User Manual

Water Bath
with Timer

MWB

5/ 10/ 20/ 30/ 40/ 55/ 80

Quality in Laboratory Technology from Saxony

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Safety Instructions

The device has been produced after the valid rules of technology. It was tested extensively before leaving the production and has left the work in safety technical and function-technical faultless condition. To guarantee safe and faultless application, the user has to take the following notes and the existing regulations for accident prevention into account.

1. The device may be used for the applications confirmed by the manufacturer. Other applications should be checked back with the manufacturer.

2. Packing was carried out with greatest care to make sure that damage by transport and storage is avoided. Upon receipt both packing and device have to be checked for damages. If such damages should be noticed, please advise the manufacturer.

3. Connection and inauguration of the device has to be carried out by qualified staff. The operating instructions have to be studied carefully before putting the device into operation.

4. The operating instructions should be kept at a place accessibly for everyone.

5. The staff for the operation, maintenance and inspection of the device must show the corresponding qualification for this work. The operator is responsible for instructing his staff. He has to take care that everybody knows and understands the contents of the user manual.

6. Service and maintenance have to be carried out by qualified staff only. The device has to be separated from the mains voltage before opening. Having completed the operations and before activating the device all safety precautions have to be checked. Any modification of the device is forbidden. Spare parts have to be decontrolled by the manufacturer.

Any disregard of the safety regulations leads to the loss of warranty claim and claim for damages.

1.   Application

Our water baths are to temper liquids for example in test-tubes, glasses, flasks or other containers. The devices guarantee a careful heating up and best temperature permanence. With the use of a flat cover (accessory), round-bottomed flasks can be inserted as well for evaporation processes. Water bath coverings are available. The different accessories offered extend the possible applications of the device.

2.   Operational Safety

All water baths are constructed for permanent operation under laboratory conditions.
The water baths meet the safety-related requirements following:

> **DIN 12876**   Electrical laboratory devices – Laboratory circulators and baths
> The water baths correspond to the class 1 following DIN 12876-1 and
> are to be operated **with inflammable thermostat liquids only**.

> **DIN EN 61010-1**   Safety requirements for electrical equipment, control and laboratory use

- Environmental conditions between 1º C and +40º C do not affect function and safety of the device.
- The device is to be attached to an earthed socket only. Please pay attention to the details on the identification plate.
- Convince yourself that a sufficient volume of liquid is in the bath before you switch it on.
- Do not transport the water bath with heated liquid inside.
- Cool down the liquid before drain.
- Do not run the device in areas with potentially explosive atmosphere.
- Interruption of the protective ground can make the device dangerous.
- Maintenance and repair work of the device standing under voltage are forbidden.
- All encroachments have to be executed by specialist staff only considering appropriate regulations.
- Please use the fuses described by the manufacturer. Short circuit of the fuse holder is forbidden.

Attention: You should not run the device if strong damages are visible.

3.   Unpack and Check

After unpacking the water bath and the accessories the scope of delivery has to be checked with the delivery note enclosed. In case of damages in transit please inform the carrier responsible to place a damage protocol if necessary.

4. Technical Data

		MWB2	MWB5	MWB10	MWB20	MWB40	MWB80
Allow.environ. temp.:	°C	1 ... 40	1 ... 40	1 ... 40	1 ... 40	1 ... 40	1 ... 40
Temp. range:	°C	25 ... 100	25 ... 100	25 ... 100	25 ... 100	25 ... 100	25 ... 100
Temp. constancy:	K	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Temp. homogenity:	K	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0,5
Heating time (20°C-70°C):	min/l	< 7.8	< 4.5	< 2.8	< 1.8	< 1.8	< 1,6
Heat emission:	Wh	< 35	< 65	< 80	< 100	< 115	< 125
Heat output:	W	700	1000	1600	2000	2600	2600
Power supply:	V,Hz	230,50/60	230,50/60	230,50/60	230,50/60	230,50/60	230,50/60
Bath volume:	l	1-2	2-5	4-10	5-20	15-35	20-80
Bath opening:	mm			Ø = 130			
Opening w. inclined cover	mm	215*230	390*230	455*230	845*230	620*420	
Depth of bath:	mm	120	120	120	170	170	300
Measurements: WxDxH	cm	23*24*22	32*34*26	49*34*26	57*34*31	94*33*29	73*53*45
Weight (without liquid):	kg	app. 5	app. 7,5	app. 10	app. 12.5	app. 21	app. 33

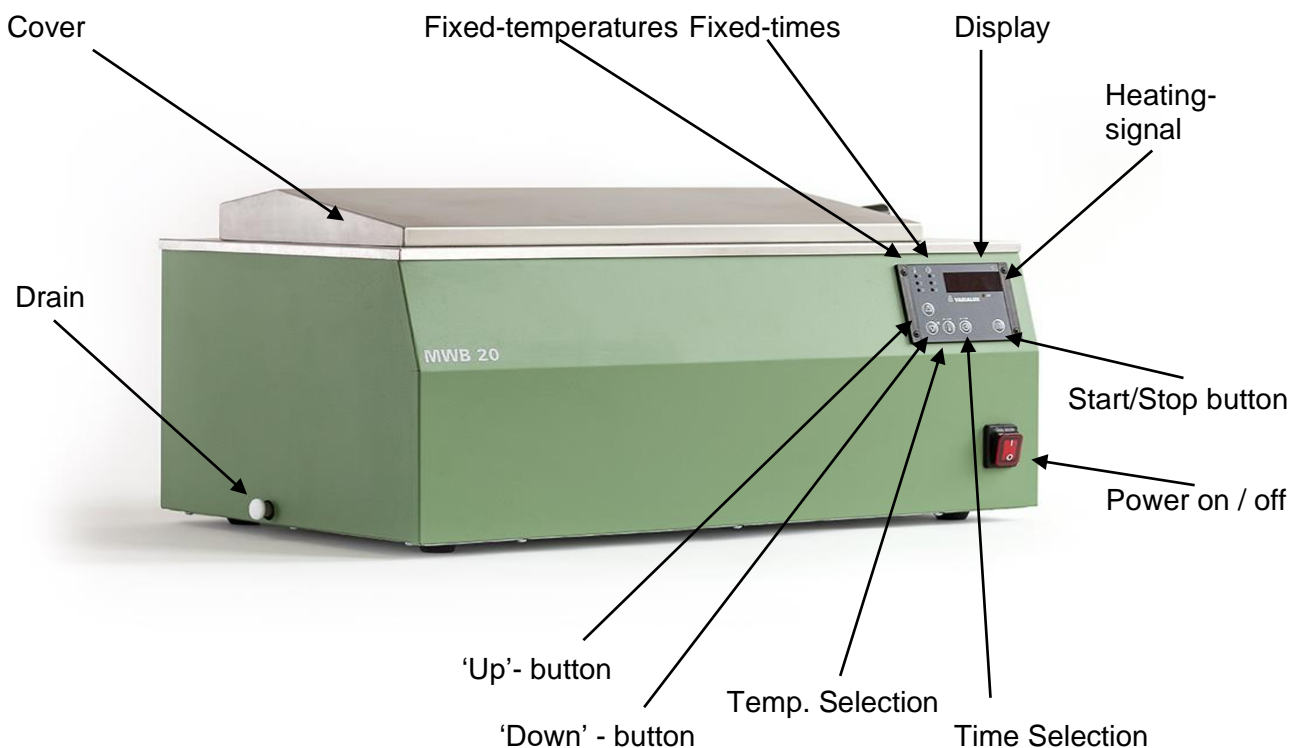|	
Temperature display:	LED, digital
Thermostat:	micro-processor-controlled PID-regulator, three fixed-temperatures adjustable, unproblematic shift, adjustable lower and upper set point limiting, adjustable button interlocking, set point limiting alarm visual and/or acoustic, alarm-setting can be disabled, alarm caused by thermistor can not be disabled, temperature measurement in Celsius or Fahrenheit
Timer	three predefined times adjustable, unproblematic shift, running-times up to 99,99 minutes are adjustable
Safety function	protection against 'running dry' is integrated
Emptying:	with seal screw or drain cock (accessory)

5.   Description

The water baths are produced double walled with intermediary insulation. Bath container and bath cover are made of stainless steel, the housing consists of coated steel sheet.
MWB 2 has a round opening of 130mm, closing with a cover. Covering with a set of water bath rings is possible. Water baths MWB 5-80 are delivered with an inclined cover. Flat covers with a different number of holes and adequate water bath rings are available as accessory. The heater at the bottom of the bath is covered with a perforated plate.
An electronic PID-controller with digital temperature setting guarantees high temperature stability. Automatic temperature monitoring is possible with the timer installed. After course of the time set, a signal is given by the timer - the water bath will keep the temperature further on.
The protection against 'running dry' integrated in the radiator cannot be adjusted. It will switch off the heater. The water bath can be switched on again after refilling liquid and a few minutes waiting time.

Note: The device ist classified to safety class 1. This allows unattended operation in combination with not inflammable liquids.

Cover   Fixed-temperatures Fixed-times   Display

Heating-signal

Drain

Start/Stop button

Power on / off

'Up'- button

Temp. Selection

'Down' - button

Time Selection

6.   Putting into operation / Emptying

- place the water bath safely against overturning
- fill up the bath with distilled or decalcified water up 20 mm over the radiator at minimum
- do not use any inflammable liquid!
- connect the device to a power supply and switch power 'on'
- set the values desired (see 7.) for your application
- Before emptying the liquid should cool down. Remove drain screw or open drain cock to start water, run out

7. Operation

7.1. Operation with presetted parameters (first operation level)

The operation with presetted parameters, named first control-level, allows the operation with the three preadjusted temperature and time values.

Parameter	Function description	Range of Adjustment	Presettings
S1, S2, S3	Temperature setpoints (the current setpoint selected is indicated and/or adjusted)	0,0°C ... 100°C	10.0°C 10.0 °C 10.0 °C
T1, T2, T3	Timer setpoints (the current setpoint selected is indicated and/or adjusted)	0:00 … 99:99 min.	5:00 min. 10:00 min. 15:00 min.

Adjustment options

Key: UP
Pressing this key you can increase the parameter or parameter value or scroll the parameter list.

Key: DOWN
Pressing this key you can decrease the parameter or parameter value or scroll the parameter list. In case of alarm the buzzer function can be switched off with this key.

Key: selection of temperature setpoint
With this key the temperature setpoint can be selected. If - previously - the timer display is or has been active, the controller switches to temperature display with first key pressing.

Key: selection of timer setpoint
With this key the time setpoint relevant for the timer is selected. If - previously - the temperature display is or has been active, the controller switches to timer display with first key pressing.

Key: START/STOP
With this key the selected heating time is started. The display indicates the remaining time. After course of time set the timer gives a signal for 5 seconds. The timer can be switched off with the DOWN key. The elapsing timer has no influence on regulation - the temperature will be hold.
After any restart of the timer, it can be cancelled by pressing the key for at least 2 seconds.
With 'parameter settings' the remaining time displayed can be suppressed. In this case the display switches to temperature display after 3 seconds and the LED of the timer flashes to indicate that it is activated.

7.2. Adjustment of the control parameters (second operation level)

For special applications, some parameters can be adjusted by the operator.
It is strongly recommended by the manufacturer, that these special adjustments should be done by specialist staff only to avoid malfunctions.

The one-finger-setup of the setpoint adjustment requires an exactly simultaneous pressing of the UP and DOWN key for at least 4 seconds to open a parameter list containing the control parameters. (If the setpoint adjustment failed a new attempt is possible after 5 seconds.) With the UP and DOWN keys the list of parameters can be scrolled in both directions. Pressing key 3 will give you the value of the respective parameter. Pressing also the UP or DOWN key at the same time the value can be adjusted. The return to the initial position takes place automatically if no key has been pressed for 60 seconds.

Para-meter	Function description	Range of Adjustment	Presettings	Remark
P1 ... P3				**do not adjust**
P4	Control range limitation – minimum setpoint	-99.9...P5°C	0.0°C	
P5	Control range limitation – maximum setpoint	P4...999.9°C	100°C	
P7	Proportional band	1...100 K	3, 4, **5**, 6, 7 **K**	
P8	Reset time Tn (I-factor)	0...999 sec. (0 sec. = inactive)	0 sec.	**do not adjust**
P9	Lead time Tv (D-factor)	0...999 sec. (0 sec. = inactive)	0 sec.	**do not adjust**
P10			.	**do not adjust**
P19	Key-lock	0: no key-lock 1: key-lock	0	
P20				**do not adjust**
P21	Actual value correction sensor F1	-20...20.0 K	0,0 K	**calibration**
P30	Lower alarm value	-99,9°C/K...P31	0,0 °C	
P31	Upper alarm value	P30...999 °C/K	+100 °C	
P32 ... 40				**do not adjust**

Parameter description:

P1 ... P3   do not adjust
P4:   Control range limitation – minimum setpoint
P5:   Control range limitation – maximum setpoint
The adjustment range of the setpoint can be limited in both directions.

P7   Proportion range at PID regulation
With approximation of the actual value to the setpoint value the variable is reduced linearly from +-100% to 0%. The regulators are adjusted to work optimally with 70°C. If the application temperature deviates relevantly the controller can be adjusted as necessary.
Temperature below 70°C -   increase parameter P7 / temperature over 70°C -   decrease parameter P7.

P8   Reset time Tn (Integral-portion)
P9   Lead time Tv (Differential-portion)
The normal proportion-controller works with fix deviation of the actual value from the setpoint. The integral

portion provides a complete compensation of this deviation. The reset-time is a measure for the period of time needed to adjust a remaining temperature deviation of the size of the proportional range.

P10   do not adjust
P19   Key-lock
The key-lock allows blocking of the control keys. In locked condition parameter adjustments with keys are not possible. During the attempt to adjust the parameters despite key-lock the message "===" appears in the display.

P20   do not adjust
P21: Actual value correction
This parameter allows the correction of actual value deviations caused for example by sensor tolerances or extremely long sensor lines. The regulation measure value is increased or decreased by the here adjusted value.

P30   Lower alarm value
P31   Upper alarm value
For the alarm contact an upper and lower boundary value can be adjusted.
Obove or below the values setted the controller will not give an alarm signal.

P32 ... P40 do not adjust

7.3   Third operation level

Attention: The following control parameters are adjustable with support of the manufacturer only. Please get in touch if necessary!

Access to the third control level is granted when selecting the last P-parameter on the second control level. Continue pressing the UP key for approximately 10 seconds until "PA" appears. Continue pressing the UP key and additionally press the DOWN key for about 4 seconds and the first A-parameter of the third control level is indicated.
With the keys UP and DOWN you can scroll the list in both directions. Pressing key 3 will give you the value of the respective parameter. By pressing the UP or DOWN key at the same time the value can be adjusted.
The return to the initial position takes place automatically, if no key has been pressed for 60 seconds, or by simultaneously pressing the UP and DOWN key for approx. 4 seconds.

Para-meter	Function description	Range of Adjustment	Standard setting	Custom setting
A1 ... A6				**do not adjust**
A8	Display mode	0: integrals 1: resolution 0.5 K	0	
A9	Remaining time display	0: Remaining time no display 1: Remaining time display	1	
A19 ... A30				**do not adjust**
A31	Special function at boundary alarm	4: flashing display buzzer active	4	
A32 ... A41				**do not adjust**

A56	Alarm suppression after "mains on" / "standby-on"	0…999 min.	30 min.	
A60 ... A70				**do not adjust**
A80	Temperature scale	0: Fahrenheit ("AUS") 1: Celsius ("AUS")	1	
A87 ... A91				**do not adjust**
Pro	Program version			

Parameter description:

Attention: The adjustment of the following parameters can change the equipment characteristics and is therefore to be set with utmost care.

A1 ... A6   do not adjust

The switch mode for the relays, i.e. cooling or heating function, can be programmed independently. Heating function means that the contact opens as soon as the setpoint is reached, thus power interruption. At cooling function the contact closes, if the actual value is above the required setpoint.

A8   Display mode

The value can be indicated in integrals or with decimals. In general, all parameter indications are presented with decimals.

A9   Remaining time display

A19 ... A30   do not adjust

A31   Special function at boundary or alarm

In the case of an alarm with this parameter it can be selected, whether the indication to flash and/or the buzzer is to start. Sensor alarm is indicated independently by a flashing display and the buzzer.

A32 ... A41   do not adjust

A56   Alarm suppression after "mains-On" and/or "Standby-On"

This parameter allows a switch-on delay of the alarm contact after switching on the mains voltage or standby. This delay corresponds with the time set here.

A60 ... A70   do not adjust

A80:   Temperature scale

The display can be switched between Fahrenheit and Celsius. At conversion, the parameters and setpoints maintain their numerical value and adjustment range. (Example: A controller with the desired value of 0°C is switched to Fahrenheit. The new desired value is then interpreted as 0°F, which corresponds to a temperature of -32°C).

A87 ... A91   do not adjust

Pro:

Indication of the program version.

8. Maintenance and Repair

The water bath is maintenance-free.
To guarantee a permanent faultless function we recommend to clean the parts which are in contact with the thermostat liquids periodically. Primarily parts with warmth transfer functions like radiator and temperature sensor should be cleaned.

The temperature controller has an own error monitoring with the following meaning.

Indication	Fault cause	Error elimination
F1	Sensor error, short or open circuit at sensor F1	Check sensor
EP	Data loss at parameter memory	The controller must be repaired.
Flashing display	Boundary or range alarm (if activated, triggerd by temperature monitoring at sensor F1)	-----

Error messages are stored and can be displayed even if the fault is eliminated. Pressing the DOWN key deletes the error message.
Do not hesitate to contact our customer service if you do have any questions.

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              E-mail: info@lrt-arnsdorf.de

9. Conformity Declaration

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CE - Conformity Declaration

The Labor und Reinraumtechnik Arnsdorf GmbH declares the conformity with the adjustment of the legal provisions of the member states for the goods described with the guidelines of the advice about the CE identification.

Thermostats	**T 100, T 150, T 200, T 200K** **TC 150, TC 250, TC 250K**
Water baths	**MWB 2, MWB 5, MWB 10** **MWB 20, MWB 40, MWB 80**
Shaking Water baths	**MSB 21**

For the evaluations of the products with regard to electromagnetic compatibility the following norms were consulted:

DIN EN 61326 **Electrical equipment for measurement, control and laboratory use –EMC requirements**

For the evaluations of the products with regard to the electrical safety the following norm was consulted:

DIN EN 61010 (VDE 0411)

For the evaluations of the products with regard to her usability the following norm
was consulted.

DIN 12876 (product norm)

Arnsdorf, 06.08.2018

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