

# Circulating water bath

## Introduction

The unique high-current device is produced only in one-channel design. The mutual characteristics of the device are the identical stimulus impulse and performance parameters. They are without isolation, operating from the electrical system.

The MCU controlling unit is built into one rack with the one- or two-channel stimulators and supplied separately in case of four-channel stimulator.



## Parts and main switches of the control unit, front and back panel

The operational switches and adjusters can be found on the front panel of the control unit. The display shows the current or adjusted temperature. The handling switch and connector (for 230 V or 110 V) can be found at the back panel of the control unit.

1	Control unit
2	Tank
3	Heater, pump, control temperature sensor (underneath)
4	Lid
5	Water outlet
6	Water inlet



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**Important!** It is recommended to use distilled water in the circulating water bath to avoid scaling and contamination. Use only non-foaming detergents in high dilution (e.g. 0,01% ROCCAL, Sigma).

1	HEATING - LED status indicator of the heater
2	LOW LEVEL – LED indicator, if not enough water in the tank
3	Display
4	SET / MEAS – display selecting switch
5	SET - temperature adjustment counter (helipot)
6	Trimmer potentiometers <i>Only for service purposes!</i>
7	Main switch
8	Fuse
9	Connection to main



## Installation

- Take off the lid of the water tank then fill up the tank with water (distilled water is recommended). Cover the tank with the lid.
- Connect silicon tubes (8 mm x 10 mm) to the “Water IN” and “Water OUT” outlets. Connect the silicon tubes to the apparatus’s inlet and outlet respectively.
- Connect the power cable into the “Power connector” at the back panel of the “Control unit”. Connect the power cable into the electrical network (230 V or 110 V).
- Switch on the device with the “Power switch”. When the device is on, the LEDs are on.

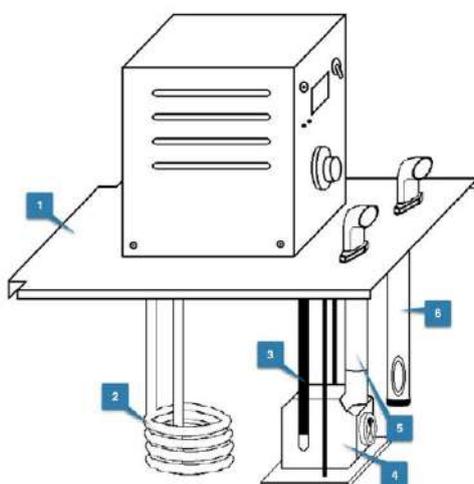
## Operation

- Set the Display switch (4) to SET, thus the set temperature shown on the display (3). Set the needed temperature with the SET potentiometer (5). It is recommended to fix the potentiometer (5) after setting the temperature.
- Set the Display switch (4) to MEAS, thus the current temperature of the fluid in the tank shown on the display (3).
- The HEATING LED (1) lights during heating the circulated water in the tank (2). When the temperature of the fluid reach the set temperature, the device regulates the temperature by a method described at technical parameters. The device heats up from +20 °C to +45 °C in 12 minutes.
- At low fluid level the temperature increasing could damage the unit. Therefore a liquid-level sensor is built in the system. The liquid-level sensor stops the pump and the heater, when the liquid level is low in the tank and the LOW LEVEL LED (2) lights at the front panel of the control unit. After reloading the tank with the required amount of distilled water, the engine and heater starts automatically at turned on state.
- After connecting the circulating water bath to any system, turn on the water bath to fill up the system’s reservoirs. Check the water level in the tank after filling up the measuring system and refill it, if necessary.

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## Technical guide

- The control unit (1) can be easily removed from the tank thereby the cleaning and maintenance can be simply performed.
- Remove the control unit by holding it at the sides of the plate. By removing the lid of the tank, all the parts can easily be cleaned.
- It is recommended to use distilled water in the circulating water bath to avoid scaling and contamination. Use only non-foaming detergents in high dilution (e.g. 0,01% ROCCAL, Sigma). Household lime scale remover is sufficient to remove lime scale.
- In case of failure or break down, please contact to your local distributor or MDE's customer support center! Follow the instructions, and return to service only the controlling unit, unless the contrary is asked.



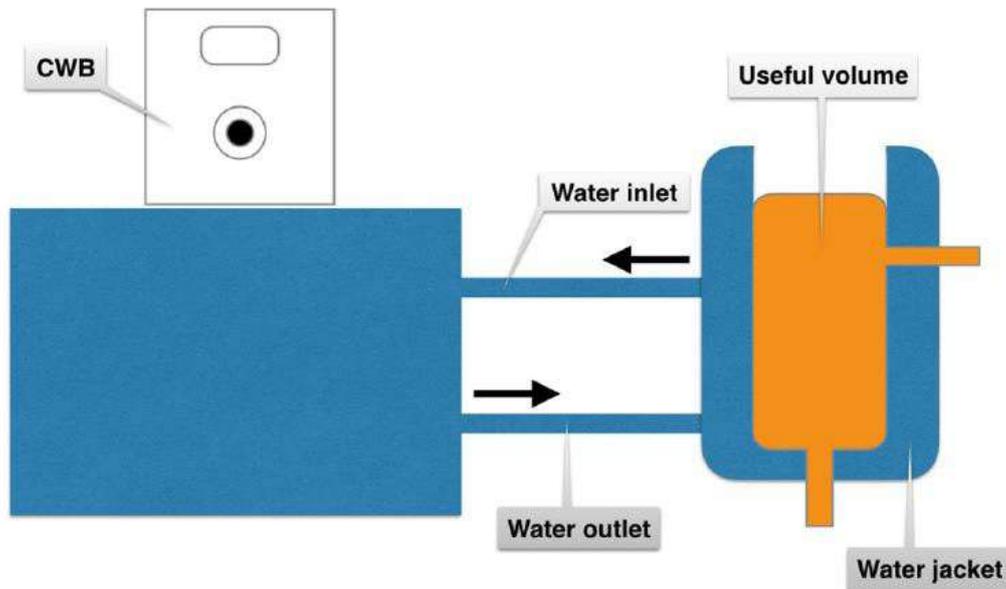
1	Control unit	4	Pump
2	Heater	5	Water inlet
3	Control temperature sensor	6	Water outlet

Technical parameters	CWB-01	CWB-02
Temperature display:	LED bar 3-digit	
Temperature sensor:	analogue (semiconductor)	
Temperature control:	on / off (automatic)	
Temperature setting:	analogue (continues)	
Delivery output of the pump max. (l/min):	60	60
Working temperature range (°C):	+20 ... +40	
Temperature stability (°C):	±0,01	
Tank capacity max. (l):	10	20
Power input (W):	600	1000
Dimension (mm):	280x320x220	320x350x220
Weight (kg):	8	10

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### Example for adjusting of temperature of a water jacketed system

To facilitating work in the followings an example can be found about the thermostating of additional equipment, and about setting the temperature. Connect one of the 20ml tissue bath of an MDE ISO-08 device to the circulating water bath.



### Parameters of the system:

Working volume*:	1 l (*Working volume = Tube "OUT" + Working volume + Tube "IN")
Circulating velocity:	13.3 l/min
Length of tube "OUT":	2.5 m
Length of tube "INP":	1.2 m
Thermostat temperature:	37 °C

After switching on the CWB, set the "Display switch" to "SET" position, then set the potentiometer to 37 °C. Then set the "Display switch" to "MEAS" position.

Wait until the "HEATING" LED is on, then went off. The LED lights again, when the CWB starts to heat again, after the fluid cools down under the set temperature. Note the extremes of the temperature, and the belonging time points. Perform the same measurement method with a mercury thermometer (0,1 °C accuracy) in the useful volume of the organ bath.

The measured data show that the system (CWB + ISO-08) operates with 0.2 °C hysteresis, which is shifted to the higher limit. This statement refers to the volume of 20 ml.

Therefore when temperature of the organ bath does not reach the desired temperature or overpasses it, the potentiometer should be set until the system reaches the desired temperature. During setting the temperature of the system, the temperature of the organ bath should be monitored using a mercury thermometer.