

Instruction Manual



Dry Block Heaters



TABLE OF CONTENTS

Package Contents	1
Warranty	1
Installation	2
Maintenance & Servicing	2
Environmental Conditions	2
Safety Instructions	3
Standards & Regulations	3
Analog Dry Block Heater	4-5
Digital Control Panel	6
Digital Dry Block Heater	7-9
Troubleshooting	9
Replacement Parts	10-11
Modular Blocks & Accessories	12-13

PACKAGE CONTENTS

Dry Block Heater
92" (234cm) detachable power cord
Instruction manual
Warranty card

WARRANTY

Manufacturer warrants this product to be free from defects in material and workmanship when used under normal conditions for two (2) years. Please complete and return the enclosed warranty card. For your reference, make a note of the serial number, date of purchase and supplier here.

Serial No.: _____ Date of Purchase: _____

Supplier: _____

INSTALLATION

Upon receiving the Thomas Scientific 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 six (6) inches 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). See 'Modular Blocks & Accessories' (page 12-13) for modular heating blocks available from Thomas Scientific.

MAINTENANCE & SERVICING

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 Thomas Scientific representative.

ENVIRONMENTAL CONDITIONS

Operating Conditions: 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.

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 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

Henry Troemner LLC hereby declares under it's sole responsibility that the construction of this product conforms in accordance with the following standards:

Safety standards:

IEC 61010-1

Safety requirements for electrical equipment for measurement, control and laboratory use. Part I: General Requirements.

IEC 61010-2-010

Part II: Particular requirements for laboratory equipment for the heating of materials.

UL Std. No. 61010-1

EMC standards:

EN6100-3-2

EN61000-3-3

EN61000-4-5

FCC-B

EN61000-4-4

EN55022-A

EN61000-4-2

EN61000-4-3

EN61000-4-11

EN61000-4-6

EN45501

Associated EU guidelines:

EMC directive 89/336/EEC

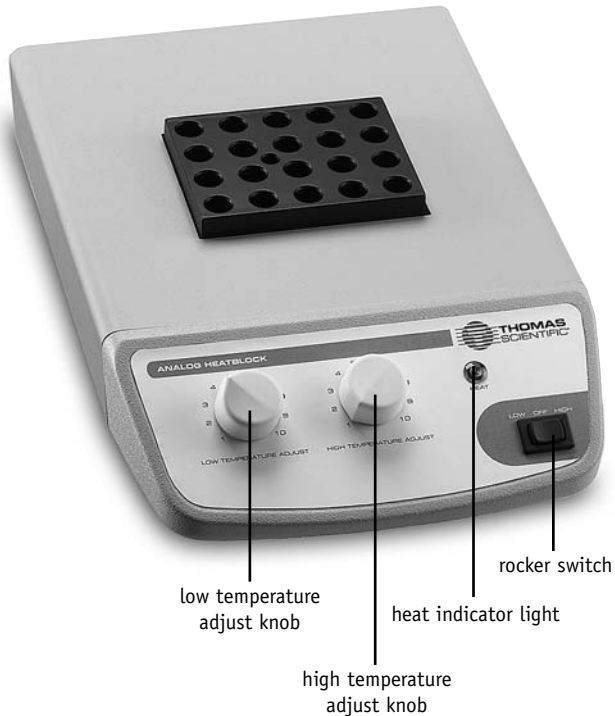
LVD directive 73/23/EEC

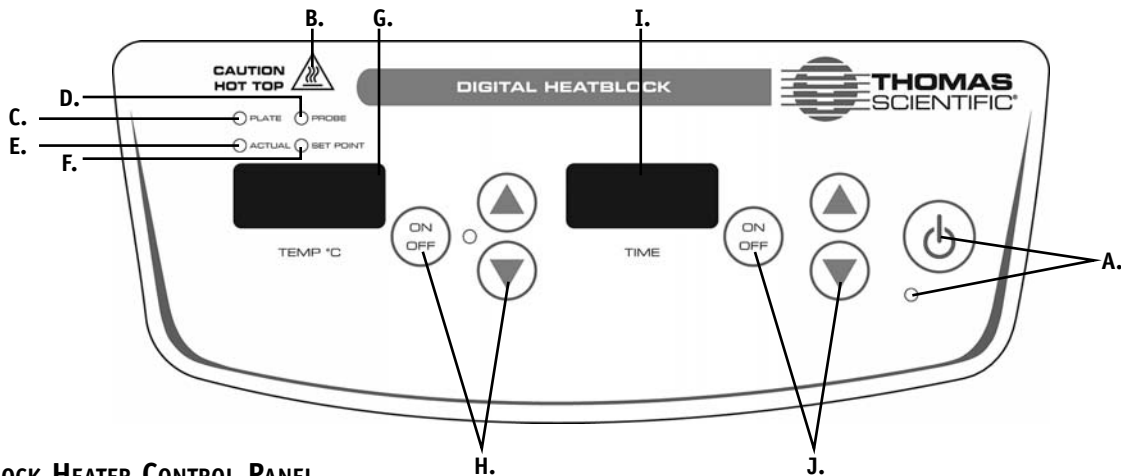
ANALOG DRY BLOCK HEATER SPECIFICATIONS

	1 Block	2 Block	3 Block	4 Block	6 Block
Dimensions (L x W x H):	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)	18.4 x 8 x 3.5" (46.7 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)
Electrical 120V 50/60 Hz:	0.9 amps, 110 watts	1.7 amps, 210 watts	1.7 amps, 210 watts	2.6 amps, 310 watts	3.4 amps, 410 watts
230V 50/60 Hz:	0.5 amps, 110 watts	0.9 amps, 210 watts	0.9 amps, 210 watts	1.3 amps, 310 watts	1.7 amps, 410 watts
Fuses:	5mm x 20mm, 5 amp quick acting				
Temperature low range:	ambient +5°C to 100°C				
Temperature high range:	75°C to 150°C				
Stability @ 37°C:	+/-1°C	+/-1.5°C	+/-2°C	+/-2°C	+/-2°C
Uniformity w/in the block @ 37°C:	+/-0.1°C				
Uniformity across similar blocks @ 37°C:	N/A	+/-0.1°C	+/-0.15°C	+/-0.2°C	+/-0.3°C
Heat-up time to 100°C:	45 min.	50 min.	60 min.	70 min.	75 min.
Controls:	rocker switch heat indicator light low temperature knob, variable 1 to 10 dial markings high temperature knob, variable 1 to 10 dial markings				
Ship weight:	5.8lbs (2.6kg)	6.4lbs (2.9kg)	8lbs (3.6kg)	8.5lbs (3.9kg)	10lbs (4.5kg)

ANALOG DRY BLOCK HEATER OPERATING INSTRUCTIONS

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 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

	1 Block	2 Block	3 Block	4 Block	6 Block
Dimensions (L x W x H):	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)	18.4 x 8 x 3.5" (46.7 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)
Electrical 120V 50/60 Hz:	0.9 amps, 110 watts	1.7 amps, 210 watts	1.7 amps, 210 watts	2.6 amps, 310 watts	3.4 amps, 410 watts
230V 50/60 Hz:	0.5 amps, 110 watts	0.9 amps, 210 watts	0.9 amps, 210 watts	1.3 amps, 310 watts	1.7 amps, 410 watts
Fuses:	5mm x 20mm, 5 amp quick acting				
Temperature range:	ambient +5°C to 120°C				
Stability @ 37°C:	+/-0.1°C				
Uniformity w/in the block @ 37°C:	+/-0.1°C				
Uniformity across similar blocks @ 37°C:	N/A	+/-0.1°C	+/-0.15°C	+/-0.2°C	+/-0.3°C
Heat-up time to 100°C:	45 min.	50 min.	55 min.	60 min.	65 min.
Controls:	see page 6				
Ship weight:	5.8lbs (2.6kg)	6.4lbs (2.9kg)	8lbs (3.6kg)	8.5lbs (3.9kg)	10lbs (4.5kg)

DIGITAL DRY BLOCK HEATER OPERATING INSTRUCTIONS

The Dry Block Heater is used to prepare samples for testing. It operates by heating samples just prior to testing. The units are designed to maintain accurate temperature for long periods with little deviation.

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. Set 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 unit 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, the temperature display and temperature indicator light will illuminate. 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 unit 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.



NOTE: Heatblock overshoot protection: If the unit exceeds the set temperature by 10°C, the unit will automatically stop heating.

3. Set timed mode:

- 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), five (5) 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).

4. Setting time to zero (0) and continuous mode:

- 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).

6. 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.

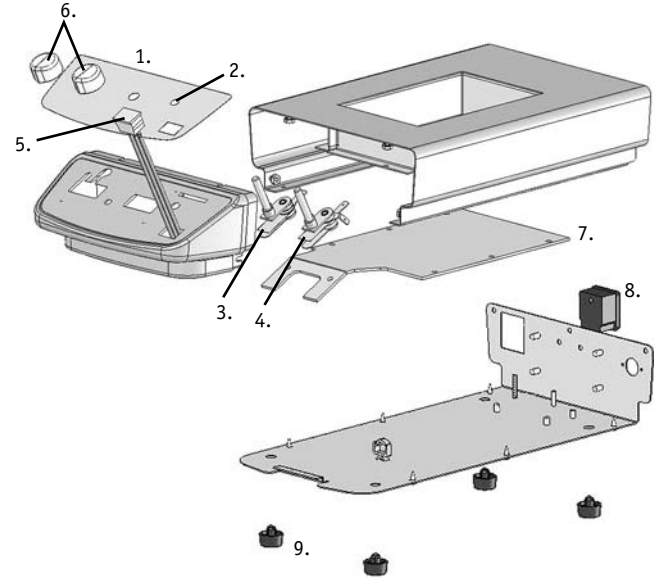
TROUBLESHOOTING

The following errors should **NOT** be addressed by the end user. Switch the unit off and contact your Thomas Scientific representative for repairs.

<u>Error Code</u>	<u>Cause</u>
E01	faulty temperature sensor
E02	thermocouple failure heating element failure
E03	probe not thermometer well probe left on counter unit cannot reach set-point

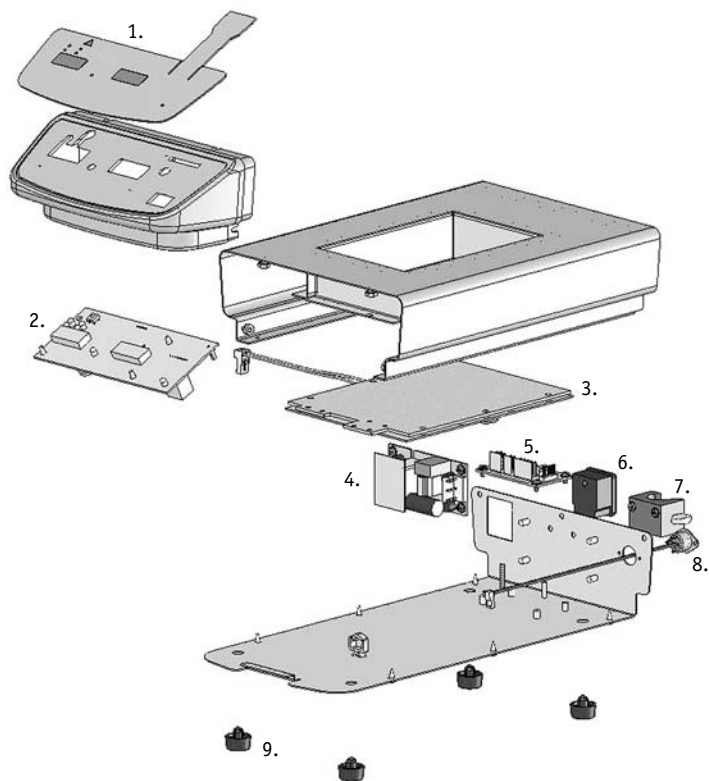
Errors will cause heating function to cease. Timing functions will be unaffected.

ANALOG DRY BLOCK HEATERS		
Description	120V	230V
1. Front panel overlay	386466-00	386466-00
2. Pilot lamp indicator	330015-00	330016-00
3. Thermostat, low	349201-00	349201-00
4. Thermostat, high	349202-00	349202-00
5. Rocker switch w-leads	349030-00	349030-00
6. Knob (2)	287010-00	287010-00
7. Heater assembly 1 block	849310-00	849311-00
2 block	849312-00	849313-00
3 block	849314-00	849315-00
4 block	849316-00	849317-00
6 block	849318-00	849319-00
8. Power entry module	386122-00	386122-00
9. Rubber foot (4)	149023-00	149023-00



POWER CORDS	
Description	Part No.
120V power cord US	330100-00
230V power cord EURO	330101-00
230V power cord UK	330102-00
230V power cord SWISS	330103-00

DIGITAL DRY BLOCK HEATER REPLACEMENT PARTS



DIGITAL DRY BLOCK HEATERS

Description	120V	230V
1. Membrane switch	386467-00	386467-00
2. Control board	349200-00	349200-00
3. Heater assembly 1 block	849300-00	849411-00
2 block	849302-00	849413-00
3 block	849304-00	849415-00
4 block	849306-00	849417-00
6 block	849308-00	849419-00
4. Power supply	349151-00	349151-00
5. Sensor board	349150-00	349150-00
6. Power entry module	386122-00	386122-00
7. Mounting bracket	230080-00	230080-00
8. RTD cable assembly	349164-00	349164-00
9. Rubber foot (4)	149023-00	149023-00

POWER CORDS

Description	Part No.
120V power cord US	330100-00
230V power cord EURO	330101-00
230V power cord UK	330102-00
230V power cord SWISS	330103-00

MODULAR BLOCKS & ACCESSORIES

Constructed from a solid anodized aluminum block, the close contact of tubes to block walls allows for maximum heat retention. Each block has a thermometer well for measuring block temperature. **CAUTION!** To avoid possible electrical hazard, do not fill well or block with water or other liquids. Units are designed as a dry bath/incubator.

Single block dimensions (L x W x H): 3.75 x 3 x 2" (9.5 x 7.6 x 5.1cm)

Double block dimensions (L x W x H): 6 x 3.75 x 2.25" (15.2 x 9.5 x 5.7cm)

MICROCENTRIFUGE TUBES

Single block.

Brand/Sample Type	Well Dia.	No. of Wells	Well Depth	Part No.
.5mL tube	7.9mm	30	27.6mm	5890J51
1.5mL tube	11.1mm	20	39.1mm	5890J61
Eppendorf 1.5mL tube	11.5mm	20	36.9mm	5890J55

TITER PLATE

Double block. Fits 2/4/6 block heaters. Ideal for 96-well or 384-well titer plates. Recessed well for better stability, flat surface good for flat and round bottom plates.

Sample Type	Well Depth	Part No
Titer plate	13.5mm	5890J65

CONICAL-BOTTOM CENTRIFUGE TUBES

Single block.

Sample Type	Well Dia.	No. of Wells	Well Depth	Part No.
15mL tube	17.1mm	12	44.5mm	5890J85
50mL tube	29.0mm	5	47.6mm	5890J77

STANDARD TEST TUBES

Single block.

Sample Type	Well Dia.	No. of Wells	Well Depth	Part No.
6mm tube	8.3mm	30	48.4mm	5890J53
10mm tube	10.7mm	24	48.4mm	5890J39
12/13mm tube	13.9mm	20	48.4mm	5890J41
12/13mm tube	13.9mm	16	48.4mm	5890J67
15/16mm tube	17.5mm	12	48.4mm	5890J43
17/18mm tube	19.1mm	12	48.4mm	5890J73
20mm tube	21.0mm	8	48.4mm	5890J45
25mm tube	26.2mm	6	48.4mm	5890J47
35mm tube	35.0mm	4	47.6mm	5890J75

COMBINATION BLOCKS

Single block. These blocks have been designed for variable sized samples.

Sample Type	Well Dia.	No. of Wells	Well Depth	Part No.
Test tube combo	8.3mm	6	48.4mm	5890J49
6mm, 12/13mm, 25mm	13.9mm	5	48.4mm	
	26.2mm	3	48.4mm	

CUVETTE

Single block. Two parallel slots fit 6 cuvettes in each slot, side-by-side for excellent stability and heat transfer.

Sample Type	No. of Wells	Well Depth	Part No.
(12) 12.5mm cuvettes	2	25.4mm	5890J59

PCR - PLATES, TUBES, STRIPS

Single and double block. Tapered tube wells for 0.2mL tubes. Spaced for easy access and removal.

Sample Type	Block Size	Well Dia.	No. of Wells	Well Depth	Part No.
96-well PCR plate	double	6.4mm	96	15.5mm	5890J83
10 x 8 tube strips	single	6.4mm	80	15.5mm	5890J79
Individual tubes	single	6.4mm	64	20.2mm	5890J81

SOLID BLOCKS

Single or double block. For use as a low-temperature hotplate or for custom drilling to make your own custom block.

Block Size	Dimension (L x W x H)	Part No.
Single	3.75 x 3 x 2" (9.5 x 7.6 x 5.1cm)	5890J57
Double	6 x 3.75 x 2.25" (15.2 x 9.5 x 5.7cm)	5890J69

MANUFACTURED BY:

HENRY TROEMNER LLC

201 Wolf Drive • PO Box 87 • Thorofare, NJ 08086-0087
Phone: 856-686-1600 • Fax: 856-686-1601 • E-mail: troemner@troemner.com
www.troemner.com