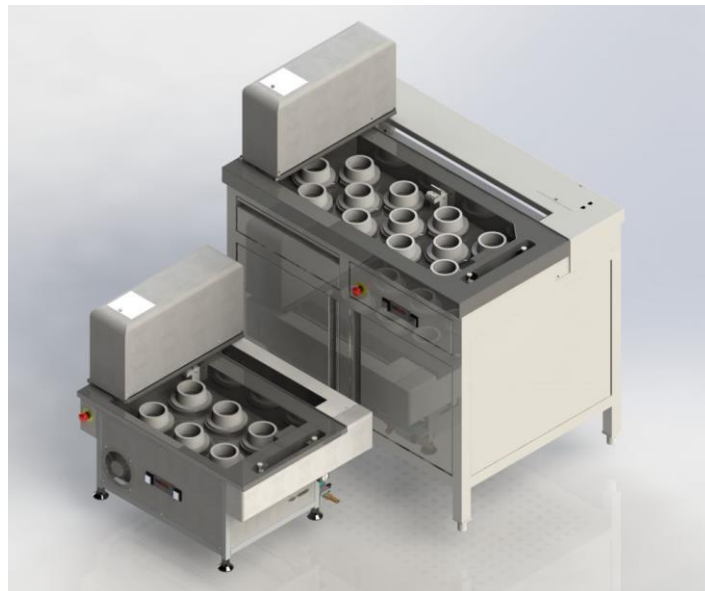


# Operating Manual

## Multi Station Vicat Needle Testing Apparatus




Model	Material		Standard		PC-controlled model with places
	Cement	Gypsum	EN	ASTM	
1.0366	X		X		6
1.0366.ASTM	X			X	
1.0366.EN_ASTM	X		X	X	
1.0366.G		X	X		
1.0366.GZ	X	X	X		
1.0367	X		X		8
1.0367.ASTM	X			X	
1.0367.EN_ASTM	X		X	X	
1.0367.G		X	X		
1.0367.GZ	X	X	X		
1.0368	X		X		12
1.0368.ASTM	X			X	
1.0368.EN_ASTM	X		X	X	
1.0368.G		X	X		
1.0368.GZ	X	X	X		

**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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note 	The descriptions and explanations are exemplary for all models.
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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 by technically qualified staff only.

“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 observe the requirements and limit values, as well as all safety instructions, given in this Operating Manual. Any use of this device not in accordance with these stipulations shall be considered to be in violation of the use for which this system was intended. If this device must be operated 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 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 immediately. Skin or tissue exposed to moist concrete, has to be washed immediately.</p>
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The operator must make sure that no other person is, put at risk. Only trained operators may use the device unsupervised.

If any faults or damage to the apparatus impair its operational safety, it must be put out of operation immediately, and only used again after all hazards have been eliminated.

This operating manual contains safety instructions, which have to be considered 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 the place of installation.


The weight is approx. 70 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:	according to DIN EN 196-3
Permissible relative humidity:	according to DIN EN 196-3
Maximum elevation:	1,000 metres above sea level

<p>Caution!</p> 	<p>Take normal and reasonable precautions so that system does not suffer impacts or is not damaged in another way.</p>
---	--

## 1.6 Scope of delivery

The apparatus comes with the following standard accessories:

Power cord

RS232 cable

Handset unit (**Figure 73**)

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 / Software-CD

Type of machine	Vicat needle	Vicat cone	Vicat rings	glass plates	replacement filter sponge	spare brushes for needle	spare brushes for cone
1.0366 6 stations Cement	Ø1,13mm, 1pc +2pcs spare		70/80 mm 6 pieces	6pcs +2pcs spare	1 pair	1 pair	
1.0366G 6 stations Gypsum		1pc +1pc spare	70/80 mm 6 pieces	6pcs +2pcs spare			PU- 2 pieces
1.0366GZ 6 stations Gypsum + Cement	Ø1,13mm, 1pc +2pcs spare	1pc +1pc spare	70/80 mm 6 pieces 65/75 mm 6 pieces	6pcs +2pcs spare	1 pair	1 pair	PU- 2 pieces
1.0366ASTM 6 stations Cement	Ø1mm 1pc +2pcs spare		65/75 mm 6 pieces	6pcs +2pcs spare		1 pair	
1.0366.EN/ASTM 6 stations Cement	Ø1,13mm 1pc +2pcs spare Ø1mm 1pc +2pcs spare		70/80 mm 6 pieces 65/75 mm 6 pieces	6pcs +2pcs spare	1 pair	1 piece	
1.0367 8 stations Cement	Ø1,13mm 1pc +2pcs spare		70/80 mm 8 pieces	8pcs +2pcs spare	1 pair	1 pair	
1.0367G 8 stations Gypsum		1pc +1pc spare	70/80 mm 8 pieces	8pcs +2pcs spare			PU- 2 pieces
1.0367GZ 8 stations Gypsum + Cement	Ø1,13mm 1pc +2pcs spare	1pc +1pc spare	70/80 mm 8 pieces	8pcs +2pcs spare	1 pair	1 pair	PU- 2 pieces
1.0367ASTM 8 stations Cement	Ø1mm 1pc +2pcs spare		65/75 mm 8 pieces	8pcs +2pcs spare		1 pair	
1.0367.EN/ASTM 8 stations Cement	Ø1,13mm 1pc +2pcs spare Ø1mm 1pc +2pcs spare		70/80 mm 8 pieces 65/75 mm 8 pieces	8pcs +2pcs spare			
1.0368 12 stations Cement	Ø1,13mm 1pc +2pcs spare		70/80 mm 11 pieces	12pcs +2pcs spare	1 pair	1 pair	
1.0368G 12 stations Gypsum		1pc +1pc spare	70/80 mm 11 pieces	12pcs +2pcs spare			PU- 2 pieces
1.0368GZ 12 stations Gypsum + Cement	Ø1,13mm 1pc +2pcs spare	1pc +1pc spare	70/80 mm 11 pieces	12pcs +2pcs spare	1 pair	1 pair	PU- 2 pieces
1.0368ASTM 12 stations Cement	Ø1mm 1pc +2pcs spare		65/75 mm 11 pieces	12pcs +2pcs spare		1 pair	
1.0368.EN/ASTM 12 stations Cement	Ø1,13mm 1pc +2pcs spare Ø1mm 1pc +2pcs spare		70/80 mm 12 pieces 65/75 mm 12 pieces	12pcs +2pcs spare			

Table 1:



## 1.7 Connection to the power supply

<p>Danger</p> 	<p>In accordance with the pertinent standards, the connection socket should be connected to the grounding system. Also, 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. 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 cannot be held liable for any damages that result because the information here is not observed.</p>

### Electrical tolerances:

- Actual voltage:  $\pm 10\%$  of the rated voltage
- Frequency: 50 Hertz  $\pm 1\%$  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 considered.

To protect the electronic components from short circuit, two troughs fuses (250VAC/ 6.3A) are build-in, easily accessible to the user.

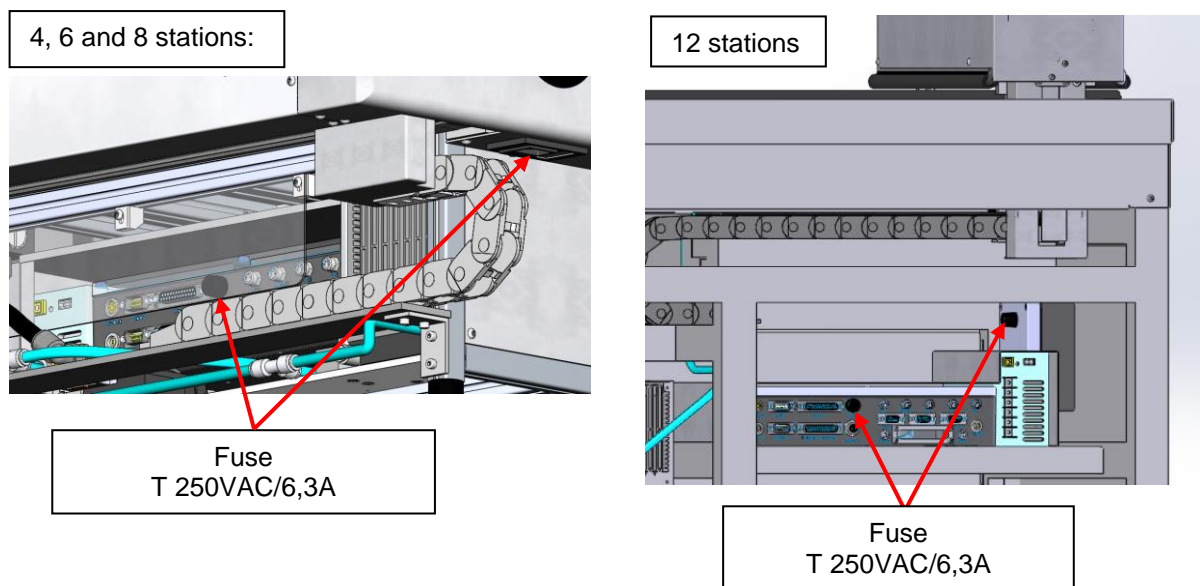


Figure 1: Fuses

## 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 for machine with 4, 6 and 8 stations:

Width/depth/height:	705 x 580 x 600 mm
Weight:	70 kg
Electrical connection:	110–230 VAC / 50–60 Hz
Power draw:	600 W
Weight of drop rod:	300g ± 1
	100g ± 1
Additional weight:	700g ± 1

### 12 stations:

Width/depth/height:	1000 x 700 x 1150 mm
Weight:	180 kg

### Test cycles:

The apparatus supports various test cycles whereby one of the penetration patterns can be combined with one of the cycle times (4, 8, 12 and 16 min).

	<p><b>Note</b></p> <p>If single range (40mm - 0mm) is used to select the cycle time and the checkbox "Use minimum cycle time in area of initial and final time of setting" is checked, the cycle time is reduced to the smallest value (4min), as soon as the device registers measured values within the defined area of initial and final time of setting. Outside these areas, the set cycle time is used for further measurements.</p>
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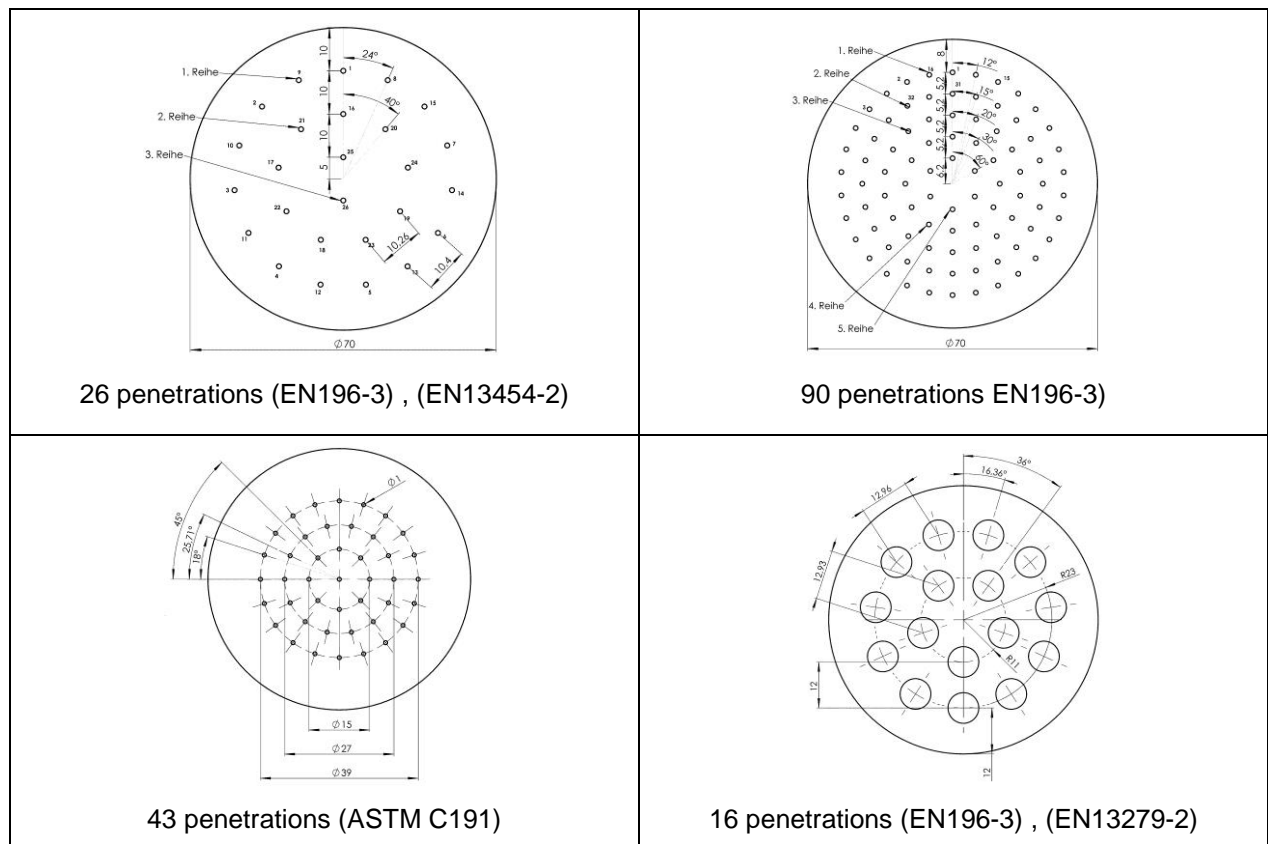


Figure 2: penetration patterns

### 3 Operation

#### 3.1 Commissioning

##### 3.1.1 Connections and switching on

Connect the handset unit to the main apparatus via (25 pin D-Sub plug, tighten screws).

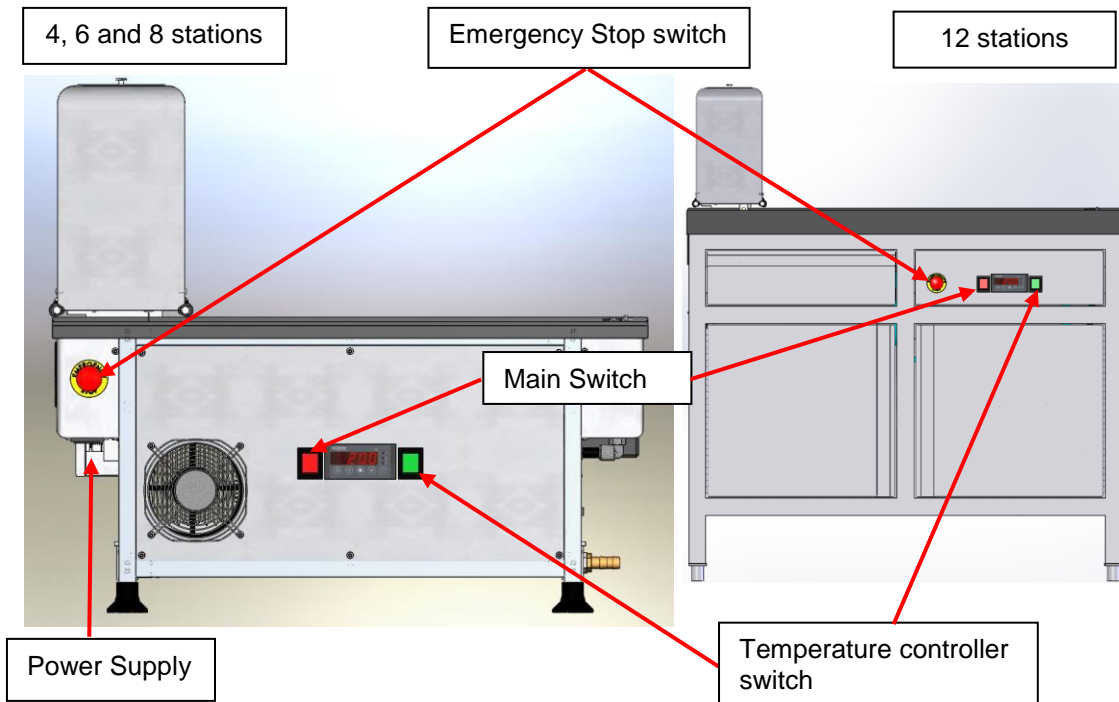
Connect the apparatus to the PC via (RS232 cable, tighten screws).

Use an USB-RS232-adaptor if necessary \*.

Plug the testing apparatus into the 230 V 50 Hz mains using the supplied cord.

Make sure that the Emergency Stop switch is unlocked.

Switch ON the red main switch on the front.



ⓘ There is a fix installed power cord at the 12 stations device.

Figure 3: Switches and power supply

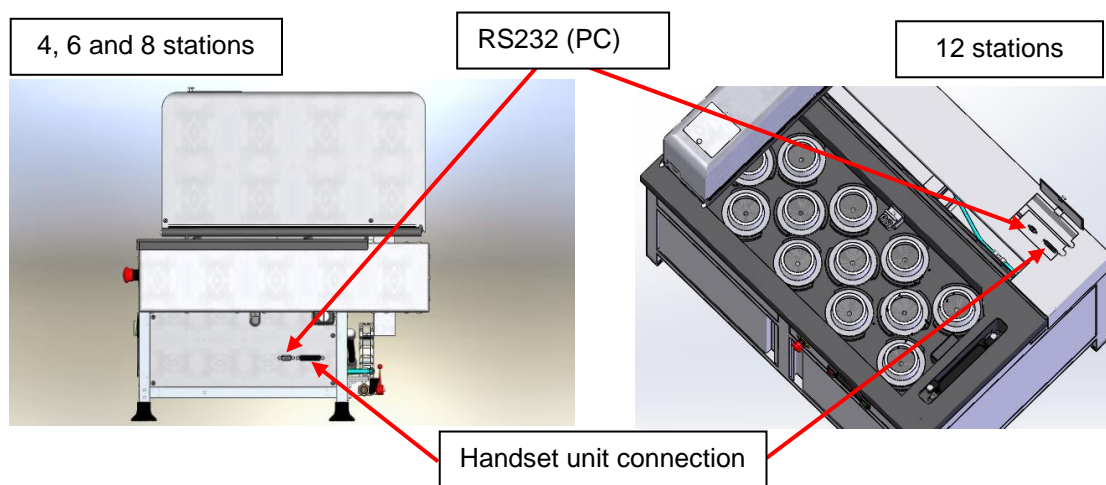


Figure 4: Communication connectors

**\* 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

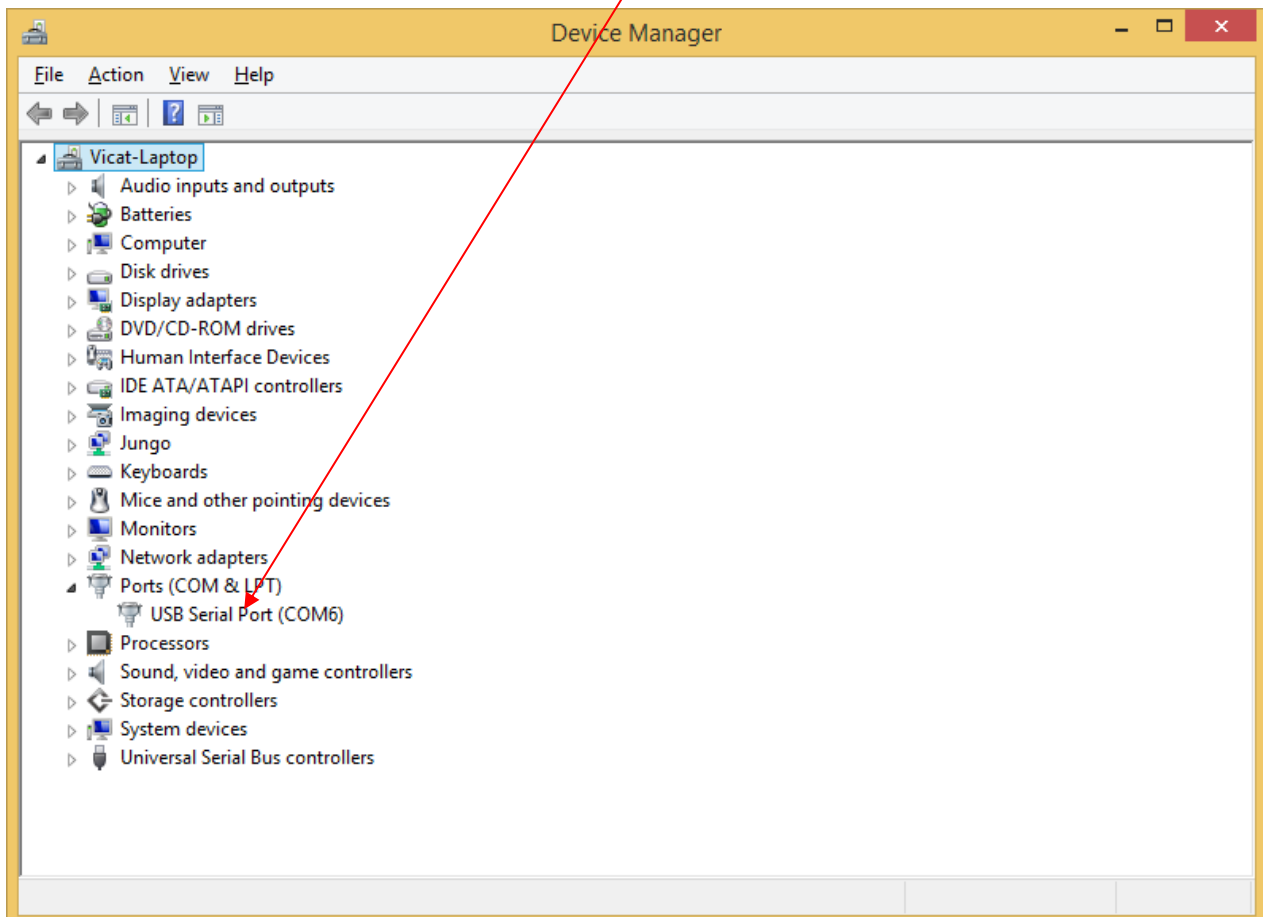
b) device manager. Right-click USB-Adapter and choose “install driver”.

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).

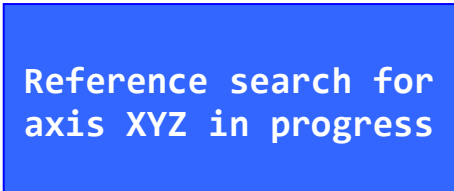
<p>Note:</p> 	<p>Communication via USB-RS232-Adapter to PC just works with properly installed drivers. The number of the COM-Ports (here COM6) can vary.</p>
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After switching ON the main switch, the control software runs through a standard initialization procedure that concludes by determining the reference points (zero points) for each axis. The reference points are located at the top left corner of the basin, near the washing unit.

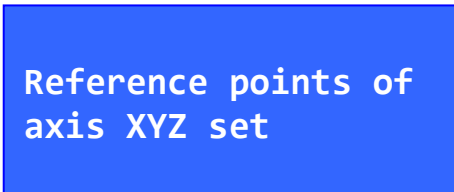
When the handset unit is connected, the display shows comments during the reference search like in **Figure 5** and **Figure 6**. If no other procedure for setting or maintenance purposes has been entered, the procedure ends by cleaning the needle and displaying ready message shown in **Figure 7**.

The VicatMPM device is ready and waiting for synchronization with "Date and Time" from the PC application. Synchronization is carried out automatically if the connection to the PC already exists, or by activating the menu commands "Device / Connect".



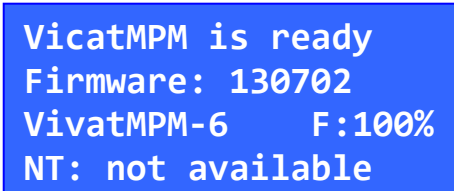
Reference search for  
axis XYZ in progress

Figure 5: Determining the reference points




Reference points of  
axis XYZ set

Figure 6: Reference points set



VicatMPM is ready  
Firmware: 130702  
VivatMPM-6 F:100%  
NT: not available

Figure 7: VicatMPM apparatus is ready

<p>Note</p> 	<p>The VicatMPM device also works without a handset unit connected.</p>
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### 3.1.2 Filling

Close the ball valves and remove the filter cartridge.

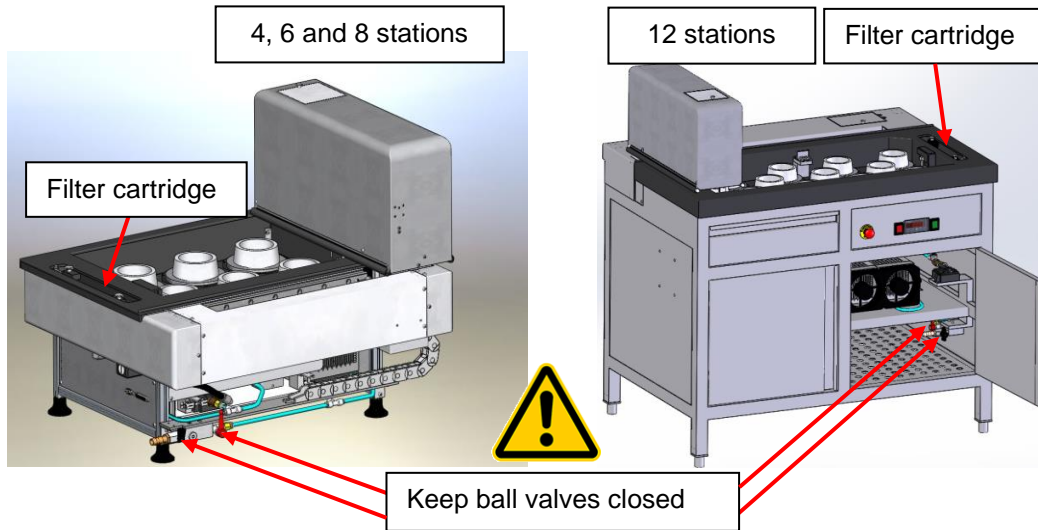



Figure 8: ball valves

<p>Caution!</p> 	<p>To prevent damage of the heat exchanger, close the middle valve before switching on the temperature controller.</p>
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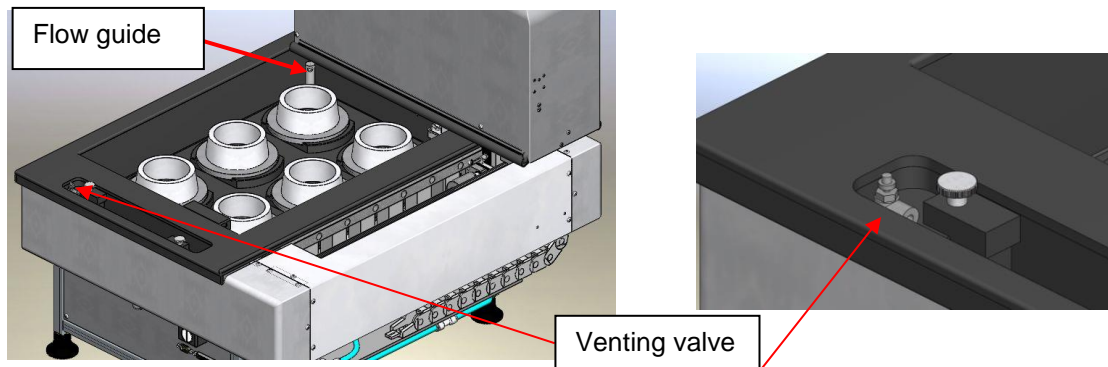




Figure 9: flow guide and venting valve


Set the flow guide into the inlet hole to fill water from one side only. Open the venting valve and fill the apparatus with water (approx. 10 l at 6 stations). Switch ON the temperature controller to activate the water circulation. As soon as water flows out of the venting valve, the system is vented and the venting valve has to be closed. Install the filter cartridge as described in section 5.5. The filling height in the basin should be approx. 55 mm after venting without samples (upper edge of the flow guide). For each sample, the water level rises by approx. 2.5 mm.


<p>Note!</p> 	<p>If there is no water flow into the filter or the pump does not promote water, please turn off temperature controller switch, remove filter cartridge, open both ball valves and drain some water to carry out any air bubbles from the system. Then close the ball valves and turn on temperature controller switch. Mount filter cartridge (section 5.5). Repeat this procedure if necessary.</p>
--	---


### 3.1.3 Temperature control

The temperature controller regulates the temperature of the water bath automatically to the  $20 \pm 1^\circ\text{C}$  value, specified by the EN196-3 Standard and should not be changed.

<p>Note</p> 	<p>The temperature control heats and cools. If cold water is being heating, then the temperature can temporarily overshoot the set value. The temperature is then automatically controlled.</p>
---	---

<p>Note</p> 	<p>The apparatus is equipped with a flow sensor that only switches on the temperature control when a constant flow exists (after pushing the green button). Without any flow, the heat exchanger would otherwise suffer severe damage (could freeze or burn out).</p>
---	---

<p>Note</p> 	<p>The temperature control is designed for an ambient room temperature of approx. <math>20^\circ\text{C}</math> (laboratory conditions). If the ambient temperature differs too greatly from this, then adherence to the set water temperature cannot be guaranteed. <b>Do not expose apparatus direct to solar/heat radiation!</b></p>
---	---

<p>Caution!</p> 	<p>To prevent contamination of the pump it is important to the drainage of the water that the right ball valve is opened first to empty the tank. After that, the middle ball valve has to be opened to drain the remains of the system.</p>
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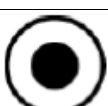
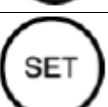
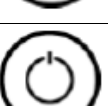
#### Functions

	Temperature
1	Heating
2	Cooling
3	no function



The open- and closed-loop control equipment installed in the device was developed for control systems in which several outputs are required. A membrane keyboard with 5 keys is used to input the settings for the required values (set points), the standby values, and all other parameters for the controllers.

Settings that can be made on the device:

	Button: UP	By pushing this button, you increase the parameter or the parameter value.
	Button: DOWN	By pushing this button, you decrease the parameter or the parameter value. In case of an alarm, you can also shut off the acoustic alert (buzzer) by pressing this button.
		Not active
	Button: SET	Pressing this button displays the set point value for heating ( <b>Default value: 19.7 °C</b> ). This button is also used to set the parameters.
	Standby	Standby circuitry

The controller has three (3) operation levels:

**Operator level no. 1:**

Parameterization of the set point value:

You can directly select the set point value for heating by pressing the SET button (regardless of the standby mode). If you keep pushing SET key and press UP and DOWN buttons, you can increase or decrease the set point values. The newly set values will then apply for the control functions.

**Operator level no. 2 (P=parameters):**

If you press both the UP and DOWN button at the same time and hold them pressed for at least 4 seconds, you will get into a parameter list for the control parameters (these parameters begin with P1). You can use the UP button to move the list upward, and the DOWN button to scroll downward in this list. When you press the SET button, this will display the value of a single parameter. If you then press the UP or the DOWN button, while still holding down the SET button, then you can increase or decrease the value of the respective parameter. When you release all buttons, the new value will be saved. If you take no action or press any button for more than 60 seconds, the system will jump back to the first display.

The following is a brief description of some of the parameters:

Parameter	Description of the function	Setting range
P0	Actual value	—
P1	Desired value (set point) for cooling	-99.9 ... +99.9 K (20.0°C)
P2	Hysteresis control-contact 1	0.1 ... 99.0 K (0.1 °C)
P3	Hysteresis control-contact 2	0.1 ... 99.0 K (0.1 °C)
P4	Lower limit for set point value	-99°C ... P5
P5	Upper limit for set point value	P4 ... 999°C
P6	Correction of actual value	-20.0 ... +20.0 K
P19	Locking the keyboard buttons	0 = unlocked; 1 = locked
P30	Lower limit value for alarm	-99 ... 999°C/K
P31	Upper limit value for alarm	-99 ... 999°C/K
P32	Hysteresis alarm, one-sided	0.1 ... 99.9 K



### Operator level no. 3:

To move into the third operator level, first go into the second operator level as described above (Operator level no. 2). Then scroll up the parameter list to the highest parameter. Then press the UP button and hold it pressed for at least 10 seconds. The display will show "PA". Then press the UP and DOWN buttons at the same time, and hold them both down for at least 4 seconds. This will take you to the parameter list on the third operator level. The parameters there begin with "A1". You can then use the UP button to move the list upward, and the DOWN button to scroll downward in this list. When you press the SET button, this will display the value of a single parameter. If you then press the UP or the DOWN button, then you can increase or decrease the value of the respective parameter. When you release all the buttons, the new value will be saved automatically. If you then take no action and press no buttons for more than 60 seconds, the system will jump back to the first display.

Changing the parameters beginning with the letter "A..." can modify the characteristics of the system. Therefore, be very careful when modifying these values.

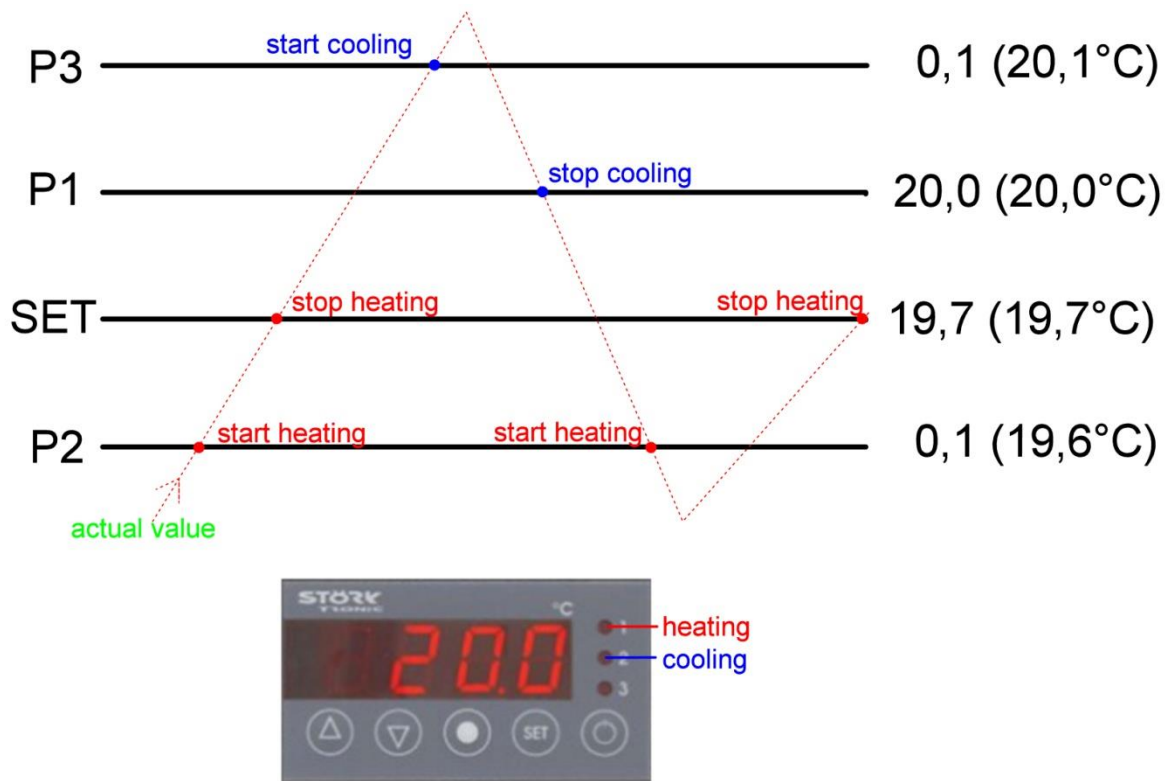
#### Selection of "A" parameters

Parameter	Description of the function	Setting range
A1	switch mode contact 1	<b>0: heating contact</b> / 1: cooling contact
A2	switch mode contact 1	0: heating contact / <b>1: cooling contact</b>
A8	actual value – display mode	0: integer / 1: 0,5K / <b>2: 0,1K</b>
A60	sensor selection	11: PT100 two conductors / 12: PT100 three conductors.
A80	Changing the temperature scale	0: Fahrenheit / <b>1: Celsius</b>
A82	Standby button	0: inactive / 1: active (2/3/4 other function)

### 3.1.4 Messages and warnings on the display

Message	Description	Action to be taken
OFF	Standby mode. There are no control functions.	Switch on by pressing the standby-button
F1L	Sensor fault or short circuit.	Check the sensors and the sensor connection terminals.
F1H	Sensor fault or breakage in the sensor.	Check the sensors and the sensor connection terminals.
	The keyboard locking function is active.	See Parameter P19 or A19.
The display is flashing	Temperature alarm (see A31)	
The acoustic alarm sounds (buzzer)	Temperature alarm (see A31)	Shut off the acoustic alarm (buzzer) by pressing the DOWN button.
EP	Data loss in parameter memory (control-contacts no. 1 and 2 are without current)	Switch the mains power OFF, then ON again. If this does not solve the problem, the controller must be repaired.

Sensor error messages are saved and will continue to be shown, even if the cause of the problem has been corrected. If you acknowledge these error messages by pushing the DOWN button, this will delete the error message.



## regulation of temperature

Figure 10: regulation of temperature

<p>Caution</p>	<p>If the water temperature regulation is not required but the basin is not empty, the pump should continue to run and only the temperature control to be switched off by pressing the standby button. The controller display shows the message „OFF“. This avoids accumulation and solidification of sludge particles inside the pump.</p>
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<p>Note</p>	<p>For ASTM we recommend for "P1" = 20.5 ° C and for "SET" = 19.5 ° C. This prevents the overshooting the temperature when heating or cooling!</p>
-------------	--

## 3.2 Equipment

### 3.2.1 Drope rods

The device is delivered with the corresponding drop rod according to the selected variant. The other drop rods can also be used if desired. To change the drop rod, you have to move to the maintenance position (4.6).

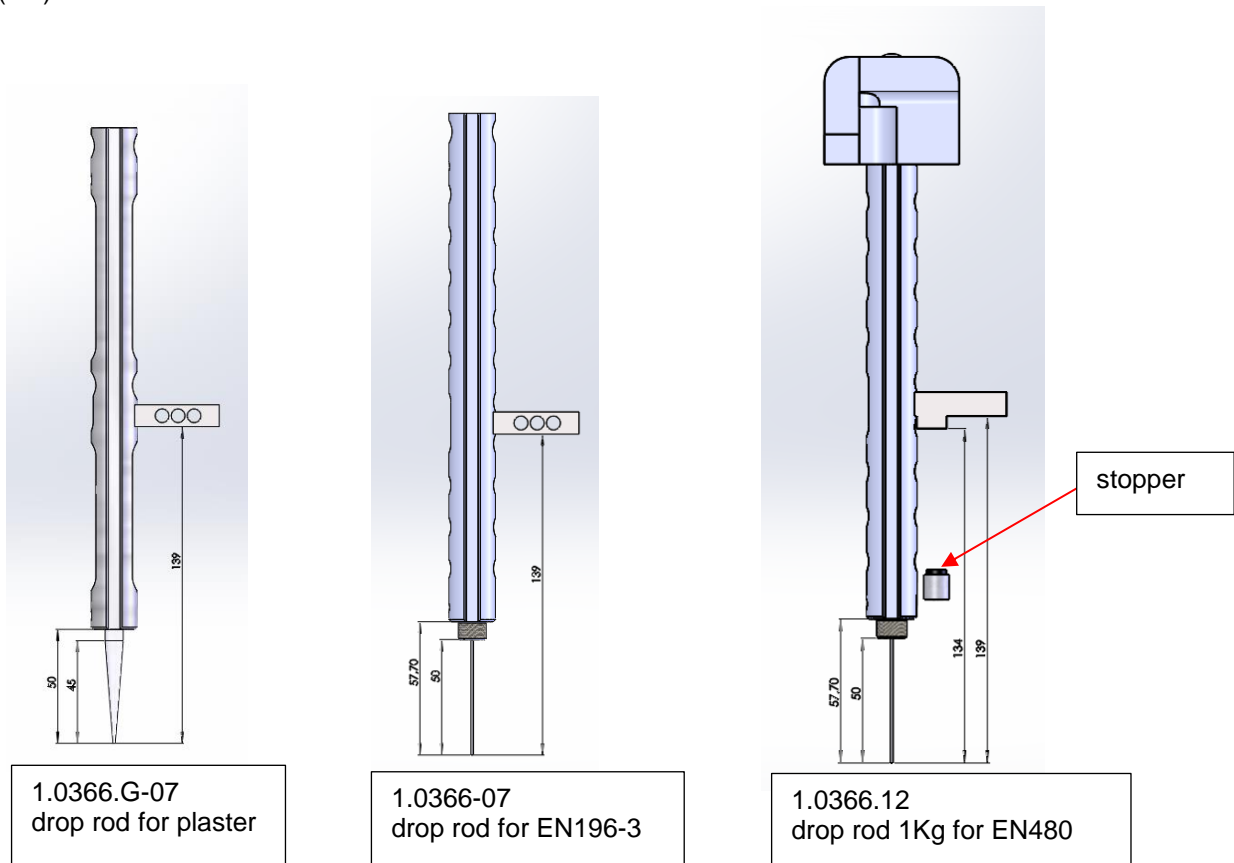


Figure 11: drop rods

The drop rod for plaster has a weight of  $100\text{g} \pm 1\text{g}$ . It is adjusted to the length and weight of the immersion cone for plaster (1.0305.01).

The drop rod for EN 196-3 as well for ASTM has a weight of  $300\text{g} \pm 1\text{g}$ . It is adjusted to the length and weight of the needle for initial time of setting (1.0306.13 EN und 1.0303.01 ASTM).

The 1Kg drop rod consists of a  $300\text{g} \pm 1\text{g}$  drop rod plus an additional weight of 700g, so that the total weight is  $1000\text{g} \pm 1\text{g}$  (EN 480).

The EN 480 standard stipulates that the needle should be stopped 3mm above the glass plate. For this purpose the 1 Kg drop rod has a 5 mm step on the holder. With this drop rod, there is also a hard stopper delivered or already installed on the apparatus (buffer chapter 5.3).

When there is a desire to make measurements with an immersion cone and drop rod of 300g or 1000g, a special immersion cone is required which is just as long and just as heavy as the needle for the initial time of setting to ensure that the drop rod weight is  $300\text{g} \pm 1\text{g}$  or  $1000 \pm 1\text{g}$ .



1.0366.G-11.T Immersion cone  
Immersion cone for use with the  
stainless steel drop rods

Figure 12: immersion cone

Figure 12: immersion cone

### 3.2.2 Additional Weight of 700 grams

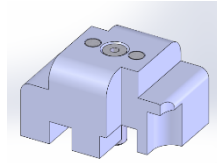



Figure 13: additional weight

It is possible to equip the Vicat needle devices with an additional weight of 700 grams, to increase the weight of the drop rod to 1 Kilogram. In this case it is recommended to purchase the complete set of drop rod with additional weight for 1 kg and a harder stoper buffer which stops the drop rod (1 kg) above the glass plate, whereas the 300 g drop rod then falls onto the glass plate.


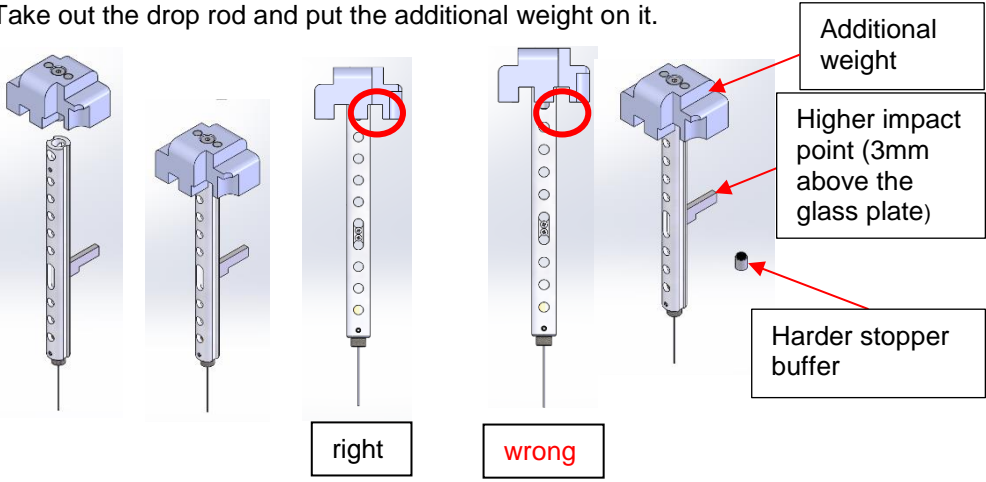
<p>Note</p> 	<p>If the drop rod is caught by the buffer above the glass plate, the detection of broken needle no longer works! The zero heights may only be measured with a drop rod that falls on the glass plate! If the device is used with the drop rod for 1 kg, the soft standard stopper (rubber buffer) must be replaced by the harder stopper (which is supplied with the 1 kg drop rod) (<a href="#">5.3.</a>)! The harder stopper can also be used with the lighter drop rods (300 and 100g).</p>
---	---


To mount the additional weight please put the device into maintenance position, as described in section 4.6.

Then open the flap, as described in section 5.4.

The drop rod is lowered, to allow the additional weight to be put on the top of the drop rod.

Leave maintenance position.

<p>Note</p> 	<p>Before taking the additional weight into operation, please check the correct fit on the top of the drop rod. Take out the drop rod and put the additional weight on it.</p>  <p style="text-align: center;"> <span style="border: 1px solid black; padding: 2px;">right</span> <span style="border: 1px solid black; padding: 2px; color: red;">wrong</span> </p>
---	--

<p>Caution!</p> 	<p>A wrong position of the additional weight (too high on the drop rod), leads to a jam of the Y-axis. It is possible that the seat of the drop rod is not adjusted correctly any more. In this case, it has to be readjusted.</p>
---	--

### 3.2.3 Additional heat exchanger / art.no.1.0366.13

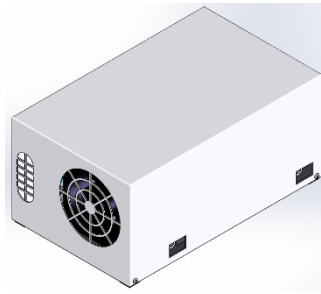


Figure 14: additional heat exchanger

The Vicac needle device can be equipped with an additional, second heat exchanger to reach a water temperature of +5°C.

Please open the housing in the front. **(Attention! Disconnect electricity!)**

Open front plate (only 4, 6 und 8-station devices) and disconnect temperature control wire from control cabinet.

Then connect Y-Wire and lead it to the outside underneath the device.

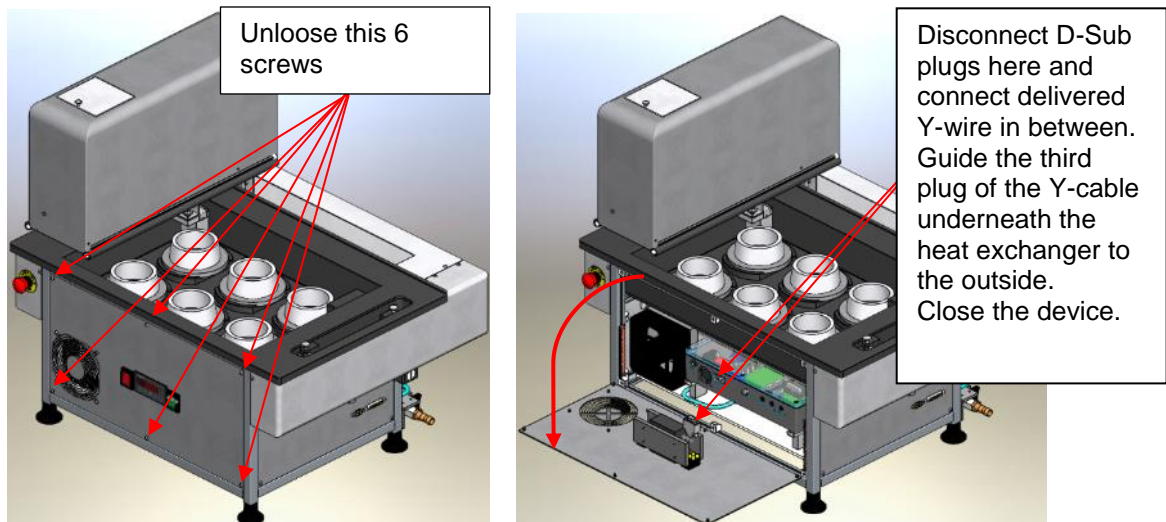


Figure 15: open housing

Pull off hose that leads to the basin at the T-switch on the back side.

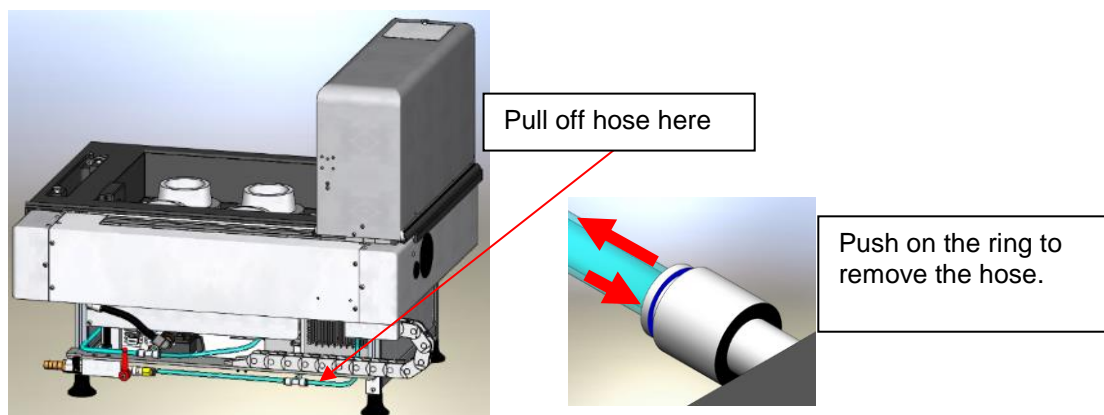


Figure 16: pull off hose

Now connect the additional heat exchanger with the Vicat needle device.

- 1.) connect delivered hose with T-switch and with the front port at additional heat exchanger
- 2.) connect hose running to the basin with the rear port at additional heat exchanger
- 3.) connect 3<sup>rd</sup> plug of the Y-wire with additional heat exchanger

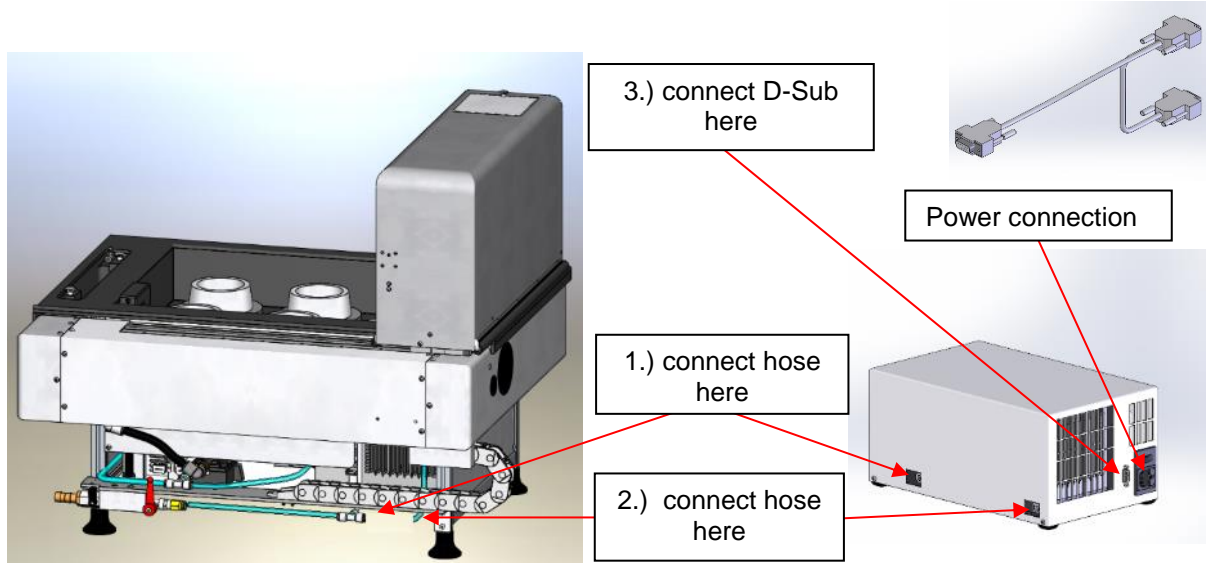



Figure 17: connecting additional heat exchanger

Connect power cables and switch on both devices.

Additional heat exchanger is controlled also by temperature controller of the Vicat device.

<p>Caution!</p> 	<p>You could use the second heat exchanger to heat up the water in the basin theoretically, but the recommended maximum temperature of 45°C is reached by the internal heat exchanger. Components inside Vicat needle device must not be exposed to more than 60°C!</p>
---	---

### 3.2.4 Consistency plunger

To check the normal consistency by a Vicat device you can use a consistency plunger, which is available as optional accessories. It has the same weight like the Vicat needle to ensure an absolute weight of 300±1g for the whole drop rod.

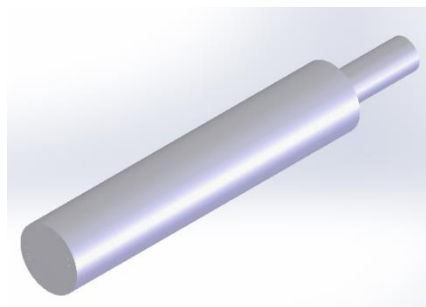




Figure 18: consistency plunger

To replace the needle with the consistency plunger, move the drop rod to the maintenance position (section 4.6). Open the flap and take out the drop rod. Loosen the stud screw and remove the needle from the drop rod. Insert the consistency plunger and tighten the stud screw. Insert the drop rod into the device and close the flap. Leave the maintenance position. In the VicatMPM software under "Standard" (for the desired sample) select the item "Normal Consistency". Start measurement on sample, the measurement is carried out. Then move the drop rod back to the maintenance position and replace the consistency plunger with the needle.

<p>Note</p>  An information icon consisting of a lowercase letter 'i' inside a circle.	<p>It is not possible to clean the consistency plunger in the cleaning unit! To clean or to replace the consistency plunger, please run to maintenance position, like described in section <b>4.6</b>.</p>
<p>Note</p>  An information icon consisting of a lowercase letter 'i' inside a circle.	<p>For measuring the standard consistency we recomend to use a manual Vicat device.</p>

## 4 Operation

### 4.1 Software

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

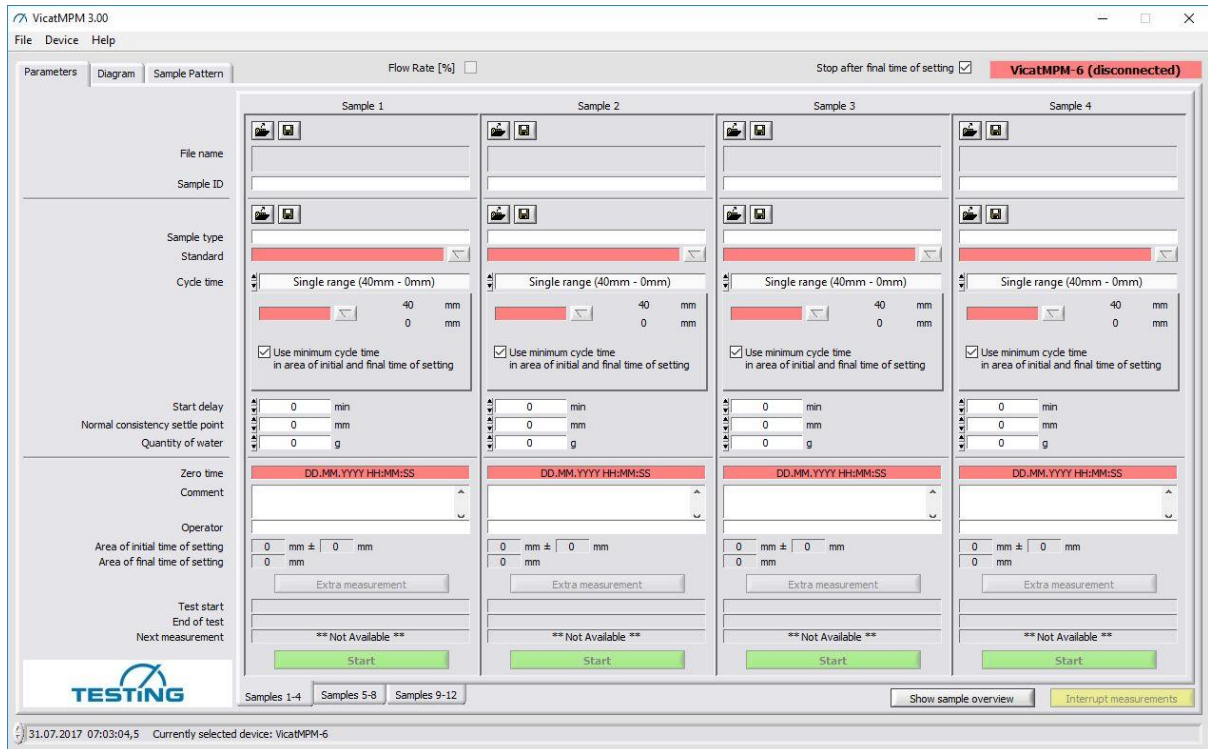

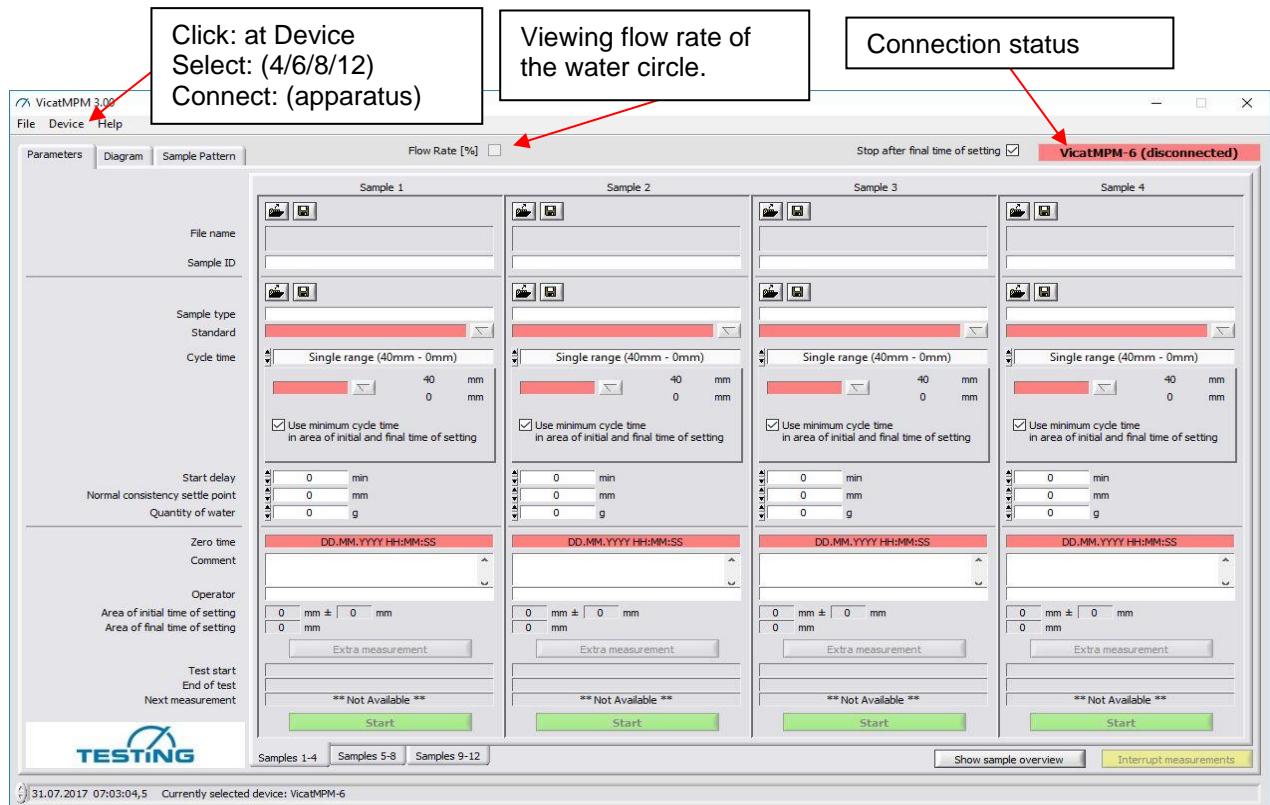


Figure 19: VicatMPM application software

<p>Note</p> 	<p>With the VicatMPM Software, you are able to determine standard consistency, initial time of setting and the final time of setting of cement or gypsum samples. Final time of setting can be determined very accurate in case the sample surface is appropriate. The measuring accuracy is <math>\pm 0.1</math> mm. The repeatability of measurements is <math>\pm 0.05</math> mm.</p>
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- **File name:** Name of file is displayed here, after starting with this sample
- **Sample-ID:** Input by the User (e.g. number of sample)
- **Sample type:** Input by the User (e.g. cement)
- **Standard:** Choose the desired test standard together with the possible amount of penetrations here
- **Cycle time:** Choose the desired cycle time (time between penetrations) here  
*Single range:* (4/8/12/16/20min), if check box is activated the shortest cycle time for initial and final time of setting is chosen in appropriate areas  
*Multi range:* different cycle times can be set for different penetration depths
- **Start delay:** Put in a time in minutes that shall pass from “zero time“ to the first penetration
- **Normal consistency settle point:** Penetration depth of plunger if sample has normal consistency.
- **Quantity of water:** Amount of water given to the sample
- **Zero time:** Time when water is added to the cement
- **Comment:** Free for comments
- **Operator:** Name of operator
- **Area of initial time of setting:** The standard value (with tolerances) for initial time of setting is displayed here
- **Area of final time of setting:** The standard value for final time of setting is displayed here
- **Extra measurement:** Generates an extra measurement for a sample despite of next measurement or delay time for a sample.
- **Test start:** Time of test start is displayed here (Start button clicked).
- **End of test:** Time of test end is displayed here (Stop button clicked or regular test end).
- **Next measurement:** Time remaining to next penetration (countdown)
- **Start:** Starts measurement of this sample (a Pop-up occurs for determining name and folder for measurement data)

## 4.2 Inserting samples

Fill sample material into the Vicat ring. Use the supplied glass plate (120 x 5 mm) as the base. Place the sample on a testing station and fasten it with the fixing ring.

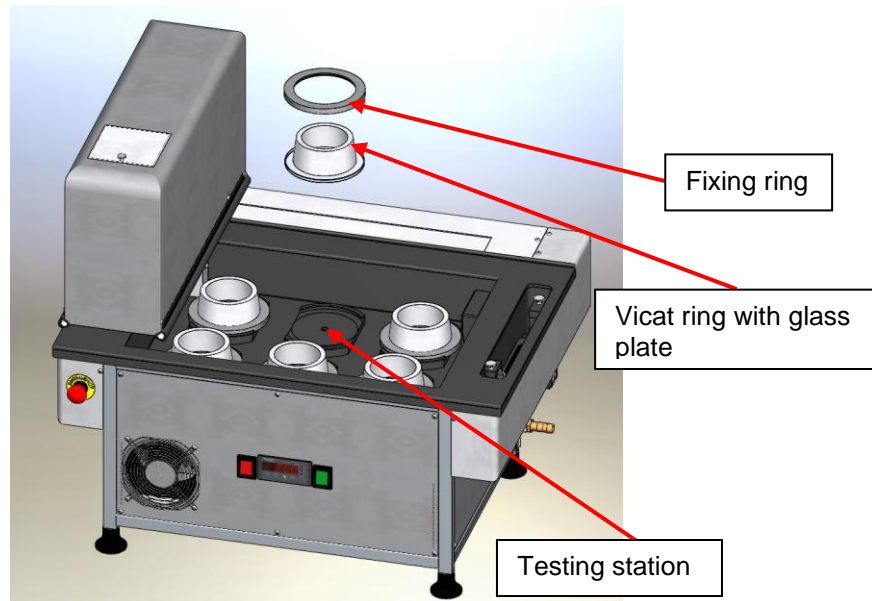


Figure 20: fixing a sample in the testing station

## 4.3 Starting the tests

Start the Vicat tests from the PC software.

After every measurement, the needle will be cleaned in the washing unit.

The position and type of the washing unit varies according to the design of the appliance (section 5.1).

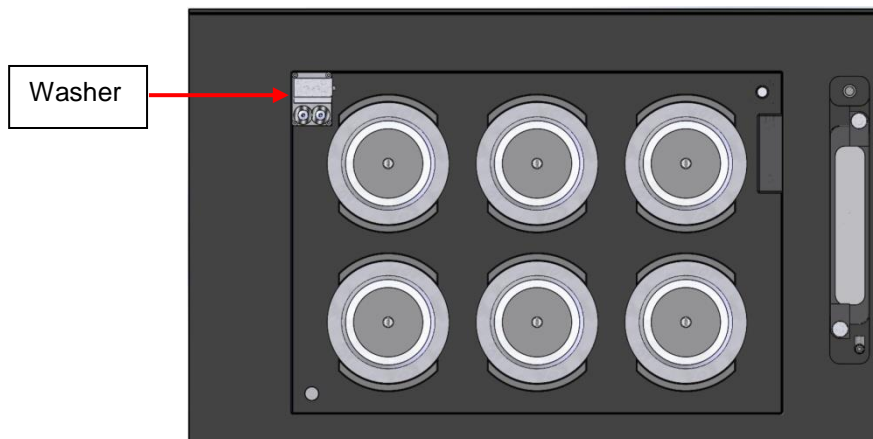


Figure 21: washing unit for needle

<p>Note</p>	<p>Once testing has started, the apparatus runs automatically and stores the measured data internally. If the apparatus is connected to PC, the measured data are transmitted to PC simultaneously. Measured data will be saved just for one sample, in measurement process and as long as power supply is given.</p>
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## 4.4 Safety during testing

The apparatus is equipped with safety strips that stop the movements of the apparatus when touched. The display of the handset unit shows a commenting message.

Emergency stop  
During moving to  
position

Figure 22: emergency stop during running to position

This emergency stop can only be cleared from the PC software, upon which the apparatus will perform a reference search and then continue the tests.

The current tests should be interrupted if samples need to be removed or added during testing (see “Software Operating Manuel”, section 4.6).

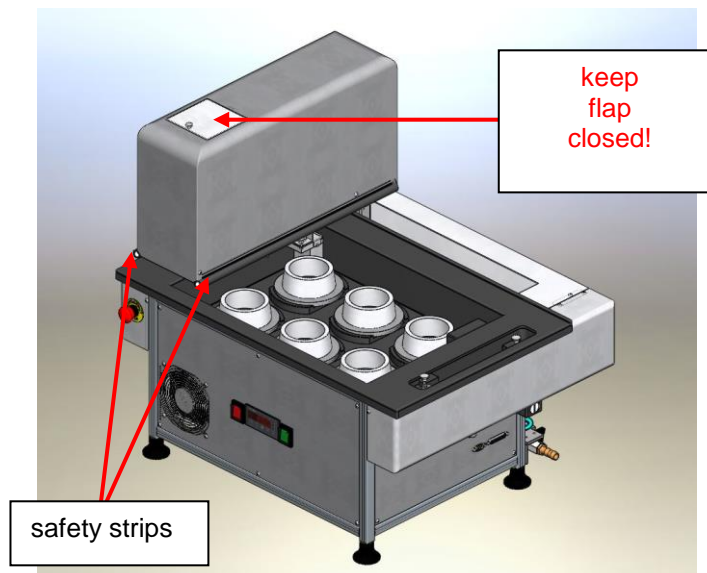



Figure 23: safety strips and flap


<p>Caution</p> 	<p>Only open the cover when the apparatus is switched OFF or in maintenance position. <b>risk of injury!</b></p>
--	--

## 4.5 Monitoring

The apparatus has various monitoring routines that monitor it during testing. One of these routines monitors the Vicat needle. If the needle breaks, the apparatus will report the needle breakage to the handset unit as well as to the PC-application and runs to maintenance position and waits until you replace the needle (section 5.4).

**Fix broken needle**

Figure 24: fix broken needle

<p>Note</p> 	<p>Notice: If the apparatus is set so that the needle does not reach the glass plate (rubber buffer set higher), the needle break detection will not function.</p>
---	--

Other reports from the monitoring routines see section 7.

## 4.6 Running to maintenance position

In order to change the needle on the drop rod or to change the brushes, the apparatus must be brought into maintenance position.

The activation of the maintenance position is the same for all Vicat devices (4, 6, 8 and 12 samples)!

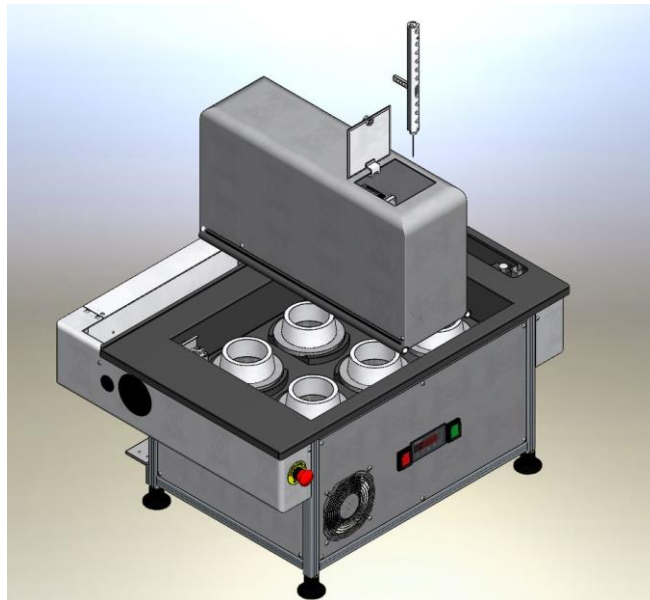
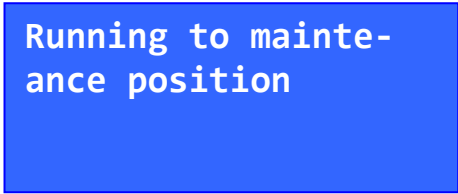


Figure 25: maintenance position

It can be done in two different ways, either from the PC software (“Device>Run to Maintenance position”; see “Software Operating Manual”, section 4.9), or during the reference search after switching ON.

**During reference search:**

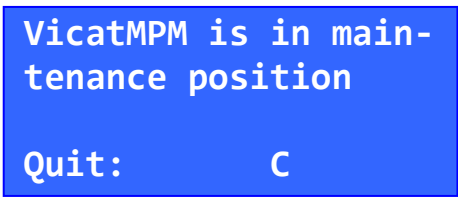
Press and hold the **“F” button** for about 2 seconds. The drop rod with the needle will run to maintenance position. While it is running, the message “Running to maintenance position” will appear (**Figure 26**).

A blue rectangular box containing the text "Running to maintenance position" in white, monospace-style font, centered within the box.

Running to maintenance  
position

Figure 26: running to maintenance position

When (and only when) the drop rod has reached maintenance position and the display shows “VicatMPM is in maintenance position” (**Figure 27**), open the cover flap and remove the drop rod.

A blue rectangular box containing the text "VicatMPM is in maintenance position" and "Quit: C" in white, monospace-style font, centered within the box.

VicatMPM is in main-  
tenance position  
  
Quit: C

Figure 27: drop rod is in maintenance position

Insert the drop rod again when maintenance is finished.  
Quit the maintenance position by pressing the **“C” button**.

## 5 Variants of Vicat needle devices

### 5.1 Position of the washing device depends on the variant

The apparatus can be equipped with one or two washing units according to desired equipment.

**NWU:** washing unit for needle

**CWU:** washing unit for cone

The washer for cone is supplemented by a dryer (wipe-off device). The usage of this dryer can be switched ON and OFF in a special menu.

Entry points into this Menu are described in section 5.1.2.

Following applies to all machines:

Machine with one washing unit is equipped either with **NWU** or **CWU** always at position 1.

Machine with two washing units is equipped with **NWU** always at position 1 and **CWU** always at position 2.

Position 1 is always to the left from position 2 (**Figure 28, Figure 29** and Fehler! Verweisquelle konnte nicht gefunden werden.).

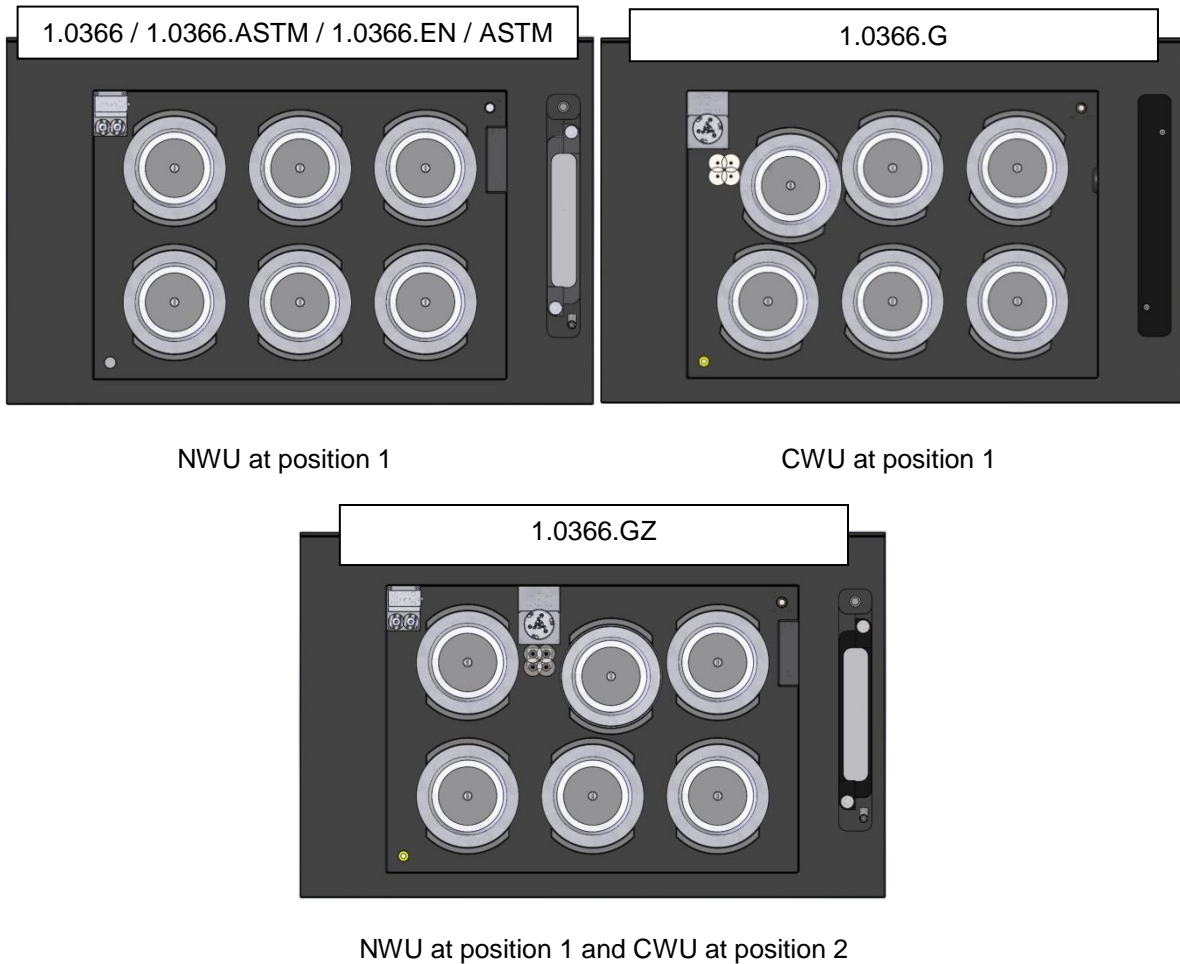



Figure 28: positions of the washing unit at 6-stations machine

<p>Note</p> 	<p>The 1.0364 device variant, 4-stations version is custom-made where sample positions 1 and 2 are omitted. They are also not taken into account by the software.</p>
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The 8-position machines 1.0367.ASTM and 1.0367.EN / ASTM are an exception and are equipped with an NWU at position 3 (Fig. 29, NWU at position 3).

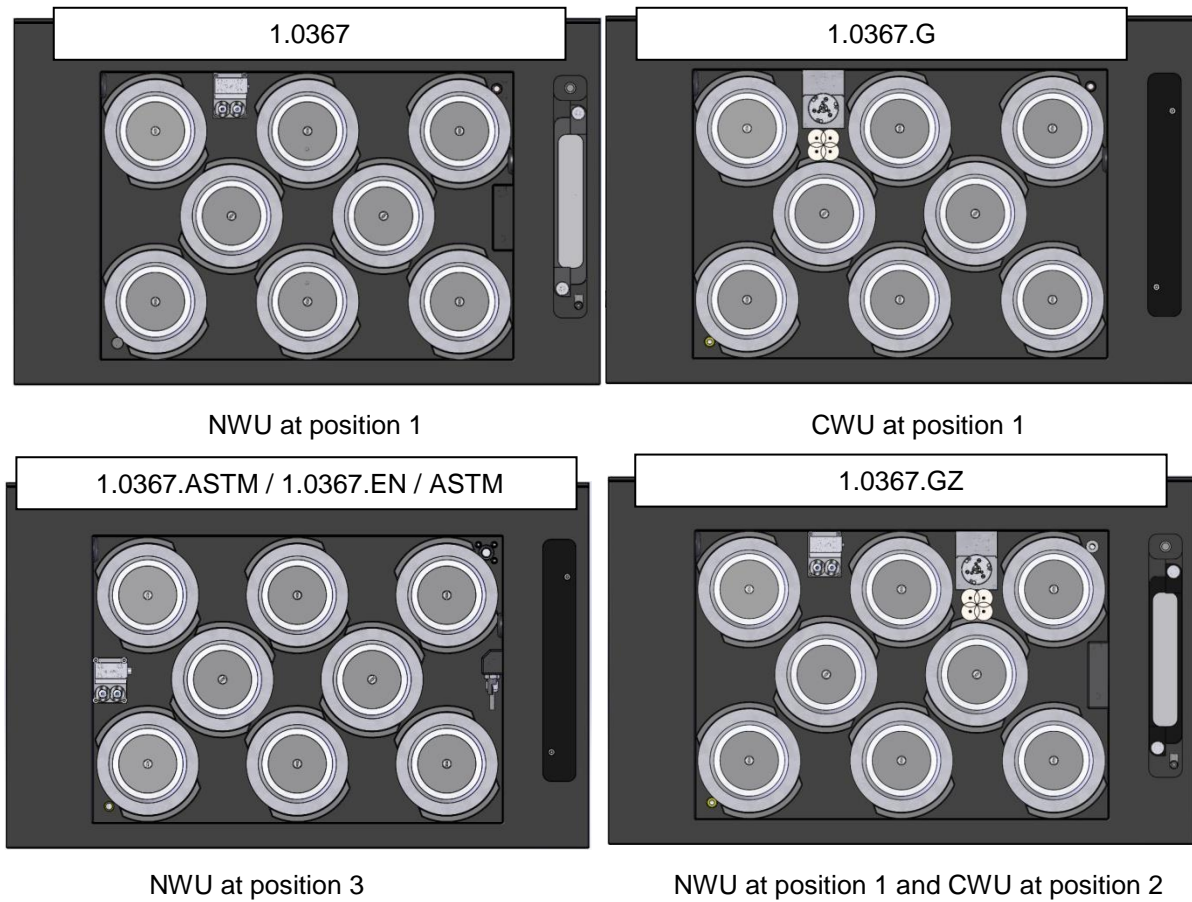


Figure 29: positions of the washing unit at 8-stations machine

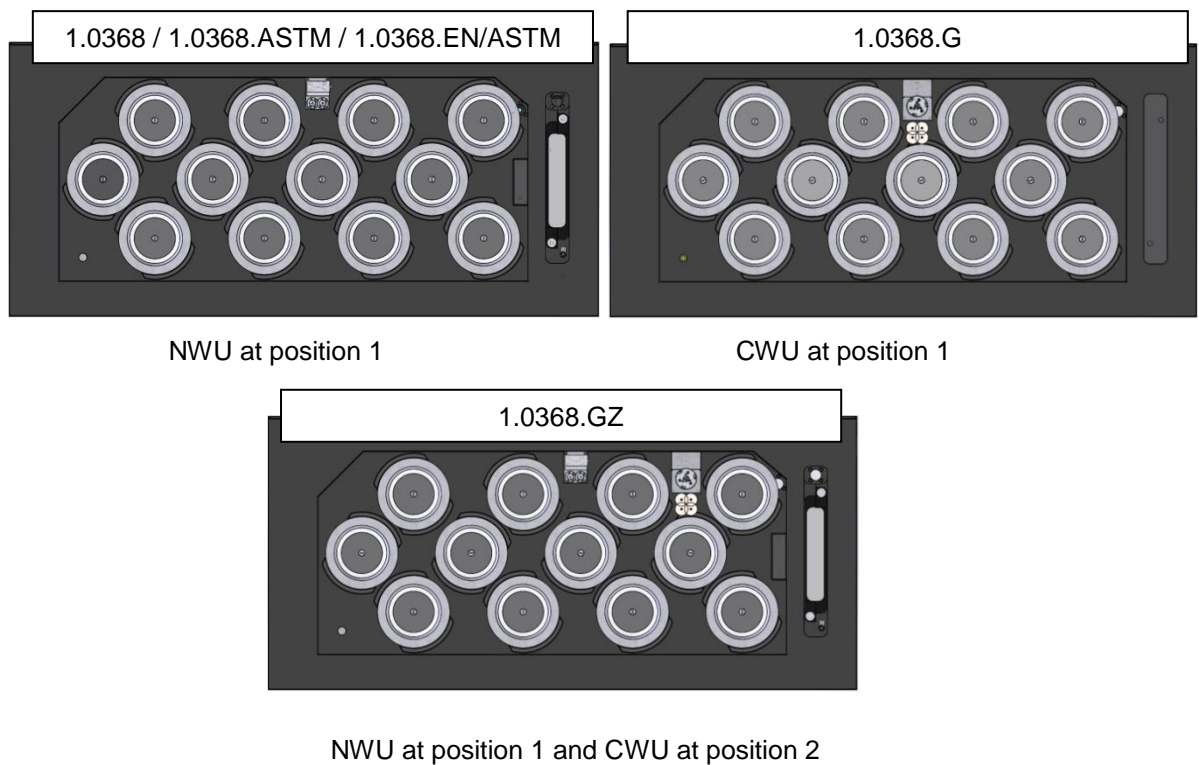


Figure 30: positions of the washing unit at 12-stations machine

### 5.1.1 Selecting washer

The special menu for selecting the built-in washer device is accessible via two different entry points.

**If no samples are under test and the apparatus is not connected to PC, proceed as follow:**

When switching on the apparatus, press the **"C" button** and hold it down for approximately 2 seconds. The display of the handset unit will show depending on the machine one of two selection windows of the **Figure 32**.

Now you can activate the built-in washer by pressing the assigned number.

**If tests are already started, proceed as follow:**

Press the **button "Interrupt measurements"** of VicatMPM application. After pressing, this button will be disabled until the device has acknowledged the interruption. The label of the button changes to **"Continue measurements"**. This button is blinking during interruption. The handset unit displays a message "All tests disabled".

Now, you can press **"C" button** on handset unit.

The display of the handset unit will show depending on the machine one of two selection windows of the **Figure 30**.

Now you can activate the built-in washer by pressing the assigned number.

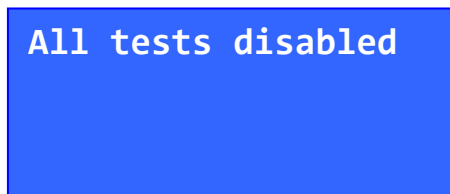
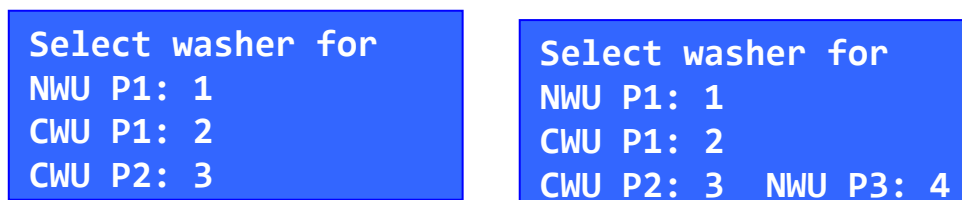


Figure 31: all tests disabled



when 4, 6 und 12 samples apparatus

when 8 samples apparatus

Figure 32: selection window to activate the build-in washer unit

The special menu will be exited immediately after activating a built-in washer.

The machine performs a reference search and goes into readiness.

### 5.1.2 Enable/Disable usage of dryer

The special menu for enabling/disabling usage of the dryer is accessible via two different entry points.

**If no samples are under test and the apparatus is not connected to PC, proceed as follow:**

When switching on the apparatus, press the **"8" button** and hold it down for approximately 2 seconds.

The display of the handset unit will show selection window for enabling/disabling the usage of the dryer as shown in Fehler! Verweisquelle konnte nicht gefunden werden..

Now you can activate or deactivate the usage of the dryer by pressing the assigned number.



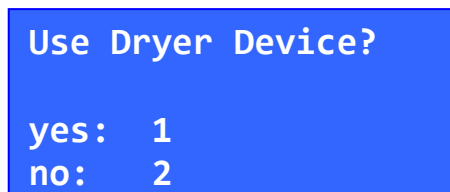
**If tests are already started, proceed as follow:**

Press the **button “Interrupt measurements”** of VicatMPM application. After pressing, this button will be disabled until the device has acknowledged the interruption. The label of the button changes to **“Continue measurements”**. This button is blinking during interruption. The handset unit displays a message “all tests disabled” (**Fehler! Verweisquelle konnte nicht gefunden werden.**).

Now, you can press **“8” button** on handset unit.

The display of the handset unit will show selection window of Fehler! Verweisquelle konnte nicht gefunden werden..

Now you can activate or deactivate the usage of the dryer by pressing the assigned number.



The special menu will be exited immediately after activating or deactivating a dryer. The machine performs a reference search and goes into readiness.

## 5.2 Setting the coordinates of the washer, the dryer, the samples and determination of the zero levels.

Depending on the choice of washer unit, you will be guided through various submenus.

After choosing washer unit for needle it is:

- Set washer unit coordinates
- Set sample coordinates (The number of samples depends on the machine type 4, 6, 8 and 12).
- Determine zero levels

After choosing washer unit for cone it is:

- Set washer unit coordinates
- Set dryer coordinates
- Set sample coordinates (The number of samples depends on the machine type 4, 6, 8 and 12).
- Determine zero levels

This special menu is accessible via two different entry points.

**If no samples are under test and the machine is not connected to PC, proceed as follow:**

Switch on the machine and press and hold **“D” button** for about 2 seconds while the machine is performing reference search. The display shows depending on the preset washing unit, the selection window for setting the coordinates of this washing unit (**Figure 33**).

Continue with Section **5.2.1**.

**If tests are already started, proceed as follow:**

Press the **button “Interrupt measurements”** of VicatMPM application. After pressing, this button will be disabled until the device has acknowledged the interruption. The label of the button changes to **“Continue measurements”**. This button is blinking during interruption. The handset unit displays a message “All tests disabled” (Figure 31).

Now, you can press **“D” button** on handset unit. The display shows depending on the preset washing unit, the selection window for setting the coordinates of this washing unit (**Figure 33**).

**At this entry point, the submenu for determination of zero levels is not available.**

Continue with Section **5.2.1**.

## 5.2.1 Setting the coordinates of washing unit

Setting or Readjusting the coordinates of the washer unit is necessary when the needle or the cone does not hit the center of the opening of the washer unit. The immersion depth of the needle or cone can also be readjusted.

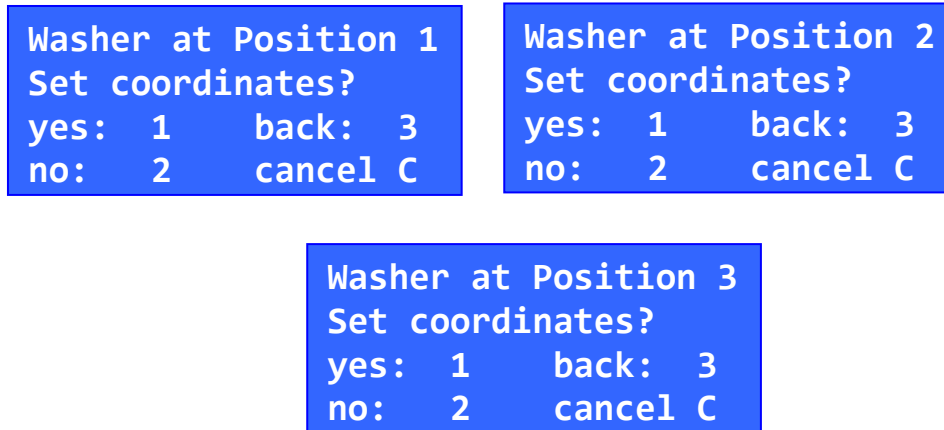


Figure 33: selection window set coordinates of washing unit?

Press “**1**” **button** to access the window for setting the washing unit coordinates (**Figure 34**).  
Press “**2**” **button** to bypass the window for setting the coordinates of washing unit and go to the next window.  
The next window may prompt you to set the coordinates of the dryer (Fehler! Verweisquelle konnte nicht gefunden werden.), if a washer for cone was activated or to set the coordinates of sample 1 (**Figure 37**).  
By repeatedly pressing the “**2**” **button**, you will be successive guided to the other windows for setting the coordinates of the other samples until finally to the window for determination of zero levels.  
Press “**3**” **button** if you want to go back to the previous window.  
Press the “**C**” **button** to exit the special menu for setting the coordinates.  
The machine performs a reference search and goes into readiness.

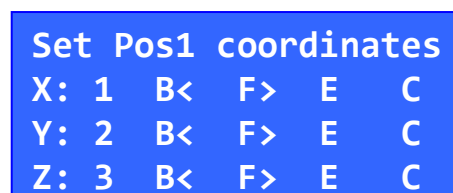


Figure 34: setting the coordinates of washing unit at position 1

To set the coordinates of the washing unit proceed as follows:

### Select an axis:

Press **button “1”** to select X-axis  
Press **button “2”** to select Y-axis  
Press **button “3”** to select Z-axis

### Modify the coordinate of the selected axis by pressing:

**Button “B”** moving towards reference point  
**Button “F”** moving away from reference point

### Save the coordinates of the selected axis by pressing:

**Button “E”** the coordinate is saved to the EEPROM and is immediately effective  
**Quit the window to return to previous window by pressing:**  
**Button “C”**

## 5.2.2 Setting the coordinates of the dryer

Setting or Readjusting the coordinates of the dryer unit is necessary when the cone does not hit the center of the sponges-arrangement. The immersion depth of cone can also be readjusted.

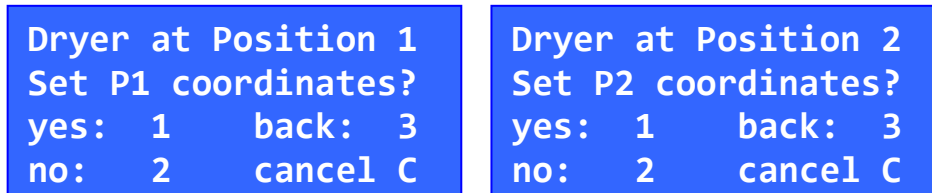


Figure 35: selection window set coordinates of dryer?

Press **“1”** **button** to access the window for setting the dryer coordinates, e.g. that of the dryer on position 1 (**Figure 36**).

Press **“2”** **button** to bypass the window for setting the dryer coordinates and go to the next window.

The next window will prompt you to set the coordinates of sample 1 (**Figure 37**).

By repeatedly pressing the **“2”** **button**, you will be successive guided to the other windows for setting the coordinates of the other samples until finally to the window for determination of zero levels.

Press **“3”** **button** if you want to go back to the previous window.

Press the **“C”** **button** to exit the special menu for setting the coordinates.

The machine performs a reference search and goes into readiness.

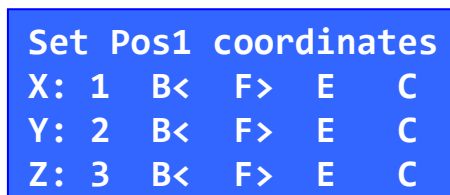


Figure 36: set coordinates of the dryer at position 1

To set the coordinates of the dryer unit proceed as follows:

### Select an axis:

Press **button “1”** to select X-axis

Press **button “2”** to select Y-axis

Press **button “3”** to select Z-axis

### Modify the coordinate of the selected axis by pressing:

**Button “B”** moving towards reference point

**Button “F”** moving away from reference point

### Save the coordinates of the selected axis by pressing:

**Button “E”**

The coordinate is saved to the EEPROM and is immediately effective.

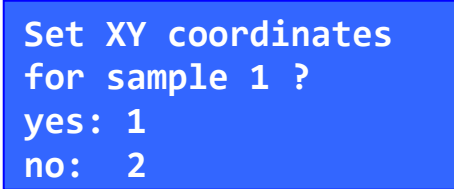
### Quit the window to return to previous window by pressing:

**Button “C”**

### 5.2.3 Setting the XY coordinates for the centre of the sample

The centre coordinates of each sample must be set to satisfy the standard criterion for the distance of the penetration points from the edge of the Vicat ring. 4, 6, 8 or 12 samples can be set consecutively depending on the testing apparatus model.

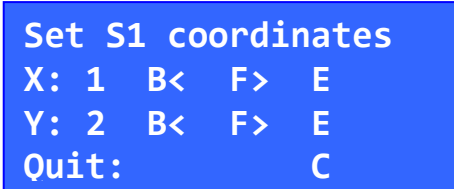
Quit the selection window for setting the washing unit coordinates by pressing **button "2"** (Figure 33). The display then shows the selection window "Set XY coordinates for Sample 1?" (Figure 37).



```
Set XY coordinates
for sample 1 ?
yes: 1
no: 2
```

Figure 37: selection window, set XY coordinates for sample 1?

Press **button "1"** to access the window for setting the XY coordinates of sample 1 (Figure 38). Press **button "2"** to bypass the window for setting coordinates of currently displayed sample. The next window (XY coordinates of Sample N+1) appears.



```
Set S1 coordinates
X: 1 B< F> E
Y: 2 B< F> E
Quit: C
```

Figure 38: window for setting coordinates of sample 1

To set the coordinates of a sample, proceed as follows:

#### Select an axis:

Press **button "1"** to select X-axis  
Press **button "2"** to select Y-axis

#### Modify the coordinate of the selected axis by pressing:

**Button "B"** moving towards reference point  
**Button "F"** moving away from reference point

#### Save the coordinates of the selected axis by pressing:

**Button "E"** the coordinate is saved to the EEPROM and is immediately effective

#### Quit the window to return to previous window by pressing:

**Button "C"**

Repeat these steps for each subsequent sample as required.

Once the XY coordinates of all samples have been set, or if you are finished making changes, continue pressing **button "2"** until the display shows the window for setting the zero levels (Fehler! Verweisquelle konnte nicht gefunden werden.).

## 5.2.4 Determining the zero levels of the samples

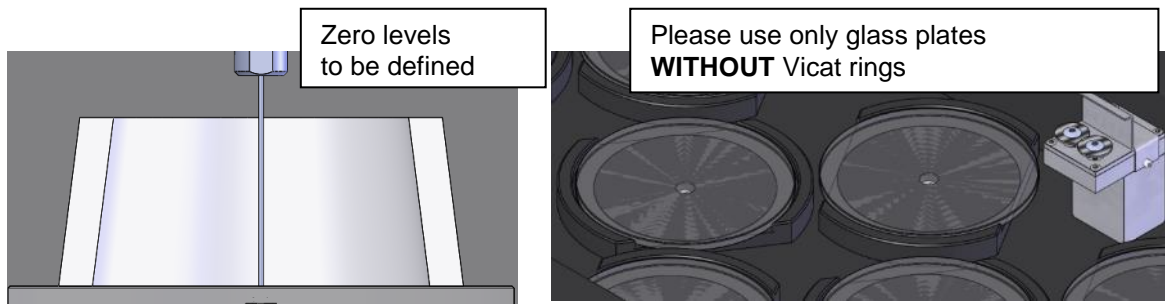
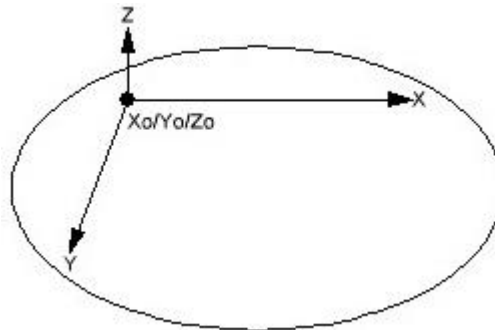


Figure 39: zero levels

Zero level is defined as the Z-coordinate at which the needle contacts the surface of the glass plate, which is located in the base. The gradient of the plane in X-direction and Y- direction is determined for each sample separately.



Xo – zero-point coordinate X-axis  
Yo – zero-point coordinate Y-axis  
Zo – zero-point coordinate Z-axis

The inclination of each glass plate with respect to the zero point coordinates of the machine is corrected during the measurement according to the formula below.

$$Z = Z_0 + a(X - X_0) + b(Y - Y_0)$$

$$X = (X - X_0)$$

$$Y = (Y - Y_0)$$

$$Z = (Z - Z_0)$$

$$a = \Delta Z / \Delta X$$

$$b = \Delta Z / \Delta Y$$

```
Determine zero lev-
els of samples?
yes:  1      back:  3
no:   2      cancel C
```

Figure 40: window for determining the zero levels of the samples

Press **button "1"** to start determining the zero levels of all samples.

The display changes and shows the progress of the zero levels determination (**Figure 41**).

Once completed, all zero levels will be saved to the EEPROM and will be immediately available for the subsequent tests. The display shows the above window again (Fehler! Verweisquelle konnte nicht gefunden werden.).


Pressing **button "2"** display remains unchanged because there is no follow-up window.


Press **button "C"** to exit the selection window.

The needle moves into so-called parking position and the apparatus reports its readiness (**Figure 7**).

```
Determine zero level
Sample: 1
Measuring point: 3
```

Figure 41: progress of the zero level measurement

Note	The glass plates must be on the testing stations to determine the zero levels!
	The zero level is calculated incorrectly, if the rubber buffer is set so that the needle does not reach the glass plate.

Note	Measurement deviation within one level is $\pm 0.1\text{mm}$ (z-axis). Measurement repeatability at the same point is $\pm 0.05\text{mm}$ (z-axis).
	

## 5.2.5 Setting the penetration time for needle and cone

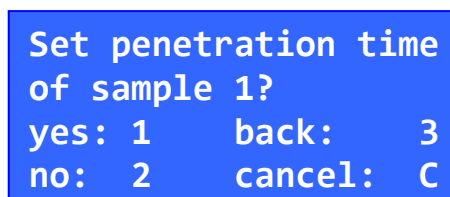
For the standard programs (e.g. EN196-3/90) the penetration time is 10 seconds.

For programs with a dynamic cycle time (e.g. EN13279-2/16DCT30s, extension ... DCT), the penetration time is 5 seconds.

For programs where the cycle times may overlap (e.g. EN13279-2/16OCT\_EXTW, extension ... OCT), the penetration time can be individually set between 0 and 10 seconds for each measuring station.

The default setting is 5 seconds.

To access the menu for setting penetration time, the device must be connected to the VicatMPM application on the PC and at least one test must be started. In the PC software, click the button "Interrupt measurements". As soon as the interruption is confirmed, the displayed text of the button changes to "Continue measurements". The display of the handset unit shows then following message (**Figure 31**). Now you can press the **button "E"** on the handset unit. The display shows the selection window for setting the penetration time for sample 1 (**Figure 42**).



```
Set penetration time
of sample 1?
yes: 1      back: 3
no: 2      cancel: C
```

Figure 42: sample selection to change penetration time

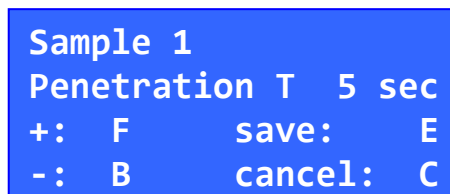
Press **button "1"** to access the window for changing penetration time of sample 1 (**Figure 43**).

Press **button "2"** to bypass the window for changing penetration time of currently displayed sample.

The next window (Set penetration time of sample N+1) appears.

Press **button "3"** if you want to navigate back to the previous window.

Press **button "C"** to leave the menu for setting penetration time.



```
Sample 1
Penetration T 5 sec
+: F      save: E
-: B      cancel: C
```

Figure 43: change the penetration time of a sample

Press **button "F"** to increase the penetration time by one second.


Press **button "B"** to decrease the penetration time by one second.

Press **button "E"** to save the penetration time.

Press **button "C"** to leave the menu.

### 5.3 Setting the rubber buffer

To protect the needle, the rubber buffer can be adjusted so that the needle will no longer strike the glass plate, but the rubber buffer just in front of the glass plate instead.

<p>Note</p> 	<p>Caution! Needle-Break recognition will be without function then.</p>
---	---

Behind the drop rod is a screw with the rubber buffer screwed onto it. This screw is secured by a nut. Hood and drop rod are the same for all devices (4, 6, 8 and 12-stations).

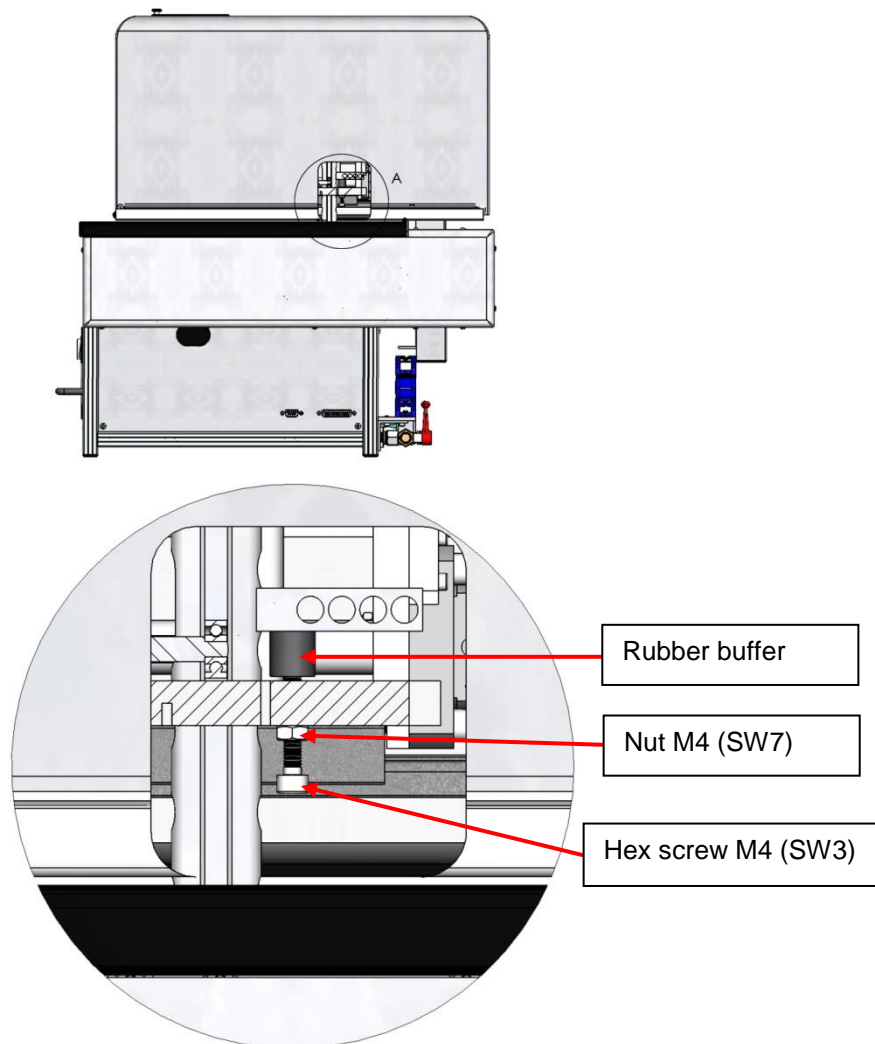



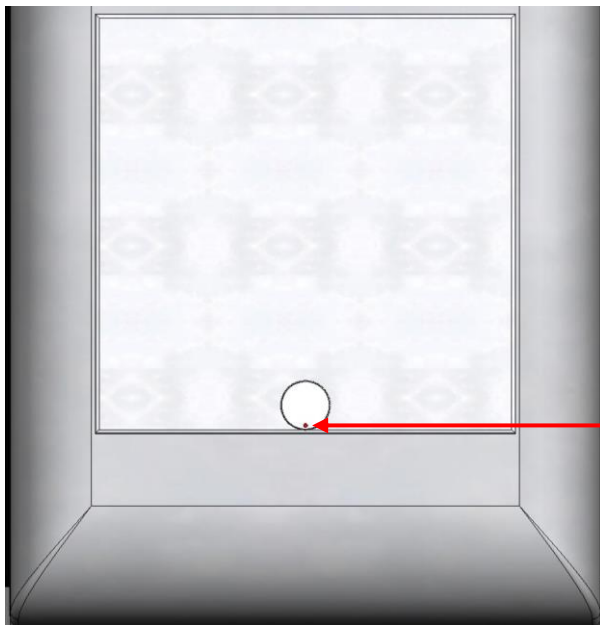
Figure 44: setting the rubber buffer

<p>Danger</p> 	<p>Attention! Switch off the apparatus before setting the rubber buffer! (Risk of injury by moving parts!)</p>
---	--

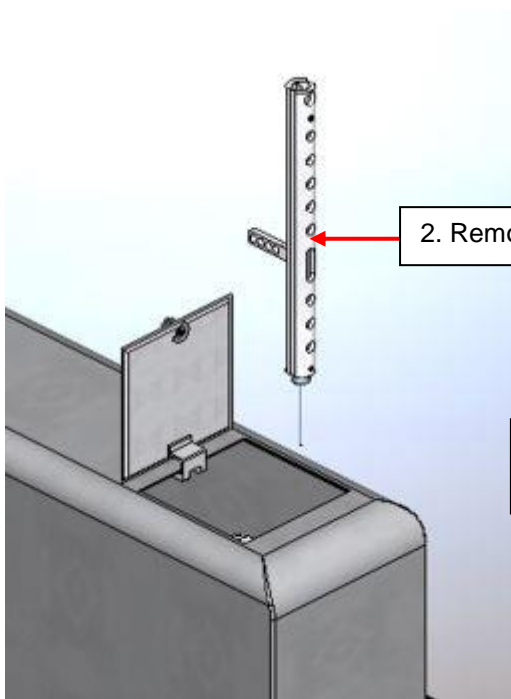


## 5.4 Changing the needle

To change the needle, go to the maintenance position (section 4.6).

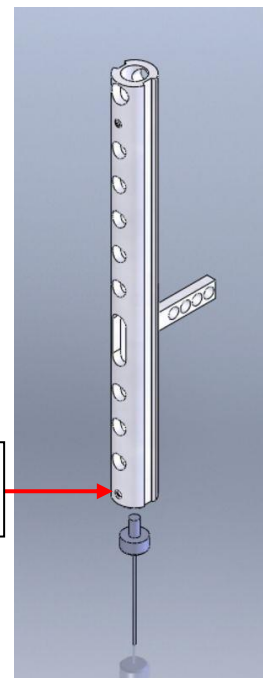


1. Turn the dot on the knurled screw to front for opening the flap.



2. Remove the drop rod.

3. Loosen the screw and change the needle.



4. Reinsert the drop rod, close the flap and lock it.  
Quit maintenance position (section 4.6).

Figure 45: changing the needle

## 5.5 Cleaning the filter

The procedure is the same for all apparatuses (4, 6, 8 and 12 stations).

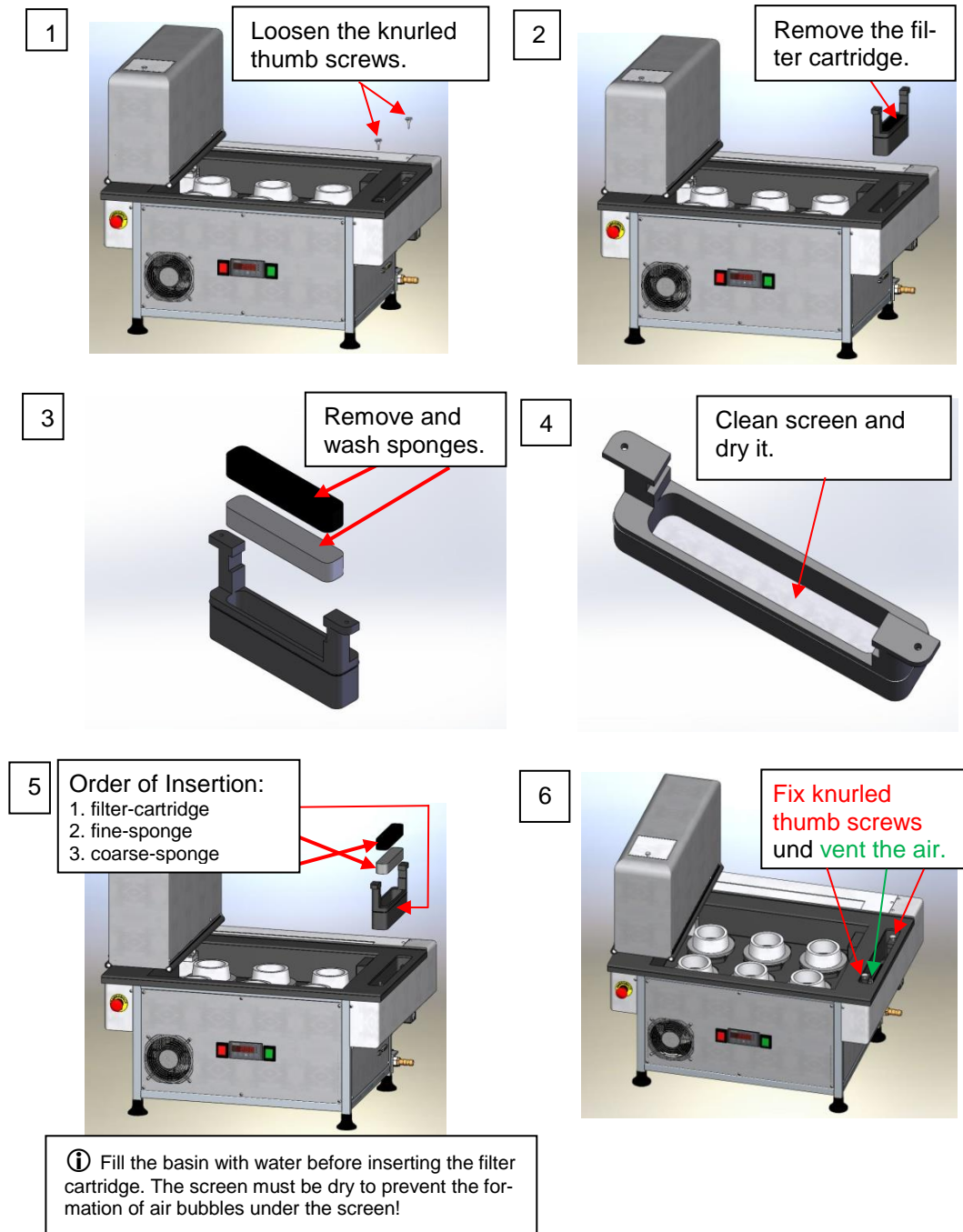



Figure 46: cleaning the filter

<p>Note</p> 	<p>The filter sponges must be wet before inserting, so that no air drawn from the sponges into the system. If there is no water flow into the filter or the pump does not promote water, please turn off temperature controller switch, open both ball valves and drain some water to carry out any air bubbles from the system. Then close the ball valves and turn on temperature controller switch again. (Repeat above procedure if necessary.)</p>
---	---

7

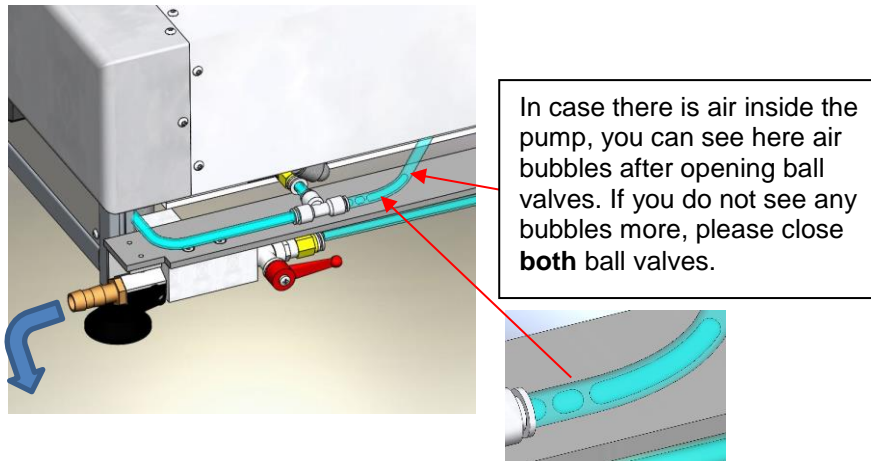



Figure 47: air venting

The flow rate is monitored by measuring, with an accuracy of  $\pm 3\%$ , and displayed on the handset unit as well as on the PC software as a percentage value "F: 99%".  
The flow rate is a measure of the permeability of the filter.

TP: 12	sample 3
TT: 14708	sec
PD: 37.1	mm F: 99%
NT: 1:23	sample 4

Figure 48: displaying flow rate

The temperature controller will be turned off to protect the heat exchanger as soon as the flow rate is less than 10%.  
The same effect can be caused by air inclusion in water circulation system or in the case of pump damage.

<p>Attention!</p> 	<p>We recommend cleaning of the filter once a week, but at the latest when the flow rate falls below F: 50%. This action protects the heat exchanger as well as the pump.</p> <p>Furthermore, we recommend cleaning of the entire water cycle with citric acid every two weeks or when after filter cleaning the flow rate does not reach F: 95%.</p> <p>After cleaning with citric acid, rinse the water cycle with clear water.</p>
---	---

## 5.6 Changing the brushes

The apparatus is equipped with a cleaning system. Depending on the version, it contains a cleaning system for needle or cone (for gypsum) or both of them.

### 5.6.1 Cleaning system for needles

When the brushes wear down so far that they don't clean the needle any more, the brushes have to be changed.

To do so, bring the apparatus into maintenance position section 4.6).

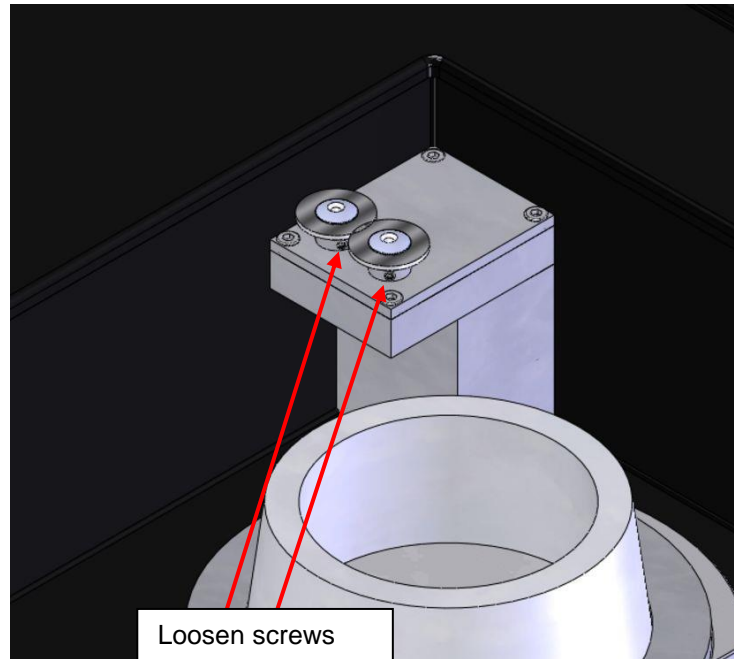



Figure 49: brushes change in needle washing unit

Loosen the screws and pull the brushes out of the holders.

<p>Note</p> 	<p>To reach screws with the key, turn the brushes into position manually.</p>
---	---

Insert new brushes and tighten the screws again.  
Quit maintenance position (section 4.6).

### 5.6.2 Version for gypsum

The apparatus for gypsum has no temperature controller. It is equipped with washing unit for cone, cleaning the cone by using a water jet and a brush. The produced dirt water will be filtered inside filter tank. Additionally, the cleaned cone will be wiped dry in a dryer gadget. The sponges of the cone dryer are changeable by pulling them out. The sponges of the cone dryer are changeable by pulling them out.

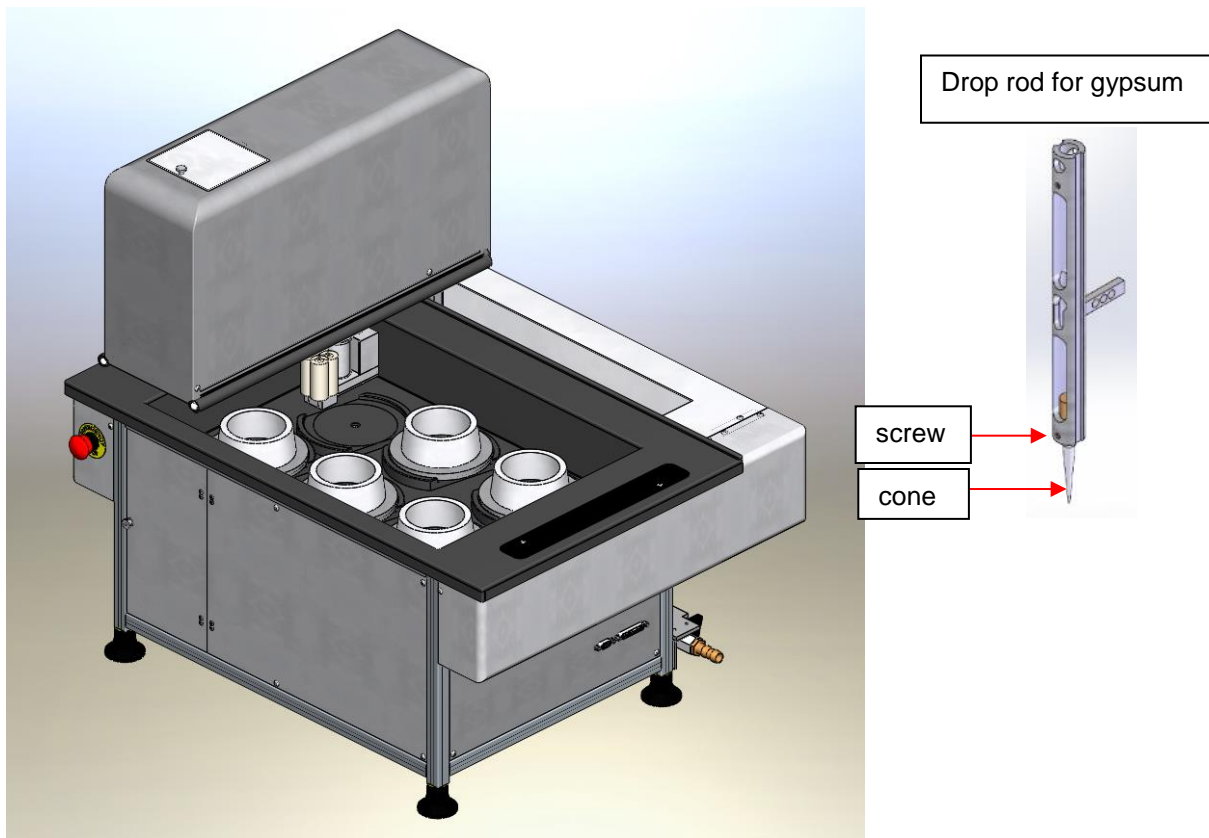




Figure 50: device version for gypsum

<p>Attention!</p> 	<p>Please check the fixation of the immersion cone at least once a month. A cone that works loose can cause damage at the Vicac device!</p>
<p>Attention!</p> 	<p>Make sure that filter is clean and there is enough water in the filter tank before putting the apparatus into operation (section 5.6.4). We recommend checking the water level of the filter system every day and, if necessary, topping up water so that the sponges are constantly covered with water. An external water connection is possible as an option.</p> <p><b>Small or no water flow makes the washing unit for cone unusable, due to hardened material.</b></p>

### 5.6.3 Cleaning or Changing the brush (washing unit for cone)

The brush can be removed for cleaning together with bracket, if necessary.  
Demount the bracket for changing the brush.

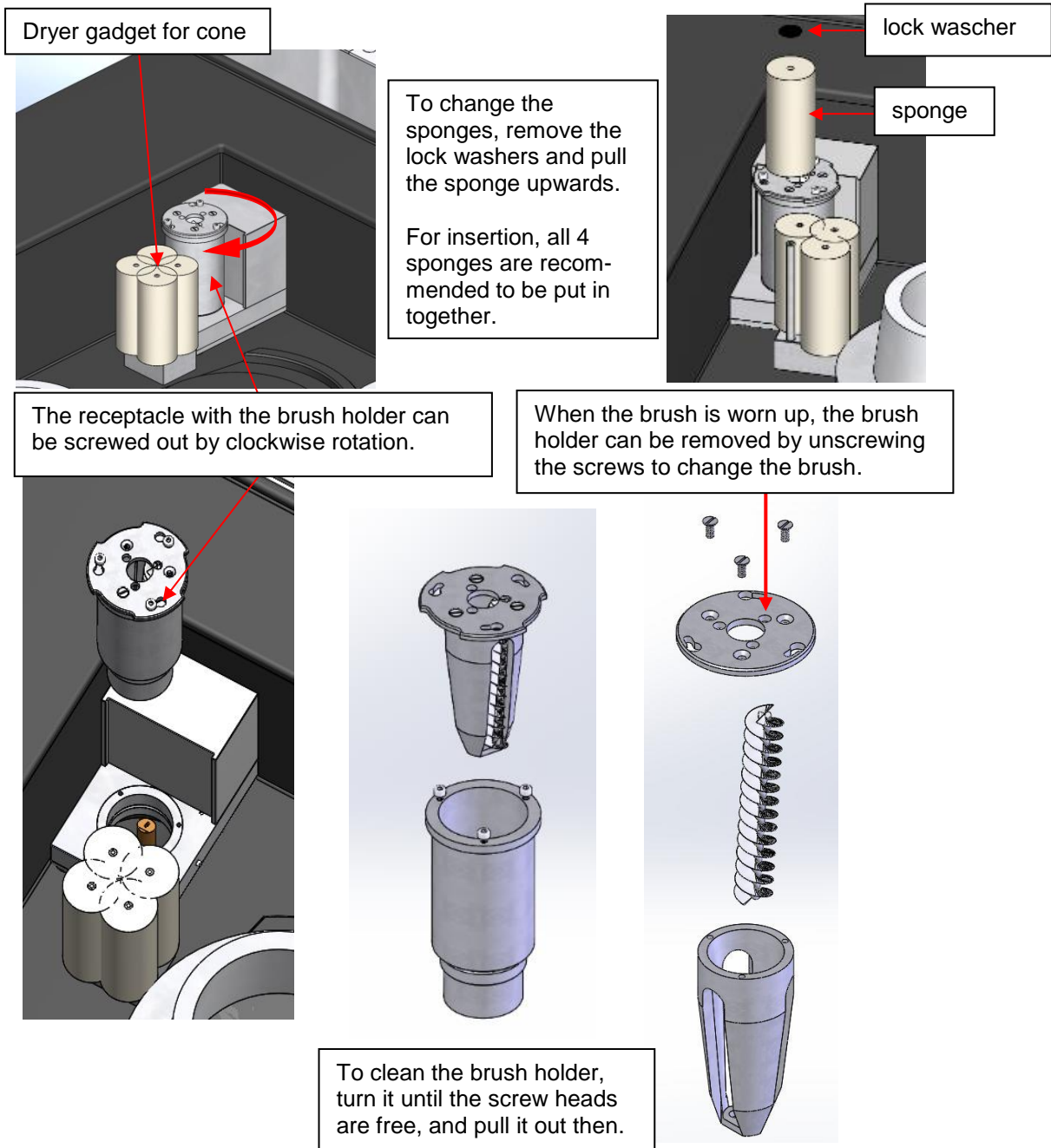



Figure 51: brush change in washing unit for cone

<p>Note</p> 	<p>After cleaning the brush holder, put it back into receptacle and screw the receptacle into the washing unit by rotating it counterclockwise. <b>Do not tighten the receptacle!</b></p>
---	---

### 5.6.4 Cleaning the filter tank (washing unit for cone)

To clean the filter, remove the filter tank from the apparatus. For a better handling, the connections are easily to unloose. (see pictures)

The position of the filter tank differs depending on the apparatus variant (it can be placed also outside of the apparatus).

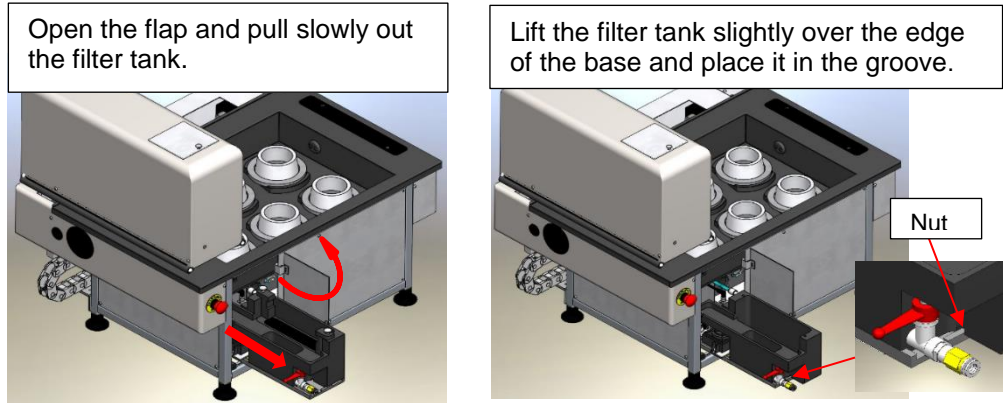
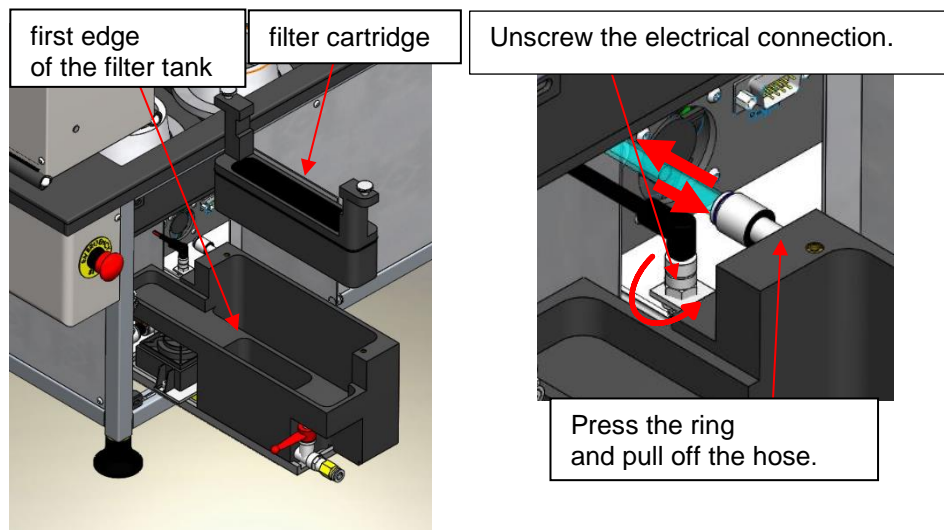
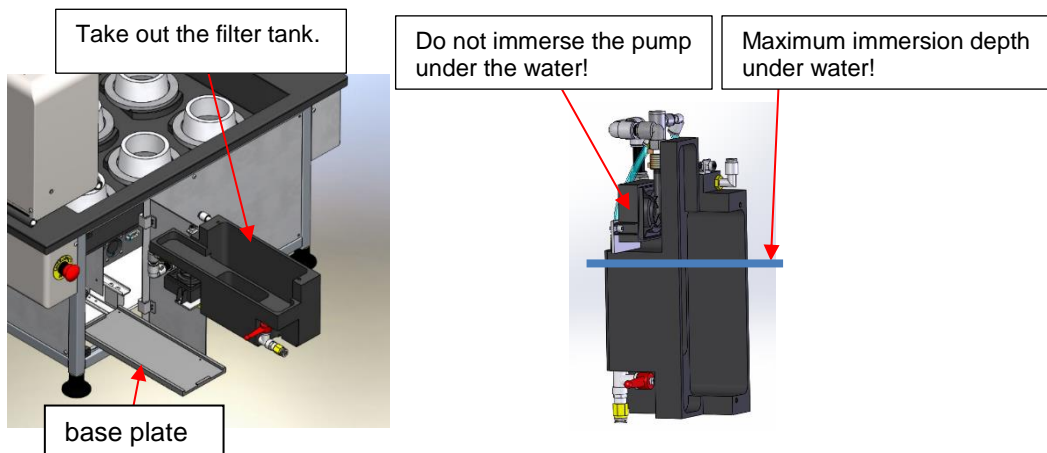


Figure 52: filter tank for gypsum version

The filter cartridge can now be removed and cleaned as described in chapter 5.5. If the filter tank has to be cleaned, it can be removed after disconnecting the connections.



**The pump of the filter tank is not waterproof and must not be kept under water!**



After cleaning, insert the filter tank into the apparatus in reverse order (without filter cartridge). Pour water into the filter tank up to the first edge. Push the filter tank halfway into the device until the back-flow hose of the cleaning device is placed above the filter tank.

To test the function of the pump and, if necessary, to vent the system, switch on the device and simultaneously press the key "9" on the hand-held device for two seconds. The following menu appears on the display.

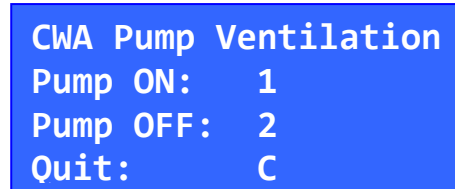


Figure 53: menu venting the washer for cone

The pump of the cleaning device can now be switched on by pressing key "1" on the hand-held device and switched off by pressing key "2" on the hand-held device.

After switching on the pump, observe the backflow hose to the filter tank.

If the pump does not promote water or if the flow is not sufficient, the pump and the water circle system must be vented.

To do this, switch off the pump and open the ball valve to drain some water off. Then close the ball valve and fill up with water up to the first edge of the filter tank. Switch the pump on again and check whether the pump promotes enough amount of water now.

There should be a continuous flow.

If the pump is properly vented, it works almost silently.

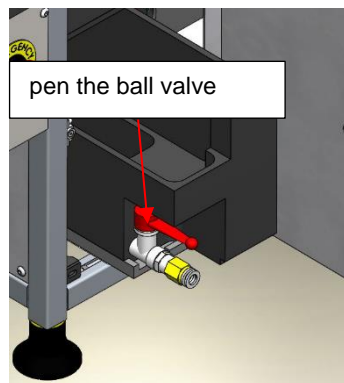



Figure 54: venting the water cycle system

Insert the filter cartridge without the sponges and with the cartridge sieve dry into the filter. Then immerse both sponges under water to fill them fully with water and to displace the air from the cavities. Insert sponges into the cartridge (first the fine sponge, then the coarse sponge). Push the filter tank completely into the apparatus (over the edge of the base plate) and refill water into the filter tank.

The level of the water should be approximately 1cm above the upper sponge.

**Check the water level at least once a day and fill up with water if necessary!**

<p>Attention!</p> 	<p>Insufficient or no water flow clogs the cone washer and the drain. Hardening sample material makes the system unusable!</p>
---	--



### 5.6.5 Cleaning the water basin

For cleaning the water basin, take out the filter cartridges, like described in section 5.5. Open both ball valves to drain water. For an easier cleaning, take out the fixation plates. You can clean the basin now. Remove chalk deposits with citric acid.

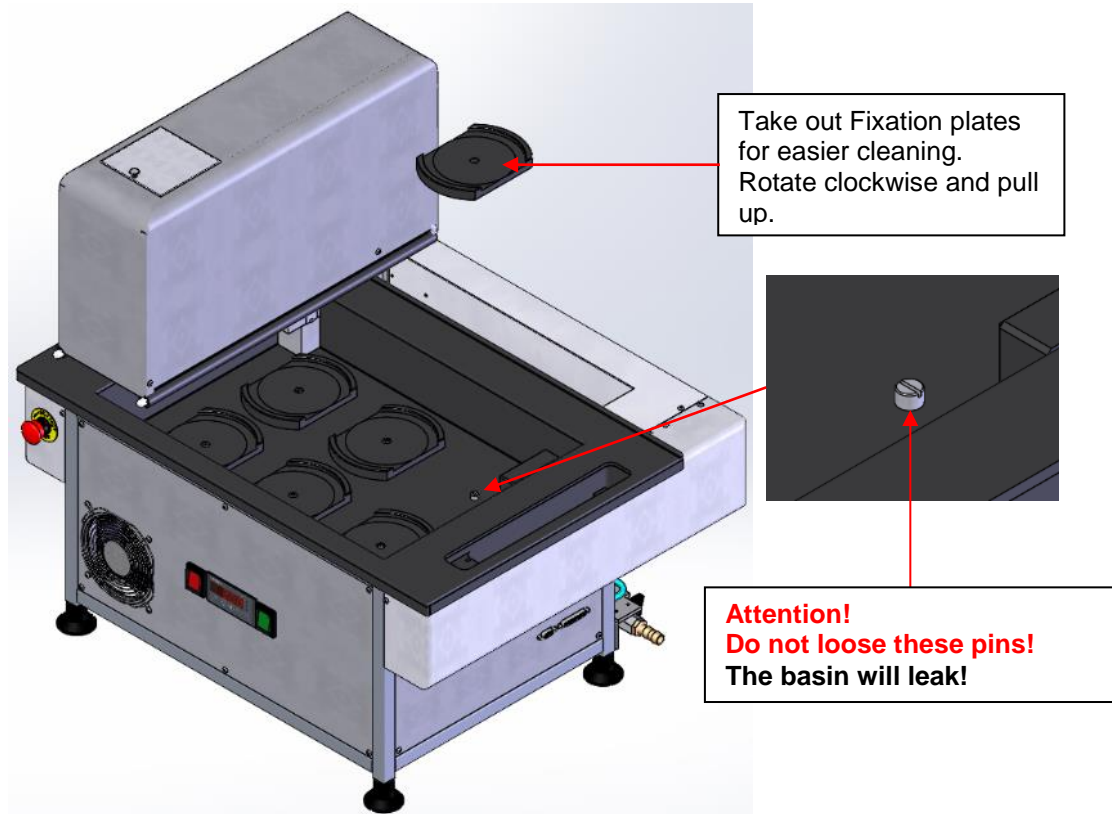




Figure 55: cleaning the water basin

<p>Attention!</p> 	<p>Do not loosen the pins that holds the fixation plates! The basin will leak! After removing fixation plates, please check the tight fitting of the pins. If necessary, screw them tight.</p>
---	--

<p>Note:</p> 	<p>Press the fixation plates in the centre when mounting to prevent the samples from tilting.</p>
--	---

## 6 Gypsum / Cement: Change of variants

The Vicat apparatuses are also available combined for gypsum and cement test in one. The particular drop rod can be exchanged easily by moving into maintenance position (section 4.6). As apparatus for gypsum, it works like described in section 5.6.2. The only difference for 4, 6 and 8-station version is that the filter tank is located outside of the device on the right side instead inside of it. To use the apparatus with a tempered water bath the valves of the filter tank have to be closed (**Figure 56** and **Figure 57**).

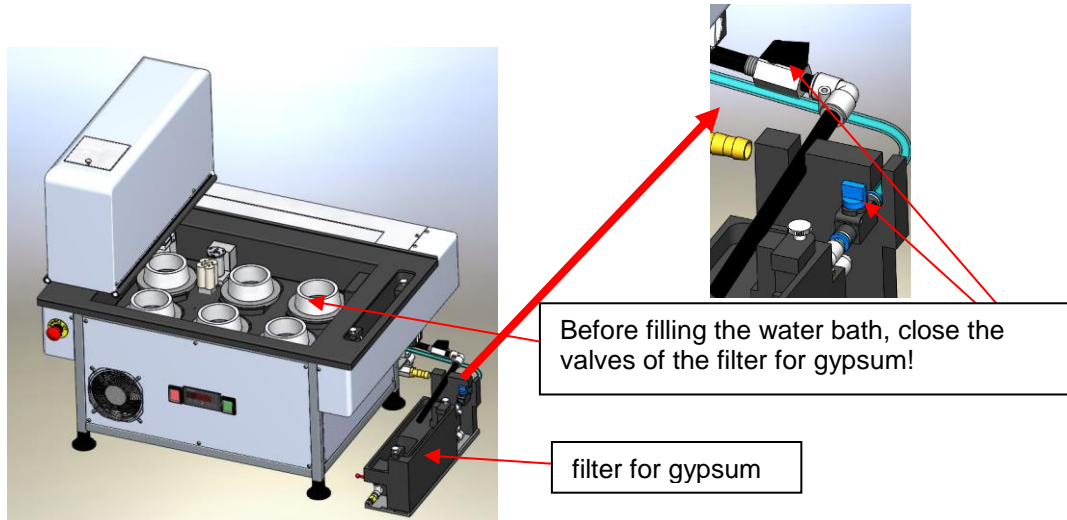


Figure 56: apparatus with 4, 6 or 8 stations for Gypsum and cement

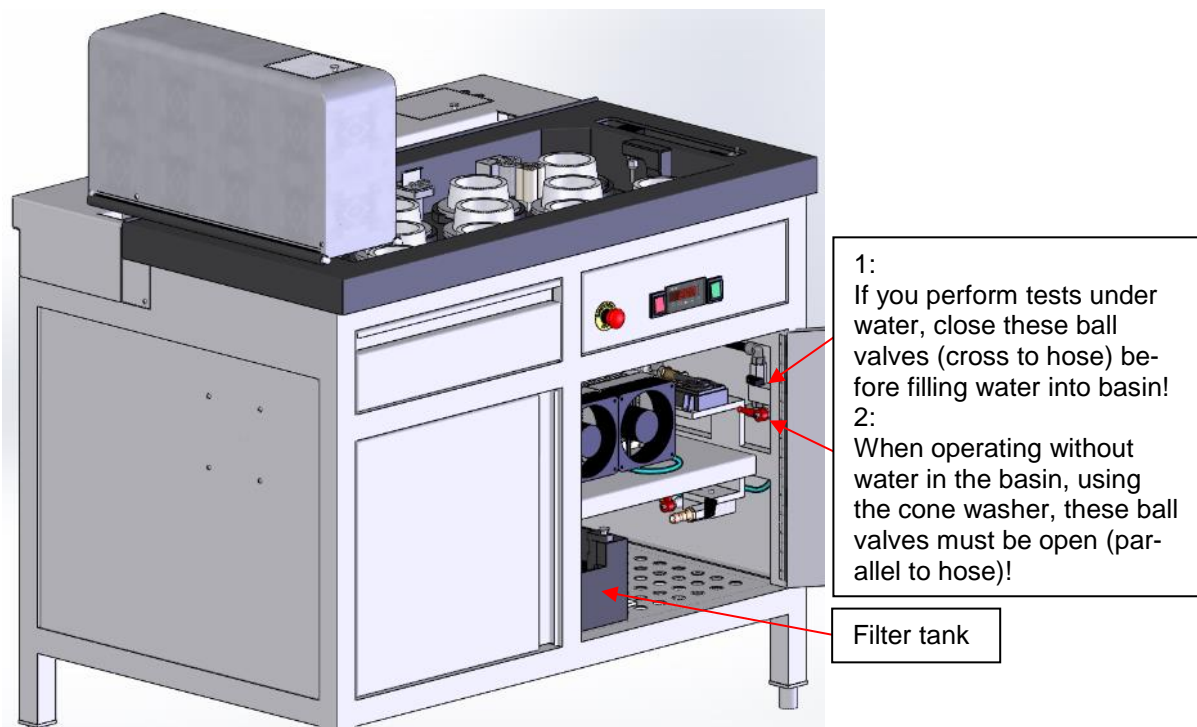


Figure 57: apparatus with 12 stations for Gypsum and Cement

## 6.1 ASTM-Devices

### 6.1.1 ASTM-Device “1.0366.ASTM “

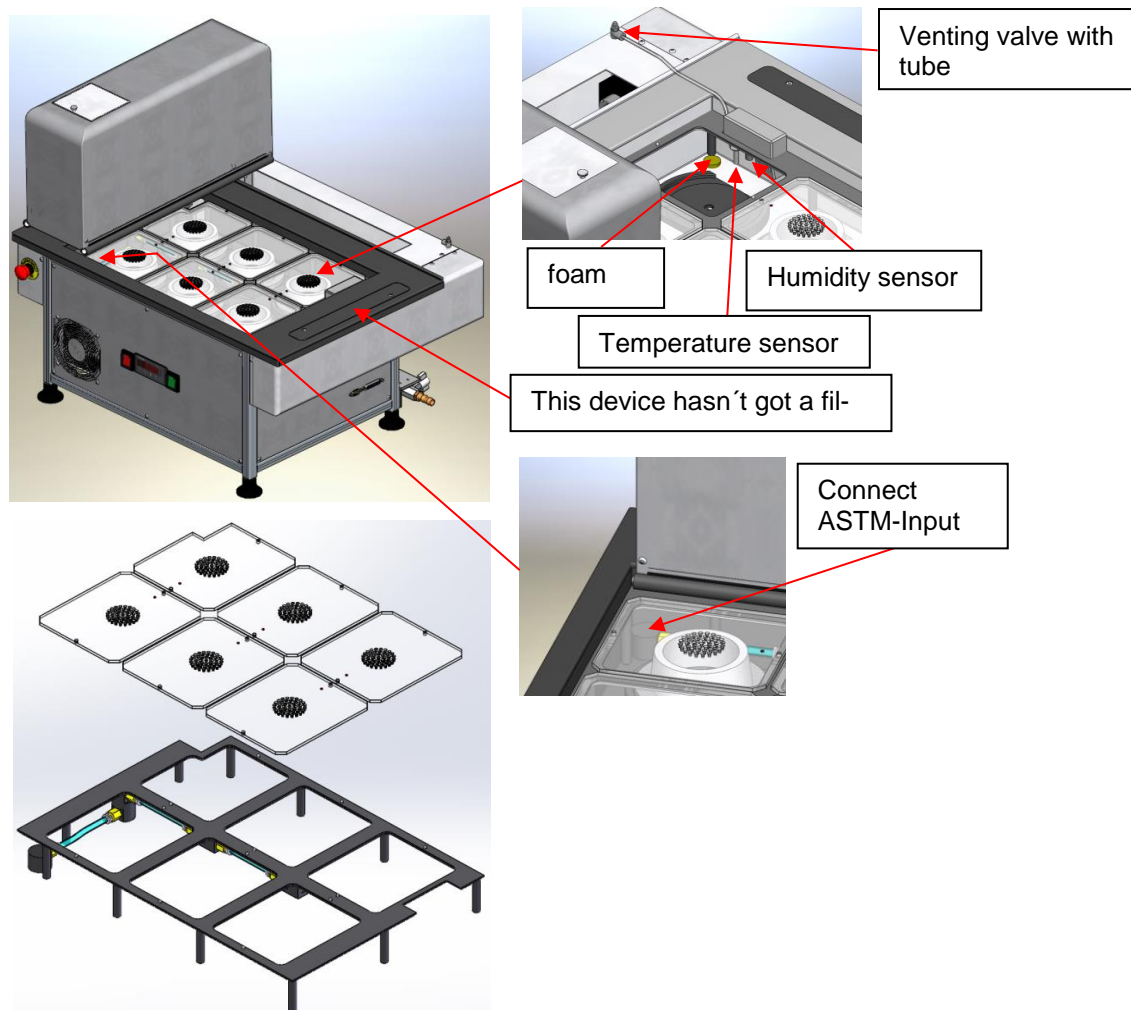




Figure 58: ASTM device “1.0366.ASTM”



<p>Note</p> 	<p>To achieve faster desired humidity within the device switch off cooling while pump is still working. Please press the indicated button 3 seconds. (“OFF”) For the highest possible air humidity, it is better if the ambient temperature of the room is lower than that set in the device (the device heats up). Each time the appliance cools, the humidity drops slightly.</p>
<p>Note</p> 	<p>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 crystal clear).</p>

## 6.2 ASTM device "1.0367.ASTM"

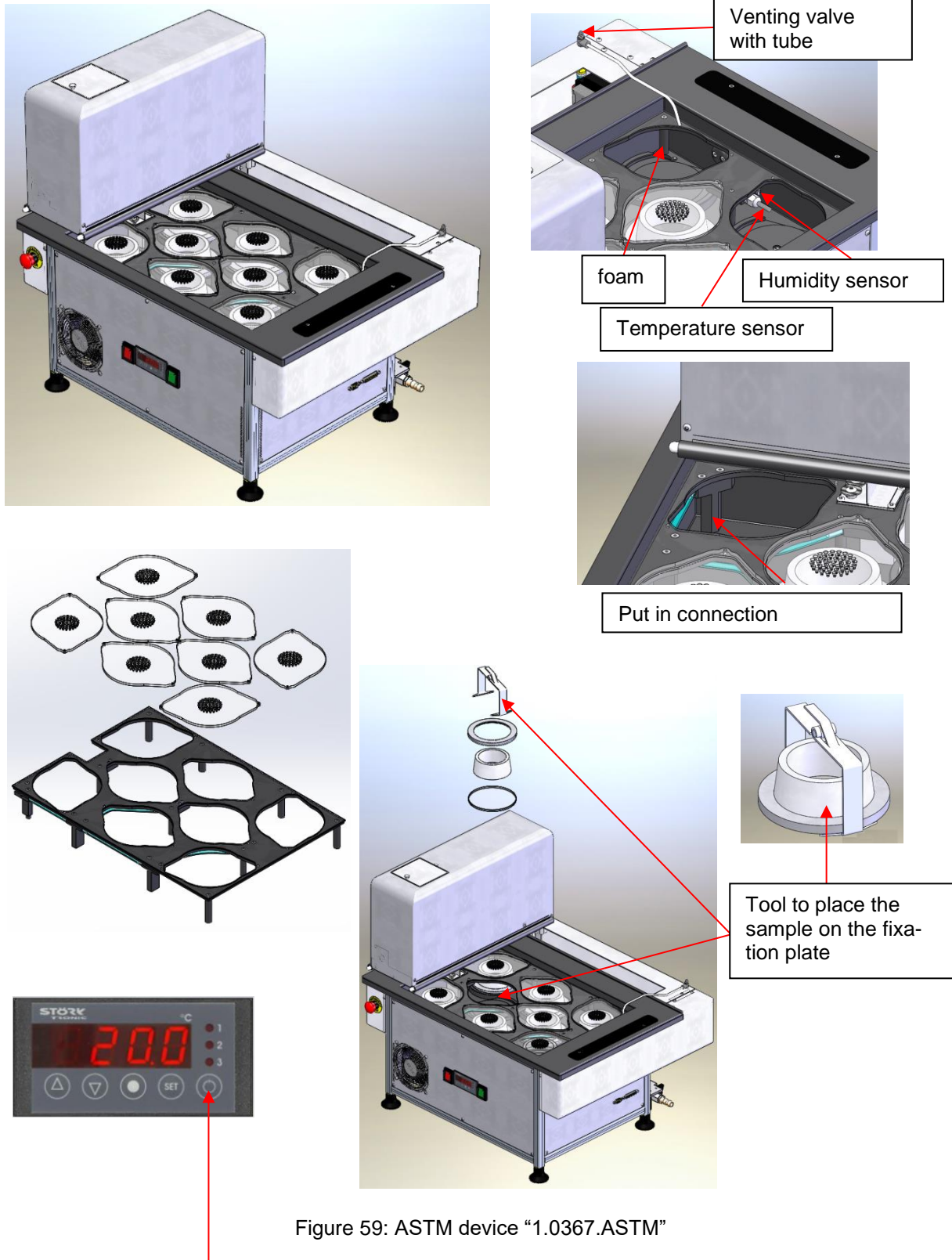



Figure 59: ASTM device "1.0367.ASTM"

<p>Note</p> 	<p>To achieve faster desired humidity within the device switch off cooling while pump is still working. Please press the indicated button 3 seconds. ("OFF")</p>
---	--

### 6.3 ASTM device “1.0368.ASTM”

The handling of this 12-stations Vicat needle device is similar to device with 8-stations. The ASTM cover is also similar to the cover of device with 8-stations (section 6.2) with appropriately adapted length

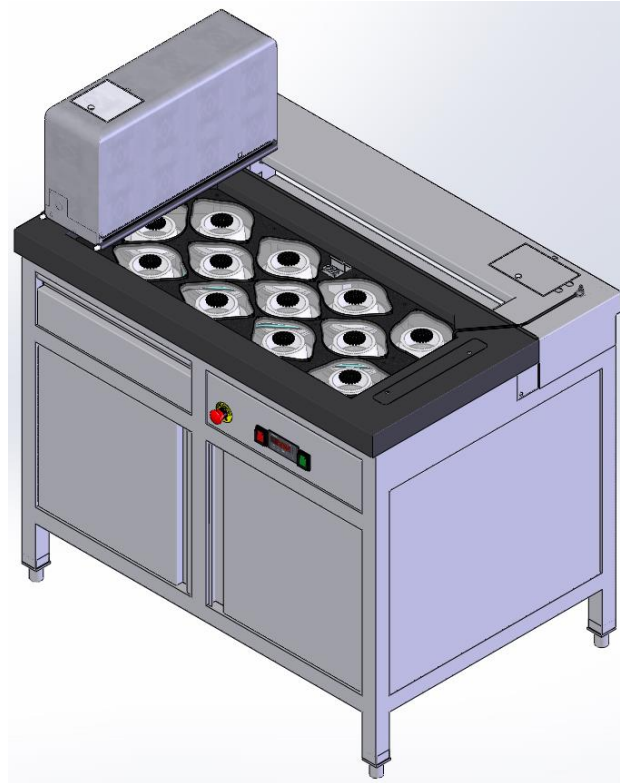


Figure 60: ASTM device “1.0368.ASTM”

## 6.4 1.0366.EN/ASTM changeable types

### 6.4.1 EN (water level 55mm without samples)

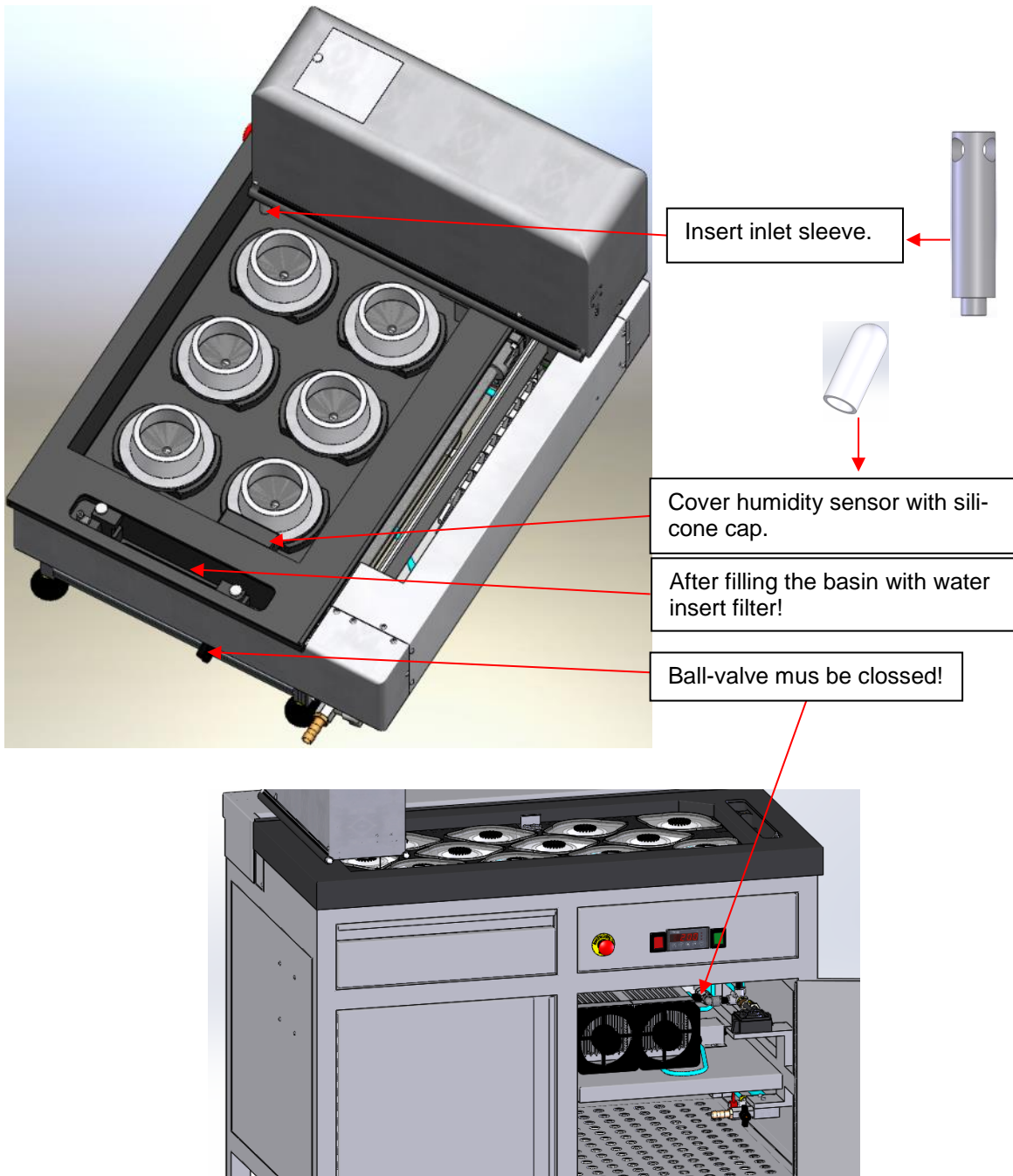


Figure 61: EN version

### 6.4.2 ASTM (water level min. 10mm)

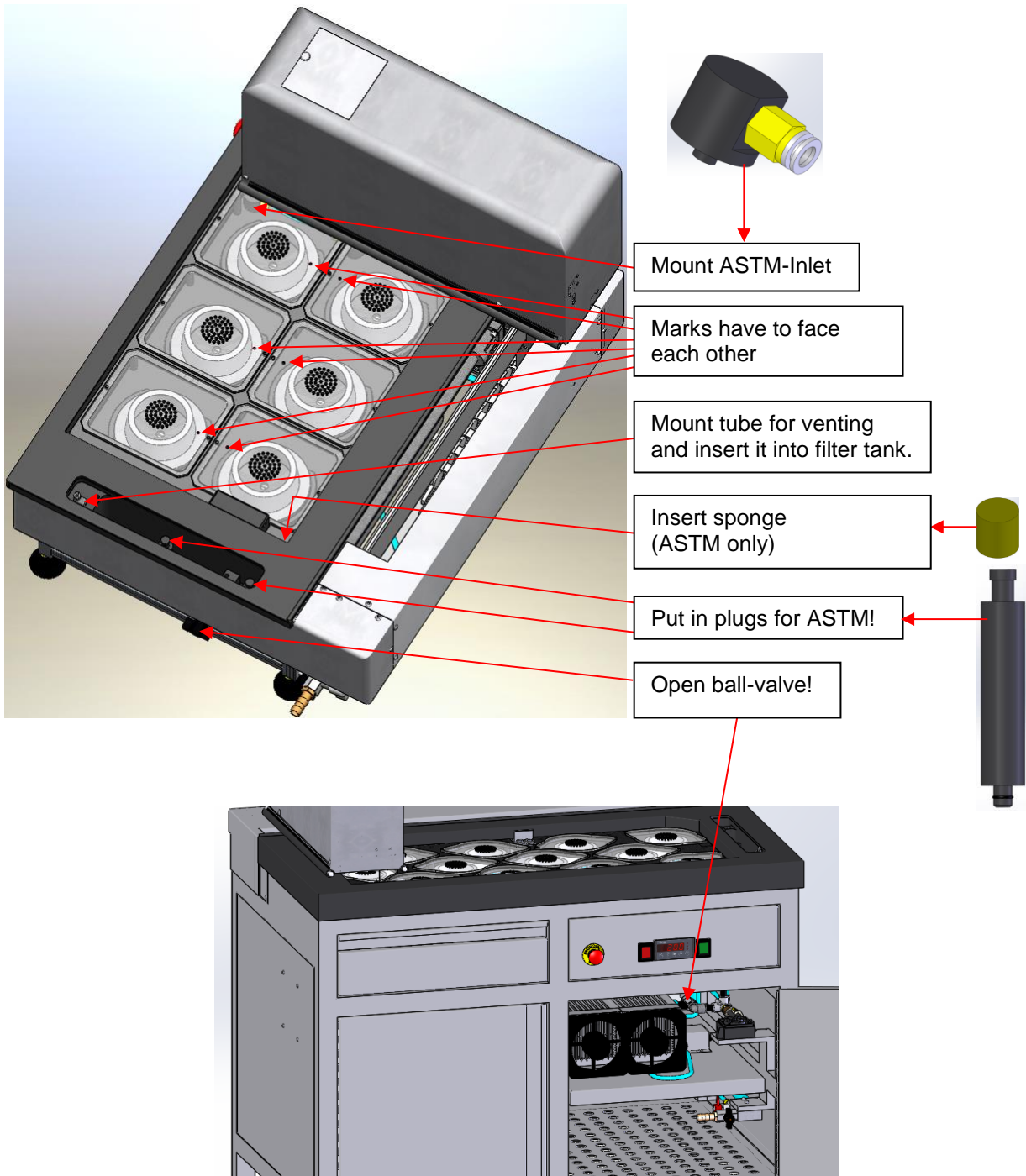
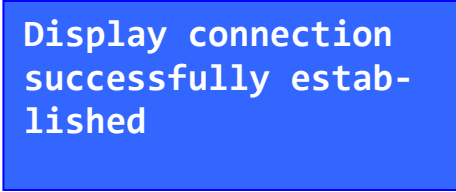


Figure 62: ASTM version

## 7 Status and error messages on the handheld unit

During operation, the apparatus intermittently checks whether the handset unit is connected. If the unit is connected while the testing apparatus is on, the following status message appears when the display connection is detected.



```
Display connection  
successfully estab-  
lished
```

Figure 63: display connection status message

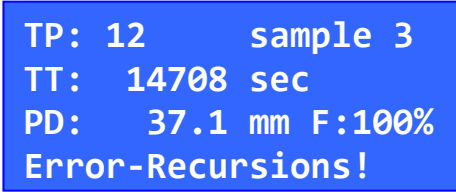
If a motor overruns a reference or limit switch due to an unusual fault (this cannot happen during normal operation), then all motors will be automatically stopped and the display shows temporarily a corresponding message e.g.



```
Emergency stop  
LIMIT SWITCH X  
IS OPEN
```

Figure 64: limit switch error message

Thereafter a reference search is initiated and the tests will be continued. A message also appears on the PC status bar as long as the machine status remains unchanged. After this so called dynamic disturbances, the software attempts to maintain the functionality of the apparatus and to continue the measurements. If the same error occurs several times in succession, the machine stops. So called "Error Recursion!" will be reported.



```
TP: 12      sample 3  
TT: 14708 sec  
PD: 37.1 mm F:100%  
Error-Recursions!
```

Figure 65: recursions error message

On the PC appears also a dialog with additional information for the user.

If the needle breaks, then the apparatus will report the needle breakage to the handset unit as well as to the PC-application and run to maintenance position (section 5.4).



```
Fix broken needle
```

Figure 66: message broken needle



The PC-application shows following message

"Needle is possibly broken!"

"Please replace needle if necessary and press OK."

After eliminating the fault, press **"OK" button** on PC-panel to continue the tests.

The testing apparatus detects when no drop rod is present in the drop rod holder and reports this with the following status display.



Drop rod missing

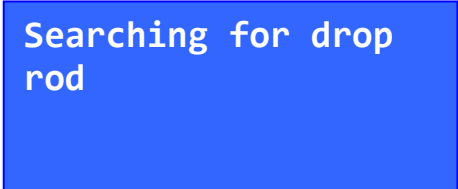
Figure 67: message drop rod missing

The PC-software shows following message.

"Rod not found!"

"Please insert rod and press OK"

The following status display appears during searching for drop rod.



Searching for drop  
rod

Figure 68: message searching for drop rod

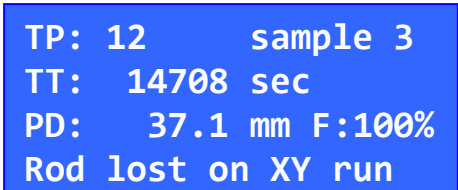
A detected drop rod is reported with the following status display.



Drop rod present

Figure 69: message drop rod present

Should the drop rod come loose from its holder while running (which is highly unlikely), all motors will be stopped and the following status message generated.



TP: 12      sample 3  
TT: 14708 sec  
PD: 37.1 mm F:100%  
Rod lost on XY run

Figure 70: message rod lost during movement

At the same time, a report will be generated on the PC. The device searches for the rod automatically. A reference search will be initiated as soon as the drop rod is in the holder and the tests continue to run.

If a motor does not reach its target position within a predefined time, a timeout message will appear.

```
TP: 12      sample 3
TT: 14708 sec
PD: 37.1 mm F:100%
Timeout Motor Y Tpr
```

Figure 71: message time out of a motor

In the message, the addition “Tpr” indicates the timeout occurred while running to the target position. The addition “Cop” indicates the timeout occurred during position correction. The addition “Ref” will appear if the timeout occurred during the reference search.

These timeouts are handled dynamically as described in case of motor overruns a reference or limit switch due to an unusual fault condition. All motors will be automatically stopped and the display shows temporarily a corresponding message.

Thereafter a reference search is initiated and the tests will be continued.

A message also appears on the PC status bar as long as the machine status remains unchanged.

After this so called dynamic disturbances, the software attempts to maintain the functionality of the apparatus and to continue the measurements.

If the same error occurs several times in succession, the machine stops.

So called “Error Recursion!” will be reported.

In this category also falls the rod magnet error and timeout of UART1.

During the tests the display of the handset unit is updated continuously.

```
TP: 12      sample 3
TT: 14708 sec
PD: 37.1 mm F:100%
NT: 1:23 sample 4
```

Figure 72: view of a measurement window

The first row of the handset display shows the last measured test point (TP: 12) of a sample (sample 3). Row two displays the test time (TT: 14798 sec) of the penetrated test point of a sample. The test time is defined as the time elapsed between zero time (time of initial contact of water and cement) and the time the penetration depth is measured.

Row three of the handset display shows the sample’s penetration depth for the measured point (PD: 37.1 mm) and the flow rate in percent (F: 100%).

Row four displays various messages dependent on the status of the apparatus (see enumeration below):

**NT: 1:23 sample 4**

Next test for the sample four begins in one minute and twenty three seconds.

**NT: not available**

No farther tests available

**Rod lost on XY run**

The drop rod comes loose from its holder while running.

**Penetration sample 4**

Waiting until the penetration time (e.g. 10 seconds) for the penetrated sample expire.

**Measurement sample 4**

Measuring of the penetration depth is in progress.

**Time out Motor Y Tpr**

Time out occurred while running to the target position.

The motor Y did not reache target position within expected time.

### Rod magnet failure?

The rod magnet did not release the drop rod.

## 7.1 The keys of the handheld unit



Figure 73: handset unit

## 8 After-sales service

Great care was taken to assure that this Operating Manual was properly prepared. We cannot, however, guarantee that it has no mistakes, or that all data are complete and correct in the event of technical modifications.

### 8.1 Date of this version of the Operating Manual

2021\02

### 8.2 Copyright

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- Reproduced,
- Distributed, or
- Provided to any third party.

Any person acting in violation of the above stipulations may be prosecuted before a court of law.

### 8.3 Spare parts and technical help

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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[info@testing.de](mailto:info@testing.de)

**EC Declaration of Conformity in accordance with Machinery Directive 2006/42/EG Annex II 1.A**

The authorised representative, established in the Community,

Mr. Feuerherdt

hereby declares that the following product

Manufacturer: TESTING Bluhm & Feuerherdt GmbH  
Motzener Str. 26b  
12277 Berlin

Product designation: 6-Station Vicat Test Apparatus

Serial number: successive

Series/Type designation: 1.036X

Complies with all relevant provisions of the above directive as well as the further applied directives (below) – including changes to these applicable at the time of declaration.

The following further EU directives were applied:

Low-voltage Directive 2014/35/EC

The following harmonised standards were applied:

EN 60204-1 Safety of machinery – Electrical equipment of machines – Part 1:  
General requirements

EN ISO 12100 Safety of machinery – Basic concepts, general principles for design:  
Basic terminology, methodology

Name and address of the person authorised to compile the technical documentation: Mr. Konstantinos Vlassakidis

Place: Berlin

Date:



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(Signature)  
Managing Director



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(Signature)  
Technician