3101
DRY-BLOCK
HEAT/COOL SOURCE

USER MANUAL

ThermoWorks

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

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1 INTRODUCTION

The 3101 dry-block heating and cooling 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 temperature 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 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 NIST traceability use a reference thermometer to make comparison measurements.

The 3101 dry-blocks are controlled by a closed loop microprocessor based digital PID temperature controller system incorporating a combination heater/cooler and a precision platinum RTD sensor housed in the aluminum block. Fan cooling allows rapid changes in block temperature upon demand. The required temperature may be adjusted in 0.1° 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 programs.

2 SAFETY

Operate dry-blocks in an ambient temperature between +50°F and 86°F (+10 and +30°C) (+15 to +25°C for optimum accuracy) and humidity between 5 to 95% (non condensing). Note: High humidity will cause icing of the well when operated below zero. The fan runs continuously to moderate the internal unit temperature. Always ensure the air vents and fan aperture are clear and have at least 6 inches (150mm) of space between them and any obstructions. NEVER cover the unit while in operation or operate if the fan stops.

The calibrator can operate at high and low temperatures. Precautions MUST be taken to prevent personal injury or damage to surrounding objects. Probes may be hot or cold when removed from the unit and should be placed on a heat resistant surface and handled with care. The unit may remain hot for several minutes after switching off. DO NOT switch off at temperatures above +212°F (+100°C). Allow to cool before storage.

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 contain electronics. DO NOT operate in dirty, dusty or very damp environments or near liquids that could present a hazard from electric shock.

Connect input power lead to only a 110-115V or 230V, 50-60 Hz (model dependant) grounded AC power supply. The unit requires up to 200 watts of power.

3101 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 AC Power

The power cord is clamped through the rear panel of the unit and is not removable. Plug into a standard 110-115V or 230 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 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 6 inches (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 aluminum temperature well is accessible from the front panel. The dry-well model 3101 is designed to accept five different probe sizes: 1/8" (3.3mm), 5/32" (4.1mm), 3/16"(4.8mm), ¼" (6.4mm), and 3/8" (9.6mm). Two inserts are included with each unit: 1/8" (3.3mm) and 3/16" (4.8mm). These inserts can be carefully removed and additional sizes may be purchased.

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 heating/cooling 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. 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 6 inches (150mm) of space in front and behind. The stand may be swung out to lift the front of the unit. Plug the power cord into a suitable grounded AC 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 cord. The fan will start immediately and the controller display will illuminate after approximately three seconds.

3.2.2 Temperature Setting

The dry-block may be set to any temperature between -14°F and 230°F (-10 to +110°C) in 0.1° 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. 10 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 ±0.9°F (±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-stabilize.

3.2.4 Display Units

The dry-block is shipped from the factory with display units set to °F or °C. This can be reset at the factory. Call for details.

4 MAINTENANCE

4.1 Care of the 3101 Units

3101 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. In the event that the heat/cool 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

This instrument carries a twelve-month warranty and guarantee against defects in either components or workmanship. During this period, products that prove to be defective will, at the discretion of ThermoWorks, be either repaired or replaced without charge. The product warranty and guarantee does not cover damage caused by fair wear and tear, abnormal storage conditions, incorrect use, accidental misuse, abuse, neglect, misapplication or modification, or use with non-ThermoWorks hardware/ software. No warranty of fitness for a particular purpose is offered and the user assumes the entire risk of using the product. Any liability by ThermoWorks is limited only to the replacement of defective materials or workmanship, and ThermoWorks accepts no responsibility for consequential loss. In line with our policy of continuous development, we reserve the right to amend our product specification without prior notice.

5 SPECIFICATIONS

Temperature Range:	-14°F to 230°F (-10 to +110°C) (at +68°F (+20°C) ambient)
Resolution:	0.1° C/F
Accuracy:	±0.9°F: -14°F to 210°F (±0.5°C: -10 to +99°C) ±1.8°F: +212°F to 230°F (± 1°C:+100 to +110°C)
Heating Times:	Ambient to +212°F (+100°C) or Ambient to 32°F (0°C): 10 minutes
Well:	Depth 4" (100mm)
Hole Dimensions*:	Ø1/8" (3.3mm), 5/32" (4.1mm), 3/16" (4.8mm), 1/4" (6.4mm), 3/8" (9.6mm) (dependant on model)
Power:	110-115V or 230 volt AC 50-60 Hz 200 watt
Display:	0.4" (10.0mm) LED
Case Dimensions:	4.1" x 6" x 7.3" (106 x 152 x 186mm) (HxWxD)
Weight:	3.9lbs. (1800 grams)

*Please note: Hole dimensions given are nominal

Certificate: This instrument has been checked or calibrated against reference instrument(s) calibrated by a UKAS Accredited Calibration Laboratory at 32°F (0°C), 104°F (+40°C) and 212°F (+100°C) with a 1/8" (3.3mm) dia insert in the top well entrant.

Notes

Manufactured for
ThermoWorks, Inc
Phone: (801) 756-7705
Fax: (801) 756-8948
E-mail: sales@thermoworks.com
Web: www.thermoworks.com