

Operating Manual

Single Station Vicat Needle Testing Apparatus



CAUTION: Do not place this device into operation until you have made yourself fully acquainted with its connection, with its function, and with the position of all its control elements and functions.

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1. Basic instructions

1.1 Designation

Designation of the device:

Please see the nameplate on the Vicat Apparatus, which shows the complete characteristic data and the electric properties of the system.


1.2 Purpose for which this system was designed

This Operating Manual contains the information required for operation of the products described here, for the purpose for which they have been designed. This Operating Manual is intended to be used only by technically qualified staff.

“Technically qualified staff” is defined as those persons who – as a result of their training; their experience; the instructions which they have received; as well as their knowledge of the relevant standards, regulations, accident-prevention regulations, and conditions of product operation in the company – have been authorized by the person responsible for the safety of the company equipment to carry out the activities and actions required for operation of the equipment described below, and who can recognize and prevent any possible dangers arising from such operation (this definition of technically qualified staff has been provided in IEC 364).

The User must, by all means observe the requirements and limit values, as well as all safety instructions, given in this Operating Manual. Any use of this device not in conformity with these stipulations shall be considered to be in violation of the use for which this system was intended. If this device must operate under special conditions, or with special modes of operation, then this shall be authorized only after consultation with the manufacturer, and after obtaining his prior and express approval.

The apparatus serves exclusively to measure the setting times of cement. The beginning and end of the setting process are determined from the way in which a steel needle penetrates into a cement sample manufactured under specific conditions.

<p>Caution!</p> 	<p>The instructions provided in this operating manual concern only the correct use of the system. To perform the test correctly, the user must observe the specific norms for the test.</p>
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1.3 Improper use and safety notices

The apparatus is built according to the state of the art and recognised technical rules. Despite this, dangers to life and limb of the user or third parties or damage to parts of the apparatus or other property can arise during operation.

Do not disassemble the apparatus and do not attempt to repair or modify it.

Operate the product within the specified supply voltage range.




Do not operate the product in places exposed to icing, heat radiation, condensation, corrosive gasses, vibrations or heavy blows, and places with high air humidity and temperature fluctuations.

<p>Caution</p> 	<p>The mixing of cement with water causes the release of alkaline substances. In working with concrete, it is essential to take all necessary precautions to prevent dry cement from entering the eyes, mouth, or nose. Use protective clothing to prevent skin contact with wet cement or concrete. If cement or concrete enters the eyes, immediately and carefully wash out the eyes with clean water. Seek medical help instantly. If moist concrete contacts the skin, wash it off immediately.</p>
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The operator must make sure not to endanger other persons. Only trained operators may use the device unsupervised.

If any faults or damage to the apparatus impairs its operational safety, put it out of operation immediately and use it again after you eliminate all hazards.

This operating manual contains safety instructions that you have to observe in order to exclude any risk of fatalities, injuries, damage to the equipment or improper operation. Safety markings are as follows:

<p>Caution!</p> 	<p>This warning refers to dangers that could cause material damage.</p>
<p>Danger</p> 	<p>This warning refers to dangers that could cause severe injuries or even fatalities.</p>
<p>Note</p> 	<p>Provides practical advice on operation</p>

1.4 Guarantee

Apply our **General Terms of Sales and Delivery** in all cases.

The Manufacturer guarantees that this Operating Manual has been prepared in conformity with the technical and functional parameters of the equipment as delivered. The Manufacturer reserves the right to add supplementary information to this Operating Manual as required.

The guarantee provided by the Manufacturer is the legal guarantee. This guarantee does not cover wear-and-tear parts.

The Manufacturer guarantees trouble-free operation only if the User observes the instructions in this Operating Manual, and only if the User employs the equipment for the purpose for which it is intended.

The Manufacturer shall not be liable for damages that may occur if the equipment is used for purposes for which it is not intended, or if the User does not observe the instructions and rules for operation as set forth in this Operating Manual.

No claims for damages may be lodged against the Manufacturer if the equipment is modified in its structural or constructional characteristics without the prior written consent of the Manufacturer, or if its functional characteristics are modified without such consent.

1.5 Acceptance of delivery and transport

1.5.1 Acceptance of delivery

When accepting delivery of the equipment, first inspect it for its outer, visible condition. If this inspection is satisfactory, the device may be accepted from the freight forwarder (railways, parcel service, or other haulage company).

If there are no shortcomings, and if there are no transport damages, then use the bill of delivery to make sure that the consignment is complete, and that all parts have been delivered.

If you assume or suspect transport damage, or if transport damage becomes apparent only after you have accepted the delivery, immediately make an exact report of the conditions and any damage as they exist. Send us this report immediately by fax or e-mail. Important: Absolutely do not make any changes to the delivered goods.

After we have studied your report, we can make a decision whether we can:

- Deliver spare parts to you, or
- Send a specialized fitter/installer to your plant, or
- Ask that you return the system to us for repair.

1.5.2 Transport

The equipment is delivered in a transport box. The open spaces inside the boxes are filled with cushioning material to prevent damage during transport.

After the equipment has been unpacked from the transport box, it can be lifted out of the box by hand and moved by hand to the place where it is to be used.


The weight is approx. 22 kg.

1.5.3 Commissioning

Place the equipment on an even and vibration-free base with a suitable load-bearing capacity. This equipment is intended for operation in dry rooms.

The ambient conditions that must be observed are as follows:

Permissible temperature conditions:	+ 5 ... 40°C
Permissible relative humidity:	30 ... 50%
Maximum elevation:	1,000 metres above sea level

Caution! 	Take normal and reasonable precautions so that system does not suffer impacts or is not damaged in another way.
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1.6 Scope of delivery

The apparatus comes with the following standard accessories:

Power cord

RS232 cable

Handset unit



Hex key (SW 1.25 / SW: 2 for needle washing unit), (SW: 2 for cone washing unit)

Operating Manual for apparatus / Operating Manual for software

type of machine	Vicat needlel	Vicat rings	glass plates	spare brushes for needle
1.0360 1 station cement	Ø1,13mm, 1 piece +2 spare pieces	70/80 mm 1 piece	1 piece +1 spare piece	1 pair
1.0360.ASTM 1 station cement	Ø1,0mm 1piece +2 spare pieces	60/70mm 1 piece	1 piece +1 spare piece	1 pair
1.0360.EN/ASTM 1 station cement	Ø1,13mm 1 piece +2 spare pieces Ø1,0mm, 3 pieces	70/80mm 1 piece 60/70mm 1 piece	1 piece +1 spare pice	1 pair

Table 1:

1.7 Connection to the power supply

<p>Danger</p> 	<p>In accordance with the pertinent standards, connect the socket to the earthing-system.</p> <p>Check the device rating plate to make sure that the ratings of the building power supply conform to the requirements for voltage, wattage, amperage, and frequency of the equipment.</p> <p>The technical characteristics of this safety device must also satisfy the standards that apply in the country in which the device is installed.</p>
<p>Caution</p> 	<p>The manufacturer of the equipment is not be liable for any damages that result because of the information here is not observed.</p>

Electrical tolerances:

- Actual voltage: $\pm 10\%$ of the rated voltage
- Frequency: $\pm 1\%$ of the rated frequency, continually; $\pm 2\%$ of the rated frequency, on a short-term basis
- The manufacturer shall not be liable for damages to persons or properties that arise because the above instructions have not been observed.

To protect the electronic components from short circuit, a troughs fuse (250VAC/ 3.6A) are build-in, easily accessible to the user.

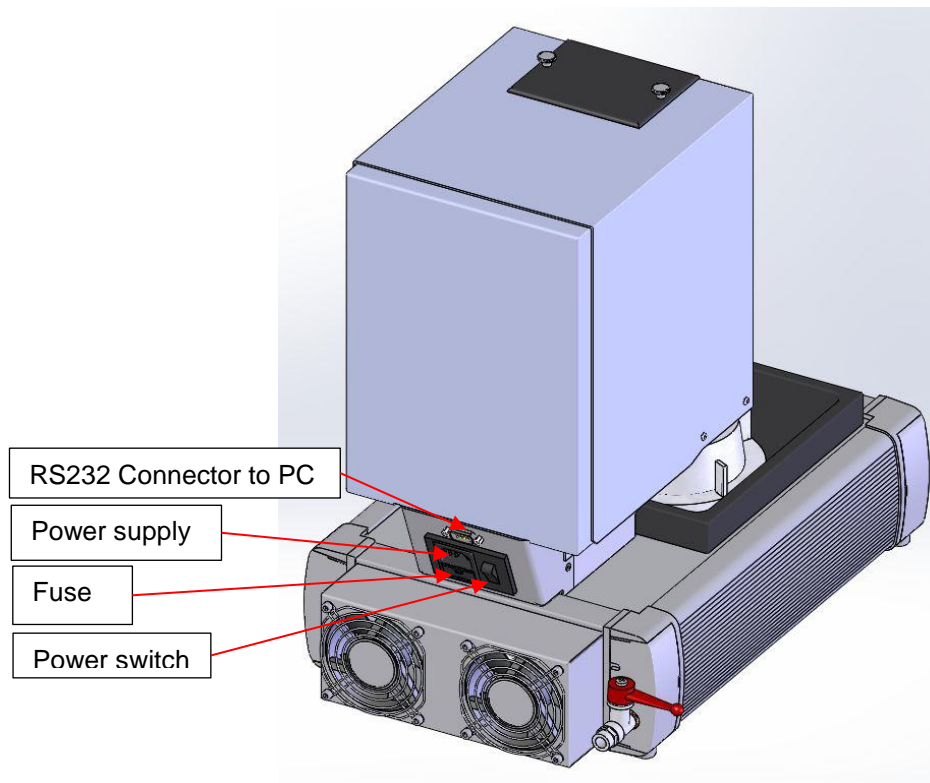


Figure 1: Connections

2. Apparatus properties

The apparatus is classified among those that generally do not reach an acoustic emission of 90 dB(A) (measured according to DIN 45 635).

The noise caused by the apparatus depends on various factors, such as installation site. It is therefore impossible to state a general sound pressure level.

Technical Data:

Width/depth/height:	280 x 480 x 460 mm
Weight:	approx: 22 kg
Electrical connection:	110–230 VAC / 50–60 Hz
Power draw:	200 W
Weight of drop rod:	300g ± 1 for cement
Additional weight:	700g ± 1 optional

Test cycles:

The apparatus supports various cycle times (0.5, 1, 2, 3, 5, 10, 20 and 30 min). According to the chosen standard, the apparatus uses one of the following penetration patterns and the chosen cycle time to perform the test.


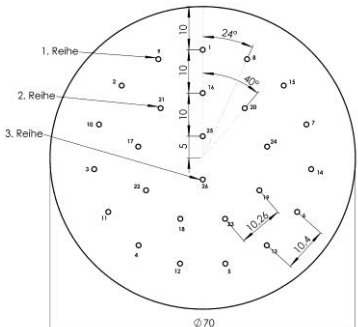
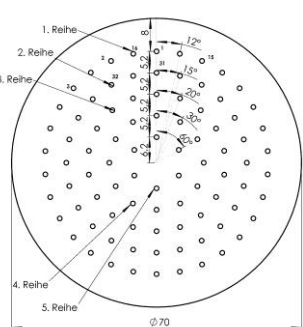
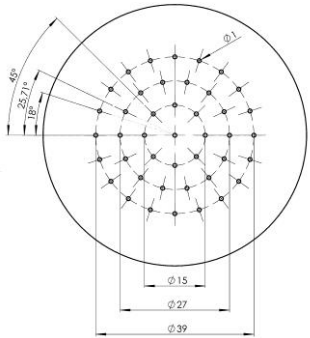
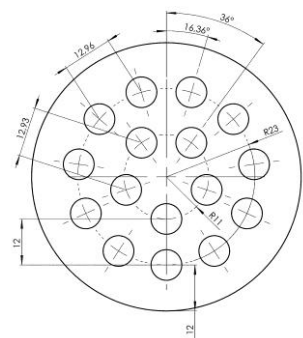
<p>Note</p> 	<p>When in single range mode the check box “use minimum cycle time” is checked, the apparatus uses minimum cycle time (0.5 min) as soon as the measured values approaches the ranges defined for initial time of setting and final time of setting. Outside of ranges for initial time of setting and final time of setting, the apparatus uses the chosen cycle time for the test.</p>
 <p>26 penetrations (EN196-3) , (EN13454-2)</p>	 <p>90 penetrations EN196-3)</p>
 <p>43 penetrations (ASTM C191)</p>	 <p>16 penetrations (EN196-3) , (EN13279-2)</p>

Figure 2: penetration patterns

3. Operation

3.1 Commissioning

3.1.1 Connections and switching on

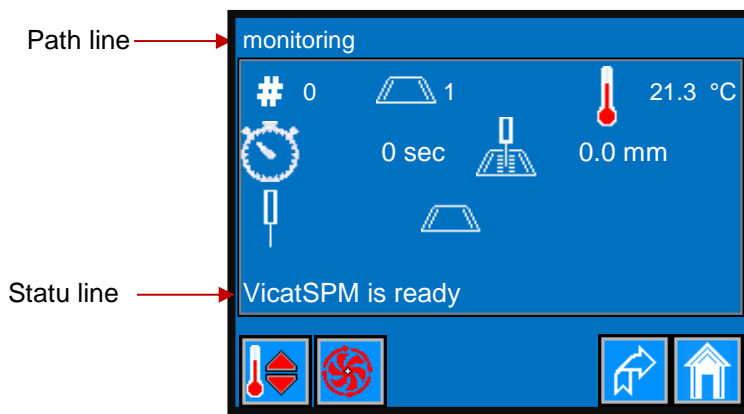
Plug the testing apparatus into the (110/230V 50/60Hz) mains using the supplied cord.

Switch ON the main switch on the rear of the device (Figure 1).

After switching ON the main switch, the control software runs through a standard initialization procedure that concludes by determining the reference points (zero points) for each axis.

The control software also checks the needle for breakage and cleans it.

The unit is ready for use as soon as the page "monitoring" appears.



The device is equipped with a touch screen. Use the touch screen for various settings of the device.

In order to parameterize and start a measurement, connect the device to the "VicatMPM" application on a PC. Do it with the supplied serial cable, by connecting the RS232 socket on the rear of the device and the USB adapter connector on the PC side.

For more information about how to perform a measurement, see "VicatMPM Software Manual".

The touch-display responds to the pressure of the finger or of a plastic pin.



Temperature control is off. Press to switch on the temperature controller.



Temperature control is on. Press to switch off the temperature controller.



Fan for the Run-ON Temperature of the heat sinks is off.



Fan for the Run-ON Temperature of the heat sinks is on.



Applies in all display views:
Press this button to return to the previous display page, here to (Figure 3



Applies in all display views:
Press this button to return directly to the page with TESTING-logo (Figure 4).

*** Installation of the USB-RS232-Adapter:**

You will find the driver for the USB-RS232-adapter on the attached installation CD, if not automatically installed.

Windows:

To install the driver, you can use either:


a) the „CDM v2.10.00 WHQL Certified.exe“, that you will find on the CD in the folder according to your operating system. Or

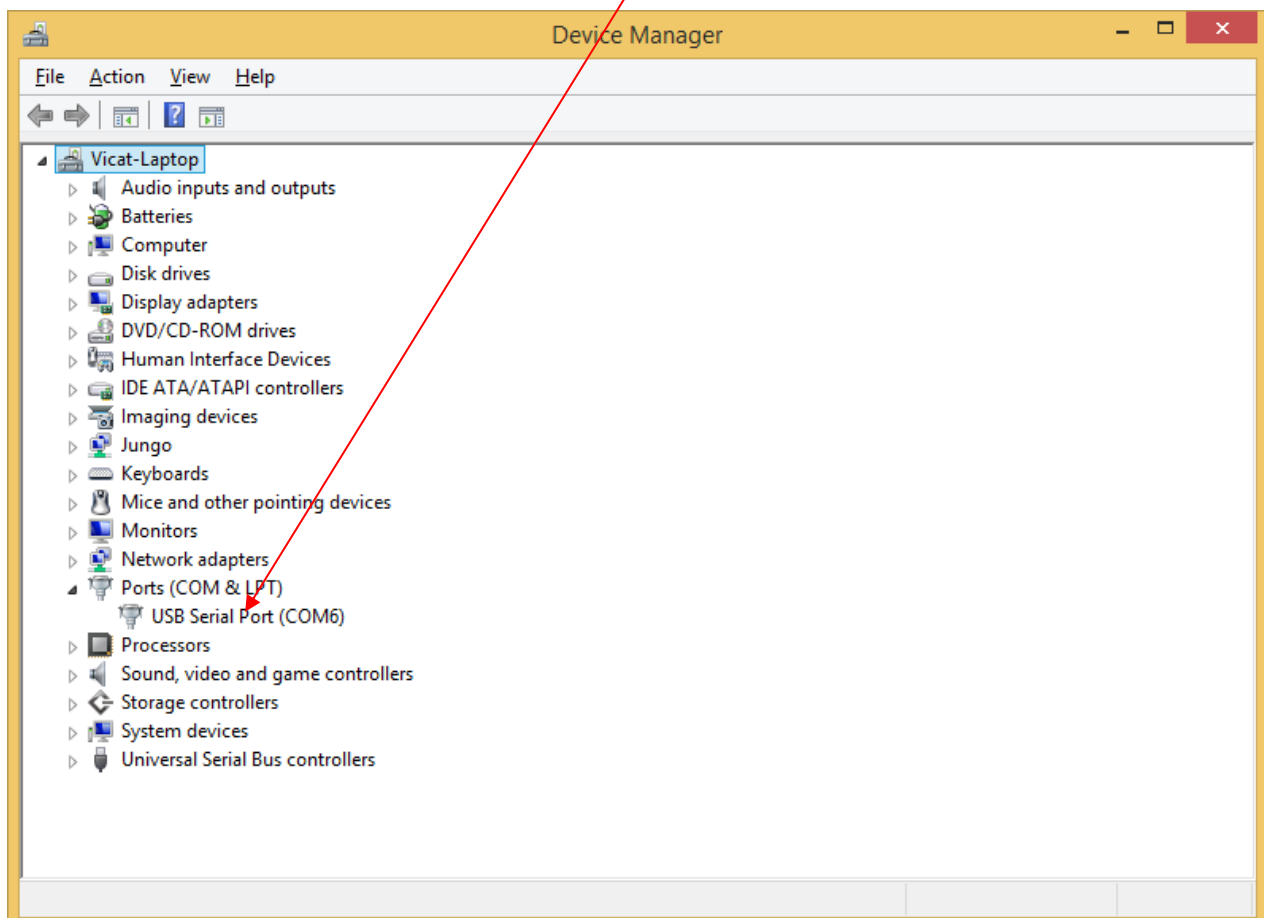
b) device manager. Right-click USB-Adapter and choose “install driver”.

Then click manual search for driver (NOT automatic search !!)

Choose on CD „ftdibus.inf“, according to your operating system.

Maybe you have to redo the procedure to install drivers for COM-Port (ftdiport.inf).

<p>Note:</p> 	<p>Communication via USB-RS232-Adapter to PC just works with properly installed drivers. The number of the COM-Ports (here COM6) can vary.</p>
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3.2 Modes of operation

In the settings mode, various parameters can be set for the display as well as for the Vicat device. The monitoring mode allows the observation of the course of the measurement, as well as the ON/OFF switching of the temperature control of the water bath.

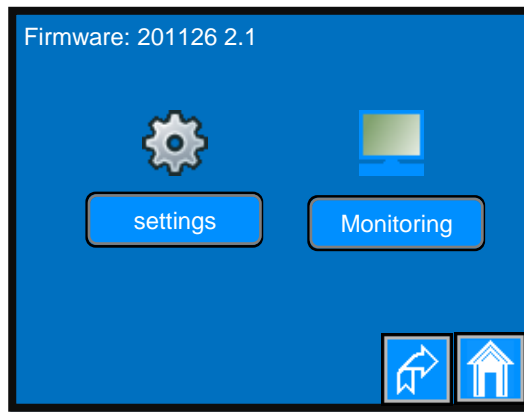





Figure 3: modes of operation

Press  button to return to the previous display page.

Press  button to go directly to the page "TESTING" logo.

Press  button to access the settings options.


Press  button to activate the monitoring mode.



Figure 4: "TESTING" logo

Click on the upper left corner of the start page to go to the next display page (Figure 3).

3.3 Setting options

Parameters can be set which affect the function of the touch display, the built-in sensors as well as the function of the Vicat device itself.

These settings remain retained after switching off the unit.

Parameters for the touch-display:

- language selection
- Enabling/Disabling the buzzer function of the touch display
- brightness adjustment of the display

Parameters for the temperature control of the water bath:

- set point heating
- hysteresis heating
- set point cooling
- hysteresis cooling
- correction factor for the temperature sensor of the temperature control

Parameters for the airflow control:

- upper temperature of the heat sinks
- lower temperature of the heat sinks
- run-on temperature of the heat sinks
- correction factor for the temperature sensor of the airflow control

Parameters for the Vicat apparatus:

- choice of the cleaner device (for needle or cone)
- cleaner device position (Y-coordinate and Z-immersion deepness of the needle)
- center of the sample (Y-coordinate)
- zero level of the sample (surface of the glass plate)
- penetration time of the needle
- factory settings

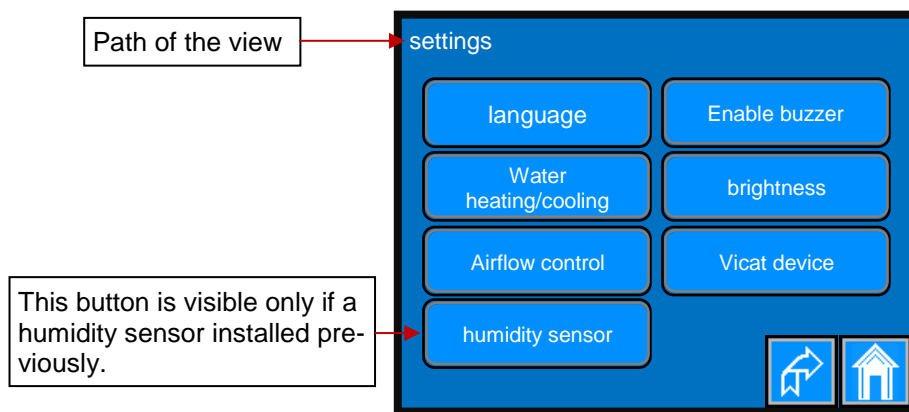


Figure 5: setting options

Pressing  button turns on the buzzer.

The button  changes to 

Pressing one of the other buttons will take you to another page to perform the desired action.

3.3.1 Choice of a language

As soon as you press a radio button assigned to the respective language, the display switches to the activated country language.

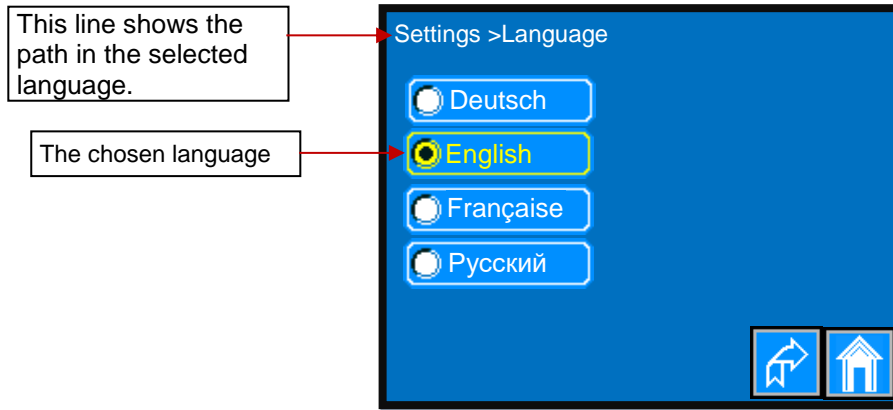


Figure 6: choice of a language

The selected language remains retained even after switching off the device.

3.3.2 Setting the brightness

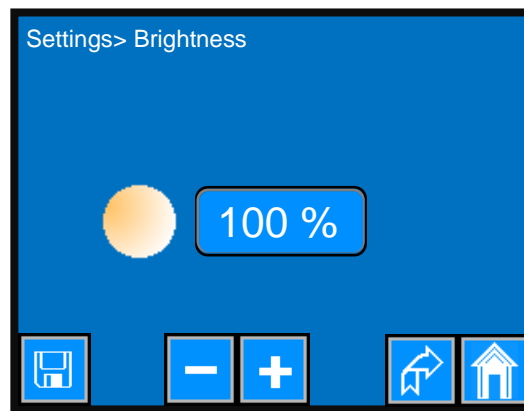



Figure 7: setting the brightness

One-time short press of the  button increases the brightness by 1%.

Pressing and hold down this button increases the brightness continuously until you release it or the brightness has reached 100%.

One-time short press of the  button decreases the brightness by 1%.

Pressing and hold down this button decreases the brightness continuously until you release it or the brightness has reached 10%.

To get the set value also after switching off the device press the  button.

3.4 Setting the parameters for water temperature control

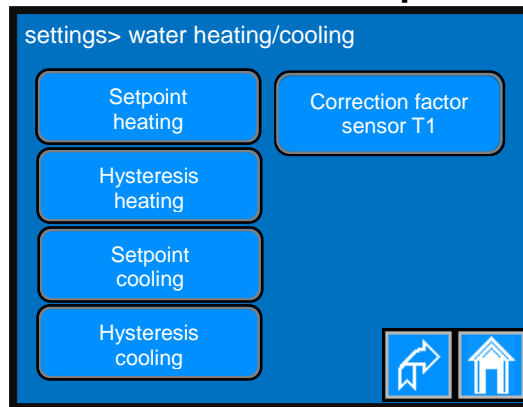


Figure 8: parameters for water temperature control

Parameters for the temperature control of the water bath:

- set point heating
- hysteresis heating
- set point cooling
- hysteresis cooling
- correction factor for the temperature sensor of the temperature control

Pressing one of the buttons (Figure 8) will take you to the page where you can edit the parameter.

3.4.1 Setting the set point for the heating

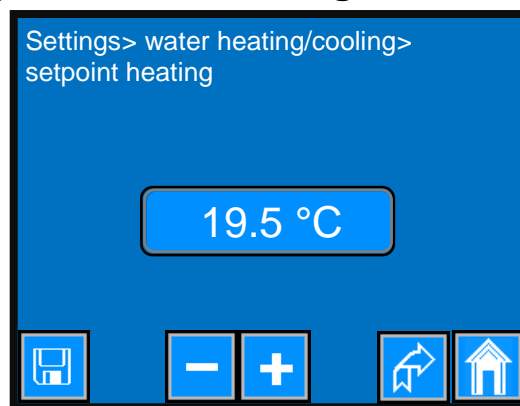




Figure 9: setting set point heating

One-time short press of the  button increases the setpoint by 0.1 °C.

Pressing and hold down this button increases the set point continuously by 0.1 °C.

If you press and hold the button for more than 3 seconds, the step size increases to 1 °C.


This process continues until you either release the button or you reach the maximum permissible value.

One-time short press of the  button decreases the setpoint by 0.1 °C.

Pressing and hold down this button decreases the set point continuously by 0.1 °C.

If you press and hold the button for more than 3 seconds, the step size increases to 1 °C.

This process continues until you either release the button or you reach the minimum permissible value.

To get the set value also after switching off the  device press the button.

3.4.2 Setting the Hysteresis for the heating

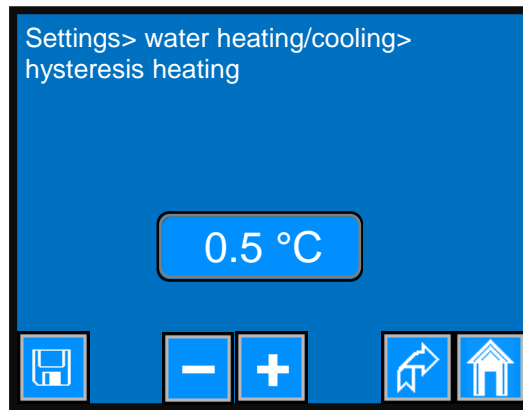



Figure 10: setting hysteresis heating

One-time short press of the  button increases the hysteresis by 0.1 °C.

Pressing and hold down this button increases the hysteresis continuously by 0.1 °C.
If you press and hold the button for more than 3 seconds, the step size increases to 1 °C.
This process continues until either you release the button or you reach the maximum permissible value.

One-time short press of the  button decreases the hysteresis by 0.1 °C.

Pressing and hold down this button decreases the hysteresis continuously by 0.1 °C.
If you press and hold the button for more than 3 seconds, the step size increases to 1 °C.
This process continues until you either release the button or you reach the minimum permissible value.

To get the set value also after switching off the device press the  button.

3.4.3 Setting the set point for the cooling

Proceed as in the section ([3.4.1](#)).

3.4.4 Setting the hysteresis for the cooling

Proceed as in the section ([3.4.2](#)).

3.4.5 Setting the correction factor for sensor T1

We use a TSIC306 temperature sensor for water temperature control.

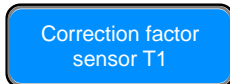
The TSIC306 has a measuring range from -50 °C to 150 °C with a resolution of ± 0.1 K.

The measuring accuracy is ± 0.3 K in the range 10 ... 90 °C and ± 0.5 K outside this range.

The correction factor adjusts the absolute temperature of the sensor to a more accurate referencing instrument.

$$T_{\text{Ref}} = T_{\text{Sens}} \pm \text{correction factor}$$

Pressing the



button on the **Settings>water heating/cooling** page let you edit the

correction factor (Figure 11).

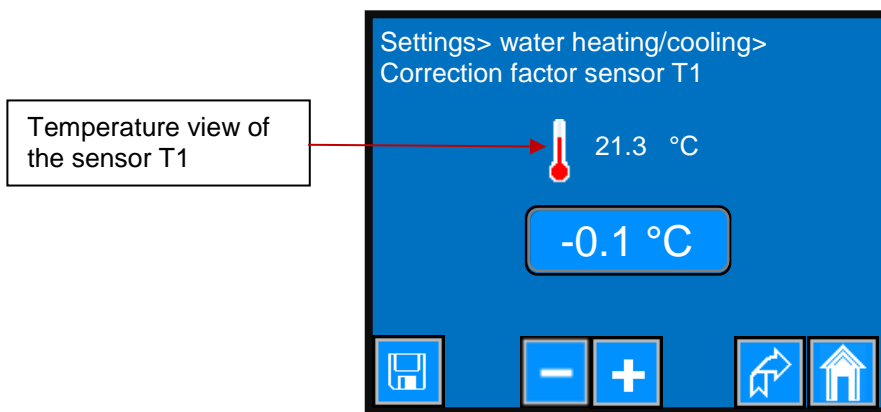


Figure 11: setting correction factor for sensor T1

One-time short press of the



button increases the correction factor by 0.1 °C.

Pressing and hold down this button increases the correction factor continuously by 0.1 °C.

If you press and hold the button for more than 3 seconds, the step size increases to 1 °C.

This process continues until you either release the button or you reach the maximum permissible value.

One-time short press of the



button decreases the correction factor by 0.1 °C.

Pressing and hold down this button decreases the correction factor continuously by 0.1 °C.

If you press and hold the button for more than 3 seconds, the step size increases to 1 °C.

This process continues until you either release the button or you reach the minimum permissible value.

To get the set value also after switching off the device press the



button.

3.5 Explanation of the process of water temperature control

The cooling process starts as soon as the water temperature reaches the value (set point cooling + hysteresis cooling) or rises above this value.

The cooling process stops only when the water temperature has declined to the value (set point cooling) or if it has fallen below this value.

The heating process starts as soon as the water temperature reaches the value (set point heating - hysteresis heating) or falls below this value.

The heating process stops as soon as the water temperature rises to the value (set point heating) or if it has exceeded this value.

The Figure below shows the graphical representation of the facts.

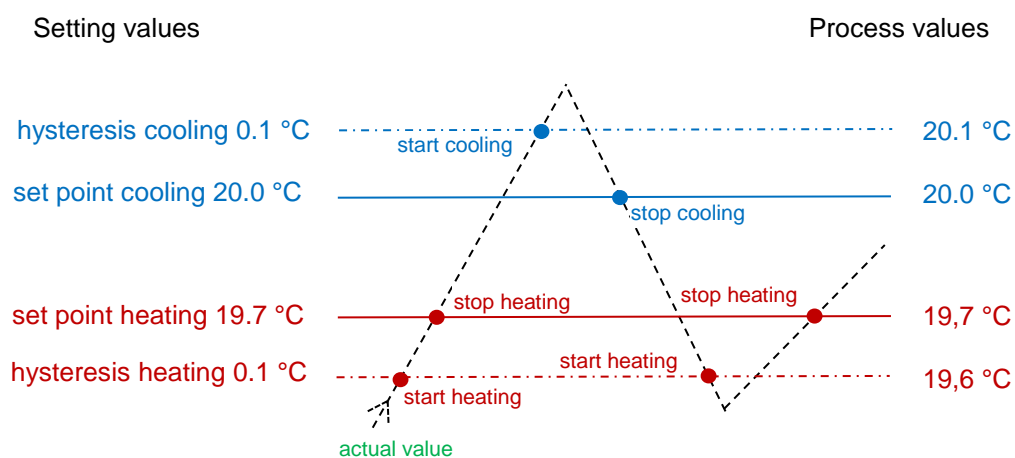


Figure 12: Temperature control

3.6 Setting the parameters for the airflow control

When the water bath is cooling, heat arises on the rear of the Peltier elements. This heat must be dissipated.

For this purpose, the device is equipped with two heat sinks, which absorb the heat from the Peltier elements.

A temperature sensor detects the temperature of the heat sinks and controls thereby the airflow generated by the fans.

The air stream transports the heat from the heat sinks into the environment.

The parameters listed below optimize the heat transfer.

Parameters for airflow control:

- Upper temperature of the heat sinks
- Lower temperature of the heat sinks
- Run-on temperature of the heat sinks
- Correction factor for the temperature sensor of the airflow control

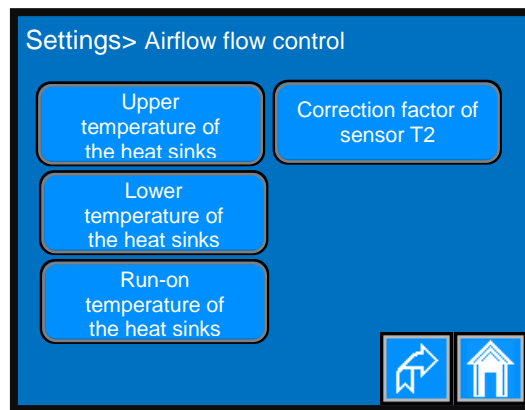


Figure 13: parameters for the airflow control

At the upper temperature, the fans reach the maximum speed and thus produce the maximal airflow.

The lower temperature of the heat sinks determines the starting velocity and thus the minimum airflow.

In order to remove the excess heat the fans may continue to run until the heat sinks reach the run-on temperature even after switching off the temperature-controller.

The correction factor adjusts the absolute temperature of the sensor to a more accurate referencing instrument.

Press the desired button to go to the settings page of the parameter.

3.6.1 Setting the upper temperature of heat sinks

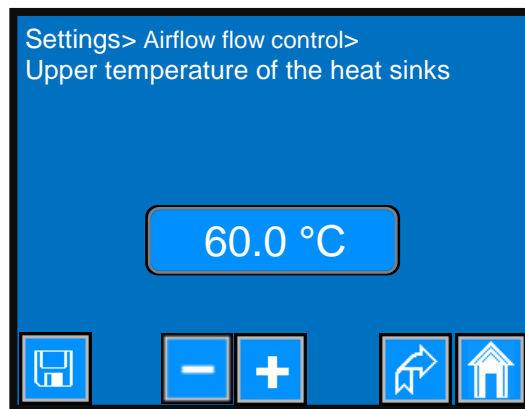



Figure 14: Upper temperature of the heat sinks

One-time short press of the  button increases the value by 0.1 °C.

Pressing and hold down this button increases the value continuously by 0.1 °C.
If you press and hold the button for more than 3 seconds, the step size increases to 1 °C.
This process continues until you either release the button or you reach the maximum permissible value.

One-time short press of the  button decreases the value by 0.1 °C.

Pressing and hold down this button decreases the value continuously by 0.1 °C.
If you press and hold the button for more than 3 seconds, the step size increases to 1 °C.
This process continues until you either release the button or you reach the minimum permissible value.

To get the set value also after switching off the device press the  button.

3.6.2 Setting the lower temperature of heat sinks

Proceed as in the section [3.6.1](#)).

3.6.3 Setting the run-on temperature of the heat sinks

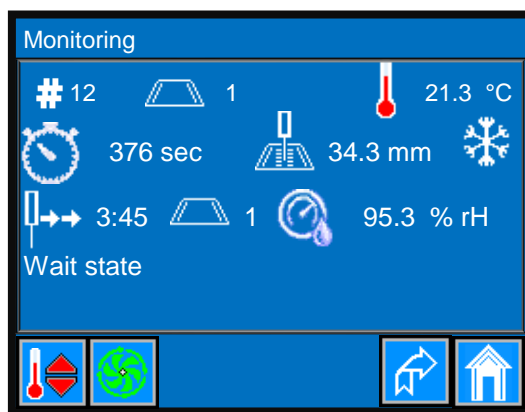
Proceed as in the section [3.6.1](#)).


3.6.4 Setting the correction factor for sensor T2


Proceed as in the section [3.4.5](#)).

3.6.5 Stop running fans

In order to remove the excess heat the fans may continue to run until the heat sinks reaches the run-on temperature even after switching off the temperature-controller.



If you want to stop the fans before reaching the "run-on temperature", press the  button.

The fan button changes to  and the fans continue to run with a low idle speed.

3.7 Settings for the humidity sensor

Devices that comply with the "ASTM C191" standard are equipped with a sensor for measuring relative humidity.

Each sensor has its own parameter settings, which we configure on delivery. Our service or the user must set and save the new parameters only if it should be necessary to change the sensor.

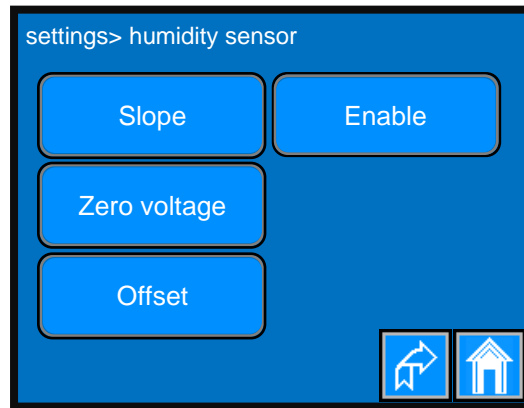
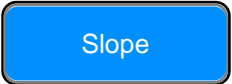



Figure 15: parameters of the humidity sensor


Parameters of the humidity sensor:

- Slope
- Zero voltage
- Offset

The offset adjusts the value to a more accurate reference device. Normally, this value is set to „0.0 %rH“.

Press the  button to get to the page for entering the slope.

Press the  button to get to the page for entering the zero level.

Press the  button to enable the use of the humidity sensor.

Then the button changes to  and when pressed again, you turn the sensor off.

You can observe the relative humidity on the page "monitoring" (Figure 30).

3.7.1 Adjusting the slope of the humidity sensor

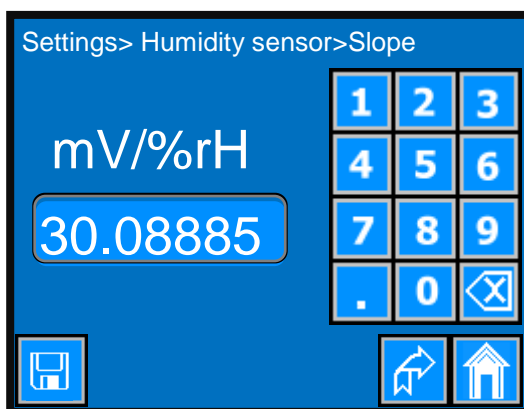


Figure 16: Adjusting the slope of the humidity sensor


Use the key pad to insert the desired value



Decimal delimiter



Delete digit

To get the set value also after switching off the device press the  button.

3.7.2 Adjusting the zero voltage of the humidity sensor

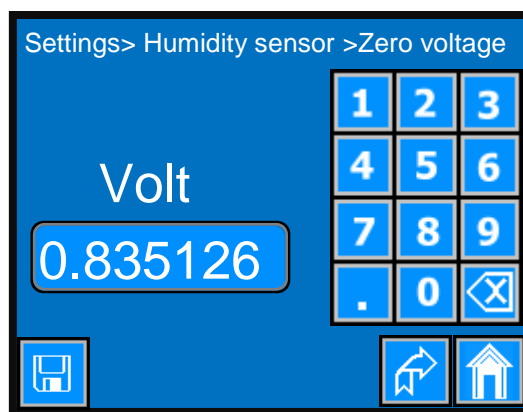


Figure 17: Adjusting the zero voltage of the humidity sensor

Proceed as in the section ([3.7.1](#)).

3.7.3 Adjusting the offset of the humidity sensor

The offset of the humidity sensor adjusts the value of relative humidity of the sensor to a more accurate referencing instrument.

$$rH_{Ref} = rH_{Sens} \pm \text{offset}$$

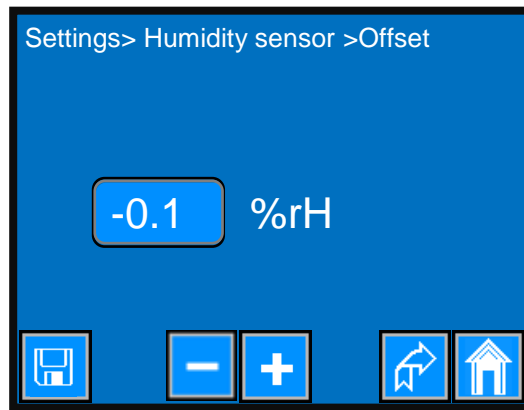





Figure 18: Adjusting the offset of the humidity sensor

One-time short press of the  button increases the value of the offset by 0.1 %rH.

Pressing and hold down this button increases the value continuously by 0.1 %rH.
If you press and hold the button for more than 3 seconds, the step size increases to 1 %rH.
This process continues until you either release the button or you reach the maximum permissible value.

One-time short press of  the button decreases the value of the offset by 0.1 %rH.

Pressing and hold down this button decreases the value continuously by 0.1 %rH.
If you press and hold the button for more than 3 seconds, the step size increases to 1 %rH.
This process continues until you either release the button or you reach the minimum permissible value.

To get the set value also after switching off the device press the  button.

3.8 Settings for the Vicat device

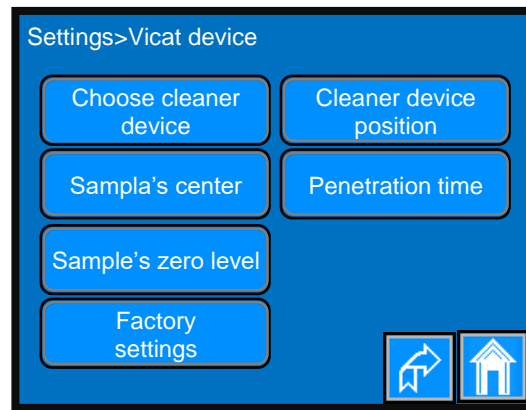


Figure 19: Settings for the Vicat device

Parameters of the Vicat device:

- choose cleaner device (for needle or for cone)
- cleaner device position (set Y-coordinate and Z-coordinate (penetration deepnes of the needle))
- samples center (set Y-coordinate)
- samples zero level (determines the zero level (surface) of the glas plate)
- Penetratin time (setting the penetration time for the needle or cone)
- factory settings (restoring of the default value)

Press one of the buttons to get to the page where you can performe the desired aktion.

3.8.1 Choosing cleaner device

Depending on the material to be tested (cement or gypsum) the right cleaner device is needed.

- For cement sample choose cleaner device for needle
- For gypsum sample choose cleaner device for cone (yet not avaable)

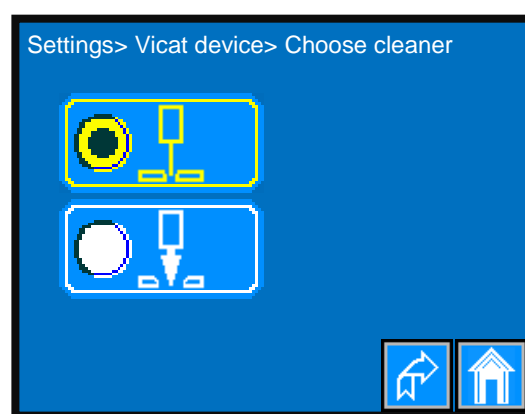



Figure 20: Choosing cleaner device

Press the radio button of the desired cleaner device to activate it.
The activated cleaner device is colored yellow and the radio button gets a black marking circle.

3.8.2 Setting the cleaner device position

Setting or readjusting the Y-coordinate of the cleaner device is necessary when the needle or the cone does not hit the center of the device opening. On this page you can also readjust the immersion depth of the needle or cone.

On the page “settings>Vicat device”, press the  button.

If sample is under test, the display shows a message to interrupt the measurements (Figure 21), otherwise the page for setting the cleaner device position (Figure 22) will appear and the needle will move to the last position set.

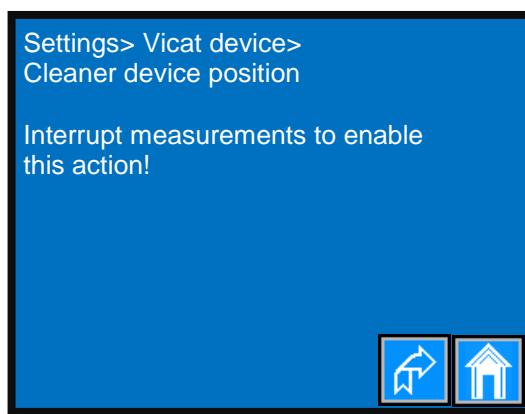



Figure 21: Hint for cleaner device position

When you see this hint, press the button „**Interrupt measurements**” in the PC VicatMPM application. After pressing, this button disables until the device has acknowledged the interruption. The label of the button changes to “**Continue measurements**” and it is blinking during interruption.

Now, you can press  button again to get the page where you can perform the desired action.

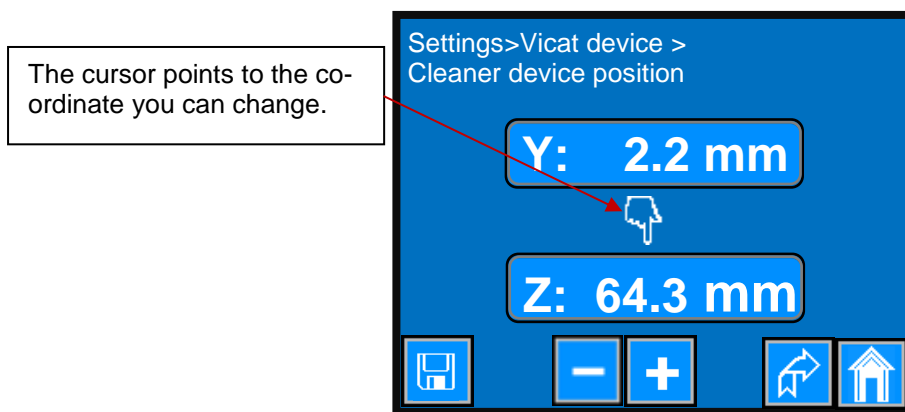




Figure 22: Cleaner device position

To change the other coordinate simply touch the appropriate field. The cursor changes his direction and points to the activated field.

One-time short press of the  button increases the Y-value by about 0.1 mm and the Z-value by about 1 mm.

The needle moves toward display when Y-coordinate is processed. The needle moves down when Z-coordinate is processed.


If you keep this button pressed, the respective value continuously increases by the relevant proportion until either you have released the button or you reach the maximum permissible value.

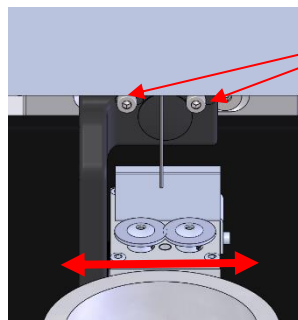
One-time short press of the  button decreases the Y-value by about 0.1 mm and the Z-value by about 1 mm.

The needle moves toward cleaner device when Y-coordinate is processed.

The needle moves up when Z-coordinate is processed.

If you keep this button pressed, the respective value continuously decreases by the relevant proportion until either you have released the button or you reach the minimum permissible value.

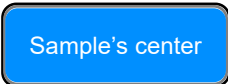
To get the set values also after switching off the device press the  button.



Loosen these screws to move the washer device sideways.

3.8.3 Setting the samples center Y-coordinate

The center of the sample (Y-coordinate) must be set accurately enough to meet the standard criterion for the distance of the puncture points from the edge of the Vicat ring.

On the page “settings>Vicat device“, press the  button.

If sample is under test, the display shows a message to interrupt the measurements (Figure 23), otherwise the page for setting the samples center point appears (Figure 24) and the needle moves to the last set position.

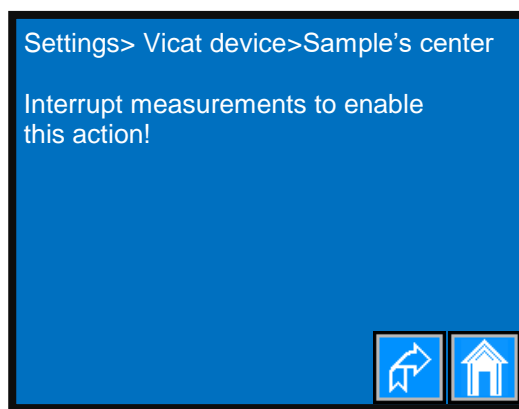
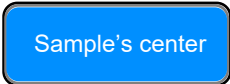


Figure 23: Hint for samples center

When you see this hint, press the button „**Interrupt measurements**“ in the PC VicatMPM application. After pressing, this button disables until the device has acknowledged the interruption. The label of the button changes to “**Continue measurements**” and it is blinking during interruption.

Now, you can press  button again to get the page where you can perform the desired action.

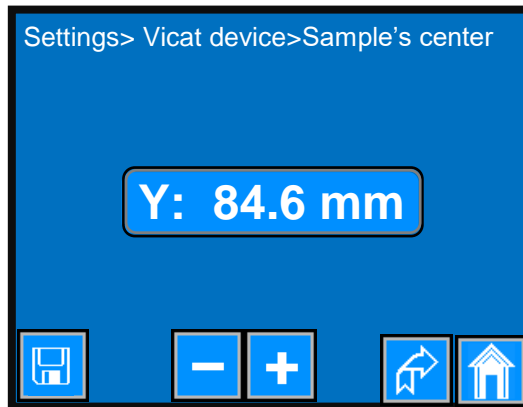




Figure 24: Setting the Y-coordinate of samples center

One-time short press of the  button increases the Y-value by about 0.1 mm.


The needle moves toward display.

If you keep this button pressed, the value continuously increases by the relevant proportion until either you have released the button or you reach the maximum permissible value.

One-time short press of the  button decreases the Y-value by about 0.1 mm.

The needle moves toward cleaner device.

If you keep this button pressed, the value continuously decreases by the relevant proportion until either you have released the button or you reach the minimum permissible value.

To get the set value also after switching off the device press the  button.


3.8.4 Setting the samples zero level

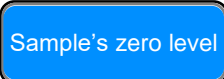
Zero level, is defined as the Z-coordinate of the point at which the needle touches the surface of the glass plate.

Due to the mechanical construction, the base plane can deviate from the ideal position in space (axis of rotation is parallel to the needle and bearing surface is perpendicular to the axis of rotation).

A determination of samples zero level is always necessary if you use a base plate that deviates from the previous one in height.

The zero level determination obtains parameters, which allow correction of the measured value during the measurement.

<p>Hint</p> 	<p>To determine the zero level, the glass plate must be in place on the measuring station!</p> <p>Attention, if the rubber buffer is set so that the needle does not reach the glass plate, the zero level is determined incorrectly!</p>
---	---

On the page “Settings>Vicat device” press the  button.

If sample is under test, the display shows a message to interrupt the measurements (Figure 25), otherwise the page for setting the samples zero level appears (Figure 26).

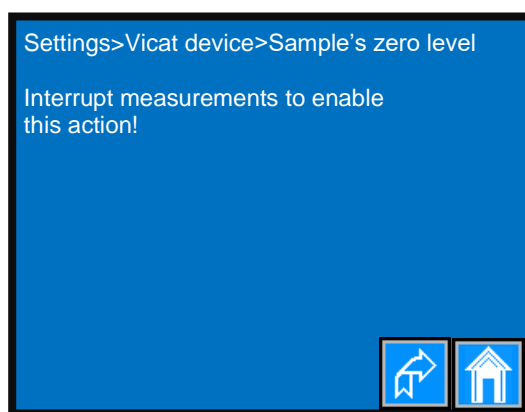
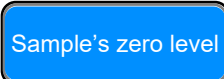


Figure 25: Hint samples zero level

When you see this hint, press the button „**Interrupt measurements**” in the PC VicatMPM application. After pressing, this button disables until the device has acknowledged the interruption. The label of the button changes to “**Continue measurements**” and it is blinking during interruption.

Now, you can press  button again to get the page where you can perform the desired action.

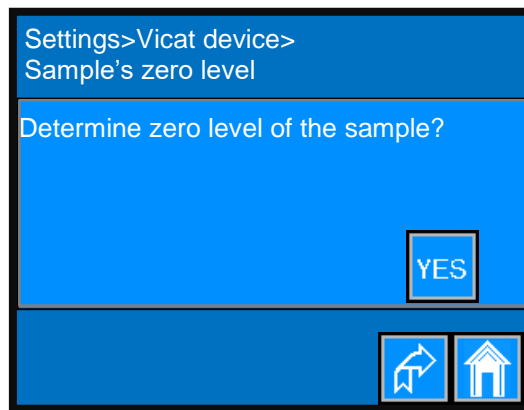



Figure 26: Determine zero level

To start the determination of the zero level press  button.
The view changes as follow:

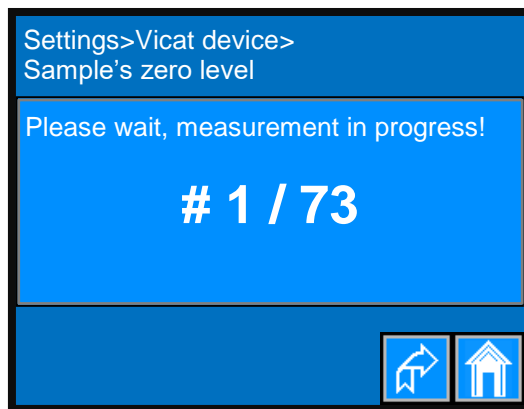


Figure 27: Course of the zero level measurement

The first digit indicates the currently executed measurement point, while the second digit indicates the total number of measurement points.
After performing the measurements, the view changes to the next page (Figure 28).

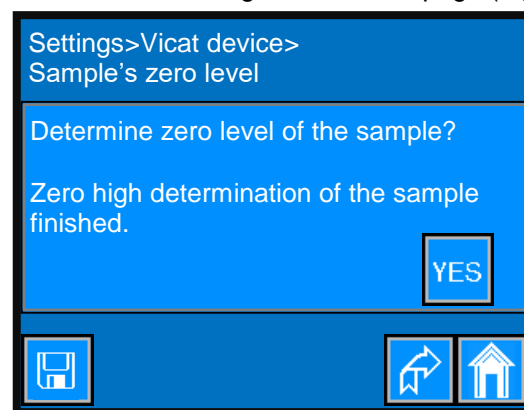




Figure 28: Zero level determination finished

To get the set values retained also after switching off the device press the  button.

3.8.5 Setting the Penetration time

You can set the penetration time of the needle or cone to a value between 0 and 10 seconds.

To do so, press on the page “setting>Vicat device” the  button.

You will get to the next page:

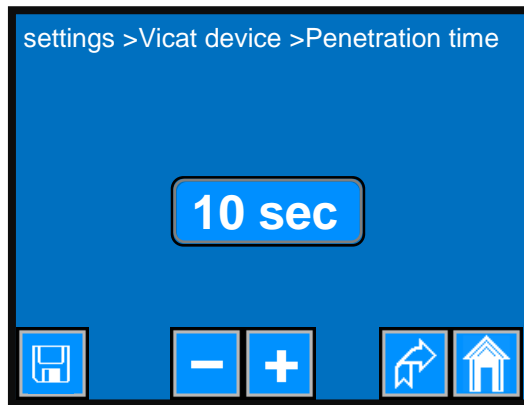





Figure 29: Setting the penetration time

One-time short press of the  button increases the penetration time by 1 second.

If you keep this button pressed, the value continuously increases until either you have released the button or you reach the maximum permissible value.

One-time short press of the  button decreases the penetration time by 1 second.

If you keep this button pressed, the value continuously decreases until either you have released the button or you reach the minimum permissible value.

To get the set value also after switching off the device press the  button.

3.9 The monitoring page

On this page, you can observe the course of a test.

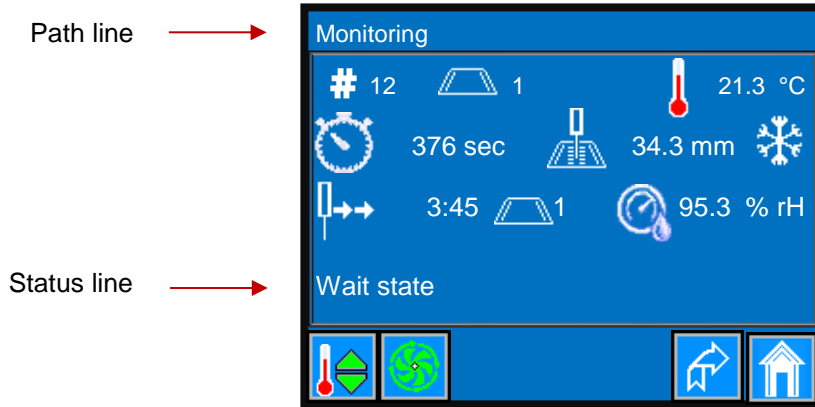




Figure 30: monitoring page

12  1 This symbol shows the recorded number of measurements on sample one.


 21.3 °C This symbol shows the temperatur of the water bath.


 This symbol is displayed briefly on the occurrence of a data transmission error of the temperature-sensor.

If this symbol is displayed permanently, either the sensor is not present or the transmission path has been interrupted or the sensor has been destroyed.


In this case, the temperature contlol turns off even if the temperature controller is switched on.







 376 sec This symbol shows the time in seconds elapsed since the zerro time until the measure-value was acquired (zerro time is the time of addition of water to the cement or gipsum).


 34.3 mm This symbol shows the penetration depth in millimeters measured at the time displayed.


 This symbol is displayed only, if the temperature control is switched on and cooling is in progress.


 This symbol is displayed only if the temperature control is switched on and the heating is in progress.

 3:45  1 These symbols show the remaining time until the next measurement on sample 1.
Display format: minutes: seconds

  These symbols are displayed if either no test has been started, or when the Test has finished.


 95.3 % rH This symbol is only displayed if the device is equipped with a sensor for measuring the relative humidity.

 Temperature control is off. Press to switch on the temperature controler.


 Temperature control is on. Press to switch off the temperature controler.


 Fan for the Run-On Temperatur of the heat sinks is off.

 Fan for the Run-On Temperature of the heat sinks is on.

<p>Danger!</p> 	<p>Turn on the temperature control only if the basin is filled with water! Without water, the heat exchanger heat sinks get too hot or too cold and can be damaged. There is risk of burns on contact or risk of fire! Capacity if the basin is approx. 2.3 l.</p>
---	--

If the temperature controller is on and the temperature of the exchanger's heat sinks is greater than the "Lower temperature of the heat sinks" the fans of the heat sinks are turned on automatically. The lower temperature of the heat sinks determines the starting velocity and thus the minimum airflow. At the upper temperature of the heat sinks, the fans reach the maximum speed and thus produce the maximal airflow. In order to remove the excess heat the fans may continue to run until the heat sinks reach the Run-On temperature even after switching off the temperature-controller.

If you want to stop the fans before reaching the "Run-On" temperature, press the  button.

The fan button changes to  and the fans continue to run with a low idle speed.

Various states and actions of the device are displayed during the runtime in the status line.

- Vicat is ready
- wait state
- Drop rod present
- Move to the target position
- Target position achieved
- Rod released
- Penetration
- Measurement
- Move to the cleaning device
- Cleaning the needle
- Cleaning finished
- Tests finished
- Tests not available (if no test is configured and started)
- All tests interrupted (when in the PC-App the button "Interrupt measurements" was pressed)

Error messages are also displayed in the status line if errors occur.

- X-Limit switch is open
- Y-Limit switch is open
- Z-Limit switch is open
- X-Reference switch is open
- Y- Reference switch is open
- Z- Reference switch is open
- Rod magnet defect?
- Time out Motor Z [M..]
- Time out Motor X [M..]
- Time out Motor Y [M..]
- Time out Motor Z [M..]
- Time out Motor X [P..]
- Time out Motor Y [P..]
- Time out Motor Z [P..]
- Time out Motor X [C..]
- Time out Motor Y [C..]
- Time out Motor Z [C..]
- Time out UART1

[M..] means during the measuremet
[R..] means during the reference search
[P..] means during moving to position
[C..] means during the correction of the position

4. Operation

4.1 Software

Install and configure the software on the PC.
See the “Software Operating Manual” for this.

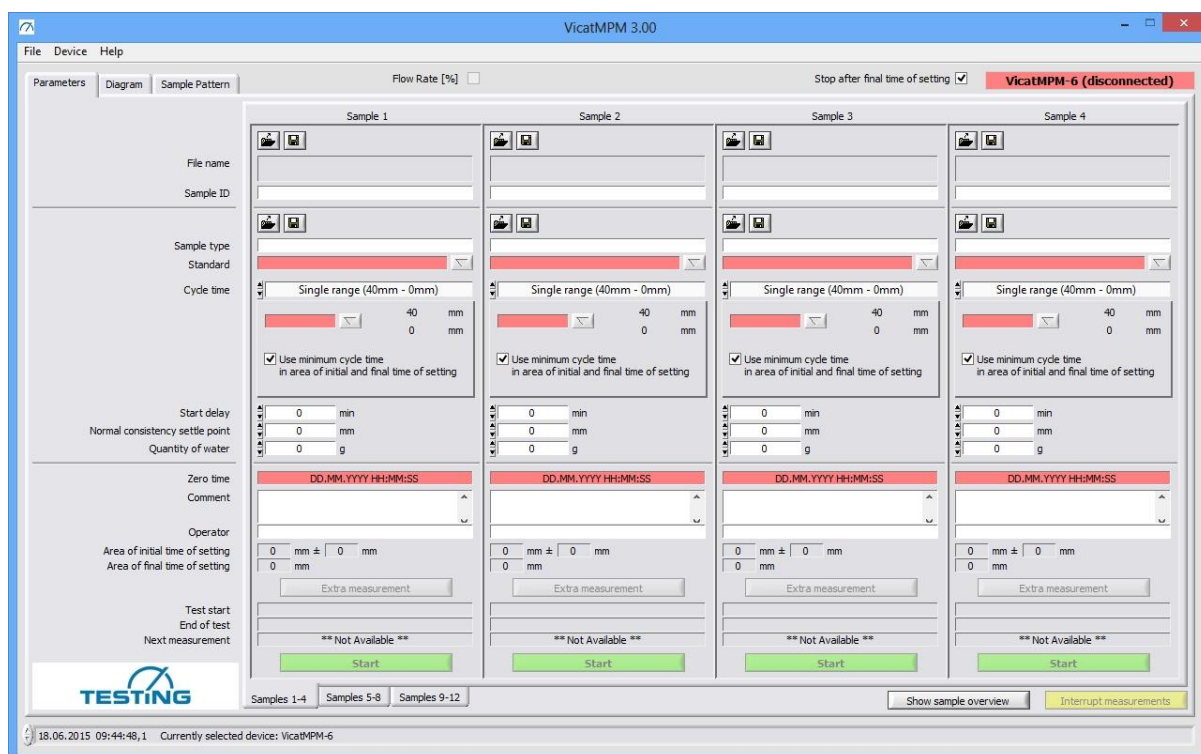



Figure 31: VicatMPM application software

<p>Note</p> 	<p>The VicatMPM software let you determine norm stiffness, initial time of seting and fi-nal time of setting. Final time of seting can be determined very accurately (in case the sample surface is appropriate) since the measurement deviation within the same level is $\pm 0.1\text{mm}$.</p>
---	--

4.2 Insert a sample

Feel the sample material into the Vicat ring, use the supplied glass plate (120x5 mm) as the base. Place the sample on the measuring station and fix it with the fixing ring (note the driving pin).

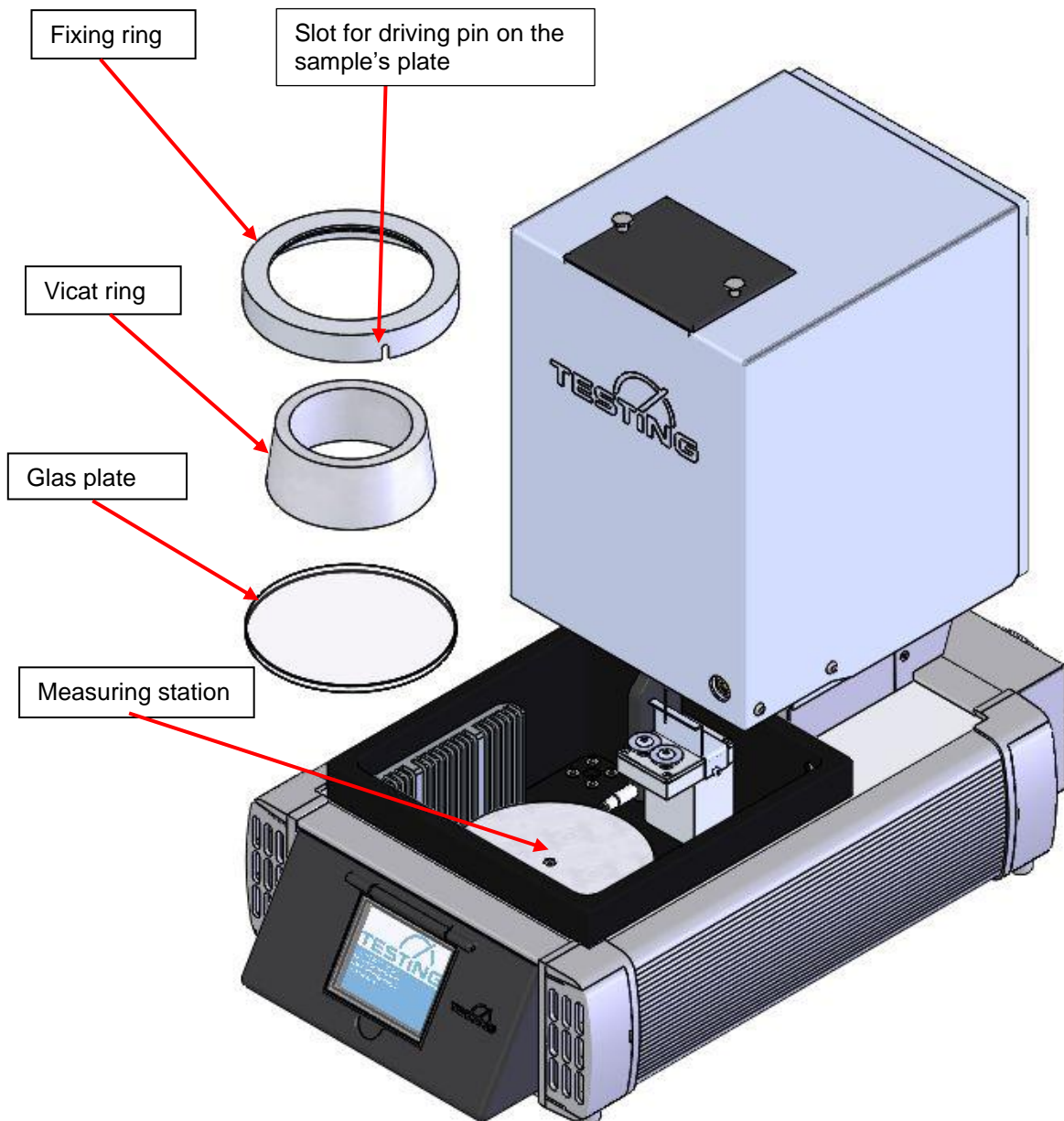


Figure 32: Fixing the sample on a measuring station

4.3 Starting a measurement on EN device

When performing tests in a water bath (EN196-3), close the ball valve on the back of the device and add water until the brushes are covered. Start the Vicat test via the PC software. After each penetration, the needle is cleaned with the cleaning device.
(Cover the humidity sensor if available with a rubber cap.)

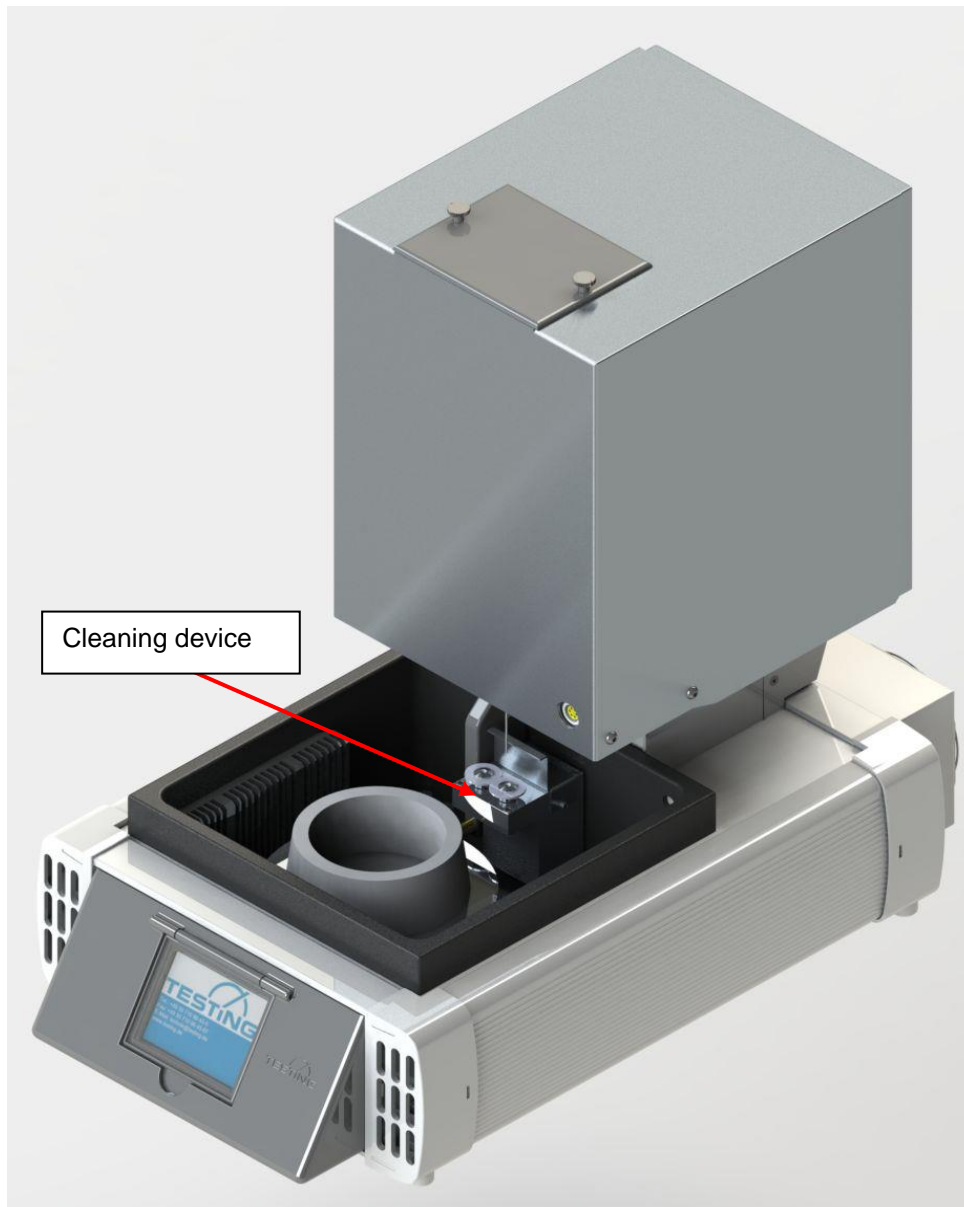

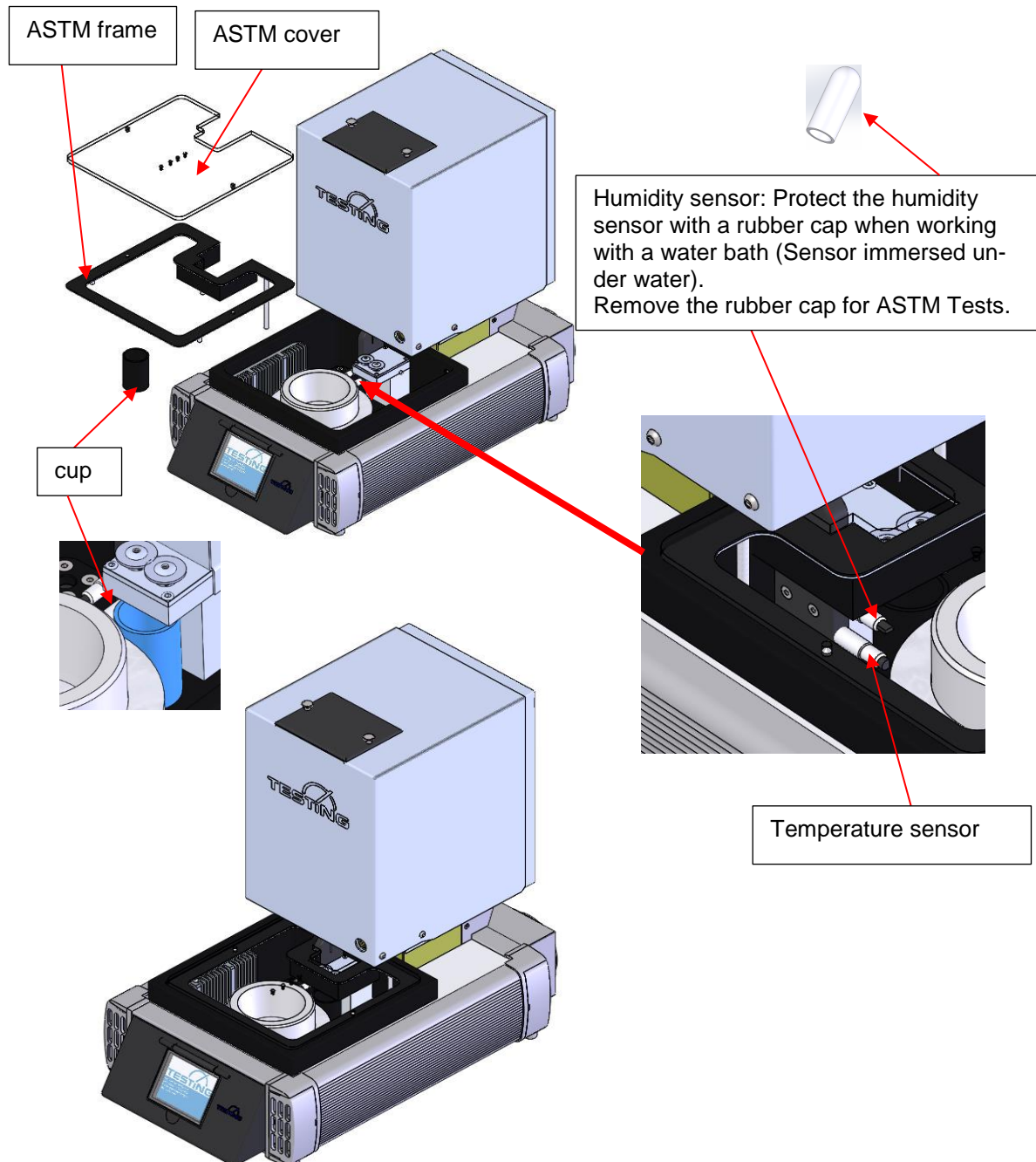


Figure 33: Cleaning device for needle

<p>Note</p> 	<p>After starting the measurements, the device works independently and saves the measurement data internally. If the device is connected to PC the measuredt data are transmitted automatically to PC.</p>
---	--

4.4 Starting a measurement on ASTM-device

If ASTM tests are performed (in moisture environment), add water until the temperature sensor is covered. First, insert the cup with water under the cleaning device, and then insert the ASTM frame and ASTM cover over the sample. Start the Vicat test via the PC software. After each penetration, the needle is cleaned with the cleaning device.



Hinweis



If the humidity sensor shows 0%, it is either wet or dirty. If the humidity sensor is wet, it must be carefully blown dry. If the sensor is dirty (lime, dirt) it must be carefully cleaned with a soft brush and a non-aggressive cleaner (e.g. brake cleaner). (The surface must look like glass).

5. Maintenance

5.1 Adjustment of the rubber buffer

To protect the needle, the rubber buffer can be adjusted such way that the needle will no longer strike the glass plate but the rubber buffer just in front of the glass plate instead. Behind the drop rod there is a screw on which the rubber buffer is screwed. This screw is secured by a nut.

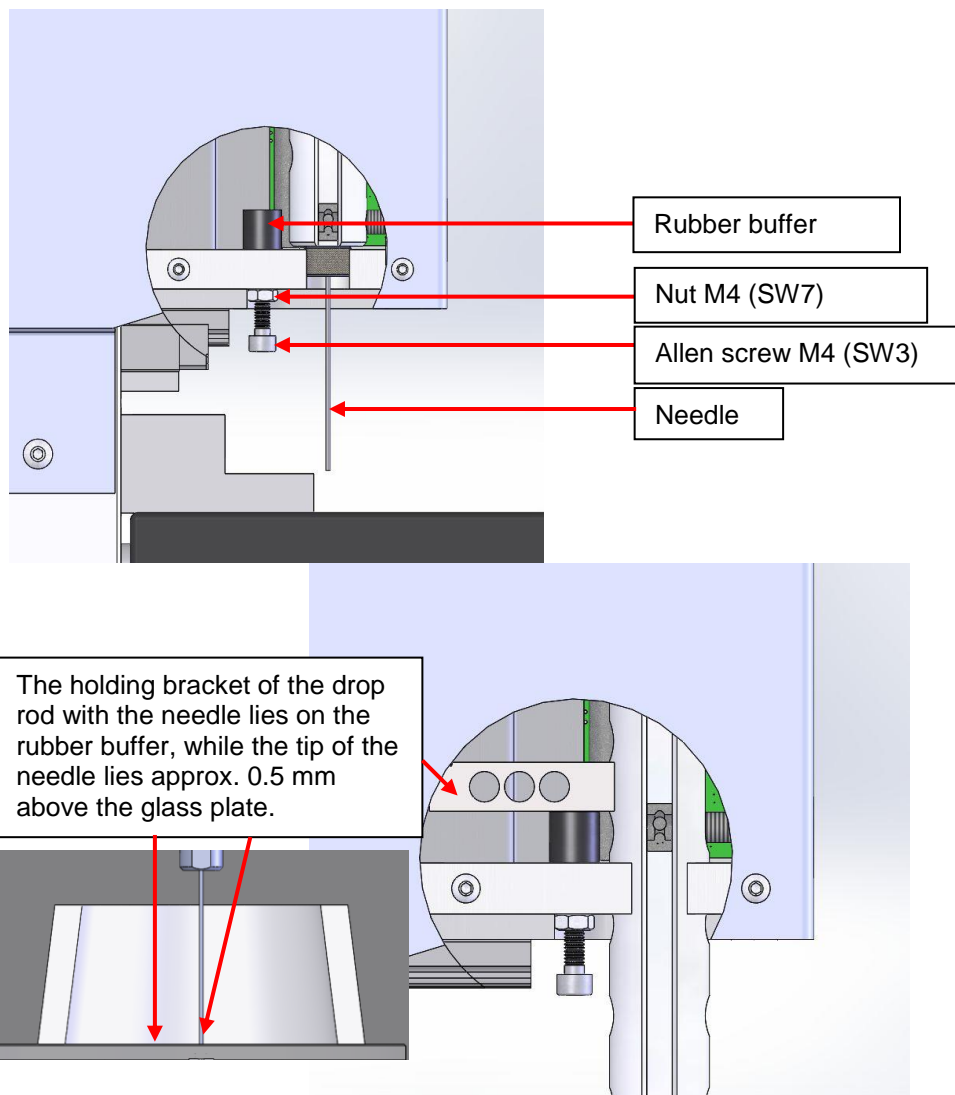


Figure 34: Adjustment of the rubber buffer



Attention! The detection of the needle breakage does not work anymore!

5.2 Replacing the brushes

Depending on the option, the device is equipped with a cleaning device for needle or cone. When the brushes wears up, so that the needle can no longer be cleaned, they must be replaced. Loosen the screws and pull out the brushes from the holders. Insert new brushes and tighten the screws.

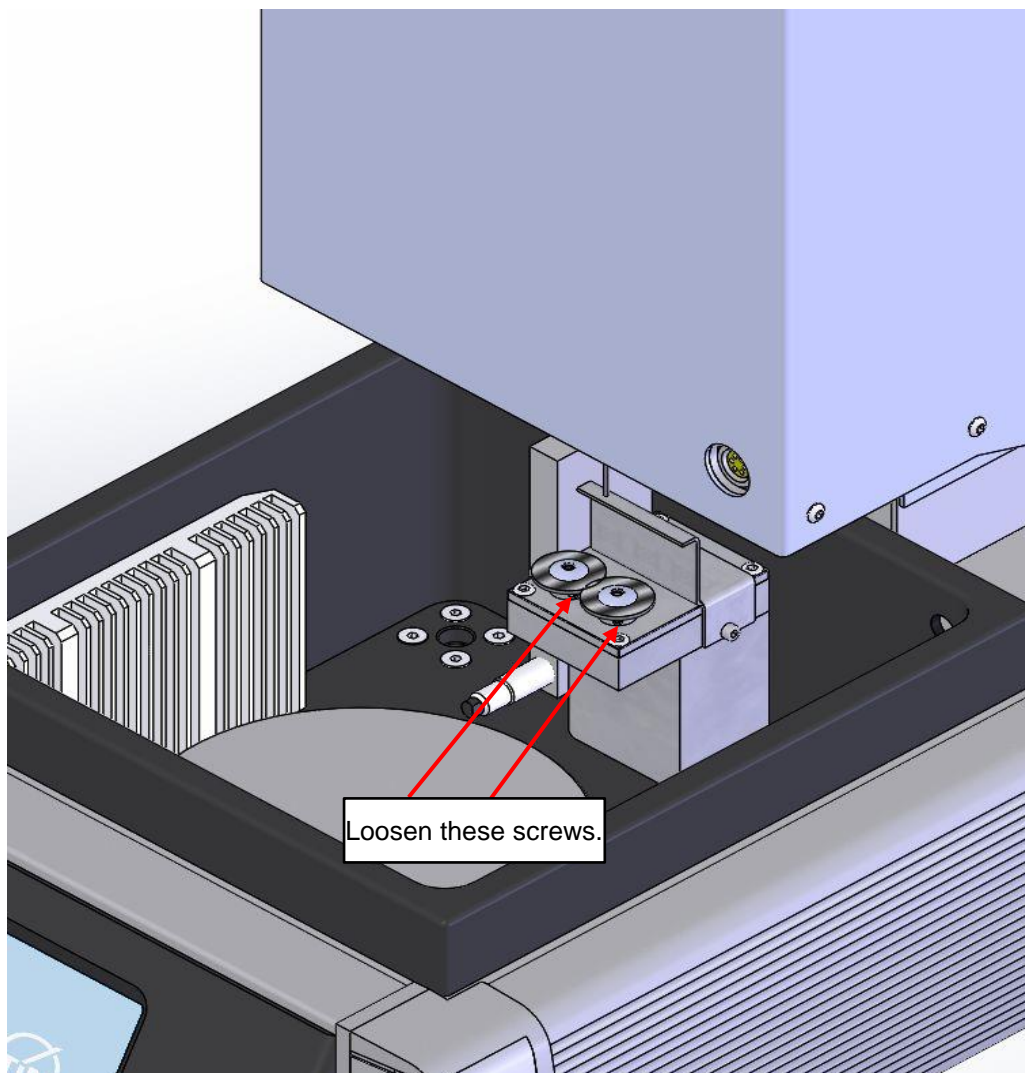


Figure 35: Replacing the brushes of device cleaner for needle

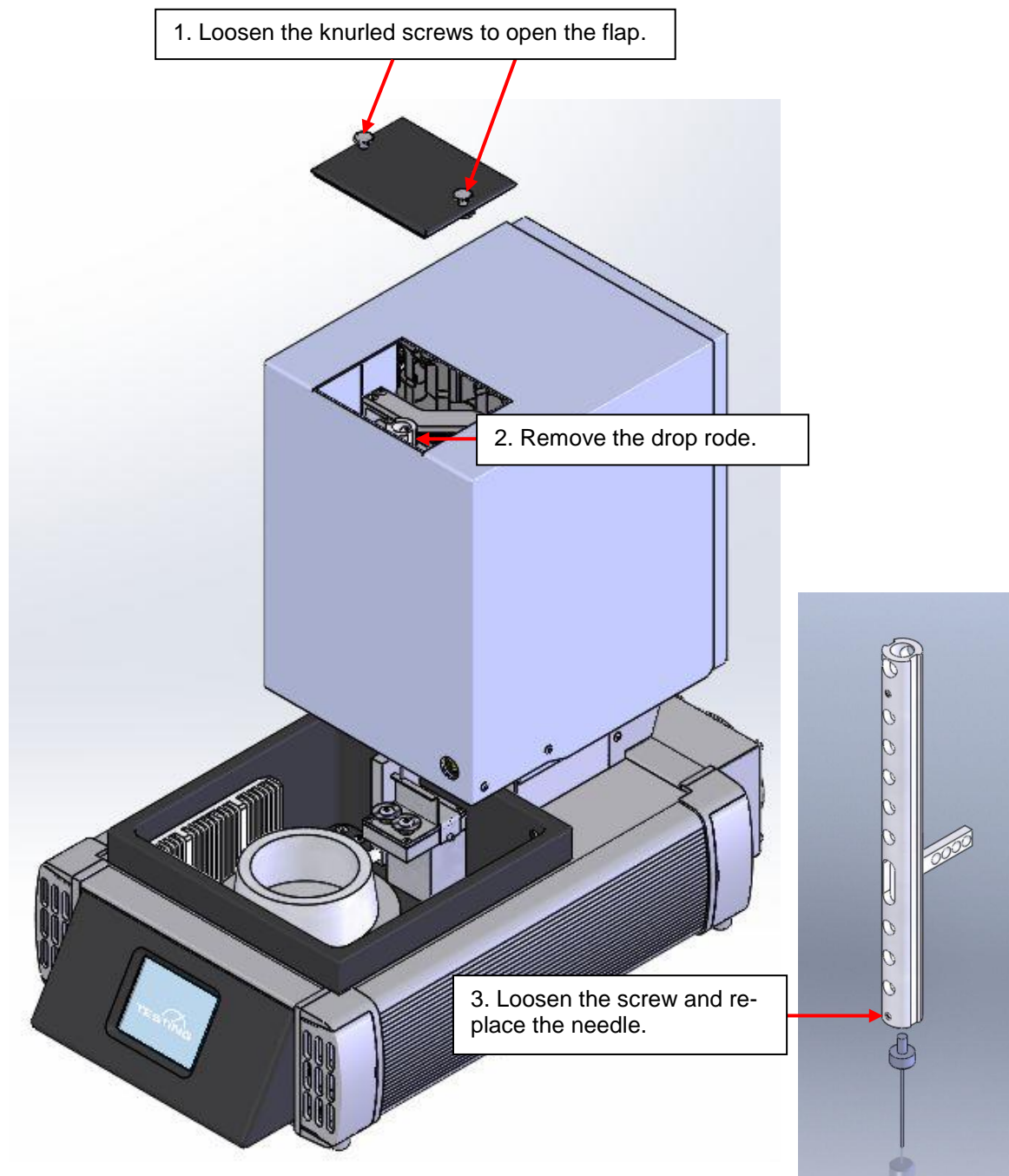
Note



The brushes can be turned into position by hand so that the screws can be reached with the key.

Insert new brushes and tighten the screws.

5.3 Replacing the needle



4. Reinsert the drop rod and lock the flap.

Figure 36: Replacing the needle

5.4 Replacing the seal ring

Depending on the degree of soiling, it may be necessary after approx. 2 years to replace the sealing ring situated under the plate for the sample. To do this, the plate for the sample must be unscrewed and removed. Then loosen and take out the ring with the sealing ring and replace it with a new one. Install the plate and tighten it

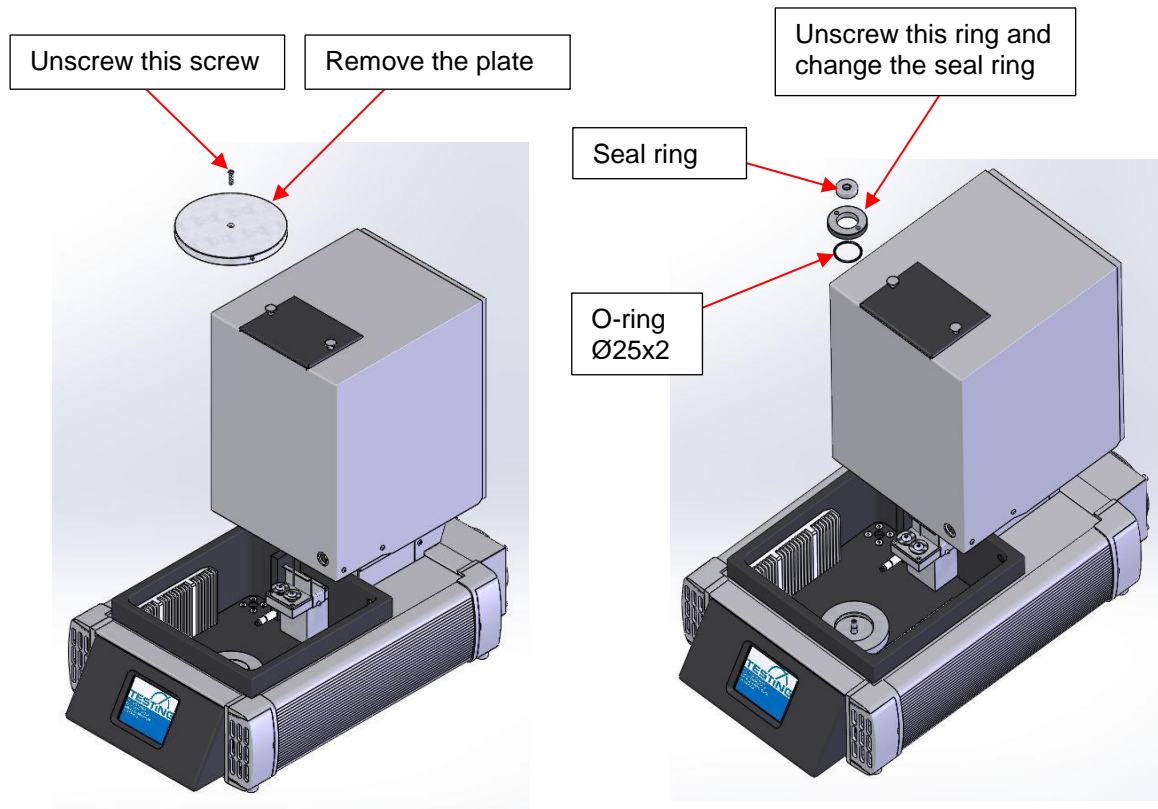


Figure 37: Replacing the seal ring

6. After-sales service

Great care was made to assure that this Operating Manual was properly prepared. However, we cannot guarantee that it has no mistakes or that all data are complete and correct in means of technical modifications.

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6.1 Date of this version of the Operating Manual

2020\12

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6.3 Spare parts and technical support

If you have any questions of technical nature, or if you need spare parts, please get in touch with the following address:

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