



## Instruction Manual

Analog, Dry Block Heater, 1 Block, HB1AL  
Analog, Dry Block Heater, 2 Block, HB2AL  
Analog, Dry Block Heater, 4 Block, HB4AL  
Analog, Dry Block Heater, 6 Block, HB6AL  
Digital, Dry Block Heater, 1 Block, HB1DG  
Digital, Dry Block Heater, 2 Block, HB2DG  
Digital, Dry Block Heater, 4 Block, HB4DG  
Digital, Dry Block Heater, 6 Block, HB6DG  
Digital, Dry Block Heater, Heat Lid, HB2DGHL

EN - English	.....	1
FR - Français	.....	16
ES - Español	.....	32
IT - Italiano	.....	48
DE - Deutsch	.....	64
PT - Português	.....	80
NL - Nederlands	.....	96
NO - Norsk	.....	101
DA - Dansk	.....	106
SV - Svenska	.....	111
FI - Suomi	.....	116
HU - Magyar	.....	121
PL - Polski	.....	126
CZ - Czech	.....	131
KR - Korean	.....	135



## TABLE OF CONTENTS

Package Contents	. . . . .	1
Service Information	. . . . .	1
Installation	. . . . .	2
Maintenance & Servicing	. . . . .	2
Environmental Conditions	. . . . .	2
Equipment Disposal	. . . . .	2
Safety Instructions	. . . . .	3
Standards & Regulations	. . . . .	3
Analog Specifications	. . . . .	4-5
Analog Operating Instructions	. . . . .	6
Digital Control Panel	. . . . .	7
Digital Specifications	. . . . .	8-9
Digital Operating Instructions	. . . . .	10-14
Troubleshooting	. . . . .	15

### PACKAGE CONTENTS

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Dry Block Heater  
 Power Cord  
 Instruction manual  
 Warranty Card

### SERVICE INFORMATION

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If the troubleshooting section does not resolve or describe your problem, contact your authorized OHAUS service agent. For service assistance or technical support in the United States call toll-free 1-800-672-7722 ext. 7852 between 8:00 AM and 5:00 PM EST. An OHAUS product service specialist will be available to provide assistance. Outside the USA, please visit our web site, [www.ohaus.com](http://www.ohaus.com) to locate the Ohaus office nearest you.

Serial Number: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Supplier: \_\_\_\_\_

## INSTALLATION

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Upon receiving the Ohaus Dry Block Heater, check to ensure that no damage has occurred in shipment. It is important that any damage that occurred in transport is detected at the time of unpacking. If you do find such damage the carrier must be notified immediately.

After unpacking, place the Dry Block Heater on a level bench or table, away from explosive vapors. Ensure that the surface on which the unit is placed will withstand typical heat produced by the unit and place the unit a minimum of 6" (15.2cm) from vertical surfaces. Always place the unit on a sturdy work surface.

The Dry Block Heater is supplied with a power cord that is inserted into the IEC connector on the back of the unit first, then it can be plugged into a properly grounded outlet. The 120V unit plugs into a 120 volt, 50/60 Hz source. The 230V unit plugs into a 230 volt, 50/60 Hz source.

It is necessary to fill the Dry Block Heater well(s) with modular heating blocks because empty block locations will affect performance. Place filled tubes in modular block(s), then place the modular block(s) into the Dry Block Heater well(s).

## MAINTENANCE & SERVICING

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The Dry Block Heater is built for long, trouble-free, dependable service. No lubrication or other technical user maintenance is required. It needs no user maintenance beyond keeping the surfaces clean.

The unit should be given the care normally required for any electrical appliance. Avoid wetting or unnecessary exposure to fumes. Spills should be removed promptly after the unit has cooled down. **DO NOT** use a cleaning agent or solvent on the front panel which is abrasive or harmful to plastics, nor one which is flammable. Always ensure the power is disconnected from the unit prior to any cleaning. If the unit ever requires service, contact your Ohaus representative.

## INTENDED USE

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The Dry Block Heaters are intended for general laboratory use. Safety cannot be guaranteed if used outside of the intended use.

## ENVIRONMENTAL CONDITIONS

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<b>Operating Conditions:</b>	Indoor use only.
Temperature:	18 to 33°C (64 to 91°F)
Humidity:	20% to 80% relative humidity, non-condensing
Altitude:	0 to 6,562 ft (2000 M) above sea level

### Non-Operating Storage:

Temperature:	-20 to 65°C (-4 to 149°F)
Humidity:	20% to 80% relative humidity, non-condensing

Installation Category II and Pollution Degree 2 in accordance with IEC 664.

## EQUIPMENT DISPOSAL

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This equipment must not be disposed of with unsorted waste. It is your responsibility to correctly dispose of the equipment at life-cycle-end by handing it over to an authorized facility for separate collection and recycling. It is also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect the persons involved in the disposal and recycling of the equipment from health hazards.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment. By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

## SAFETY INSTRUCTIONS

Please read the entire instruction manual before operating the Dry Block Heater.



**WARNING! DO NOT** use the Dry Block Heater in a hazardous atmosphere or with hazardous materials for which the unit was not designed. Also, the user should be aware that the protection provided by the equipment may be impaired if used with accessories not provided or recommended by the manufacturer, or used in a manner not specified by the manufacturer.

Always operate unit on a level surface for best performance and maximum safety.



**CAUTION!** To avoid electrical shock, completely cut off power to the unit by disconnecting the power cord from the unit or unplug from the wall outlet. Disconnect unit from the power supply prior to maintenance and servicing.

Spills should be removed promptly, after the unit has cooled down. **DO NOT** immerse the unit for cleaning. **DO NOT** operate the unit if it shows signs of electrical or mechanical damage.

The main supply power cord provided with this product is rated to safely handle the products electrical load under the stated environmental conditions. **DO NOT** replace the cord with an inadequately rated main supply cord.

The Dry Block Heaters are designed to be operated in dry conditions. **DO NOT** put water, oil or other fluids in the wells of the units. The chamber that the modular heating blocks and baths sit in is not designed to be filled with liquid or other fluids. **DO NOT** place anything other than the appropriate heating block(s) in this cavity.



**CAUTION!** Dry Block Heaters are not explosion proof. Use caution when unit is on or when heating volatile materials.







Earth Ground - Protective Conductor Terminal



Alternating Current

## STANDARDS & REGULATIONS

Compliance to the following standards and regulations is indicated by the corresponding mark on the product.

Mark	Standards and Regulations
	OHAUS Corporation declares that the HB series dry block heaters comply with directives 2011/63/EU, 2014/30/EU, 2014/35/EU and standards EN 50581, EN 61010-1, EN 61010-2-010, EN 61326-1. The full text of the EU declaration of conformity is available at the following internet address: <a href="http://www.ohaus.com/ce">www.ohaus.com/ce</a> .
	This product complies with directive 2012/19/EU. Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. For disposal instructions in Europe, refer to <a href="http://www.ohaus.com/weee">www.ohaus.com/weee</a> .
	EN 61326-1
	CAN/CSA C22.2 61010-1, CAN/CSA C22.2 61010-2-010 UL 61010-1, UL 61010-2-010

### Global Notice

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### Canada Notice

This Class A digital apparatus complies with Canadian ICES-003.

### FCC Notice

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by Ohaus Corporation could void the user's authority to operate the equipment.

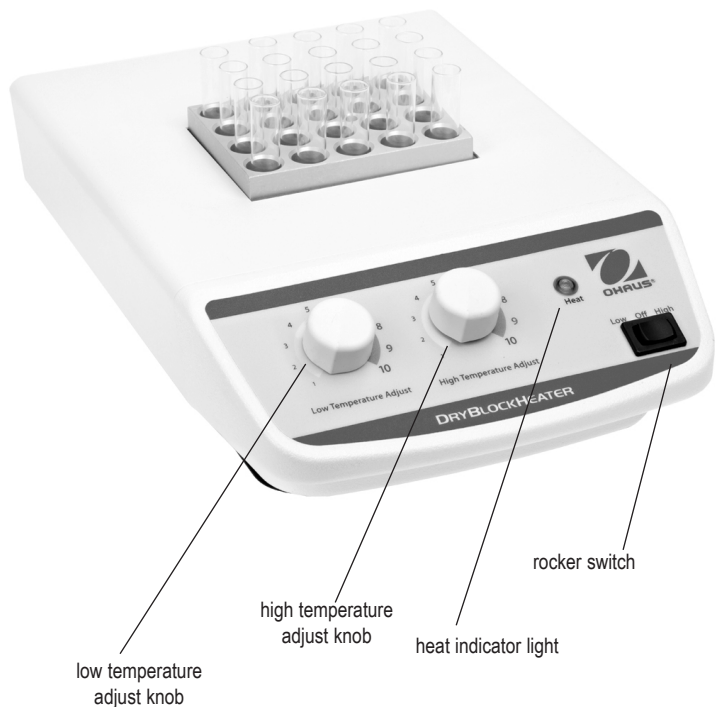
## ANALOG DRY BLOCK HEATER SPECIFICATIONS - 120 VOLT

	1 Block	2 Block	4 Block	6 Block
<b>Dimensions (L x W x H):</b>	12.4 x 8 x 3.5" (31.5 x 20.3 x 8.9cm)	15.4 x 8 x 3.5" (39.1 x 20.3 x 8.9cm)	16.9 x 8 x 3.5" (42.9 x 20.3 x 8.9cm)	20.9 x 8 x 3.5" (53.1 x 20.3 x 8.9cm)
<b>Electrical 120V 50/60 Hz:</b>	0.92 amps, 110 watts	1.75 amps, 210 watts	2.6 amps, 310 watts	3.42 amps, 410 watts
<b>Fuses:</b>	5mm x 20mm, 5 amp quick acting, 250V			
<b>Temperature low range:</b>	ambient +5°C to 100°C			
<b>Temperature high range:</b>	75°C to 150°C			
<b>Stability @ 37°C:</b>	+/-1°C	+/-1.5°C	+/-2°C	+/-2°C
<b>Uniformity w/in the block @ 37°C:</b>	+/-0.1°C			
<b>Uniformity across similar blocks @ 37°C:</b>	N/A	+/-0.1°C	+/-0.2°C	+/-0.3°C
<b>Stability @ 60°C:</b>	+/-3°C	+/-4°C	+/-5°C	+/-5°C
<b>Uniformity w/in the block @ 60°C:</b>	+/-0.6°C			
<b>Uniformity across similar blocks @ 60°C:</b>	N/A	+/-0.8°C	+/-1.2°C	+/-1.4°C
<b>Heat-up time to 100 °C:</b>	45 min.	50 min.	70 min.	75 min.
<b>Controls:</b>	rocker switch heat indicator light low temperature knob, variable 1 to 10 dial markings high temperature knob, variable 1 to 10 dial markings			
<b>Ship weight:</b>	5.8lbs (2.6kg)	6.4lbs (2.9kg)	8.5lbs (3.9kg)	10lbs (4.5kg)

## ANALOG DRY BLOCK HEATER SPECIFICATIONS - 230 VOLT

	1 Block	2 Block	4 Block	6 Block
<b>Dimensions (L x W x H):</b>	12.4 x 8 x 3.5" (31.5 x 20.3 x 8.9cm)	15.4 x 8 x 3.5" (39.1 x 20.3 x 8.9cm)	16.9 x 8 x 3.5" (42.9 x 20.3 x 8.9cm)	20.9 x 8 x 3.5" (53.1 x 20.3 x 8.9cm)
<b>Electrical 230V 50/60 Hz:</b>	0.5 amps, 110 watts	0.92 amps, 210 watts	1.35 amps, 310 watts	1.79 amps, 410 watts
<b>Fuses:</b>	5mm x 20mm, 5 amp quick acting, 250V			
<b>Temperature low range:</b>	ambient +5°C to 100°C			
<b>Temperature high range:</b>	75°C to 150°C			
<b>Stability @ 37°C:</b>	+/-1.5°C	+/-2°C	+/-2.5°C	+/-2.5°C
<b>Uniformity w/in the block @ 37°C:</b>	+/-0.4°C			
<b>Uniformity across similar blocks @ 37°C:</b>	N/A	+/-0.1°C	+/-0.2°C	+/-0.3°C
<b>Stability @ 60°C:</b>	+/-3°C	+/-4°C	+/-5°C	+/-5°C
<b>Uniformity w/in the block @ 60°C:</b>	+/-0.6°C			
<b>Uniformity across similar blocks @ 60°C:</b>	N/A	+/-0.8°C	+/-1.2°C	+/-1.4°C
<b>Heat-up time to 100 °C:</b>	45 min.	50 min.	70 min.	75 min.
<b>Controls:</b>	rocker switch heat indicator light low temperature knob, variable 1 to 10 dial markings high temperature knob, variable 1 to 10 dial markings			
<b>Ship weight:</b>	5.8lbs (2.6kg)	6.4lbs (2.9kg)	8.5lbs (3.9kg)	10lbs (4.5kg)

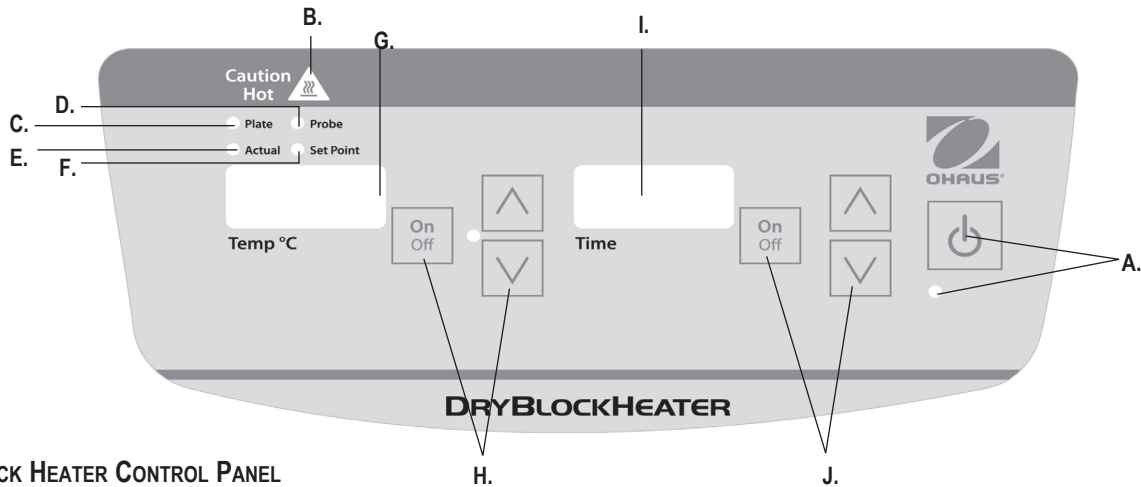
## ANALOG DRY BLOCK HEATER OPERATING INSTRUCTIONS



*Ohaus Analog 1 Block Heater with modular block and tubes*

These multi-purpose units are ideal for incubation and activation of cultures, enzyme reactions, immunoassays, melting/boiling points and a wide variety of other laboratory procedures.

1. Switch the three (3) position rocker power switch from the center off position to the low range or high range position as desired. The controls are divided into two separate heating ranges, both thermostats having graduations to assist in setting the desired temperatures. The left hand 'low temperature adjust' controls from slightly above ambient to approximately 100°C. The right hand 'high temperature adjust' controls from approximately 75°C to 150°C.
2. The rocker switch has a center off position and is used to select the desired operating range. When operating at the point where the two thermostats overlap in temperature range, the proper thermostat must be chosen for the task being performed. Move the power switch to the desired operating range and turn the matching range temperature control knob clockwise to increase the temperature within the range selected. The heat indicator light will illuminate during the operation of the heater.
3. The temperature may be verified by placing a calibrated thermometer in the test solution or by insertion in the modular block thermometer well provided. This hole fits regular glass bulb thermometers or small diameter digital probes. Due to air currents and radiation losses, the temperature in the test solution will be lower than the temperature in the block itself. For the most accurate readings a thermometer should be placed in a sample test tube with solution matching the samples being tested. If the temperature is too high or too low, adjust clockwise to increase temperature, counter-clockwise to decrease temperature. Slight adjustments will usually suffice to correct the temperature setting. When the heat indicator light flashes on and off intermittently, check the temperature again. Allow sufficient time for the temperature to stabilize before re-adjusting. This procedure should be followed until the desired temperature is reached.



## DIGITAL DRY BLOCK HEATER CONTROL PANEL

The front panel of the Dry Block Heater contains all the controls and displays needed to operate the unit.

- A. Standby button/standby indicator light:** The standby indicator light will illuminate when the unit is plugged in. The unit will be in standby mode. Press the standby button to start the temperature and time functions. The standby indicator light will shut off. Press the standby button again and the unit will once again be in standby mode.
- B. Caution hot top indicator light:** Illuminates when the plate temperature is above 40°C (104°F).
- C. Plate indicator light:** Illuminates when the optional external RTD probe is not being used. The temperature displayed is the plate temperature.
- D. Probe indicator light:** Illuminates when the optional external RTD probe is plugged in. The temperature displayed is the probe temperature, NOT the plate temperature.

- E. Actual indicator light:** Illuminates when the temperature displayed is the actual temperature of the plate/RTD probe.
- F. Set-point indicator light:** Illuminates when the set-point temperature is displayed.
- G. Temperature display:** Displays the actual/set-point temperatures in conjunction with the actual/set-point indicator lights. **H.** Up/down arrows for set-point control. On/off button starts/stops the heating function.
- I. Time display:** Displays accumulated time (continuous mode) or how much time is remaining (timed mode). The display range is from 0 to 9,999 minutes in one (1) second increments. The display will indicate minutes and seconds until the timer reaches 99 minutes and 59 seconds (99:59), then the display will automatically display minutes up to 9,999. **J.** Up/down arrows for set-point control. On/off button starts/stops the timer function.



## DIGITAL DRY BLOCK HEATER SPECIFICATIONS - 120 VOLT

	1 Block	2 Block	4 Block	6 Block	2 Block with Lid
<b>Dimensions (L x W x H):</b>	12.4 x 8 x 3.5" (31.5 x 20.3 x 8.9cm)	15.4 x 8 x 3.5" (39.1 x 20.3 x 8.9cm)	16.9 x 8 x 3.5" (42.9 x 20.3 x 8.9cm)	20.9 x 8 x 3.5" (53.1 x 20.3 x 8.9cm)	15.4 x 8 x 7" (39.1 x 20.3 x 17.8cm)
<b>Electrical 120V 50/60 Hz:</b>	0.92 amps, 110 watts	1.75 amps, 210 watts	2.6 amps, 310 watts	3.42 amps, 410 watts	3.0 amps, 400 watts
<b>Fuses:</b>	5mm x 20mm, 5 amp quick acting, 250V				
<b>Temperature range:</b>	ambient +5°C to 120°C				ambient +5°C to 100°C
<b>Stability @ 37°C:</b>	+/-0.1°C				
<b>Uniformity w/in the block @ 37°C:</b>	+/-0.1°C				+/-0.1°C
<b>Uniformity across similar blocks @ 37°C:</b>	N/A	+/-0.1°C	+/-0.2°C	+/-0.3°C	+/-0.1°C
<b>Stability @ 60°C:</b>	+/-0.4°C				
<b>Uniformity w/in the block @ 60°C:</b>	+/-0.4°C				
<b>Uniformity across similar blocks @ 60°C:</b>	N/A	+/-0.5°C	+/-0.8°C	+/-1°C	+/-0.5°C
<b>Heat-up time to 100 °C:</b>	45 min.	50 min.	60 min.	65 min.	50 min.
<b>Controls:</b>	see page 7				
<b>Ship weight:</b>	5.8lbs (2.6kg)	6.4lbs (2.9kg)	8.5lbs (3.9kg)	10lbs (4.5kg)	7lbs (3.2kg)

## DIGITAL DRY BLOCK HEATER SPECIFICATIONS - 230 VOLT

	1 Block	2 Block	4 Block	6 Block	2 Block with Lid
<b>Dimensions (L x W x H):</b>	12.4 x 8 x 3.5" (31.5 x 20.3 x 8.9cm)	15.4 x 8 x 3.5" (39.1 x 20.3 x 8.9cm)	16.9 x 8 x 3.5" (42.9 x 20.3 x 8.9cm)	20.9 x 8 x 3.5" (53.1 x 20.3 x 8.9cm)	15.4 x 8 x 7" (39.1 x 20.3 x 17.8cm)
<b>Electrical 230V 50/60 Hz:</b>	0.5 amps, 110 watts	0.92 amps, 210 watts	1.35 amps, 310 watts	1.79 amps, 410 watts	1.65 amps, 400 watts
<b>Fuses:</b>	5mm x 20mm, 5 amp quick acting, 250V				
<b>Temperature range:</b>	ambient +5°C to 120°C				ambient +5°C to 100°C
<b>Stability @ 37°C:</b>	+/-0.2°C				
<b>Uniformity w/in the block @ 37°C:</b>	+/-0.2°C				+/-0.1°C
<b>Uniformity across similar blocks @ 37°C:</b>	N/A	+/-0.1°C	+/-0.2°C	+/-0.3°C	+/-0.1°C
<b>Stability @ 60°C:</b>	+/-0.4°C				
<b>Uniformity w/in the block @ 60°C:</b>	+/-0.4°C				
<b>Uniformity across similar blocks @ 60°C:</b>	N/A	+/-0.5°C	+/-0.8°C	+/-1°C	+/-0.5°C
<b>Heat-up time to 100 °C:</b>	45 min.	50 min.	60 min.	65 min.	50 min.
<b>Controls:</b>	see page 7				
<b>Ship weight:</b>	5.8lbs (2.6kg)	6.4lbs (2.9kg)	8.5lbs (3.9kg)	10lbs (4.5kg)	7lbs (3.2kg)

## DIGITAL DRY BLOCK HEATER OPERATING INSTRUCTIONS

Designed for applications that require repeatable results and superior temperature stability. These multi-purpose units are ideal for incubation and activation of cultures, enzyme reactions, immunoassays, melting/boiling points, and a wide variety of other laboratory procedures.

For best performance, the Dry Block Heater should be used in a stable environment. The unit's environment should have no air currents, drafts or temperature changes and it cannot be placed in direct sunlight. The unit requires a stable electrical supply that is free of voltage fluctuations. An unstable environment will adversely affect the performance of the unit. For example, even minor air drafts or temperature changes will adversely affect the unit's ability to maintain a stable temperature.

### 1. Getting ready:

- a. When using the external RTD probe, plug the RTD probe into the three (3) pin DIN connector at the back of the unit and place the thermometer portion in the thermometer well of the modular block. When using multiple blocks, place the RTD probe in the front right modular block.
- b. Press the standby button to change the unit from standby mode. The temperature display, time display and probe indicator light will illuminate. When not using the RTD probe, the plate indicator light will illuminate. The temperature display will alternate between the actual and set-point temperatures.

### 2. Setting temperature:

- a. Press the up/down arrows to the right of the temperature display until you reach the desired temperature. Holding down either the up or down arrow will cause the set temperature to change rapidly, a single pressing of either key will move the set temperature by 0.1°C. When you release the button, the display will blink off and then on, indicating the new set temperature has been accepted. Once the set-point has been programmed and the keys are not being pressed, press the on/off button to the right of the temperature display to activate the heating function. A green indicator light will illuminate next to the on/off button indicating the heating function is on. The actual and set-point indicator lights

will alternate between set and actual temperatures. There are three (3) audible beeps to indicate the set-point temperature has been reached.

- b. Set-point temperature adjustments can be made without interrupting heating using the up/down arrows to the right of the temperature display. After the change has been made and you release the button, the display will blink off and then on indicating the new set temperature has been accepted.
- c. To stop heating, press the on/off button to the right of the temperature display.
- d. Allow time for the temperature to stabilize. The actual temperature displayed is the temperature at the bottom of the modular block or of the RTD probe. Once the displayed actual temperature agrees with the set temperature, several minutes should be allowed for the temperature to stabilize throughout the block evenly.

**Overshoot protection:** If the unit exceeds the set temperature by 10°C, the unit will automatically stop heating.

### 3. Setting timed mode: Programmed time.

- a. Press the up/down arrows to the right of the time display until you reach the desired time.
- b. Start this function by pressing the on/off button to the right of the time display, the unit will run for the selected time. When using the timer in conjunction with the heating function, when the time display reaches zero (0:00), four (4) audible beeps will indicate the time down function is complete. Both the time and heating functions will shut off automatically and the time display will default back to the set time. To repeat for the same time, simply depress the on/off button again.
- c. To interrupt an automatic timing cycle before it is completed, press the on/off button to the right of the time display. The time display will flash until you resume the time function by pressing the on/off button again. This interrupt will not stop the heating function, the heating function will stop only when the timer reaches zero (0:00).

4. **Setting time to zero (0:00) and continuous mode:** Accumulated time.
  - a. Press and hold the on/off button to the right of the time display. After three (3) seconds, the display will indicate the previous set time.
  - b. Simultaneously press both the up and the down arrows, the display will indicate zero (0:00). The unit time is now set to zero (0:00) minutes. Alternately, you can use the up/down arrows to get to zero (0:00).
  - c. Press the on/off button to the right of the time display, the display will indicate actual running time. The up/down arrows will become inactive. To stop timer, press the on/off button again. **IMPORTANT:** This will not affect the heating function. Press the on/off button to the right of the heat display to interrupt the heating function.
  - d. To reset, press and hold the on/off button to the right of the time display. After three (3) seconds the display will indicate the previous set time, which was zero (0:00).
5. **Turning unit off:**
  - a. To turn the unit off, press the standby button, the temperature and time displays will be blank, the standby indicator light will turn on.

#### **CALIBRATION PROCEDURE**

This procedure is used to fine tune and calibrate the block temperature at a specific temperature setting. It will only be active without an external temperature probe connected. This process may be repeated for up to three (3) separate set-points. If a fourth calibration set-point is entered, the first set-point entered will be overwritten.

1. Turn unit on.
2. Set desired temperature.
3. Stabilize twenty (20) minutes or more, measuring the block temperature with a calibrated precision instrument or thermometer.
4. Press and hold standby button, then press the temperature up button once. The unit will beep two (2) times, confirming calibration mode. The display will now be flashing.

5. Press the temperature up/down arrows until the display matches the temperature probe/thermometer.
6. Press standby button to exit calibration mode and return to normal heating.

This process may be repeated at the same set-point multiple times for fine tuning if desired.

The unit will now use the biased offset for that specific temperature setting and increase or decrease temperature accordingly to bring the block temperature to set temperature. The decimal point of the display will flash to indicate a biased offset is being used. All other temperature settings will use the standard internal calibration. This offset will be stored in memory and retained until reset.

#### ***To restore unit to factory setting:***

Press and hold standby button while pressing the temperature down button once. The reset will be confirmed with two (2) beeps. Press the standby button to exit calibration mode and return to normal heating.

#### **BEEPER PREFERENCE**

To silence beeper operation (except for error codes), with the unit in standby mode, press and hold the time on/off button and press the standby button. To restore normal beeper operation, remove AC power to unit for 10 seconds and then restore. Alternately, you may have to turn the unit on and press and hold the standby button and press and hold the time on/off button simultaneously.

## OPERATING INSTRUCTIONS CONT'D

### MODULAR HEATING BLOCKS AND SAMPLES

Only Ohaus Modular Heating Blocks are to be used in the Dry Block Heaters.

1. Select the proper blocks that will be a precise fit for the tubes, plates, or vials that you will be using for your application.
2. Only plastic or glass tubes, plates, or vials are to be used in the Modular Heating Blocks. Metal vessels will adversely affect the temperature performance of the unit. Metal vessels will dissipate too much heat into the air, thus adversely affecting the temperature readings of the unit.
3. Blocks need to be in all positions on the unit so the heating plate is not exposed to the environment.
4. To ensure proper heating, the tubes, plates, or vials that are used must be the correct size for the Modular Heating Block. The tubes, plates or vials must fit securely in the hole with no air gaps and maintain as much contact as possible with the wall of the block. This will ensure good thermal contact between the Modular Heating Block and the tube, plate or vial you are using for your application.
5. For proper heating, the fluid level within your tube, plate or vial should not exceed the height of the Modular Heating Block. If your application requires the fluid level to be above the height of the block, then a temperature cover is recommended.
6. When using a temperature measuring device in a sample, the end of the probe should be placed at the bottom of the sample and the height of the liquid should not exceed the height of the Modular Heating Block. Ensure that your temperature measuring device is designed for immersion in liquids.
7. Contact your Ohaus representative for information on ordering Modular Heating Blocks and other Dry Block Heater accessories.

### OPTIONAL EXTERNAL RTD PROBE KIT (FOR DIGITAL UNITS)

1. If your application requires a high level of accuracy, the optional external RTD probe should be used with the Dry Block Heater.
2. Follow the 'Operating Instructions' for the proper installation of the optional external RTD probe. With the RTD probe plugged into the back of the unit, place the thermometer portion in the thermometer well of the Modular Heating Block. With the external RTD probe in place, the RTD probe is now driving the displayed temperature setting for the operation of the unit, not the heating plate of the unit. Once the optional external RTD probe is properly installed, the probe indicator LED above the temperature display will be illuminated.

## TEMPERATURE TESTING

1. To ensure good thermal conductivity, select the proper Modular Heating Block for your application. Select the proper tubes or vials which are the proper size for the Modular Heating Block. Close contact, with no air gaps, must be maintained between the walls of the Modular Heating Block well and the sides of the tubes or vials.
2. Fill the tubes or vials so that the fluid level does not rise above the top surface of the Modular Heating Block.
3. Select a temperature measuring device that is designed for immersion in liquids. Place your calibrated temperature measuring device in one of the samples so it reaches the bottom of the tube or vial. Once the temperature measuring device is placed in the fluid sample, ensure the fluid level is still below the top surface of the Modular Heating Block.
4. Set the desired temperature on the unit, allow the unit to reach this temperature, and let the unit stabilize for an additional twenty (20) minutes or more before taking any temperature readings.
5. The temperature can also be tested by utilizing the thermometer hole in the Modular Heating Block. A calibrated temperature measuring device can be inserted into the thermometer hole where there is a snug fit and close contact between the walls of the block and the temperature device. The temperature device must reach the bottom of this hole with no air gaps. Follow the procedure above for allowing the unit to reach temperature and stabilize before taking any temperature readings.
6. If the measured temperature on your temperature measuring device does not match the actual temperature on the display of the unit (for Digital units only), then the single point calibration procedure can be used. By doing this, the unit will now be more accurate at that set-point for your specific application.

## STABILITY TESTING

1. The manufacturer has performed temperature stability tests on Dry Block Heaters. The manufacturer used calibrated temperature measuring device for the stability tests. Units were set-up with the proper number of Modular Heating Blocks so the heater plates were not exposed to the environment. A calibrated temperature measuring device was inserted into the thermometer well of one block on each unit. The testing temperature was set, the units were allowed to heat up and stabilize for a minimum of twenty (20) minutes and then temperature readings were recorded at regular intervals for four (4) hours. These tests confirmed the temperature stability of the units.
2. The recommended procedure for testing the unit's stability is as follows:
  - a. Set-up the unit in a stable environment.
  - b. Set-up the unit with the proper number of Modular Heating Blocks for the unit. Place a calibrated temperature measuring device into the thermometer well of the Modular Heating Block. The temperature device should have a snug fit with no air gaps in the thermometer well. Set the temperature of the unit. Allow the unit to reach temperature and stabilize for twenty (20) minutes or more and then take temperature readings for stability.
  - c. Another method to test for stability is to set up the unit with the proper number of Modular Heating Blocks and then place the proper fitting tubes or vials into the blocks. Fill the tubes or vials with liquid, where the liquid level is lower than the top surface of the Modular Heating Block. Use a calibrated temperature measuring device that is designed for immersion in liquids, and place the temperature probe in the bottom of one of the tubes or vials in one block. Set the temperature of the unit. Allow the unit to reach temperature and stabilize for twenty (20) minutes or more and then take temperature readings for stability. Please note the characteristics of the liquid used for the test and the fit of the tube or vial in the Modular Heating Block can affect the results of a stability test for the Dry Block Heaters. Tubes and vials must be the proper size for the Modular Heating Block so there is a secure fit with no air gaps to ensure good thermal contact.

## OPERATING INSTRUCTIONS CONT'D

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### UNIFORMITY TESTING

1. The manufacturer has performed uniformity tests on Dry Block Heaters to ensure even heating across the entire heater plate. For the one block heaters, the manufacturer used a specially designed Modular Heating Block with five (5) temperature holes. Five independent calibrated temperature measuring devices were used during the test. For multiple block units, Modular Heating Blocks were placed in all positions to cover the entire heating plate and then an independent calibrated temperature measuring device was used in the thermometer well of each block. For all tests, the tip of the temperature measuring device was an exact fit for the temperature well in the Modular Heating Block with no air gaps. The temperature was set and the units were allowed to heat up and stabilize for twenty (20) minutes or more. Readings were then taken at regular intervals to monitor the temperature uniformity for four (4) hours. These tests were repeated after rotating the temperature measuring devices to different thermometer well positions to confirm the temperature uniformity of the units.
2. The recommended procedure for testing the unit's temperature uniformity is as follows:
  - a. Set-up the unit in a stable environment.
  - b. Set-up the unit with the proper number of Modular Heating Blocks to cover the entire heating plate. Then set up the blocks with the proper fitting tubes or vials. Place liquid samples in tubes or vials where the liquid level is lower than the height of the top surface of the Modular Heating Block.
  - c. Select multiple calibrated temperature measuring devices that are designed for immersion in liquids. Use these temperature measuring devices at the same time across various positions in the Modular Heating Block(s). Place the temperature probes in the bottom of several of the filled tubes or vials. Ensure the liquid levels in the tubes or vials with the temperature probes does not rise above the height of the top surface of the Modular Heating Block.
  - d. Set the temperature of the unit. Allow the unit to reach temperature and stabilize for twenty (20) minutes or more and then take temperature readings from all the temperature devices to test for temperature uniformity
- e. Please note the characteristics of the liquid used for the test and the fit of the tube or vial in the Modular Heating Block can affect the results of the uniformity test for the Dry Block Heaters. Tubes and vials must be the proper size for the Modular Heating Block so there is a secure fit with no air gaps to ensure good thermal contact.

## TROUBLESHOOTING

To clear error press the standby button

Problem	Cause	Solution
Unit fails to power on	Missing or blown fuse	Add or replace fuse as necessary. If problem persists, please contact your Ohaus representative for repair.
E1	Faulty temperature sensor	This error cannot be fixed by the end user. Please contact your Ohaus representative for repair.
E2	Thermocouple failure or Heating element failure	This error cannot be fixed by the end user. Please contact your Ohaus representative for repair.
E3	Unit cannot reach set-point or Probe not in thermometer well	If using probe, verify probe is in thermo well and follow Single Point Calibration instructions on page 11. If problem persists, please contact your Ohaus representative for repair.

Errors will cause heating function to cease. Timing functions will be unaffected.





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P/N: 715300-00

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