Operating manual (Translation)

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Temperature calibrators

Series TP37 / TP3M

Types: TP 37 200 E • TP 37 165 E • TP 37 166 E
• TP 37 700 E • TP 3M 165 E • TP 3M 255 E.



3a_TP37-TP3M_en • 07/2015

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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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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.

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1 Device description

The calibrators of the series TP37 / TP3M serve for testing and calibrating different temperature measuring instruments and temperature sensors, as well as for measurement of temperatures.
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 TP37 / TP3M series is used for service purposes and for different industrial and laboratory tasks.
Thus, for example, thermometers, temperature switches/thermostats, resistance thermometers and thermo-elements can be directly connected and checked.

Versions*:
The TP37 / TP3M is available as a dry block, multi function and micro bath calibrator.

It can be supplied both with a heating function as well as a cooling and heating function.

The series and the various types are different in their construction (tank or metal block, the temperature range, the accuracy, the adapter sleeves and calibration inserts, the fittings and the available accessories.

Further information on the series, the models of the individual types that can be supplied, and their fittings can be found in our catalogues at "catalogues.sika.net".



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 (→ example).



Type plate example

*Customised versions available on request.

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)
❒ TP37 / TP3M according to the order data. ❒ Test certificate. ❒ Mains cable. ❒ Sleeve exchange tool. ❒ PC- and network cable. ❒ Operating manual. ❒ Protective packaging / transport protection. ❒ Sensor cage*. ❒ Draining pump*. ❒ Transport cover*. ❒ Magnetic stirrer with magnet lifter*. ❒ Work cover with 5 Silicone plugs*.	❒ Transport case. ❒ Adapter sleeve(s). ❒ Infrared insert*. ❒ Surface insert and exchange tool*. ❒ Tub insert*. ❒ External reference sensor TF 255-3-300. ❒ PC software. ❒ Network switch, barcode reader, WLAN router. ❒ DAkkS certificate. ❒ Works certificate.

* only TP 37 166 E, TP 3M 165 E and TP 3M 255 E ** only TP 3M 165 E and TP 3M 255 E



IMPORTANT!

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

1.2 Intended use

The calibrators of theTP37 / TP3M series TP37 / TP3M 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 (→ § 10 "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 machine.

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.

SIKA also provides an extra 5-year guarantee for calibrators which are calibrated and inspected annually by the SIKA-DAkkS laboratory.

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, in-appropriate use of the device or failure to follow the instructions in this operating manual.

2 Safety Instructions



Before you install the TP37 / TP3M, read through this operating manual carefully. If the instructions contained within it 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 TP37 / TP3M 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.

SIKA 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- 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 who are charged for the installation, operation and maintenance of the TP37 / TP3M must hold a relevant qualification. This can be based on training or relevant tuition.
The personnel must be aware of this operating manual and have access to it at all times.

⚠ The electrical connection should only be carried out by a fully qualified electrician.

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 (→ § 10.1 "Characteristics TP37 / TP3M").

⚠ 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 TP37 / TP3M 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 obliterate type plates or other markings on the device, as otherwise 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 SIKA.

⚠ 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 attentively. 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	0...95°C		none
Silicone oil from XIAMETER®:			
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	25°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:

⚠ SIKA supplies the calibrators 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 calibrator consists of a robust, black-and-red painted steel housing ② and has a carrying handle at the top ①.

The front part of the housing holds the electronics of the TP37 / TP3M for controlling the reference temperature and for the touch screen ③.

On the front side are the main switch with fuse and mains plug connection ④, the connection for the external reference ⑦, as well as the ports for the PC, the network and service ⑧.

The grille ⓐ for the exhaust air is located, in the TP3M calibrators, in both the side walls of the housing. In the TP37 calibrators, the grille ⓐ is located in the upper plate of the housing in the range of the opening of the metal block.

The rear part of the housing holds a heat-insulated calibration block with heating or cooling elements and an integrated sensor for the reference temperature. In the case of the dry block and multifunction calibrator, this is a metal block ⑥ and in the micro bath calibrator, it is a tank ⑤.

In the base, there are grilles for cooling the calibrator. The in-built fans control the inlet air of the housing ⓑ and of the calibration block ⓒ.

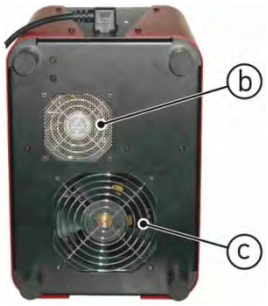
An overview of the most important components of the TP37 / TP3M:

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 (Micro bath).
ⓐ Calibrator ventilation:
Exhaust through lateral and upper housing grilles.
⑥ Metal block (Dry block).
⑦ Connection for external reference.
⑧ Ports for PC, network and service.



Calibrator, bottom view:

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



3.2 Function

IMPORTANT NOTICE!

For your safety, manual operation of the calibrator, i.e. directly starting it up and its remaining at a certain temperature, is not possible.
The testing procedure is always started with a testing task (→ § 3.3).
This ensures that the calibrator is always started with a defined "Behaviour at test end" (→ Pg. 24).

The calibrators can be used with dry block , infrared, surface or micro bath function.

The function is determined by the calibrator type and the used measuring insert.

Function / Type	Dry block	Infrared	Surface	Micro bath
Measuring insert:	Adapter sleeve	Infrared insert	Surface insert	Calibration liquid
TP 37 200 E	✓	**-/-**	**-/-**	**-/-**
TP 37 165 E	✓	**-/-**	**-/-**	**-/-**
TP 37 166 E	✓	✓	✓	**-/-**
TP 37 700 E	✓	**-/-**	**-/-**	**-/-**
TP 3M 165 E	✓	✓	✓	✓
TP 3M 255 E	✓	✓	✓	✓

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 the preparations have been carried out, 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 (→ Pg. 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 "Functionality of the calibrator" (→ § 5.4) 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 (→ § 5.6).

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 TP37 / TP3M.

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 (→ § 5.6) when selecting the function or the test sample, you can switch to the respective expert mode for administration and configuration.

↳ Note here that changes to existing functions and test specimens always apply to all the 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 machine is operated without supervision, third-party persons in the vicinity could get injured. Moreover, flammable material could get into the machine 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 calibrators of the TP37 / TP3M series, 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 machine.
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. 55).

4.1 Operating conditions

Select a safe installation site for commissioning the machine.

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 machine
  On the front side > 1 m, behind and to the sides > 0.5 m. Head clearance and sufficient clear space above the machine.
- ❒ Sufficient ventilation must be ensured.
- ❒ Do not operate in the vicinity of flammable materials.
- ❒ Do not install in a cupboard or other similar object.
- ❒ The ventilation openings must not be blocked or covered.
- ❒ The machine must be so installed that it can be switched off at any time.



IMPORTANT! "KILL" switch!
The plug of the mains connecting cable serves as an "KILL" switch.

↳ Ensure that the plug is always easily accessible and easy to reach.

↳ In an emergency, pull the plug, so that the machine is isolated from the mains.

4.2 Electrical connection

The electrical connections are made with the accompanying mains connecting cable.



DANGER! Risk of death due to electric current!

The TP37 / TP3M is operated at mains voltages up to 240 V_{AC}. Contact with the mains voltage can result in serious or fatal injuries.

↳ Switch off the TP37 / TP3M and remove the mains connecting cable before you start any work on live parts.

Check the following points before you connect the calibrator:

- ❒ Operate the machine only with the approved supply voltage (→ § 10.1). Ensure that the mains voltage is the same as that specified on the type plate.
- ❒ Please follow the local regulations of the energy supplier.
- ❒ Connect the calibrator only to a properly installed and earthed 3-pole outlet for Schuko plugs.
- ❒ 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 cables from SIKA or approved cables of the same type with the correct design as replacements (→ "Electrical characteristics").

Connect TP37 / TP3M:

↳ Connect the mains connecting cable with the connector plug of the TP37 / TP3M.

↳ 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 machine.

IMPORTANT! Empty the tank and clean it!

With micro bath calibrators (TP 3M 165 E), 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 (→ § 5.4).

4.3.1 Dry block calibrator

Type	TP 37 200 E	TP 37 165 E	TP 37 166 E	TP 37 700 E	TP 3M 165 E	TP 3M 255 E
Dry block	✓	✓	✓	✓	✓	✓

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

To achieve the specified accuracy of the calibrators (→ § 10.1) 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.

↳ Please also follow the "Details of the DKD technical committee "Temperature and Humidity" for the operation of temperature block calibrators" (→ § 11).



Inserting:

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

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.



Adapter sleeves and sleeve exchange tool

4.3.2 Calibrator for infrared thermometer

Type	TP 37 200 E	TP 37 165 E	TP 37 166 E	TP 37 700 E	TP 3M 165 E	TP 3M 255 E
Infrared	**-/-**	**-/-**	✓	**-/-**	✓	✓

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.

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 °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

Type	TP 37 200 E	TP 37 165 E	TP 37 166 E	TP 37 700 E	TP 3M 165 E	TP 3M 255 E
Surface	**-/-**	**-/-**	✓	**-/-**	✓	✓

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.



Surface insert and exchange tool

Inserting:

- The surface insert is inserted into the metal block with the aid of the exchange tool.

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.

IMPORTANT NOTICE!
The calibration of surface temperature sensors is very difficult and not uncontroversial. The temperature sensor, which are placed on the surface, conduct heat away from the surface and thus produce a cold spot on the surface to be measured.

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

Type	TP 37 200 E	TP 37 165 E	TP 37 166 E	TP 37 700 E	TP 3M 165 E	TP 3M 255 E
Micro bath	-/-	-/-	-/-	-/-	✓	✓



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 (→ Pg.21).

The micro bath includes the transport cover, the work cover, the sensor cage, the magnetic stirrer, the draining pump, 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 Configuration range (→ § 5.2) or in the window "Configure Function" (→ § 5.4.3 "Stirring speed").



IMPORTANT! Wearing part!
The magnetic stirrer is a wearing part.
↳ Replace worn-out magnetic stirrers. (→ § 8.1 "Maintenance").

Draining pump and magnetic lifter:
The draining pump 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 into 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

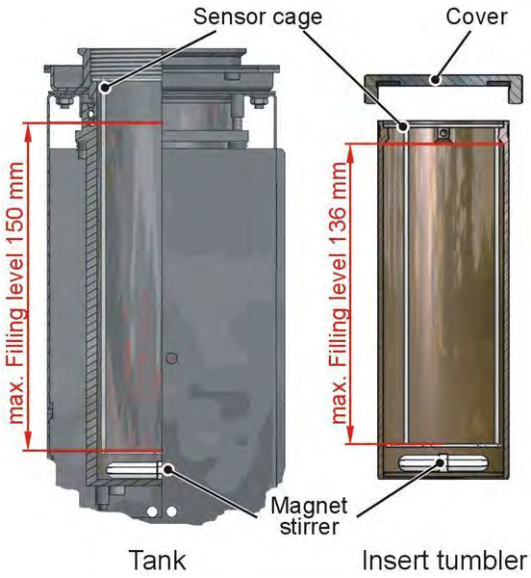
CAUTION! Risk of incorrect measurement or material damage!
Do not exceed the maximum fill level during operation!

- 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.



max. fill level of the micro bath

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 *1

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.



- Screw on 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.

*1 For tubs already filled, some step are not required.

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.

Switching on:

↳ Put on the main switch.

- ➢ The fan of the device starts and the SIKA logo appears for ~ 40 s on the screen.
- ➢ The type designation and the current software version are displayed for ~ 4 s.
- ➢ 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.

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.

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 range" (→ Pg. 37) is saved in the calibrator. Upon switching off, the machine 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 (→ § 8.2).

5 Operation

The TP37 / TP3M is operated by means of the touch screen.



You can use the icons and operating elements of the screen to navigate through the window. There, you can edit parameters and input values.

The main window, which is displayed after starting up, is the starting point for the operation of the TP37 / TP3M.

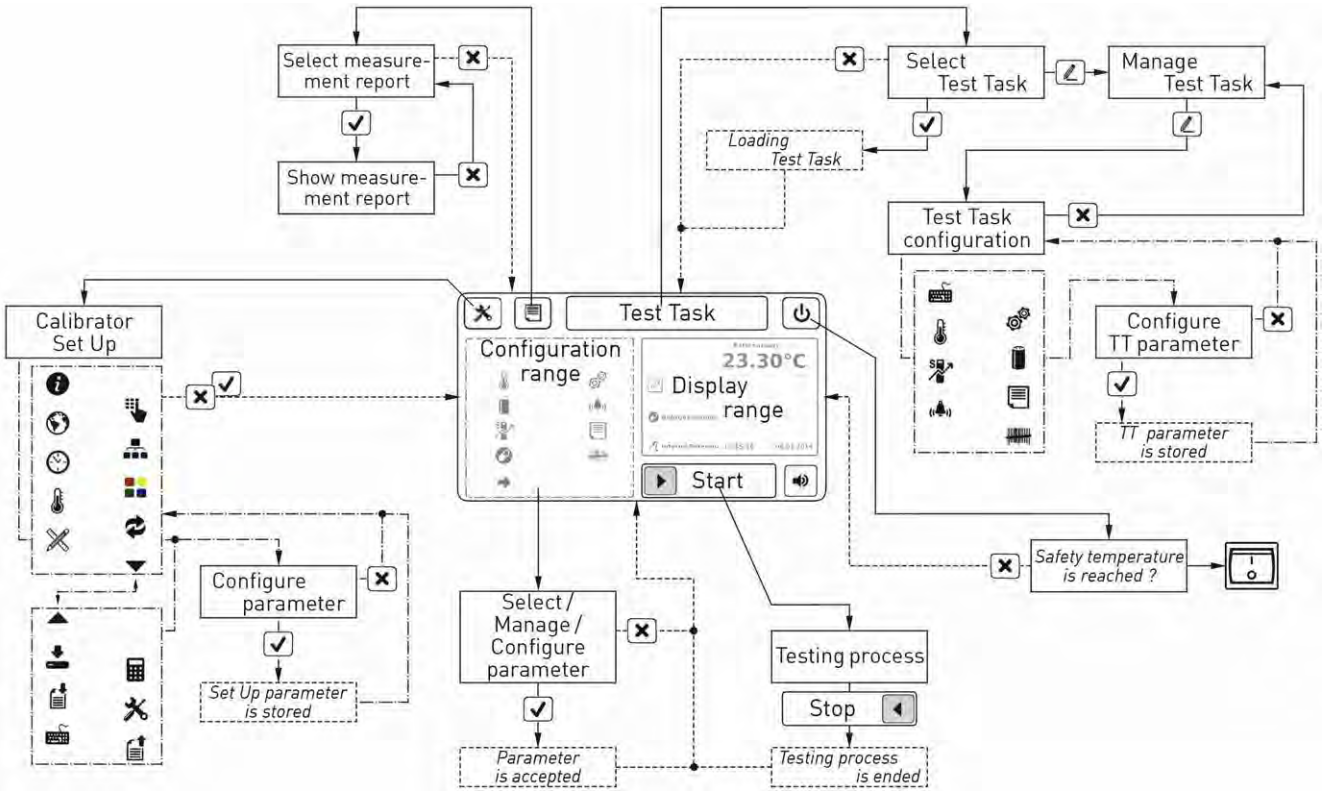
From there, you can get to the various windows or start the testing process.

Upon tapping the corresponding symbols or parameter fields, the respective window of the parameter is opened or displayed.

The windows "Calibrator Set Up" and "Select measurement report" are opened with the icons [ ] and [ ]. The window "Select Test Task" is opened from the parameter field with the name of the test task.

Operating structure:

The following diagram gives an overview of the operation structure of the TP37 / TP3M. The zones are schematically depicted with their windows and parameters. Furthermore, the parameters of the other operating elements of the main window can be seen.

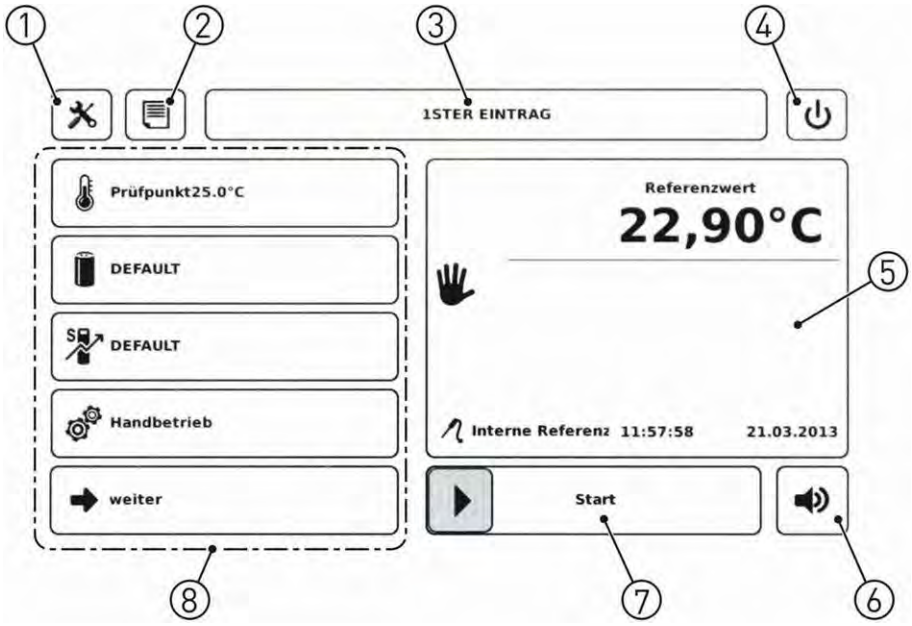


The operating concept of the TP37 / TP3M is based on pre-installed and self-defined test tasks for recurring testing processes.

One-off testing processes can be directly set via the configuration range and then started.

5.1 Main window

The individual icons and the most important ranges of the main window are presented in brief in the following.



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 (→ Pg. 41).

② Measurement reports:
By using the [📄] icon, you can reach the "Select measurement report" window. There, you can select saved measurement logs and view them (→ Pg. 45).

③ 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 (→ Pg. 35).

④ Switching off:
By using the [⏻] icon, you can switch the calibrator off (→ § 4.4 "Switching on, cool down and switching off").

⑤ Display range:
The reference temperature, the set temperature as well as additional information related to the selected test task (→ Pg. 47).

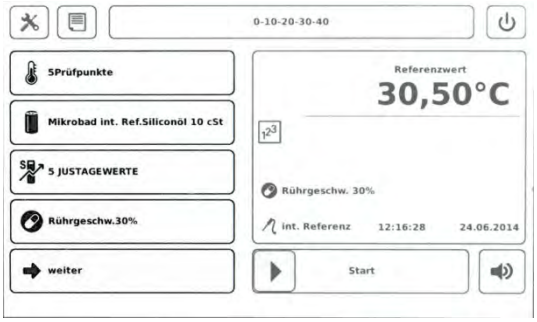
⑥ Alarm signal:
You can switch the alarm signal on or off using the icon [🔊] / [🔇].
In the window "Alarm settings" (→ Pg. 40) you can define under what criteria the alarm signal is to be activated.

⑦ Start / Stop slider:
The start / stop slider is used to start [▶] or end [◀] the testing process.

⑧ Configuration range (→ § 5.2):
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 Configuration range

The calibrator settings can be changed directly from the configuration range. You can get to the windows of the parameters from the corresponding parameter fields.





The operation of the calibrator via the configuration range is particularly well suited for one-off testing processes. You can directly set the required test conditions and then start the testing process.

You can save the new test conditions under the current test task or a new test task. Without saving, the test conditions are discarded.

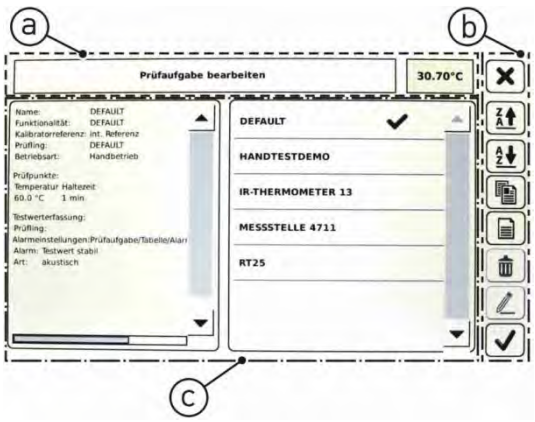
IMPORTANT! In expert mode, keep the following in mind!

From the windows "Select Function" (→ § 5.4.1) and "Select DUT" (→ § 5.5.1) k you can switch to the expert mode for administering and configuring.

- Follow the instructions in the corresponding sections.
- Changes to functions and test specimens always affect all the test tasks linked to them.

5.3 Window structure, operating elements and icons

The windows are divided into three ranges: the information line, the toolbar and the parameter range.



ⓐ Information line:
The information line is located at the top edge of the window. It shows the name of the window and the reference temperature.

ⓑ Toolbar:
The toolbar is located along the right edge of the window. It contains the icons available in this window.

ⓒ Parameter range:
The parameter range is the biggest part of the window. Information about the window and other operating elements are displayed in it.

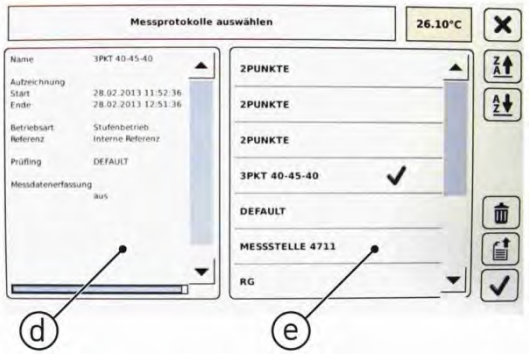
5.3.1 Operating elements

The following operating elements can be found in the parameter range of the window.

ⓓ Information box:

Different kinds of information is displayed in the information box. This information can be explanations for the window, information on the selected element of the selection list, measurement values or measurement value curves.

If the information is extensive, such as measurement value curves, the section of the information box can be scrolled (adjusted).

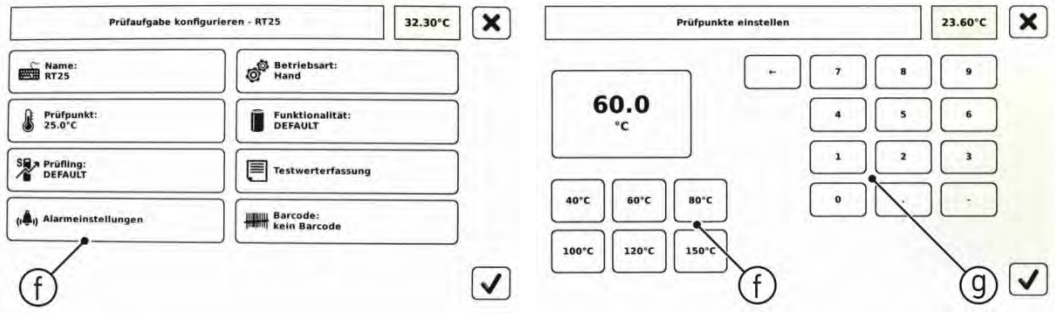


ⓔ Selection list:

The selection list displays the elements available in the window. This can be available test tasks, recorded measurement logs, saved test specimens or functions of the calibrator.

The desired element is selected by tapping ✓ and its information is displayed in the information range.

The scrollbar on the right can be used to easily view long lists.

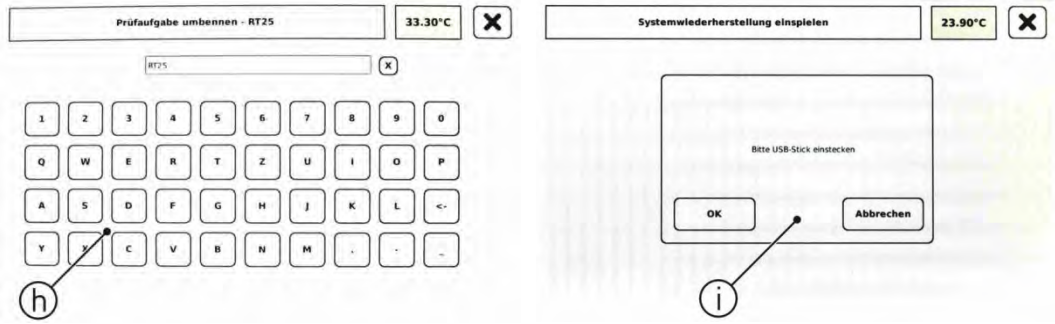


ⓕ Parameter fields:

Parameter fields are active elements of the window. From the parameter fields, you can get to the next window or carry out defined actions.

ⓖ Numeric keypad:

The numeric keypad is for inputting numeric values.



ⓗ Virtual keyboard and input line:

The alphanumeric virtual keyboard can be used for inputting text and numbers in the relevant input line.

ⓘ Dialog box:

Special messages are displayed in a dialog box.

5.3.2 Toolbar and icons

Some icons occur in different windows, selection fields / lists and input ranges and have the same meaning.



Cancel / back:
Return to the previous window. Changes are discarded without saving.



Input confirmation / Save:
The selected value or setting is confirmed and saved.



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 (→ for example Pg. 35 "search for test tasks") 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.

For better differentiation and simpler operation, most of the parameter fields are marked with additional symbols before the text in the windows. These icons are also used in the operating manual.

5.4 Functionality of the calibrator

Here, you can select and manage the function of the calibrator for the relevant measuring insert. You can create new functions or tailor unprotected functions to your requirements.

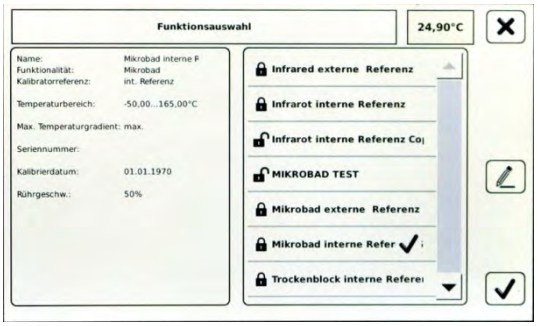
IMPORTANT! When changing functions, please consider!
The individual functions of the calibrator are independent. Changes to existing functions always affect all the test tasks that are linked to the function.

You can get to the "Select Function" window via the parameter field in the configuration range of the main window or from the window "Test Task configuration".

5.4.1 Select Function

Information on the selected function is displayed in the information box.

All the functions of the calibrator are displayed in the selection list.



- Select the desired function by tapping on ✓ in the selection list.
  - The information on the function is immediately displayed in the information box.

From the toolbar, you can accept the selected function, or switch to expert mode for managing and configuring the functions.

Accept function:

- Confirm your selection with the ✓ icon.
  - The selected function is adopted with all its settings, and you will be returned to the main window or to the previous window.

Managing functions:

- Tap on the ✎ icon to manage the functions in the expert mode.
  - The "Manage Function" window is displayed. This window offers special functions for managing and configuring the functions. Details can be found in the following section.

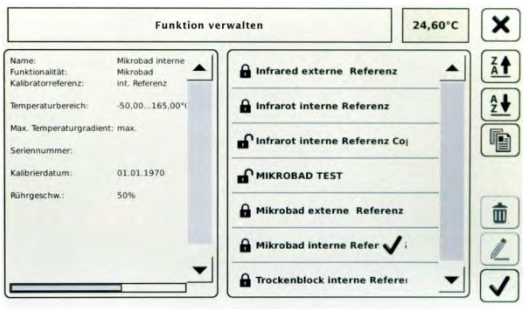
5.4.2 Manage Function

From the "Select Function" window, you can use the ✎ icon to go to the window "Manage Function".

This window is different from the "Select Function" window only in the other elements in the toolbar.

The information box and selection list are the same.

The functions can be sorted, copied, deleted or configured.



Copy Function:

↳ Tap on the icon to copy the selected function.
➢ A copy is created and the "Configure Function" window is opened.
From the parameter fields of this window, you can set the parameters of the new function. Details can be found in the following section.

Delete Function:

↳ On tapping the icon, the selected function is immediately deleted.

Configure Function:

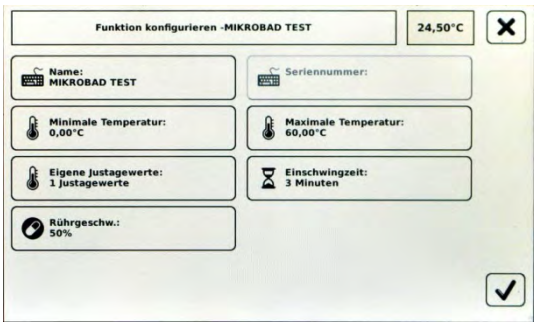
↳ Tap on the icon to edit the parameters of the selected function.
➢ The "Configure Function" window is opened. Details can be found in the following section.

5.4.3 Configure Function

From the "Manage Function" window, you can use the icon to go to the window "Configure Function".

Here, you can change the parameters of the selected function.

↳ Tap on the parameter field of the desired parameter.
➢ The parameter's window is opened. You can configure the parameter there.



Name :
You can change the name of the function here. After tapping, the virtual keyboard with the input line is displayed.

↳ Input the name of the function and confirm the input.
➢ The new name is adopted and you will be returned to the previous window.

Serial number :
The parameter field of the serial number is disabled and cannot be edited.

Minimum temperature :

↳ Input the new value in the input window and confirm the input.
➢ The new value is adopted and you will be returned to the previous window.

Maximum temperature :

↳ Input the new value in the input window and confirm the input.
➢ The new value is adopted and you will be returned to the previous window.

Own adjustment values :
If required, you can save the corresponding adjustment values for your own measuring inserts here. Further information on this can be found under "Adjustment" (→ § 8.4).

Setting time ⌛:

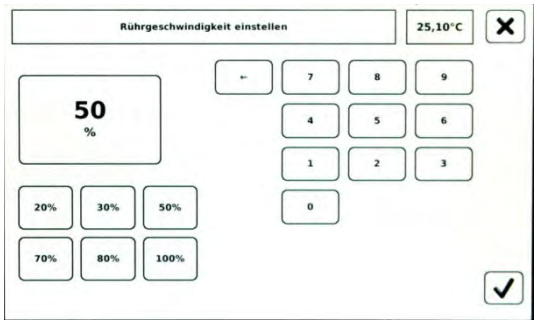
↳ Input the new value in the input window and confirm the input.
➢ The new value is adopted and you will be returned to the previous window.

Stirring speed 🔘:

You can change the stirring speed here. The parameter field is only displayed with "Select Function" as micro bath.

The parameter field of the stirring speed is only displayed if the calibrator is operated as a micro bath and the corresponding functionality has been selected.

↳ Tap on the parameter field "Stirring speed"
↳ Input the desired speed and confirm the input.
➢ The new stirring speed is adopted and you will be returned to the previous window.



5.5 Test specimen (DUT - Device under test)

Here, you can select and manage existing test specimens. You can create new test specimens or tailor unprotected test specimens to match your requirements.

IMPORTANT! When changing test specimens, please consider!
The individual test specimens of the calibrator are independent. Changes to existing test specimens always affect all the test tasks that are linked to the test specimen.

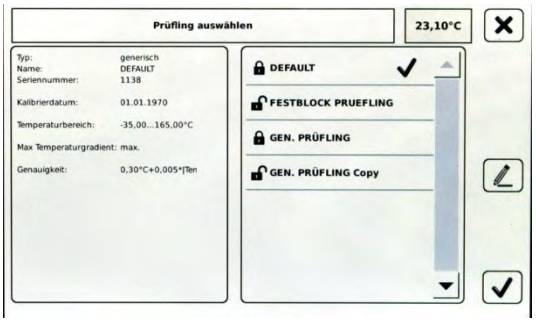
You can get to the "Select DUT" window via the parameter field in the configuration range of the main window or from the window "Test Task configuration".

5.5.1 Select DUT

Information on the selected test specimen is displayed in the information box.

All the test specimens of the calibrator are displayed in the selection list.

From the toolbar, you can accept the selected test specimen, or switch to expert mode for managing and configuring the test specimens.



Operation is analogous to the section "Select Function" (→ § 5.4.1).

5.5.2 Manage DUT

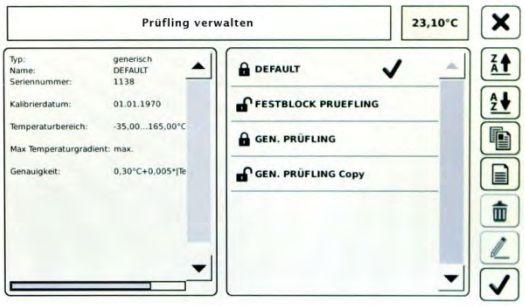
From the "Select DUT" window, you can use the icon to go to the window "Manage DUT".

This window is different from the "Select DUT" window only in the other elements in the toolbar.

The information box and selection list are the same.

The test specimens can be sorted, copied, deleted or configured, or new ones created.

Operation of the window is analogous to the section "Manage Function" (→ § 5.4.2).



In addition, you can also create a new test specimen.

Create new DUT:

↳ Tap on the icon to create a new test specimen.

➢ A new test specimen is created and the window "Configure DUT" is opened. Details pertaining to the window can be found in the following section.

5.5.3 Configure DUT

From the "Manage DUT" window, you can use the icon to go to the window "Configure DUT".

Here, you can change the parameters of the selected test specimen.

You can define the name, the serial number, the minimal and maximal temperature, the adjustment value and the type.

↳ Tap on the parameter field of the desired parameter.

➢ The window of the parameter is opened. You can configure the parameter there.



Operation is analogous to the section "Configure Function" (→ § 5.4.3), with the difference being that the parameter field of the serial number is activated.

Serial number :

↳ Input the new value of the serial number and confirm the input.

➢ The new value is adopted and you will be returned to the previous window.

5.6 Test Task

Here, you can select and manage existing test tasks. You can create new test tasks or tailor unprotected test tasks to your requirements.

From the parameter field "Test Task" of the main window, you get to the window "Select Test Task".

Select Test Task:

Information on the selected test task is displayed in the information box.



All the test tasks of the calibrator are displayed in the selection list.

From the toolbar, you can accept the selected test task, or search for test tasks or switch to expert mode for managing and configuring the test tasks.

Operation is analogous to the section "Select Function" (→ § 5.4.1).

In addition, you can also search for test tasks:

↳ Tap on the icon to search for a test task.
➢ A virtual keyboard with an input line is displayed.

↳ Input the desired search term and confirm your input.
➢ The result of the search is shown in the selection list.

Manage Test Task:

From the "Select Test Task" window, you can use the icon to go to the window "Manage Test Task".

This window is different from the "Select Test Task" window only in the other elements in the toolbar.



The information box and selection list are the same.

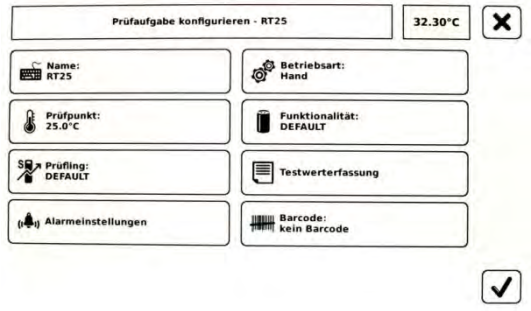
The test tasks can be sorted, copied, deleted or configured, or new ones created.

Operation of the window is analogous to the sections (→ § 5.4.2) and (→ § 5.5.2).

Configure Test Task:

From the "Manage Test Task" window, you can use the icon to go to the window "Configure Test Task".

Here, you can change the parameters of the selected test task.



↳ Tap on the parameter field of the desired parameter.
➢ The window of the parameter is opened. You can configure the parameter there.

5.6.1 Name

Here, you can change the name of the test task. After tapping, the virtual keyboard with the input line is displayed.

↳ Input the new name of the test task and confirm the input.
➢ The new name is adopted and you will be returned to the previous window.

5.6.2 Operating mode

Here, you can select the "Operating mode" of the calibrator.

Details of the selected operating mode are displayed in the information box in the window.

↳ Select the desired operating mode and confirm the input.
➢ The new operating mode is adopted and you will be returned to the previous window.



5.6.3 Test point

The parameters of the test points are set here. Depending on the selected "Operating mode", you can set the parameters of one or more test point(s).

IMPORTANT! Dynamic designation and depiction of the parameter fields.
Depending on the selection of the "Behaviour at test end" (→ Pg.°37) , individual parameter fields have another designation or are suppressed.

5.6.3.1 "Single test point"

The parameters of a test point are set in this operating mode. Upon tapping, a new window is displayed.

With the parameter fields of the window, you can set the test point, the dwell time and the behaviour at test end.



Set test point:

↳ Tap on the parameter field "Test point".
↳ Input the temperature in the "Set test point" window and confirm the input.
➢ The new temperature is adopted and you will be returned to the previous window.

Set dwell time:

↳ Tap on the parameter field "Dwell time".
↳ Input the dwell time in the "Set dwell time" window and confirm the input.
➢ The new dwell time is adopted and you will be returned to the previous window.

Behaviour at test end / Safety temperature range

Using the parameter fields of the new window, you can set the safety temperature range and define the behaviour at test end.

The two parameter fields "Safety range from" and "Safety range to" are only visible if "Safety temperature range" was selected as the behaviour at test end.



Behaviour at test end:

- Tap on the parameter field "Behaviour at test end".
  - ➢ The "Set test end" window is displayed.
- Select the desired behaviour and confirm the input.
  - ➢ The new behaviour is adopted and you will be returned to the previous window.



Safety temperature range:

- Tap on the parameter fields "Safety range from" and "Safety range to".
- Input the respective starting and end value of the safety temperature range and confirm the inputs.
  - ➢ The new values are adopted and you will be returned to the previous window.

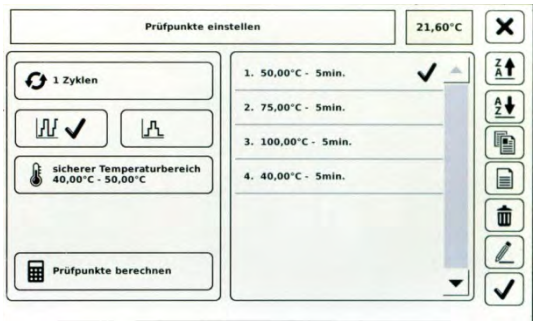
5.6.3.2 "Control off" / "Step operating"

With these operating modes, you can set the parameters of several test points. Upon tapping, a new window is displayed.

The information box has several parameter fields for setting the test points.

All the test points are displayed in the selection list.

The test points can be moved, copied, created, deleted or changed from the toolbar.



Move test point:

- Select the desired test point by tapping on ✓ in the selection list.
- Move the test point down or up by tapping the / icons.

Copy test point:

- Tap on the icon to copy the selected test point.
  - ➢ The test point is copied and appended at the end of the selection list.

Create new test point:

- Tap on the icon to create a new test point.
  - ➢ The window for the test point setting is opened.
- Input the temperature and the dwell time and confirm the relevant input.
  - ➢ The input values are adopted and you will be returned to the previous window.

Delete test point:

↳ On tapping the 🗑 icon, the selected test task is immediately deleted.

Change test point:

↳ Tap on the ✎ icon to modify the selected test point.
➢ The window for the test point setting is opened.

↳ Change the temperature and the dwell time and confirm the new values.
➢ The new values are adopted 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 on 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 adopted and you will be returned to the previous window.

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.

Middle parameter field 🌡:
The parameter field displays the current "Behaviour at test end".

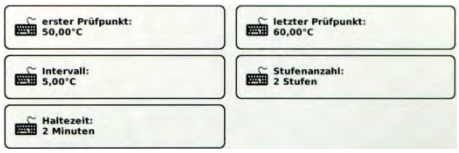
↳ Tap on the parameter field to change the behaviour. Details can be found in the section "Behaviour at test end" (→ Pg. 37).

Calculate test points 🖩

Here, you can easily have the steps between two temperatures calculated. If a change is made to a parameter, the other parameters dependent on it are calculated afresh automatically.

↳ Tap the parameter field to open the window "Calculate test points".

Define first and last test point:



↳ To do so, tap on the parameter fields, input the new values and confirm the input.
➢ The new values are adopted, the interval is calculated afresh and you will be returned to the previous window.

Set interval:

↳ For fixed intervals, tap on the parameter field "Interval", input the desired step width and confirm the input.
➢ The new interval is adopted 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 on 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 adopted and the interval is calculated afresh.

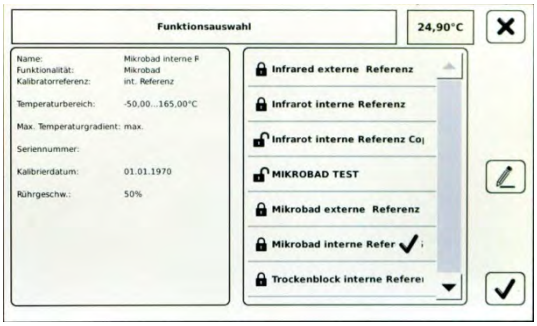
Set dwell time:

↳ Tap on the parameter field "Dwell time", input the new values and confirm the input.
➢ The new value is adopted and you will be returned to the previous window.

5.6.4 Functionality

Here, you can link the desired function of the calibrator with the test task.

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



Details regarding the selected function are displayed in the information box in the window.

↳ Select the desired function by tapping on ✓ in the selection list.

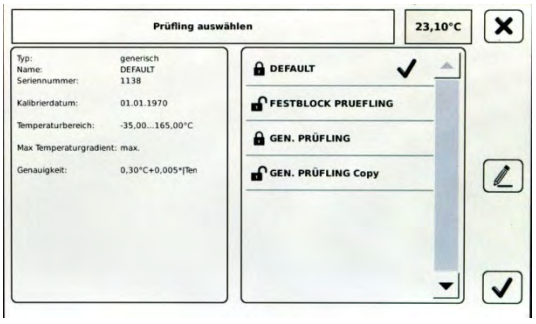
↳ Confirm the selection by using the ☑ icon.
➢ The new function is adopted and you will be returned to the previous window.

You can use the ✎ icon to switch into expert mode for administering and configuring the functions.

⚠ Caution! Changes to existing functions always affect all the test tasks that are linked to the function (→ § 5.4).

5.6.5 Test specimen (DUT)

Here, you can link the desired test specimen with the test task.



Details of the selected test specimen are displayed in the information box in the window.

↳ Select the desired test specimen by tapping on ✓ in the selection list.

↳ Confirm your selection with the ☑ icon.
➢ The new test specimen is adopted and you will be returned to the previous window.

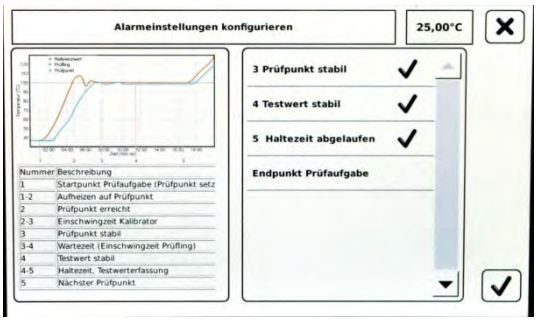
You can use the ✎ icon to switch into expert mode for administering and configuring the test specimens.

⚠ Caution! Changes to existing test specimens always affect all the test tasks that are linked to the test specimen (→ § 5.5).

5.6.6 Alarm settings

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

Details on the selectable times are displayed in the information box.



- Select the desired times by tapping on ✓ in the selection list.
- Confirm your selection with the ☑ icon.
  - The new times are adopted and you will be returned to the previous window.

5.6.7 Test value acquisition

Here, you can change the name of the measurement log under which the measurement values of the test task are saved. Moreover, you can define the type of test value acquisition.

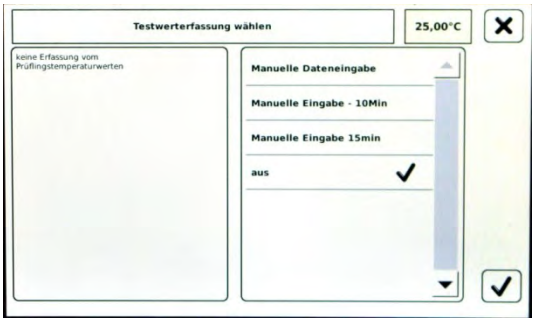
- Tap on the parameter field to change the desired parameter.
  - The window of the parameter is opened.



Record name:

- Input the new name of the measurement log and confirm the input.
  - The new name is adopted and you will be returned to the previous window.

Test value acquisition:
Information on the selected type of test value acquisition is displayed in the information box.



- Select the desired type and confirm the input.
  - The new type of test value acquisition is adopted and you will be returned to the previous window.

When the test value acquisition is activated, the test specimen temperature is additionally saved to the measurement log. To that end, a window is opened, in which you have to input the test specimen temperature.

5.6.8 Scan / Barcode

Via the parameter field of the configuration range, an input window is opened with a virtual keyboard. A connected USB barcode reader can replace the keyboard input here.

When scanning a barcode, all the test tasks and test specimens are searched for the code. All the entries linked to the barcode are displayed in a selection list.

By using the parameter field of the test tasks, a scanned barcode can be linked to the test task.

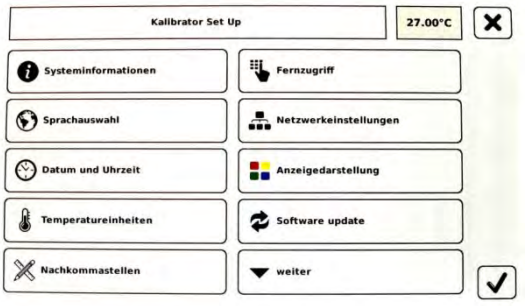
5.7 Calibrator settings

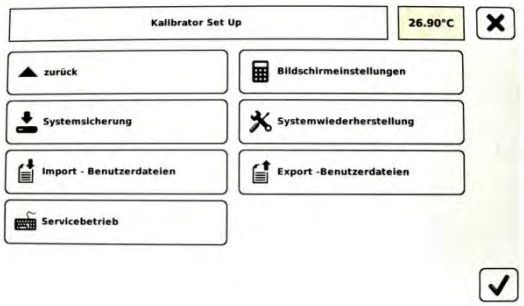
The most important windows for the setting of the calibrator are described in the following sections.

5.7.1 Calibrator Set Up

In the "Calibrator Set Up" window, the settings of the calibrator are displayed and the parameters are changed.

The window has two pages. You can switch between the two pages with the parameter fields " ▼ next" and " ▲ back".





By using the parameter fields of the "Calibrator Set Up" window, you can get to the windows of the parameters. There, the relevant information is displayed or the parameters are configured.

Parameter fields of the "Calibrator Set Up" window

System information:

The most important data of your calibrator is displayed. These data are the calibrator type, the production date, the version of the software, the serial number, the operating hours (total / since the last calibration) and the calibration date.



Remote control:

In conjunction with the PC software (accessory), the calibrator can be monitored via a network from a PC. Various parameters can be set, for example, setting the desired value or selecting the function.
During remote access, no inputs are possible via the touch screen, except for ending remote access. The current reference temperature is displayed.

Language selection:

The current language is indicated in the information box. All the installed languages of the calibrator can be seen in the selection list.



↳ Select the desired language by tapping ✓ in the selection list.

↳ Confirm your selection with the ☑ icon.

➢ The selected language is adopted and you will be returned to the "Calibrator Set Up" window.

Network settings:



Using the parameter fields of the window, you can integrate the calibrator in your network.

First connect the calibrator with your network:

- Insert one plug of a suitable network cable in the socket of the calibrator.
- Insert the other plug of the network cable in a free socket of your network.

Now configure the calibrator for the network.

- First set the network mode on.
  "DHCP" = automatic assignment of the IP address.
  "Manual" = Manual input of the IP address and subnet mask.
- Select the desired mode by tapping in the selection list.
- Confirm your selection with the ☑ icon.
  - ➢ "DHCP": The IP address and subnet mask are requested from the network. The two parameter fields are disabled.

In addition, for "Manual":

- Input the IP address from the numeric keypad of the window and confirm the input with the ☑ icon.
- Input the subnet mast from the numeric keypad of the window and confirm the input with the ☑ icon.

Date and Time:

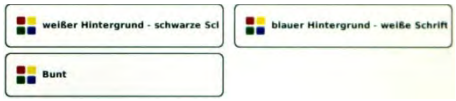


Using the parameter fields of the window, you can set the date and time of the calibrator, as well as change the format of the date and time.

By tapping the respective parameter field, a window is opened for the input/change.

Upon confirming with the ☑ icon, the input/change is adopted and you return to the "Date and Time" window.

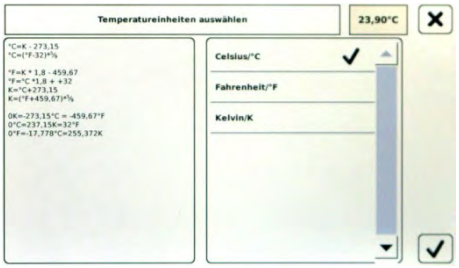
Display layout:



The depiction on the screen is changed using the parameter fields in this window.

Upon tapping on the corresponding parameter field, the display on the screen is immediately adjusted.

Temperature unit:



In the selection list, you can select between Celsius, Fahrenheit and Kelvin as the temperature unit.

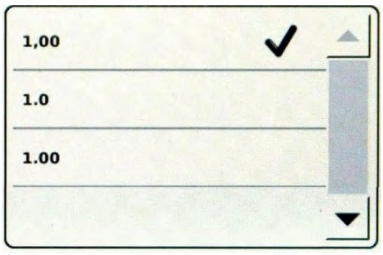
- Select the desired unit by tapping on ✓ in the selection list.
- Confirm your selection with the ☑ icon.
  - ➢ The selected unit is adopted, the temperature values are converted and you will be returned to the "Calibrator Set Up" window.

Software update:

For a software update, you need a new software version. The newest software version for your calibrator can be found on our homepage at "www.sika.net".

- Compare the version level of your calibrator (→ "System information") with the version level of the latest software.
- Download the latest software to a USB stick.
- Insert the USB stick in the calibrator and wait for 20-30 s so that the USB stick is recognised. Now tap on the parameter field "Software update".
- Follow the instructions on the screen.

Decimal places:



Here, you can define the format of the temperature values in the windows.

- Select the desired format by tapping on ✓ in the selection list.
- Confirm your selection with the ☑ icon.
  - ➢ The selected format is adopted, the temperature values are displayed accordingly and you will be returned to the "Calibrator Set Up" window.

Display settings:



You can use the parameter field of this window to set the screen brightness.

- Input the desired values from the numeric keypad of the window and confirm the input with the ☑ icon.
  Input values: 1 ... 100%.

System backup:

When taking a system backup, all the settings of the calibrator, including the software, are saved to the connected medium. The required "SIKA" folder is created if it does not exist.

- Insert the USB stick in the calibrator and wait for 20-30 s so that the USB stick is recognised. Now tap on the parameter field "System backup".
- Follow the instructions on the screen.



System recovery:

You can use the system restore function to restore a previously saved system backup to the calibrator. Next, the calibrator is restarted to activate the restoration.

- Insert the USB stick in the calibrator and wait for 20-30 s so that the USB stick is recognised. Now tap on the parameter field "System recovery".
- Follow the instructions on the screen.



Import user files:

You can use this parameter field to load previously saved user settings to the calibrator. Moreover, you can copy additional SIKA factory settings of measurement tasks, test specimens and functions.

- Insert the USB stick in the calibrator and wait for 20-30 s so that the USB stick is recognised. Now tap the parameter field "Import user files".
- Follow the instructions on the screen.



Export user files:

You can use this parameter field to save all the user settings of test tasks, test specimens and functions to the connected medium. The required "SIKA" folder is created if it does not exist.

- Insert the USB stick in the calibrator and wait for 20-30 s so that the USB stick is recognised. Now tap the parameter field "Export user files".
- Follow the instructions on the screen.



Service operation:

You can use this parameter field in the window to set the system parameters of the calibrator. These settings may only be done by authorised SIKA technical staff.

This range is password-protected!



CAUTION! Material damage!

Service operations are protected by a password. Unauthorised access to this range can result in damage to the calibrator.

- Do not try to hack the password.
- Quit this range by tapping the ✖ icon.

5.7.2 Measurement reports

Here, you can select saved data of testing processes and have them displayed. The measurement log is saved under the name of the testing process. Several measurement logs can have the same name, if a testing process was carried out at different times.

From the main window, you get to the window "Select measurement report".

Information on the selected measurement log is displayed in the information box.

All the measurement logs of the calibrator are displayed in the selection list.

The measurement logs can be sorted, deleted, exported or displayed from the toolbar.



- Select the desired measurement log by tapping on ✔ in the selection list.
  - ➢ The information on the measurement log is immediately displayed in the information box.

Delete measurement report:

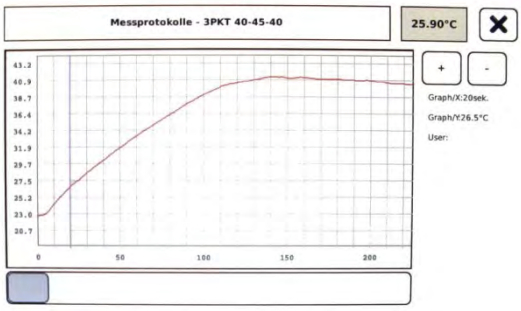
- On tapping the 🗑 icon, the selected measurement log is immediately deleted.

Export measurement report:

- Tap on the icon to export the selected measurement log.
- Follow the instructions on the screen.

Show measurement report:

- Confirm your selection with the ☑ icon.
  - ➢ The window for displaying the measurement logs is opened and the data of the selected measurement log are loaded.
- Move the scrollbar below the measurement value range to move the time axis of the recording.
  - ➢ The relevant measurement data are displayed in the measurement value range. The temperature axis is scaled automatically.
- Tap on the (+/-) symbols next to the measurement value range to change the scaling of the time axis.



6 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 machine.

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 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.

Starting the testing process:

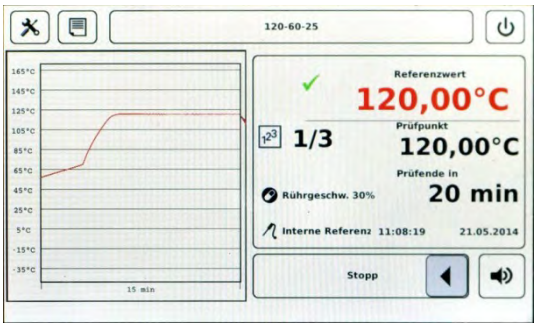


IMPORTANT! Parameter fields disabled!
During the testing process, all the parameter fields, with the exception of the Start / Stop slider and the alarm signal, are disabled.

↳ 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.



The temperature progression of the last 15 minutes is displayed in the information box.

Information on the testing process is displayed in the display range (→ Pg. 47).

Testing process finished:

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



↳ Tap "OK" to close the dialog box.

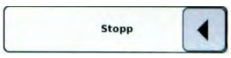
↳ Push the button of the start / stop slider completely to the left.



➢ The main window is displayed.

Cancel testing process:

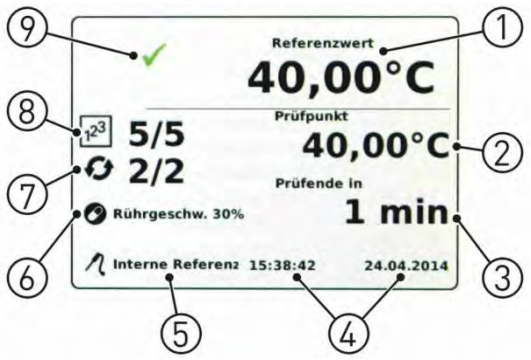
↳ Push the button of the start / stop slider completely to the left.



➢ The testing process is aborted and the machine gets programmed to reach the temperature of the "Behaviour at test end" (→ Pg. 37) of the test task.

Display range:

The following information is shown in the display range:



① Current temperature values of the reference used.
② Current test point.
③ Probable remaining test duration for the current test point.
④ Time and date.
⑤ Reference used.
⑥ Current stirring speed.
⑦ Cycle counter, in case of more than one pass.
⑧ Step counter for stepped operation.
⑨ Measurement value stable, if applicable.

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 (→ § 8.2).

7 Problems



CAUTION! Material damage!

The TP37 / TP3M cannot be repaired by the user! In case of a defect, the device must be returned to the manufacturer for repair.

↳ Never open the TP37 / TP3M 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.	Unknown.	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.	The temperature switch is possible triggered, switching off the power supply to the heat cartridge (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.
No function.	Network connection not established correctly or fuse defective.	Check the network connection and fuse.

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 or directly to SIKA. 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.

7.1 Return shipment to the manufacturer

Due to legal requirements placed on environmental protection and occupational safety and health and to maintain the health and safety of our employees, all units returned to SIKA for repair must be free of toxins and hazardous substances. That also applies to cavities in the devices. If necessary, the customer must neutralise or purge the unit before return to SIKA.

Costs incurred due to inadequate cleaning of the device and possible costs for disposal and/or personal injuries will be billed to the operating company.



WARNING! Risk of injury due to insufficient cleaning!

The operating company is responsible for all damages and harm of any kind, in particular physical injuries (e.g. caustic burns or toxic contaminations), decontamination measures, disposal etc. that can be attributed to insufficient cleaning of the measuring instrument.

↳ Comply with the instructions below before returning the unit.

The following measures must be taken before you send the unit to SIKA for repair:

- Clean the device thoroughly. This is of extreme importance if the medium is hazardous to health, i.e. caustic, toxic, carcinogenic or radioactive etc.
- Remove all residues of the media and pay special attention to sealing grooves and slits.
- Attach a note describing the malfunction, state the application field and the chemical/physical properties of the media.
- Please follow the instructions on the procedure for sending returns which are on our website (www.sika.net/en/services/return-of-products-rma.html) and please specify a point of contact in case our service department has any questions.

The customer must confirm that the measures were taken by filling out the declaration of decontamination. It can be found on our website as a download:

www.sika.net/images/RMA/Formular_Warenruecksendung.pdf

8 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.

8.1 Maintenance

The TP37 / TP3M 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 in accordance with BGV A2.

Recalibration:

↳ Send the calibrator for Recalibration (→ § 8.3) once annually or after a maximum of 500 operating hours to SIKA.

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 wear 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 (T6.3AH 250V).
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").

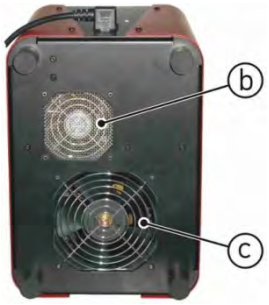
Should the fuses blow repeatedly, there is probably a fault in the calibrator.
In this case, send the calibrator to SIKA for repairs (→ § 7+§ 7.1).

8.2 Cleaning

External cleaning:

Clean the TP37 / TP3M 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 machine 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 ⓑ + ⓒ 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! Temperature fuse at over-temperature!

An air flow that is too low can result in the temperature fuse getting triggered. The calibrator is then rendered operationally disabled, and must be sent to SIKA.

- 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 draining pump. 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 draining pump 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 draining pump.
- Dry the tank, the sensor cage, the magnetic stirrer and the draining pump thoroughly.

8.3 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 SIKA at intervals of max. 12 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.

8.4 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 (→ § 11).

For this case, the TP37 / TP3M 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 (→ § 5.2), or in the "Configure DUT" window (→ § 5.5.3), 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.

9 Decommissioning and disposal

CAUTION! Risk of injury!
Never remove the device from a measurement set up in operation.
↳ Make sure that the measurement set up is shut down professionally.

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").

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 (→ § 8.2 "Cleaning").

Disposal calibration liquid:

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

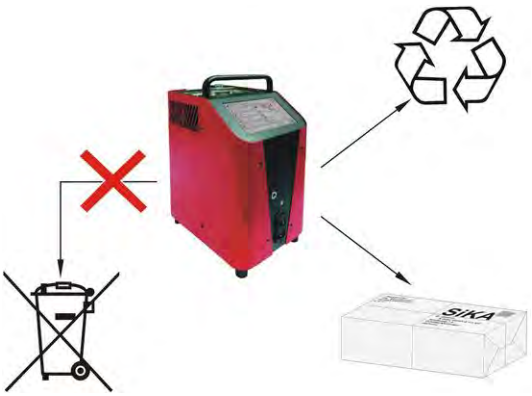
Disposal calibrator:

NO HOUSEHOLD WASTE!
The calibrator of the series TP37 / TP3M consist of various different materials. It must not be disposed of with household waste (EU Directive 2002/96/EC).

↳ Take the TP37 / TP3M to your local recycling plant

or

send the TP37 / TP3M back to your supplier or to SIKA.



10 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.

10.1 Characteristics TP37 / TP3M

Type / Characteristics	TP 37 200 E	TP 37 165 E	TP 37 166 E	TP 37 700 E	TP 3M 165 E	TP 3M 255 E
Calibrator						
Temperature range: - Dry block - Infrared - Surface - Micro bath (Silicone oil) - Micro bath (Water)	 -55...200 °C -/- -/- -/- -/-	 -35...165 °C -/- -/- -/- -/-	 -35...165 °C -35...165 °C -25...150 °C -/- -/-	 RT...700 °C -/- -/- -/- -/-	 -35...165 °C -35...165 °C -25...150 °C -35...165 °C 0...100 °C	 RT...255 °C RT...255 °C RT...200 °C RT...255 °C RT...100 °C
Tolerance: - Dry block - Infrared - Surface - Micro bath	 ±0.2 °C -/- -/- -/-	 ±0.2 °C -/- -/- -/-	 ±0.2 °C ±0.5 °C ±1 °C -/-	 ±0.4 °C -/- -/- -/-	 ±0.3 °C ±0.5 °C ±1 °C ±0.1 °C	 ±0.3 °C ±0.5 °C ±1 °C ±0.1 °C
Emission degree: - Infrared	 -/-	 -/-	 0.9994	 -/-	 0.9994	 0.9994
Stability (of the control): - Dry block - Infrared - Surface - Micro bath	 ±0.05 °C -/- -/- -/-	 ±0.05 °C -/- -/- -/-	 ±0.05 °C ±0.05 °C ±0.2 °C -/-	 ±0.05 °C -/- -/- -/-	 ±0.05 °C ±0.05 °C ±0.2 °C ±0.05 °C	 ±0.05 °C ±0.05 °C ±0.2 °C ±0.05 °C
Measurement zone [mm]: - Dry block - Infrared - Micro bath	 110...150 -/- -/-	 110...150 -/- -/-	 110...150 110 -/-	 110...150 -/- -/-	 123...163 110 110...150	 123...163 110 110...150
Detection speed	130 ms					
Control sensor	Internal • External					
Display						
Properties: - Kind • Size - Viewing angle - Brightness (adjustable)	Colour Touch screen • 7" 120...140° ⩽ 400 cd/m²					
Display range	-60...200 °C	-50...165 °C		0...700 °C	-50...165 °C	0...255 °C
Resolution	0.1 / 0.01 / 0.001 °C					
Unit	°C (optional °F)					
Sensor break: - Display - Behaviour	Text message Turn off the controller					
Behaviour when temperature is exceeded in the housing	Temperature fuses switch off the heating when the limit values are exceeded.					

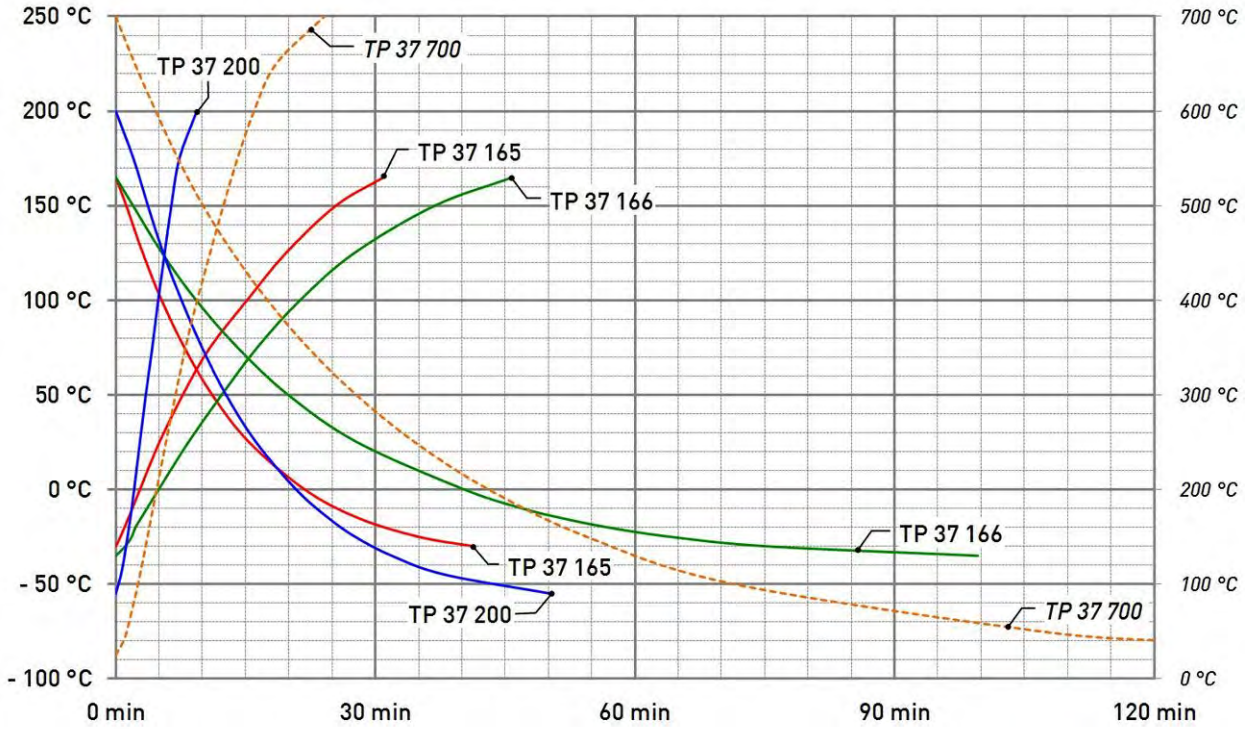
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Type / Characteristics	TP 37 200 E	TP 37 165 E	TP 37 166 E	TP 37 700 E	TP 3M 165 E	TP 3M 255 E
Electrical characteristics						
Supply voltage	100...240 V_{AC} • 50/60 Hz					
Power consumption	~ 600 VA	~ 400 VA		~ 1000 VA	~ 400 VA	~ 1000 VA
Fuse	100...240 V_{AC} • 6.3 A slow-blow					
Interfaces: - Network / PC - Service - external devices	Ethernet: RJ45 USB OTG: USB-jack Type B USB 2.0 Host: USB-jack Type A • 12 Mbit/s Full-Speed • max 100 mA					
Device safety	Overvoltage category II Pollution level 3 (industrial environment)					
Degree of protection (EN 60529)	IP 20					
Connecting cable	H05VV-F 3 G 0.75 mm^2 with angled protective contact plug and cold equipment plug • Length ~ 2 m					
Process variables						
Metal block / Tank opening: - Borehole - Depth	∅ 28 mm 150 mm		∅ 60 mm 150 mm	∅ 28 mm 150 mm	∅ 60 mm 170 mm	
Dimensions: - Width - Height - Depth	210 mm 380 + 50 mm 300 mm					
Weight	~ 12.5 kg	~ 10 kg	~ 10 kg	~ 8.5 kg	~ 13 kg	~ 8.5 kg
Sensor cage working depth	-/-				150 mm	
Ambient conditions						
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: - Location • Altitude - Operating position	Interiors • up to 2000 m Standing upright/vertically					
Application area	tested according to EN 61326-1, class A (industrial sector)					

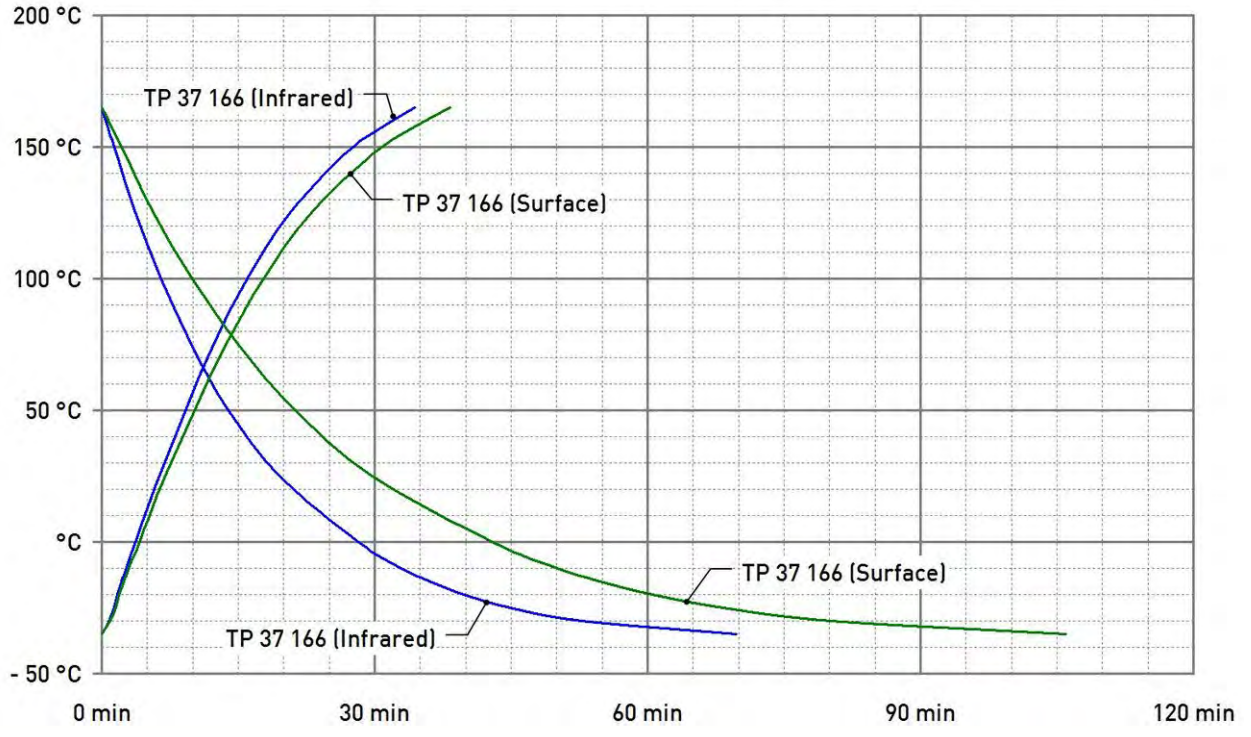
10.2 Heating up and cooling times

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.

10.2.1 10.2.1 TP 37 200 E • TP 37 165 E • TP 37 166 E • TP 37 700 (dry block)



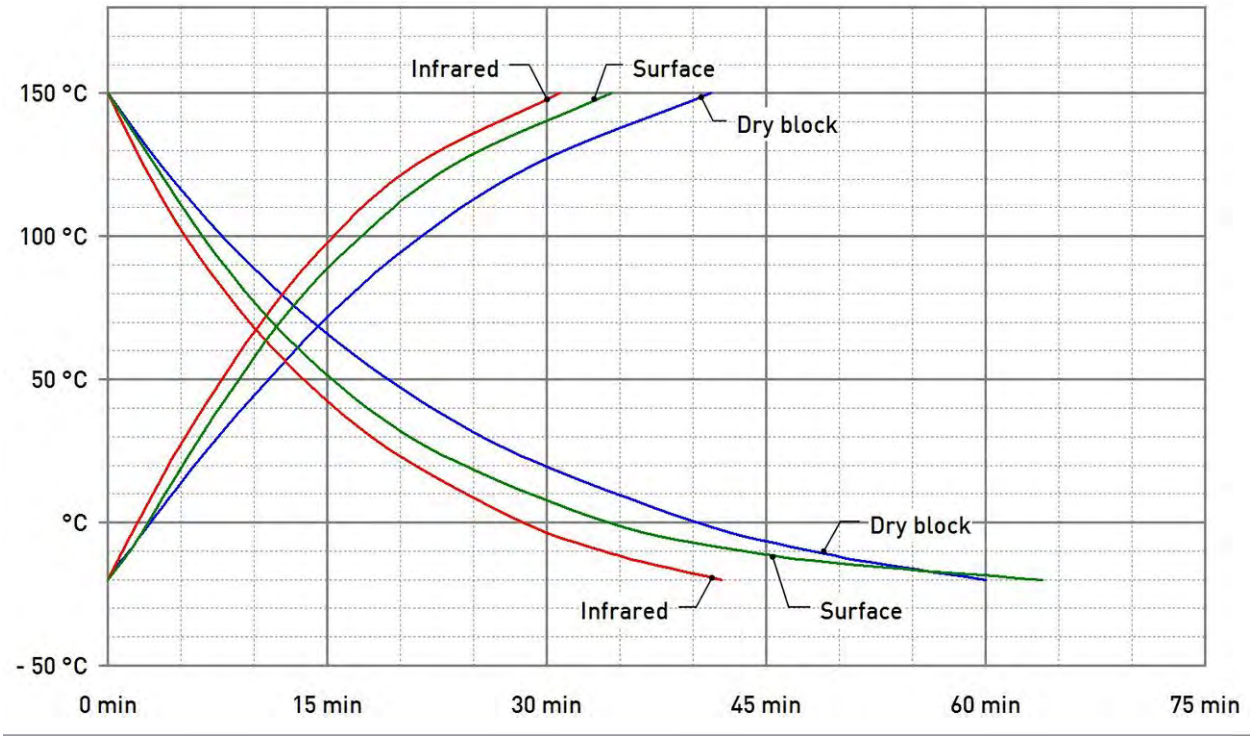
10.2.2 TP 37 166 E (Infrared and surface)



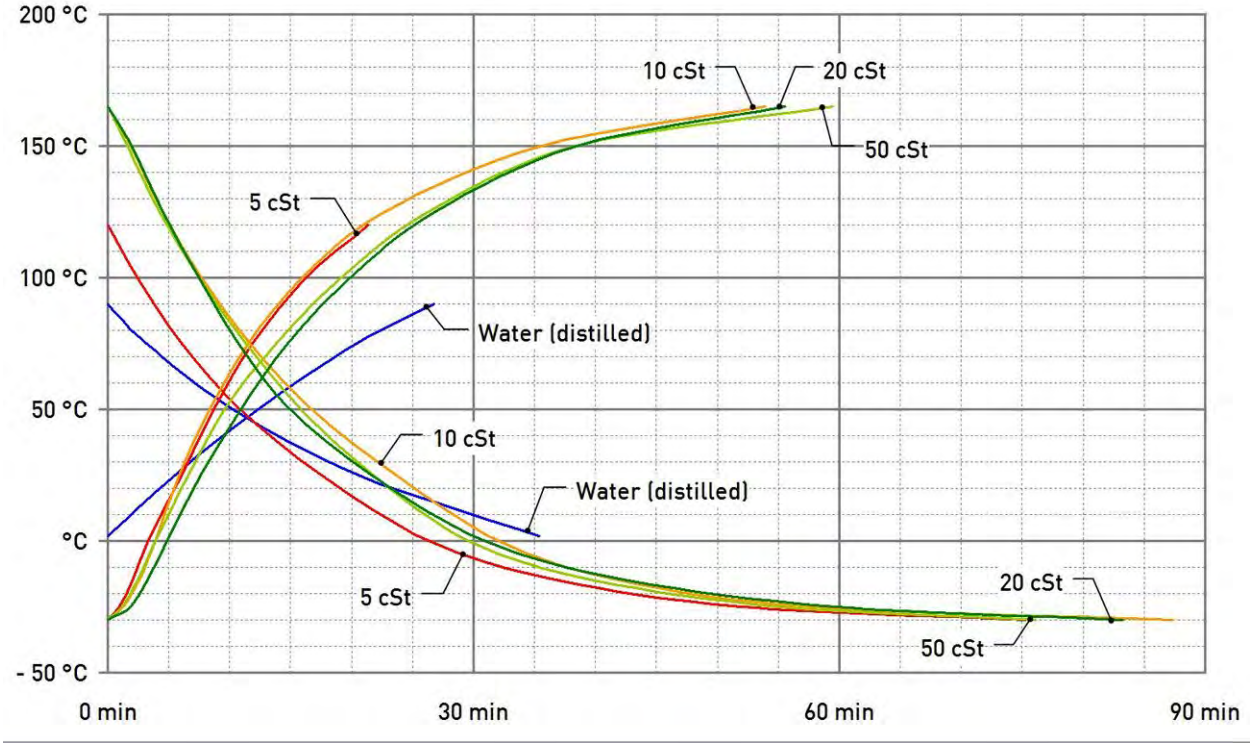
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10.2.3 TP 3M 165 E

Dry block, infrared and surface

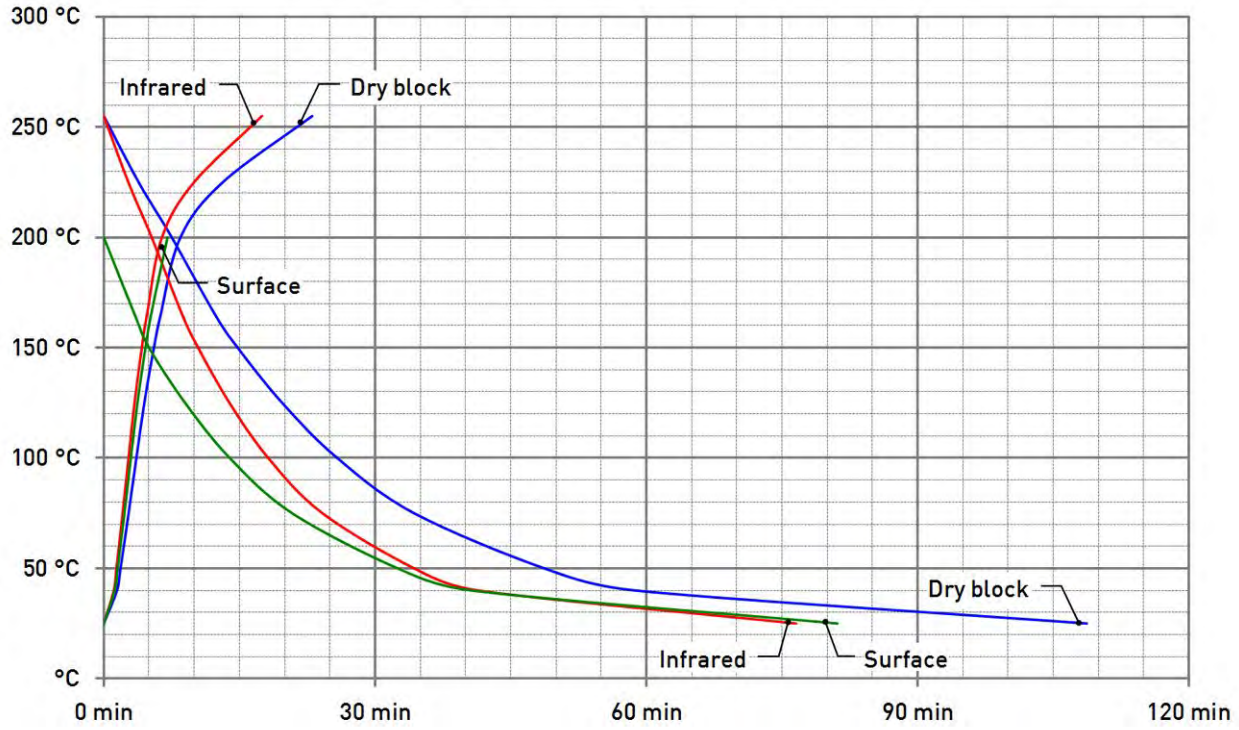


Micro bath: Water and silicone oil

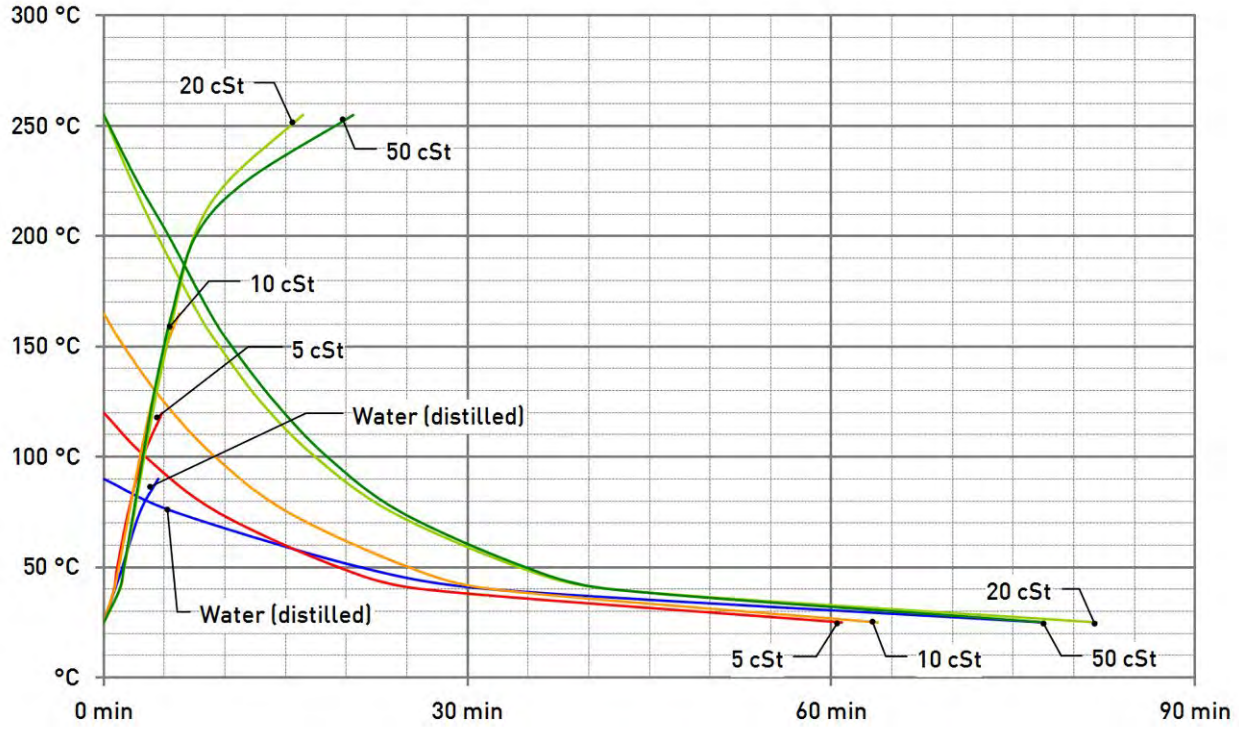


10.2.4 TP 3M 255 E

Dry block, infrared and surface



Micro bath: Water and silicone oil



11 Guideline DAkkS-DKD-R 5-4 • Appendix B

Details of the DKD technical committee "Temperature and Humidity" for the operation of temperature block calibrators.

Having a calibrator certificate from a DAkkS calibration laboratory confirms that the temperature block calibrator meets the high demands of the calibrating ability of such a device, which are outlined in the guideline DAkkS-DKD-R 5-4. Nevertheless, the following points should be noted regarding the use of the calibrator:

The calibration of the temperature block calibrator predominantly relates to the temperature of the solid body block. The temperature of the thermometer in the block to be calibrated can differ from this temperature. If a thermometer of the same model, under the same test conditions as were used in the calibration is used, it can be assumed that the measurement difference in the calibration of ideal thermometers are not larger than the measurement inaccuracy which is stated in the calibrator certificate. If it is the case that nothing else is specified on the calibrator certificate, it must be ensured that

- the measuring element is located in the homogeneous temperature zone.
- the inner diameter of the bore hole used in the calibrator (possibly the casing) in the temperature range of –80 °C to 660 °C is a maximum of 0.5 mm bigger than the outer diameter of the calibrated thermometer, and in the temperature range of 660 °C to 1300 °C is a maximum of 1.0 mm bigger.
- the immersion depth of the thermometer to be calibrated amounts to at least 15 times the outer diameter of the thermometer to be calibrated.
- the thermometer to be calibrated has an outer diameter of d < 6 mm.

Please take particular care if a heat transfer medium was used during the calibration of the temperature block calibrator. If this is the case the calibration is only effective if the calibrator was used with a corresponding heat transfer medium.

With the calibration of thermometers with an outer diameter d > 6 mm allow for an additional error of measurement due to heat conduction. In the case that such measurements are required, the additional heat conduction can be determined by the thermometer model and ascertained from your accredited calibration laboratory. A good test of the possible temperature variations caused by heat conduction consists of testing whether the display of the calibrated thermometer changes when it is lifted 20mm. Contributions to measurement inaccuracy that are conditional on the thermometer to be calibrated (e.g. inhomogeneities from thermal elements), are likewise not covered in the measurement inaccuracy of the calibrator.

In the case that the calibrator is used in load conditions that do not comply with the load condition from the calibration, the influence of the load condition can be determined through replacement or addition of other thermometers on site.

The details on the calibration certificate are important for the calibration, not the manufacturers' instructions. Before the calibration, please make sure you agree upon the operation and calibration conditions with your DAkkS calibration laboratory.

If there is nothing else specified on the calibrator certificate, (independent from the manufacturers' instructions) it must be ensured that

- the calibrator is used in a vertical position.
- no additional thermal isolation is in use.
- the environmental temperature is (23 ±5) °C.

In order to check the calibration of the temperature block calibrator it is recommended to take regular measurements with a calibrated thermometer. If control measurements with a calibrated thermometer are not taken annually, recalibration of the temperature block calibrator is strongly recommended.

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