3000 Series

Dry-Block Heat Source

User Manual

Please read this manual before switching the unit on.
IMPORTANT safety information inside.

UK / Europe Office
Tel: +44 (0)845 9000 601
Fax: +44 (0)845 9000 602
info@omniinstruments.co.uk
www.omniinstruments.co.uk

Australia / Asia Pacific Office
Tel +61 (0)282 442 363
Fax +61 (0)294 751 278
info@omniinstruments.com.au
www.omniinstruments.com.au

USA / Canada Office
Tel +1-866-849-3441
Fax +1-866-628-8055
info@omniinstruments.net
www.omniinstruments.net

TABLE OF CONTENTS

1. INTRODUCTION

The 3000 Series dry-block heat sources allow users to check the accuracy of thermometers and sensors as a system, on site, without the need for heavy, expensive equipment. The dry-blocks are high accuracy, portable heat sources that are extremely easy to use. Simply plug in, switch on and set the dry-block to the temperature that you wish to check, insert your probe into the correct size well and take the reading. Compare the temperature reading of your thermometer and probe to the displayed temperature of the dry-block and the difference is the error of your instrument. For optimum accuracy and UKAS traceability use a Reference Thermometer to make comparison measurements.

The 3000 Series dry-blocks are controlled by a closed loop microprocessor based digital PID temperature controller system incorporating a heater and precision platinum RTD sensor housed in the aluminium block. Fan cooling allows rapid changes in block temperature upon demand. The required temperature may be adjusted in 0.1°C increments across the range of the instrument using the buttons on the front panel.

These units are ideal for use in a variety of industrial and process applications. Each unit is supplied with a traceable certificate of calibration showing actual test data, which can be used as part of quality assurance programmes.

2. SAFETY

- Operate dry-blocks in an ambient temperature between +10 and +30°C (+15 to +25°C for optimum accuracy) and a humidity between 5 to 95% (Non condensing). The fan runs continuously to moderate the internal unit temperature. Always ensure the air vents and fan aperture are clear and have at least 150mm of space between them and any obstructions. NEVER cover the unit while in operation or operate if the fan stops. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

- 
The calibrator can operate at very high temperatures. Precautions MUST be taken to prevent personal injury or damage to surrounding objects. Probes may be hot when removed from the unit and should be placed on a heat resistant surface. The unit may remain hot for several minutes after switching off. DO NOT switch off at temperatures above +100°C. Allow to cool before storage.

- 
Care must be taken when removing probes and inserts from the units. If the unit is set at a high temperature the inserts will be very hot and could cause burns to the hands. Please use the insert removal tool supplied. After removal place hot probes and inserts only on a suitable heatproof surface.

- Only place temperature probes in dry-block holes. These units are designed to be operated dry. DO NOT introduce any liquid into any of the dry-block holes.

- These dry-blocks are designed to be rugged and durable but do contain electronics. DO NOT operate in dirty, dusty or very damp environments or near liquids that could present a hazard from electric shock.

- Connect the input power lead to only a 230 V, 50-60 Hz (or 110-115 V 50-60 Hz :- model dependant) grounded a.c. power supply. The unit requires up to 200 Watts of power. Mains plug fuse rating is 3 Amps.

- 3000 series Dry-Block heat sources are programmed and calibrated at the factory for optimum performance and should not need adjusting. If the unit is out of calibration or is in need of repair please return to the supplier. The Dry-Block unit is equipped with an internal electrical fuse. If a fuse blows, return to the supplier for inspection and repair. THERE ARE NO USER SERVICEABLE PARTS INSIDE.

3. OPERATION

3.1 PARTS AND CONTROLS

3.1.1 Power lead

The power lead is clamped through the rear panel of the unit and is not removable. Plug into a standard 230 V (110-115 V - model dependant) grounded power outlet socket.

3.1.2 Power Switch

The power switch is located on the rear panel of the unit and operation is indicated with a 1 and a 0.

3.1.3 Fan

The internal fan runs continuously when the unit is operating. This provides cooling for the internal electronic components.
Allow at least 150mm of space in front and behind the unit and DO NOT obstruct any of the ventilation holes.

3.1.4 Stand

The stand can be folded flat against the under side of the unit when not in use or if the unit is to be operated in a horizontal position. It can be swung down and forward until it hits the stops so that the unit can be used in an inclined position. The stand was not designed to be a carrying handle and should NOT be forced past the stops for this purpose.

3.1.5 Dry-Block

The aluminium Dry-Block is located on the right hand side of the front panel. Dry-Well models have blocks with holes in to accept temperature probes. The Dry-Well model 3001 is designed to accept 4 different probe sizes:- two 3.3mm, 4.0mm, 4.76mm and 6.35mm. The Dry-Well model 3002 is designed to accept 4 different probe sizes:- 3.3mm, 4.76mm 6.35mm and 9.5mm. The Dry-Well model 3003 is designed to accept 2 different probe sizes:- 4.76mm and 12.7mm. The Dry-Well model 3004 is designed to accept one 3.3mm probe and a 13mm diameter insert to fit a 3.3mm probe. Other inserts are available to suit standard probe diameters. Use the nearest, larger size insert to

the probe diameter being checked. The inserts are a close fit in the dry-block to give good thermal conduction. Keep the inserts clean and avoid damage by storing carefully. The inserts MUST be regularly removed and cleaned to ensure they do not seize in the dry-block. DO NOT introduce any liquids or substance into the dry-block or inserts as this may result in the inserts sticking in the dry-block.

3.1.6 Temperature Controller

In normal operating mode the numeric LED display shows the actual block temperature. A Control Output Indicator light is located in the top left corner of the display. This indicates the on/off state of the heater element in the block.

To show the set point temperature in the display press and release either the up or down arrow button (∧ ∨). Press and hold either the up or down arrow button (∧ ∨) to change the set-point value.

A shift can be entered into the controller by pressing the scroll (left-hand) button. Press and hold either the up or down arrow button (∧ ∨) to change the shift value. A factory set value will be entered at the time of certification. The shift value should only be adjusted if the unit is being monitored by a precision reference thermometer.

All other functions of the controller have been factory set and locked to maintain accuracy and repeatability.

3.2 OPERATION

3.2.1 Dry- Block Set-Up

Place the Dry-Block unit on a flat level surface with at least 150mm of space in front and behind. The stand may be swung out to lift the front of the unit. Plug the power lead into a suitable grounded a.c. power outlet socket. Check for and remove any foreign objects prior to switching on. Turn the instrument on using the switch located on the rear panel, below

the power lead. The fan will start immediately and the controller display will illuminate after approximately 3 seconds.

3.2.2 Temperature Setting

The dry block may be set to any temperature between +33 and +300°C in 0.1°C increments (see 3.1.6 Temperature Controller for details). The control will cause the unit to heat or cool to the set point temperature. A control indicator light will show in the top left corner of the display when the heater is active. The Dry-Block temperature is displayed in operation. A small overshoot and undershoot will occur when the block reaches the set point temperature. Ten minutes is normally required to reach a higher set point temperature. It will take longer to reach a lower set point temperature. Once the set point temperature is reached a further 10 minutes should be allowed for stability to be achieved. For optimum accuracy and stability allow the unit to warm up for 30 minutes after power up. The displayed block temperature should stay within ±0.5°C of the set point temperature.

3.2.3 Probe Testing

Insert the probe to be tested into one of the holes in the Dry-Block. The probe should be a snug fit for good heat transfer but should not be so tight that it cannot be removed easily. Best results will be obtained when the probe is inserted to the full depth of the Dry-Block hole of closest size to the probe diameter. Allow the reading from the probe to stabilize and then compare the reading with either the temperature controller display or an external reference thermometer. For optimum accuracy use a high precision reference thermometer and probe. If probes with a large mass are inserted into the Dry-Block holes the unit will require up to 10 to 15 minutes to re-stabilise.

4. MAINTENANCE

4.1 CARE OF THE 3000 SERIES UNITS

3000 Series Dry-Block units require very little maintenance. Avoid operation in dusty, dirty, oily or wet environments. If the case becomes dirty it may be cleaned using a damp cloth and mild detergent. Do not allow moisture to enter the case. It is important to check for and remove any foreign objects in the Dry-Block holes.

WARNING:

Never introduce any fluids or other foreign material into the Dry-Block. This will damage the Dry-Block and could cause probes to become stuck. It could also cause a potential electric shock hazard. In the event that the heat source should require service or repair, please contact the manufacturer for assistance. There are no user serviceable parts inside and any attempted repair will void any warranty.

4.2 WARRANTY

All 3000 Series products carry a 12-month warranty, from the date of purchase, against component failure or manufacturing defect. The warranty will not apply if the unit has not been used in accordance with this instruction manual or has been tampered with in any way. Consequential loss or damage is not covered by this warranty.

5. SPECIFICATIONS

Temperature Range	+33 to +300°C (at 20°C ambient)
Resolution	0.1°C
Accuracy	+33.0 to +199.9°C ±0.5°C +200.0 to +300.0°C ±1°C : - holes greater than 6.35mm ±2.0°C
Stability	±0.5°C
Heating Times	Ambient to +300°C after 10 minutes
Stabilization	5 minutes
Cooling Times	+300 to +100°C after 15 minutes
Hole Dimensions* 3001	2 off Ø3.3 & 1 off 4.1, 4.8 & 6.4mm
Hole Dimensions* 3002	1 off Ø3.3, 4.8, 6.4 & 9.6mm
Hole Dimensions* 3003	1 off Ø4.8 & 12.8mm
Hole Dimension* 3004	1 off Ø3.3 & 1 off Ø 13mm insert
Well Depth	100mm
Power	230 Volt AC 50-60 Hz (110-115 Volt 50-60 Hz available) 200 Watt Mains plug fuse rating - 3 Amps
Display	10.0mm LED
Case Dimensions	57 x 125 x 158 (HxWxD) mm
Weight	900 grams

*Please note: Hole Dimensions given are nominal

Certificate: This instrument has been checked or calibrated against Laboratory Standards which are traceable via certification to National Standards at 50°C, 100°C and 150°C.