HOT PLATE
Operation Manual
and Parts List
Series 237

Model Numbers

HPA2230M
HPA2234M
HPA2235M
HPA2238M
HPA2235M-13
HPA2230M-26
IMPORTANT INFORMATION

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

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

**Warnings**

To avoid electrical shock, always:

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.
2. Disconnect 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; top surface can reach the “Flash Point Temperature” of many chemicals. Fire or explosion may result. This device contains components which may ignite such materials. This Hot Plate is not explosion proof.
2. Refer servicing to qualified personnel.
3. “Caution: Hot Surface. Avoid Contact.” The surface of the hot plate will remain hot for some time after use.

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 Barnstead|Thermolyne Corporation at 1-800-553-0039.
Warning
Do not use in the presence of flammable or combustible materials; fire or explosion may result. This device contains components which may ignite such materials.

Intended Use
The Type 2200 hot plates are general purpose heating devices intended for laboratory procedures requiring temperatures from 38°C to 371°C (700°F).

The unit consists of 1) a heated plate, and 2) an adjustable temperature control.

Principles of Operation
The aluminum top plate is heated by two 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 and the bimetallic thermostat.
General Specifications

Model Numbers:  HPA2230M* HPA2234M HPA2235M* HPA2235M-13 HPA2230M-26 HPA2238M
Top Plate:  12” x 12” (30 cm X 30 cm)
Overall Width:  12” (30 cm)
Dimensions: Height: 6.125” (15.6 cm); Depth: 13” (33 cm)
Weight: 17.5 lbs. (7.9 kg)
Electrical Ratings:

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Volts</th>
<th>Control Amps</th>
<th>Circuit Watts</th>
<th>Phase</th>
<th>Freq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA2230M*</td>
<td>240</td>
<td>6.7</td>
<td>1600</td>
<td>1</td>
<td>50/60</td>
</tr>
<tr>
<td>HPA2234M</td>
<td>100</td>
<td>15</td>
<td>1500</td>
<td>1</td>
<td>50/60</td>
</tr>
<tr>
<td>HPA2235M*</td>
<td>120</td>
<td>13.3</td>
<td>1600</td>
<td>1</td>
<td>50/60</td>
</tr>
<tr>
<td>HPA2235M-13</td>
<td>115</td>
<td>13</td>
<td>1500</td>
<td>1</td>
<td>50/60</td>
</tr>
<tr>
<td>HPA2230M-26</td>
<td>240</td>
<td>6.7</td>
<td>1600</td>
<td>1</td>
<td>50/60</td>
</tr>
<tr>
<td>HPA2238M</td>
<td>208</td>
<td>7.7</td>
<td>1600</td>
<td>1</td>
<td>50/60</td>
</tr>
</tbody>
</table>

Maximum Temperatures: 371°C (700°F)
Maximum Weight on Top Plate 40 lbs. (18.1 kg)

NOTES: Supplied with three wire cord and plug.
(-13) model—CSA listed.
(-26) model—Supplied with European Cord Set.
* U.L. Listed
Site Selection
Install hot plate on a sturdy surface and allow space for ventilation.

The electrical specifications are listed on the specification plate on the side of the hot plate. Consult Barnstead/Thermolyne if your electrical service is different than those listed on the specification plate. Prior to connecting your Type 2200 hot plate to your electrical supply, be sure the dial switch is in the OFF position.

Warning
Use a properly grounded electrical outlet of correct voltage and current handling capacity.

Do not use in the presence of flammable or combustible materials; fire or explosion may result. This device contains components which may ignite such materials.

Caution
Space unit 6 inches from combustible materials. This permits the heat to escape so as not to create a possible fire hazard.

Caution
Do not place metal containers, metal foil, or any insulating materials on heating surface. This action may permanently damage the aluminum heating surface.

Caution
Gross weight of items placed on top of hot plate should not exceed 40 lbs. (18.1 kg).
Operation

Warning
Disconnect from the power supply prior to maintenance and servicing.
Refer servicing to qualified personnel.

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 on page 8.) 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 hot plate off, turn dial switch to the fully counterclockwise position.

Hot Surface
Caution - Hot surface. Avoid Contact
Preventive Maintenance

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 plate.

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.

Note
Do not use emery paper to clean contact points.
The Troubleshooting Guide 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.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cycle light does not illuminate.</td>
<td>Hot plate not connected to power supply.</td>
<td>Check hot plate connections to power source.</td>
</tr>
<tr>
<td></td>
<td>Cycle light burned out.</td>
<td>Replace cycle light.</td>
</tr>
<tr>
<td>Hot plate does not heat.</td>
<td>No power.</td>
<td>Check power source and fuse.</td>
</tr>
<tr>
<td></td>
<td>Defective electrical hookup.</td>
<td>Repair electrical hookup.</td>
</tr>
<tr>
<td></td>
<td>Burned out heating element.</td>
<td>Replace defective element.</td>
</tr>
<tr>
<td></td>
<td>Burned out heater coil on control unit.</td>
<td>Replace heater coil.</td>
</tr>
<tr>
<td>Hot plate does not hold temperature.</td>
<td>Control out of calibration.</td>
<td>Refer to recalibration instructions.</td>
</tr>
</tbody>
</table>
Maintenance and Servicing

Warning
Disconnect from the power supply prior to maintenance and servicing.

Refer servicing to qualified personnel.

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

Warning
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).

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To Replace Insulator on Adjusting Shaft

a) Disconnect hot plate from power supply.

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

- **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 on page 10.)
- **e)** Replace bottom cover.
- **f)** Turn hot plate upright and reconnect to power supply.

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**To Replace Heater Coil**

- **a)** Disconnect hot plate from power supply.
- **b)** Turn hot plate upside down and remove bottom cover.
- **c)** Remove two nuts that hold heater coil to terminals and slide heater coil off.
- **d)** Install new heater coil and secure with two nuts.
- **e)** Replace bottom cover.
- **f)** Turn hot plate upright and reconnect to power supply.

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**To Replace Cycle Light**

- **a)** Disconnect hot plate from power supply.
- **b)** Turn hot plate upside down and remove bottom cover. (Note placement and connection of wires to cycle light.)
- **c)** Disconnect two leads from cycle light.
- **d)** Push in two clips on pilot light and remove by pulling the cycle light out from the front.
- **e)** Insert new cycle light through the front.

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**Note**
Distance between coil and control should be approximately 1/8" with control at maximum setting.
f) Reconnect lead wires to cycle light terminals.

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 two white insulated wires from control unit. (Note placement and connection of wires.)

f) Remove two screws from control unit and remove control unit.

g) Install new control unit and secure with two screws.

h) Reconnect two white insulated wires to control unit.

i) Reinsert adjusting shaft and stop collar. (Recalibration is necessary—refer to recalibration instructions.)

j) Replace bottom cover.

k) 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) Disconnect the necessary wires to enable the control section to be removed. Identify or mark wires disconnected to insure proper placement and connection when reinstalling.

d) Loosen stop collar screw and remove both the stop collar and adjusting shaft.

e) Remove the case section from heating plate.

f) Remove metal cover and insulation block to expose elements.

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

h) Bend the new element leads at a 90° angle and slide them through the insulation block.

i) Slide metal cover over element leads and insulation block.

j) Secure metal cover and replace case section over heating plate.

k) Secure case section.

l) Reconnect wires disconnected in Step C.

m) Reinsert adjusting shaft and stop collar. (Recalibration is necessary—refer to recalibration instructions.)

n) Replace bottom cover.

o) Turn hot plate upright and reconnect to power supply.
Recalibration

a) Disconnect hot plate from power supply.

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

c) Remove the knob from the adjusting shaft by removing screw from 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.

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 plate.

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

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

Note
The gap between the contact spring and spring action limiting screw 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 band, 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.
## Replacement Parts List

**Product Name:** Hot Plate (12 x 12)  
**Model Nos:** HPA2235M-13, HPA2235M, HPA2230M, HPA2234M, HPA2230M-26, HPA2238M  
**Series No:** 237

<table>
<thead>
<tr>
<th>Key No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PT54X1</td>
<td>Plate Top Casting</td>
</tr>
<tr>
<td>2</td>
<td>EL20X1</td>
<td>Element (2 required) 120V &amp; 240V</td>
</tr>
<tr>
<td>2</td>
<td>EL237X1</td>
<td>Element (2 required) 100V</td>
</tr>
<tr>
<td>2</td>
<td>EL20X2</td>
<td>Element (2 required) 208V</td>
</tr>
<tr>
<td>3</td>
<td>JC237X1</td>
<td>Insulation, Castable</td>
</tr>
<tr>
<td>4</td>
<td>CN137X1</td>
<td>Control</td>
</tr>
<tr>
<td>5</td>
<td>JSX8</td>
<td>Insulator</td>
</tr>
<tr>
<td>6</td>
<td>SF54X1</td>
<td>Shaft</td>
</tr>
<tr>
<td>7</td>
<td>CR178X1</td>
<td>Cord Set for HPA2235M, HPA2235M-13, HPA2234M</td>
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<tr>
<td>7</td>
<td>CR64X2A</td>
<td>Cord Set for HPA2230M-26</td>
</tr>
<tr>
<td>7</td>
<td>CR64X1A</td>
<td>Cord Set for HPA2230M, 240V, HPA2238M, 208V</td>
</tr>
<tr>
<td>8</td>
<td>KBX18</td>
<td>Knob</td>
</tr>
<tr>
<td>9</td>
<td>TRX11</td>
<td>Terminal Block</td>
</tr>
<tr>
<td>10</td>
<td>PLX35</td>
<td>Pilot Light</td>
</tr>
<tr>
<td>11</td>
<td>HT54X2</td>
<td>Heater Coil for HPA2235M, 120V, UL, HPA2234M, 100V, HPA2235M-13,120V, CSA</td>
</tr>
<tr>
<td>11</td>
<td>HT54X1</td>
<td>Heater Coil for HPA2230M, HPA2230M-26, HPA2238M</td>
</tr>
</tbody>
</table>
Wiring Diagram

100 Volt
115 Volt &
120 Volt Line

208 Volt &
240 Volt Line
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 Barnstead|Thermolyne 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 319-556-2241 or 800-553-0039.

Prior to returning any materials to Barnstead|Thermolyne Corp., please contact our Customer Service Department for a “Return Goods Authorization” number (RGA). Material Returned without an RGA number will be returned.
Barnstead|Thermolyne Corporation warrants that if a product manufactured by Barnstead|Thermolyne and sold by it within the continental United States or Canada proves to be defective in material or construction, it will provide you, without charge, for a period of ninety (90) days, the labor, and a period of one (1) year, the parts, necessary to remedy any such defect. Outside the continental United States and Canada, the warranty provides, for one (1) year, the parts necessary to remedy any such defect. The warranty period shall commence either six (6) months following the date the product is sold by Barnstead|Thermolyne or on the date it is purchased by the original retail consumer, whichever date occurs first.

All warranty inspections and repairs must be performed by and parts obtained from an authorized Barnstead|Thermolyne dealer or Barnstead|Thermolyne (at its own discretion). Heating elements, however, because of their susceptibility to overheating and contamination, must be returned to our factory, and if, upon inspection, it is concluded that failure is not due to excessive high temperature or contamination, warranty replacement will be provided by Barnstead|Thermolyne. The name of the authorized Barnstead|Thermolyne dealer nearest you may be obtained by calling 1-800-446-6060 (319-556-2241) or writing to:

Barnstead|Thermolyne
P.O. Box 797
2555 Kerper Boulevard
Dubuque, IA 52004-0797
USA
FAX: (319) 589-0516
E-MAIL ADDRESS: mkt@barnstead.com

Barnstead|Thermolyne’s sole obligation with respect to its product shall be to repair or (at its own discretion) replace the product. Under no circumstances shall it be liable for incidental or consequential damage.

THE WARRANTY STATED HEREIN IS THE SOLE WARRANTY APPLICABLE TO Barnstead|Thermolyne PRODUCTS. Barnstead|Thermolyne EXPRESSLY DISCLAIMS ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE.