Unstirred water bath

JBA5PH, JBA12PH, JBA18PH

Operating Manual

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1 Use of products

The following products are covered by in this operating manual

JBA5PH, JBA12PH, JBA18PH

The products listed above are a general purpose series of thermostatically controlled unstirred water baths designed for indoor laboratory use by a professional user.

2 How to use this operating manual

This operating manual will allow you to unpack, set up and operate this water bath correctly and safely. Important safety information, symbols and warnings are listed below and should be read carefully.

If there is a technical matter that this operating manual does not address, or any other questions concerning this product, please contact Philip Harris who will be able to provide any additional information.

3 Product registration and warranty

The warranty for this water bath is detailed in section 10 but to register you should complete the on-line registration form at

Not registering your product may affect your warranty.

4 Safety information

4.1 Safety compliance

The baths are manufactured for Philip Harris (Findel Education) in the UK by Grant Instruments Ltd and meet the requirements of international safety standard IEC 61010 – “Safety requirements for electrical equipment for measurement, control, and laboratory use”.

They also comply with the equivalent national standards including:

EN 61010-2-010

4.2 Safety symbols

The symbols below are marked on the equipment to indicate:

Caution: Surfaces and water can be hot during and after use

Read this manual before using the bath

Important safety warning

Recommended operation
Failure to follow may affect the performance of the equipment

4.3 Safety warnings

	Read the whole of the instructions. Safety may be impaired if they are not followed.
 	Surfaces and water can be hot during and after use. Before emptying a bath, allow the water temperature to fall to a safe level. This bath is only intended for use with water or metallic heat transfer beads. Use of other fluids or heat transfer media may invalidate the warranty and present a risk of fire or explosion. The tray must be removed when using heat transfer beads. Place on a stable flat surface to reduce the risk of accidental spillage. No user serviceable parts. Risk of electric shock after disassembly or operation with covers removed. Not for use in environments with a risk of flammable or explosive gases. To be operated within the limits listed in this guide Only use the mains cord provided or one with an identical rating. Ensure that the mains plug and the switch are easily accessible. A clearance of >10cm around the bath is required to ensure adequate airflow. If a potentially hazardous liquid is spilt onto the equipment, disconnect it from the power supply and have it checked by a competent person. It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on the equipment.

Clean the outside of the equipment with a damp cloth, using water and domestic cleaning products only.

The use of other chemical cleaning agents may damage the equipment. Always follow the manufacturer's instructions and any applicable legislation about the use of potentially hazardous substances.

To preserve your water bath in peak condition consult the extra guidance listed below. Failure to do so may affect your warranty. Consult online resources for additional important information.

For optimum performance prevent tray from touching bath sides.

Before first switching on the bath please remember to fill the bath with water. Switching the bath on dry can damage the heater and could invalidate the product warranty.

If the equipment has been transported or stored in cold or humid conditions, condensation may form inside it. If that could have happened, allow time (at least 2 hours at room temperature) for the condensation to evaporate before using the equipment.

When operating the bath in high ambient temperatures (> 30°C) the temperature of the water used to fill the bath should be no more than 10°C below the ambient.

5 Operating instructions

5.1 Unpacking instructions

Standard equipment includes:

- Thermostatic water bath
- Mains cord with plug
- Gabled polycarbonate lid
- Polycarbonate base tray
- Short user guide

Remove packing materials carefully, and retain for future shipment or storage of the equipment.

5.2 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 tank and the tray.

	For optimum temperature stability, avoid allowing the base tray to touch the sides of the tank when using water. The base tray must be removed when using heat transfer beads

The unit plastic lid should always be removed by using the handle, as other parts can become hot during use. It also has a vent/thermometer hole – this hole should not be sealed as pressure could build up inside the bath.

5.3 Installation

Place the water bath on a level, non-combustible surface. Ensure that the mains plug and the switch are easily accessible.

5.4 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 ground connection.

To disconnect the equipment from the mains supply, remove the mains plug from the mains supply outlet.

6 Operating procedures

6.1 Operation

6.1.1 Water level

The bath will provide optimum performance when filled to the swage line which is typically 25mm below the top of the tank.

Do not fill above the swage line.

The water level used in the tank will influence the temperature accuracy and stability. Using liquid levels below the swage line needs consideration, especially when operating at higher water temperatures (>50ºC) and without a lid. We recommend the following minimum fill levels

Tanks size	Recommended min % fill	Approximate water depth (mm)
5L	40%	50
12L		50
18L		50

Table 1 - Recommended minimum fill levels

When using a larger bath with vessels it only requires a shallow immersion, we recommend filling the bath as close to the swage line as possible and using raised shelves in the bath to elevate the vessel to the desired immersion depth.

6.1.2 Operating the bath without water (δρψ, OTX)

Do not attempt to use your bath without water in the tank. The bath has an inbuilt protection mechanism known as dry start protection will detect this condition in most circumstances and prevent the bath from continuing to heat. In this instance the bath will display δρψ and sound an alarm.

	The tank 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 tank until it has been left to cool for several minutes.

Once you have filled the bath, you will need to switch the bath off and on in order to resume operation.

	Repeated dry starting of the bath stresses key components in the bath which can affect service life and the equipment's warranty.

The bath also includes an independent safety temperature cut out which will protect the bath in the unlikely event of a fault or if the dry protection alarm is switched off (see section 6.1.5).

If the cut out is activated then the bath will stop heating, show on the display and sound an alarm.

The bath should be switched off, unplugged and allowed to cool for at least 30 minutes.

6.1.3 Operation above 60°C

The lid must be used above 60°C to maintain proper temperature control and to 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.

6.1.4 Flat bottomed vessels

Do not place flat-bottomed vessels or other objects directly on the bottom of the tank.

Always use the base tray. This avoids possible damage to the heater mounted under the tank. The base tray also improves temperature control.

6.1.5 Allowing the bath to run dry (δΠA)

Always take care to avoid allowing the water to evaporate to the point that the bath runs dry. This can lead to the bath's internal safety cut-out operating. In this situation the display will show **(OTX)** and sound an alarm.

Contact Philip Harris service department at for information on how your bath can be reset.

The bath has a built-in advanced detection mechanism to greatly reduce the chances of the safety cut out occurring in most circumstances where the bath is left to accidentally run dry. This feature is only enabled automatically when the following criteria are met:

- The set temperature is >50°C
- The bath has been operating for a least one hour
- The water is not set to boiling point (>=99ºC)

If the bath detects signs that the bath water level may be becoming low, it will alert the user by displaying drY and sounding an alarm

Once you have checked the water level and topped up the water level as necessary you will need to switch the bath off and on in order to resume operation.

For users with specialist applications where this feature maybe unnecessarily triggered it can be disabled.

Press the set key to enter the bath menu and use the arrow keys to select δπA (Dry Protection Alarm).

Press the set key and use the arrow keys to select off.

Use the set key to confirm that the dry start and run dry protection are switched off.

6.1.6 Emptying the baths

Before emptying any bath allow the water temperature to fall to a safe level and take reasonable precautions to prevent accidental spillage.

Larger baths have drain taps to make emptying easier.

To empty the bath using the drain tap, push the supplied drain insert into the drain tap.

Note that the water will begin to empty as soon as the drain insert is fully engaged.

A length of hose can be added to the barbed end of the drain insert if required.

6.1.7 Using the bath with heat transfer beads (HτΣ)

The baths can be set up to operate with heat transfer beads as an alternative to water. Remove the tray before filling the bath with the beads.

Configure the bath using the Heat transfer selection menu

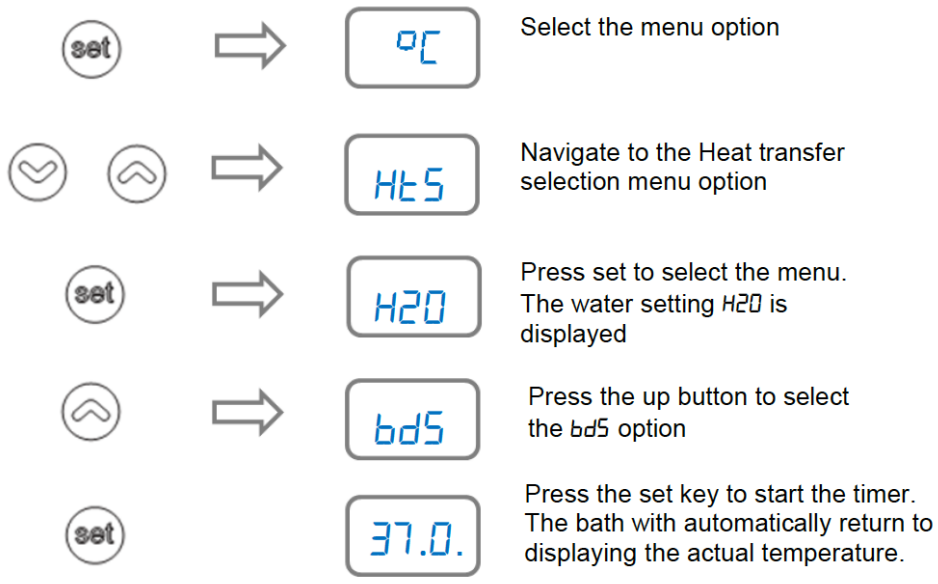


Figure 1 – Setting the bath for heat transfer beads

Operating the bath configured for use with heat transfer beads the temperature range is limited to 80°C maximum.

The Dry Protection Alarm is no longer required so is not available on the bath menu.

Note - Baths using heat transfer beads behave differently from water baths.

The performance specification of Philip Harris baths detailed in Section 9 is for water only.

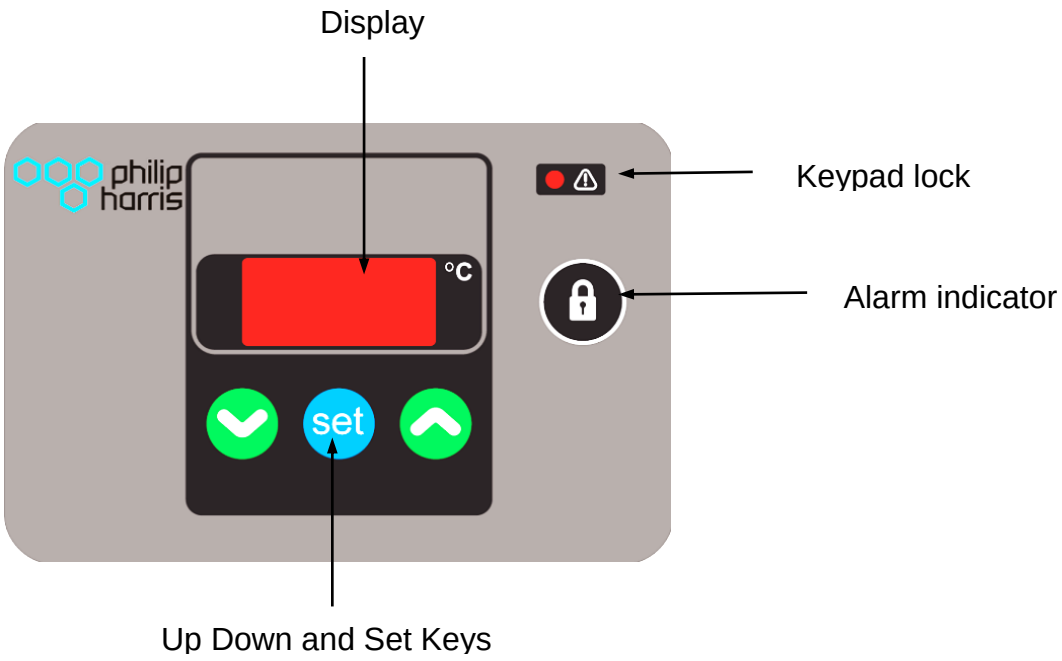
Performance with heat transfer beads will be significantly different. Users should refer to the bead manufacturer's recommendations for use and performance.

Any existing protocols for sample preparation will need to be revalidated to prevent possible overheating.

7 Using the water bath

7.1 Using the JBAPH baths

7.1.1 Bath controls



7.1.2 Indicators

There are two indicators:

- Main display – used to show temperature and short messages
- Alarm - Flashes red when activated. A buzzer also sounds.

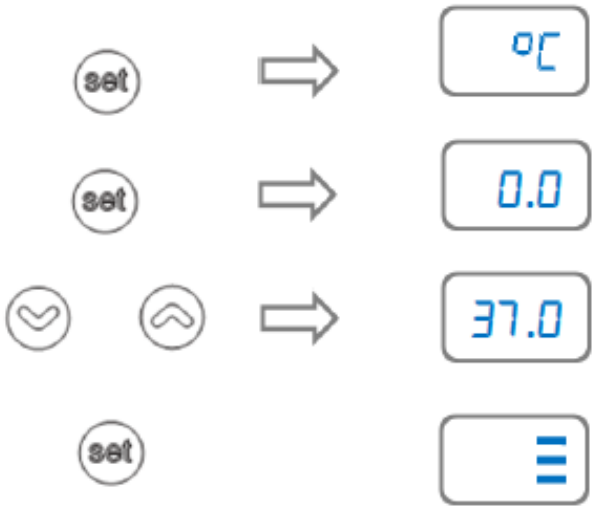
7.1.3 Setting the bath control temperature (°C)

The water temperature of the bath can be set using the main display.

The following example shows setting the water bath to 37.0°C.

Note that once the set point is entered the bath shows a scrolling bar display indicating the bath is heating.

Once the bath is with 1°C of the set temperature this will change to displaying the actual water temperature in the bath.



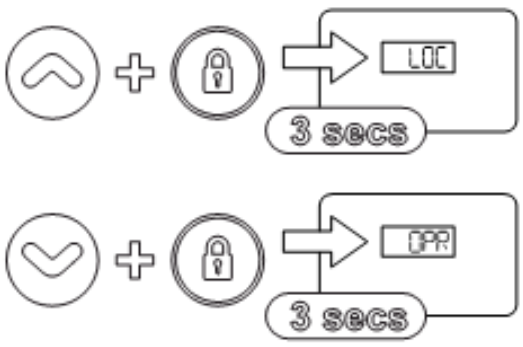
7.1.4 Enabling the keypad lock

The control panel can be locked by pressing the **set** and **up** keys simultaneously for at least 3 seconds.

The display will show LOC to confirm that the keypad has locked.

The display will show OPR to confirm that the keypad is operational.

To enable and disable the lock, press and hold the **lock** and **up** or **down** keys for three seconds as shown below



Locked

Unlocked

7.1.5 Setting the over temperature protection (OτΠ)

The over temperature protection can be used to protect samples by setting a maximum temperature limit the bath is allowed to heat to.

If the bath exceeds this temperature, it will stop heating, display OτA (over temperature alarm) and sound an alarm.

To silence the alarm feature press the set key.

Allow the bath to cool down before switching the bath off and on to resume normal operation.

Note that if the cause of overheating is an incorrect set point, this will need to be corrected otherwise the alarm will operate again.

You should set the over temperature value, allowing for a safety margin to the sample maximum temperature limit if possible.

Additionally the OτΠ limit should be greater than the bath set point to avoid nuisance alarms. Philip Harris recommends this is at least 1°C.

If an over temp value has already been set the display will show the value and not off.

Set the value you wish to use – in this case 40°C

The OTA is now set and the bath will display the current water temperature

To disable the alarm, set the over temperature alarm limit to 10.0°C and then press the down button one further time so the display shows OFF.

This can be saved by pressing the over temperature alarm key.

7.1.6 Setting the countdown timer (Xδτ)

A countdown timer can be set in the range of 1 to 999 minutes.

The countdown timer will sound an alarm at the end of a countdown period.

It can be used to time experiments or remind you to take a further action.

When the countdown timer expires the bath will sound an alarm and display End.

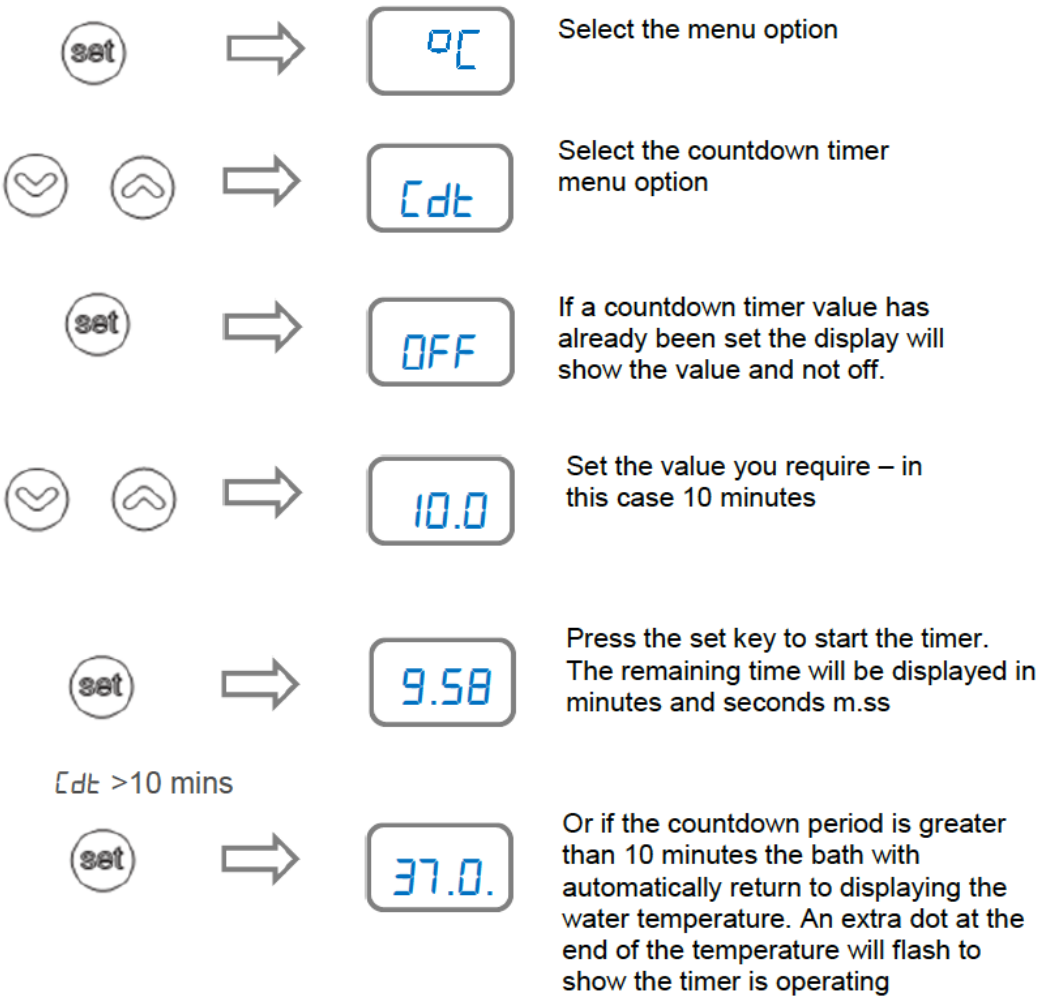
Press **set** to silence the alarm.

To find out the water temperature whilst the display is showing the remaining time, press the **set** button.

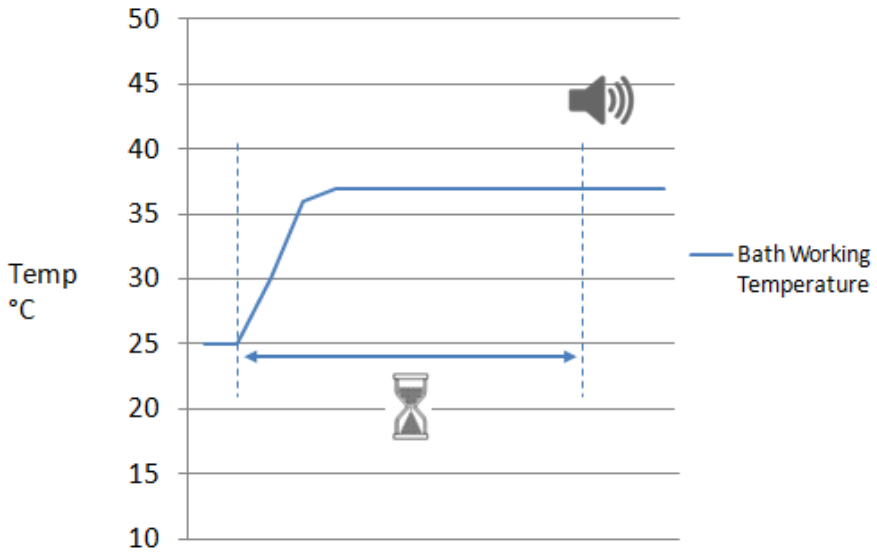
To enter the configuration menus whilst the display is showing the remaining time, press the **set** button twice.

The timer can be turned off at any time by selecting the **(Χδτ)** menu option and pressing the down arrow button until the display shows ΟΦΦ.

To set the countdown timer:



Countdown Timer profile



8 Calibration

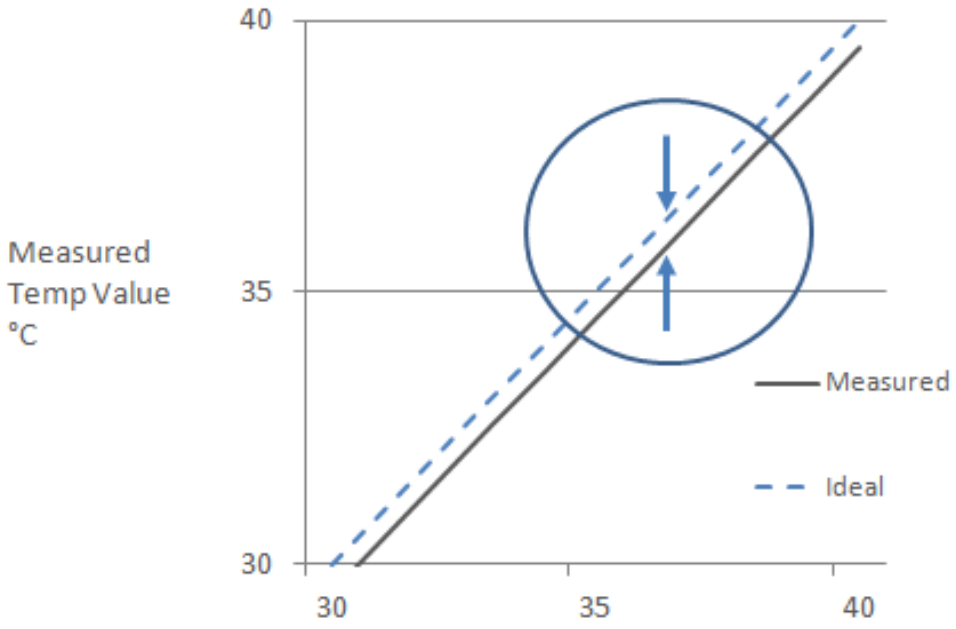
8.1 Calibration

- Single point calibration

	The quality of the calibration is highly dependent on: Use of a suitable reference thermometer, ideally 10 times the accuracy you are trying to achieve. Performing a calibration in a stable ambient environment (+/-1ºC) free from draughts or cooling air currents.

8.2 Single point calibration (ΣΠX)

A single point calibration applies a single offset over the bath temperature curve. For this reason the calibration temperature is usually the same as the intended working temperature for the bath or particular experiment:

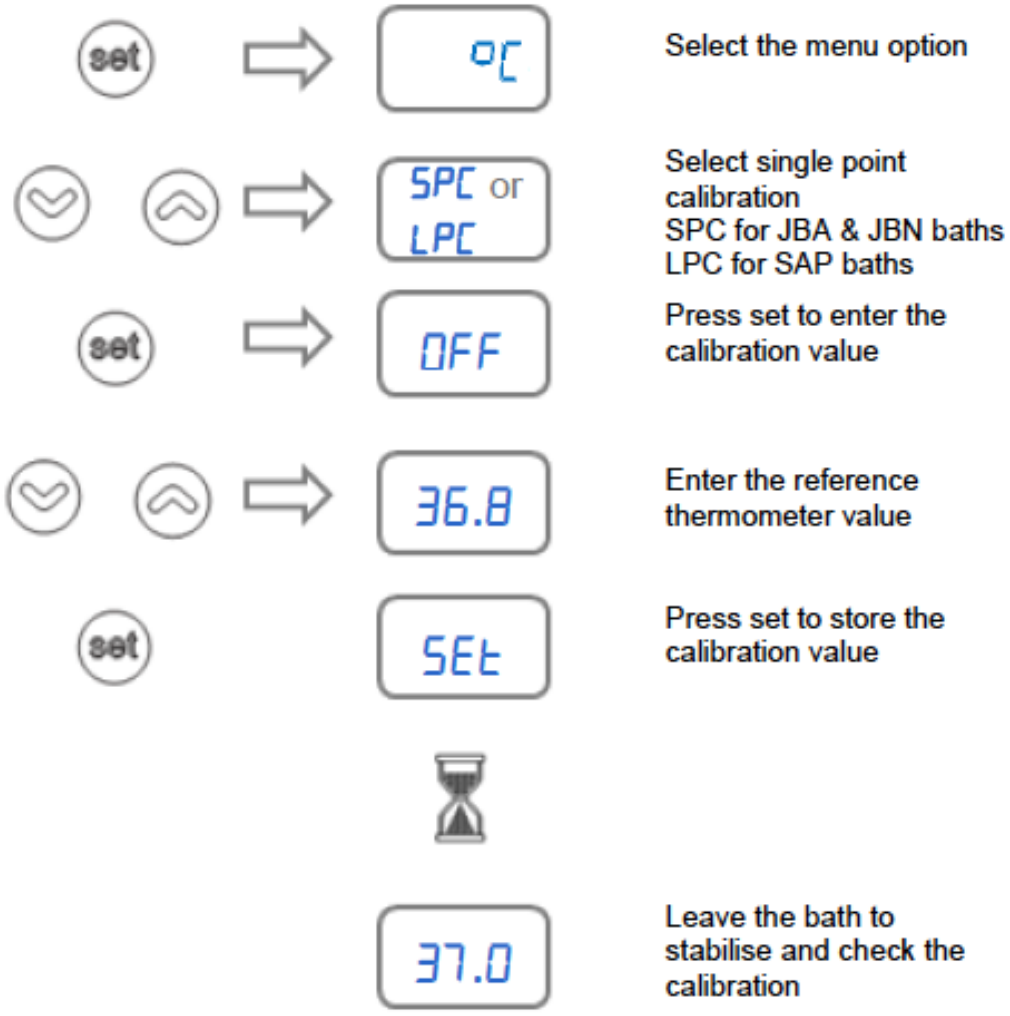


To configure a single point calibration:

Firstly, set the bath to the desired set point and leave to stabilise for at least an hour.

Place the reference thermometer either in the centre of the bath, or if using a lid, through the thermometer hole.

Note the temperature shown by the reference thermometer and enter it into the calibration menu by following the steps below.



9 Technical specifications

Operating conditions

Ambient Temperature	5 to 40°C
Maximum relative humidity	80% R.H. in room temperatures up to 31°C decreasing linearly to 50 % R.H. at 40°C
Altitude above sea level	Up to 2,000 m (6,500 ft)
Operating Environment	Indoor use only

Electrical details

Mains supply: 220-230V @ 50/60 Hz
Pollution degree: 2
Installation Category: II

Note: Mains supply voltage fluctuations are not to exceed ±10% of the nominal supply voltage

Models	Capacity (L)	Current rating (A)
		230V
JBA5PH	5	1.5
JBA12PH	12	3.5
JBA18PH	18	6.0

Aquaria bath performance

Temperature range	5°C above ambient to 95°C
Setting scale	10 to 95°C in 0.5°C steps
Temperature stability	± 0.5°C

All performance data specified tested in accordance with DIN12876.

Technical tips

9.1 Which water should you use in your bath?

- Use tap water with care. Water with a high lime content will cause scale build up and should be avoided.
- Distilled water and some types of de-ionised water may be used. Avoid ultra high purity de-ionised waters.
- Avoid using water with high levels of salts or iron. These will reduce the life of your bath
- Regular water changing and frequent cleaning of your bath is needed to preserve the baths corrosion resistance
- Ensure you bath is stored dry.
- Use care in placing other metallic items in the bath. Some metals (e.g. ferrous materials such as iron filings or similar) can cause an electro-chemical reaction leading to corrosion.
- The product warranty may be affected by the use of inappropriate or corrosive liquids

10 Warranty information

When used in laboratory conditions according to this manual, this product is guaranteed for THREE YEARS against faulty materials or workmanship.

11 Maintenance and service

No routine maintenance is required except for cleaning. There are no user serviceable parts inside the unit.

11.1 Cleaning

Clean the outside of the equipment with a damp cloth. Domestic detergents may be used to remove stubborn dirt. Scale on immersed parts can be removed using chemical de-scaling products designed for use on kitchen equipment that have metal parts.
De-scaling products may be toxic and manufacturer's instructions should always be followed.

11.2 Fuses

The fuses are internal and should not need to be replaced.

11.2.1 Replacing the mains cord

Any replacement mains cord-set used with the water baths must meet the same specification as the one originally supplied with the unit to maintain safety of the unit.

For Europe (including the UK), the cable must have the following markings; <HAR>, HO5VV-F 3Gx1mm2 and be rated to carry 10A. The mains plug and IEC connector must carry approvals from a European certification body (e.g. BSI, VDE or equivalent).

11.2.2 Routine safety tests

If routine tests are to be made, we recommend a test of the integrity of the protective earth conductor and an insulation test at 500 V DC. Routine flash tests are not recommended for any electrical equipment, because repeated high voltage tests degrade insulation materials.

11.3 Service

If service is required, switch off the unit and contact supplier service department

Philip Harris Education
2 Gregory Street
Hyde
Cheshire
SK14 4TH

12 Troubleshooting

Symptom	Possible cause	Action required
Temperature does not rise when expected	Set temp is lower than liquid temp Set temperature is too close to ambient	Check that the bath set temperature is correct (see section 7). Increase the set temperature (see section 7). Minimum temp is 5°C above ambient.
Temperature continues to rise when not expected	Set temp is higher than liquid temp Set temperature is too close to ambient	Check that the bath set temperature is correct (see section 7). Increase the set temperature (see section 7). Minimum temp is 5°C above ambient.
Display shows OTA	Water temperature has gone above the OTP alarm temperature	Let water cool. Check OTP is set above the required water operating temperature (see section 7.3.4).
Display shows drY	Bath has been heated with no water Bath has run out of water	Fill the bath with water. Switch the bath off and on to restart Refill the bath with water. Switch the bath off and on to restart
Display shows OTX	Bath has overheated due to lack of water Objects have been placed directly on the base of the bath	The over temperature cut-out needs to be reset. Contact Philip Harris for instructions on how to do this. After reset has been completed, use a tray on the bath base
Display shows Oπεν	Faulty temperature probe	Have a competent person check the probe for an open circuit fault or contact Philip Harris.
Display shows Shrt	Faulty temperature probe	Have a competent person check the probe for a short circuit fault or contact
Display shows dEF	Bath is running on its default settings	Contact Service Department for assistance.

13 Compliance

13.1 WEEE directive

These products comply fully with the Waste Electrical & Electronic Equipment (WEEE) regulations 2006.

The products are manufactured in the UK for Philip Harris (Findel-Education) by Grant Instruments Ltd who are a member of the B2B compliance scheme (Scheme Approval Number WEE/MP3338PT/SCH), which handle our WEEE obligations on our behalf.

The supplier has been issued with a unique registration number by the Environmental Agency reference number is WEE/GA0048TZ.

For General WEEE information please visit: www.b2bcompliance.org.uk

13.2 RoHS directive

All the products covered by this manual comply with the requirements of the RoHS Directive (Directive 2002/95/EC).

13.3 Electrical safety and electromagnetic compatibility

All the products covered by this manual comply with the requirements of the Low Voltage Directive (2006/95/EC) for electrical safety and the EMC directive (2004/108/EC) for electromagnetic compatibility. See the Declaration of Conformity on the inside back page

Declaration of Conformity

Manufacturer:-	GRANT INSTRUMENTS (CAMBRIDGE) LTD, Shepreth, Cambridgeshire SG8 6GB
Equipment Name/Type Number:-	JBA5PH, JBA12PH, JBA18PH
Description of Equipment:-	Unstirred Water Baths based on Grant Instrument JBA range of products.
Directives:-	EMC Directive 2004/108/EC
Including Accessories:-	Detachable mains cordset and Clear Plastic Polycarbonate lid

Applied Harmonised Standards:-	BS EN 61326-1:2006 Electrical Equipment for measurement,control and laboratory use - EMC requirements-Part 1: General Requirements BS EN61010-1: 2010 Safety requirements for electrical equipment for measurement, control and laboratory use. BS EN61010-2-010: 2003 Safety requirements for electrical equipment for measurement, control and laboratory use; particulary for the heating of materials

This product complies with the requirements of the above Directive(s) when used with mains cordset supplied. Compliance may be affected by using alternative leads.

I confirm that this apparatus conforms to the requirements of the above Directive(s)

…… Dated……

Managing Director
Grant Instruments (Cambridge) Ltd.

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