Instruction manual

VWR unstirred water baths

Introduction

VWR laboratory thermostatic baths provide the means to maintain samples at a precise temperature from just above room temperature up to 99^{0}C.

Contents

1. Safety

1.1 Warning 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

1.2 Safety certification

VWR water baths meet the requirements of international safety standard **IEC 61010-2-010: Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-010: Particular requirements for laboratory equipment for the heating of materials**, and national standards based on it, including:
UL 61010A-2-010
CAN/CSA-C22.2 NO. 61010-2-010-04;
EN 61010-2-010;

1.3 Safety features

To protect samples and in case of failure of the primary control system, there is a second, completely independent adjustable control system.

In addition to the second control system for sample protection, there is a separate fixed-temperature cut-out to protect the bath and surroundings in the very unlikely event of failure of both control systems.

1.4 Before first operating the equipment

Read the whole of these instructions. Safety may be impaired if they are not followed.

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) for the condensation to evaporate before using the equipment.

Before using this water bath for the first time, please clean the inside tank with general household cleaner, rinse with de-ionised water, then dry and wipe clean thoroughly.

1.5 Precautions during and after operation

The bath is for use only with water as the bath liquid. Make sure that it cannot become contaminated by other liquids. The use of de-ionised water is recommended to prevent corrosion. A full explanation of this is given in Section 6 of this manual.

CAUTION. PLEASE FILL BATH WITH WATER BEFORE SWITCHING ON.

Change the water regularly and empty when not in use for prolonged periods, to further prevent corrosion and contamination.

Before emptying a bath, allow the water temperature to fall to a safe level. For 18 and 26 litre baths, empty the bath before moving it.

Do not use the equipment in an area where there are aggressive or explosive chemical mixtures.

If 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.

Do not use the bath to heat any material that could cause a fire or any other kind of hazard.

2. Getting started

2.1 Unpacking

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

Thermostatic bath
Mains cord with plug
Gabled polycarbonate lid
Polycarbonate base tray
Operating manual

CAUTION. PLEASE FILL BATH WITH WATER BEFORE SWITCHING ON.

2.2 Optional accessories

If ordered, one or more of the following items may be included:

Test tube racks
Stainless steel base tray
Raised shelves

2.3 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 ground connector.

To disconnect the equipment from the mains supply, remove the mains plug from the mains supply outlet. Make sure that the mains plug is easily accessible.

2.4 Conditions of use

The water baths are for indoor laboratory use only. Check that the environmental conditions of the laboratory are within the following limits:

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	Up to 6,500 feet (2,000 m) above sea level

3. Operation

3.1 Water level

Ensure that the water level is at least 2” (5cm) above the bottom of the tank, and not higher than 1” (2.5 cm) from the top. This applies both without any vessels in the bath and with the maximum contents.

If the bath is allowed to run dry, the safety cutout will trip and disconnect the heater. If this happens, unplug the bath and have the cut-out re-set by a competent person.

Water is the only liquid suitable for use in the baths.

3.2 Flat-bottomed vessels

If flat-bottomed vessels or objects are to be placed in the bath, always use the base tray to avoid possible damage to the heater mounted under the tank.

3.3 Operation above 60°C

The supplied gable lid must always be used above 60°C to optimise the temperature control; for the bath to operate efficiently and to ensure the set temperature is reached and maintained.

Without the lid, excessive evaporation will require the bath to be filled more often.

3.4 Setting the temperature of VWR baths with analog control system

3.4.1 Indicator lamps

There are three indicator lamps:

1. Power on (green)
2. Heater on (orange) marked ≋
3. Warning (orange) marked ! Indicates that the temperature is being controlled by sample protection thermostat

3.4.2 Setting the control temperature

1. Turn the knob of the sample protection thermostat fully clockwise
2. Turn the knob of the primary temperature control to the desired temperature
3. Using the switch on the rear of the bath, turn the unit on and wait until the temperature has stabilized
4. Measure the temperature with a thermometer, and adjust the temperature control knob if necessary to obtain the desired temperature

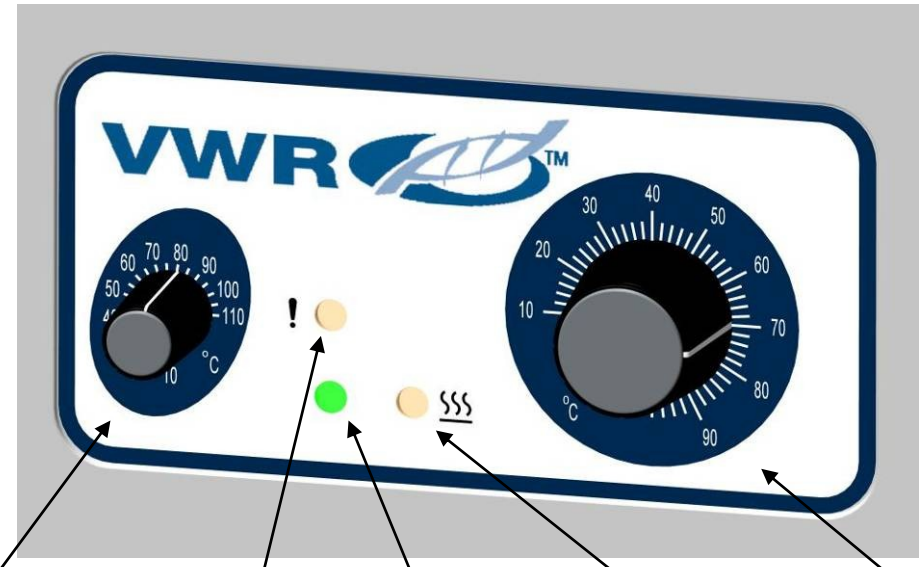
3.4.3 Setting the sample protection thermostat

1. Wait for the bath to stabilize at the correct temperature
2. Turn the sample protection thermostat control knob slowly anti-clockwise until the heater lamp stops going on and off, and then turn it clockwise until the heater lamp turns on again

3.4.4 Calibration of the temperature control knob

1. Carefully remove the cap of the control knob by levering it with a small screw driver
2. Undo the brass nut so that the knob can rotate on the shaft
3. Set the knob at the actual bath temperature, then tighten the nut and replace the cap

In the unlikely event of failure of the primary temperature control system, the sample protection thermostat will maintain the water in the bath at a temperature a few degrees above the set temperature, and with greater temperature fluctuations. This will be indicated by cycling of the two orange lamps. If this happens, first check that the sample protection thermostat is not set to a lower temperature than the primary control system. If that is **not** the reason, the control thermostat is not operating correctly. The bath can continue to be used without compromising the safety of persons or the surroundings until current work is completed. However, it is recommended to have the bath checked by a competent person as soon as conveniently possible.



3.5 Setting the temperature of VWR baths with the digital control system

3.5.1 Setting the control temperature

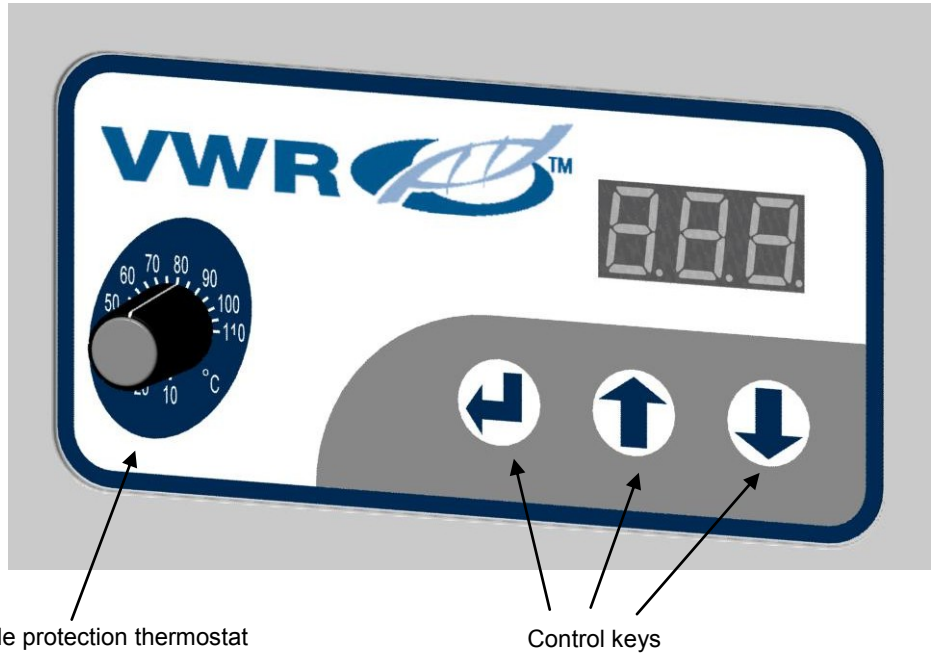
1. Turn the knob of the sample protection thermostat to maximum
2. Press ↵ control key, the display will show °C, press ↵ control key again. The display will flash once a second with the current set temperature to show that the controller is ready to be re-set
3. Press **up** ↑ or **down** ↓ control keys to set the desired temperature
   (If no key is pressed for 4 seconds, the display will revert back to showing the actual temperature and the set point will remain at its original value)
4. Press ↵ control key. This will store the requested value and the display will revert to showing the actual water temperature. The water temperature will change to the new set value
5. Measure the temperature with a thermometer, and adjust the set temperature again if necessary

3.5.2 Setting the sample protection thermostat

1. Turn the knob of the sample protection thermostat to maximum
2. Set the control temperature 2°C above the desired operating temperature, and wait for the temperature to stabilize for 20 minutes.
3. Turn the knob of the sample protection thermostat slowly anti-clockwise until a click is heard and Otc is displayed *
   The audible alarm will sound continuously to warn you that the bath is controlling using the sample protection thermostat.
4. Re-set the control temperature to the desired temperature
   The audible alarm will sound continuously until the primary control system is re-activated.

In the unlikely event of failure of the primary temperature control system, the sample protection thermostat will maintain the water in the bath at a temperature a few degrees above the set temperature and with greater fluctuations. The display will cycle between Otc and the actual bath temperature. If this happens, first check that the sample protection thermostat is not set to a lower temperature than the primary control system. If that is **not** the reason, the primary control system is not functioning correctly. The bath can continue to be used without compromising the safety of persons or the surroundings until current work is completed. However, it is recommended to have the bath checked by a competent person as soon as conveniently possible.

* Note: in earlier models, Err is displayed instead of Otc



3.5.3 Single point calibration (SPC)

The display of set temperature and actual temperature is accurate to within 1°C at 37°C but may be up to 5°C out at maximum temperature. Using SPC the display can be re-set to be accurate to ±0.1°C at a single point by the following procedure:

1. Set the bath to the calibation temperature and allow the bath temperature to stabilse for 20minutes and indicated by the display not fluctuating by more than 0.2°C. Measure the actual water temperature with a calibrated thermometer.
2. Press control key. The display will show °C, press the **up** control key and the display will show SPC, press control key to enter SPC mode. The display will flash once a second with the current value and shows that the controller is ready to be re-set
3. Calculate the difference in temperature between the set point and the thermometer. Press **up** or **down** control keys to enter this correction value (positive or negative). If no key is pressed for 4 seconds, the display will revert back to showing the actual temperature and the set point will remain at its original value.
4. Press control key. This will store the new corrected set temperature and the display will revert to showing the new correct actual water temperature

4 Specification

4.1 Electrical details

Mains supply 120Vac, 60 Hz
Polution degree: 2
Installation Category: II

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

Models		Capacity	Current Consumption
89032-196	89032-210	2L	1.0A
89032-198	89032-212	2L	2.6A
89032-200	89032-214	5L	2.6A
89032-202	89032-216	12L	5A
89032-204	89032-218	18L	7.9A
89032-206	89032-220	26L	7.9A
89032-208	89032-222	12 & 5L	7.9A

4.2 VWR analogue bath performance

Range	5°C above ambient to 98°C
Setting scale	10 to 98°C in 2°C graduations
Temperature stability to DIN 12876-3 *	± 1.0°C

4.3 VWR digital bath performance

Range	5°C above ambient to 99°C
Display (also used for setting)	10.0 to 99.0°C in steps of 0.1°C
Temperature stability to DIN 12876-3 *	± 0.2°C

* The supplied polycarbonate lid must be used to achieve the quoted performance

5 Maintenance and service

No routine maintenance is required except for cleaning.

5.1 Cleaning

Clean the outside of the equipment with a damp cloth, using water only. Do not use chemical cleaning agents. Before using any other cleaning or decontamination method, check with your local VWR representative to make sure that the proposed method will not damage the equipment.

Scale on immersed parts can be removed using chemical de-scaling products designed for use on kitchen equipment which has metal parts.

Warning - De-scaling products may be toxic - follow the manufacturer's instructions.

5.2 Replacement of fuses

Fuses are Littlefuse 3AB 314 series. Fast-acting, high breaking current (max breaking current at least 750 A). Dimensions; 1.25 inch long, 0.25 inch diameter. Replace fuses only by the same type and rating (250volt).

Models		Capacity	Fuse rating, Amps
89032-196	89032-210	2L	5
89032-198	89032-212	2L	5
89032-200	89032-214	5L	5
89032-202	89032-216	12L	10
89032-204	89032-218	18L	15
89032-206	89032-220	26L	15
89032-208	89032-222	12 & 5L	15

Replace fuses as follows:

1. Disconnect the unit from the power supply
2. Remove the mains input connector from the socket at the back of the bath
3. Press down the fuse drawer catch
4. Pull out the fuse drawer, check the fuse(s) and replace it if necessary, using the fuse type and rating specified above
5. Push back the drawer, and replace the mains input connector

5.3 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 Vd.c. Routine flash tests are **not** recommended for any electrical equipment, because repeated high voltage tests degrade insulation materials.

5.4 Service

If service is required, switch off the unit and contact your local VWR representative for repairs.

6 Technical Tips

6.1 Which water should you use in your bath?

For the long-term reliability of water baths it is important to use oxygenated water that is free from ions and minerals that can cause corrosion of stainless steel. We recommend the use of distilled water and de-ionised water from modern ion exchange systems that do not use salt back flushing to regenerate the ion-exchange cartridges.

Stainless steel is protected from corrosion by a layer of chromium oxide. If the layer is damaged, oxygen present in water can reform the oxide layer. If the water is still or de-oxygenated, and the oxide layer is damaged, ions can corrode the stainless steel tank. If a

water bath has been unused for some time, or water boiled, we recommend changing to fresh distilled water or correct de-ionised water.

Water normally contains calcium or magnesium ions. De-ionised water has most ions removed as indicated by its conductivity level; the purer the water the lower the conductivity. It is important to use only de-ionised water from an ion exchange system with replaceable cartridges. Do not use de-ionised water generated from an ion-exchange system that incorporates a salt back-flush system to regenerate the ion-exchange resin as this can leave sodium ions that are very corrosive to stainless steel.

6.2 How to prevent rust in water baths

Most Grant tanks, as well as immersed parts, are made from type 304 stainless steel, an extremely versatile general purpose grade of stainless steel. It is the excellent forming characteristic that has made this grade dominant in the manufacture of laboratory and industrial water baths, as well as domestic sinks and saucepans. Type 304 stainless steel is highly suitable for applications where hygiene is important; it exhibits good heat resistance and excellent resistance to corrosion.

However, despite resistance to general surface corrosion, stainless steel is susceptible to specific types of corrosion, in particular pitting (small pin hole style corrosion) and stress corrosion cracking. It can also undergo general corrosion in specific environments, such as one containing hydrochloric or sulphuric acids.

Stainless steel is protected by its high content of alloying elements, primarily chromium and nickel. Chromium is the most important with respect to corrosion resistance, although the nickel assists in allowing the chromium to do its job. The chromium forms an oxide layer on the surface of the steel, which inhibits further oxidation. This layer adheres extremely well to the metal substrate, but it is essential that it remains intact, and must be protected from various forms of damage.

If the surface chromium oxide layer becomes damaged, oxygen present in water can partially reform the oxide layer, so it is advisable to ensure that water is always fresh and well oxygenated. Baths that will be out of use for an extended period should be emptied, and all moisture should be wiped from the bottom of the tank.

In some cases a brown layer may appear on the surface of a stainless steel tank. In most of these cases this is not rust, but it may be a surface deposit of minerals from the local water supply, or ferrous particles or salts that have fallen into the tank. These surface deposits can usually be removed by using a household cleaner such as Duraglit or Silvo metal polish.

6.3 How to prevent algae and bacteria?

Water baths provide the ideal environment for the growth of micro-organisms. If left uncontrolled the growth of these organisms can result in a range of serious problems and health risks from pathogenic bacteria.

The growth of algae on the surface of parts will cause biofouling which can reduce performance.

Micro-organisms that produce acidic metabolic by-products can cause bio-corrosion by depolarisation of metal surfaces.

There are a number of biocides available on the market.

Notes

Notes

IMPORTANT!

Before using this water bath for the first time, please clean the inside tank with general household cleaner, rinse with de-ionised water, then dry and wipe clean thoroughly. This will help prevent bath corrosion. Please refer to “How to prevent rust in water baths” section of the operating manual for more detail.

PLEASE FILL BATH WITH WATER BEFORE SWITCHING ON