

English

Operating manual

Shaking Water Baths

SW22

SW23

Distributed by:



Carl Stuart Limited

ADVANCED APPLIED TECHNOLOGIES

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Software Version

SW22 n2.6

SW23 n2.7

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Julabo

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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 principles of operating and possibilities of our shaking water baths. For optimum utilization of all functions, we recommend that you thoroughly study this manual prior to beginning operation.

Unpacking and checking

Unpack the shaking water bath and accessories and check for damages incurred during transit. These should be reported to the responsible carrier, railway, or postal authority, and a request for a damage report should be made. 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.



The JULABO Quality Management System:

Development, production and distribution of temperature application instruments for research and industries conform to the requirements according to DIN EN ISO 9001:2000.

Certificate Registration No. 01 100044846

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Operating manual

Description

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

JULABO shaking water baths of the series SW22 and SW23 are ideally suited for laboratory applications and research in the fields biology, biochemistry, pharmacology, chemistry and general medical technologies. They are likewise suited for routine laboratory tasks and long-term unattended operation. The JULABO shaking water bath SW 23 with constant bath liquid circulation, ensures a constant water temperature with a maximum deviation of $\pm 0.02\text{ }^{\circ}\text{C}$.

Julabo shaking water baths feature a stainless steel bath containing heater, temperature sensor and the overtemperature protection safety element. The shaking carriage is totally removable.

The units are operated via a water protected foil keypad with integrated mains switch. Microprocessor technology enables selection and storage of different temperature values and operating times, and display of them in the LED-MULTI-DISPLAY. The self-optimizing electronic PID-control circuit automatically adjusts the heat supply to the value required by the bath.

The RS232C port permits modern process engineering without additional interface, directly on-line, from the waterbath to your application equipment.

The overtemperature protection to DIN 12876-1: 2000 is a safety feature with a fixed safety value of $130\text{ }^{\circ}\text{C}$. It functions independent of the regulator circuit.



The safety classification 1 permits unattended operation with non-flammable bath liquids!



JULABO water baths are not conceived for direct temperature application to food and luxury articles or pharmaceutical and medico-technical products. Direct temperature application means: Unprotected contact of the object with the bath medium (bath fluid).

Operator responsibility – Safety recommendations

The products of JULABO Labortechnik GmbH warrant a safe operation if installation, operation and maintenance is carried out according to common safety regulations. This section informs you about potential dangers that may arise from operating the circulator and also mentions the most important safety precautions

Persons:

The operator is responsible for the qualification of the personnel operating the units. The operator should be constantly informed about the dangers involved with their job activities as well as preventive actions.

Make sure all persons expected to carry out operation, installation and maintenance of the unit read and understand the safety information and operating instructions.

When using hazardous materials, the circulator may only be operated by persons that are absolutely familiar with these materials and the circulator. 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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Handling:

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.

Operation:

Only qualified personnel is authorized to perform configuration, installation, maintenance and repairs of the circulator.




Routine operation can also be carried out by untrained personnel who should however be instructed by trained personnel. The summarized user guidance (short manual) and the specification table with information on individual parameters are sufficient for this.

Use:


The bath may **not** be filled with flammable materials. Fire hazard!

Only use recommended materials (bath fluids). Only use non-acid and non corroding bath fluids.

When using hazardous materials, **the user must** attach the enclosed safety labels to the front of the unit so they are well visible: The yellow warning label W09 (danger area) and the blue mandatory label M018 or Semi S1-0701 Table A1-2 #9 (Carefully read the user information prior to beginning operation).

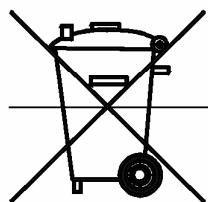
| | | |
|---|---|---|
| Warning label W09: Colors: yellow, black |  | Danger area. Attention! Observe instructions. (operating manual, safety data sheet) |
| Mandatory label M018 Colors: blue, white |  | Carefully read the user information prior to beginning operation Scope: EU |
| Semi S1-0701 Table A1-2 #9 |  | Carefully read the user information prior to beginning operation Scope: NAFTA |

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) |
|---|---|---|

Observe the instructions in the manuals for instruments of a different make that you connect to the circulator, particularly the respective safety recommendations. Also observe the pin assignment of plugs and technical specifications of the products.

Disposal:



Valid in EU countries

Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE).

This directive requires electrical and electronic equipment marked with a crossed-out trash can to be disposed of separately in an environmentally friendly manner.

Contact an authorized waste management company in your country. Disposal with household waste (unsorted waste) or similar collections of municipal waste is not permitted!

EC Conformity



The products described in the operating instructions conform to the requirements of the following European guidelines:

Low voltage regulations with respect to legal harmonization of the member countries concerning electric devices for use within certain voltage limits.

EMC guideline with respect to legal harmonization of the member countries concerning electromagnetic compatibility.

Julabo

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Warranty conditions

JULABO Labortechnik GmbH warrants its products against defects in material or in workmanship, when used under appropriate conditions and in accordance with appropriate operating instructions

for a period of ONE YEAR.

Extension of the warranty period – free of charge



With the '1PLUS warranty' the user receives a free of charge extension to the warranty of up to 24 months, limited to a maximum of 10 000 working hours.

To apply for this extended warranty the user must register the unit on the JULABO web site www.julabo.de, indicating the serial no. The extended warranty will apply from the date of JULABO Labortechnik GmbH's original invoice.

JULABO Labortechnik GmbH reserves the right to decide the validity of any warranty claim. In case of faults arising either due to faulty materials or workmanship, parts will be repaired or replaced free of charge, or a new replacement unit will be supplied.

Any other compensation claims are excluded from this guarantee.

Technical data

| | | SW22 | SW23 |
|---|--------|-------------------|-------------------|
| Working temperature range with water cooling | °C | 25 ... 99,9* | 25 ... 99,9* |
| | °C | 20 ... 99,9* | 20 ... 99,9* |
| MULTI-DISPLAY (LED) Resolution | °C | 0.1 | 0.1 |
| Temperature stability | °C | ±0.2 | ±0.02 |
| Computer interface | | RS232 | RS232 |
| Electronic timer | h.min | 0:01 ... 9:59 | 0:01 ... 9:59 |
| Heater wattage (at 230 V / 115 V) | W | 2000/1000 | 2000/1000 |
| Adjustable shaking frequency, Shaking stroke | rpm | 20 ... 200 | 20 ... 200 |
| | mm | 15 / 25 | 15 / 25 |
| Bath opening (B x L) | cm | 50 x 30 | 50 x 30 |
| Usable bath depth | cm | 18 | 18 |
| Filling volume | liters | 8 ... 20 | 8 ... 20 |
| Dimensions W x L x H (including cover) | cm | 70 x 35 x 26 (42) | 70 x 35 x 26 (42) |
| Weight | kg | 22 | 23 |
| Mains power connection ±10 % or | V/Hz | 230/50 | 230/50 |
| | V/Hz | 115 / 60 | 115 / 60 |
| Total power consumption (at 230 V / 115 V) | W | 2100/1100 | 2150/1150 |

All measurements have been carried out at: (DIN 12876-2: 1999/12)
rated voltage and frequency

ambient temperature: 20°C; operating temperature: 70°C;

bath liquid: water



*)

Important notice:

When the working temperature is higher than 90 °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.

Safety installations according to IEC 61010-2-010:

| | |
|---|-------------------------------------|
| Excess temperature protection | 130 °C - fixed value |
| Alarm indication | optical + audible (continuous tone) |
| Classification according to DIN 12876-1 | class I |
| High temperature warning function | optical + audible (in intervals) |
| Low temperature warning function | optical + audible (in intervals) |
| Timer | audible (in intervals) |
| Protection class | IP43 acc. to IEC 529 |

Environmental conditions according to IEC 61 010-1:

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

Protection class according to IEC 60 529 IP43

Power supply: corresponds to Class I; according to VDE 0106 T1

not for use in explosive atmosphere

Max. mains fluctuations of ± 10 % are permissible.

Overvoltage category II

Pollution degree 2

Standards for interference resistance EN 61326

Emitted interferences

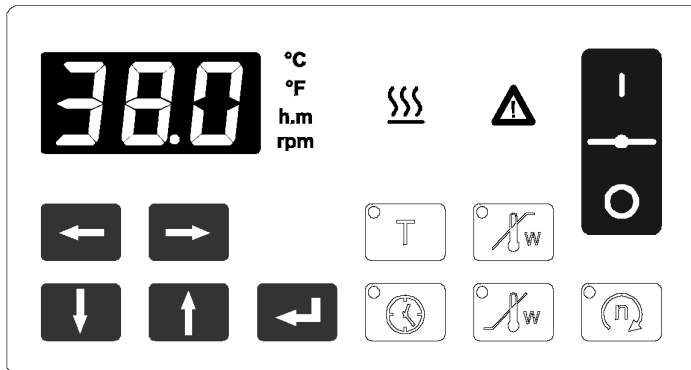
The unit adheres to the threshold values for emitted interferences according to table 3.












Interference resistance

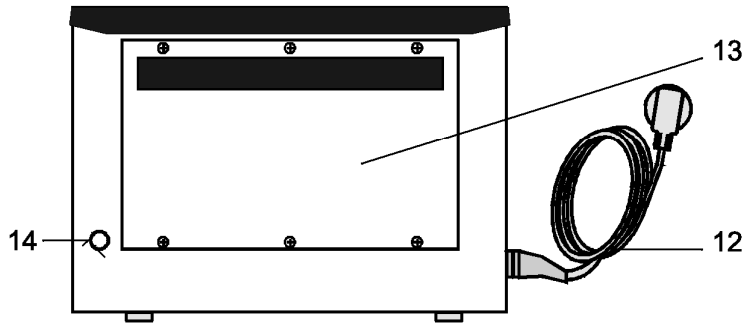
The unit conforms to the requirements according to table B.1.


Operating instructions

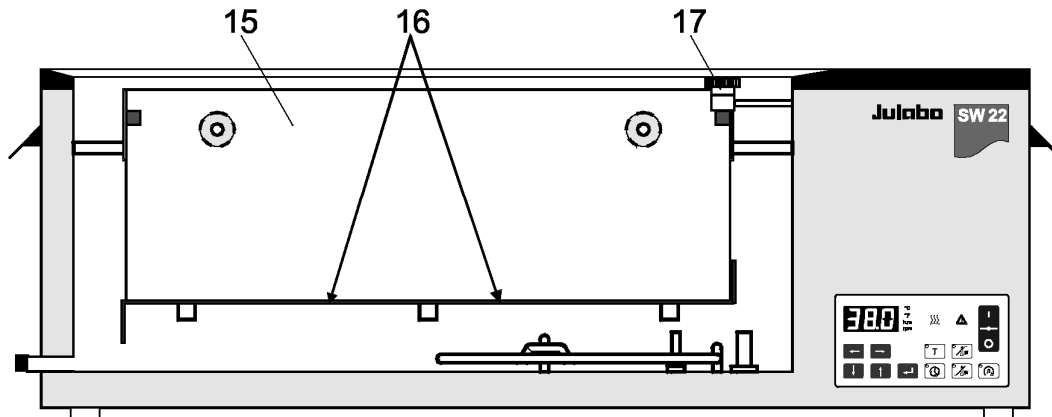
1. Operating controls and functional elements







- 1  Mains power switch, illuminated
 on
 off
- 2  Working temperature
- 3  High temperature warning limit
- 4  Low temperature warning limit
- 5  Operating hours indicator key
- 6  Nominal value shaking frequency display key
- 7 Indication:
 - MULTI-DISPLAY (LED)
 Temperature display optionally in °C or °F;
 time display in h:m and shaking frequency.
 The corresponding symbol will illuminate on selection.
 - Indicator light - Alarm red illuminated
 - Indicator light - Heating yellow illuminated
- 8  Cursors left/right
- 9  Edit keys (increase/decrease setting)
- 10  Enter key (store/quitting the audible signal)



- 11 Drainage screw
Connector for liquid level/cooling set (accessory)
- 12 Mains power cable with plug
- 13  T 10 A power supply fuses behind side cover
- 14 RS232C interface
- 15 Shaking carriage - totally removable
- 8 kg load-carrying capability
- 16 Surface for placement of items (fixtures)
- 17 Stroke bar with fastening screw



2. Safety notes for the user

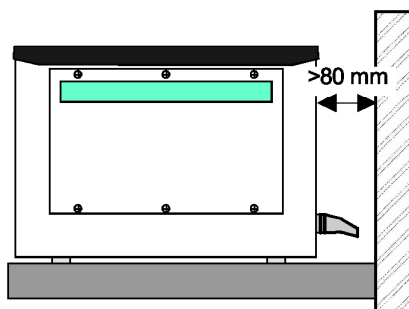
| | |
|---|--|
|  | <p>In addition to the safety warnings listed above, warnings are posted throughout the manual. These warnings are designated by an exclamation mark inside an equilateral triangle. „Warning of a dangerous situation (Attention ! Please follow the documentation).“</p> <p>The danger is described according to an alarm keyword.</p> <p>Read and follow these important instructions.</p> |
|  | <p>Warning:</p> <p>Describes a possibly highly dangerous situation. If this is not avoided, serious injury and danger to life could result.</p> |
|  | <p>Caution:</p> <p>Describes a possibly dangerous situation. If this is not avoided, slight or minor injuries could result.</p> <p>A warning of possible damage can also be contained in the text.</p> |
|  | <p>Notice:</p> <p>Describes a possibly harmful situation. If this is not avoided, the product or anything in its surroundings can be damaged.</p> |


3. Preparations

3.1. Installation

The installation site should meet the following conditions:

1. The base of the installation site should be level to ensure proper functioning of the safety features.
2. The laboratory table, for example, should be sturdy enough, to where the shaking frequency cannot cause vibration of the table. Consider that the masses moved may be in the order of several kg.



 At unattended operation, the vibration may cause items on the table top to fall off under extreme unfavorable circumstances.

3. Keep a wall distance of minimum 80 mm.

3.2. Bath liquid



Caution:

No liability for use of other bath fluids!

Do not use flammable bath fluids!

Water:

The quality of water depends on local conditions.

Ferrous water can cause corrosion - even on stainless steel.

Chloric water can cause pitting corrosion.

Recommended bath fluids: water



Notice:

Please contact JULABO before using other than recommended bath fluids.

JULABO takes no responsibility for damages caused by the selection of an unsuitable bath fluid.

Unsuitable bath fluids are liquids which e.g.

- have corrosive characteristics or
- tend to cracking.



Caution:

The temperature controlling i.e. of fluids in a reactor constitutes normal circulator practice.

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!



Accessory:

We recommend the use of the "Aqua-Stabil" protective media to eliminate the formation of algae, bacteria, and other micro-organisms.

| Order No. | Description |
|-----------|----------------------|
| 8 940 006 | 6 bottles ea 100 cc |
| 8 940 012 | 12 bottles ea 100 cc |

3.3. Filling / Draining

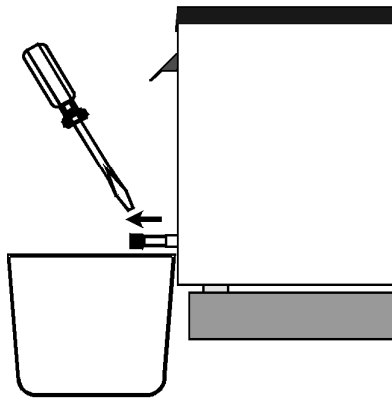
Filling:

- Maximum filling level: 6 cm below the bath rim
- Minimum filling level: 7 cm (level approx. 3 cm above surface (16) for the placement of items/fixtures)

Note:

The working filling level depends on size and number of the items (fixtures) to be placed inside.

Fill to minimum level only. Insert the complemented shaking carriage and correct the filling level (adding or removing liquid) as required.



Draining:

- Switch off the shaking water bath with the mains switch and move the equipment to the table edge.
- Place a suitable collecting bucket or tub underneath the equipment for draining the used 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:

Exercise caution when emptying hot bath fluids!

There are thermal dangers when opening the bath cover:

Burn, scald, hot steam, hot parts and surfaces that can be touched.

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 70 °C.

Lift-up Makrolon[®] cover

Order No. 8 970 288

3.4. Maintaining a constant water level / Countercooling

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

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:

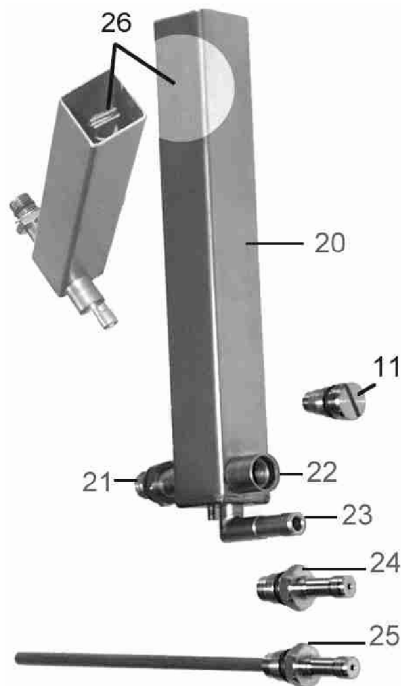
Securely attach all tubing to prevent slipping.
Observe the laws and regulations of the water distribution company valid in the location where the unit is operated.

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 countercooling 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 countercooling function and simultaneous constant liquid level control
- 26 adjuster screw for filling level adjustment



4. Operating procedures

4.1. Power connection



Caution:

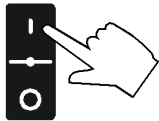
ConnOnly connect the unit to a power socket with earthing contact (PE – protective earth)!

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 $\pm 10\%$ are permissible.

5. Switching on



- Switching on:

Turn on the mains power switch.

The unit performs a self-test. All segments of the 4-digit MULTI-DISPLAY (LED) and all indicator lights will illuminate.

Then the software version (example: n 1.3) appears.

Together with the display of the water bath temperature the operating state is also displayed.

(Example: 18.6 °C)

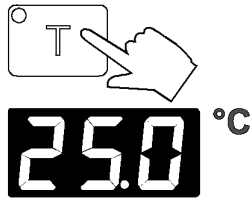
The monitor lamp  illuminates when the heater is in operation (on).



Notes:

- Adjustable parameters and temperature values are retained and the electronic timer is reset to zero when the equipment is switched off.
- When the shaking water bath is operating under remote control at the time of switchoff (connected to PC via RS-232 interface connection), the MULTI-DISPLAY (LED) will display the message „OFF“. (see chapter 6.5. Setup for remote control)
- If shaking operation is not desired it can be switched off at menu level. Select the menu level and activate the option SA (see page 22).

5.1. Setting the temperature



Display and adjustment of the working temperature:

- ① Press the setpoint key . The indicator light **blinks** and the value previously set appears on the MULTI-DISPLAY (LED). (example: 25.0 °C).

If no further key is pressed the display will return to show the actual bath temperature after approx. 8 seconds.

- ② Use the cursor keys to move left or right on the display until the numeral you wish to change is blinking.
- ③ Use the increase/decrease arrows to change the selected numeral (0, 1, 2, 3, ... 9).
- ④ Press enter to store the selected value (example: 38.0 °C).



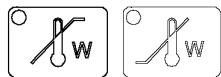
The working temperature is maintained constant after a short heat-up time (e. g. 38.0 °C).



Notice:

When the working temperature is higher than 90 °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.

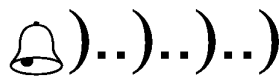
5.2. Warning functions or temperature limit



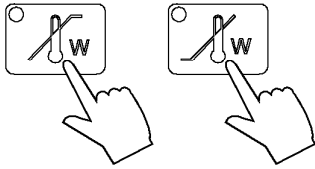
More protection for your samples in the bath!

As soon as the actual temperature leaves one of the pre-adjusted limits, this status is evaluated.

The high- and low-temperature limit can be evaluated in two ways (see page 27).



1. As pure warning function with an acoustic signal in regular intervals. (Signal - Pause) (DBGM: G94 10 134.5)
2. As temperature limit by switching-off the heating and alarm.



41 °C

35 °C

Display and adjustment of over-/undertemperature:

- 1 Press the key

(example: 41 °C)

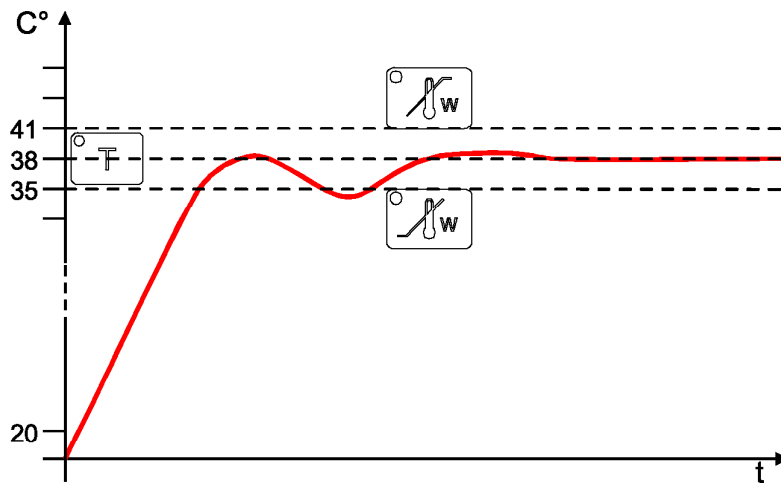
or

(example: 35 °C).

The indicator light **blinks** and the value previously set appears on the MULTI-DISPLAY (LED).

If no further key is pressed the display will return to show the actual bath temperature after approx. 8 seconds.

- 2 Use the cursor keys to move left or right on the display until the numeral you wish to change is blinking.
- 3 Use the increase/decrease arrows to change the selected numeral (0, 1, 2, 3, ... 9).
- 4 Press enter to store the selected value



Note:

The warning functions will be activated only after the bath temperature has remained for at least 3 seconds within the adjusted threshold values after the equipment is switched on.

5.3. Adjustment of the shaking frequency

The shaking frequency is adjustable between 20...200 rpm. If shaking operation is not desired it can be switched off at menu level. Select the menu level and activate the option SA (see page 22)






Display and adjustment of the shaking frequency



- ① Press the key .

The indicator light **blinks** and the value previously set appears on the MULTI-DISPLAY (LED).
(example: 120 rpm).

If no further key is pressed the display will return to show the actual bath temperature after approx. 8 seconds.

- ② Use the cursor keys   to move left or right on the display until the numeral you wish to change is blinking.
- ③ Use the increase/decrease arrows   to change the selected numeral (0, 1, 2, 3, ... 9).
- ④ Press enter  to store the selected value

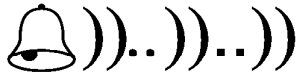


Caution:

Do NOT reach between shaking carriage and bath casing during shaking operation. Danger of injury!

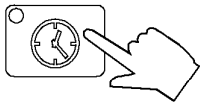
5.4. Electronic timer

The electronic timer enables adjustment of the operating time up to a maximum of 9 hours and 59 minutes. Countdown then commences to zero, at which time an acoustical time signal will be issued in intervals (double signal - pause).



- the equipment will not be switched off -

Display and adjustment of the operating time:








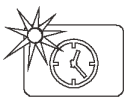
- ① Press the key .

The indicator light **blinks** and the MULTI-DISPLAY (LED) will display the remaining operating time (example: 4.28 h:m).



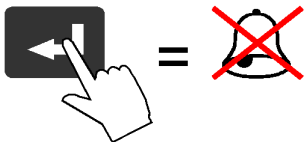
If no further key is pressed the display will return to show the actual bath temperature after approx. 8 seconds.

- ② Use the cursor keys   to move left or right on the MULTI-DISPLAY (LED) until the numeral you wish to change is blinking.
- ③ Use the edit keys   to increase or decrease the numeral value (0, 1, 2, 3, ... 9).
- ④ Press enter  to store the value when the countdown will commence. During that time the monitor lamp (control lamp) will remain permanently illuminated.



When the operating time is expired an acoustical time signal is issued in intervals.

Cancellation of the time signal:



Press enter  to silence the time signal.



Notes:

- Following switch-on of the equipment and after a power failure, the timer will show 0:00 h:m.
- When the equipment is operating remotely controlled the timer is rendered inoperative.

6. Menu functions

Adjustment of parameters which, in most instances, need only be adjusted once, are performed on the water bath at menu level.








1. Shaking operation On/Off
2. Circulator pump On/Off
(Only shaking water bath SW23).
3. MULTI-DISPLAY temperature display in °C or °F
4. ATC (absolute temperature calibration)
5. Switchover to remote controlled operation
6. Adjustment of interface parameters
7. Adjustment of the high and low temperature limit. Choice between pure warning function or a temperature limit by switching off the heating.

Selecting/exiting the menu level.

- Simultaneously press the cursor key  and enter .

6.1. Shaking operation On/Off



- ❶ Press the cursor key  and enter  at the same time.
- ❷ Use the cursor keys   to select the menu option „shaking operation“
example: „SA1“ = shaking frequency ON.
- ❸ Select the alternative state with the edit keys  
and confirm the selection with the ENTER key .
The display now shows „SA0“ = shaking frequency OFF.

6.2. Circulator pump on/off

Only shaking water bath SW23 feature a circulator pump. The pump can be set to **on** and **off** at the menu level. At working temperatures > 80° C the pump will switch off automatically

- ① Press and **at the same time.**
- ② Use the cursor keys to select the menu option PUMP
(example: „Pu1“ = Pump ON)
- ③ Select the alternative state with the edit keys and confirm the selection with the ENTER key .
(example: „Pu0“ = Pump OFF).
- ④ Press and **at the same time.**

6.3. Temperature indication in °C or °F

The working temperature can be displayed in the MULTI-DISPLAY (LED) in °C or °F as desired.

- ① Press and **at the same time.**
- ② Use the cursor keys to select the menu option „temperature display“
(example: „t C“ = temperature display in °C).
- ③ Select the alternative state with the edit keys and confirm the selection with the ENTER key . The display now shows „t F“ = temperature display in °F.
- ④ Press and **at the same time.**

Switchover to the selected display mode takes place automatically upon leaving the menu level.

6.4. ATC - Absolute Temperature Calibration

37.0 °C

Internal sensor (T_F)

ATC serves to compensate a temperature difference that might occur between circulator and a defined measuring point in the bath tank because of physical properties.

36.8

Measuring point (T_M)

The difference temperature is determined ($\Delta T = T_M - T_T$) and stored as correcting factor (example $\Delta T = -0.2$ °C).

At0

① Press the cursor key  and enter  **at the same time.**






At1

② Use the cursor keys   to select the menu option „At0“.

③ With the edit keys   select "At1" and then press enter .

Enter the corrective value.

-0.2 °C

④ Using the cursor keys   and the edit keys   set the correcting factor (example -0.20 °C) and then press enter .

⑤ Press  and  **at the same time.**

37.0 °C

Measuring point

The temperature on the measuring point rises to a temperature of 37.0 °C and is indicated on the MULTI-DISPLAY (LED).



The ATC function stays activated until resetting to 00.0 °C.



Recommendation:

Use a calibrated temperature measuring instrument.

6.5. Setup for remote control

If the shaking water bath is to be remotely controlled or monitored, the parameter of the menu option REMOTE must be changed and set from **0** to **1**.




REMOTE 0 = Keypad control
1 = Remote control via RS232 interface

① Press  and  at the same time.



② Use the cursor keys   to select the menu option REMOTE (display „r 0“).



③ Select the alternative state with the edit keys   and confirm the selection with the ENTER key  (display „r 1“).












The shaking water bath will switch to the REMOTE „STOP“ condition and the MULTI-DISPLAY will show the message „OFF“.

④ Press  and  at the same time.

6.6. Adjusting interface parameters

Correct data transmission takes place only when the interface parameters of PC and water bath are identical.

- ❶ Press  and  **at the same time.**
- ❷ Use the cursor keys   to select the desired menu option (BAUDRATE, PARITY, HANDSHAKE).
- ❸ Select the alternative state with the edit keys   and confirm the selection with the ENTER key .
- ❹ Press  and  **at the same time.**

Adjustable interface parameters





BAUDRATE 48 = 4800 bauds *
 96 = 9600 bauds

PARITY 0 = no parity
 1 = odd parity
 2 = even parity *

HANDSHAKE
 0 = Protocol Xon/Xoff (software handshake)
 1 = without handshake *
 Data bits = 7; Stop bit = 1 *

(*Factory setting)



Like all parameters which can be entered through the keypad, interface parameters are stored in memory even after the circulator is turned off.

6.7. Evaluation of the temperature limits










The high- and low-temperature limit can be adjusted in two ways (see page 18)



1. As pure warning function with an acoustic warning signal in regular intervals.
Adjustment „Li 0“ – factory adjustment



2. As temperature limit by switching-off the heating.
Adjustment „Li 1“
The alarm is indicated by optical and audible signals (continuous tone) and on the MULTI-DISPLAY (LED) appears the error message "Error 01".

- 1 Press  and  at the same time.
- 2 Use the cursor keys   to select the menu option Limit. (example: „Li 0“).
- 3 Select the alternative state with the edit keys   and confirm the selection with the ENTER key  (display „Li 1“).
- 4 Press  and  at the same time.

7. Safety installation (with shutdown function)

(excess temperature protection)



These safety installations is independent of the control circuit. When the temperature of the bath liquid has reached the safety temperature, a complete shutdown of the heater and pump (only CW-models) is effected.

The alarm is indicated by optical and audible signals (continuous tone) and on the MULTI-DISPLAY (LED) appears the error message "Error 01".

8. Troubleshooting guide / Error messages



Whenever the microprocessor electronics registers a failure, a complete shutdown of the heater and circulation pump (only CW-models) is performed. The alarm light "△" illuminates and a continuous signal tone sounds.



- Cause:
The waterbath is operated without bath liquid, or the liquid level is insufficient
or
The adjusted temperature limit was exceeded or the temperature fell below the limit.
- Remedy: Replenish the bath tank with the bath liquid. Control the adjustment of the temperature limit. Get to safety the samples.
- The wires of the working temperature sensor are interrupted or short-circuited.

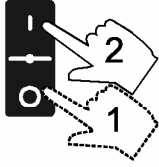


}
- - -
} other errors
}

- Heating circuit interrupted.

E 17

E 18



- Short-circuit of triac.
- Short-circuit in alarm relay.

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.

Disturbances that are not indicated.

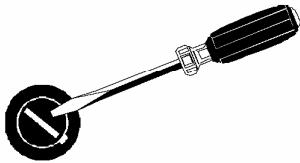


Warning:

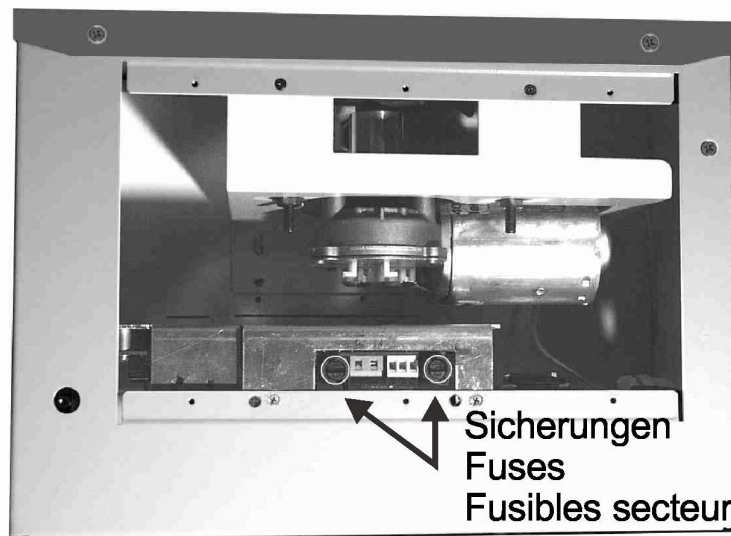
Before exchange the fuses, disconnect the power plug from the mains socket!

Only use fine fuses with a nominal value as specified.

Mains fuses



- Pull the mains plug from the power outlet before opening the equipment!
- The mains fuses are located behind side plate (13). The side plate is fastened to the casing with 6 screws. (Fine fuse T 10.0 A, dia. 5 x 20 mm)



Pump motor overload protection

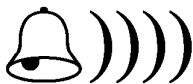
The pump motor is protected against overloading. After a short cooling interval, the motor will automatically start running.

8.1. Acoustical signals and their differentiation

Three different signals are generated by the sound generator as follows:

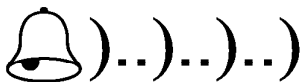
- an alarm signal
- a warning signal
- a time signal

The signals can easily be recognized and differentiated, even from a good distance. Required actions can be initiated immediately.

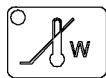
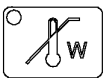


- The Alarm signal is a continuous sound signal.

Heater and circulator pump (SW23 only) are completely and permanently switched off.
(see page 28)



- The warning signal is issued at regular intervals (signal - pause - signal - pause).



The actual bath temperature is higher than the set overtemperature value or lower than the set undertemperature value
(see page 18)



- The time signal is issued in the intervals (double signal - pause - double signal - pause).



Countdown of the adjusted operating time commences to zero, after which a time signal is issued at intervals
(see page 21)

9. Safety recommendations

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



- Only connect the unit to a power socket with earthing contact (PE – protective earth)!
- 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.
- Never operate the unit without bath fluid in the bath.
- Prevent water from penetrating into the hot bath oil.
- Exercise caution when emptying hot bath fluids!
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.
- Always empty the bath before moving the unit.
- Never operate equipment with damaged mains power cables.
- 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!

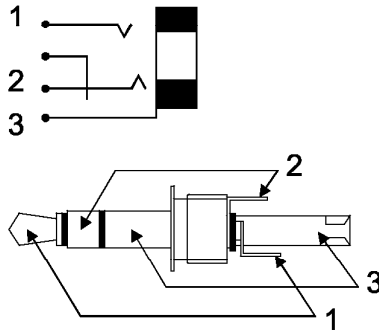


- Some parts of the bath cover may become extremely warm during continuous operation.
When lifting the bath cover, pay attention to hot steam!
Be careful when touching these parts!

10. Electrical connection

RS232C serial interface

This port can be used to connect a computer with an RS232C cable for remote control of the waterbath.

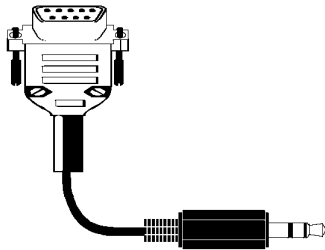


Pin assignment:

| | | |
|-------|------|---------------|
| Pin 1 | RxD | Receive Data |
| Pin 2 | TxD | Transmit Data |
| Pin 3 | 0 VD | Signal GND |



Use shielded cables only.



Accessories:

RS-232 interface connecting cable, terminated with 3-pin Cinch plug and 9 hole subD socket. Length: 3.0 m.

Order No. 8 980 075

11. Remote control

11.1. Communication with a PC or a superordinated data system

Suitable terminal programs for communicating with a PC are:
 MS-Windows - Terminal.EXE (included with MS-Windows).

If the waterbath is put into remote control mode via the menu level, the display will read "OFF" = REMOTE STOP. (see page 25).

The waterbath is now operated via the computer.

In general, the computer (master) sends commands to the waterbath(slave). The waterbath sends data (including error messages) only when the computer asks for it.

A transfer sequence consists of:

command

space \leftrightarrow ; Hex: 20)

parameter (the character separating decimals in a group is the period)

end of file (\downarrow ; Hex: 0D)

The commands are divided into **in** or **out** commands.

in commands: asking for parameters to be displayed

out commands: setting parameters

The **out** commands are valid only in remote control mode.



Examples:

- Command to set the working temperature T to 55.5 °C:
out_sp_00 \leftrightarrow 55.5 \downarrow
- Command to ask for the working temperature T:
in_sp_00 \downarrow
- Response from the shaking water bath:
55.5 \downarrow

11.2. List of commands

| Command | Parameter | Response of the shaking water bath |
|-------------|-----------|--|
| version | none | Number of software version(V X.xx) |
| status | none | Status message, error message (see below) |
| out_mode_05 | 0 | STOP - returns the water bath to the „OFF“ state |
| out_mode_05 | 1 | START - water bath is switched to the operating state |
| out_mode_08 | 0 | Circulator pump „OFF“ |
| out_mode_08 | 1 | Circulator pump „ON“ |
| out_mode_09 | 0 | Shaking operation drive motor „OFF“ |
| out_mode_09 | 1 | Shaking operation drive motor „ON“ |
| out_sp_00 | xxx.x | Set working temperature„T“ |
| out_sp_02 | xxx.x | Set high temperature warning limit \mathcal{J}_w |
| out_sp_03 | xxx.x | Set low temperature warning limit \mathcal{J}_w |
| out_sp_16 | xxx.x | Set shaking frequency |
| in_sp_00 | none | Ask for working temperature „T“ |
| in_sp_02 | none | Ask for high temperature warning limit \mathcal{J}_w |
| in_sp_03 | none | Ask for low temperature warning limit \mathcal{J}_w |
| in_sp_16 | kein | Ask for shaking frequency |
| | | |
| in_pv_00 | none | Ask for actual bath temperature |
| in_pv_01 | none | Ask for the heater wattage being used |

11.3. Status messages

| Message | Description |
|-----------------|-----------------------------------|
| 01 MANUAL START | Waterbath in keypad control mode. |
| 02 REMOTE STOP | Waterbath in „OFF“ state |
| 03 REMOTE START | Waterbath in remote control mode |

11.4. Error messages

| Message | Description |
|--|---|
| -01 TEMP / LEVEL ALARM | Safety temperature or low liquid level alarm |
| -03 EXCESS TEMPERATURE WARNING | High temperature warning „ T_w „. |
| -04 LOW TEMPERATURE WARNING | Low temperature warning „ T_w „. |
| -05 TEMPERATURE MEASUREMENT ALARM | Error in measuring system |
| -07 I ² C-BUS WRITE ERROR -07 I ² C-BUS READ ERROR -07 I ² C-BUS READ/WRITE ERROR | Internal error |
| -08 INVALID COMMAND | Invalid command |
| -10 VALUE TOO SMALL | Entered value too small |
| -11 VALUE TOO LARGE | Entered value too large |
| -12 WARNING : VALUE EXCEEDS TEMPERATURE LIMITS | Value lies outside the adjusted range for the high and low temperature warning limits. But value is stored. |
| -13 COMMAND NOT ALLOWED IN CURRENT OPERATING MODE | Invalid command in current operating mode |

12. Cleaning / repairing the unit



Caution:

Gerät ausschalten und Verbindung zum Energieversorgungsnetz trennen, bevor Reinigungsarbeiten durchgeführt werden.
Prevent humidity from entering into the water bath.
Service- und Reparaturarbeiten dürfen nur von autorisierten Elektro-Fachkräften durchgeführt werden.

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 Skaking Water Baths are designed for continuous operation under normal conditions. Periodic maintenance is not required.

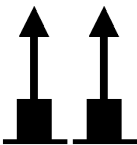
The tank should be filled only with a bath fluid recommended by JULABO. To avoid contamination, it is essential to change the bath fluid from time to time.

Repairs

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

When returning the unit:

- Clean the unit in order to avoid any harm to the 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.