

Thermo shakers and Block thermostats

MKR13-MKR23-MHR13-MHR23-MHL23-TK23-TH21

Read this document before commissioning!



User's guide (Original instructions EN)

About Hettich Benelux

Hettich Benelux is a leading manufacturer of laboratory equipment, which is tailored to your specific applications and requirements. Expect quality, innovation and service from Hettich Benelux in everything we do. Not only is innovation important, the maintenance of your equipment is also in good hands.

As a manufacturer Hettich Benelux is responsible for the design-to-production process; with full, extensive tests being conducted on the end product. Our products do not only meet the current requirements, but also anticipate future demands. We realise that standard solutions are not enough in many cases, which is why Hettich Benelux continues to develop individual solutions for your specific situation.

Engineered for you!

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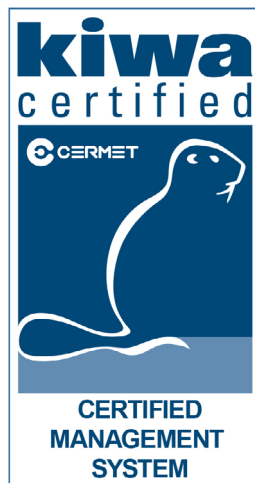
W: www.hettichbenelux.com



Quality management system



Environmental management system



Medical devices - Quality management system in accordance with
ISO 13485:2016



F-gases, regulation on fluorinated greenhouse gases and repealing regulation (EC) No 517/2014



Certification for quality, durability and safety



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Declaration of Conformity according to Annex II.1.A Directive 2006/42/EC

Hettich Benelux B.V., De Aaldor 9, NL – 4191 pc, Geldermalsen

Verklaart hierbij dat het product vanaf 2018:

Declare herewith that the following product(s):

Thermoshakers

MKR13, MKR23, MHR13, MHR23, MHL23

Blockthermostats

TK23, TH21

Voldoet aan de bepalingen van de machine richtlijn 2006/42/EU

Complies with the provisions of Machine Directive 2006/42/EC

Voldoet aan de bepalingen van de EMC richtlijn 2014/30/EU

Complies with the provisions of EMC Directive 2014/30/EU

Voldoet aan de bepalingen van de RoHS richtlijn 2011/65/EU

Complies with the restriction of the RoHS directive 2011/65/EC

En verklaart voorts dat (onderdelen van) de onderstaande (geharmoniseerde) normen zijn toegepast:

And declares furthermore that the following standards or normative documents are applied:

- | | | |
|----------------------------|--|-----------------------------------|
| • Veiligheidseisen | - Voor elektrisch materiaal voor meet- en regeltechniek en laboratoriumgebruik | NEN-EN-IEC 61010-1:2010+Cor. 2011 |
| <i>Safety requirements</i> | - For electrical equipment for measurement, control and laboratory use | |
| • Veiligheidseisen | - elektrische apparatuur voor het meten, controle en laboratoriumgebruik - Deel 2-010 Bijzondere eisen voor laboratoriumapparatuur voor het verwarmen van materialen | NEN-EN-IEC 61010-2-010:2003 |
| <i>Safety requirements</i> | - electrical equipment for measurement, control and laboratory use – Part 2-010 Particular requirements for laboratory equipment for the heating of materials | |

Nederland / The Netherlands

Plaats / Place: Geldermalsen

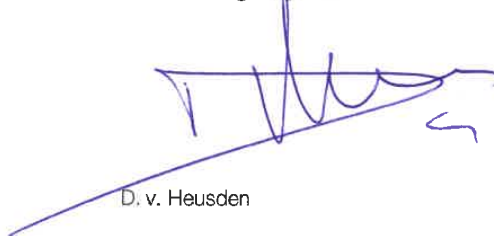
Bedrijfsstempel / Company stamp



Datum / Date:

25-06-2018

Handtekening / Signature:



D. v. Heusden
Directeur Hettich Benelux B.V.

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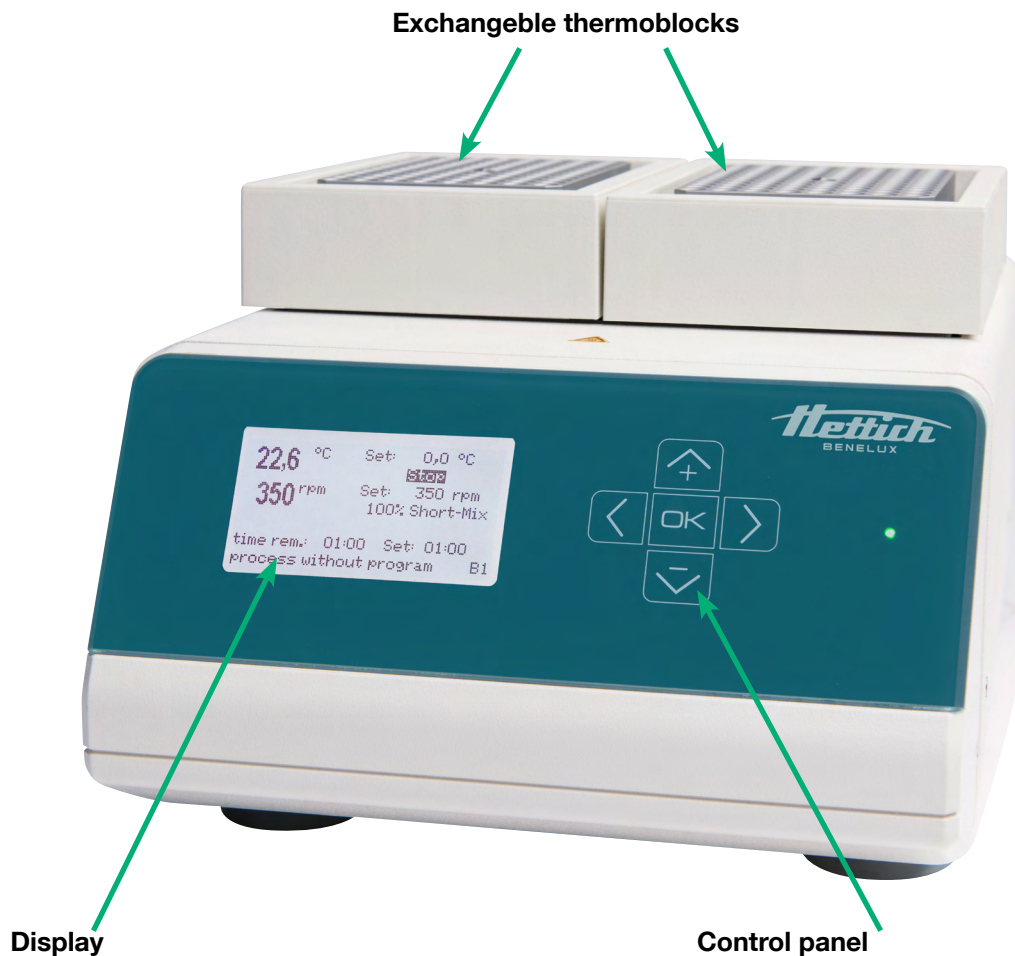
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Read the safety instructions before use!

1 Description of the product

1.1 Overview:



1.2 Explanation:

Control panel:

Program up to 9 complete programs with 30 program steps and temperature curves in total - exactly tailored to your application. The application variety is rounded out by the short mix function e.g. for vortexing as well as interval shaking. The direction of rotation is switchable by the software.

Display:

There is a constant overview of your process at any time. With the detailed information on the display you always have an overview of the following values:

- *Actual and set temperature
- *Actual and set shaking frequency
- *Actual and set time
- *Program number, cycle, step

Exchangeable thermoblocks:

There are more than 40 exchangeable blocks. Quick and simple handling: they are simply inserted and fixed on top of the heating and cooling units. The blocks are suitable and exchangeable for all Thermo shakers and Block thermostats. Our blocks have consistent outside dimensions of 14,5 x 10,2 cm. The usable area here is 12,5 x 8,5 cm. The height varies with each block.



Read the safety instructions before use!

Temperature accuracy:

Every Hettich Benelux system is calibrated with a gauged high-precision temperature measuring device to temperature accuracy and reproducibility. This calibration is performed at a room temperature of +20,0°C and with oil as a reference liquid. Hettich Benelux reaches a very high accuracy by measuring the block temperature directly inside the block. It can, however, not be avoided that the room temperature affects the sample temperature in case of a large temperature difference between room and block temperature. The anti-condensation plate reduces this effect. We recommend using the anti-condensate plate BA 24 / BA 96 or the tempering tub BT 01 / BT 02. When setting a process time, please note that the sample temperature is always reached a little later than the displayed block temperature.



The TK 23 and the TH 21 are not be able to shake.

Sound level:

The noise that the device makes is caused by the cooling fan. The cooling fan runs faster as the device consumes more power. If the device warms up or cools down to its set temperature, it will produce more noise than when it reaches the set temperature.

This is designed to make the device as quiet as possible.

2 Intended use

The Hettich Benelux Thermo Shakers and Block Thermostats are used for tempering and mixing of solutions in closed reaction tubes and plates. Please pay attention that the target temperature of the samples should not exceed the boiling point of the solution, which should be heated. Please consider this when setting the target temperature via the software of the Thermo Shaker or Block Thermostat. If there are any uncertainties regarding the liquids, which should be heated or cooled, please contact Hettich Benelux. The Hettich Benelux devices are meant for indoor usage only. Please use only Hettich Benelux accessories or accessories recommended by Hettich Benelux.

3 Residual risks



The device is built according to the current state of the art and the current rules relating to When used without sufficient knowledge and without sufficient capacity, risk of injury and situations will arise. Both for the user and third parties.

dangerous

The unit may only be operated as intended and by competent and adequately trained personnel. The device may only be used in a faultless and a trouble-free condition.

4 Transport and storage

The device during transport and storage is suitable for an ambient temperature of -20 °C to + 60° C and a relative humidity up to 80%. (non-condensing)

The unit should be stored and transported in an upright position. The device should be stored in dry and closed areas.

When moving the device from a colder to a warmer environment, the device must be warmed up at least 3 hours, before connecting the device to the mains.

5 Safety instructions and warnings



If you discover damage to the device during unpacking, contact the supplier before connecting the device to the mains.



The device can only be used when it is installed correctly according the instructions in this user's guide and according to the local applicable regulations.



Do only connect the system to an earthed mains power socket of 100 – 240V AC / 47 – 63Hz.



Do not place hot blocks on inflammable or not heat-resistant surfaces.



Make sure to only use containers in the block which are suitable for the desired temperature range.



If liquid gets into the system, immediately pull out the plug and contact our service department to ensure complete safety.



Do not touch or transport hot systems.



Contact with highly flammable fluids must be avoided.



The ventilation of the device must not be blocked. To ensure proper ventilation at all times, take care of a minimum distance of 10 centimetres on each side of the device.



Damaged mains cable should only be replaced with equal ones.



Read the safety instructions before use!



This device is not intended for use by persons (including children) with reduced physical, sensory or mental defects or persons who do not have sufficient experience and knowledge, unless they are taught by a person responsible for their safety in the use of the machine or initially supervised.



To prevent damage by condensation, the device in the transition from a cold to a warm room should be at least 3 hours in the warm room before the device can be connected to the mains.



The device may not be used in the open air.



The device is not suitable for use in areas where explosive atmospheres may prevail.



The device must not be moved or knocked during the operation.



Only the exchangeable thermoblocks approved or delivered by Hettich Benelux BV may be used on this device.



When a malfunction occurs: Disconnect the device from the mains, remove the plug from the outlet and / or remove the fuse in the fuseholder. If a plug connection is mounted, unplug the power cord by grasping the plug and not the powercord.



Repairs and other work on the appliance should only be performed by qualified personnel. You can also rely on the support of Hettich Benelux BV.



Only original spare parts or authorised spare parts by Hettich Benelux BV may be applied for maintenance and/or malfunction.



The device during transport and storage is suitable for an ambient temperature of -20°C to +60°C and a relative humidity up to 80%. (non-condensing)



Please note, that by heating your samples dangerous gases may be emitted. In this case, the device must be used with an extractor hood.



If the Thermo shakers are operated with a high shaking frequency, the vibrations of the system might transmit to the underground. There is the possibility that the thermo shaker vibrates from and off the table.

Please do consider this when placing the system.



Hot surface temperatures! The device is getting hot on the outside. Before using the device please take care of the necessary safety-measures so that it is not possible to touch the thermo blocks during the operation.



The device may not be exposed to direct sunlight, large heat-radiating surfaces (e.g. a window) and strong air streams (e.g. a radiator or air conditioning) at the location required.



Extra information;

Hettich Benelux BV works continuously to develop and improve our equipment. Please understand that we reserve the right to change the shape, version, and the technology to improve the equipment.



Read the safety instructions before use!

6 Ambient conditions in operation



The device is designed for indoor operation, within the ambient temperatures of 5°C up to 40°C, at a maximum relative humidity of 80% (non-condensing).

7 Explanation of the symbols

7.1 Symbols used in this document:



This symbol indicates instructions regarding to safety and pointing out potential hazards.



This symbol indicates hot surfaces danger.



This symbol indicates that this user's guide along with all its safety instructions must be read and understood.



This symbol indicates important and/or convenient and practical tips.



Symbol for the separate collection of electrical and electronic equipment in accordance with the Directive 2002/96/EG (WEEE, waste of electrical and electronic equipment)

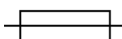
7.2 Symbols used on the device:



This symbol indicates electrical danger.



This symbol indicates hot surfaces danger.



Fuse



Earth conductor



Read the safety instructions before use!

8 Identification plate

The identification plate is attached above the electrical outlet of the device.



De Aaldor 9, 4191 PC Geldermalsen The Netherlands Tel. +31 (0)88 221 99 00


Model: MHR 23

S/N:

Build: XX

Weight: 6,4 kg

100-240 V AC / 47-63 Hz / 380 W

 2x 6.3 AT / 250 V



Explanation identification plate:

Model:	Type of product
S/N:	Unique serial number of the machine
Build:	Year of Construction
Weight:	Weight of device without blocks
100-240 V AC/ 47-63 Hz/ 380W:	Electrical power supply / voltage, frequency, power consumption.
2x 6.3 AT /250 V:	Type of glass fuse.



The displayed image is an example. For the correct data, look at the identification plate on the device itself.



Read the safety instructions before use!

9 Installation

9.1 Unpacking



If you discover damage to the device during unpacking, contact the supplier before connecting the device to the mains.



Keep packaging materials away from children. Plastic can be a choking hazard to children. Please return the packaging to an official collection point.

9.2 Installation

The equipment can be used on a flat and stable surface. Make sure the suction feet are clean and dust free before placing the device on the desired place. Test if the device is fixed on the desired place by pulling it up. A clear “plop” sound assures you that the surface is not porous.



Be aware that there are many blocks that are suited for the device. Please ensure that you adjust the mixing speed of the device, to make sure that it remains at its place.



The device still could move because of the shaking motion. Make sure it is impossible for the device to fall from the table.



Make sure that the ventilation openings of the device are not blocked. To ensure proper ventilation at all times, a minimum distance of 10 centimetres on each side of the device is required.

9.3 Changeable blocks

At delivery, the changeable blocks are packed separately. Place the blocks on the tempering plates and take care of the proper alignment of the central threaded bolt and the two small corner bolts ensuring that the block lays accurately on the tempering plate. Then attach the block with the enclosed socket screw tightly at the bottom of the tempering plate to get the block fixed for shaking and to obtain even better temperature accuracy. Check the tight attachment of the block by pulling it up.

Never start the process without the block being tightly attached. Do always use two blocks for two-block systems, even if only one of them is used. This ensures safety as well as a smooth shaking operation.

9.4 Connecting the device to the mains

Plug the mains cable in the IEC socket on the back of the system and connect it with the mains power 100 – 240 V AC / 47 – 63 Hz via a Schuko socket. Please make sure that you are using earthed mains power sockets.



Do only connect the system to an earthed mains power socket of 100 – 240V AC / 47 – 63Hz.



Damaged mains cable should only be replaced with equal ones.



Read the safety instructions before use!

10 Operation

Switch on the system with the mains switch on the back of the system. The start menu will be displayed. The green LED turns on, on the right sight of the touch panel, as soon as a process is running.

10.1 Start menu

This menu is displayed after the power is switched on, after abortion or after the normal completion of a process. The last set values are retained even after the switch-off of the system.

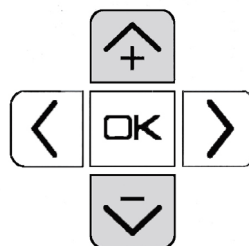
25,6 °C	Set: 25,6 °C
0 rpm	Start
00:00 h:m	Set: 0 rpm
	100% Short-Mix
	Set: endless
	Program
	Setup Menu
not started	B0

10.2 Setup menu

Select setup menu in the start menu and confirm with **ok**.

25,6 °C	Set: 25,6 °C
0 rpm	Start
00:00 h:m	Set: 0 rpm
	100% Short-Mix
	Set: endless
	Program
	Setup Menu
not started	B0

With the keys **+** and **-**, the input or the values can be changed. If an input is confirmed with **ok**, the box will highlighted flashing again. With confirming the button **Start menu**, the start menu is displayed again.



The following values can be adapted:

Page 1:

Language: English, German, French, Spanish

Tempering unit: °C or °F

Block number (10-point calibration)

Confirm end:

Yes: at the process end, a signal is audible until the **ok** key is pushed. Until then, the process runs with the previous data.

No: the process ends without confirmation.

Rotation direction: right, left. Not available with TK 23 and TH 21.

Page 2:

Display colour: Normal - inverse

Display:	norm
Goto	Page 1
Startmenu	

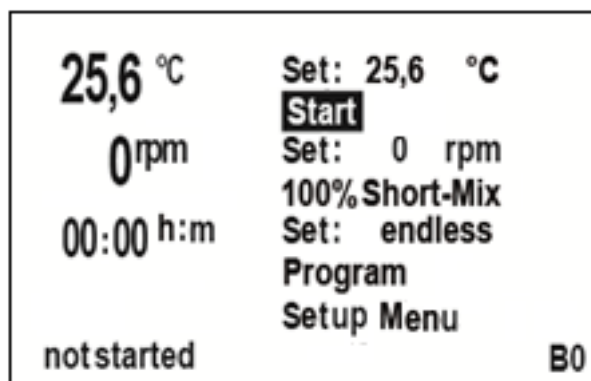
Language:	EN
Tempering unit:	°C
Block number:	B0
confirm process end:	Yes
rotation direct.:	left
goto:	Page 2
Startmenu	



Read the safety instructions before use!

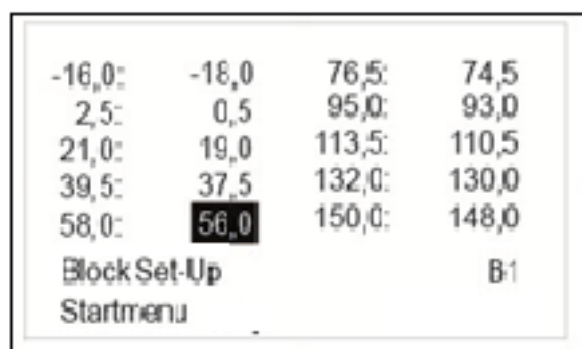
10.3 10-point-calibration

By default the standard calibration begins with the block number "B1". 10 temperature bases are underlying this calibration. The calibration is optimized for all HETTICH BENELUX standard blocks. If you are using customized blocks you will be able to do individual calibrations in addition. For the calibration you need a gauged high-precision temperature measuring device.



Select block number in the set up menu and confirm with **ok**. Now you will get to the calibration menu. You are now able to calibrate and save different individual calibrations, from standard block B1 up to B4. Therefore please select B1 to B4. Confirm again with **ok**. In the first and third column you can see the temperature base. In the second and fourth column you can see the variable set values.

By pushing the **+** and **-** keys the entries and values can be changed. The selected field is blinking; by pushing **ok** the field is selected for changing.

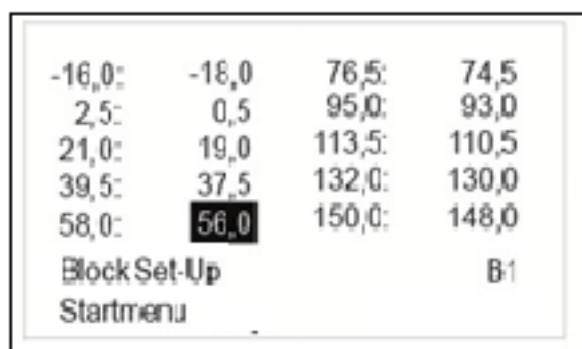


Example:

You have adjusted the device for 95,0°C in the start menu and are measuring only 85,0°C with a calibrated thermometer inside your sample. Now you have to change the temperature set value in column four about 10°C.



By doing so you can calibrate every single base individually but if there are **red numbers**, then the place of the values are not correct.



Read the safety instructions before use!

10.4 Temperature set value

Navigate with **+** and **-** to the temperature input box and confirm with **ok**. The individual numbers can be selected with **arrow left** and **right**, their value can be changed with **+** and **-**. The input is confirmed with **ok** and the cursor automatically jumps to the **Start** button.

A set value change can also be made in the same way during a running process. After confirming the input with **ok**, the new set value is effective immediately. For the hundreds, the following values can be selected:
0 for temperatures up to +99,9°C
1 for temperatures from +100,0°C
- for temperatures below 0,0°C

Important information

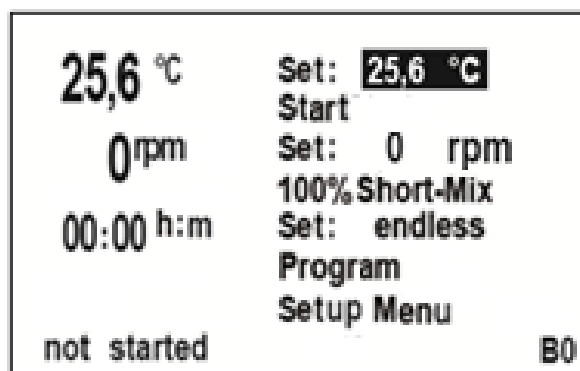
For cooling systems, the minimum temperature may not be smaller than the difference from room temperature mentioned below.

MKR 13 / TK 23: 16°C below r.t.

MKR 23: 11°C below r.t.



The temperature adjustable range is larger than the temperature working range. For details see the appendix of this user's guide.



10.5 Mix set value

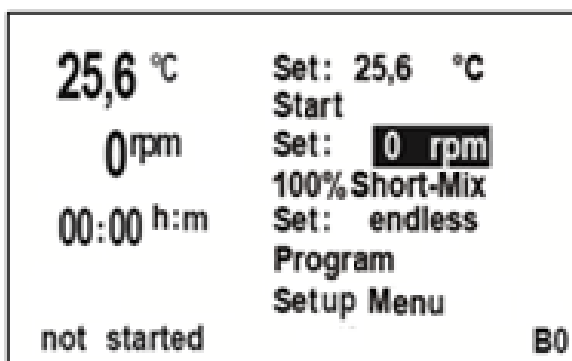
Navigate with **+** and **-** to the shaking frequency input box and confirm with **ok**. The individual numbers can be selected with

arrow left and **right**, its value can be changed with **+** and **-**.

The input is confirmed with **ok** and the cursor automatically jumps to the button **Start**.

The 1. Digit number cannot be selected and changed.

A set value change can also be made in the same way during a running process. After confirming the input with **ok**, the new set value is effective immediately.



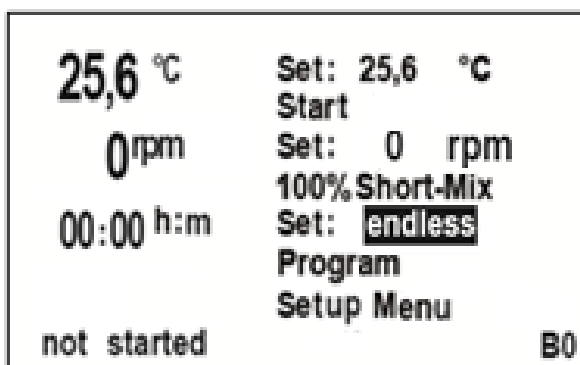
The device still could move because of the shaking motion. Make sure it is impossible for the device to fall from the table.

10.6 Duration of the process (time setting)

Navigate with **+** and **-** to the time input box and confirm with **ok**. The individual numbers can be selected with **arrow left** and **right**, its value can be changed with **+** and **-**.

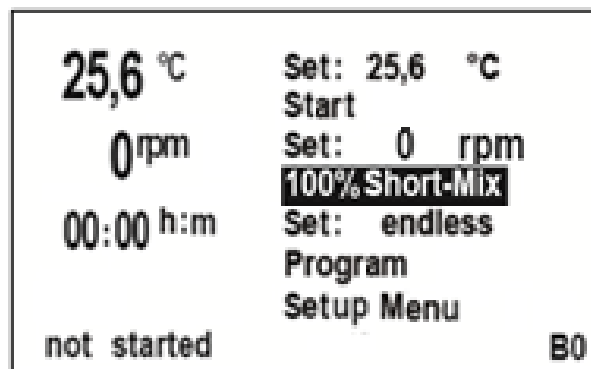
The input is confirmed with **ok** and the cursor automatically jumps to button **Start**.

For an endless process, select 00:00.



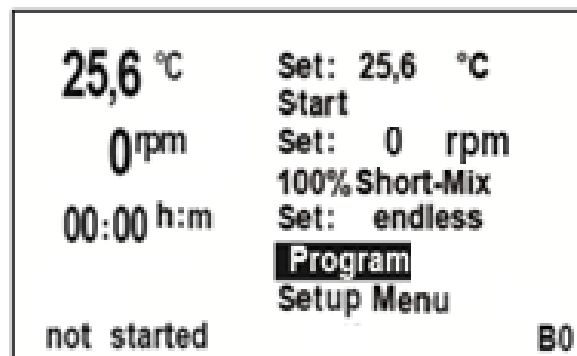
10.7 100% Short-Mix (vortexing)

Navigate with **+** and **-** to the button **100% Short-Mix** and confirm with **ok**. The system shakes with maximum mixing speed regardless of a process is started or not. During the whole shaking process **ok** must be pushed continuously.



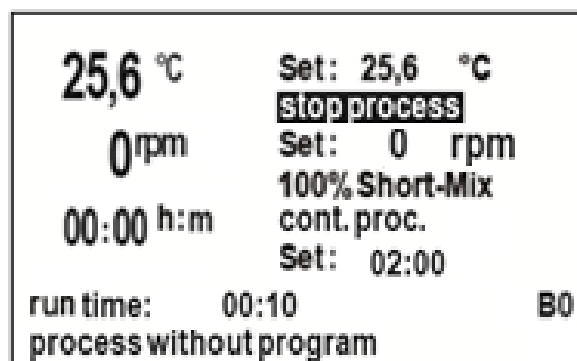
10.8 Select program mode

Navigate with **+** and **-** to the button **Program** and confirm with **ok**. For detailed information on programming see page 10.



10.9 Process without time setting

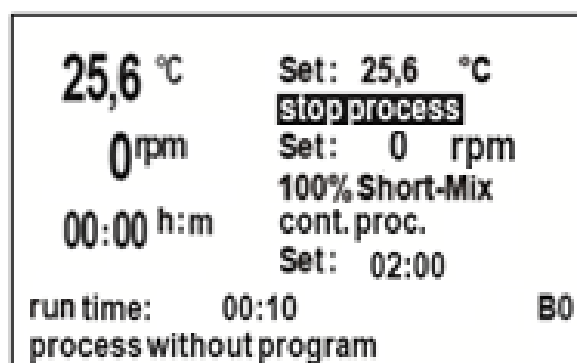
Only set a set temperature and a set shaking frequency but set the time on continuous **00:00**. Now, the process time is displayed continuously. It only starts to run if the temperature set value is reached. A set value change can also be made as described above during a running process. Changes are re-tained also after the completion of the process and are displayed in the start menu as current set values. For terminating the process, push **Stop**.



10.10 Process with time setting

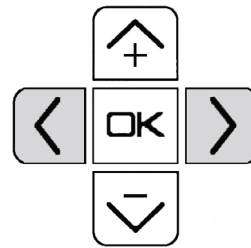
If a process time is set, the remaining time is displayed in the menu. The time only starts to run if the temperature set value is reached. This does also apply for subsequent temperature changes. A set value change can also be made as described above during a running process.

The process ends without a signal or continuous with a signal until it is terminated manually. The relevant modus can be set in the setup menu.



For changes during the process

If set value changes have been made, you can select to save these changes and to have them displayed in the start menu as new set values.



Stopping the process before the expiration of the time

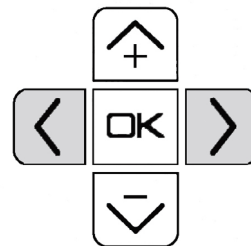
If the process is stopped or changed before the expiration of the time, you can select whether the process really should be terminated or if it should continue. Depending on the selection, the start menu or the selection to continue the process from the stop (time runs from stop) or to make a restart (time runs from zero) is displayed.

10.11 Process end

Setting in setup:

Confirm end: Yes

If a process time is preset, the expiration of the time is indicated by a flashing LED and a signal, the process continues. You can terminate the process with ok.



Confirm end: No

If a process time is preset, only the information that the process is completed will be displayed after the expiration of the time. The device turns off automatically.



11 Programming function

11.1 Program menu

Navigate with **+** and **-** to the button **Programs** and confirm with **ok**. A total of 30 different program steps can be preset, distributed on max. 9 different programs.

Confirm the highlighted flashing program number if you want to change it. Confirm the prog. no. with **ok**. With **+** and **-**, the program numbers 1-9 can be selected. If you want to edit the displayed program, select the different adjustable parameters with **+** and **-**. For editing, confirm with **ok** and change the value. For final confirmation confirm with **ok** again.

123456789		Startmenu	
free: 12/30		Delete	Start
temp(°C):	42,0	prog-no:	1
risingtime:	6	cycles:	1
speed:	1100	step:	4
pause(min):	0,5	hours:	01
mix(s)	1	minutes:	25

11.2 Setting of the individual parameter

1 23456789		Startmenu	
free: 12/30		Delete	Start
temp(°C):	42,0	prog-no:	1
risingtime:	6	cycles:	1
speed:	1100	step:	4
pause(min):	0,5	hours:	01
mix(s)	1	minutes:	25

By selecting “Programs” in the start menu, you will have a total number of 30 different (recurrent) program steps available. These can be selected in up to 9 different programs. You have the choice of f. ex. either 9 programs with 3 program runnings each or f. ex. 1 program with 30 program runnings. For normal operation the choice will be somewhere in between.

“**prog-no.**” is blinking and shows 1 as standard. By pressing **ok** any program number. between 1 and 9 can be selected using buttons **+** and **-**. Confirm your entry by pressing **ok** and the next field “cycles” will be blinking.

Cycles = Number of repetitions of the program, selection 1-9 possible without having to confirm “Start” again.

If no changes are to be made, select the next field by using the **-** (down) button.

By pressing **ok** you can change the number of cycles from 1 to 9 using the **+** and **-** buttons. Confirm your entry by pressing **ok** and the next field “step” will be blinking.

Step = Section within a program. Selection 1-9 possible.

If no changes are to be made, select the next field by using the **-** (down) button.



For changing the program step displayed, press **ok**. A value between 1 and 30 can be selected using buttons + and -. Confirm your entry by pressing **ok** and the next field "hours" will be blinking. If in the field "minutes" no entries are to be made, select the next field by using the - (down) button.

Hours = Duration of the section in hours.

If no changes at "hours" are to be made, select the next field by using the - (down) button. For any changes press **ok**; the ones column is highlighted and can be changed with buttons + and -. For changing the tens column use button for marking and + and - for changing. Confirm your entry by pressing **ok** and the next field "minutes" will be blinking.

Minutes = Duration of the section in minutes.

For entries press **ok**; the tens column is highlighted and can be changed by using buttons + and -. For changing the ones column use button for marking and + and - for changing. Confirm your entry by pressing **ok** and the next field "temp °C" will be blinking.

Time "endless"

If a program step (normally the last one) shall be running without a time setting until the program will be completed manually, i.e. endless, the hours and minutes must be set to 00.

Temperature = Set temperature of the section.

The temperature set value is 37°C as standard. If no changes are to be made, select the next field by using the - (down) button. To change this value press **ok**. Every single digit can be changed. The cursor is placed at the tens column of the set value.

This value can be changed with buttons + and -. To change another digit in this data field, it must be marked by buttons < and >. The highlighted value will be changed with button + or -. After setting the value it must be confirmed with ok; the field "rising time" will be blinking.

Rising time = Time setting for tempering the sample to set temperature. This setting is only required if the sample is to be tempered slower than in presttings of the device. If the sample is to be tempered as fast as possible, set the value to 0.

With "rising time" the heating or cooling speed compared with the normal speed can be reduced. You have the possibility to determine a certain period (= rising time; with a max. of 99 minutes to choose) in which a set temperature shall be reached in the actual program step, if a slower than normal tempering is desired.

As shown in the illustration beside, a temperature of 60,0°C in step 2 shall be reached within 20 minutes, starting from a temperature of 37,0°C in step 1. If no changes are to be made in "rising time" (fastest possible heating or cooling time), select the next field by using the - (down) button. For changing the standard value 0 press **ok**; the ones column is highlighted and can be changed with buttons

+ and -. For changing the tens column use button for marking and + and - for changing. Confirm your entry by pressing **ok** and the next field "speed" will be blinking.

Rotational speed = Shaking frequency with which the blocks are shaken.

The last number (1. digit) can not be selected and changed.

For "speed" 0 is set as standard. If no changes are to be made (tempering without shaking), select the next field by using the - (down) button. To change this value press **ok**; every single digit can be changed. The cursor is placed at the hundreds column of the set value. This value can be changed with buttons + and -. To change another digit in this data field, it must be marked by buttons < and >. The highlighted value will be changed with button + or -. The last digit (ones column) cannot be chosen and changed. After setting the value it must be confirmed with **ok**; the field "pause" is blinking.



Interval shaking = Interval shaking is an alternative when the probe shall not be subject to permanent shaking. A resting time of up to 9.9 minutes can be set in "pause". The following short shaking time of up to 9 seconds is set in "mix sec". This is a reasonable choice for the last program running of a complete program with time setting "" during off working hours.

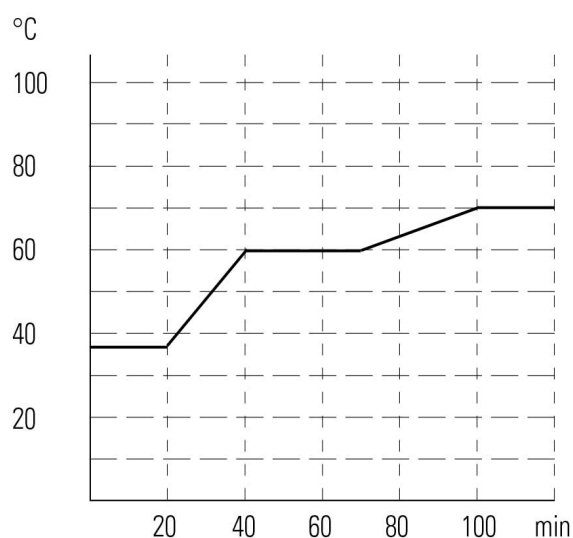
Pause [min] = Resting time of up to 9.9 minutes. If no intervals are to be set, enter the value 0.0 here.

Duration of pause is 0.0 as standard. If no changes are to be made, select the next field "step" by using the – (down) button. To change this value press **ok**; the ones column is highlighted and can be changed by using buttons + and –. For changing the 1/10 digit press button >; the digit is highlighted and can be changed with buttons + and –. Confirm your entry by pressing **ok** and the next field "mix sec" will be blinking.

Mix [s] = Short shaking time up to 9 seconds after resting time.

For "mix sec" 1 is set as standard. If no changes are to be made, select the next field "step" by using the – (down) button. For changing the shaking time press **ok** and change time by using buttons + and –. Confirm your entry by pressing **ok** and the next field "step" will be blinking.

Example of a temperature program:



Step: 1
 Minutes: 20
 Temp. °C: 37,0
 Rising time: 00

Step: 2
 Minutes: 50
 Temp. °C: 60,0
 Rising time: 20

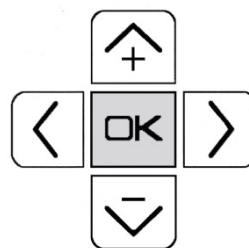
Step: 3
 Minutes: endless
 Temp. °C: 70,0
 Rising time: 30



Read the safety instructions before use!

11.3 Entry of further program steps

If another program step shall be added to a chosen program, press **ok** at the blinking field "step" and increase the number of the last program step by 1. Further entries as already described.



11.4 To change the program data entry

To change the chosen program, enter the program step number to be changed.

Select the field to be changed by using buttons **+** and **-**. Press **ok** for changing. Changes are made as already described and must be confirmed with **ok**. Select a corresponding field by using buttons **+** and **-** or **<** / **>**.

11.5 Termination of program data entry

To complete a chosen program, mark either "Start" (to start the program immediately) - screen 6 will appear, or "Startmenu" (to save the program only) - screen 1 will appear. You can also select "prog-no." (for entry of another program). When "Delete" is selected, the complete program with all program steps as displayed is deleted.

11.6 Starting a program

Select the relevant prog. no. and confirm the **Start** button in the program menu.

1	2	3	4	5	6	7	8	9	Startmenu	
free: 12/30									Delete	Start
temp (°C):		42,0		prog-no:		1				
rising time:		6		cycles:		1				
speed:		1100		step:		4				
pause (min):		0,5		hours:		01				
mix (s)		1		minutes:		25				

11.7 Changing parameters during the program process

Change of temperature and rotational speed as well as performing a Short-Mix are possible during a running program.

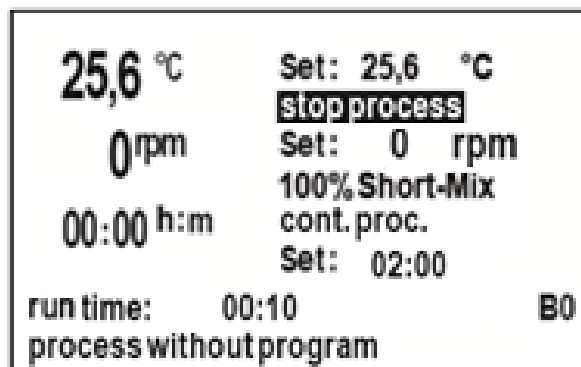
The set time is the time of the running step, the remaining time is the time of the complete process. In the lower right part of the display, program no., cycle and step are indicated.

25,6 °C		SP: 25,6 °C	
1100 rpm		SP: 1100 rpm	
		100% Short-Mix	
		Program	
time: 01:30		SP: 02:00	
process running		P1-Z1-S1 B0	

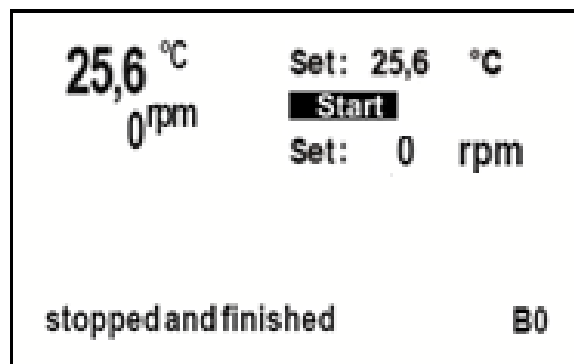


11.8 Termination/ interruption of the program

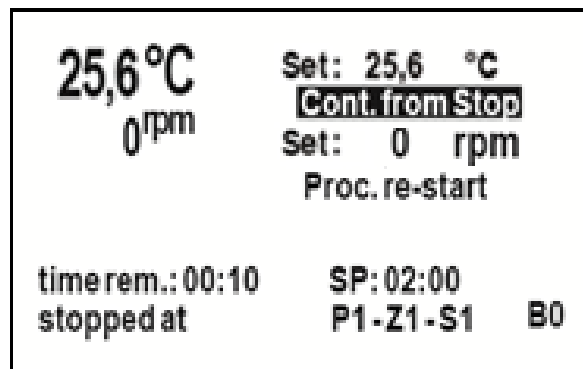
If you push **Stop**, the options **stop process** and **continue process** are displayed.



If you select **stop process**, the **Start menu** or **Save changes** is displayed if parameters have been changed during the process.



If you select **Continue with process** the selection **Continue from stop** or **Process Restart** is displayed.
(program starts from cycle 1, step 1).



12 Assembly of accessories

Anti-Condensation Plate BA 24 / 96

The anti-condensation plate BA 96 (800013000) is placed on the attached block, no assembly steps are required. For using the anti-condensation plate BA 24 (800012900), remove the socket screw in the block with the enclosed screwdriver. Screw the enclosed threaded pin with isolation knob into the anti-condensation plate. Place the anti-condensation plate on the block and screw the threaded pin in deeper so that it takes hold of the bolt of the system and with that tightly attaches block and anti-condensation to the system.



Read the safety instructions before use!

13 Troubleshooting

The display remains blank

Please check if the mains switch on the back side is switched on.

If it is switched on and voltage is present at the socket, check the micro-fuse and replace if required. (IEC 127-2/III, 250 V, 6.3 A time-lag).

This fuse and a spare fuse are located in the IEC-bushing (in which the connection cable is plugged). The fuse box can be pulled out with a screwdriver.

The system does not cool, heat or shake as set

Check whether the display indicates the correct system type name at power-on. If not, please contact your local dealer or the Hettich Benelux service de-partment.

There are excessive temperature fluctuations

Check the seat of the changeable block by pulling it up. If it is too loose or if the block exhibits roughness, e.g. contamination, the heat / coolness is not transferred correctly.

Information on the capacitive touch display

The touch display reacts on finger pressure, even when wearing thin latex gloves, but not on stylos.

Due to its glass surface, the front panel is insensitive to dirt, chemicals and mechanical damage. Please avoid scratches in the coating since they can cause malfunctions. Please take note of the following cleaning instructions.



14 Maintenance

Regularly clean the housing and the changeable blocks of the Thermo Shakers and BlockThermostates.



With long-term use at high speed or with a high weight of the interchangeable blocks there is a chance that the parts of the thermomixer vibrate apart. Therefore, regularly check all fastening parts and tighten them where necessary.



Precautions for avoiding electric shocks

Electronic devices can cause electric shocks in case of an operating error. Never try to repair electric parts. Never open the housing.



Switch off the system and disconnect it from the power supply before starting with cleaning or disinfection works.



Never let get liquids inside the housing (ventilations slit).



Do not perform spray disinfection.



Do only connect the system with the power supply if it is completely dry.

The repair may only be performed by staff authorized personnel which are trained by the manufacturer of the device. A modification of the system is not permitted.

14.1 Cleaning

1. Please disconnect the system from the power supply before you start cleaning.
2. Please clean all outer parts of the system with a mild detergent and a lint-free cloth.
3. Please wipe off the detergent with Aqua dest..
4. Please dry all cleaned parts.

Caution when handling aggressive chemicals

Do not use aggressive chemicals like e.g. strong and weak bases, strong acids, formaldehyde, acetone, halogenated hydrocarbons or phenol for cleaning the system and its accessories.



In case of contamination with aggressive chemicals, clean the system with a neutral detergent immediately.



Use neither corrosive detergents nor aggressive solvents or abrasive polishing agents.



The thermoblocks are not suitable for cleaning in a dishwasher.

14.2 Disinfection

1. Please disconnect the system from the power supply before you start disinfecting.
2. Let the system cool down.
3. Please clean the system as described above.
4. Please select a disinfection method compliant to the applicable local legal regulations and directives.
5. Please wipe off all outer parts of the system with the disinfectant and a lint-free cloth.



Read the safety instructions before use!

15 Service

If a technical problem arises, please contact your local dealer or the Hettich Benelux service department. The Hettich Benelux contact information can be found at www.hettichbenelux.com. If required, the system will be returned for repair. Please take note of our service guidelines, which can be found at www.hettichbenelux.com as well.

15.1 Decontamination before shipment

If you send the system to the authorised technical service for repair or to your distributor for disposal, decontaminate all parts you want to send. Document the decontamination in a Decontamination certificate (incl. serial number) and include it with the shipment.

16 Recycling

Devices at the end of their life, must be discarded in a professional and appropriate manner, in accordance with local regulations and laws.

Contact your local recycling organization and trade according to local law.



Hettich Benelux BV is a member of the Foundation for Technical Waste Recycling (RTA)
For disposal and recycling please use the return system via www.stichtingrta.nl
(Only valid in the Netherlands)

Packing material

The packaging is made of;

- Polyethylene stretch film.
- The clip box is made of premium waterproof plywood.
- The clip box is mounted with stainless steel brackets.



Keep the packaging away from children, polyethylene stretch film can cause suffocation.

Please return the packaging to an official collection point.

Discarded appliances should be disabled: Remove the plug and cut the power cord through.

Ensure that the cooling circuit is not damaged when the device is removed.

Information about the refrigerant can be found on the nameplate.

Appendix

Technical data

Technical data MKR 13	
Temperature-working range	Amb. -16°C to +100°C
Temperature-adjustable range	-10°C to +105°C
Accuracy / resolution	+/- 0.1°C /0.1°C
Max. heating time	11.3°C / min.
Max. cooling time	-12.0°C / min
Shaking frequency	200 - 1.500 rpm
Orbit	3mm round
Dimensions (without block) W x D x H	220x330x144mm
Block - capacity	1 changeable block
Weight (without block)	10kg
Power input	220W
Electr. supply	100 - 240V AC 47 - 63Hz
Fuse	6,3AT
Protection class	IP21
Environmental conditions	
Ambient air temperature in service (non-condensing)	5 - 40°C
Relative humidity	Max. 80%

Technical data MKR 23	
Temperature-working range	Amb. -11°C to +100°C
Temperature-adjustable range	-10°C to +105°C
Accuracy / resolution	+/- 0.1°C /0.1°C
Max. heating time	11.7°C / min.
Max. cooling time	-9.6°C / min.
Shaking frequency	200 - 1.200 rpm
Orbit	3mm round
Dimensions (without block) W x D x H	220x330x144mm
Block - capacity	2 changeable blocks
Weight (without block)	9.5kg
Power input	400W
Electr. supply	100 - 240V AC 47 - 63Hz
Fuse	6,3AT
Protection class	IP21
Environmental conditions	
Ambient air temperature in service (non-condensing)	5 - 40°C
Relative humidity	Max. 80%



Read the safety instructions before use!

Technical data MHR 13	
Temperature-working range	Amb. +3°C to +130°C
Temperature-adjustable range	0°C to +137°C
Accuracy / resolution	+/- 0.1°C /0.1°C
Max. heating time	11.3°C / min.
Shaking frequency	200 - 1.500 rpm
Orbit	3mm round
Dimensions (without block) W x D x H	220x330x109mm
Block - capacity	1 changeable block
Weight (without block)	8.8kg
Power input	230W
Electr. supply	100 - 240V AC 47 - 63Hz
Fuse	6,3AT
Protection class	IP21
Environmental conditions	
Ambient air temperature in service (non-condensing)	5 - 40°C
Relative humidity	Max. 80%

Technical data MHR 23	
Temperature-working range	Amb. +3°C to +130°C
Temperature-adjustable range	0°C to +137°C
Accuracy / resolution	+/- 0.1°C /0.1°C
Max. heating time	8.9°C / min.
Shaking frequency	200 - 1.500 rpm
Orbit	3mm round
Dimensions (without block) W x D x H	220x330x109mm
Block - capacity	2 changeable blocks
Weight (without block)	9.2kg
Power input	380W
Electr. supply	100 - 240V AC 47 - 63Hz
Fuse	6,3AT
Protection class	IP21
Environmental conditions	
Ambient air temperature in service (non-condensing)	5 - 40°C
Relative humidity	Max. 80%



Read the safety instructions before use!

Technical data MHL 23	
Temperature-working range	Amb. +3°C to +130°C
Temperature-adjustable range	0°C to +137°C
Accuracy / resolution	+/- 0.1°C /0.1°C
Max. heating time	8.9°C / min.
Shaking frequency	200 - 1.300 rpm
Orbit	3mm linear
Dimensions (without block) W x D x H	220x330x109mm
Block - capacity	2 changeable blocks
Weight (without block)	9.2kg
Power input	380W
Electr. supply	100 - 240V AC 47 - 63Hz
Fuse	6,3AT
Protection class	IP21
Environmental conditions	
Ambient air temperature in service (non-condensing)	5 - 40°C
Relative humidity	Max. 80%

Technical data TK 23	
Temperature-working range	Amb. -16°C to +100°C
Temperature-adjustable range	-10°C to +105°C
Accuracy / resolution	+/- 0.1°C /0.1°C
Max. heating time	11.7°C / min.
Max. cooling time	-11.5°C / min
Dimensions (without block) W x D x H	220x330x144mm
Block - capacity	2 changeable blocks
Weight (without block)	6.2kg
Power input	360W
Electr. supply	100 - 240V AC 47 - 63Hz
Fuse	6,3AT
Protection class	IP21
Environmental conditions	
Ambient air temperature in service (non-condensing)	5 - 40°C
Relative humidity	Max. 80%



Read the safety instructions before use!

Technical data		TH 21
Temperature-working range		Amb. +3°C to +130°C
Temperature-adjustable range		0°C to +137°C
Accuracy / resolution		+/- 0.1°C /0.1°C
Max. heating time		10.6°C / min.
Dimensions (without block) W x D x H		220x330x109mm
Block - capacity		2 changeable blocks
Weight (without block)		3.9kg
Power input		370W
Electr. supply		100 - 240V AC 47 - 63Hz
Fuse		6,3AT
Protection class		IP21
Environmental conditions		
Ambient air temperature in service (non-condensing)		5 - 40°C
Relative humidity		Max. 80%

Article description blocks & accessories

Blocks	Art. No.	Dimensions of the containers
For micro test tubes	800010800	BM 02 for 96 x 0.2 ml conical & 8-container stripes
	800010900	BM 05 for 38 x 0.5 ml conical
	800011000	BM 15 for 24 x 1.5 ml conical
	800011100	BM 20 for 24 x 2.0 ml cylindrical
For sample tubes	800011500	BP 10 for 24 x D=10.3 mm, 46 mm deep, round bottom, lid
	800011600	BP 12 for 24 x D=12 mm, 20 mm deep, flat bottom
	800011700	BP 15 for 24 x D=15 mm, 30 mm deep, flat bottom
	800011800	BP 16 for 24 x D=16.5 mm, 46 mm deep, round bottom, lid
	800014200	BP 17.0 for 24 x D=17 mm, 30 mm deep, flat bottom
	800016100	BP 19.2 for 24 x D=18.7 mm, 25 mm deep, flat bottom
	800015200	BP 23.0 for 12 x D=22.5 mm, 56 mm deep, flat bottom
	800016000	BP 25.5 for 12 x D=23.0 mm, 56 mm deep, flat bottom
	800011900	BP 28 for 8 x D=28 mm, 40 mm deep, flat bottom
For centrifuge tubes	800012200	BZ 15 "Falcon" tubes 14 x 15 ml, with isolation lid
	800012300	BZ 50 for "Falcon" tubes 6 x 50 ml, with isolation lid
For PCR plates	800010401	BC 96 for 96-well "V"-bottom
	800010301	BC 84 for 384-well
For micro plates	800012000	BV 96 for 96 x round or "V"-bottom
	800010600	BF 96 for flat bottom
For deep- well plates	800010500	BD 96 for 96-deep-well-plates
For other applications	800011200	BN 10 for 36 rectangular cuvettes, outer diameter 12.5 mm
	800012100	BW 01 as tub for deep-well, stacked microtiter plates and other containers, incl. isolation lid and unloading device
	800014100	SO 10.4 for 24 x D=10.4 mm, 180 mm deep
	800012600	SO 12.0 for 24 x 12ml test tubes
	800012700	SO 20.5 for 12 x 20ml test tubes
For customized containers	800010700	BM 00 without drilling, height 25 mm
	800011300	BO 37 without drillings, height 37 mm
	800011400	BO 50 without drillings, height 50 mm
For Slides	800012400	BY 12 for 12 slides for hybridisation



Read the safety instructions before use!

Article description blocks & accessories

	800017101	BD 96 Exchangeable thermoblock for 4titute Deep-Well plates round bottom
	800016602	BD 96-BR Exchang. thermoblock for Eppendorf Deep-Well-plates, round bottom
	800016900	BM 05/15 Block for 24x1,5+0,5 Micro tubes, conical
	800016400	BM 13 exchangeable thermoblock for cryo tubes 1,5-2,0ml d=12,5
	800017400	BP 13 Exchangeable thermoblock for cryo tubes 24xØ=12,5mm 40mm deep, round
	800018600	BZ 15 Exchangeable block + lid for Falcontubes 14x15ml 93mm deep
	800019001	BV 96 Exchangeable block for 96 well microtiter plates, round bottom
	800019301	BF96 Exchangeable thermoblock for Microtiterplates, Flat bottom
	800018500	BP 47 Exchangeable block Scott Draun flasks 50ml 2x47mm drill. 60mm deep
	800018900	BP71.5 Exchang. thermoblock Schott Draun flasks 250ml 2x71,5mm drill. 74 deep
	800018701	BZ 50 exchangeable thermoblock for Falcon tubes, 95mm deep drillings

Accessories

Art. No.	Description
800012800	BI 01 Isolation lid
800013800	BT 01 Tempering tub for 1 block, transparent
800013900	BT 02 Tempering tub for 2 blocks, transparent
800012900	BA 24 Anti-condensation plate for 1 block (micro test tubes)
800013000	BA 96 Anti-condensation-plate for 1 block (PCR / test plates)
800013100	BR 05 Rack with holder f. tubes 0.5 ml
800014300	BR 15 Rack with holder f. tubes 1.5 / 2,0ml
800012501	Heating top 48V