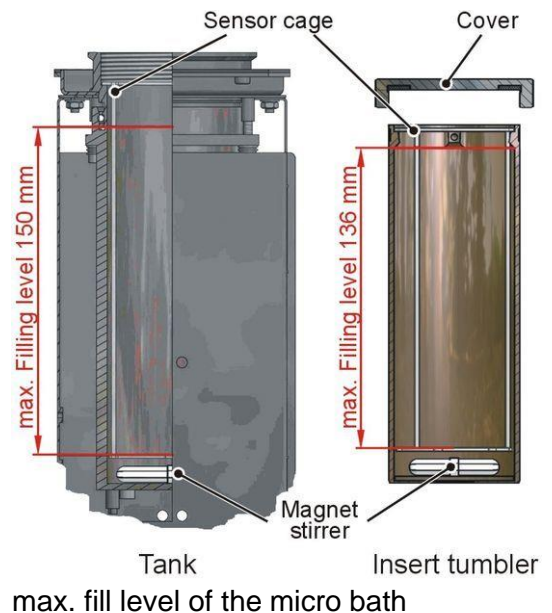
- ↻ Clean the tank.
- ↻ Clean before calibration the sensors.
- ↻ Exchange the worn magnet stirrer.
- ↻ Exchange dirty, smeary calibration fluid.

**4.3.4.2 Information on filling amounts****CAUTION! Risk of incorrect measurement or material damage!****Do not exceed the maximum fill level during operation!**

- Above the maximum fill level the heat dissipation is too great, preventing compliance with the specified tolerances.
  - Overflow of the calibration liquid causes contamination and can damage the calibrator.
- ↻ Ensure that the maximum fill level is not exceeded during operation.

The fill level in the tank or tub insert rises as a result of

- Thermal expansion  
Calibration liquids expand to varying degrees as a result of heating. The increase in fill level depends on the calibration liquid that is used and the reference temperature setting.
- Displacement by sensors  
The volume displaced by the sensors being calibrated must be taken into account in the filling amount.
- Rise due to stirring  
The rotation of the magnetic stirrer forms a whirlpool in the liquid. This raises the fill level at the wall.

**Tank:**

The maximum fill level in the tank is displayed by the upper edge of the aluminium lining.

The maximum fill level is ~0.45 litres.

**Tub insert:**

The maximum fill level with the tub insert is below the fixture for the sleeve exchange tool.

The maximum fill level is ~0.32 litres.

#### 4.3.4.3 Filling the micro bath <sup>\*1</sup>



IMPORTANT! Pay attention to § 4.3.4.2 "Information on filling amounts"!

- ↪ When filling, leave enough room for thermal expansion, displacement by sensors and level rise due to stirring.

- ↪ Unscrew the cover of the tank/ tub insert.
- ↪ Insert the tub insert in the tank using the sleeve exchange tool (only for tub insert).
- ↪ Place the magnetic stirrer in the tank / tub insert.
- ↪ Insert the sensor cage.



- ↪ Insert the test specimens in the sensor cage. This accounts for the volume of the sensors to be tested.
- ↪ Fill the calibration liquid in the tank / tub insert. Leave sufficient reserve space for an additional rise in the level.
- ↪ If necessary, remove the test specimens again.
- ↪ Screw the work cover onto the tank and insert the sensors through the work cover into the tank or tub insert.



<sup>\*1</sup> For tubs already filled, some steps are not required.

### 4.3.5 Integrated measuring instrument

Applies to calibrators with integrated measuring instrument:

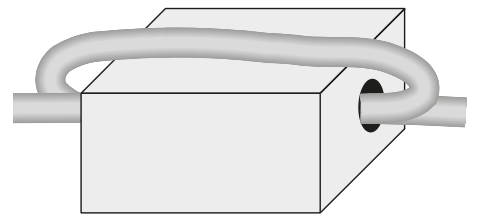
#### Connect the test specimen

- ↪ Connect the cable ends with terminal connectors or the thermocouple adapter to the appropriate inputs.
- ↪ Connect the cable screen to the earthing socket if necessary.

If your sensor cable has no cable screen and the measurement result is affected by electromagnetic interference, we recommend using a clamp-on ferrite. Clamp-on ferrites are basically suitable in which the sensor cable can be inserted with a winding and whose damping properties match the interference frequency.

#### Attach clamp-on ferrite

- ↪ Place the sensor cable with a winding in a suitable clamp-on ferrite.
- ↪ Attach the clamp-on ferrite as close as possible to the connectors of the measuring instrument and close the clamp-on ferrite.



#### Open clamp-on ferrite

- ↪ Open the clamp-on ferrite with the supplied ferrite key.

## 4.4 Switching on, cool down and switching off



### IMPORTANT!

Keep in mind the instructions and notes in the previous sections (→ § 4.1 + → § 3.3).

For reasons of safety, upon switching on the calibrator, the fan runs at the fastest speed. As soon as the internal reference has measured a safe block temperature, the fan speed is adjusted.

### IMPORTANT! Keep in mind after transport or storage!



After transport, storage or long periods of non-use, moisture can seep into the heating elements (magnesium oxide).

For drying, the calibrator must be slowly heated up. During this process, the calibrator has not yet reached the required insulation voltage for protection class I.

- ↪ For drying the heating elements, heat the calibrator for at least 15 min to 120 °C.



**Switching on:**

- ↪ Put on the main switch.
  - The fan of the device starts and the Testo logo appears on the screen.
  - The type designation and the current software version are displayed.
  - The main window is displayed and the device is ready for operation.
  - The first entry in the selection list, with its parameters, is displayed as the test task.

**Cool down the calibrator:**

To avoid injuries or material damage, it is necessary to bring the calibrator into a defined operational state.

To that end, a "Safety Temperature Value" (→ p. 34) is saved in the calibrator. Upon switching off, the calibrator will go to it via the main window.

**IMPORTANT!** Mains failure or separation from the mains!





If there is a mains failure, or if the main switch is turned off, or upon removal of the mains connection ("EMERGENCY STOP"), the built-in fan does not blow any more cooling air. Sufficient thermal de-coupling between the metal block, the tank and the housing is nonetheless guaranteed

**Switching off:****CAUTION! Before switching off, pay attention to the block temperature!**

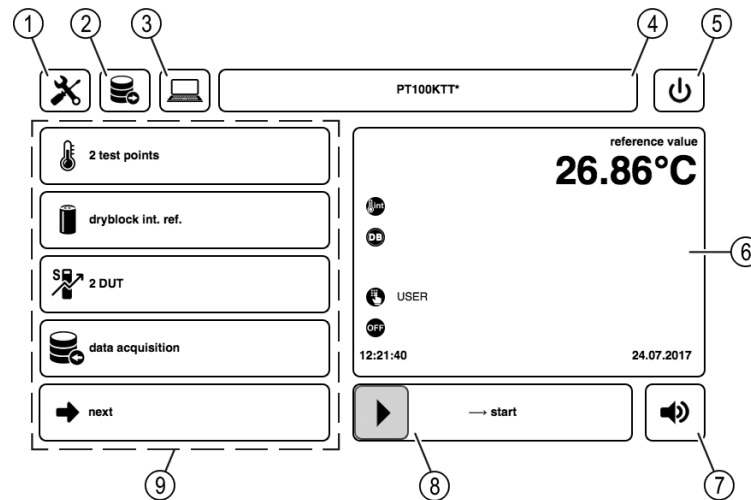
The calibrator should first reach a safe block temperature before switching off. Upon switching off outside the safe temperature range, the calibrator can get damaged.









- ↪ Switch off the calibrator only when the safe temperature range has been reached.

- ↪ Press the  key until the main window is displayed.
- ↪ Press the  key to switch off the calibrator.
  - The calibrator regulates the temperature in the safe range:  
The message "Please wait – device is being brought to a safe temperature" is displayed.
  - The safe temperature range was reached:  
The message "You can now switch off the device" is displayed.
- ↪ Switch off the calibrator via the main switch.
- ↪ Clean the calibrator after use (→ § 11.2).

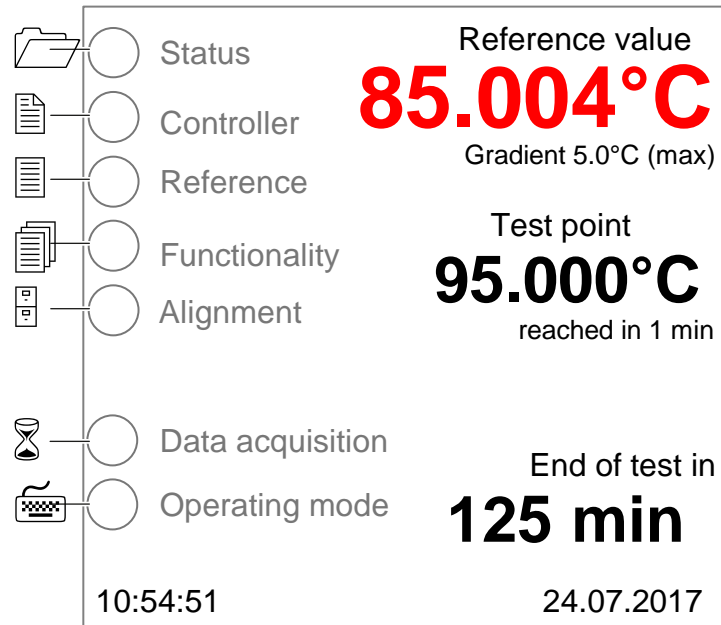
## 5 User interface

### 5.1 Main window



- ① **Calibrator Set Up:**  
By using the  icon, you can reach the "Calibrator Set Up" window. There, you can change the settings of the calibrator (→ p. 35).
- ② **Measurement logs:**  
By using the  icon, you can reach the "Select log data" window. There, you can select saved measurement logs and view them (→ p. 39).
- ③ **Remote Control:**  
Enables Internet communication.
- ④ **Test Task:**  
Using this parameter field, you can reach the "Select Test Task" window. There, you can select the saved test tasks and create or configure your own test tasks (→ p. 29).
- ⑤ **Switching off:**  
By using the  icon, you can switch the calibrator off (→ § 4.4 "Switching on, cool down and switching off").
- ⑥ **Display range:**  
The reference temperature, the set temperature as well as additional information related to the selected test task (→ p. 27).
- ⑦ **Alarm signal:**  
You can switch the alarm signal on or off using the icon  / .  
In the window "Alarm settings" (→ p. 34) you can define under what criteria the alarm signal is to be activated.
- ⑧ **Start / Stop slider:**  
The start / stop slider is used to start  or end  the testing process.
- ⑨ **Configuration range:**  
You can use the parameter fields of the configuration range to get to the parameter windows of the calibrator.  
By using the  icon, you can get to the parameter fields of the other parameters.

## 5.2 Display range



| No. | Icon | Meaning                            |
|-----|------|------------------------------------|
| ①   |      | Status Reference and test specimen |
| ②   |      | Heating                            |
|     |      | Cooling                            |
|     |      | Stable with standard deviation     |
|     |      | Off                                |
| ③   |      | Internal reference sensor          |
|     |      | External reference sensor          |
| ④   |      | Micro bath / tub insert            |
|     |      | Dry block                          |
|     |      | Infrared                           |
|     |      | Surface                            |
|     |      | Reference thermometer              |
| ⑤   |      | Factory setting                    |
|     |      | Customer specific                  |
| ⑥   |      | Off                                |
|     |      | User input                         |
|     |      | Automatic                          |
| ⑦   |      | Step/Cycle                         |
|     |      | Switch test                        |

## 5.3 Toolbar

The following icons are used:



Cancel / back:

Return to the previous window. Changes are discarded without saving.



Input confirmation / Save:

The selected value or setting is confirmed and saved.



Configure:

Switch to expert mode.



Manage / configure:

The selected entry in the selection list is processed and the relevant window is displayed.



Copy:

The selected entry in the selection list is copied and the relevant window is displayed.



Create new:

A new entry is generated for the selection list and the relevant window is displayed.



Delete:

The selected entry in the selection list is deleted.



Search:

The selection list is searched for an entry and the result is displayed in the selection list. Tapping the icon once again shows the entire list.



Sorting A-Z:

The selection list is sorted alphabetically in ascending order.



Sorting Z-A:

The selection list is sorted alphabetically in descending order.



Export:

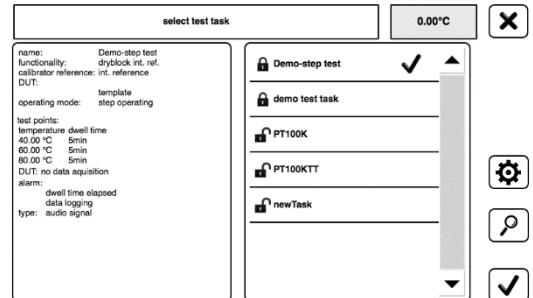
The selected entry in the selection list is copied and the relevant window is displayed.

## 6 Test Task


↩ In the main window, tap the “Test Task” parameter field ④ (→ p.26).

### 6.1 Select Test Task




↩ Select a test task and confirm your selection.



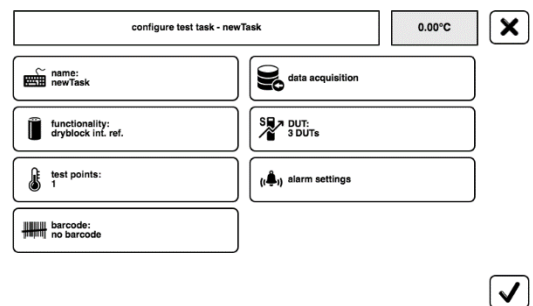
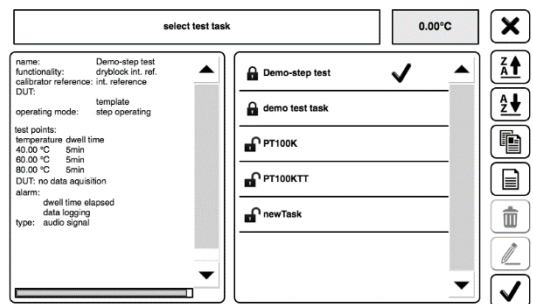
### 6.2 Configure Test Task

↩ Select the desired test task and tap the  icon.

- If you want to edit a  protected test task, you must copy it first.

↩  Create a new test task or  edit an  unprotected test task.

➤ You can now configure the test task with the parameter fields.



#### 6.2.1 Name of Test Task

↩ In the window „Configure Test Task“, tap the parameter field “Name”.

↩ Enter the new name of the test task and confirm the input.

## 6.2.2 Data Acquisition

↪ In the window “Configure Test Task”, tap the parameter field “Data Acquisition”.

### 6.2.2.1 Change the name of the measurement log

↪ Tap “Record name”.

↪ Enter the new name of the measurement log and confirm the input.

### 6.2.2.2 Select the type of data acquisition

↪ Tap “Data Acquisition”.

↪ Select the desired type of data acquisition and confirm the selection

## 6.2.3 Functionality


↪ In the window “Configure Test Task”, tap the parameter field “Functionality”.

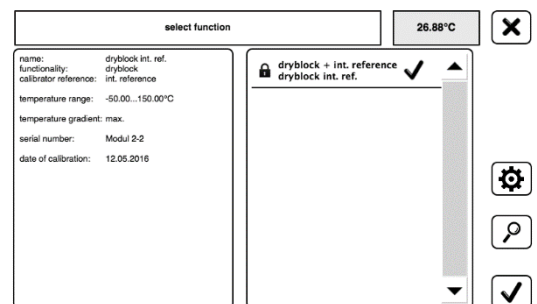


### IMPORTANT!

The selected function must be suitable for the calibrator type (→ § 3.2) and the measuring insert (→ § 4.3) used.

### 6.2.3.1 Link function to test task

↪ Select the desired function and confirm the selection with the  icon.



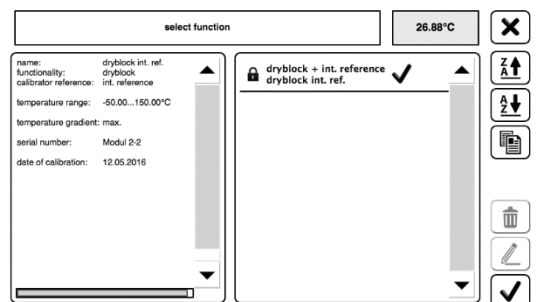
### 6.2.3.2 Configure function

↪ Select the desired function and tap the  icon.

- If you want to edit a  protected function, you must copy it first.

↪ Tap the  icon.

- You can now configure the function with the parameter fields.



**Alignment types**

The value pairs Ax~Nx are used for

- adjustment values measured by the customer
- functions with internal calibrator reference (intRef)
- functions with external calibrator reference (extRef)

The Callendar van Dusen coefficients are used for

- CvD coefficients documented in the certificate
- functions with external calibrator reference (extRef)

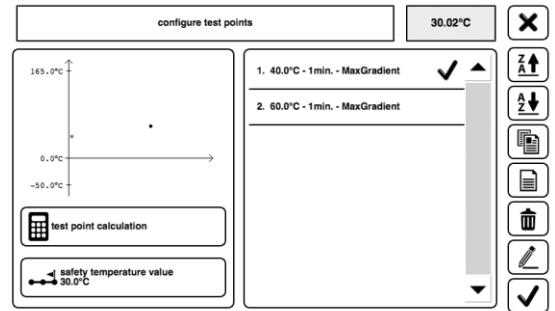
Either the factory setting or a selected alignment method applies.

**Stability range**

The stability range defines the maximum deviation from the set point which the calibrator should detect as stable. The smallest permitted value is 0.001.

## 6.2.4 Test Points


- ↪ In the window “Configure Test Task”, tap the parameter field “Test Points”.
  - The window “Configure Test Points” appears.




### IMPORTANT!

If you have selected automatic data acquisition (Switch Test) and switch as DUT type, the Test Points “Starting Temperature”, “Test Area Beginning” and “Test Area End” are specified. The "Test Point Calculation" parameter field is not available.

### 6.2.4.1 Create Test Points

- ↪ Tap the  icon.
- ↪ Enter temperature and dwell time and confirm the respective input.

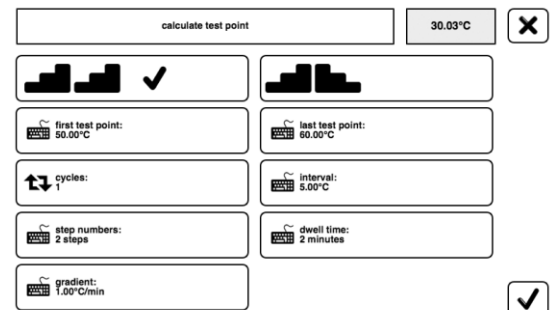
### 6.2.4.2 Edit Test Points


- ↪ Tap the  icon.
- ↪ Change temperature and dwell time und confirm the new values.

### 6.2.4.3 Test Point Calculation

Here you can very easily calculate the steps between two temperatures. When a parameter is changed, the other dependent parameters are automatically recalculated.


- ↪ Tap the parameter field to open the window “Calculate Test Point”.



Step, one-sided 

- ↪ Activate the parameter field by tapping  if the Test Points are to be approached in succession from the first to the last Test Point.

Step, two-sided 

- ↪ Activate this parameter field by tapping  if the Test Points are to be approached in succession from the first to the last back to the first Test Point.

Define first and last Test Point

- ↪ Tap on the parameter fields, enter the new values and confirm your input.
  - The new values are applied, the interval recalculated and you will be returned to the previous window.



**Cycles:**

You can set the number of cycles here. For every cycle, the Test Points in the selection list are approached successively.

- ↩ Tap the parameter field to change the number of cycles.
- ↩ Input the desired number in the input window and confirm the input.
  - The new values are applied and you will be returned to the previous window.

**Set interval:**

- ↩ For fixed intervals, tap the parameter field "Interval", input the desired step width and confirm the input.
  - The new interval is applied and the number of steps is calculated. If necessary, the last Test Point is also adjusted to match, and you will be returned to the previous window.

**Defining the number of steps:**

Note in this context that the number of Test Points is greater than the number of steps by 1.

- ↩ Tap the parameter field "Number of Steps" to change the number of steps. Input the desired number and confirm the input.
  - The number of steps is applied and the interval is automatically recalculated.

**Set dwell time:**

- ↩ Tap the parameter field "Dwell time", input the new values and confirm the input.
  - The new value is applied and you will be returned to the previous window.

**Set gradient:**

- ↩ Tap the parameter field "gradient", input the new values and confirm the input.
  - The new value is applied and you will be returned to the previous window.

### Behavior at End of Test / Safety Temperature Value

Use the parameter fields of the new window to set the safe temperature range and determine the behavior at the end of the test.

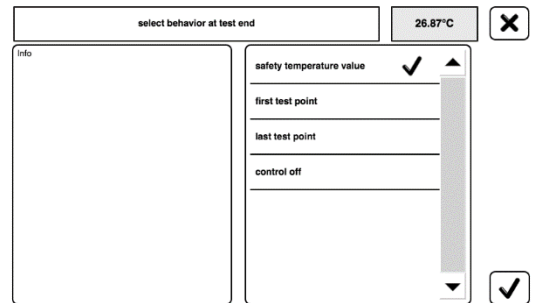
The "Safe Temperature Value" parameter field is only visible if "Safe Temperature Value" has been selected as the behavior at the end of the test.

Behavior at End of Test:

- ↶ Tap the parameter field "Behavior at End of Test".
  - The "Select Behavior at End of Test" window appears.

- ↶ Select the desired behavior and confirm the input.

- The new behavior is adopted and you will be returned to the previous window.



Safety Temperature Value:

- ↶ Tap the parameter field "Safety Temperature Value".

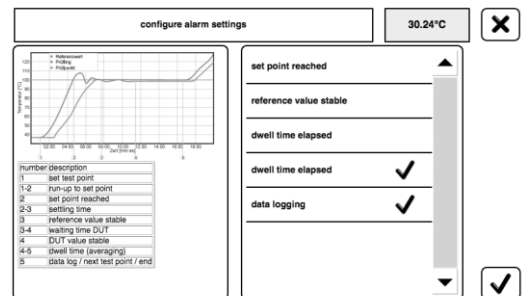
- ↶ Input the respective safety temperature value and confirm the input.

- The new value is applied and you will be returned to the previous window.

### 6.2.5 Alarm Settings

Here you can define at what times the calibrator activates the alarm signal.

- ↶ In the window "Configure Test Task", tap the parameter field "Alarm settings".
- ↶ Select the desired entries from the list.
- ↶ Confirm the selection.



### 6.2.6 Barcode

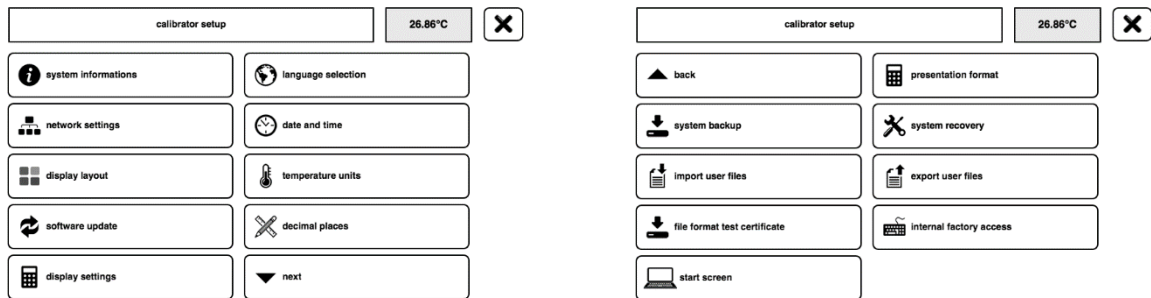
Here you can link the test task with a bar code.

You can either enter the barcode number or enter the barcode using a USB barcode scanner.

## 7 Calibrator Setup

↩ In the main window, tap the  icon ① (→ p. 26).

➤ You can now change the calibrator settings.



### 7.1 Configure network

↩ In the window “Calibrator Setup”, tap the parameter field “Network Settings”.

➤ You can now configure the calibrator for the network.

#### Network Mode DHCP

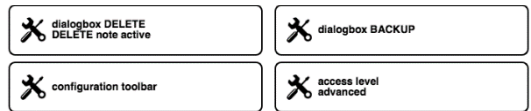
The IP address and subnet mask are automatically assigned.

#### Network Mode Manual

You enter the IP address and subnet mask yourself using the parameter fields.

## 7.2 Configure Presentation Format

- ↩ In the window “Calibrator Setup”, tap the parameter field “Presentation Format”.
  - You can now configure the dialog boxes, configuration toolbar and the access level.



### Dialog box DELETE

Select whether a note is to be displayed before deletion.

### Dialog box BACKUP

Note settings:

Select whether to display a prompt for a system backup when the Calibrator starts.

Backup interval:


Specify the number of completed test tasks after which the prompt for a system backup is to be displayed.

### Configuration Toolbar

Select which entries are displayed in the configuration bar on the main screen. You can also change the order of the selected entries.

### Access Level

Select an access level:

| Access Level       | Description   |
|--------------------|---|
| Standard           | You cannot change any parameters of the test task.  |
| Advanced (Default) | You can change the parameters of the test task after tapping the  icon |
| Expert             | You can change the parameters of the test task without prior confirmation.  |

## 8 Testing process / Calibration

### CAUTION! Risk of burns!

The calibrator can become very hot when in operation. Touching hot parts can result in serious injuries.



- ↪ Never touch the metal block, the tank, the adapter sleeve or the test specimen at temperatures above 35 °C or below 10 °C.
- ↪ Allow the calibrator to cool before you remove the test specimen, clean the tank, change the adapter sleeve or the calibration insert or switch off the calibrator.



**IMPORTANT!** Allow the calibrator to warm up before first calibration!

Allow the calibrator to warm up for at least an hour before the first calibration. This can be achieved during the calibrator approaches the first test point, for example.

### 8.1 Before the testing process

Before the start of the testing process, check whether

- the instructions regarding the installation site and the operational position have been complied with (→ § 4.1).
- the electrical connections have been made correctly (→ § 4.2).
- the inside of the block and the surface of the adapter sleeve or the calibration insert are dry. You can safely remove existing ice or condensation water by heating to above 100 °C.
- the correct measuring insert has been selected for the test task (→ § 3.3).
- the test specimen is securely fixed in the calibrator.
- the calibrator has sufficient structural stability.

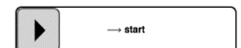
### 8.2 Start testing process



**IMPORTANT!** Parameter fields disabled!

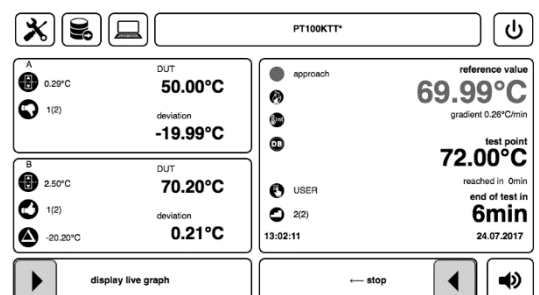
During the testing process, all the parameter fields, with the exception of the Start / Stop slider and the alarm signal, are disabled.

- ↪ Push the button of the start / stop slider completely to the right.

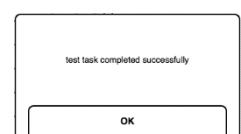


- The testing process is started. Information on the testing process and the temperature progression is displayed in the window.

Information on the testing process is displayed in the display range (→ p. 27).

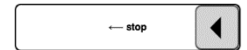


A dialog box with the message that the test task was successfully completed is displayed.



### 8.3 Cancel testing process

↪ Push the button of the start / stop slider completely to the left.




- The testing process is aborted and the calibrator gets programmed to reach the temperature of the "Behaviour at test end" (→ p. 34) of the test task.

### 8.4 After the testing process

- ↪ Allow the calibrator to cool to room temperature.
- ↪ Note the instructions in the section "Test tasks" (→ § 3.3).
- ↪ Clean the calibrator (→ § 11.2).

## 9 Manage measurement logs

- ↖ In the main window, tap the  icon ② (→ p. 26).
- ↖ Select the desired measurement log and confirm the selection
  - The window “View Data Log” appears.




### Diagram

- ↖ Tap the parameter field “Diagram”.
- A diagram with the set points and Test Points is displayed.

### Table

- ↖ Tap the parameter field “Table”.
- ↖ Select the desired channel and confirm the selection.

Export log data:

- ↖ Tap the  icon.
- ↖ Follow the instructions on the screen.

### Export Data Log

The data of the diagram is exported

### Export All Data Logs

The measurement log is exported in the desired file format (Calibrator setup → File format test certificate).

## 10 Troubleshooting

### CAUTION! Material damage!



The Thermator cannot be repaired by the user! In case of a defect, the device must be returned to the manufacturer for repair.

↳ Never open the Thermator and perform any repair yourself.

The following table details what problems you can solve yourself and how to solve them.

| Problem                                      | Possible cause   | Remedy   |
|--|--|--|
| Calibrator and touch screen no longer react. | The Thermator is in an undefined state.  | Turn off calibrator, wait a few minutes, and then restart. |
| Sensor break.                                | External reference sensor not properly connected.  | Recheck connection and connect properly.                   |
|  | Cable break or short circuit.  | Service call required.                                     |
| Fan not running.                             | The fan is defective or blocked and the temperature switch has triggered.                | Service call required.                                     |
| End temperature is not achieved.             | Solid state relay is defective or heating / cooling element has short circuited or aged. | Service call required.                                     |
| No display.                                  | Controller defective.  | Service call required.                                     |
| Calibrator cannot be switched on.            | Power supply not available or thermal fuses defective.                                   | Check the power supply and thermal fuses.                  |
|  | Residual current circuit breaker has tripped due to moisture in the heating cartridges.  | Service call required.                                     |

If you are unable to remedy any particular problem, then immediately disconnect the calibrator in order to protect it from unintended operation.

Contact your supplier. Please send the device for repair with a brief description of the problem, the environmental conditions and the length of time the device was operational before the problem occurred.



## 11 Maintenance and cleaning

Before maintenance and cleaning, check whether

- the calibrator has cooled sufficiently (→ § 4.4 "Cool down").
- the calibrator has been switched off and disconnected from the mains.

### 11.1 Maintenance

The Thermator itself is maintenance-free and cannot be repaired by the user. In case of a defect, the device must be returned to the manufacturer for repair.



#### **CAUTION! Material damage!**

When opening the device, critical parts or components can be damaged.

↪ Never open the device and perform any repair yourself.

For safe operation of the calibrator, the following checks must be carried out at regular intervals:

#### **Before use:**

- ↪ Check the calibrator for damage.
- ↪ For micro bath calibrators, check the filled height of the calibration liquid. When doing so, note the Information on filling amounts (→ § 4.3.4.2).

#### **Annually:**

- ↪ Subject all the parts of the calibrator to a visual inspection for corrosion, wear and damage.
- ↪ Have a trained technical person carry out a safety inspection of all the electrical parts.

#### **Recalibration:**

- ↪ Send the calibrator to Testo Industrial Services for Recalibration (→ § 11.3) after 36 months or after a maximum of 500 operating hours.

#### **Air Shield Insert:**

- ↪ Replace the spring of the adapter sleeve if the sleeve is no longer firmly seated in the block.

#### **Calibration liquid:**

Calibration liquids get fouled or age with time. This depends to a great extent on the type of liquid and the usage behaviour.

- ↪ Replace the fouled or aged calibration liquid.

**Magnetic stirrer:**


The magnetic stirrer is a limited life part. The fillet in the middle reduces the friction during the rotary movement. Once the fillet has worn, the stirring function can no longer be guaranteed because of the increased friction.

- ↪ Check the fillet of the magnetic stirrer for wear and replace it in time.

**Thermal fuse:**

The thermal fuses of the calibrator are located on the front side and are integrated in the mains connection. If there is a mains voltage present, but the screen is dark and the fan is not running, you should check the fuses and replace them if required.

- ↪ Pull the mains connection cable from the calibrator.
- ↪ Prise open the fuse compartment from the bottom with a fingernail or a flat screwdriver.
- ↪ Remove the compartment with the fuses.
- ↪ Check the fuses and replace the faulty fuses.

 **IMPORTANT!** Only use fuses of the same type (→ p. 49).  
Always replace both fuses, even if only one is defective.

- ↪ Fit the fuse compartment back in place and connect the mains connecting cable (→ § 4.2 "Electrical connection").

Should the fuses blow repeatedly, there is probably a fault in the calibrator. In this case, send the calibrator to Testo Industrial Service for repairs (→ § 10 + § **Fehler! Verweisquelle konnte nicht gefunden werden.**).

## 11.2 Cleaning

**External cleaning:**

Clean the Thermator with a dry or slightly damp lint-free cloth. Do not use sharp objects or aggressive agents for cleaning.

Ensure that your cleaning agent cannot be a source of danger from a reaction with parts of the calibrator or the materials inside it.

If you have any questions regarding compatibility, please contact our customer service.

**Venting grilles for inlet air:**

The grille openings (b) + (c) in the base of the calibrator must be cleaned at regular intervals.

The cleaning intervals depend very closely on the air pollution at the installation site and the daily operation duration.

- ↪ Clean the grille openings by vacuuming or brushing off.
- ↪ Please keep in mind the following instruction regarding the temperature fuse.

**IMPORTANT! Overtemperature protection!**

If the air flow is too low, the temperature fuse may trip. The calibrator is then no longer ready for operation and must be sent to the producer

- ↪ Ensure that the grille openings are always clear.

**Measuring insert (Adapter sleeves and calibration inserts):**

During operation, small quantities of metal dust get created. It can result in the measuring insert getting stuck in the calibration block.

- ↪ Pull the measuring insert out of the calibration block with the help of the sleeve exchange tool.
- ↪ Clean the measuring insert and the calibration block at regular intervals.



Before a prolonged shutdown of the calibrator, remove the measuring insert from the calibration block.

**Tank (Micro bath calibrator):**

Before cleaning, the tank must be drained as much as possible with the drain syringe. When doing so, follow the corresponding instructions in the safety data sheet of the calibration liquid used.

Distilled Water:

- ↪ Remove the sensor cage from the tank.
- ↪ Remove the magnetic stirrer with the help of the magnetic lifter.
- ↪ Dry the tank, the sensor cage, the magnetic stirrer and the drain syringe thoroughly.

Silicone oil:

- ↪ Remove the sensor cage from the tank.
- ↪ Remove the magnetic stirrer with the help of the magnetic lifter
- ↪ Clean the cage, the magnetic stirrer and the tank with water to which a generous amount of rinsing liquid has been added.
- ↪ Remove the cleaning water to the maximum extent possible using the drain syringe.
- ↪ Dry the tank, the sensor cage, the magnetic stirrer and the drain syringe thoroughly.

### 11.3 Recalibration

The calibrator is adjusted and tested with measuring equipment in accordance with recognized national standards prior to delivery.

The calibrator should, depending on the application situation, be inspected at appropriate intervals on the basis of DIN ISO 10012. We recommend you to return the calibrator to us at intervals of max. 36 months or approx. 500 operating hours for recalibration and readjustment.

Recalibration is based on the directive DAkkS-DKD R5-4 of the German Accreditation Body. The measures described here are applied and considered during recalibration.

### 11.4 Adjustment

In practice, the usage conditions during the testing process can vary from the measurement conditions prevailing at the time of calibration of the calibrator.

For this case, the Thermator offers the facility to store your own adjustment values. This is possible for your own functions of the calibrator and for your test specimens.


The number of adjustment values can be freely selected. You can equalise the calibrator directly on-site with your standard thermometer and thus achieve a maximum of display accuracy. It is not necessary to send it to the manufacturer.

The calibration values set at the factory are retained. You can reset the calibrator to these values at any time.

From the configuration range of the main window, or in the "Configure DUT" window (→ § **Fehler! Verweisquelle konnte nicht gefunden werden.**), you can input your own adjustment values.

#### IMPORTANT!



Only functions and test specimens that are marked with the  icon can be adjusted. All test tasks that use adjusted functions or test specimens are affected by the adjustments.

## 12 Decommissioning and disposal

### Before decommissioning:

Prior to decommissioning, ensure that

- the measurement set up is switched off and is in a safe and de-energised state.
- the calibrator and the accessories has completely cooled down (→ § 4.4 "Switching on, cool down and switching off").

### Decommissioning:

- ↪ Remove all connected sensors and devices.
- ↪ Switch off the calibrator and disconnect the mains plug
- ↪ Empty the calibrator tank in case there is residual calibration liquid (→ § 11.2 "Cleaning").

### Disposal calibration liquid:



**IMPORTANT!** Disposal calibration liquid!

Dispose of the calibration liquid in accordance with the Technical Safety Data Sheet.

### Disposal calibrator:

Compliant with the Directives 2011/65/EU (RoHS) and 2012/19/EU (WEEE)\*, the device must be disposed of separately as electrical and electronic waste.



### **NO HOUSEHOLD WASTE!**

The calibrator consists of various different materials. It must not be disposed of with household waste.

- ↪ Take the Thermator to your local recycling plant

or

- ↪ send the Thermator back to your supplier.

\* WEEE reg. no.: DE 25976360

## 13 Technical data

The technical data of customised versions may differ from the data in these instructions. Please observe the information specified on the type plate.

### 13.1 Characteristics Thermator II

| Type<br>Characteristics                                       | Thermator II                           |                                     |
|---|--|-------------------------------------|
| Temperature range*  | -35...165 °C<br>-25...150 °C (Surface) |                                     |
| Setting range   | -50...165 °C                           |                                     |
| Control sensor (switchable)                                   | <b>External</b>                        | <b>External + Air Shield Insert</b> |
| Hysteresis  | ±0.025 °C                              |                                     |
| <b>Dry block (DB)</b>   |  |                                     |
| Display accuracy  | ±0.2 °C                                | ±0.099 °C**                         |
| Stability   | ±0.005 °C                              | ±<0.001...0.005 °C                  |
| Influence of load   | ±0.01 °C                               |                                     |
| Temperature distribution<br>- Axial<br>- Radial               | ±0.06 °C<br>±0.01 °C                   |                                     |
| <b>Infrared (IR)</b>  |  |                                     |
| Display accuracy  | ±0.5 °C                                | -/-                                 |
| Stability   | ±0.02 °C                               | -/-                                 |
| <b>Surface (SU)</b>   |  |                                     |
| Accuracy  | ±1.0 °C                                | -/-                                 |
| Stability   | ±0.15 °C                               |                                     |
| <b>Micro calibration bath (LI)</b>                            |  |                                     |
| Display accuracy  | ±0.137 °C**                            |                                     |
| Stability   | ±0.005 °C                              |                                     |
| Influence of load   | ±0.05 °C                               |                                     |
| Temperature distribution<br>- Axial<br>- Radial               | ±0.075 °C<br>±0.05 °C                  | -/-                                 |
| <b>Stabilisation time</b>                                     |  |                                     |
| With ext. reference sensor<br>- to ±0.05 °C<br>- to ±0.005 °C | From 1 min<br>From 5 min               |                                     |

\* At ambient temperature of 20 °C / 68 °F

\*\* Extended measurement uncertainty according to DAkkS-DKD-R 5-4

| Type                         | Thermator II               |  |
|------------------------------|----------------------------|--|
| Characteristics              |                            |  |
| <b>Block</b>                 |                            |  |
| Borehole                     | Ø 60 mm                    |  |
| Depth                        | 170 mm                     |  |
| Homogeneous temperature zone | Bottom 40 mm of the sleeve |  |



### 13.2 General characteristics

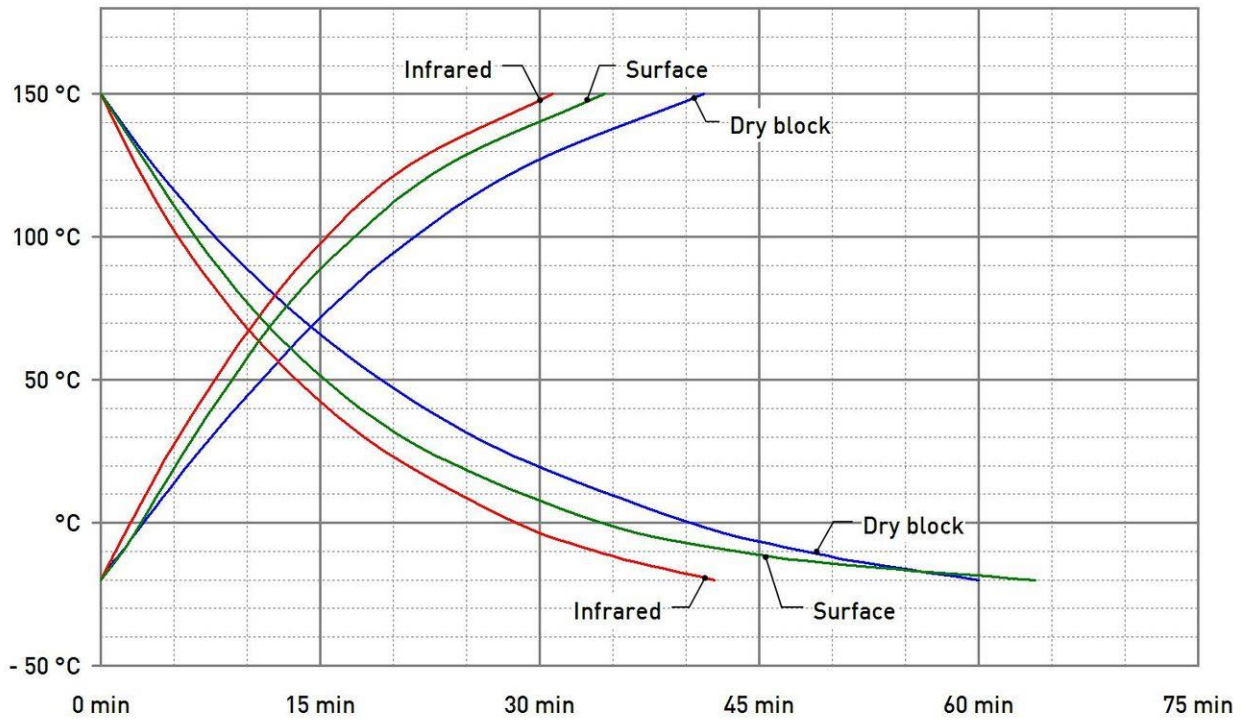
| Type   | Thermator II  |
|--|---|
| <b>Characteristics</b>   |   |
| <b>Display</b>   |   |
| Type • Size  | Colour Touch screen • 7"  |
| Resolution   | 0.1 / 0.01 / 0.001 °C / °F / K  |
| Unit   | °C / °F / K   |
| Sensor break:<br>- Display<br>- Behaviour                              | Text message<br>Switching off the controller  |
| Behaviour when temperature is exceeded in the housing                  | Temperature fuses switch off the heating when the limit values are exceeded.                                |
| <b>Electrical characteristics</b>                                      |   |
| Supply voltage   | 100...240 V <sub>AC</sub> • 50/60 Hz  |
| Power consumption  | ~ 375 W   |
| Fuse   | T6.3AH 250V   |
| Connecting cable   | H05VV-F 3 G 0.75 mm <sup>2</sup> with angled protective contact plug and cold equipment plug • Length ~ 2 m |
| PC interfaces  | Ethernet, 3x USB  |
| <b>Ambient conditions</b>  |   |
| Operating temperature  | 0...50 °C   |
| Transport and storage temperature                                      | -10...60 °C   |
| Humidity (RH)  | < 80% to 31 °C, reducing linearly up to 50% at 40 °C (non-condensing environment)                           |
| Operating conditions:<br>- Location • Altitude<br>- Operating position | Interiors • up to 2000 m<br>Standing upright/vertically   |
| Application area   | tested according to EN 61326-1, class A (industrial sector)   |
| <b>Case</b>  |   |
| Dimensions [mm]<br>- Width   | 210<br>380+50   |
| - Height + Handle  | 300   |
| - Depth  |   |
| Weight   | ~ 13 kg   |

### 13.3 Heating up and cooling times

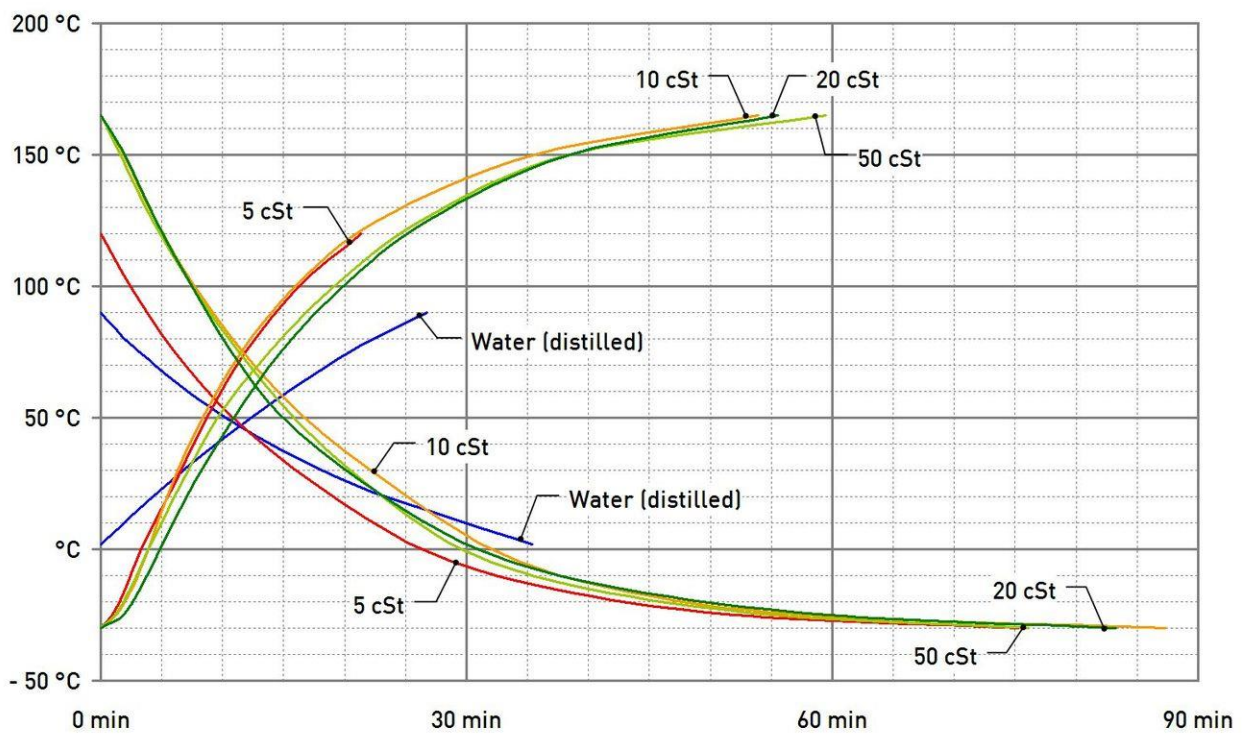
The heating up and cooling times are dependent on the parameters of the test task used and the ambient conditions. The following times are guide values for a room temperature of 23 °C without settling processes.

#### 13.3.1 Thermator II

##### Dry block, infrared and surface



##### Micro bath: Water and silicone oil









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