

Model 300 Electronic Stirrer

Operating Manual

Manufactured by:

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Warranty

We guarantee the manufacture of the instrument and parts against faults for a period of twelve months from the invoice date.

If a fault should occur within this period then we undertake to either:

- Supply free of charge replacement parts for you to fit to the instrument.
- Upon return of the item at your expense, repair or replace (at our discretion) the instrument free of charge and return it to you at our expense.

1. Getting Started

Thank you for purchasing Rank Brothers equipment. Please ensure that you have read and understood this operating manual before use. You should safely store this manual for future reference.

1.1 Do Not

- Do not switch on until you have checked that the voltage selector switch is set to your local mains voltage and that the correct fuse is being used.
- Do not change the fuse or remove any covers with the mains inlet lead connected.
- Do not plug or unplug any stirring heads while the control box is switched on.
- Do not use the stirring heads at temperatures above 50 °C.
- Do not use the stirring heads in corrosive liquids.
- Do not stand items being stirred on the control box. A spillage of water into the mains inlet connector could cause an electrical shock hazard. If this occurs, switch off the mains supply and unplug the lead from the supply.

1.2 Do

- Do ensure that if the moulded plug is removed from the mains inlet lead it is disposed of safely.
- Do read and understand this manual before use.

1.3 Connection to your Mains Supply

IMPORTANT: This unit must be earthed to ensure operator safety. If the supplied mains lead does not have a moulded plug that is suitable for connection to your local supply, then cut it off. If it is necessary to remove this plug and fit a suitable one, the removed plug must be safely disposed. The removed plug would present a serious shock hazard if plugged into a suitable supply with the bare wires exposed.

The wires of the mains inlet lead are coloured as follows:

GREEN and YELLOW
BLUE
BROWN

EARTH
NEUTRAL
LIVE

As the colours of the wires in the mains lead may not correspond with the coloured markings identifying the connections in your plug, proceed as follows:

- The wire coloured GREEN and YELLOW must be connected to the terminal in the plug marked with the letter E or the earth symbol or coloured GREEN or coloured GREEN and YELLOW.
- The wire coloured BLUE must be connected to the terminal marked N or coloured BLACK.
- The wire coloured BROWN must be connected to the terminal marked L or coloured RED.

Before connecting the unit to the mains, ensure that the mains voltage selector switch is set to the voltage of your supply and that the fuse in the mains inlet connector is correct for the voltage selected. Before changing a fuse, switch off the mains supply and disconnect the mains inlet lead from the instrument. The correct fuse values are as follows:

220/240 V
110/120 V

T50mA
T63mA

The instrument contains no user serviceable parts. The base cover should be removed by competent personnel only (after first switching off the power supply and disconnecting the mains inlet lead).

To carry out any servicing or repairs the instrument should be returned to the manufacturer with a covering letter. Please ensure that the instrument is carefully packaged to avoid damage during shipment.

2. Controls

2.1 Mains On/Off Switch

The on/off switch is located at the rear of the stirrer control above the mains inlet connector. It is marked to indicate the on position.

2.2 Up and Down Arrow Buttons

These buttons are located on the right hand side of the front panel and are membrane type, press inside the white square border to operate them. The up arrow button increases the stirring speed and the down arrow decreases the speed, with both buttons repeating if held down. There are 37 discrete speeds between 100 rpm and 1800 rpm

and these are only adjustable in single direction stirring modes 3 and 4 (see section 2.3 below). The stirring speed is remembered during mode changes and when the unit is turned off.

2.3 Mode Button

The *Mode* button selects one of the four stirring modes available. Pressing the button once selects the next stirring mode, whilst pressing repeatedly cycles through all four modes. The mode selected is indicated by the four decimal points on the stirring speed display. Mode 1 is indicated by the left-hand decimal point through to mode 4 by the right-hand decimal point. The modes are as follows:

- Mode 1 Bi-directional (auto reversing) stirring with fast acceleration.
- Mode 2 Bi-directional stirring with slow acceleration.
- Mode 3 Single direction stirring, clockwise.
- Mode 4 Single direction stirring, counter-clockwise.

Modes 1 and 2 provide bi-directional stirring as follows:

1. Accelerate up to set speed.
2. Hold set speed briefly.
3. Instantly drop to minimum speed, the display blanks briefly.
4. Hold minimum speed briefly to 'capture' the stirring bar.
5. Reverse direction.
6. Hold minimum speed briefly to 'capture' the stirring bar.
7. Repeat steps 1 to 6.

Modes 1 and 2 differ only by the acceleration rate.

The set speed (maximum) can only be adjusted in modes 3 and 4. To adjust it in modes 1 and 2 proceed as follows:

1. Press the *Mode* button repeatedly until mode 3 or 4 is selected.
2. Adjust stirring speed with the up and down arrow buttons until satisfactory. This now becomes the set speed.
3. Press the *Mode* button until the desired mode (1 or 2) is selected.

Note the set speed and mode will be retained by the control even when switched off.

2.4 Capture Button

The *Capture* button is used to allow the stirring bar to 'catch up' without having to adjust the stirring speed when the set speed is high and a vessel is placed onto a stirring head. When pressed the stirring will stop until the button is released, the stirring speed will

then accelerate up to the set speed. Note the display may flash until the stirrer restarts, this is normal and does not indicate a fault.

2.5 Display

The display serves three functions:

1. The four digits indicate the stirring speed in rpm. The decimal point should be ignored (e.g. a display of 1.200 is 1200 rpm not 1.2 rpm).
2. The four decimal points are used to indicate the stirring mode. Mode 1 is indicated by the left hand point through to mode 4 by the right hand point.
3. The display flashes OVL when the stirring head driver circuits are overloaded. This may be caused by either using three type two heads simultaneously or using a faulty stirring head. The driver circuits are automatically protected and the display will return to normal once the problem has been rectified.

3. Troubleshooting

Symptoms	Possible Causes	Suggested Remedies
Display fails to illuminate.	Control unit switched off.	Ensure unit is on.
	Fuse in control unit failed.	Replace fuse.
	Fuse in plug failed.	Replace fuse.
	Faulty control unit.	Check unit in a power outlet that is known to work. If still faulty return for repair.
Display flashes OVL.	Using three type two heads will cause an overload.	Remove one stirring head and try again.
	Stirring heads faulty.	Switch off and remove one stirring head at a time to determine faulty head.
	Control unit faulty.	Return unit for repair.
Stirring bar jumps instead of rotating smoothly.	Stirring bar is not magnetised.	Only use stirring bars containing magnets.
	Stirring head faulty.	Replace or return stirring head for repair.
	Control unit faulty.	Replace or return control unit for repair.

4. Specifications

4.1 Stirrer Control

4.1.1 Controls

- Power on/off switch.
- Speed increase button.
- Speed decrease button.
- *Mode* selector button to select stirring mode.
- *Capture* button momentarily stops stirrer to allow stirring bar capture.
- Four-digit display of stirring speed. Decimal point indicates stirring mode.

4.1.2 Supply Voltage

110/120 V or 220/240 V; 50/60 Hz. Voltage user selectable.

4.1.3 Outputs

3 off 5-pin DIN sockets for stirring heads. Maximum drive capability 15 V 8 W protected by current limiting, will drive:

- 3 × Type one stirring heads.
- 2 × Type two stirring heads.
- 12 × Type three stirring heads (requires multiple heads wired to each plug).

Combinations of all three types up to the maximum output are possible.

4.1.4 Stirring Speed

- 37 speeds between 100 and 1800 rpm.
- Display accuracy $\pm 2\%$.
- Speed stability better than 300 parts per million.

4.1.5 Dimensions

Model 300 Stirrer	
Size	215 mm (w) × 215 mm (d) × 58 mm (h)
Weight	1.2 kg (excluding stirring head and power lead)

4.2 Stirring Heads

4.2.1 Type One

The type one head is designed for use with our range of oxygen electrodes. The stirrer body is 38 mm diameter stainless steel tube with an acrylic base 89 mm in diameter. The

overall height is also 89 mm and it weighs 0.45 kg. The unit is sealed and may be immersed in water baths with a temperature range of 10–50 °C.

4.2.2 Type Two

The type two head is designed for general laboratory use, suitable for beakers and flasks up to one litre. The head is 90 mm in diameter and 68 mm high and weighs 1.2 kg.

4.2.3 Type Three

The type three head is designed for use with 10 ml cuvettes. The head is 12 mm square and 7.5 mm high and weighs 30 g. Up to four heads may be wired to a single plug to enable 12 heads to be powered by a single control unit. We are able to modify most spectrophotometer cell holders to incorporate the stirring head without raising the cuvette to ensure no interference with the beam. Thermostating the cell at the same time may also be possible.

Specifications may be subject to change at any time.

5. Ordering Information

Order Code	Description
MAG007B	Model 300 Electronic Stirrer control box complete with power lead but excluding stirring heads
MAG101A	Stirring head type one
MAG102A	Stirring head type two
MAG103A	Stirring head type three
MAG300A	Stirring bar for 10 ml cuvette
OXY328A	Stirring bar for 1 ml & 2.5 ml Perspex oxygen electrode
OXY329A	Stirring bar for 4 ml Perspex oxygen electrode
OXY330A	Stirring bar for 7 ml Perspex and 6 ml glass oxygen electrode