



Installation and Operating Instructions

SERVICE REFERENCE	
DIVISION	SECTION
SALES REFERENCE	PE441-OMC47
	161-305399-007
DATE	FEBRUARY, 2004

Circulation Heaters

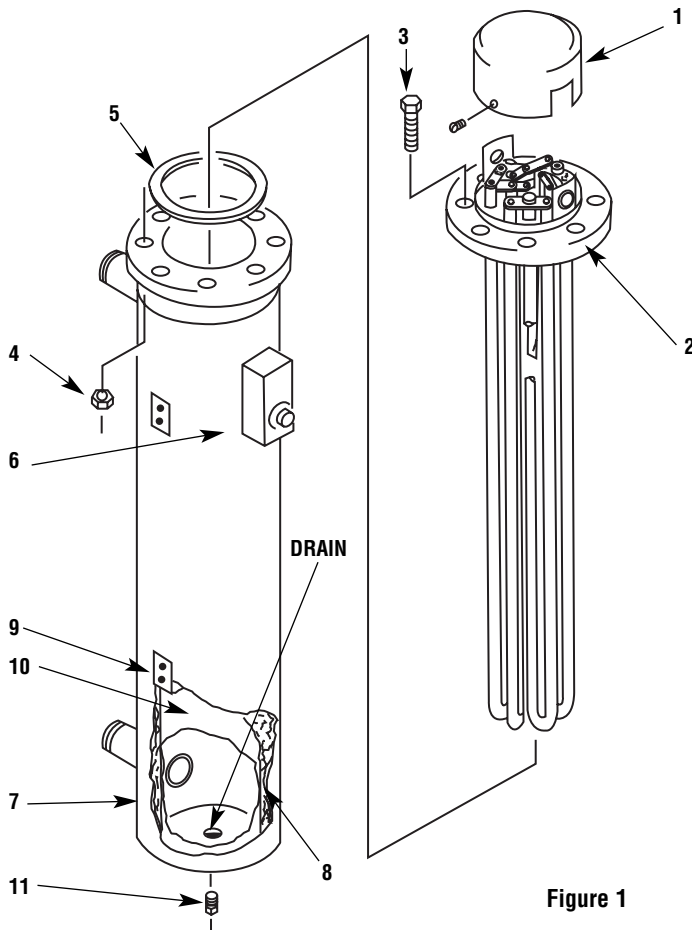
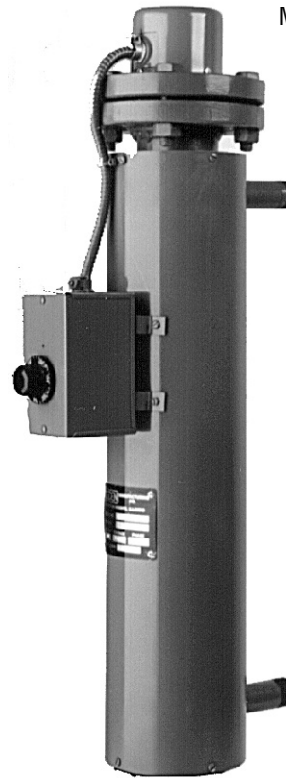


Figure 1

M1 STYLE HOUSING



PARTS LIST*
1. Housing
2. Heater Assembly
3. Hex Bolt
4. Hex Nut
5. Gasket
6. Thermostat
7. Sheet Metal Jacket
8. Insulation
9. Mounting Lug
10. Heating Chamber
11. Drain Plug

* Index numbers are for part identification only. When ordering replacement parts, refer to catalog number stamped on the heater nameplate.

Note: These instructions relate to all housing styles shown within.

GENERAL

⚠ WARNING

The system designer is responsible for the safety of this equipment and should install adequate back-up controls and safety devices with their electric heating equipment. Where the consequences of failure could result in personal injury or property damage, back-up controls are essential.

IMPORTANT: It is the responsibility of the purchaser of the heater to make the ultimate choice of sheath material based upon their knowledge of the chemical composition of the corrosive solution, character of the materials entering the solution, and controls which they maintain on the process.

⚠ WARNING

FIRE/EXPLOSION HAZARD. Sheath corrosion can result in a ground fault which, depending upon the solution being heated, can cause explosion or fire.

INSTALLATION

BEFORE INSTALLING

1. Unpackage the heater at the place of installation. Inspect the heater for shipping damages and report any claims to the carrier. **Do not operate damaged equipment.** Consult OGDEN for instructions.
2. Check the nameplate watt and volt rating against your supply voltage and capacity and the requirements of your installation.

MOUNTING:

1. Mounting lugs with tapped holes are located on the side of the vessel for bolting the heater to structural members or a customer fabricated support system. Heater should not be supported solely by the piping. (See Figure 2.)

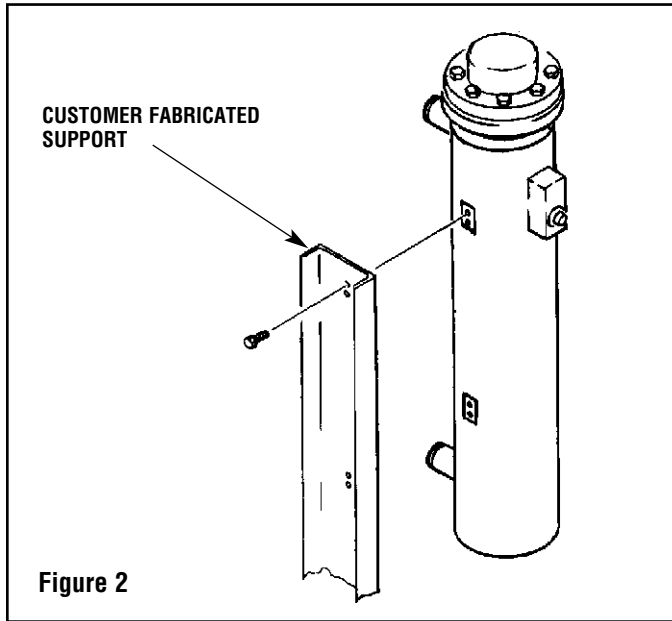


Figure 2

2. Circulation heaters may be mounted either horizontally or vertically. (See Figure 3.) (NOTE: When mounted in the horizontal position the inlet and outlet pipes must be up. If positioned in any other way, the chamber cannot be purged of air and damage to the elements may result). Allow adequate space for removing the element assembly for cleaning or servicing.

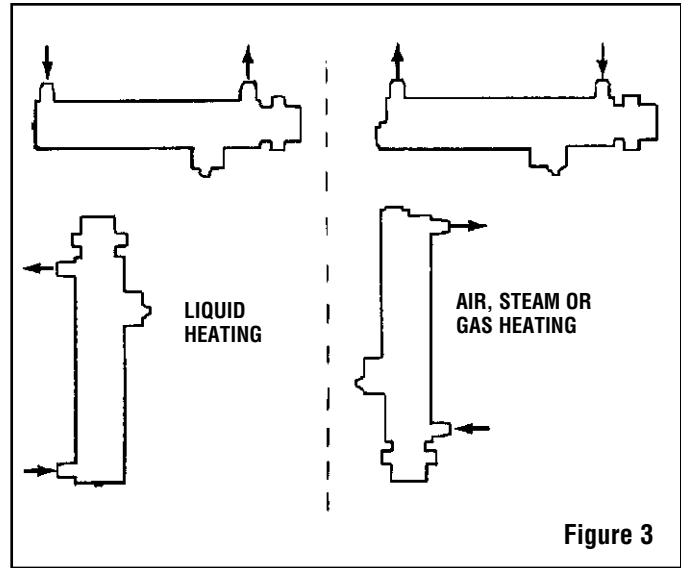


Figure 3

3. When mounted in the vertical position for liquid heating, the inlet is at the bottom and the outlet is at the top. A drain plug is provided at the bottom of the heater. Be sure to allow space to drain the heater.
4. When mounted in the vertical position for air, steam or gas heating, the terminal enclosure should be located at the bottom. The lower pipe is the inlet and the outlet is at the top.

⚠ WARNING

EXPLOSION HAZARD. When heating in closed vessels, controls and back-up controls must be used to regulate build-up of temperature and/or pressure.

WIRING

⚠ WARNING

ELECTRIC SHOCK HAZARD. Disconnect all power before installing or servicing heater. Failure to do so could result in personal injury or property damage. Heater must be installed by a qualified person in accordance with the National Electrical Code, NFPA 70.

⚠ WARNING

ELECTRIC SHOCK HAZARD. Any installation involving electric heaters must be performed by a qualified person and must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.

1. All wiring should be done in accordance with the National Electric Code and applicable local codes by qualified personnel.
2. Refer to the wiring diagram(s) included in the terminal enclosure for the proper method of connecting the heater.

3. The current carrying capacity of the power supply leads should exceed the heater amperage by at least 25%. Be sure to consider the ambient operating temperature and apply the appropriate correction factor to the ampacity rating of the wire.
4. If the heater amperage exceeds the contact rating of the thermostat, the heater should be controlled by a magnetic contactor, with the thermostat wired for pilot duty.
5. A magnetic contactor must be used if the power source is 480V or when the heater is wired for a 3-phase power source.
6. In addition to the control thermostat, specific installations may require one or more of the following to be included in the control circuitry:
 - A. A flow switch: To prevent heater operation when flow rate is insufficient.
 - B. Over temperature protection for material being heated: When heating sensitive materials or when material temperature must be limited.
 - C. Over temperature protection for the elements: Particularly important in air and gas heating applications where maximum element temperatures can easily be exceeded.

WIRING (cont'd.)

BEFORE ENERGIZING

1. Check tightness of flange bolting and all piping connections.
2. Check that power connections are made according to the wiring diagram. Also check for positive connection of all bus bars and power supply leads.
3. The insulating material used in electric heaters may absorb moisture during shipping, while in storage or when subjected to a humid environment. Because this moisture can lead to eventual failure of the heater, it is recommended that the heater be subjected to a high potential test and/or checked with a megohmmeter before energizing. A test voltage of 1000 volts plus twice the rated voltage should be used for the hi-pot test. [ex.: heater voltage = 480V, test voltage = 1000V + (2 x 480V) = 1960V]. A reading of 50 megohms or greater can be considered acceptable if checking insulation resistance.

4. If a moisture condition exists, energize the heater for 15 minutes at half-voltage and repeat test. Heating cycles may be repeated until satisfactory test results are obtained. This drying procedure should be performed with no material in the heating chamber.

CAUTION

Do not use this drying procedure if element megohm readings are less than 0.5 meg or if terminal enclosure utilizes a "stand-off" design with an extended cold section between flange & enclosure. Megohm check must be accomplished using 500 VDC megger unit.

SPECIAL REQUIREMENTS

Special Requirements for Electric Heaters and Terminal Enclosures in Hazardous Locations:

WARNING

FIRE/EXPLOSION HAZARD. Failure to follow these instructions could result in an explosion and/or fire, causing personal injury and/or property damage.

Wiring

Use only Type M6 and M7 terminal enclosures in hazardous location environments. The proper use of Type M6 and M7 terminal enclosures on electric heaters located in hazardous areas requires that all electrical wiring comply with National Electrical Code (NEC) requirements for hazardous locations.

Maximum Temperatures

Safe operation in a hazardous location requires the maximum operating temperatures of all exposed surfaces of the heater

including temperatures on the outside of the vessel, piping, flanges, screw plugs, enclosures and other heat conducting parts be limited. The flammable liquids, vapors or gases present determine the maximum surface temperature permitted in any hazardous location. The end user or purchaser of the electric heating equipment is responsible for determining the proper classification of an area and for providing Ogden Mfg. Co. with hazardous area specifications and requirements for proper equipment design. (NEC Articles 500 and 501 provide guidelines for evaluating and classifying hazardous locations.)

Safety Devices

Approved pressure and/or temperature limiting controls must be used on electric heaters and heating elements to ensure safe operation in the event of system malfunctions.

Note: Class I Group B locations include Hydrogen gas. These areas require additional conduit seals and thread engagement.

OPERATION AND MAINTENANCE

WARNING

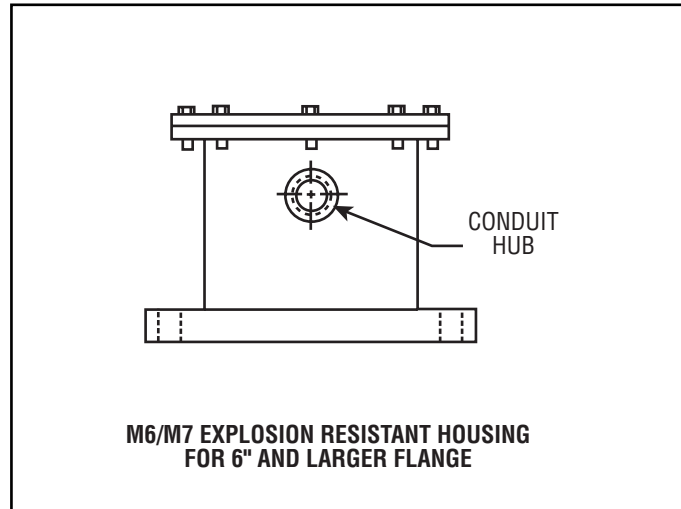
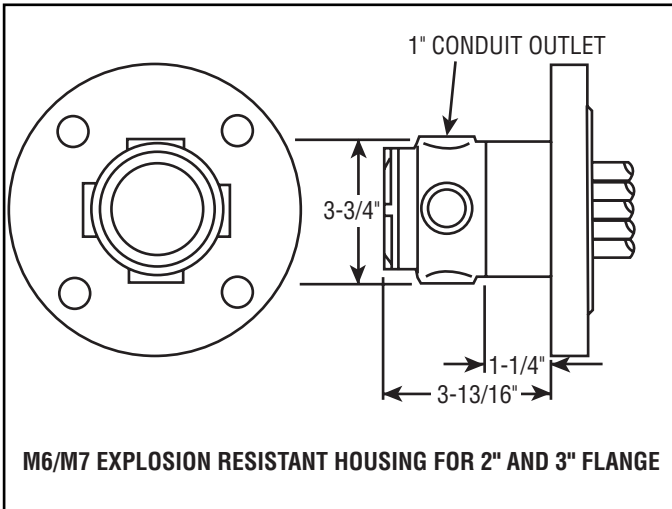
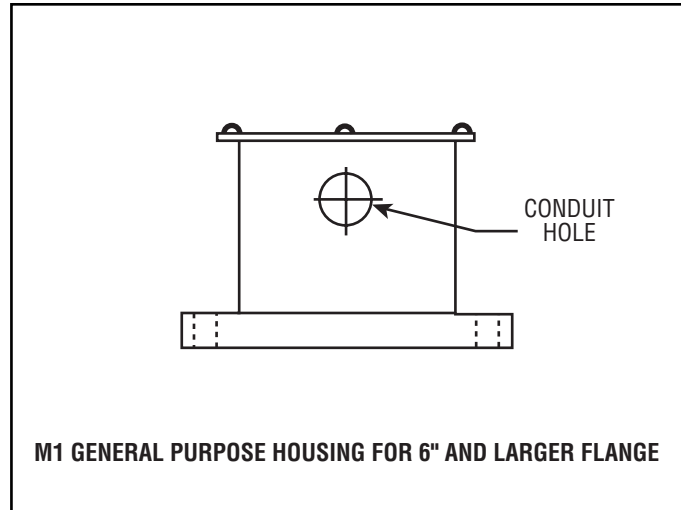
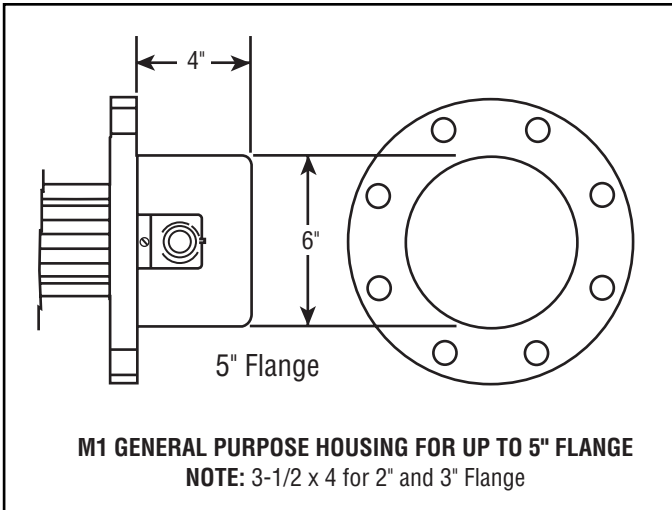
ELECTRIC SHOCK HAZARD. Disconnect all power before installing or servicing heater. Failure to do so could result in personal injury or property damage. Heater must be installed by a qualified person in accordance with the National Electrical Code, NFPA 70.

1. Do not use heaters designed for heating liquids to heat air or other gases.
2. If a pump or blower is used, it should be installed on the inlet side of the heater.
3. A suitable filter should be provided at the inlet to trap any foreign material in the fluid or gas stream.
4. Maintain the minimum rated flow of gas or liquid while the heater is energized. Do not energize the heater without gas or liquid flow or at reduced flow rate.

5. Protect the terminal end of the heater from spray, condensation, dripping and vapors. Protective enclosures should be used if the heater is to be subjected to these conditions.
6. Do not operate heater in the presence of explosive vapors or dust. Explosion resistant housings must be provided for the terminals and thermostat.
7. Do not heat materials that are corrosive to the sheath material. Check with the supplier of the material or OGDEN for a recommendation as to a suitable sheath material.
8. The operating conditions should not exceed the "pressure-temperature" rating of the flange.
9. The heater assembly should be removed periodically to inspect and remove deposits from the element sheath. Sludge in the heating chamber can be removed through the drain.

BE SURE POWER IS DISCONNECTED BEFORE REMOVING ELEMENTS.

HOUSING STYLES



WARRANTY AND LIMITATION OF REMEDY AND LIABILITY

Ogden warrants only that the Products and parts manufactured by Ogden, when shipped, and the work performed by Ogden when performed, will meet all applicable specification and other specific product and work requirements (including those of performance), if any, and will be free from defects in material and workmanship under normal conditions of use. All claims for defective or nonconforming (both hereinafter called defective) Products, parts or work under this warranty must be made in writing immediately upon discovery, and in any event, within one (1) year from delivery, provided, however all claims for defective Products and parts must be made in writing no later than eighteen (18) months after shipment by Ogden. Defective and nonconforming items must be held for Ogden's inspections and returned to the original f.o.b. point upon request. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESS, IMPLIED AND STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Notwithstanding the provisions of this WARRANTY AND LIMITATION Clause, it is specifically understood that Products and parts not manufactured and work not performed by Ogden are warranted only to the extent and in the manner that the same are warranted to Ogden by Ogden's vendors, and then only to the extent that Ogden is reasonably able to enforce such warranty, it being understood Ogden shall have no obligation to initiate litigation unless Buyer undertakes to pay all cost and expenses therefor, including but not limited to attorney's fees, and indemnifies Ogden against any liability to Ogden's vendors arising out of such litigation.

Upon Buyer's submission of a claim as provided above and its substantiation, Ogden shall at its option either (i) repair or replace its Products, parts or work at the original f.o.b. point of delivery or (ii) refund an equitable portion of the purchase price.

THE FOREGOING IS OGDEN'S ONLY OBLIGATION AND BUYER'S EXCLUSIVE REMEDY FOR BREACH OF WARRANTY, AND IS BUYER'S EXCLUSIVE REMEDY AGAINST OGDEN FOR ALL CLAIMS ARISING HEREUNDER OR RELATING HERETO WHETHER SUCH CLAIMS ARE BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES. BUYER'S FAILURE TO SUBMIT A CLAIM AS PROVIDED ABOVE SHALL SPECIFICALLY WAIVE ALL CLAIMS FOR DAMAGES OR OTHER RELIEF, INCLUDING BUT NOT LIMITED TO CLAIMS BASED ON LATENT DEFECTS. IN NO EVENT SHALL BUYER BE ENTITLED TO INCIDENTAL OR CONSEQUENTIAL DAMAGES AND BUYER SHALL HOLD OGDEN HARMLESS THEREFROM. ANY ACTION BY BUYER ARISING HEREUNDER OR RELATING HERETO, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES, MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE DATE OF SHIPMENT OR IT SHALL BE BARRED.

W2008M



103 GAMMA DRIVE EXT., PITTSBURGH, PA 15238
PHONE: (412) 967-3800 FAX: (412) 967-5148