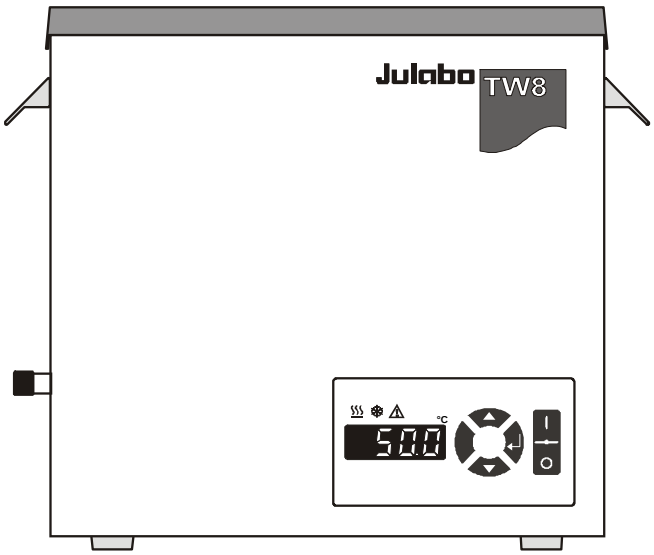
English

Operating manual

Water Baths

TW2
TW8
TW12
TW20



Julabo
THE TEMPERATURE CONTROL COMPANY

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Congratulations!

You have made an excellent choice.
JULABO thanks you for the trust you have placed in us.
This operating manual has been designed to help you gain an understanding of the operation and possible applications of our circulators. For optimal utilization of all functions, we recommend that you thoroughly study this manual prior to beginning operation.

The JULABO Quality Management System

Temperature control devices for research and industry are developed, produced, and distributed according to the requirements of ISO 9001:2008. Certificate Registration No. 01 100044846

Unpacking and inspecting

Unpack the water bath and accessories and inspect them for possible transport damage. Damage should be reported to the responsible carrier, railway, or postal authority, and a damage report should be requested. These instructions must be followed fully for us to guarantee our full support of your claim for protecting against loss from concealed damage. The form required for filing such a claim will be provided by the carrier.

1.953.6062 04/11 Printed in Germany

Important: keep operating manual for future use

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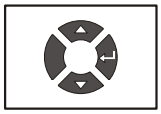
Operating manual

1. Intended use

JULABO water baths have been designed for temperature application to specific fluids in a bath tank.

	JULABO water baths are not suitable for direct temperature control of foods, semi-luxury foods and tobacco, or pharmaceutical and medical products. Direct temperature control means unprotected contact of the object with the bath medium (bath fluid).

1.1. Description



- ☑ The water baths are operated via the splash-proof keypad. The implemented microprocessor technology allows to set and to store the setpoint that can be indicated on the LED temperature display.
- ☑ The PID temperature control adapts the heat supplied to the thermal requirements of the bath.
- ☑ The water baths conforms to the relevant requirements specified by European guidelines.
- ☑ The models TW8, TW12, TW20 provide a drain screw and handles for easy relocation.

2. Operator responsibility – Safety instructions

The products of JULABO ensure safe operation when installed, operated, and maintained according to common safety regulations. This section explains the potential dangers that may arise when operating the circulator and also specifies the most important safety precautions to preclude these dangers as far as possible.

The operator is responsible for the qualification of the personnel operating the units.

- ➢ The personnel operating the units should be regularly instructed about the dangers involved with their job activities as well as measures to avert these dangers.
- ➢ Make sure all persons tasked with operating, installing, and maintaining the unit have read and understand the safety information and operating instructions.
- ➢ When using hazardous materials or materials that could become hazardous, the unit may be operated only by persons who are absolutely familiar with these materials and the unit. These persons must be fully aware of possible risks.

If you have any questions concerning the operation of your unit or the information in this manual, please contact us!

Contact

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Safety recommendations for the operator

- You received a product conceived for industrial use. Nevertheless, avoid strikes to the housing, vibrations, damages to the keypad foil (keys, display) or contamination.
- Make sure the product is regularly checked for proper condition. Regularly check (at least every 2 years) the proper condition of the mandatory, warning, prohibition and safety labels.
- Take care that the mains supply features a low impedance to avoid any negative affects on the instrument being operated in the same mains.
- This unit is designed for operation in a controlled electromagnetic environment. This means that transmitting devices (e.g. cellular phones) should not be used in the immediate vicinity. Magnetic radiation may influence other units with components susceptible to magnetic fields (e.g. a monitor). We recommend to keep a minimum distance of 1 m.
- Permissible ambient temperature: max. 40 °C, min. 5 °C.
- Permissible relative air humidity: 50 % (40 °C).
- Do not store in an aggressive atmosphere. Protect from contaminations.
- Do not expose to sunlight.

Appropriate Operation

Only qualified personnel is authorized to perform configuration, installation, maintenance and repairs of the water bath.
Routine operation can also be carried out by untrained personnel who should however be instructed by trained personnel.

Use:

Insufficient ventilation may result in the formation of explosive mixtures. Only use the unit in well ventilated areas. The unit is not for use in explosive atmosphere.

JULABO water baths have been designed for temperature application to water in a bath tank.

The bath may **not** be filled with flammable materials. Fire hazard!
Only use non-acid and non corroding bath fluids.

When using hazardous materials or materials that could become hazardous, **the operator must** affix the enclosed safety labels to the front of the unit so they are highly visible:

If this unit is intended for use within the United States of America, all 3 warning labels **must** be affixed to the housing of the unit prior to use.
Directions for the positioning of the individual warning labels are enclosed with the warning labels included in the delivery. Warning labels must be easily visible to users.

1		Warning label W00: Colors: yellow, black Danger area. Attention! Observe instructions. (operating manual, safety data sheet)
2 **or**		Mandatory label M018: Colors: blue, white Carefully read the user information prior to beginning operation. **Scope: EU**
2		Semi S1-0701 Table A1-2 #9 Carefully read the user information prior to beginning operation. **Scope: USA, NAFTA**
3	**WARNING:** This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.	Warning label Proposition 65

Particular care and attention is necessary because of the wide operating range.
There are thermal dangers:
Burn, scald, hot steam, hot parts and surfaces that can be touched.

	Warning label W26: Colors: yellow, black Hot surface warning. (The label is put on by JULABO)

2.1. Disposal

Do not dispose of the unit with household waste!
However, over the long operating period of the unit, disposal rules may change. Therefore, only qualified personnel should handle the disposal.

2.2. Technical specifications

Water Bath		TW2	TW8
Working temperature range	°C	20 ... 99,9*	20 ... 99,9*
Temperature stability		±0,2	±0,2
Temperature selection		digital	digital
Temperature indication		LED	LED
Resolution	°C	0.1	0.1
Temperature control		PID1	PID1
Heater wattage (at 230 V)	kW	1,0	2,0
Heater wattage (at 115 V)	kW	1,0	1,0
Bath opening (WxL)	cm	15x13	23x27
Bath depth	cm	11	14
Filling volume	liters	1 ... 2	3 ... 8
Overall dimensions (WxDxH) with Makrolon®-cover	cm	17x16x26 17x16x37	29x32x28 29x32x44
Weight	kg	3,5	8,5
Ambient temperature	°C	5 ... 40	5 ... 40
Mains power connection 230 V/50-60 Hz	V/ Hz	190-253 / 50-60	190-253 / 50-60
Current input (at 230 V)	A	4	8
Mains power connection 115 V/60 Hz	V/ Hz	103-127 / 50-60	103-127 / 50-60
Current input (at 115 V)	A	9	9

All measurements have been carried out at: rated voltage and frequency
operating temperature: 70 °C ambient temperature: 20 °C bath fluid: water

Technical changes without prior notification reserved.

Water Bath		TW12	TW20
Working temperature range	°C	20 ... 99,9*	20 ... 99,9*
Temperature stability		±0,2	±0,2
Temperature selection		digital	digital
Temperature indication		LED	LED
Resolution	°C	0.1	0.1
Temperature control		PID1	PID1
Heater wattage (at 230 V)	kW	2,0	2,0
Heater wattage (at 115 V)	kW	1,0	1,0
Bath opening (WxL)	cm	35x27	50x30
Bath depth	cm	14	18
Filling volume	liters	5 ... 14	8 ... 26
Overall dimensions (WxDxH) with Makrolon® -cover	cm	40x32x28 40x32x44	50x35x32 50x35x49
Weight	kg	8,9	14,2
Ambient temperature	°C	5 ... 40	5 ... 40
Mains power connection 230 V/50-60 Hz	V/ Hz	190-253 / 50-60	190-253 / 50-60
Current input (at 230 V)	A	8	8
Mains power connection 115 V/60 Hz	V/ Hz	103-127 / 50-60	103-127 / 50-60
Current input (at 115 V)	A	9	9

All measurements have been carried out at: rated voltage and frequency
operating temperature: 70 °C ambient temperature: 20 °C bath fluid: water

Technical changes without prior notification reserved.

Safety installations according to IEC 61010-2-010:

Excess temperature protection	105 °C - fixed value
Classification according to DIN 12876-1	class I
Alarm message	optical + audible (permanent)

Environmental conditions according to EN 61 010, part 1:

Use only indoor.
Altitude up to 2000 m - normal zero.
Ambient temperature: +5 ... +40 °C (for storage and transportation)
Air humidity:
Max. rel. humidity 80 % for temperatures up to +31 °C,
linear decrease down to 50 % relative humidity at a temperature of +40 °C
Max. mains fluctuation of ±10 % are permissible.

Protection class according to EN 60 529 IP43

The unit corresponds to Class I
Overvoltage category II
Pollution degree 2

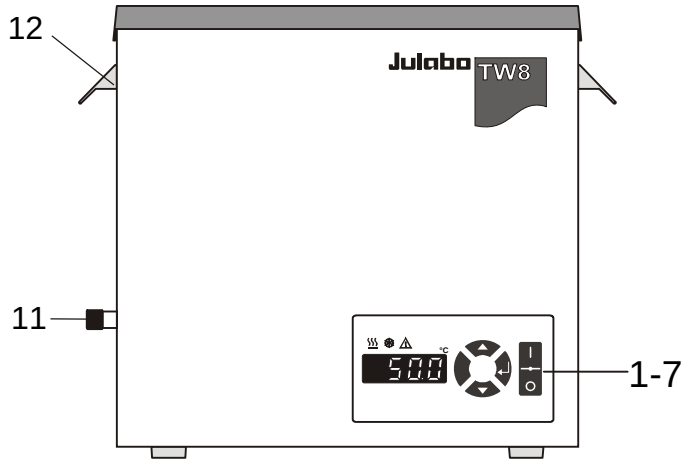
Caution:
The unit is not for use in explosive environment

Standards for interference resistance according to EN 61326-1
This unit is an ISM device classified in Group 1 (using high frequency for internal purposes) Class A (industrial and commercial range).

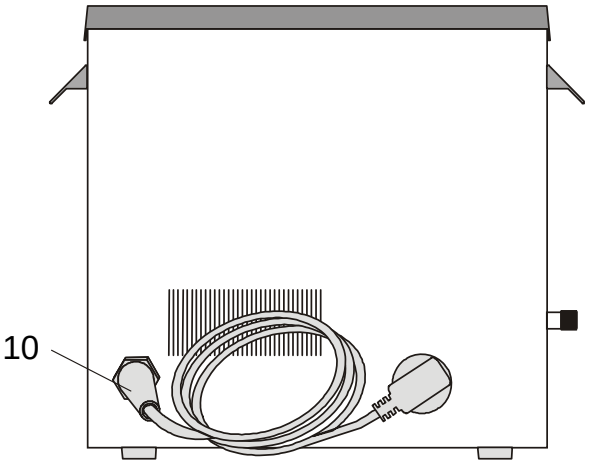
Operating instructions

3. Operating controls and functional elements

Front view



Rear view



Example: TW8

1		Mains power switch, illuminated I on O off
2		Edit keys (increase/decrease setting)
3		Enter key (store)
4		LED temperature display, menu indication
5		Control indicator –Heating
6		Control indicator – Cooling (without function)
7		Control indicator – Alarm
10		Mains power cable with plug
11		Drainage screw Connector for liquid level/cooling set (accessory)
12		Handle

4. Safety notes for the user

4.1. Explanation of safety notes

	In addition to the safety warnings listed, warnings are posted throughout the operating manual. These warnings are designated by an exclamation mark inside an equilateral triangle. “Warning of a dangerous situation (Attention! Please follow the documentation).” The danger is classified using a signal word. Read and follow these important instructions for averting dangers.
	**Warning:** Describes a **possibly** highly dangerous situation. If these instructions are not followed, serious injury and danger to life could result.
	**Caution:** Describes a **possibly** dangerous situation. If this is not avoided, slight or minor injuries could result. A warning of possible property damage may also be contained in the text.
	**Notice:** Describes a **possibly** harmful situation. If this is not avoided, the product or anything in its surroundings can be damaged.

4.2. Explanation of other notes

	**Note!** Draws attention to something special.
	**Important!** Indicates usage tips and other useful information.

4.3. Safety recommendations

Follow the safety recommendations to prevent damage to persons or property. Further, the valid safety instructions for working places must be followed.

- ConnOnly connect the unit to a power socket with earthing contact (PE – protective earth)!
- The power supply plug serves as a safe disconnecting device from the line and must always be easily accessible.
- Operation is permitted with **non-flammable** liquids only.
- Place the instrument on an even surface on a pad made of **non-inflammable** material.
- Do not stay in the area below the unit.

- Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit.
- Check the filling level of the bath fluid from time to time. The heater must always be fully covered with the bath fluid!
- Never operate the unit without bath fluid in the bath.
- Do not drain the bath fluid while it is hot!
  Check the temperature of the bath fluid prior to draining (by switching the unit on for a short moment for example).
- Never operate damaged or leaking equipment.
- Always turn off the unit and disconnect the mains cable from the power source before performing any service or maintenance procedures, or before moving the unit.
- Transport the unit with care.
- Sudden jolts or drops may cause damage in the interior of the unit.
- Always empty the bath before moving the unit.
- Never operate equipment with damaged mains power cables.
- Observe all warning labels.
- Never remove warning labels.
- Condensation that could appear in and on other units near the water bath may result in reduced operating safety.
  Be careful when setting up and operating the water bath!
- Always turn off the unit and disconnect the mains cable from the power source before cleaning the unit.
- Repairs are to be carried out only by qualified service personnel.

- ➢ Some parts of the bath cover may become extremely warm during continuous operation.
  When lifting the bath cover, pay attention to hot steam!
- ➢ Be careful when touching these parts!
- ➢ Use safety glasses!

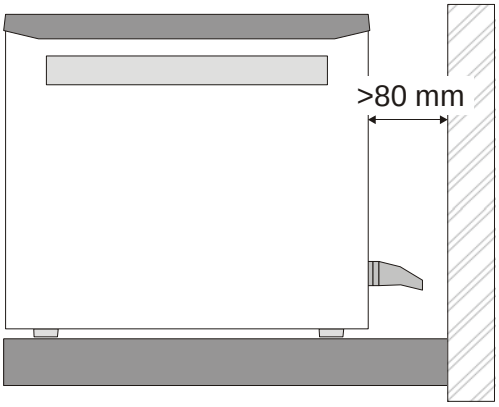
WARNING

This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

5. Preparations

5.1. Installation

Caution:
The unit is not for use in explosive environment.



Place the water bath in an upright position.

Keep a wall distance of minimum 80 mm.

Caution:
Potential hazards from the samples

Proper use of water baths includes immersion of samples contained in test tubes, Erlenmeyer flasks, or other containers for the purpose of controlling their temperature.
We do not know which substances are contained within these vessels.
Many substances are:

- **inflammable, easily ignited or explosive**
- **hazardous to health**
- **environmentally unsafe**

i.e.: **dangerous**

The user alone is responsible for the handling of these substances!

- Always properly seal all sample containers.

Notice:
There is a danger of electrochemical oxidation or corrosion when using test-tube racks or samples made of non-ferrous metal.

- Avoid using these types of racks or samples.
- Use only original JULABO test-tube racks.

5.2. Bath fluids

Recommended bath fluids: soft/decalcified water.

Caution:

Poor water quality may result in corrosion in the bath.

Water: The quality of water depends on local conditions.

- Due to the high concentration of lime, hard water is not suitable for temperature control because it leads to calcification in the bath.
- Ferrous water can cause corrosion - even on stainless steel.
- Chloric water can cause pitting corrosion.
- Distilled and deionized water is unsuitable. Their special properties cause corrosion in the bath, even in stainless steel. JULABO takes no responsibility for damages caused by the selection of an unsuitable bath fluid.

Please contact JULABO before using other than recommended bath fluids.

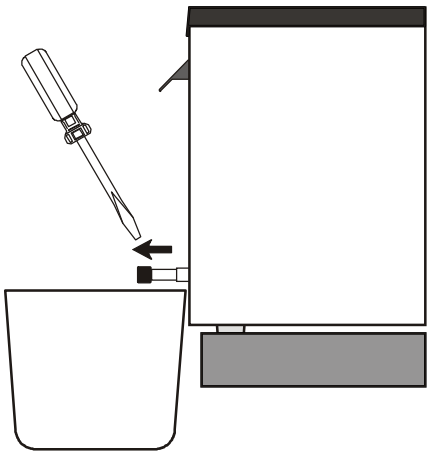
Do not use flammable bath fluids!

5.3. Filling / Draining

Filling

- Recommended maximum filling level is 25 mm below the tank rim
- Minimum filling level: approx. 1 cm above the perforated stainless steel base plate.

Note:
The working filling level depends on size and number of the items (fixtures) to be placed inside.
The recommended procedure is to fill the water bath only partially, place the items (fixtures) inside and then correct the filling level (adding or removing liquid) as required.



Draining

- Press the mains switch to turn the water bath off
- TW2
  Take the water bath in both hands and pour out the bath liquid into a suitable vessel.
- TW8, TW12, TW20
  Place a suitable collecting bucket or tub underneath the unit for draining the used bath liquid.
- To drain the liquid open the drainage screw (11) on the side of the water bath.
- After the liquid has been fully drained, securely tighten the drainage screw (11) again.

Warning:

There are thermal dangers when opening the bath cover:
Burn, scald, hot steam, hot parts and surfaces that can be touched.

- ➢ Do not drain the bath fluid while it is hot!
- ➢ Check the temperature of the bath fluid prior to draining (by switching the unit on for a short moment, for example).

Recommendation:
Use the water bath cover to keep temperature losses to a minimum. This is especially important for working temperatures above 60 °C.

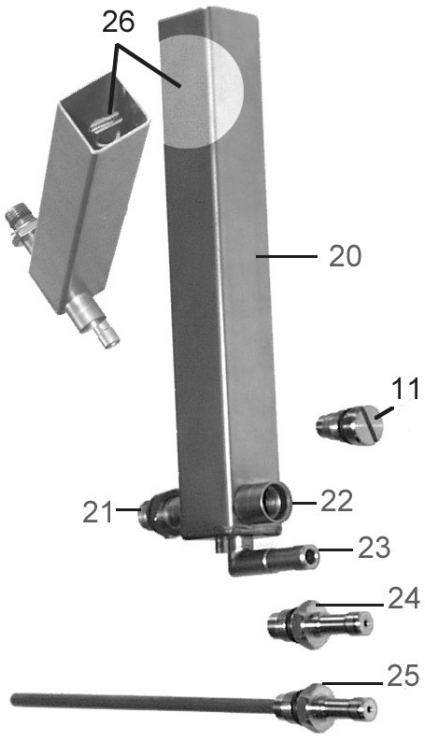
5.4. Maintaining a constant water level / Counter cooling

For cooling tasks near the ambient air temperature the liquid level/cooling set can be used for counter cooling.

By special pipe routing, cool faucet water is continuously supplied to the water bath, while at the same time, the heated water is drained via the overflow connection of the Level/Cooling set.

ⓘ A specific water flow rate of 100 ml/minute is sufficient to compensate for the characteristic temperature.

Caution:
Securely attach all tubing to prevent slipping.
Observe the laws and regulations of the water distribution company valid in the location where the unit is operated.



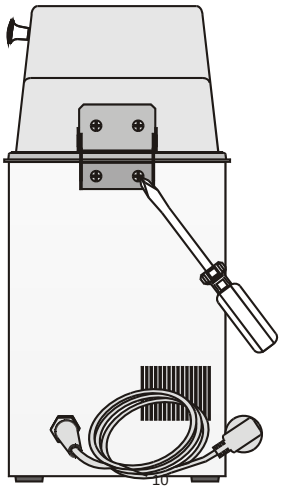
Use of the liquid level/cooling set for a continuous supply of faucet water:

1. to keep the water level constant, especially for applications up to the boiling point (supply of faucet water only in the amount of evaporation losses).
2. for counter cooling of cooling tasks near the ambient surrounding temperature (cool faucet water is continuously supplied to the water bath, while at the same time, the heated water is drained via the overflow connection of the liquid level/cooling set).

Liquid level/cooling set
Order number: 8 970 415

11 drainage screw on water bath
20 compensation reservoir
21 connecting sleeve
22 supply/drainage sleeve
23 overflow sleeve
24 adaptor screw for constant liquid level function
25 adaptor screw assy. for counter cooling function and simultaneous constant liquid level control
26 adjuster screw for filling level adjustment

5.5. Accessoires



Lift-up Makrolon® covers

Order numbers:

TW2	TW8	TW12	TW20
8 970 289	8 970 286	8 970 287	8 970 288

The lift-up Makrolon® covers are supplied with pre-assembled hinges. Screw the hinges with the included screws to the rear side of the bath by means of a screwdriver.

TW2

Insert capacity for test tube racks to 100 °C, stainless steel

TW2 1

Order No.	Test tube rack	
8 970 330	for 24 test tubes	16/17 mm dia.

TW8
TW12
TW20

Insert capacity for test tube racks to 100 °C, stainless steel

TW8	TW12	TW20
2	3	4

Order No.	Test tube racks	
8 970 344	for 50 test tubes	16/17 mm dia.
8 970 345	for 90 test tubes	12/13 mm dia.
8 970 346	for 90 microliter tubes	16/17 mm dia.
8 970 347	for 21 test tubes	30 mm dia.

TW8
TW12
TW20

Insert capacity for test tube racks to 80 °C, Polypropylene

TW8	TW12	TW20
2	3	4

Order No.	Test tube racks	
8 970 380	for 60 test tubes	16/17 mm dia.
8 970 381	for 90 test tubes	12/13 mm dia.
8 970 382	for 90 microliter tubes	16/17 mm dia.
8 970 383	for 21 test tubes	30 mm dia.

Cooling installation / continuo water supply

Recommendation: for model TW8, TW12, TW20
For continuous water supply and counter-cooling

Order No.	Description
8 970 415	Liquid level/cooling set
8 970 416	Cooling coil

6. Operating procedures

6.1. Power connection

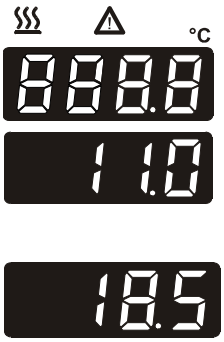
Caution:

- Only connect the unit to a power socket with earthing contact (PE – protective earth)!
- The power supply plug serves as safe disconnecting device from the line and must be always easily accessible.
- Never operate equipment with damaged mains power cables.
- Regularly check the mains power cables for material defects (e.g. for cracks).
- We disclaim all liability for damage caused by incorrect line voltages!

Check to make sure that the line voltage matches the supply voltage specified on the identification plate.
Deviations of ±10 % are permissible.

6.2. Switching on / Start - Stop

- **Switching on:**
  Turn on the mains power switch (1).



ⓘ The unit performs a self-test. All segments of the 4-digit LED temperature DISPLAY and all indicator lights will illuminate. Then the software version (example: n 11.0) appears.

Together with the display of the water bath temperature the operating state is also displayed. (Example: 18.5 °C)
The heat-up phase is indicated by the yellow heating control light which will blink in regular intervals when the selected temperature has been attained.

- **Switching off:**
  Turn the unit off with the mains power switch.

6.3. Setting the temperatures

ⓘ Setting can be carried out in the start/stop condition.

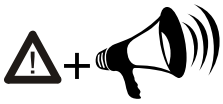
1. Press one of the keys ▼ ▲ for a short moment. The setpoint value instead of the actual value is indicated on the display for about 8 seconds. The value can now be changed.
2. Change value:
   Press ▲ to set a higher value.
   Press ▼ to set a lower value.
   Keep the keys depressed for the value to change fast.
3. Press enter ↵ to store the value.

Notice:

When the working temperature is higher than 50 °C, it might happen that due to strong production of steam there is considerable dripping on the inside of the lift-up Makrolon® cover. Some drops may fall directly into the material to be tempered.

➢ Always properly seal all sample containers.

7. Troubleshooting guide / Error messages

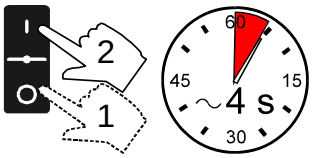


Whenever the microprocessor electronics registers a failure, a complete shutdown of the heater and circulating pump is performed.

The alarm light "⚠" illuminates and a continuous signal tone sounds. The LED temperature display indicates the cause for the alarm in form of a code.

- Safety sensor or working temperature sensor.
- The water bath is operated without bath fluid, or the liquid level is insufficient.
  Replenish the bath tank with the bath fluid.

- Cable of the working temperature sensor interrupted or short-circuited.



After eliminating the malfunction, press the mains power switch off and on again to cancel the alarm state.
If the unit cannot be returned to operation, contact an authorized JULABO service station.

8. Cleaning / repairing the unit

Caution:

Improper maintenance or repair can result in electric shock or damage to the unit.

- Repairs and any other work are to be carried out only by qualified service personnel authorized by JULABO.
- Always turn off the unit and disconnect the mains cable from the power source before performing any service or maintenance procedures, or before moving the unit.
- Prevent humidity from entering into the water bath.
- Do not use alcohol-based or solvent-based cleaning agents. These cleaning agents will result in damage and cracks in the Makrolon® cover.

Cleaning:

For cleaning the bath tank and the immersed parts of the water bath, use low surface tension water (e.g., soap suds).
Clean the outside of the unit using a wet cloth and low surface tension water.
The JULABO Water Baths are designed for continuous operation under normal conditions. Periodic maintenance is not required.

The tank should be filled only with a bath fluid recommended by JULABO. To avoid contamination, it is essential to change the bath fluid from time to time.

Repairs:

Before asking for a service technician or returning a JULABO instrument for repair, please contact an authorized JULABO service station.

Returning a unit:

When returning the unit:

- Clean the unit and, if necessary, decontaminate the unit in order to avoid endangering service personnel.
- Attach a short fault description.
- During transport the unit has to stand upright. Mark the packing correspondingly.
- When returning a unit, take care of careful and adequate packing.
- JULABO is not responsible for damages that might occur from insufficient packing.

JULABO reserves the right to carry out technical modifications with repairs for providing improved performance of a unit.

9. WARRANTY PROVISIONS

The following Warranty Provisions shall apply to products sold in North America by Julabo ("Seller") to the entity shown as buyer ("Buyer") on Seller's invoice.

1. Initial Warranty. Upon Seller's receipt of payment in full for the products and subject to Buyer's compliance with the terms of sale and any other agreement with Seller relating to the products, Seller warrants to the Buyer that the products manufactured by the Seller are free from defects in material and workmanship for a period not to exceed two (2) years or ten thousand (10,000) hours of operation, whichever comes first, from the date the product is shipped by Seller to Buyer (the "Initial Warranty").

2. EXCLUSION OF ALL OTHER EXPRESS WARRANTIES; EXCLUSION OF ALL IMPLIED WARRANTIES. OTHER THAN THE INITIAL WARRANTY, NO OTHER EXPRESS WARRANTIES ARE MADE. ALL IMPLIED WARRANTIES OF EVERY TYPE AND KIND, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, ARE EXCLUDED IN ALL RESPECTS AND FOR ALL PURPOSES. SELLER DISCLAIMS AND MAKES NO IMPLIED WARRANTIES WHATSOEVER.

3. Exclusions. The Initial Warranty does not include damage to the product resulting from accident, misuse, improper installation or operation, unauthorized or improper repair, replacement or alteration (including but not limited to repairs, replacements, or alterations made or performed by persons other than Seller's employees or authorized representatives), failure to provide or use of improper maintenance, unreasonable use or abuse of the product, or failure to follow written installation or operating instructions. Buyer must return the product's record of purchase to the Seller or one of Seller's authorized representatives within thirty (30) days of the date the product is shipped by Seller to Buyer in order to make a claim under the Initial Warranty. Notwithstanding anything contained herein to the contrary, all glassware, including but not limited to reference thermometers, are expressly excluded from the Initial Warranty.

4. Buyer's sole remedies; Limitations on Seller's Liability. Buyer's sole and exclusive remedy under the Initial Warranty is strictly limited, in Seller's sole discretion, to either: (i) repairing defective parts; or (ii) replacing defective parts. In either case, the warranty period for the product receiving a repaired or replaced part pursuant to the terms of the Initial Warranty shall not be extended. All repairs or replacements performed by Seller pursuant to these Warranty Provisions shall be performed at Seller's facility in Allentown, Pennsylvania, U.S.A. or Vista, California, U.S.A or at the facility of an authorized representative of Seller, which location shall be determined by Seller in its sole discretion; provided, however, that Seller may, in its sole discretion perform such repairs or replacements at Buyer's facility in which case Buyer shall pay Seller's travel, living and related expenses incurred by Seller in performing the repairs or replacements at Buyer's facility. As a condition precedent to Seller's obligation to repair or replace a product part under the Initial Warranty, Buyer shall (i) promptly notify Seller in writing of any such defect; (ii) shall have returned the product's record of purchase to Seller or to one of Seller's authorized representatives within thirty (30) days of the date the product is delivered to Buyer; and (iii) assist Seller in all respects in its attempts to determine the legitimacy and basis of any claims made by or on behalf of Buyer including but not limited to providing Seller with access to the product to check operating conditions. If Buyer does not provide such written notice to Seller within the Initial Warranty period or fails to return the product's record of purchase as set forth above, Seller shall have no further liability or obligation to Buyer therefore. In no event shall Seller's liability under the Initial Warranty exceed the original purchase price of the product which is the subject of the alleged defect.

5. THE REMEDIES PROVIDED IN THE INITIAL WARRANTY ARE THE SOLE AND EXCLUSIVE REMEDIES AVAILABLE TO THE BUYER. NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED HEREIN, AND EVEN IF THE SOLE AND EXCLUSIVE REMEDIES FAIL OF THEIR ESSENTIAL PURPOSE FOR ANY REASON WHATSOEVER, IN NO EVENT SHALL SELLER BE LIABLE FOR BUYER'S MANUFACTURING COSTS, LOST PROFITS, GOODWILL, OR ANY OTHER SPECIAL, INDIRECT, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES TO BUYER OR ANY THIRD PARTY AND ALL SUCH DAMAGES ARE HEREBY DISCLAIMED.

6. Assignment. Buyer shall not assign any of its rights or obligations hereunder without the prior written approval of Seller; provided, however, that if Buyer is a distributor of Seller, the rights and obligations of Buyer under these Warranty Provisions shall inure to the benefit of and be binding upon Buyer's customers who provide the product's proof of purchase to Seller pursuant to the terms set forth herein. Seller may assign any or all of its rights or obligations hereunder without Buyer's prior consent.

7. Governing Law. The Warranty Provisions and all questions relating to their validity, interpretation, performance, and enforcement shall be construed in accordance with, and shall be governed by, the substantive laws of the Commonwealth of Pennsylvania without regard to its principles of conflicts of law.

8. Waiver. Any failure of the part of Seller to insist on strict compliance with the Warranty Provisions shall no way constitute a waiver of such right. No claim or rights arising out of a breach of the Warranty Provisions by Buyer may be discharged in whole or in part by a waiver of the claim or right, unless the waiver is in writing signed by an authorized representative of Seller. Seller's waiver or acceptance of any breach by Buyer of any provisions of the Warranty Provisions shall not constitute a waiver of or an excuse for nonperformance as to any other provision of the Warranty Provisions nor as to any prior or subsequent breach of the same provision.

9. Freight. Buyer will arrange and pay for shipping and handling charges for the unit to be returned to the Seller.Seller will arrange and pay for shipping and handling for the return of the unit to the Buyer.