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MASH BATH
Type: R4, R8, R12

USER'S GUIDE

Contents:

1. Mash Bath – range of the supply

Mash Bath …….…….....…….....…1 unit

Metal beakers (volume 500 ml): type R4-4 pces, type R8-8 pces, type R12-12 pces

Glass test tubes (volume 100 ml): type R4-4 pces, type R8-8 pces, type R12-12 pces

2. Mash Bath - Installation - putting the device into operation and its maintenance

Mash Bath is determined only for work in laboratories which is the ordinary place for laboratory testing of malt. The Mash Bath must be located in the horizontal position (for proper operation of the apparatus). The mash will be connected to the cooling water distribution by expert company (**Warning!** Pressure of water must not exceed value 600kPa). The equipment will be connected to the inlet piping of the cooling water with the help of the 1/2" union piping with orifice plate inside. It is forbidden to také the orifice plate out of the union piping. Hold the tube leading into the Mash Bath to prevent its rotation during tightining the union piping. There is the electromagnetic valve on the tube and this electromagnetic valve has to be in the vertical position. It is also reccommended to incorporate ball closing valve and filter into the cooling water circuit (in front of the Mash Bath). Connect the 3/4" discharge piping from the Mash Bath with the help of hose into the drain. Then plug in the Mash Bath with the help of a standardized single-phase plug into el.socket. Before plugging in the technician has to check the condition of the el.circuit that will be used for the Mash Bath operation. If the result of the el.circuit inspection is positive, the Mash Bath can be plugged in.

During long-run operation the water stone may be sedimented on the Mash Bath vessel and the heating elements that is why it is reccommended to remove the sediments and to clean the vessel with the acetic water. Pour the acetic water into the Mash Bath and for example start the methodics Hartong for 1 hour at 65 degrees Celsius. Then disconnect the Mash Bath of the electricity, discharge the water of the vessel and clean the vessel.

In addition it is reccommended to oil the yellow alcamid bearings of the stirrers with the supplied oil always after 2 months of the operation. Disconnect the Mash Bath of the electricity and také off the upper cover of gearbox to oil the upper bearings. Then it is very easy to oil all upper bearings of the stirrers and part of the lower bearings. Inject the oil between the strirer and the yellow alcamid bearing from outside to oil the rest of the lower bearings.

3. Safety recommendations

Mash Bath may be operated only by person who became completely acquainted with its function within the framework of the training, or who became thoroughly acquinted with the user's guide of this device. The Mash Bath must be plugged in with the help of a standardized plug into single-phase el.socket with 16A circuit breaker. Before plugging in the technician has to check the condition of the el.circuit that will be used for the Mash Bath operation. If the result of the el.circuit inspection is positive, the Mash Bath can be plugged in. In case of danger switch off the Main Switch and disconnect feed el.cord out of the socket. The stirrers must be switched off while any handling the metal beakers and the stirring airscrews. Switch off the Main Switch, disconnect feed el.cord out of the socket and contact the qualified service personnel who provides service for delivered device if any problem with any water leakage appears.

Warning! It is forbidden to handle the beakers at temperature higher than +40 degrees Celsius. It could cause staff injury. It is hazardous for anyone except for the producer and authorized service company to repair the apparatus.

4. Technical data:

Electric data:

- voltage systém TN-S 1+PE+N
- voltage 230V/50 Hz or 110V/60 Hz
- protection IP 20
- the equipment can be used in neutral medium
- the equipment output : type R4- P_i=1,4 kW, type R8- P_i=2,1 kW, type R12- P_i=2,8 kW
- circuit breaker– type R4-8 A fusible cut out, type R8-12 A fusible cut out, type R12-16 A fusible cut out

Sound level parameters:

- max sound pressure – 51 dB

Data represented on LCD display:

- type of method: Hartong, Congress, ASBC, Thermostat, PROFILE
- instantaneous temperature of bath
- time since the begining of test

Adjustable data:

- choice of methods: HARTONG, CONGRESS, ASBC, THERMOSTAT, PROFILE
- temperature range: from 15^0C to 90^0C
- mixer speed: 0, 100, 200 R.P.M.
- time

Accuracy:

- accuracy of temperature adjustment: +-0,1^0C
- accuracy of regulation: to 0,3^0C
- accuracy of time adjustment: 1 sec

Signalization:

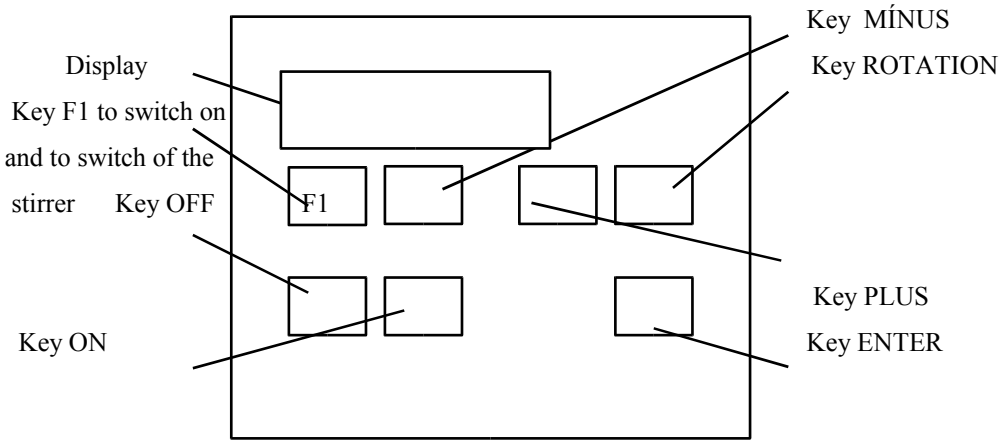
- acoustic and optical alarm

5. Operating instructions

First connect the equipment to the circuit of the cooling water. Switch on the Main Switch located on the front panel of the equipment. **NOTICE:** It is forbidden to use the Mash Bath without filling it with water. It could cause device destruction and staff injury. The way of filling the Mash Bath with water is described in one of next paragraph.

Program is controlled with the help of 7 keys of the membrane keyboard which is located on the front panel of the equipment. The report about the operating condition can be observed on the 2 lines of the display.

Display and keyboard scheme:



After switching on the equipment there is CUBE name and the version of the controlling programme on the display, they disappear after a while and the first item of the Main Menu appears on the display.

How to switch on the stirrers:

Before the switching on the stirrer adjust the required speed with the help of speed change-over switch located on the front panel of the gearbox. The positions of the speed change-over switch are marked HARTONG and KONGRES. Method HARTONG - 200 speed per minute, method KONGRES-- 100 speed per minute. **NOTICE: It is forbidden to change the speed when the stirrers work!**

Switch on mixing after the speed has been adjusted. Press the key F1 on the membrane keyboard to switch on or to switch off of mixing. The only task of the F1 key is switching on and switching off the stirrers.

After the end of the measurement switch off the Main Switch and shut the cooling water supply (into the equipment) with the closing valve.

The control is based on several menus. One can change the single items of the menus with the help of the key ROTATION. It is possible to rotate just in one direction. Any activity can be interrupted by pressing the key **OFF.**

Control algorithms

The following control algorithms KONGRES, HARTONG, ASBC, THERMOSTAT, PROFILE can be run with the Mash Bath. The control algorithms can be switched on after pressing the key ON and or switched off after pressing the key OFF. After expiry of the technological algorithm or of some certain action the acoustic signalization starts hooting and the optical signalization starts blinking. After pressing any key (except for the key OFF and F1) the acoustic signalization stops hooting and the optical signalization stops blinking. After pressing key OFF the control technological algorithm may be completely interrupted and you are back in the Main Menu. During the process the following information are automatically displayed on the display.

1. line:

Information about the running technological algorithm. If the equipment is in the phase of balancing to the working temperature, the required temperature is also displayed.

2. line:

Information about time given in minutes: seconds and instantaneous real working temperature. The time may be cleared several times during algorithm.

Fall Out Loss of Electrical Energy during the running of the control algorithm:
After renewal of electric power supply the real remparature is compared with the required temperature. If the difference between the above mentioned temperatures does not exceed the value adjusted in item **Power off** in menu hysteresis, the algorithm will run further after renewal of electric power supply. If the difference between the above mentioned temperatures exceeds the value set in item **Power off** in menu hysteresis, the algorithm is interrupted after renewal of electric power supply. After pressing key **OFF** the Main Menu is displayed on the display:

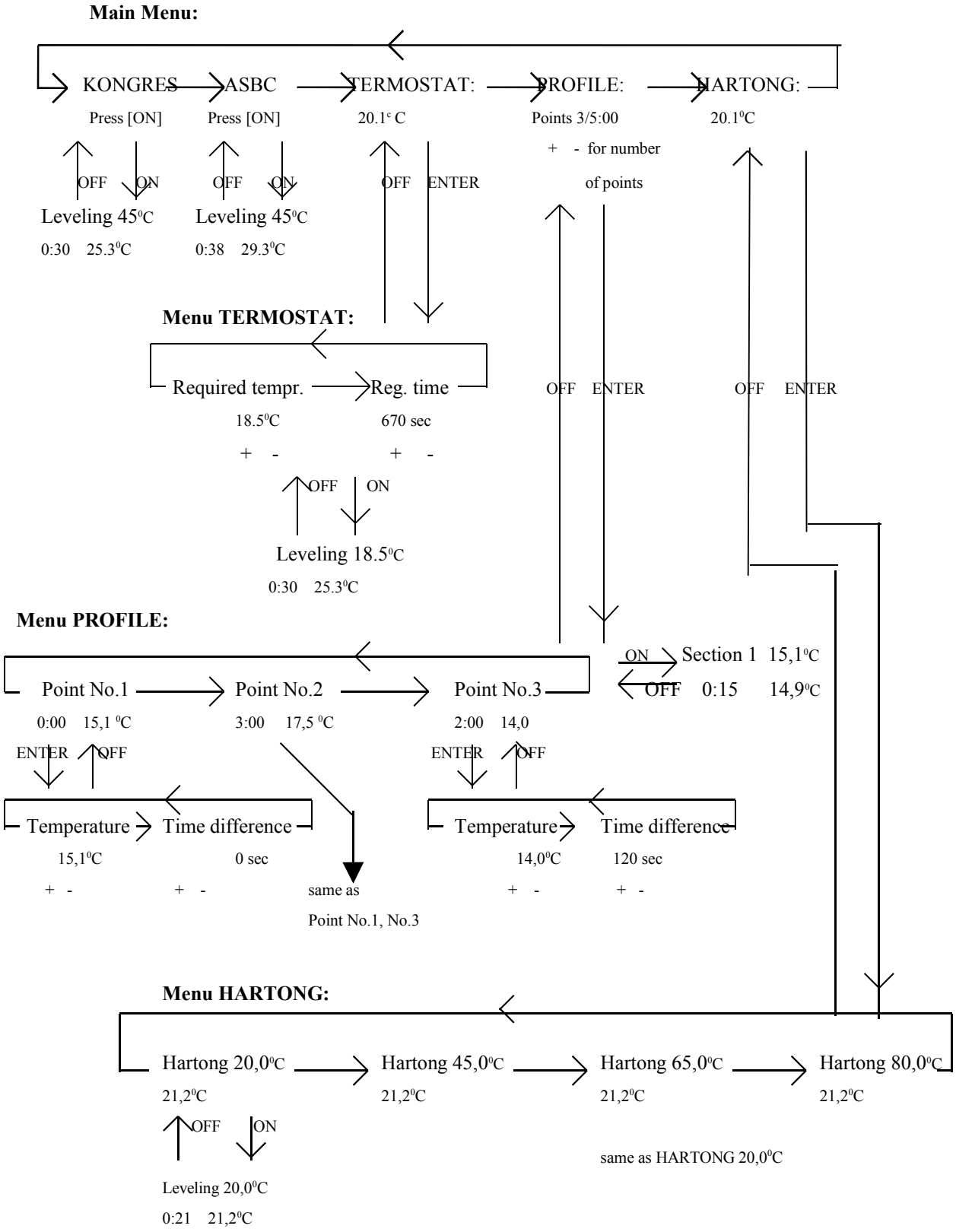
Notice: Pre-adjusted value **Power off is** 3°C.

Adjustment of the required temperature or time:

The required temperature or time in the methods (menu) THERMOSTAT a PROFILE are adjusted by pressing keys plus + (to increase the value) or minus – (to decrease the value). First the required value is changed of tenths of degree or 1 seconds, after ten changes (ten presses of key) the required value is changed of degrees or 10 seconds, after ten following changes (ten presses of key) the required value is changed of 10 degrees or 100 seconds etc.

Scheme of menu

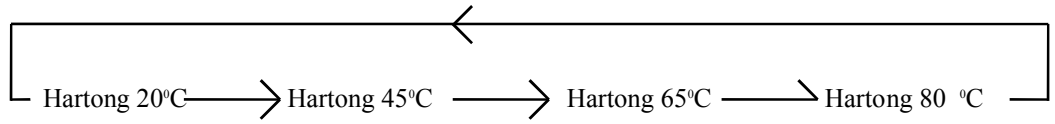
One can change the single items of the menus with the help of the key ROTATION.



Method Kongres:

After choice of the item KONGRES in the main menu one can start the algorithm itself by pressing the key **ON**. After reaching the temperature 45 degrees Celsius the acoustic signalization starts hooting. After pressing any key (except for the key OFF and F1) the acoustic signalization stops hooting and one can start the algorithm itself by pressing the key **ON**. While the technologic algorithm runs the defined instants are signalized by acoustic alarm. After pressing any key the acoustic signalization stops hooting but it is not reccommended to press key **OFF** because the algorithm would be finished. After the expiry of the prescribed technological algorithm the temperature is maintained at the value that is adjusted in menu „Configuration“ in item **Final tempr.** (pre-adjusted value is 18,9°C). The temperature is maintained till pressing the key **OFF** which definetely finishes the algorithm.

Method Hartong:



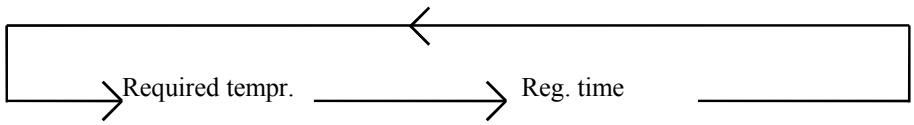
One of the items of the menu Hartong is displayed in the upper part of the diplay, the instantaneous temperature is displayed in the lower part of the display which can help to check the right activity of the temperature sensor.

- the single items of the menu Hartong can be changed with the help of the key ROTATION

- the control algorithms (Hartong 20°C, Hartong 45°C, Hartong 65°C a Hartong 80°C) can be found under the single items, the algorithms can be started with the key **ON** and after start it runs automatically

After reaching the required temperature (20, 45, 65, or 80 degrees Celsius) the acoustic signalization starts hooting. After pressing any key (except for the key OFF and F1) the acoustic signalization stops hooting and one can start the algorithm itself by pressing the key **ON**. While the technologic algorithm runs the defined instants are signalized by acoustic alarm. . After pressing any key the acoustic signalization stops hooting but it is not reccommended to press key **OFF** because the algorithm would be finished. After the expiry of the prescribed technological algorithm the temperature is maintained at the value that is adjusted in menu „Configuration“ in item **Final tempr.** (pre-adjusted value is 18,9°C). The temperature is maintained till pressing the key **OFF** which definetely finishes the algorithm.

Method Thermostat:



This algorithm allows to adjust any required temperature and the Mash Bath maintains the temperature for the required time (Reg. time).

One of the items of the menu Termostat is displayed in the upper part of the diplay, the instantaneous temperature is displayed in the lower part of the display which can help to check the right activity of the temperature sensor.

- the single items of the menu Termostat can be changed with the help of the key ROTATION
- Adjust the required temperature in the item **Required tempr**. by pressing keys plus + (to increase the value) or minus – (to decrease the value)
- Adjust the required temperature in the item **Reg. time** by pressing keys plus + (to increase the value) or minus – (to decrease the value)
- start the algorithms with the key **ON**

Method PROFILE:

This algorithm allows to adjust any required time behaviour of temperatures. It is possible to adjust as many as 15 points determined with time and temperature coordinates. The number of points that are required to be adjusted can be adjusted by pressing keys plus + (to increase the value) or minus – (to decrease the value) in the item PROFILE of the Main Menu:

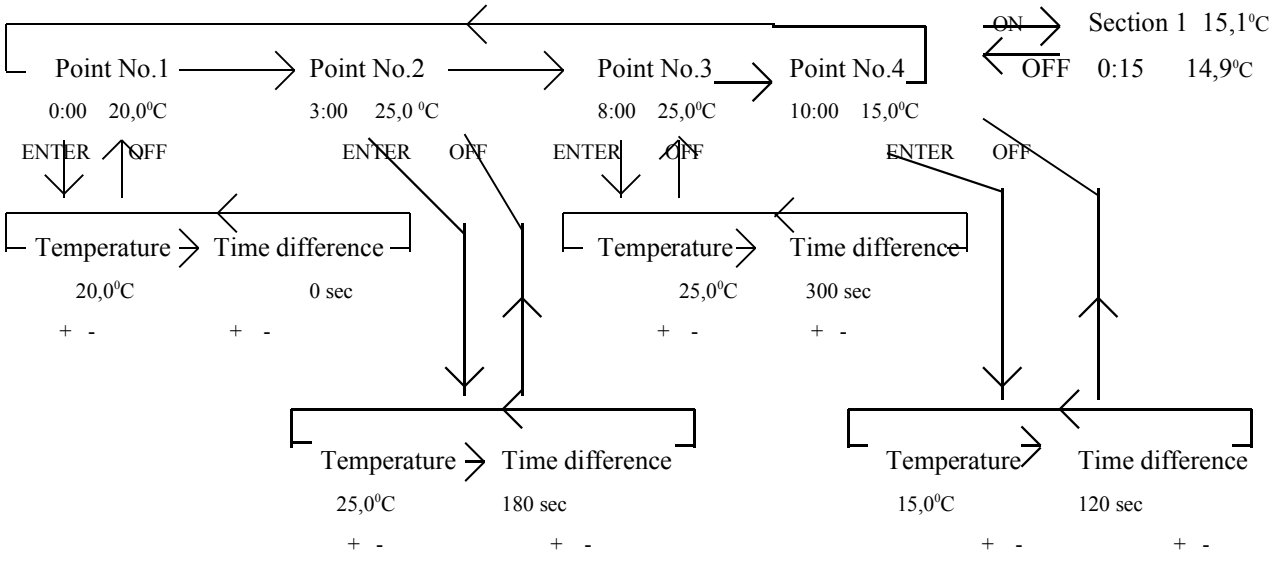
PROFILE:

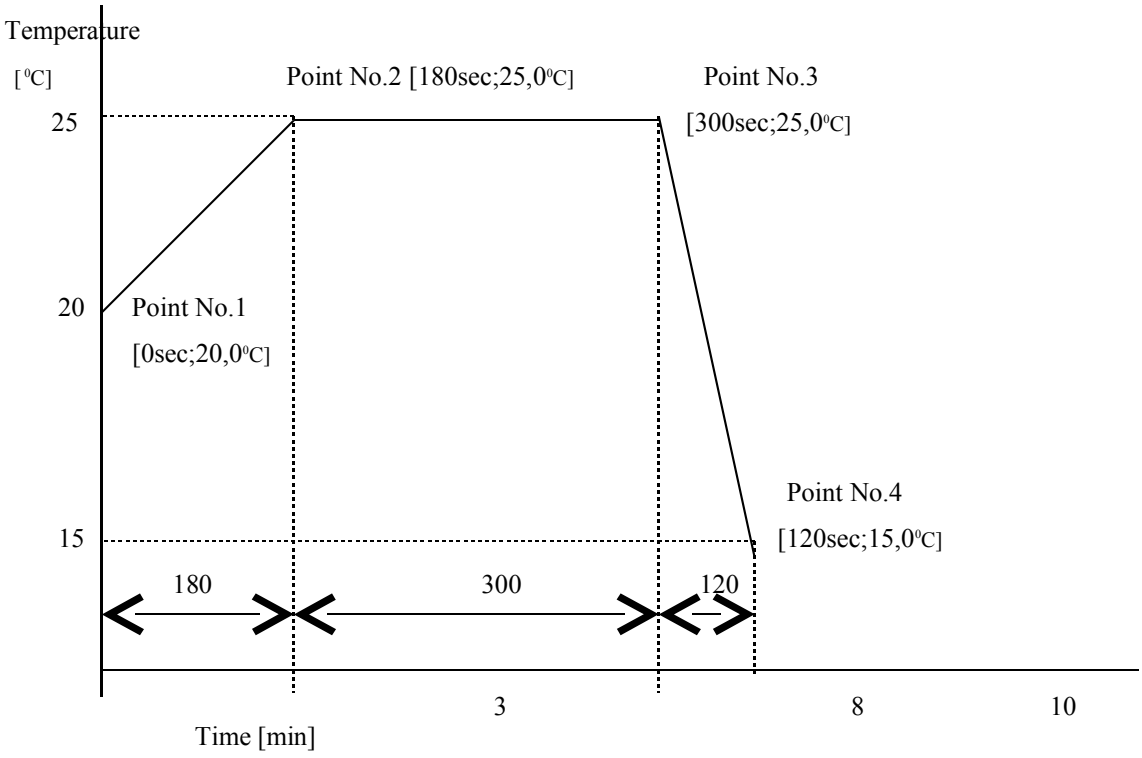
Points 4 / 10:00

Number of adjusted points total time of regulation in minutes

Example of the method PROFILE adjustment for 4 points and total time of regulation for 10 minutes

The algoritm is started with the key **ON**

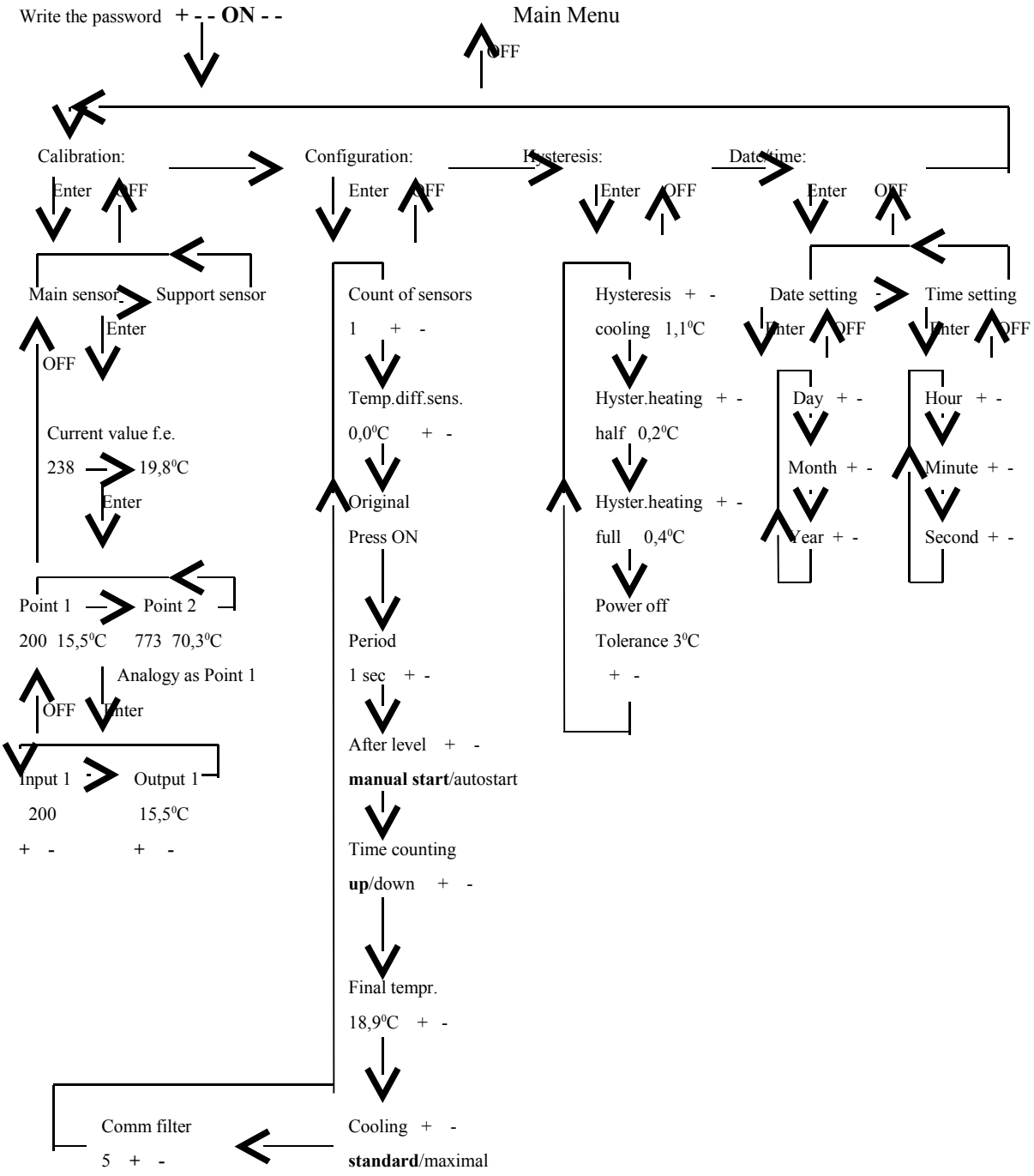




6.0 How to adjust the parametres of regulation:

Parametres of regulation, date and time, pitch of acoustic signalization, period of temperature sampling etc. can be adjusted in the menu of adjustment. The temperature sensor is also calibrated in this menu. **All these parametres with the optimal values are pre-adjusted and it is not reccommended to change them!!!!** One can adjust the parametres of the regulation after giving the password. Give the password in the Main Menu in the items HARTONG or THERMOSTAT. After giving the password (with pressing keys **+ - - ON - -**), you will be transfered into one of the items in the menu of adjustment. The single items of the menu can be changed with the help of the key ROTATION. There are sub-menus under the single items that can be opened by pressing the key **ENTER.**

Scheme of the menu of adjustment:

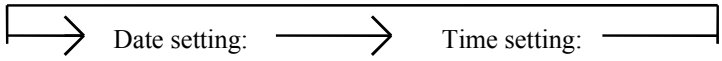


Menu hysteresis:

- Menu Change - hysteris consists of the items: **Power off**.....……....adjusted to 3°C
  Hysteresis cooling..... adjusted to 1,1°C
  Hysteresis heating half… adjusted to 0,2°C
  Hysteresis heating full.... adjusted to 0,4°C

- the single items of the menu can be changed with the help of the key ROTATION
- Adjust the required value by pressing keys plus + (to increase the value) or minus – (to decrease the value)
- leave the menu and safe the new adjusted values by pressing key **OFF**

Menu Date/time:



- For adjustment the **date and time**
- There is an internal watch in the microcomputer
- the single items of the menu can be changed with the help of the key ROTATION
- There are sub-menus under the items **Date setting:, Time setting:** that can be opened by pressing the key **ENTER.**
- Menu **Date setting:** consists of the items **Year, Month, Day** that can be changed with the help of the key ROTATION
- the required value can be adjusted by pressing keys plus + (to increase the value) or minus – (to decrease the value)
- Menu **Time setting:** consists of the items **Hour, Minute, Second** that can be changed with the help of the key ROTATION
- the required value can be adjusted by pressing keys plus + (to increase the value) or minus – (to decrease the value)
- leave the menu and safe the new adjusted values by pressing key **OFF**

The adjustment of the sensors:

It is reccommended to check the accuracy of the temeprature measurement with the help of the temperature etalon always after 3 months. If the temperature of the bath doesn‘t correspond to the tempearature of the etalon, it is necessary to calibrate the temperature sensor. The temperature sensor shall be calibrated only if it is really necessary because it is calibrated in the optimal way by the manufacturer.

Calibration:

It is necessary to calibrate two temperatures for the right measurement of the Mash Bath. The lower temperature has to be set in the range from 5 degrees Celsius to 20 degrees Celsius and the upper temperature has to be set in the range from 65 degrees Celsius to 80 degrees Celsius.

Calibration of the lower temperature:

First check that the temperature in bath is between 5 degrees Celsius and 20 degrees Celsius.

1) Set the password +- - ON - - in the main menu and now you on one item in the Menu of adjustment
2) Press the key „Rotation“ till you have the menu Calibration Menu on the display
3) Press the key „Enter“ to activate the Calibration Menu
4) Press the key „Rotation“ to choose calibration of of the Main Sensor or Support sensor. Choose the Main Sensor and press the key „Enter“ to confirm the choice
5) There is the current temperature (output) on the display for a second and then there is also corresponding digital value (input). Write down the digital value (input).
6) Now either Point 1 or Point 2 is on the upper line of the display and the digital value of temperature with corresponding temperature in degrees Celsius is on the on the lower line of the display. You can switch over between Point 1 and Point 2 with the key „Rotation“. Choose the Point 1 and press the key „Enter“ to confirm the choice
7) Now either Input 1 or Output 1 is on the upper line of the display and the corresponding values are on the on the lower line of the display. You can switch over between Input 1 and Output 1 with the key „Rotation“. Set (with the help of keys PLUS and MINUS) the Input value (it is the value you have written down – see point 5) and (with the help of keys PLUS and MINUS) set the Output value (it is the value you have measured using an external calibrated thermometer in the Bath)
8) Press the key „OFF“ three times

The lower temperature is calibrated now

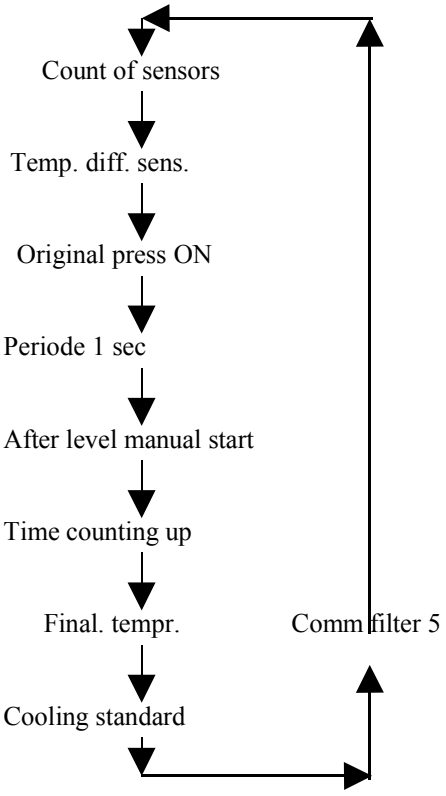
Calibration of the upper temperature:

First heat up the Mash Bath for some temperature in the range from 65 degrees Celsius to 80 degrees Celsius. You heat it up using f.e. Hartong 65 C.

1) Set the password +- - ON - - in the main menu and now you on one item in the Menu of adjustment
2) Press the key „Rotation“ till you have the menu Calibration Menu on the display
3) Press the key „Enter“ to activate the Calibration Menu
4) Press the key „Rotation“ to choose calibration of of the Main Sensor or Support sensor. Choose the Main Sensor and press the key „Enter“ to confirm the choice
5) There is the current temperature (output) on the display for a second and then there is also corresponding digital value (input). Write down the digital value (input).
6) Now either Point 1 or Point 2 is on the upper line of the display and the digital value of temperature with corresponding temperature in degrees Celsius is on the on the lower line of the display. You can switch over between Point 1 and Point 2 with the key „Rotation“. Choose the Point 1 and press the key „Enter“ to confirm the choice
7) Now either Input 2 or Output 2 is on the upper line of the display and the corresponding values are on the on the lower line of the display. You can switch over between Input 2 and Output 2 with the key „Rotation“. Set (with the help of keys PLUS and MINUS) the Input value (it is the value you have written down – see point 5) and (with the help of keys PLUS and MINUS) set the Output value (set the value you have measured using an external calibrated thermometer but first deduct 1.8 degrees Celsius from the value you have measured using an external calibrated thermometer). We set the deducted value because the temperature in the beakers for mash is for about 1.5
- 2 degrees lower than in the bath of the Mash Bath itself. The reason for that is that the walls of the beakers for mash absorb some temperature.
9) Press the key „OFF“ three times

The upper temperature is calibrated now

Menu Configuration:



- the single items of the menu can be changed with the help of the key ROTATION

Period:

- For adjustment the period of measurement of the temperature during the single algorithms
- the required value can be adjusted by pressing keys plus + (to increase the value) or minus – (to decrease the value)
- leave the menu and safe the new adjusted values by pressing key **OFF**
- **Pre-adjusted value is 1 sec. It is not reccommended to change this value!!!!**

After level manual start:

- For adjustment of the methods of the single algorithms

It is possible to choose between

After level manual start: After reaching the required temperature it is necessary to press key ON to start the algorithm

After level autostart: After reaching the required temperature the algorithm starts to run automatically (it is not necessary to press key ON to start the algorithm)

- the single items of the menu can be changed with the help of the keys + or –
- The item displayed on the display is active
- leave the menu and safe the new adjusted values by pressing key **OFF**
- **Pre-adjusted value is After level manual start:**

Time counting:

- For adjustment of the methods of the single algorithms

It is possible to choose between

- **Time counting down:** After reaching the required temperature, time is adjusted to the required value (according to algorithm) and then it is deducted to zero
- **Time counting up:** After reaching the required temperature, time is set to zero and then it is added to required value

- the single items of the menu can be changed with the help of the keys + or –
- The item displayed on the display is active
- leave the menu and safe the new adjusted values by pressing key **OFF**
- **Pre-adjusted value is Time counting up**

Final tempr:

- For adjustment of the final temperature (the temperature that Mash Bath after the end of KONGRES, HARTONG and other algorithms are cooled down for)
- the single items of the menu can be changed with the help of the keys + or -
- leave the menu and safe the new adjusted values by pressing key **OFF**
- **Pre-adjusted value is** 18.9^0C

Cooling:

- For adjustment of the speed of cooling down of the final temperature

It is possible to choose between

- **Cooling standard:** Cooling down with the standard speed
- **Cooling maximal:** Cooling down with the maximum speed (Elektromagnetic valve is open)

- the single items of the menu can be changed with the help of the keys + or –
- The item displayed on the display is active
- leave the menu and safe the new adjusted values by pressing key **OFF**

- **Pre-adjusted value is Cooling standard:**

Comm filter:

- For adjustment of the time interval for transfer of the temperatures from the Mash Bath into the PC with the help of RS 232 line
- the single items of the menu can be changed with the help of the keys + or -
- leave the menu and safe the new adjusted values by pressing key **OFF**
- Pre-adjusted value is 5 sec. It means that the data are transfered into the PC every 5 sec.

Count of sensors:

- For adjustment of the sensors number.
- If there is only main sensor in the bath, the number of the sensors is 1.
- If there is except for the main sensor in the bath also one accessory sensor for measurement of the temperature in the beaker for the mash, then the number of the sensors is 2.
- the single items of the menu can be changed with the help of the keys + or -
- leave the menu and safe the new adjusted values by pressing key **OFF**
- Pre-adjusted value has to be **Count of sensors 1**

Monitoring- Transfer of the data into PC:

Mash Bath can work itself without connection to PC. In addition the Mash Bath can transfer the data describing the course of the test (time, real temperature and required temperature) into PC with the help of the connecting cable RS232. Before the first data transfer from the equipment into PC the operator must install software from our supplied floppy disk.

Installation of the software

1) Insert enclosed floppy disk into computer driver
2) Type text: **A:INSTAL** on the keyboard

The communicating program will be installed automatically into the directory C:\RMUT

Transfer of data from the equipment to PC

1) Switch off both the equipment and PC
2) Connect the PC and the Mash Bath with the help of the supplied communicating cable. The Mash Bath has the connector marked as RS232 for connection on its front panel and the PC has the port marked as COM1 or COM2 on its back panel
3) Switch on the PC and the Mash Bath
4) You can start the required method KONGRES, HARTONG, ASBC, or THERMOSTAT
5) Type name of the communicating program RMUTCOM 1 15 in the directory C:\RMUT. **Note:** RMUTCOM 1 15= number 1 behind the word RMUTCOM means number of COM port of the computer that is connected to Mash bath (i.e. this number can be only 1 or 2). Number 15 means maximal period (in seconds) for transfer of the data from the Mash Bath into PC. If the data aren't transfered within the stated period the connection will be automatically disconnected. The period must exceed the period **Comm filter** adjusted in menu Configuration of the Mash Bath. The example given above is all right because 15sec >5sec, when the method is over and switched off (by pressing key **OFF**) the communication between PC and Mash Bath will be also interupted (within the period stated in **Comm filter** adjusted in menu Configuration (in our case 5 sec), the data will be automatically saved.
   The file is always saved in the directory C:\RMUT with the date and time when the communication has been started
   Note: file saved as 01111052.TXT means the communication started at 10:52a.m. on the 11th January (the first two numbers mean month, the second two numbers mean day, the third two numbers mean hour, the fourth two numbers mean minute).
6) Switch off the Mash Bath and PC before disconnection if they are not switched off during disconnection they can be damaged!!!

7. Filling the Mash Bath with water

There is electromagnetic valve located on the inlet piping – the electromagnetic valve is closed during the stillstand (without supply voltage) and it prevents filling the Mash Bath with water. The valve opens when it is necessary to cool down the water bath of the Mash Bath (for example method KONGRES – cooling down from temperature 70^0C to temperature 20^0C, single methods of the method HARTONG or cooling down for method THERMOSTAT). The method THERMOSTAT can be used for filling the Mash Bath with water – just adjust temperature lower then real temperature. Filling the Mash Bath with water can be interrupted by pressing the key **OFF**.

8. Important warnings:

Do not switch on algorithms HARTONG, KONGRES and the heating elements when the Mash Bath is not filled with water. It could cause device destruction and staff injury. Always fill the Mash Bath with water before you start work.

Let the Mash Bath rest at room temperature for 5 hours before switching on if the equipment has been transported at freezing point.

Single electric elements of the Mash Bath are protected with tube fusible cut-out that are located on the common panel together with microcomputer inside the Mash Bath. The fuses are located on the back panel of the Mash Bath. It is forbidden to replace the fuse by fuse with different value than the value indicated on the equipment.

Service:

For service contact the manufacturer: 1-CUBE, Hamry 3567, 580 01 Havl.Brod, Czech Rep.
tel. 00 420- 569 433 620
fax.00 420-569 422 144
1-cube@1-cube.com

NOTICE: It is forbidden for anyone except for the manufacturer or authorized company to repair the apparatus.

At the end of the apparatus life we recommend that it is according to corresponding waste categorization.

Take the metallic parts made of iron, brass, plastic elements and packing material to the separated collection as a secondary raw material. You can also order the apparatus liquidation at the above mentioned company that ensures the liquidation of the waste according to Waste Act.