

OPERATION AND
MAINTENANCE MANUAL

BPC[®] Thermostatic Water Bath



Version 1.0 January 2024

The latest version of this manual can always be downloaded from:
https://bpcinstruments.com/bpc_products/

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GENERAL INFORMATION

Before operating the Thermostatic Water Bath (hereafter referred to as “the instrument”, “the system”, “the equipment” or “BPC® Thermostatic Water Bath” interchangeably) from BPC Instruments AB (hereafter referred to as “BPC Instruments”, “BPC”, “Bioprocess Control” or “BPC Instruments AB” interchangeably), carefully read this operator manual for the instrument, any separate instructions for other equipment used together or in conjunction with the instrument as well as the safety instructions for any and all chemicals used in the process of utilizing the instrument.

Safety Information

When performing experiments with the instrument, always use protective eyewear, gloves, and lab coat. Always make sure there is adequate ventilation and take proper precautions when handling electrical devices near water or explosive gases. Make sure to tie back any hanging objects, such as hair and clothing, when working near rotating or otherwise moving parts.

Do not modify the instrument without the prior consent of the manufacturer. BPC Instruments AB do not assume responsibility for any errors due to equipment modification.

Do not clean or service the instrument while it is running.

Do not expose the instrument to mechanical vibrations or high frequency radio transmissions.

Never operate the instrument in a way it was not intended.

Never operate the instrument, nor let anyone else operate it, without proper training.

Never use the instrument outside or in environments with parameters outside of the instruments recommended range.

Never connect additional electrical equipment not supplied by BPC Instruments AB for the express purpose of using with the instrument. This is true even if the connections can mate.

Never attempt to lift the instrument when it is filled with liquid.

Always keep the instrument level and on a flat and stable surface.

Always make sure all safety guards are in place and working before operating the instrument.

Always make sure that all parts are functioning properly immediately after start-up.

Always keep the instrument clean.

Always make sure to have access to relevant chemicals before starting an experiment.

Dispose of parts and chemicals performed according to applicable rules in the country of usage.

Periodic maintenance of the instrument and its various accessories is essential. Always make sure they are in working condition. If service or spare parts are required, please visit <https://webshop.bpcinstruments.com> or contact BPC Instruments AB directly or one of its representatives.

Always make sure to connect the power supply so that it is easy to remove from the mains power outlet and so it doesn't risk becoming damaged.

Always wait 60 seconds between powering the system on and off. This will allow for the operating system to shut down properly and for the capacitors to properly cycle.

Limited Warranty

The product warranty provided with the instrument corresponds to the stipulations in Orgaline 2012, unless otherwise agreed upon with BPC Instruments AB ("BPC"). BPC Instruments AB ("BPC") reserves the right to correct any possible errors, mistakes, changes, updates, technical data or otherwise relevant information in this manual or any other documents, where applicable by law.

Electrical Safety

Compliance is required with respect to voltage, frequency and current requirements indicated on relevant parts. Improper operation, damage to the equipment, fire or otherwise undesired effects might be caused by connecting to a different power source. There are no user-serviceable parts in the equipment, unless otherwise agreed upon with BPC Instruments AB ("BPC").

Declaration of Conformity

Hereby, BPC Instruments AB ("BPC"), declares that this device is in compliance with the essential requirements and other relevant provisions according to the EU declaration of conformity.

Delivery Checks

As soon as taking delivery of the instrument and before putting it into service, inspect the package and make sure there is no damage. If there is any reason to believe that the instrument has not arrived in a suitable condition, inform the transport company and request that they document the issue appropriately, self-document using photographs and contact your seller for further information.

Read the operations manual in its complete form. This will assure that the instrument is used appropriately and will serve as a guide to identify any damage to the instrument or parts thereof.

The following parts should be included in your purchase. If this is not the case, please contact your seller in order to receive the missing parts.

BPC® Thermostatic Water Bath (Art No 21-0104-01)

1 Drainage Tube / 1 Bottom Plate / 1 Power Cable

Optional Equipment

The following equipment can be bought from BPC Instruments AB and its distributors. They are not required to perform experiments with the instrument, but they are fully compatible and, depending on the use case, can increase the effectiveness, abilities, or functions of the instrument.

Glass Bottle 0.5 or 1 L, (2) Package 10 (Art No 01-0101-03 / 95-0001-00)

Glass Bottle 2 L, (1) Package 10 (Art No 102-0003-00)

Brushless DC Motor, Kit 18 and Kit 9 (Art No 21-0102-02 / 22-0102-02)

Thermostatic Water Bath Lid for 18 Bottles (0.5 and 1 L) and 9 Bottles (2 L) (Art No 21-0105-01 / 21-0105-02 / 22-0105-01)

Lid GL 45 with Twin Connectors, Package 10 (Art No 22-0201-02)

Stirrer GL 45 0.5, 1 and 2 L, Package 10 (Art No 21-0101-02 / 21-0103-02 / 22-0103-02)

Push-In Valve 6 mm, Package 10 (Art No 24-0401-02)

Festo PUN-H-6X1-NT (50 m) (Art No 08-0610-01)

For a complete listing of available systems and parts from BPC Instruments AB, for this instrument and others, please visit our online store at <https://webshop.bpcinstruments.com> or contact our sales team via email at sales@bpcinstruments.com or via phone at +46 (0)46 163950.

For assistance with usage of the system, or parts of it, please contact our support team via email at support@bpcinstruments.com or via phone at +46 (0)46 163950.

Please have the serial number of your instrument easily accessible as this will allow us to assist you in a quicker and more accurate fashion.

Before Getting Started

Read this manual before installing and using the instrument. In addition, keep this instruction manual for future reference and make sure it is easily available for people who regularly use the agitation system.

Contact Information

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Swedish organisation number: 556687-246

TECHNICAL SPECIFICATIONS

Parameters	Unit	
Working temperature range	°C	20 - 60
Temperature stability	°C	±0.2
Resolution	°C	0.1
Temperature setting mode		Digital
Display		LED
Heating mode		Electric heating
Temperature control mode		PID
Heating power	kW	1.2
Bath opening (length × width)	cm	60×50
Bath depth	cm	20
Capacity	L	40
Material		Stainless steel
External dimensions	cm	68×56×32
Weight	kg	20
Temperature sensor		NTC 10k
Liquid level sensor		HB-30
Power supply	V / Hz	AC 220 / 50-60 AC 110 / 50-60

Table 1. Technical specifications of the Thermostatic Water Bath.

MAIN FEATURES AND RECOMMENDATIONS

- Easy to setup the desired temperature. The temperature is controlled by a simple and intuitive digital interface.
- Designed with PID micro-processing technology to provide high temperature control.
- Protective function to automatically stop heating in case of lack of water.
- Designed with independent temperature-limiting alarm system
- Lid to minimize water loss and ensure that the temperature set point will be reached (not included in the package).
- Lateral drainage port and handles for easy discharging of water.
- Only water should be used as bath liquid. *Do not use flammable or volatile toxic substances as bath liquid.*
- The water level in the bath chamber should be kept between 10 mm above the bottom holder and 45 mm below its maximum capacity (the top of the tank).
- Materials that need temperature control should not be in direct contact with the bath liquid.
- This instrument meets the safety-related requirements in accordance with the following standards: DIN 12876, DIN EN 61010-1, and DIN EN 61326-1.



Important notes:

- The instrument must be plugged into an earthed socket with the correct voltage.
- Always unplug the power cable from the mains before doing maintenance and repair work, and when moving the equipment.
- Never run the device in areas with potentially explosive atmosphere.
- Never run the device if it has visible damages or if it is leaking.
- Beware of high surface temperatures (above 60° C) on the Thermostatic Water Bath when it is in operation.
- This instrument is not designed for tempering of food, pharmaceuticals, medico-technical products, or any other products, which would be in unprotected contact with the bath liquid.
- **Conductivity sensor is used for water detection, specifically to prevent dry running. Some salt (approx. 0.2 mg/L) or tap water (approx. 20 mL/L) needs to be added to deionized/distilled water.**

CHAPTER 01: OVERVIEW

The Thermostatic Water Bath is a laboratory instrument designed to heat and keep samples at a constant temperature. This equipment has been used for a wide range of applications in chemical, biochemical, biotechnology laboratories, mostly as an important part of a larger test.

Among several possible processes and procedures involving the application of a Thermostatic Water Bath, this instrument has been widely used to incubate samples for anaerobic tests (e.g., anaerobic digestion for biogas production) and aerobic tests (e.g., biodegradability of plastic materials).

The analytical platforms provided by BPC Instruments AB, Automatic Methane Potential Test System (AMPTS® III), BPC® Blue, Gas Endeavour (GE® III), and BioReactor Simulator (BRS® III), apply a Thermostatic Water Bath as part of the Unit A (incubation unit). The BPC® Thermostatic Water Bath has a double wall construction, where the bath container is made of stainless steel and the housing is made of coated steel sheet. This instrument allows the operation of 18 bioreactors (0.5 or 1 L) or 9 bioreactors (2 L) simultaneously, providing an outstanding temperature control and stability. Experiments can be conducted for a long period of time (several months) at a certain temperature with minimal variation.

CHAPTER 02: EQUIPMENT DESCRIPTION

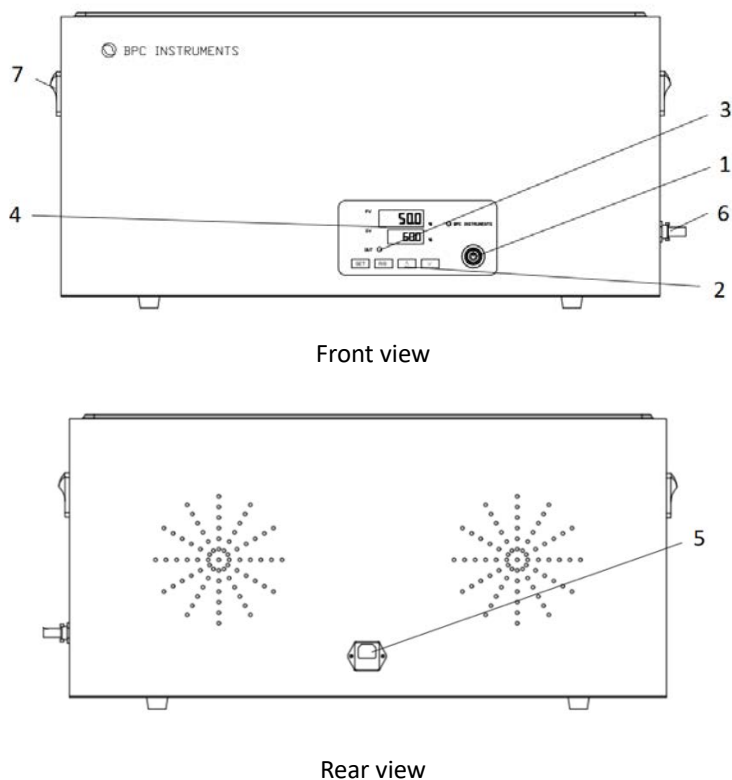






Figure 1. Representation (front and rear view) of the thermostatic water bath.

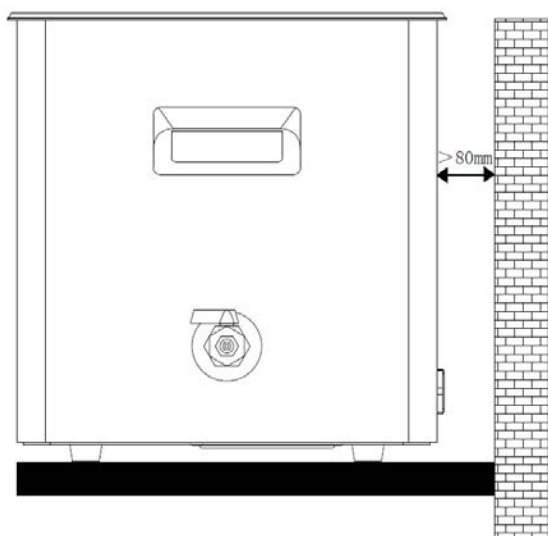
Based on the description of the instrument above (**Figure 1**), the BPC® Thermostatic Water Bath presents the following functions and components:

1.  Power switch
2.  Editing key (shift digit / increase/ decrease)
3.  Heating control light
4.  LED screens for temperature control
5. Power cord socket
6. Draining port
7. Handles

A plastic bottle holder located on the bottom of the bath chamber creates a distance between the reactors and the heated surface of the chamber, where water can circulate and keep the temperature of the system constant.

Additionally, the equipment has the option to add a lid which provides suitable temperature control by minimizing water loss.

CHAPTER 03: INSTALATION AND OPERATION



Please always keep the instrument upright.

Keep a distance of at least 80 mm between the instrument and the wall (**Figure 2**).

Figure 2. Basic instructions of how to install and place the instrument.

In order to use the Thermostatic Water Bath, please follow the steps below:

- Place the plastic bottle holder on the bottom and the lid on the top of the bath chamber.
- Add water (*preferably distilled water*) in the bath chamber observing the minimum and maximum recommendation level. The volume applied will be determined by the volume and quantity of bottles placed inside the instrument. The user can inject a small volume of bath liquid first, insert the object that needs to be temperature-controlled, and then adjust the amount of bath liquid to the required level.
- Connect the instrument to the power source.
- Press the power switch to turn it on. After a few seconds, the current water temperature and the desired temperature will be shown. The instrument contains 2 LED screens: the first one displaying the current temperature (PV) and the second one showing the desired temperature (SV).
- Press the button **SET** to determine the desired temperature (SV). The desired temperature can be easily selected by using the shift digit, increase and decrease buttons. When the button **SET** is pressed, the last digit of the value displayed in SV blinks, indicating that the respective digit can be changed by pressing the buttons increase (\wedge) and decrease (\vee). If there is a considerable difference between the current and desired temperature in SV, the user can use the shift digit button (R/S) to select the first digit and quickly go from 30 to 60°C, for example. Once the desired temperature is selected, press the button set again to save the value.
- Once the desired temperature is established, the instrument will heat the water until PV and SV reach the same values. When the light **OUT** is on, it is an indication that the instrument is on heating mode. When the temperature in PV is close to reach the SV, 2° C from SV, the light **OUT** will start blinking until the desired temperature is achieved.

After using the instrument, the following procedures described below need to be done:

- Turn off the instrument by pressing the power switch button.
- Disconnect the thermostatic water bath from the power source.
- If the instrument was used under high temperatures, wait until the system cools down before removing the lid.
- Remove the lid and the bottles.
- Insert a suitable drainpipe into the drainage port. Put the end of the pipe into a sink or container to completely discharge the water inside the bath chamber, according to the picture below (**Figure 3**):

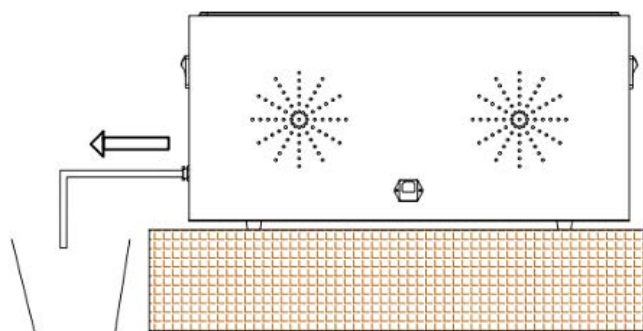


Figure 3. Instruction to discharge the water after using the instrument.

The table below (**table 2**) shows 2 situations that can occur with the Thermostatic Water Bath, where the nature of the problem is described and how to solve them.


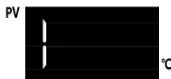
 <p>Continuous beep warning (alarm)</p>	<p>The instrument is operating without bath liquid or lower than the minimum recommended level</p> <p>Add enough water to the bath chamber</p>
 <p>Only 1 is displayed at PV</p>	<p>The temperature sensor is not working</p> <p>Restart the instrument. If the problem remains, the temperature sensor needs to be changed</p>

Table 2. Possible faults and troubleshooting involving the recommended level of the bath liquid and temperature sensor.

CHAPTER 04: MAINTENANCE

In order to ensure a long life of the BPC® Thermostatic Water Bath, regular maintenance of the instrument is needed. Always make sure to use the instrument according to the following guidelines:

- The instrument must be kept in a dry and clean environment.
- When operating the instrument, ensure that the bath liquid is maintained within the recommended level. Regularly monitor the water level and replenish the equipment with water if it is not in direct contact with the water bath lid.
- Avoid applying only tap water as bath liquid, since the minerals included in this type of water might negatively impact the material of the bath chamber (calcification or corrosion of stainless steel).
- If the Thermostatic Water Bath will be not used for a long period of time, make sure that the water chamber is empty and clean. To clean the water bath, wipe it with a damp cloth and, if required, a gentle form of detergent.
- Water must not get into the machine, since it can harm electrical components.

CHAPTER 05: EQUIPMENT DISPOSAL

This equipment must not be disposed together with unsorted waste. Instead, it is the user responsibility to dispose the equipment at lifecycle end by handling it over to an authorized facility for separate collection and recycling. It is also the user responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, to prevent any risk of spreading health hazards to people involved in the disposal and recycling of the instrument.

For more information about where you can leave electronic devices for recycling, please contact your local dealer from whom you originally purchased this equipment.