

**SUB**

**Universal water baths**

**SBB**

**Boiling baths**

**JB, PB**

**Unstirred water baths**

*Operating instructions*

**Universal water baths**

SUB6: 6 litres

SUB14: 14 litres

SUB28: 28 litres

SUB36: 36 litres

**Boiling baths**

SBB6: 6 litres

SBB14: 14 litres

SBB28: 28 litres

**Unstirred water baths**

JB1: 3.5 litres

JB2: 10 litres

JB4: 16 litres

JB5: 24 litres

**Transparent unstirred water bath**

PB1: 3.5 litres

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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.



Caution: Risk of electric shock when cover is removed.

### 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 remove the IEC connector (where applicable).
- 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 (where applicable) 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.
  - These baths are for use only with water.
  - 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 or cold.
  - 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 or polypropylene spheres 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 moving the bath. Before draining allow the liquid to cool to below 50°C or heat to above 10°C.

## 2 Assembly

### 2.1 Unpacking

Remove packing materials carefully, and retain for future shipment or storage of the unit. Packs should contain:

<p><b>SUB bath</b> mains cable operating instructions</p>	<p><b>SBB bath</b> mains cable perforated tray operating instructions</p>
<p><b>JB bath</b> perforated tray operating instructions thermometer clip</p>	<p><b>PB bath</b> mains cable perforated tray operating instructions</p>

### 2.2 Installation

#### 2.2.1 SUB baths

Fit the mains cable into the IEC power socket on the rear of the unit.  
Fill the bath with water. The minimum depth is 50mm above the base of the tank and the maximum level is 30mm from top of the tank when bath is fully loaded.  
A lid or layer of polypropylene spheres must be used with baths above 60°C.

**CAUTION: To prevent damage to the unit when using FLASKS, the flasks MUST be placed on a raised tray.**

##### 2.2.1.1 Adjustable over temperature cut-out

Before switching the SUB baths on for the first time, using a screwdriver through the hole in the set over temperature knob, turn the **set over temperature** control fully clockwise and press. Plug in and switch on power to the unit.

#### 2.2.2 SBB baths

Fit the mains cable into the IEC power socket on the rear of the unit.  
Fill the bath with water. The minimum depth is 50mm above the base of the tank and the maximum level is 30mm from top of the tank when bath is fully loaded.  
A lid or layer of polypropylene spheres must be used with baths above 60°C.

##### 2.2.2.1 Constant level device

A constant level device is fitted to the SBB to maintain the required water level. To use the constant level device, connect the inlet pipe (black) to a water supply and the outlet pipe (white) to a drain. The level can be adjusted by loosening the white nut and raising or lowering the white tube. The position of the top of the tube determines the water level. Re-tighten the white nut.

After filling the bath adjust the water flow rate to the minimum which maintains a constant water level when the water is boiling. If connecting to a mains water supply, check that local water supply regulations are complied with.  
Plug in and switch on power to the unit.

#### 2.2.3 JB baths

Fill the bath with water. The minimum level is 10mm above the top of the perforated tray and the maximum level is 40 mm from the top when bath is fully loaded.  
A lid or layer of polypropylene spheres must be used with baths above 60°C.  
Plug in and switch on power to the unit.

### 2.2.4 PB

Fit the mains cable into the IEC power socket on the rear of the unit.

Fill the bath with water. The minimum level is 10mm above the top of the perforated tray and the maximum level is 40 mm from the top when bath is fully loaded.

A lid or layer of polypropylene spheres must be used with baths above 60°C.

Plug in and switch on power to the unit.

Fit the unit inside the raised edges of the plastic case at one end of the bath.

## 3 Operation

### 3.1 SUB baths

#### 3.1.1 Controls and indicator lamps

The temperature display shows the water temperature in °C.

**Set temperature control knob** sets the required operating temperature.

**Display set temp** shows set temperature when pressed.

**Heater lamp (orange)** indicates when the heater is on.

The heater lamp is on continuously while the water 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.

**Alarm lamp (red)** illuminates when the over temperature cut-out has operated.

**The set over temperature** control sets the operating point of the over temperature cut-out.

The cut-out operates if the bath temperature rises above the temperature at which the cut-out is set. When it has operated, the red alarm lamp illuminates and the heater is switched off. The temperature continues to be displayed to warn of possible high temperatures.

#### 3.1.2 Setting the temperature

The display normally shows the water temperature. To show the set temperature at any time, press the **display set temp** button. To set the required operating temperature, push the **display set temp** button, whilst turning the **set temperature** control knob until the required temperature is indicated on the display.

#### 3.1.3 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, adjustment is via the hole in the **push to reset** knob. Turn the control fully clockwise and press to reset. The cut-out is now set at its maximum. Allow the bath to stabilise at the required operating temperature. Turn the control slowly anticlockwise using the screwdriver until the red alarm lamp comes on. Press the outer knob to reset and slowly turn the control clockwise until the alarm lamp goes out. Turn the control anticlockwise three quarters of the way back towards the point where the alarm lamp came on. The over temperature cut-out is now set approximately 10°C above the required operating temperature.

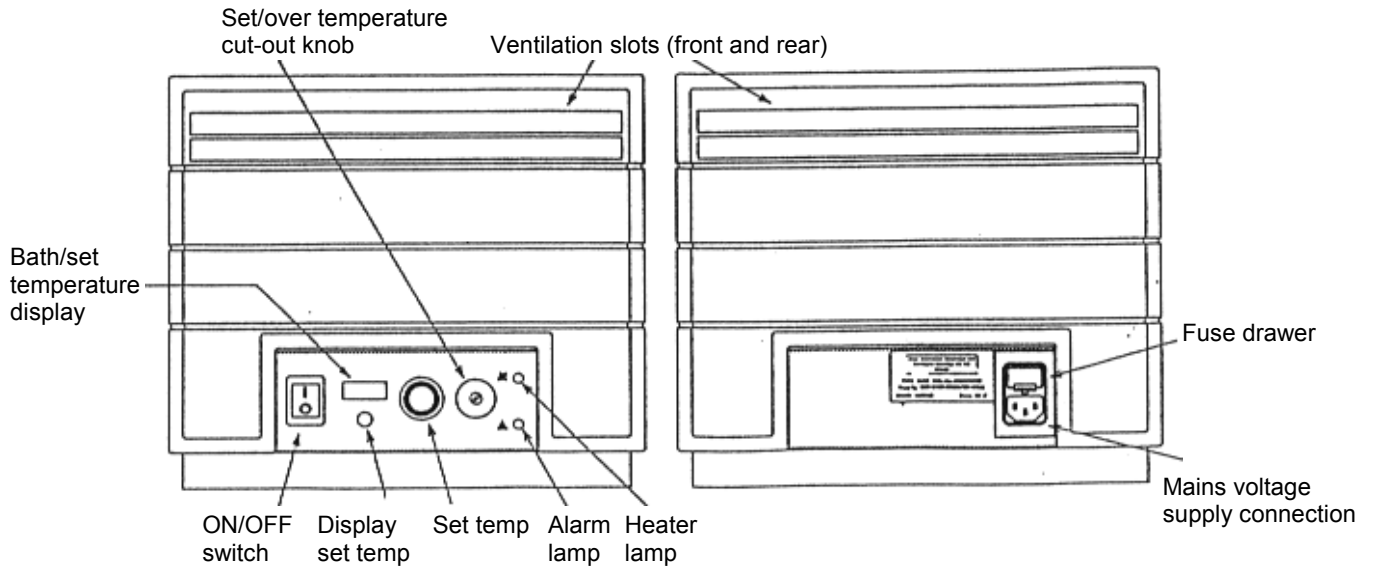
**Note:** If the required operating temperature is above 95°C turn the control fully clockwise.

#### 3.1.4 Resetting the over temperature cut-out

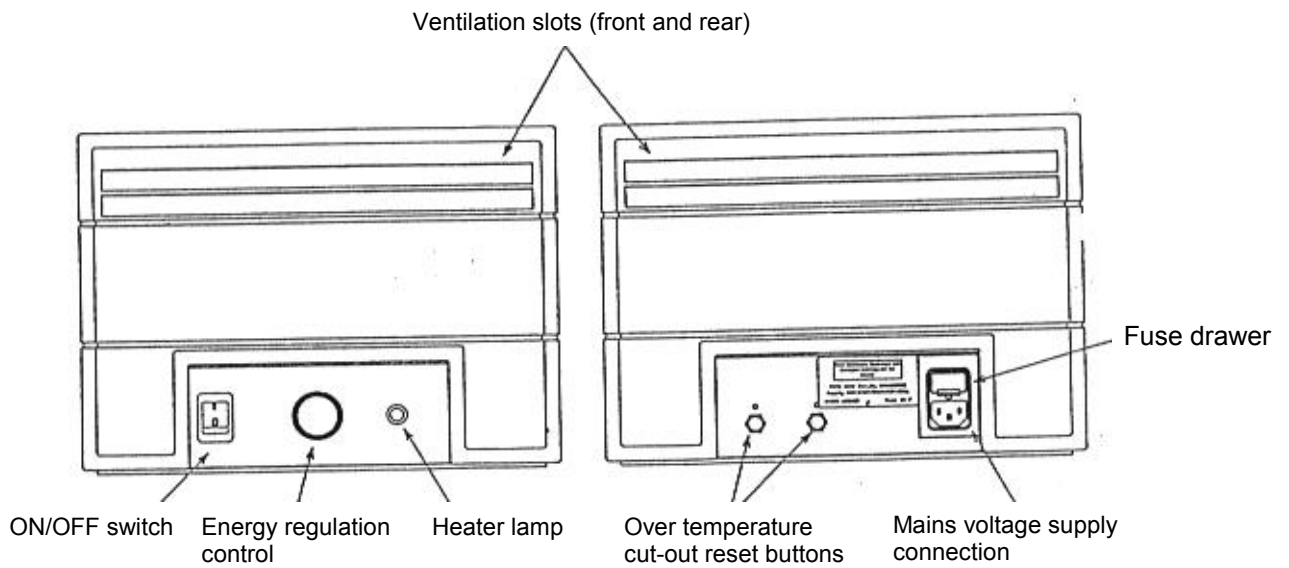
If the over temperature cut-out has operated, the bath needs to cool to below the set temperature before the cut-out can be reset. Reset by pushing the outer knob.



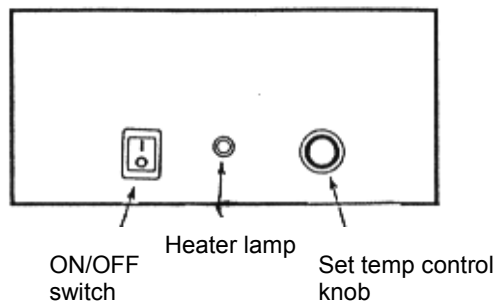
**SUB**



**SBB**



**JB**



## **3.2 SBB baths**

### **3.2.1 Controls and indicator lamps**

The **set heater power** knob controls the power of the heater through an energy regulator. **It is not a thermostat.**

For heat up, turn the set heater power knob to maximum. Once the water is boiling, turn the knob to the minimum position which will maintain boiling.

The **heater lamp (orange)** indicates when the heater is on.

### **3.2.2 Over temperature protection**

Two fixed over temperature cut-outs prevent the heater reaching a high temperature in the case of low liquid level.

The reset buttons for the cut-outs are on the rear panel.

## **3.3 JB baths**

### **3.3.1 Controls and indicator lamps**

The set temperature knob sets the required operating temperature.

The **heater lamp (orange)** indicates when the heater is on.

### **3.3.2 Over temperature protection**

The JB1 unit is protected against over temperature by an internal thermal fuse and the other JB units by a fixed over temperature cut-out.

If the heater lamp does not come on when expected and the temperature of the bath does not rise, see fault diagnosis (section 5).

## **3.4 PB 1**

### **3.4.1 Controls and indicators**

The temperature knob °C sets the required operating temperature.

The **heater lamp** indicates when the heater is on.

The **overtemperature lamp** indicates when the protection has activated

### **3.4.2 Over temperature protection**

The PB1 unit is protected against over temperature by a fixed over temperature cut-out. The overtemperature lamp will come on if it is activated. In addition the heater lamp does not come on when expected and the temperature of the bath does not rise, see fault diagnosis (section 5).



## 4 Accessories

### 4.1 Individual racks for test tubes and universal bottles

<u>Test Tube size</u>	<u>Tubes per rack</u>		
	<b><u>J2</u></b>	<b><u>J3</u></b>	<b><u>P1</u></b>
10mm	84	102	
13mm	55	70	12
16mm	36	44	10
19mm	32	40	9
25mm	18	24	
30mm	12	20	

	<u>Racks per bath</u>		
	<b><u>J2</u></b>	<b><u>J3</u></b>	<b><u>P1</u></b>
SUB/SBB6	1	--	
SUB/SBB14	2	2	
SUB/SBB28	4	4	
SUB36	6	6	
JB1	1	1	
JB2	4	2	
JB4	3	2	
JB5	4	4	
PB1			3

### 4.2 Lids and covers

#### 4.2.1 Gabled lids

Gabled lids direct condensate away from vessels in the bath. They help to reduce evaporation, and to avoid contamination of samples.

<u>Bath</u>	<u>Gabled lid</u>
SUB/SBB6	LU6
SUB/SBB14	LU14
SUB/SBB28	LU28
SUB36	LU36
JB1	LJ1
JB2	LJ2
JB4	LJ4
JB5	LJ5
PB1	LP1

A gabled lid pack contains:-

- cover
- handle
- 2 adapters
- 2 screws

Assembly instructions: Remove the protective film from the lid. Pass two screws through the holes in the lid. Thread the adapters on to the screws, so that the 'v' cut fits over the ridge of the lid. Hold the handle in position against the adapters and fasten to the lid by tightening the screws.

#### 4.2.2 Flat lids with holes

Flat lids have holes 105mm diameter. Ring sets give alternative hole diameters of 78, 59, 43 and 31mm to accommodate tall vessels. Flat lids minimise evaporation and heat loss, whilst accommodating tall flasks.

<u>Bath</u>	<u>Flat lid</u>	<u>Ring sets</u>
SUB/SBB6	LF6	2
SUB/SBB14	LF14	4
SUB/SBB28	LF28	6
SUB36	LF36	
JB2	LF2	6

A flat lid pack contains:

cover  
set of rings

#### 4.3 Polypropylene spheres

Polypropylene spheres are an alternative to a lid; they minimise evaporation and heat loss, allow easy access to vessels in the bath, and they are particularly useful for tall vessels.

<u>Bath</u>	<u>Spheres required</u>
SUB/SBB6	1 x PS20
SUB/SBB14	1 x PS20
SUB/SBB28	2 x PS20
SUB36	3 x PS20
JB1	1 x PS20
JB2	1 x PS20
JB4	1 x PS20
JB5	2 x PS20
PB1	1 x XP20

#### 4.4 Raised shelves for SUB and SBB baths

Raised shelves alter the effective liquid depth of half the bath, to accommodate different shapes and sizes of vessel simultaneously. Each shelf provides two alternative depths. You can use more than one shelf per bath to achieve a range of depths. The raised shelves can be used either way up in the bath to give different liquid depths. The liquid depth can be set by changing the amount of liquid in the bath.

RS14H covers half the area of SUB/SBB14  
RS28H covers half the area of SUB/SBB28  
RS36H covers half the area of SUB36.

#### 4.5 Syphon SY1

Use for draining baths.

## 5 Fault Diagnosis



<u>Symptom</u>	<u>Possible cause</u>	<u>Action required</u>
Unit does not operate	Unit not switched on	Switch on
	Unit not plugged into power supply	Plug in, switch on
	Power supply failure	Check that other electrical appliances on the same circuit are working
	Fuse blown in unit or in plug (UK units only)	Check and replace - see 7.1
SUB Alarm lamp on or SBB heater lamp does not come on	Over temperature cut-out has operated	Reset cut-out and check its setting as described in 3.1.3 and 3.1.4. Check water level If the cut-out operates again or cannot be reset, have the unit checked by a competent person.
Temperature does not rise when expected	Set temperature is lower than liquid temperature (not SBB)	Check set temperature
	Set temperature is too close to ambient (not SBB)	Raise set temperature
	JB1 thermal fuse has operated	Have JB1 thermal fuse replaced by competent person, see Service Manual
	JB2, JB4, JB5, PB1 Internal over temperature cut-out has operated	Check water level Have over temperature cut-out reset by competent person.
	SBB over temperature cut-out has operated	Reset cut-out
	Temperature control circuit fault (not SBB)	Have unit checked by competent person
Temperature continues to rise when not expected (not SBB)	Set temperature is higher than water temperature	Check setting
	Temperature control circuit fault	Have unit checked by competent person

## 6 Technical Specification

This equipment is for indoor use and will meet its performance figures within the ambient temperature range 10°C to 35°C, with maximum relative humidity of 80% non-condensing. Installation category II (transient voltages). Pollution degree 2 in accordance with IEC 664. For operation at altitudes of up to 2000 metres.

### 6.1 SUB baths

Conforms to IEC 61326-1 (EN 61326-1) Class **B** except where indicated \*.

**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.

Temperature range	(Ambient +5°C) to 99°C			
Setting range	15°C to 99°C			
Stability at 37°C	± 0.1°C			
Temperature display resolution	1°C			
Supply voltage range	230V ± 10% @ 50Hz or 120V ± 10% @ 60Hz			
Power Rating	SUB6	- 400VA (230v)	450VA (120v)	
	SUB14	- 750VA (230v)	950VA (120v)	
	SUB28	- 1450VA (230v)	1600VA (120v)	
	*SUB36	- 2050VA (230v)	1600VA (120v)	<b>(CLASS A)</b>
Over temperature protection	Adjustable, resettable safety cut-out			
	SUB6	SUB14	SUB28	SUB36
Uniformity at 37°C	± 0.2°C	± 0.2°C	± 0.2°C	± 2°C
Heat-up rate (ambient to max)	90 mins	80 mins	80 mins	80 mins
Overall dimensions l/w/h (mm)	205/325/275	380/325/275	555/325/300	720/325/300

### 6.2 SBB units

Temperature range	100°C only	
Supply voltage range	230V ± 10% @ 50Hz or 120V ± 10% @ 60Hz	
Power rating	SBB6	- 1350VA (230v) 1600VA (120v)
	SBB14	- 1550VA (230v) 1600VA (120v)
	SBB28	- 2050VA (230v) 1650VA (120v)

Over temperature protection Two resettable fixed temperature cut-outs  
Constant level device which maintains the required liquid level.

	SBB6	SBB14	SBB28
Overall dimensions l/w/h (mm)	205/325/275	380/325/275	555/325/300

### 6.3 JB units

Temperature range	(Ambient +5°C) to 90°C			
Setting range	20°C to 90°C			
Stability at 37°C	± 0.3°C			
Supply voltage range	230V ± 10% @ 50Hz or 120V ± 10% @ 60Hz			
Power Rating	JB1	- 350VA (230V)	350VA (120V)	
	JB2	- 800VA (230V)	800VA (120V)	
	JB4	- 800VA (230V)	800VA (120V)	
	JB5	- 1550VA (230V)	1400VA (120V)	
	Over temperature protection	JB1 - thermal fuse JB2, JB4, JB5 - Resettable fixed temperature cut-out		
	JB1	JB2	JB4	JB5
Overall dimensions l/w/h (mm)	335/160/200	450/285/195	355/325/270	530/325/270

## 6.4 PB1

Temperature range	(Ambient +5°C) to 60°C
Setting range	20 °C to 60°C
Stability at 37°C	± 0.3°C
Supply voltage range	230V ± 10% @ 50Hz or 60Hz
Power Rating	PB1 - 350VA
Over temperature protection	Resettable fixed temperature cut-out
Dimensions l/w/h (mm)	355/160/130

## 7 Maintenance and Service

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

SUB baths only:

The over temperature cut-out should be checked periodically by turning the **set over temperature** control anticlockwise until the alarm lamp comes on. The cut-out should then be reset and set-up (see 3.1.3). If the alarm lamp fails to light with the knob turned fully anticlockwise the unit should be checked by a competent person.

No other routine maintenance is required.

### 7.1 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

### 7.2 Replacement of Fuses

#### 7.2.1 SUB, SBB and PB1

Empty the bath. Disconnect the unit from the power supply.

Remove the IEC plug from the socket in the back of the bath.

Press down the fuse drawer catch (see figure).

Pull out the fuse drawer, check and replace with the correct fuses if necessary.

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

	<b>Model</b>	<b>Fuse Rating (Amps)</b>		<b>Model</b>	<b>Fuse Rating (Amps)</b>
230V	SUB6	5	120v	SUB6	5
	SUB14	10		SUB14	10
	SUB28	10		SUB28	15
	SUB36	10		SUB36	15
	SBB6	10		SBB6	15
	SBB14	10		SBB14	15
	SBB28	15		SBB28	15
	PB1	3			

Push back the drawer, and replace the IEC plug.



### 7.2.2 JB baths

The fuse is accessible under the base cover. This should only be replaced by a competent person.

The fuses are Littelfuse 3AB 314 series, fast-acting, high breaking current (max breaking current at least 750 A); dimensions are 1.25 inch long, 0.25 inch diameter. Replace fuses only by the same type and rating (250V).

	<b>Model</b>	<b>Fuse Rating (Amps)</b>		<b>Model</b>	<b>Fuse Rating (Amps)</b>
230V	JB1	3	120V	JB1	5
	JB2	5		JB2	10
	JB4	5		JB4	10
	JB5	10		JB5	15

### 7.3 Resetting the over temperature cut-out on JB2, JB4 and JB5 baths

The over temperature cut-out is accessible under the base cover. This should only be reset by a competent person.

### 7.4 Resetting the over temperature cut-out on PB1 baths

The over temperature cut-out is accessible under the top cover. This should only be reset by a competent person.

## 8 Guarantee

When used in laboratory conditions and according to these operating instructions, these baths are guaranteed for THREE YEARS against faulty materials or workmanship.

## 9 Service

For service, return to our Service Department in the UK, or to our distributor.

Service Address: Grant Instruments (Cambridge) Ltd.  
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Cambs  
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