

HE

**High temperature
bath/circulator**

Operating instructions

High temperature baths and circulators

HE10D, HE30D	High temperature baths
UH2D	Controller for HE10 bath
UH3D	Controller for HE30 bath
HQ10	Pump/circulator for HE10D
HQ30	Pump/circulator for HE30D

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1 Safety

The following symbols marked on the equipment mean:-



Caution: Read these operating instructions fully before use and pay particular attention to sections containing this symbol



Caution: Surfaces can become hot during use.

Always observe the following safety precautions



- Use only as specified by the operating instructions, or the intrinsic protection may be impaired.
 - After transport or storage in humid conditions, dry out the unit before connecting it to the supply voltage. During drying out the intrinsic protection may be impaired.
 - Connect only to a power supply with a voltage corresponding to that on the serial number label.
 - Connect only to a power supply which provides a safety earth (ground) terminal.
 - Before moving, disconnect at the power supply socket.
 - Do not check the temperature by touch, use the temperature display or a thermometer.
- To reduce the risk of eye injury during high temperature operation, use safety goggles or spectacles.
 - Do not touch surfaces which become hot during high temperature operation.
 - Ensure that the operating temperature is less than the maximum operating temperature of your sample material.
 - Set the adjustable over temperature cut-out after setting or changing the set temperature, and reset it at monthly intervals to check that the cut-out is operating correctly.
 - Ensure that the mains switch is easily accessible during use.
 - Do not block or restrict ventilation slots.
 - If liquid is spilt inside the unit, 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 or inside the equipment.
 - Do not connect to a power supply or switch on before filling the tank.
 - Take care when topping up or draining, as the liquid in the tank may be very hot.
 - If the alarm lamp is illuminated do not touch the liquid or the heater, they may be very hot. Refill carefully, a hot heater can cause a spattering of very hot water droplets and scalding steam.
 - Always use a lid when operating above 60°C. Take care when raising and removing the lid, it may be hot. Steam and hot vapours can cause scalding.
 - Drain before removing the bath. Before draining allow the liquid to cool to below 50°C.
 - Use only liquids specified in the operating instructions, within the specified temperature range. If the alarm lamp is illuminated the liquid temperature may be above its recommended maximum; do not inhale the vapours given off as they may be toxic; liquids should be safely discarded and replaced.
 - When pumping to external apparatus, always use connecting pipe or hose suitable for the operating temperature and liquid used, and check that the pipe connections are secure.
 - Do not disconnect any pipes or hoses while they contain very hot liquid.

2 Assembly

2.1 Unpacking

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

Packs should contain:

2.1.1. Baths

Control unit
Tank
Lid
Tray
Operating instructions

2.1.2. Pump/circulator

Pump

2.2 Installation

2.2.1 UH2D/UH3D control unit

Remove the four screws from the top of the tank and fit the control unit on the top of the tank with the four holes in the plate on the bottom of the unit in line with the fixing holes from which the screws were removed.

Fit the controller to the tank using the four screws.

2.2.2 HQ10, HQ30 pump

The pump comes pre-fitted with the lid. Fit the lid onto the top of the tank. Pipework for external circulation must be fitted to the two pipe connectors located next to the pump in the lid. On the HQ10 the pump takes the place of the lid, on the HQ30, the pump takes the place of half of the lid.

2.3 Connection to electrical supply

WARNING: The equipment must be earthed (grounded). We strongly recommend that the power supply to any equipment for heating liquids should include a residual-current circuit breaker (earth leakage trip).

Check that the voltage rating of the products, given on the serial number plate at the power cable entry, is correct for your supply.

3 Operation

3.1 Controls and indicator lamps UHD.

Power (mains) switch, located on the front panel of the controller.

The **set temperature °C** control sets the required operating temperature.

Heater Lamp (orange) indicates when the heater is on. The heater lamp is on continuously while the unit is heating up. As the required temperature is approached, it starts to flash. When the unit is controlling at set temperature, the heater lamp flashes intermittently.

Set over-temperature control sets the over-temperature cut-out to a value between 20°C and 500°C. The cutout operates if the liquid temperature rises above its set temperature. When it has operated the red alarm lamp illuminates and the heater is switched off.

The **over-temperature** Lamp (red) illuminates when the over-temperature cutout has operated.

3.2 Controls and indicator lamp HQ

Power

The illuminated power (main) switch is located on the front panel of the pump unit.

3.3 Setting the temperature (see figure 1)

To set the required operating temperature, press the 'down' or 'up' arrow button until the required temperature is displayed. Two seconds after releasing the button, the new value will be accepted and the display will revert to showing the actual temperature.

High temperature bath/circulator

3.3.1 Step or ramp to set temperature

UH2D and UH3D control unit

The following instructions describe how to set-up the UH2D and UH3D controller for *Step or Ramp* to standard automatic control

		DISPLAY	* These display figures are for reference only
Power ON		65	* Actual temperature
		m-A	Manual or Automatic control
	To Set	Auto	Automatic control
		1FSH	Alarm 1 Full Scale High The alarm will trigger if Overtemperature is reached
	To Set	200	* Set the required Overtemperature in °C
		2FSL	Alarm 2 Full Scale Low The alarm will trigger if Undertemperature is reached
	To Set	30	* Set the required Undertemperature in °C
		65	* Actual temperature in °C
		SP	Setpoint List
		SPrr	Setpoint Ramp Rate To set the ramp rate. number of degrees per minute
	To Set	2.0	* Set the required rate of degrees per minute (OFF is the maximum rate)
		tmr	Time Remaining Time remaining of Dwell period (default is 0)
		0	Display reads 0, until program is running
		dwELL	Dwell time The period of time at the setpoint temperature in minutes
	To Set	OFF	As no program is required, set Dwell period to "off"
		STRT	Program Status Program timer status
	To Set	OFF	As no program is required, set Timer Status to "off"
		SP	Setpoint List
		ACCS	Only required for commissioning
		65	* Actual temperature in °C
	To Set	200	* Desired temperature in °C

3.3.2 Ramp to and dwell time at, set temperature

UH2D and UH3D control unit

The following instructions describe how to set-up the UH2D and UH3D controller for Programmed Ramp/Dwell/End

		DISPLAY	* These display figures are for reference only
▲ ▼	To Set	200	* Desired temperature
⌚		m-A	Manual or Automatic control
▲ ▼	To Set	Auto	Automatic control
⌚		1FSH	Alarm 1 Full Scale High The alarm will trigger if Overtemperature is reached
▲ ▼	To Set	200	* Set the required Overtemperature in °C
⌚		2FSL	Alarm 2 Full Scale Low The alarm will trigger if Undertemperature is reached
▲ ▼	To Set	30	* Set the required Undertemperature in °C
⌚		65	* Actual temperature in °C
■		5P	Setpoint List
⌚		5Prr	Setpoint Ramp Rate To set the ramp rate, number of degrees per minute
▲ ▼	To Set	2.0	* Set the required rate of degrees per minute (OFF is the maximum rate)
⌚		tmr	Time Remaining Time remaining of Dwell period (default is 0)
▲ ▼		0	Display reads Dwell time remaining in Program. Dwell time can be increased/decreased whilst program is running.
⌚		dwEll	Dwell time The period of time at the setpoint temperature in minutes
▲ ▼	To Set	30	* Set Dwell period to number of minutes that is required to maintain setpoint temperature
⌚		StAt	Program Status Program timer status
▲ ▼	To Set	run	Set to run to begin program
⌚		5P	Setpoint List
■		ACCS	Only required for commissioning
■		65	* Actual temperature in °C

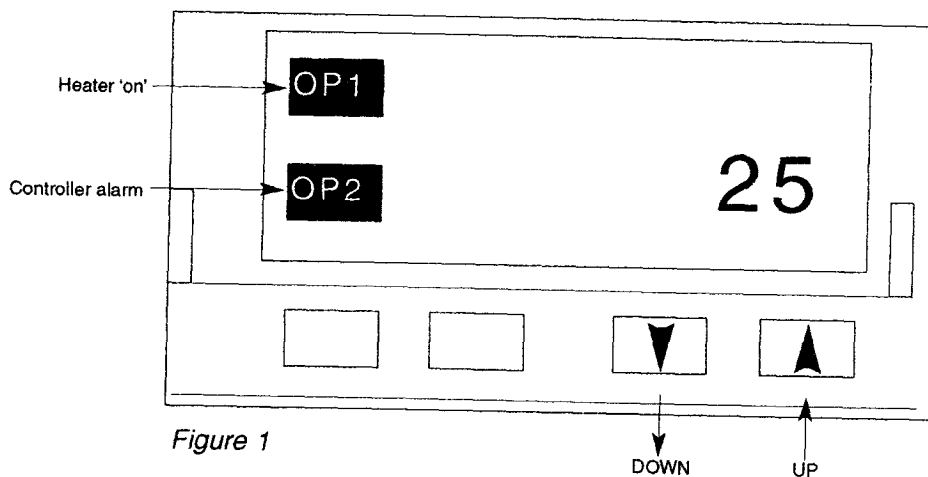
UH2D and UH3D control unit

To view remaining *Dwell time* whilst a program is running, follow the instructions to view the value of **Emr**

To perform *Ramp* to set point temperature with no *Dwell time*, set **dwEll** to **OFF**

At the end of the program the heater power will be cut off, and the display will flash **End** and **MAN** will be lit

To reset, follow previous instructions and set **m-A** to **Auto**



3.4 Setting the over-temperature cut-out



To protect both the unit and your samples, the over-temperature cut-out should be set each time the required operating temperature is changed. Using a screwdriver, turn the **set over-temperature** control fully clockwise. The cut-out is now set at its maximum. Remove the black cap from the reset push-button. Allow the block heater to stabilise at the required maximum temperature. Turn the **set over-temperature** control slowly anti-clockwise until the red alarm lamp comes on. Allow the unit to cool. Press the reset button. Set the controller to the required run temperature. Ensure cut-out does not operate when the controller is running at the set temperature. Replace the black cap.

3.5 Filling

Before filling the bath, disconnect the mains power supply. The liquid must be a minimum of 20mm above the top of the heater coils.

When the tank is fully loaded, fill to a maximum level of 10mm from the top with a liquid suitable for your working temperature

+5 to 80°C Water, recommended temperature range.
Use a lid or polypropylene spheres above 60°C to reduce evaporation and heat loss.

80 to 99.9°C Water can be used but care should be taken with its use as hot water vapour can be dangerous. A lid or polypropylene spheres must be used.
At these temperatures the temperature control will be reduced due to localised boiling, and there may be a loss of water due to evaporation.
The control units should not be used to boil water.

Note: Both water from a drinking source and deionised water is suitable for use in the baths. However, some older deionisers can create concentrated salt solutions for a short time after the ioniser is rejuvenated. This solution should not be used in the baths as it may cause corrosion.

50 to 150°C Dow Corning silicone fluid DC200/20
150 to 260°C Dow Corning silicone fluid DC210H/100

Do not use these liquids above the temperatures quoted or use any other liquid without consulting us.

3.6 Evaporation and Fumes

We recommend siting the controller in a fume cupboard or under an extraction fan. A fume cupboard **MUST** be used above 150°C.

3.7 Switching on and setting up

Connect the pump to your external circuit if required.
Connect the control unit to a grounded (earthed) electrical power supply with voltage and frequency within the range specified on the serial number plate.

DO NOT SWITCH ON BEFORE FILLING THE TANK.

Before switching on for the first time, turn the **set over temperature** control fully clockwise. Press the knob to ensure that it is reset.

Switch the power on and check that the power lamp is illuminated.

Set the required operating temperature. Wait until the liquid temperature has stabilised at the operating temperature.

After the temperature has stabilised at the required set temperature, adjust the **set over temperature** control as follows:

Turn the control anticlockwise, until the **alarm** lamp comes on. Press the knob to reset it and turn the control slowly clockwise until the **alarm** lamp goes out.


3.8 Use of pump

Connect the outlet pipe to the inlet pipe. Secure the pipe with clips. The pump has a separate power supply and does not need to be switched on until the viscosity of the liquid is low enough for pumping.

The pump will pump liquid around a closed external circuit, which is one not open to the atmosphere. It cannot be used for circulation through an external open tank. The FH15/16 circulator or RC range of refrigerated circulators can be used for this application.

WARNING: If the operating temperature is greater than 60°C, ensure that the pipes are securely clamped to the pump outlet and to the external circuit, and that the tubing is suitable for the liquid temperature.

4 Fault diagnosis

Symptom	Possible cause	Action required
Unit does not operate	Unit not switched on	Switch on
Power lamp off	Unit not plugged into power supply	Plug in, switch on
	Fuse blown in the unit or, for UK units, in the plug	Have fuse replaced by competent person
	Electrical power supply failure	Check that other electrical appliances on same circuit are working
Alarm light on	Overtemperature cut-out has operated	Reset cut-out as described in 3.3
 Temperature does not rise when expected	Set temperature is lower than liquid temperature	Check set temperature
	Temperature control circuit fault	Have unit checked by a competent person
Temperature continues to rise when not expected	Set temperature is higher than liquid temperature	Check set temperature
	Temperature control circuit fault	Have unit checked by a competent person
Pump motor does not rotate	Pump obstructed	Clear obstruction
	If stirrer motor shaft rotates freely then motor thermal fuse may have blown	Have unit checked by a competent person

5. Technical Specification

This equipment is designed for indoor use in laboratory conditions, with room temperature between 5°C and 40°C and 80% relative humidity up to 31°C.

Performance figures apply within the ambient temperature range 10°C to 35°C

Installation category II (transient voltages). Pollution degree 2 in accordance with IEC 664.

For operation at altitudes of up to 2000 metres.

Conforms to IEC 61326-1 (EN 61326-1) Class A.

Class B equipment is for use in domestic establishments, and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

Class A equipment is suitable for use in establishments other than domestic, and those directly connected to a low voltage power supply network, which supplies buildings used for domestic purposes.

	HE10	HE30	HQ10	HQ30
Temperature Range		50 to 260°C		
Stability (DIN 58966)		+/- 0.5	-----	
	@ 100°C	+/- 0.25	-----	
Temperature setting/display		digital (LED)	-----	
Display resolution		1°C	-----	
Heater power	230V 115V	1.2Kw 1.1Kw	2.4Kw 1.5Kw	-----
Overall consumption	230V 115V	1.3Kw 1.2Kw	2.5Kw 1.6Kw	100W 100W
Pump (Silicon oil @ 150°C)				max.head 1.6mtrs max.flow 4L/min pipe bore 7.5mm
Supply voltage range		220-240V 110-120V	50/60Hz	
Tank capacity - litres	10		30	-----
Tank dimensions l/w/d mm	305/210/185		455/305/240	-----
Liquid depth min/max mm	100/140		145/190	-----
Top opening mm	190/210		350/305	-----
Height to tank rim mm	265		320	-----
Overall dimension l/w/h mm	415/320/400		565/415/455	-----

Over temperature protection - adjustable resettable overtemperature cut-out

6. Maintenance

All Grant Laboratory products are designed to comply with IEC1010-1 and can be flash tested. Some are fitted with radio frequency interference suppressers, therefore it is recommended that only a d.c. test is performed.

The over temperature cutout should be checked periodically by turning the set over temperature control anticlockwise until the alarm comes on. The cut-out should then be reset and set-up (3.4).

If the alarm lamp fails to light with the knob fully turned anticlockwise the unit should be checked by a competent person.

Any hoses connected to the pump should be checked periodically for wear, damage or leaks and should be replaced if necessary.

No other routine maintenance is required.

6.1 Cleaning

The cases can be cleaned with a damp cloth after disconnection. Do not use solvents. The immersed parts can be cleaned using proprietary heating element cleaners. CAUTION: these may be toxic - follow the cleaner manufacturer's instructions.

Before using any decontamination or cleaning method except that recommended, check with our Service Department, or in other countries with our distributor, that the proposed method will not damage the equipment.

6.2 Replacement of fuses

Fuses are accessible under the cover. These should only be replaced by a competent person. The fuses are 1.25 x 0.25 inch ceramic quick acting, rated:

220-240V	UH2 10AF	HQ10 1AF
	UH3 15AF	HQ30 1AF

7 Guarantee

When used in laboratory conditions and according to these instructions, this controller is guaranteed for THREE years against faulty materials or workmanship.

8 Service

The control unit should be returned to our Service Department or, in other countries, to our distributor.

DO NOT RETURN THE TANK

Service Address: Grant Instruments (Cambridge) Ltd.
Service Dept
Shepreth
Cambridgeshire
SG8 6GB
England.

Tel: +44 (0) 1763 262 811
Fax: +44 (0) 1763 260 410

Grant Instruments (Cambridge) Ltd.
Shepreth,
Cambridgeshire,
SG8 6GB
England

Tel: +44 (0) 1763 260811
Fax: +44 (0) 1763 262410
EMAIL: marketing@grantinst.co.uk
INTERNET: <http://www.grant.co.uk>