Thermo
SCIENTIFIC

Hot Plate

OPERATION MANUAL
AND PARTS LIST
SERIES 1065

Model #

HPA2240M
HPA2244M
HPA2245M
HPA2248M

LT1065X5 • 10/29/09

Table of Contents

Safety Information

This manual contains important operating and safety information. The user must carefully read and understand the contents of this manual prior to the use of this equipment.

Warning: These products should be used only under the operating conditions specified in the Operating Manual. Always use safe laboratory practices and do not leave the hotplate in operation while unattended as product funcionality or laboratory practice failures could occur that might lead to uncontrolled or excessive heating of the top surface. Safety procedures (including, but not limited to, unplugging when not in use) and response plans should be put in place to address the worst case possibility. If an over-temperature failure occurs, the top surface temperature could rise to the maximum temperature (300-540°C depending on your model's specification) and remain at that temperature indefinitely. Under these conditions, the material being heated on the surface of the hotplate could reach levels in excess of the maximum temperature.

Your Thermo Scientific Hot Plate has been designed with function, reliability, and safety in mind. It is the user's responsibility to install it in conformance with local electrical codes. For safe operation, please pay attention to the alert signals throughout the manual.

Alert Signals

Warning
Warnings alert you to a possibility of personal injury.

Caution
Cautions alert you to a possibility of damage to the equipment.

Note
Notes alert you to pertinent facts and conditions.

Hot Surface
Hot surfaces alert you to a possibility of personal injury if you come in contact with a surface during use or for a period of time after use.

Warnings

To avoid electrical shock, this hot plate must:

1. Be installed by a competent, qualified electrician who ensures compatibility among hot plate specifications, power source, and grounding code requirements.

2. Be disconnected from the power supply prior to maintenance and servicing.

To avoid personal injury:

1. Do not use in the presence of flammable or combustible materials. This

device contains components which may ignite such materials: top surface and element can reach the “Flash Point temperature” of many chemicals. Fire or explosion may result. *These hot plates are not explosion proof.*

2. Refer servicing to qualified personnel.

Hot Surface
Caution: Hot Surface. Avoid Contact. The hot plate surface will remain hot without visual indication fro some time after the unit is turned off.

Caution
Do not use metal foil on hot plate. Do not use metal containers, sand bath or other insulating material on the hot plate - top plate can be damaged.

Do not use in highly corrosive atmosphere; corrosive fumes and spills may damage top and internal components, creating a shock hazard.

Please note the following WARNINGS:
This warning is presented for compliance with California Proposition 65 and other regulatory agencies and only applies to the insulation in this product. This product contains refractory ceramic, refractory ceramic fiber or fiberglass insulation, which can produce respirable dust or fibers during disassembly. Dust or fibers can cause irritation and can aggravate preexisting respiratory diseases. Refractory ceramic and refractory ceramic fibers (after reaching 1000°C) contain crystalline silica, which can cause lung damage (silicosis). The International Agency for Research on Cancer (IARC) has classified refractory ceramic fiber and fiberglass as possibly carcinogenic (Group 2B), and crystalline silica as carcinogenic to humans (Group 1).

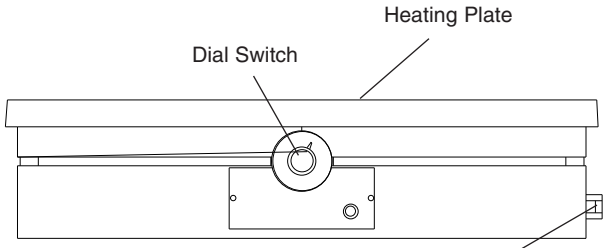
The insulating materials can be located in the door, the hearth collar, in the chamber of the product or under the hot plate top. Tests performed by the manufacturer indicate that there is no risk of exposure to dust or respirable fibers resulting from operation of this product under normal conditions. However, there may be a risk of exposure to respirable dust or fibers when repairing or maintaining the insulating materials, or when otherwise disturbing them in a manner which causes release of dust or fibers. By using proper handling procedures and protective equipment you can work safely with these insulating materials and minimize any exposure. Refer to the appropriate Material Safety Data Sheets (MSDS) for information regarding proper handling and recommended protective equipment. For additional MSDS copies, or additional information concerning the handling of refractory ceramic products, please contact the Customer Service Department at 1-800-553-0039.

Introduction

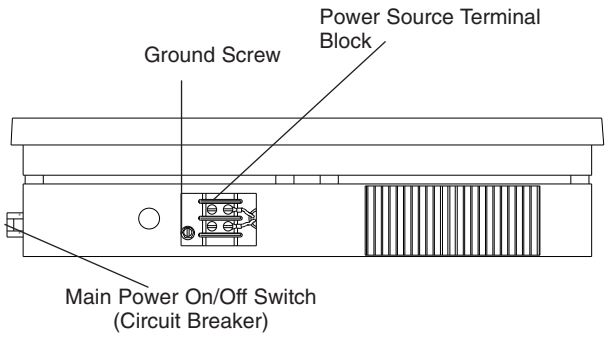
Intended Use

The Type 2200 hot plates are general purpose heating devices intended for laboratory procedures requiring temperatures from 38°C (100°F) to 371°C (700°F). They are not to be used in the presence of combustible vapors; this device contains parts which may ignite such vapors.

The unit consists of 1) a heating plate and 2) an adjustable temperature control with electronic circuitry. See Figure 1 for the overall shape and the general features of the unit.



HPA2200 Front View



HPA2200 Back View

Figure 1
Wire conduit connections or cord through the port and connect to the terminals on the left side of terminal block.

General Usage

Do not use this product for anything other than its intended usage.

Principles of Operation

The top metal plate is heated by four resistant heaters embedded in a refractory material. The plate is made of cast aluminum to aid in uniform surface temperature. The temperature of the plate is controlled by a bimetallic thermostat. The case supports the top plate and also serves to house the electrical connections, electronic components and temperature control.

General Specifications

Model No.	Dimensions in. (cm.)				Weight lbs. (kg.)	Electrical Ratings					
	Top Plate	Overall				Volts	Amps	Watts	Phase	Frequency	Max. Temp. °C (°F)
		Width	Height	Depth							
HPA2240M*	12 x 24 (30 x 61)	24-1/2 (62.2)	6-1/8 (15.6)	13-5/8 (34.6)	34 (15.4)	240	13.3	3200	1	50/60	371 (700)
HPA2244M	12 x 24 (30 x 61)	24-1/2 (62.2)	6-1/8 (15.6)	13-5/8 (34.6)	34 (15.4)	100	30	3000	1	50/60	371 (700)
HPA2245M*	12 x 24 (30 x 61)	24-1/2 (62.2)	6-1/8 (15.6)	13-5/8 (34.6)	34 (15.4)	120	26.6	3200	1	50/60	371 (700)
HPA2248M	12 x 24 (30 x 61)	24-1/2 (62.2)	6-1/8 (15.6)	13-5/8 (34.6)	34 (15.4)	208	15.4	3200	1	50/60	371 (700)

Notes:
All models connected through a conduit system.
** U.L. Listed, CSA Certified.*

Environmental Conditions

Operating: 17°C - 27°C; 20% to 80% relative humidity, non-condensing. Installation Category II (overvoltage) in accordance with IEC 664. Pollution Degree 2 in accordance with IEC 664. Altitude limit: 2,000 meters.

Storage: -25°C to 65°C; 20% to 80% relative humidity.

Installation

Warning
To avoid electrical shock, this hot plate must be installed by a competent, qualified electrician who ensures compatibility among hot plate specifications, power source, and grounding code requirements.

Caution
Space unit six inches from combustible walls under any condition. This permits the heat to escape so as not to create a possible fire hazard.

Caution
For supply connections, use 10 AWG or larger wires suitable for at least 90°C. Gross weight of items placed on top of hot plates should not exceed 40 lbs.

Install hot plate on a sturdy surface and allow space for ventilation.

The electrical specifications are located on the specification plate on the back of the hot plate. Consult Barnstead International if your electrical service is different than those listed on the specification plate.

Your 2200 hot plate may be wired either directly through a conduit system or by a flexible cable system which conforms to the National Electrical Codes and electrical code requirements of your area. The terminals to be wired are located on the middle rear of the hot plate behind the terminal cover. (See Figure 1)

Operation

Warning
Do not use in the presence of flammable or combustible materials. This device contains components which may ignite such materials: top surface and element can reach the “Flash Point temperature” of many chemicals. Fire or explosion may result. *These hot plates are not explosion proof.* Caution: Hot Surface - Avoid Contact. The hot plate surface will remain hot without visual indication for some time after unit is turned off.

Note
Be sure Main Power ON/OFF switch (circuit breaker) on side of unit is turned on. Once the desired top plate temperature has been reached, use of the Main Power ON/OFF switch will facilitate temperature repeatability.

Dial (Power) Switch

The power is turned ON or OFF by means of the dial switch. The power is ON when the pointer on the dial is at or near the FIRST MARK on the dial plate.

Dial (Control) Switch

Turn dial clockwise to set desired temperature. Dial marks indicate approximate surface temperature in °C. The green cycle light will illuminate at or near the FIRST MARK on the dial plate. (If this does not occur, see recalibration instructions.). When the temperature for a given dial setting has been reached, the light will cycle OFF and ON at a rate required to hold that temperature. If the cycle light is OFF, hot plate may still be hot. To turn off hot plate, turn dial switch to the fully counterclockwise position.

Preventive Maintenance and Servicing

Warning
To avoid electrical shock, this hot plate must be disconnected from the power supply prior to maintenance and servicing.

Note
Perform only maintenance described in this manual. Contact an authorized dealer or our factory for parts and assistance.

Warning

This warning is presented for compliance with California Proposition 65 and other regulatory agencies and only applies to the insulation in this product. This product contains refractory ceramic, refractory ceramic fiber or fiberglass insulation, which can produce respirable dust or fibers during disassembly. Dust or fibers can cause irritation and can aggravate preexisting respiratory diseases. Refractory ceramic and refractory ceramic fibers (after reaching 1000°C) contain crystalline silica, which can cause lung damage (silicosis). The International Agency for Research on Cancer (IARC) has classified refractory ceramic fiber and fiberglass as possibly carcinogenic (Group 2B), and crystalline silica as carcinogenic to humans (Group 1).

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Note
Do not use emery paper to clean contact points.

Cleaning Bimetal Control Contact Points

Bimetal control contact points may need cleaning after severe or extended use.

a) Disconnect hot plate from power supply

b) Turn hot plate upside down and remove bottom cover.

c) The contact points are accessible now and may be cleaned with fine sandpaper or a contact file.

d) If contact points are severely pitted or burned, replacement is suggested at this time. (Refer to replacement of control unit).

e) Replace bottom cover.

f) Turn hot plate upright and reconnect to power supply.

General Cleaning Instructions

Wipe exterior surfaces with lightly dampened cloth containing mild soap solution.

Troubleshooting

The Troubleshooting section is intended to aid in defining and correcting possible service problems. When using the chart, select the problem category that resembles the malfunction, then proceed to the possible causes category and take necessary corrective action.

Problem	Possible Causes	Corrective Action
The cycle light does not illuminate.	No input power.	Check power source.
	Cycle light burned out.	Replace cycle light.
Hot plate does not heat.	No input power.	Check power source
	Defective electrical hookup.	Repair electrical hookup.
	Defective circuit breaker.	Replace circuit breaker.
	Defective printed circuit board.	Replace printed circuit board.
	Defective solid state relay.	Replace solid state relay.
	Burned out heating element(s).	Replace element(s).
	Burned out heater coil (on 208/220-240V units).	Replace heater coil.
	Contact points on temperature control are damaged.	Replace control.
Hot plate does not hold temperature.	Control out of calibration.	Refer to recalibration instructions.
	Defective printed circuit board.	Replace printed circuit board.

To Replace Insulator on Adjusting Shaft:

a) Disconnect hot plate from power supply.

b) Turn hot plate upside down and remove bottom cover.

c) Loosen set screw on stop collar and screw adjusting shaft out to remove insulator.

d) Insert new insulator and screw the shaft in part way (Recalibration is necessary—refer to recalibration instructions below.).

e) Replace bottom cover.

f) Turn hot plate upright and reconnect to power supply.

To Replace Heater Coil

a) Disconnect hot plate from power supply.

b) Turn hot plate upside down and remove bottom cover.

c) Remove the heater coil from the terminals.

d) Install new heater coil.

e) Replace bottom cover.

f) Turn hot plate upright and reconnect to power supply.

To Replace Cycle Light

a) Disconnect hot plate from power supply.

b) Turn hot plate upside down and remove bottom cover.

c) Disconnect two leads from cycle light. (Note placement and connection of leads)

d) Push in two clips on pilot light and remove cycle light.

e) Insert new cycle light through the front.

f) Reconnect cycle light leads.

g) Replace bottom cover.

h) Turn hot plate upright and reconnect to power supply.

To Replace Control Unit

a) Disconnect hot plate from power supply.

b) Turn hot plate upside down and remove bottom cover.

c) Remove knob on adjusting shaft and loosen set screw on stop collar.

d) Remove adjusting shaft and stop collar from control unit.

e) Disconnect wire at J11 on printed circuit board going to control.

f) Disconnect wire on control screw coming from J12 on printed circuit board.

g) Remove two screws and lock washers from control unit and remove control unit.

h) Install new control unit.

i) Reconnect two wires disconnected in steps e and f.

j) Reinsert adjusting shaft and stop collar. (Recalibration is necessary—refer to recalibration instructions on page 15.)

k) Replace bottom cover.

l) Turn hot plate upright and reconnect to power supply.

To Replace Heating Element

a) Disconnect hot plate from power supply.

b) Turn hot plate upside down and remove bottom cover.

c) Remove the stop collar and adjusting shaft.

d) Disconnect the necessary wires to enable the control section to be removed. Identity or mark wires disconnected to ensure proper placement and connection when reinstalling.

e) Disconnect and straighten element leads.

f) Remove locknuts and flat washers from both threaded rods and separate lower control section from top section of hot plate.

g) Remove the insulation block to expose elements.

h) Remove defective element and insert new element with the notched side up.

i) Bend the new element leads up at a 90° angle.

j) Reverse the previous steps to reassemble the hot plate. NOTE: When the stop collar and adjusting shaft are reassembled, recalibration is necessary. (See recalibration instructions on page 15.)

To Replace Circuit Breaker, Solid State Relay or Printed Circuit Board

a) Disconnect hot plate from power supply.

b) Turn hot plate upside down and remove bottom cover.

c) Disconnect wires from defective component. Identify or mark wires disconnected to ensure proper placement and connection when reinstalling.

d) Remove defective component.

e) Install new component and reconnect wires removed in step c.

f) Replace bottom cover.

g) Turn hot plate upright and reconnect to power supply.

Recalibration

Recalibration may be needed for the control unit due to contact wear, or because of other repairs to the hot plate.

a) Disconnect hot plate from power supply.

b) Turn hot plate upside down and remove bottom cover.

c) Remove the knob from the adjusting shaft by loosening screw in knob.

d) Turn the adjusting shaft into the control mounting bracket until the contact points just close with a “snap” action.

e) Measure the gap between the contact spring and spring action limiting screw with a feeler gauge.

f) This gap should be between .006 and .010 for normal operation of control.

g) Adjust the spring action limiting screw until the proper gap is attained just before the magnetic attraction is overcome and the points open. NOTE: This gap controls the difference between the “ON” and “OFF” temperatures of the surface plate when the control is holding a set temperature. A narrow gap will give a narrow control ban, while a wide gap will increase the range between the “ON” and “OFF” temperatures. There must be a definite “SNAP” opening and closing of the contact points when the control shaft is slowly screwed in and out. This snap action in conjunction with magnetic blow out of any arc which tends to form between the contacts results in long contact life.

h) Turn the adjusting shaft until the contact points close and slide knob over shaft with the FIRST MARK aligned with the pointer line. (Leave 3/16" of space between knob and dial plate).

i) Tighten screw on knob and check to see that the contacts “SNAP” closed as the pointer crosses the index line.

j) Turn knob counterclockwise until the “OFF” mark on dial plate aligns with pointer line, and readjust stop collar against the stop pin at this point.

k) Tighten set screw on stop collar and check for free rotation of the control shaft between stops.

l) Replace bottom cover.

m) Turn hot plate upright and reconnect to power supply.

Replacement Parts

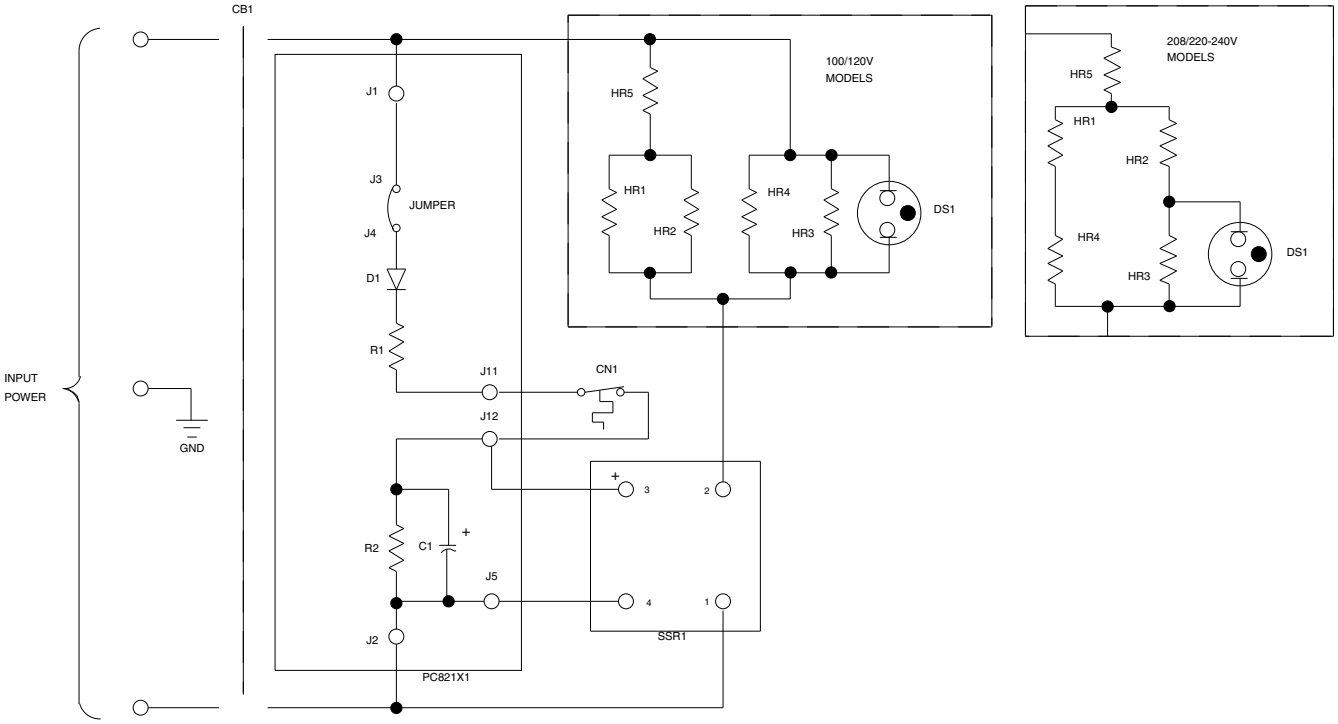
Product Name: Hot Plate (12 x 24)
Model Numbers: HPA2240M, HPA2244M, HPA2245M, HPA2248M,
Series Number: 1065

Part No.	Description
CN1065X1	Control, Temperature
CS54X7A	Case, Upper
CS1065X1A	Case, Lower
EL20X1	Element for HPA2240M, 220-240V (4 required)
EL20X1	Element for HPA2245M, 120V (4 required)
EL20X2	Element for HPA2248M, 208V (4 required)
EL237X1	Element for HPA2244M, 100V (4 required)
HEX10	Heat Sink
HT54X2	Heater Coil
JC247X1	Insulation, Castable
KBX18	Knob
LT1065X1	Literature, Instructions/Parts List
PC1065X1A	Printed Circuit Board for HPA2244M, HPA2245M
PC1065X2A	Printed Circuit Board for HPA2240M, HPA2248M
PLX35	Pilot Light
PT54X5	Plate, Top Casting
RYX34	Relay, Solid State, for HPA2240M, HPA2248M
RYX37	Relay, Solid State, for HPA2244M, HPA2245M
SF54X1	Shaft, Temperature Control
SWX54	Switch, Circuit Breaker for HPA2244M
SWX103	Switch, Circuit Breaker for HPA2240M, HPA2245M, HPA2248M
TRX39	Terminal Block

Wiring Diagram

DIAGRAM COMPONENT LIST

REF. NO.	DESCRIPTION
C1	CAPACITOR
CB1	CIRCUIT BREAKER
CN1	BIMETAL CONTROL
D1	SEMICONDUCTOR
DS1	PILOT LIGHT
HR1	ELEMENT, HEATING
HR2	ELEMENT, HEATING
HR3	ELEMENT, HEATING
HR4	ELEMENT, HEATING
HR5	ELEMENT, HEATER COIL
R1	RESISTOR
R2	RESISTOR
SSR1	SOLID STATE RELAY



Ordering Procedures

Please refer to the Specification Plate for the complete model number, serial number, and series number when requesting service, replacement parts or in any correspondence concerning this unit.

All parts listed herein may be ordered from the **Thermo Scientific** dealer from whom you purchased this unit or can be obtained promptly from the factory. When service or replacement parts are needed we ask that you check first with your dealer. If the dealer cannot handle your request, then contact our Customer Service Department at 563-556-2241 or 800-553-0039.

Prior to returning any materials, please contact our Customer Service Department for a “Return Materials Authorization” number (RMA). Material returned without an RMA number will be refused.

One Year Limited Warranty

This Thermo Scientific product is warranted to be free of defects in materials and workmanship for one (1) year from the first to occur of (i) the date the product is sold by the manufacturer or (ii) the date the product is purchased by the original retail customer (the “Commencement Date”). Except as expressly stated above, the MANUFACTURER MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCTS AND EXPRESSLY DISCLAIMS ANY AND ALL WARRANTIES, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF DESIGN, MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

An authorized representative of the manufacturer must perform all warranty inspections. In the event of a defect covered by the warranty, we shall, as our sole obligation and exclusive remedy, provide free replacement parts to remedy the defective product. In addition, for products sold within the continental United States or Canada, the manufacturer shall provide free labor to repair the products with the replacement parts, but only for a period of ninety (90) days from the Commencement Date.

The warranty provided hereunder shall be null and void and without further force or effect if there is any (i) repair made to the product by a party other than the manufacturer or its duly authorized service representative, (ii) misuse (including use inconsistent with written operating instructions for the product), mishandling, contamination, overheating, modification or alteration of the product by any customer or third party or (iii) use of replacement parts that are obtained from a party who is not an authorized dealer of Thermo Scientific products.

Heating elements, because of their susceptibility to overheating and contamination, must be returned to the factory and if, upon inspection, it is concluded that failure is due to factors other than excessive high temperature or contamination, the manufacturer will provide warranty replacement. As a condition to the return of any product, or any constituent part thereof, to the factory, it shall be sent prepaid and a prior written authorization from the manufacturer assigning a Return Materials Number to the product or part shall be obtained.

IN NO EVENT SHALL THE MANUFACTURER BE LIABLE TO ANY PARTY FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR FOR ANY DAMAGES RESULTING FROM LOSS OF USE OR PROFITS, ANTICIPATED OR OTHERWISE, ARISING OUT OF OR IN CONNECTION WITH THE SALE, USE OR PERFORMANCE OF ANY PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, TORT (INCLUDING NEGLIGENCE), ANY THEORY OF STRICT LIABILITY OR REGULATORY ACTION.

For the name of the authorized Thermo Scientific product dealer nearest you or any additional information, contact us:

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