FOUR E'S SCIENTIFIC

Operating Instructions

Water Bath

WB101 / WB201

V02

Contents

Declaration of Conformity

Please read the operating instructions in full before starting up and follow the safety instructions.
The appearance and specifications are subject to change without notice.

PREFACE

Welcome to your Water Bath operating instructions. Users should read this manual carefully, follow the instructions and procedures, and be aware of all cautions when using this instrument.

DECLARATION OF CONFORMITY

This water bath complies with the relevant standards of
2014/35/EU: EN61010-1:2010+A1:2019+AC:2019
2014/30/EU: EN55011:2016+A2:2021, EN61326-1:2013,
EN EIC 61000-3-2:2019, EN61000-3-3:2013/A1:2019

1. SAFETY INSTRUCTIONS

Read the operating instructions in full before starting up and follow the safety instructions.

- Socket must be earthed (protective ground contact) before use.
- Water must be filled into the chamber before power-on.
- Avoid operating the bath without water.
- The symbols below are marked on the equipment and in this manual to indicate:

Caution: Surfaces can be hot during and after use.

Caution: Socket must be earthed (protective ground contact).

2. UNPACKING

Carefully unpack the device and inspect it for any damage.
Report any shipping damage to the carrier immediately.

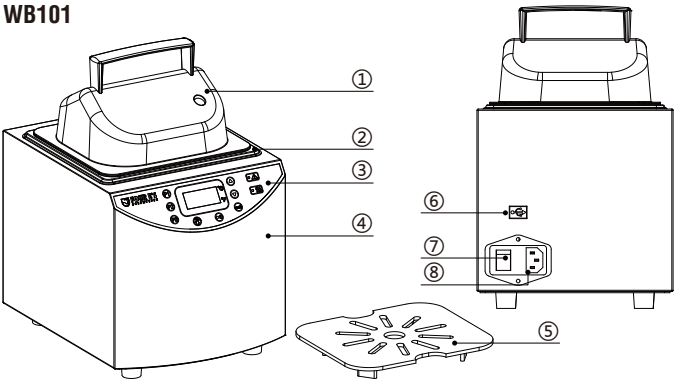
Caution: Do not plug in the device if the device and/or plug are visibly damaged.

Box contents

Model	WB101	WB201
Water bath	1	1
Cover board	/	1
Transparent lid	1	2
Base tray	1	1
Power cable	1	1
USB Type-A cable	1	1
Operating manual	1	1

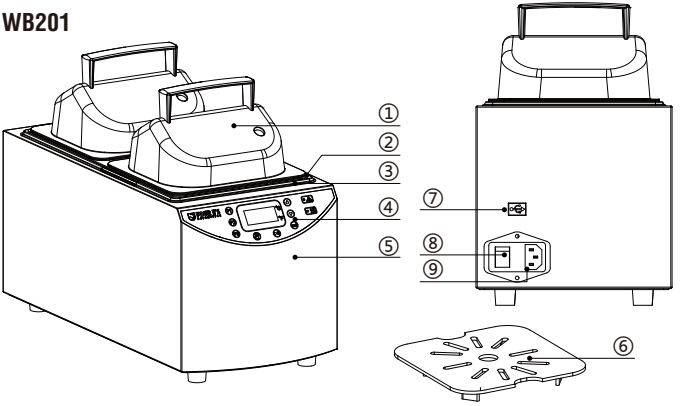
Note: There is a USB port at the back for software upgrade. For upgrading instructions, please contact your local dealer or manufacturer.

WB101



① Transparent lid ② Stainless-steel chamber ③ LED display
④ Water bath ⑤ Base tray ⑥ USB port ⑦ Power switch
⑧ Power socket

WB201



① Transparent lid ② Cover board ③ Stainless-steel chamber
④ LED display ⑤ Water bath ⑥ Base tray ⑦ USB port
⑧ Power switch ⑨ Power socket

3. INSTALLATION

3.1 Assembly of the equipment and components

The water bath has three main components, the bath, the lid and the base tray. The base tray fits into the bath with the feet downward so that it creates a gap between the bottom of the chamber and the tray.

Note:

1. For optimal temperature stability, avoid allowing the base tray and sample container to touch the sides of the chamber while operating.
2. The lid should only be lifted by the handle, as other parts can become hot during use.
3. The ventilation hole allows for temperature probe insertion. Do not seal this vent, as doing so may cause pressure to build up within the bath.

3.2 Instrument placement

Place the water bath on a level, non-combustible surface.

Ensure that the mains plug and the switch are easily accessible.

3.3 Electrical supply

- Check that the supply voltage marked on the serial number label, and the type of mains plug, are correct for your mains supply outlet, which must have a grounded connection.
- To disconnect the equipment from the mains supply, remove the mains plug from the mains supply outlet.

4. CORRECT USE

4.1. Avoid operating the bath without water

- Avoid using your bath without water in the chamber. Dry-start will affect the service life of the key components.

- The recommended minimum water level is one-third of the chamber height.
- The bath has an inbuilt protection mechanism known as dry start protection which will detect this condition in most circumstances and prevent the bath from continuing to heat. In this instance the bath will display "dry" and sound an alarm. If the protection program fails to detect the dry-heating, built-in safety temperature cut-out switch will cut off the heating to protect the water bath when heated to a certain temperature .

Note:

The dry-start protection program is on by default. If you need to turn it off, please refer to 5.8. Setting the dry-start protection alarm. The chamber internal surface can become very hot if an accidental dry start has occurred, even if the dry start cut out has operated. Avoid touching the chamber until it has been left to cool.

4.2. Emptying the baths

Before emptying any bath, disconnect the device from the power supply and pull out the plug. Then allow the water temperature to fall to a safe level and take reasonable precautions to prevent accidental spillage.

4.3. Using transparent lid

- When the setting temperature is above 60°C , use the lid to maintain proper temperature control and ensure that the water temperature reaches the set point.
- The lid will also prevent excessive evaporation that requires the bath to be filled more often and will save energy.

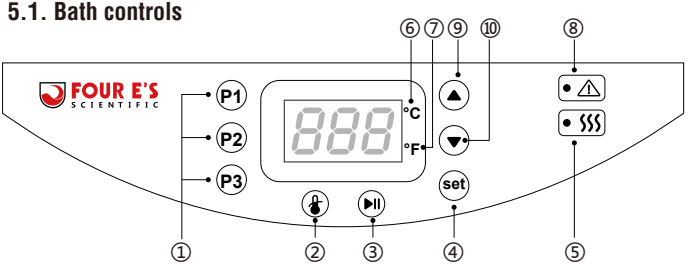
4.4. Using base tray

- Using the base tray can improve temperature control inside containers.

• Don't put the containers or other items into the stainless-steel chamber directly. Avoid the containers or other items direct contact with the inside walls of chamber.

5. OPERATION

5.1. Bath controls



① Preset program ② Over-temperature alarm key ③ Run/Stop
④ Set ⑤ Heating indicator ⑥ °C indicator ⑦ °F indicator
⑧ Alarm indicator ⑨ Up button (adjust values) ⑩ Down button (adjust values)

5.2. Heating temperature setting

Method 1:

Directly press ▲ ▼ to enter the temperature setting as following steps:
For example:
the current temperature is 37.0°C, and set the temperature 50.0°C

Operation	Display	
▲ ▼ →	50.0	Directly set the heating temperature you require
set →	37.0	Press the set key to save the value then exit, it displays the current temperature / OFF

Method 2:

Press (set) to enter the temperature setting sub-menu to adjust the temperature as following steps:

For example:

The current temperature is *37.0°C*, and set the temperature *50.0°C*

Operation	Display	
(set) →	°C	Press set key to enter the first level menu
(set) →	50.0	Press set key again to enter the temperature setting menu option
(▲) (▼) →	55.0	Set the temperature you require
(set) →	37.0	Press the set key to save the setting then exit, it displays the current temperature / *OFF*.

Method 3: Run the preset (P1) (P2) (P3) . Please see the detailed steps 5.4 for how to configure and run the presets.

5.3. Run/Stop

When it is displayed *OFF*, the water bath is in unheated status.

When it displays the actual temperature, the water bath is in heating status.

Press (▶II) to switch run/stop heating

For example:

Operation	Display	
	OFF	The bath is in unheated status
(▶II) →	50.0	Press the run/stop key to start heating, it displays the current temperature
(▶II) →	OFF	Press the run/stop key again, heating stops, and the screen displays "*OFF*"

5.4. Configuring and running temperature presets

The bath has 3 presets: (P1)(P2)(P3) . Temperature presets allow you to conveniently store or run bath temperature settings for you routinely use. Before you can use presets, you need to store the values you wish to use in at least one of the presets as the following procedures:

For example:

configuring the preset P1, the current temperature is 37.0°C, preset the temperature 50.0°C

Operation		Display	
(P1)	→	Pr 1	Select the preset you wish to set;
(▲)(▼)	→	50.0	Set the value you wish to use;
(P1)	→	37.0	Press the preset again to store the value and the bath with automatically return to displaying the current temperature/OFF

Running the preset as the following procedures

For example: run the preset P1

Operation		Display	
(P1)	→	Pr 1	Press the preset you want to use;
(set)	→	50.0	Press “set” to confirm the preset, it displays the current temperature/OFF.

5.5. Switch between Fahrenheit Temperature (°F) and Celsius Temperature (°C)

When the °C indicator is on, the unit of temperature is °C; When the °F indicator is on, the unit of temperature is °F.

Setting procedures as following:

For example: switch “°C” to “°F”.

Operation	Display	
set →	°C	Select the menu option;
▲ ▼ →	CFU	Navigate to the switching °C /°F selection menu option
set →	C	Press the set key to enter °C/ °F switching
▲ ▼ →	F	Switch to °F; C stands for °C, and F stands for °F
set →	37.0	Press the set key to save the setting, it displays the current temperature / OFF.

5.6 Setting the over temperature alarm

Protect the sample by setting the max. temperature that the bath allows to be heated.

The setting procedures are as following:

Operation	Display	
🌡	OtP	Press the over-temperature alarm key to enter the setting menu.
▲ ▼ →	90.0	Set the over-temperature alarm value you require.
🌡 →	37.0	Press the over-temperature alarm key again to save the setting, it displays the current temperature/OFF.

If the liquid temperature exceeds the setting over-temperature alarm limited temperature, the water bath will stop heating, display "OtA" and start an alarm. The alarm can be turned off by the following operations:

• Turn off the power, the alarm is turned off, and restart the machine

after the water temperature is lower than the over-temperature alarm limited temperature.

- Add some cold water until the water temperature drops below the over-temperature alarm limited temperature, and the alarm will be turned off.
- Set the over-temperature alarm limited temperature to above the water temperature, and the alarm will be turned off.

5.7. Setting the countdown timer

The countdown timer range is 1~999 min.

After the countdown is over, an alarm will sound three times and the heating will stop, "*OFF*" is displayed.

Note:

1. When the countdown time is more than 10 minutes, the countdown time is hidden and the real-time temperature is displayed.
2. When the countdown time is less than 10 minutes, the countdown time is displayed.
3. The countdown can start only in heating state. The countdown will stop once the heating is stopped.
4. In heating state, save the setting value of timer, the countdown will start immediately.
5. In unheated state, save the setting value of timer, then press the "⏯RUN/STOP" to start countdown.
6. The countdown settings are independent of the temperature settings. When setting the countdown, take into account the time required to achieve the set temperature.

The countdown timer setting as following procedures:

For example:

set the countdown time from 0 to 10 min.

Operation	Display	
(set) →	°C	Select the menu option
(▲) (▼) →	CdE	Navigate to the countdown timer selection menu option.
(set) →	OFF	Press set key to enter the countdown timer setting. If the countdown time is 0, it displays OFF. If not, it displays the countdown timer value.
(▲) (▼) →	010.	Set the countdown time you require. The " • " in lower right corner means that it is in countdown timer setting.
(set) →	9.57	Press (set) key to save the setting. The countdown timer will begin once you save the setting. The setting will exit automatically after 5S without operation.

5.8. Setting the dry start protection alarm

When the dry start protection alarm function is on, the bath will stop heating and an alarm will sound when the system detects that the inner chamber is in dry-start status. When the dry start protection alarm is off, there is no protection alarm and the bath will stop heating if the inner chamber is in dry status and error code "dry" will be shown.

For example:

the current temperature is 37.0°C, set the dry start protection alarm from "ON" to "OFF".

Operation	Display	
(set) →	°C	Select the menu option
(▲) (▼) →	dPA	Select the dry start protection alarm setting menu option
(set) →	On	Press set key to enter the dry start protection alarm setting. The default setting is "On"
(▲) (▼) →	OFF	Select to turn off the dry start protection alarm
(set) →	37.0	Press (set) key to save the setting. The setting will exit automatically after 5S without operation. It displays the current temperature / OFF

Note: The dry-start protection mechanism works by heating up the bath a few degrees and checking the water level. If the set temperature is too close to the current water bath temperature and/or the water level is quite low, then the overshoot past the set temperature point will be quite high. To avoid such conditions, ensure the water level is at an adequate height of at least 38mm.

6. CALIBRATION

6.1. Calibration Conditions

To ensure accurate calibration results, ensure the following:

1. The accuracy of the temperature probe used for calibration shall be more than 10 times that of the water bath display (which has a precision of 0.1°C).
2. The ambient temperature shall be stable to ±1°C without air convection.
3. Allow the bath temperature to stabilize at the calibration temperature

for 30 minutes before inputting the calibration reading.

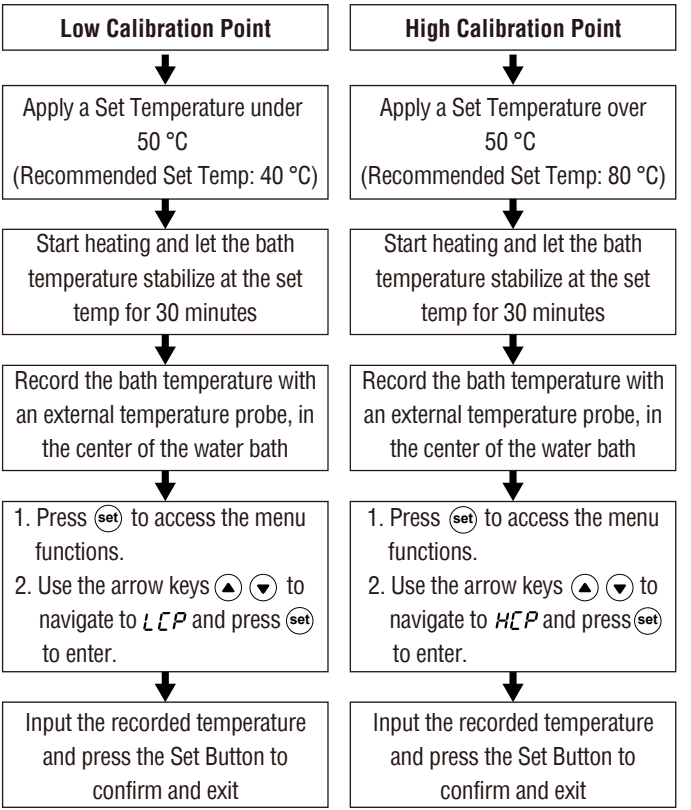
4. Fill the water bath to a height of 38mm, and place the temperature probe in the center of the water bath, 40mm from the sides.

6.2. Dual point calibration

Our instrument employs two-point calibration, with the Low Calibration Point between 5-50°C (40°C recommended), and the High Calibration Point between 50-99.9°C (80°C recommended)

Calibration Procedure

1. Fill your water bath to a height of at least 38mm.
2. Power on your water bath (starting from ambient temperature conditions)
3. Follow the Low Calibration Point procedure in the flowchart
4. Follow the High Calibration Point procedure in the flowchart


Low Calibration Point
Apply a Set Temperature under 50 °C (Recommended Set Temp: 40 °C)
Start heating and let the bath temperature stabilize at the set temp for 30 minutes
Record the bath temperature with an external temperature probe, in the center of the water bath
1. Press set to access the menu functions.
2. Use the arrow keys ▲ ▼ to navigate to LCP and press set to enter.
Input the recorded temperature and press the Set Button to confirm and exit
High Calibration Point
Apply a Set Temperature over 50 °C (Recommended Set Temp: 80 °C)
Start heating and let the bath temperature stabilize at the set temp for 30 minutes
Record the bath temperature with an external temperature probe, in the center of the water bath
1. Press set to access the menu functions.
2. Use the arrow keys ▲ ▼ to navigate to HCP and press set to enter.
Input the recorded temperature and press the Set Button to confirm and exit

7. FAULTS

Error code	Cause	Solution
SHt	Temperature sensor short-circuit	Check the temperature sensor or motherboard for a short circuit fault.
OPn	Temperature sensor open-circuit	Check if the sensor is well connected.
dry	Dry-start alarm, no water in the chamber or the water level is below the min.	Switch the bath off and refill the bath with water
OtP	Over-temperature Alarm 1. The initial water temperature is above the OtP value 2.The OtP setting value is too low	1. Let water cool. 2.Reset the OtP value.
rOn	Temperature sensors malfunction	Contact supplier or manufacturer.
Out	Calibration temperature not within the required range	1. Check if the low calibration point or high calibration point is within the required range. 2. Check if the temperature difference between the one measured by a thermometer and the one measured on the water bath is more than 10°C (If it is, there is issue on the temperature probe on the water bath）.

8.MAINTENANCE AND CLEANING

Correct use of the instrument to keep it in good working condition will help extend its service life.

Disconnect the power supply before maintenance and cleaning.

No routine maintenance is required except for cleaning. Clean the outside of the equipment with a damp cloth soaked in soap, dish washing liquid or alcohol. Wait until dry before continuing to use.

There are no user serviceable parts inside the unit.

9. TECHNICAL DATA

Model	WB201	WB101
Reservoir Capacity	5L	2L
Heating temperature range	RT+5°C to 99°C	RT+5°C to 99°C
Permissible ambient temp.	10-35°C	10-35°C
Over temperature cut-off	Yes	Yes
Dry-start protection	Yes	Yes
Temperature stability	±0.5°C	±0.5°C
Display resolution	0.1°C	0.1°C
Temperature uniformity	±0.5°C	±0.5°C
Display	LED	LED
Time setting range	1-999min	1-999min
Chamber dimensions (W x D x H)	150x300x150mm / 5.9x11.8x5.9in	150x138x150mm / 5.9x5.4x5.9in
Dimensions (W x D x H) (incl. cover)	188x394x285mm / 7.4x15.5x11.2in	188x23 x285mm / 7.4x9.1x11.2in
Weight	4.5kg / 9.9lbs	3.0kg / 6.6lbs
Power Supply	100-120V 60Hz / 200-240V 50Hz	
Power	450W	200W

10. WARRANTY

We guarantee that our scientific instruments adhere to the most rigorous engineering and quality standards. This instrument is warranted to be free from defects in materials and workmanship under normal use and service, for a period of 24 months from the date of dispatch. The warranty is extended only to the original purchaser. For claims under the warranty, please contact your local supplier. After the warranty period expires, the manufacturer retains the right to invoice the cost price for the repair or maintenance of a faulty device, along with any associated service fees.

Scope of Warranty

The following conditions are not covered under the warranty.

- Faults or damage caused by negligence, improper installation, improper operation, or failure to use and maintain the machine in accordance with the instructions in this operating manual.
- Issues caused by unauthorized disassembly or modification.

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