

# WATLOW ELECTRIC MFG CO.

## WATROD & FIREBAR<sup>®</sup> Installation & Maintenance Manual

I&M NUMBER: 316-42-7-1

Date:11/25/2013

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### Pre Installation

- Check to make sure that heater received is the same as that ordered.
- Watlow heaters are built to comply with UL and CSA dielectric requirements, it may be necessary due to atmospheric conditions / humidity, to perform a dielectric test prior to startup. (Refer to **megohm test** under **Installation** section)

### Safety

**Electric heaters are inherently dangerous!!** Care should be taken to read and completely understand the Installation and Maintenance manual before installing and wiring the heater. Any installation and maintenance performed on the heater shall be done by a qualified electrician, in accordance with the "National Electric Code" and other electrical codes as they apply. It is the users responsibility to ensure that the heater being used is properly selected and installed in the application.



The Caution Symbol (exclamation point) alerts you to a "**CAUTION**", a safety or functional hazard which could affect your equipment or its performance.



The warning symbol (lightning bolt) alerts you to a "**WARNING**", a safety hazard which could affect you and the equipment

### Installation

Proper heater selection and installation will result in efficient heat transfer, safe operation, and long heater life.

#### 1. Megohm precheck

During shipping and/or storage, the possibility of moisture absorption by the insulation material within the element is possible. To ensure proper megohm values a minimum 500 VDC megohm meter (Megger) should be used to ensure that the megohm reading between the heater terminal and the heater sheath is more than 10 megohms when the unit is at room temperature.

If a low megohm value exists, two alternative methods can be used to remedy the situation. The best method is to remove all terminal hardware and bake out the heater at no higher than 250°F (120°C) overnight or until an acceptable reading is reached. The second method is to energize the unit at low voltage in air until the megohm is at an acceptable reading. Care should be taken to prevent the heater sheath from exceeding 750°F (398°C) for Incoloy<sup>®</sup> and steel elements and 400°F (204°C) for copper elements.

#### 2. Protection of heater elements from over temperature

The use of temperature controls to regulate heating process and prevent heater over temperature is highly recommended to ensure safe heater operation. It is the users responsibility to ensure safety of the installation.

***WARNING: Install high temperature control protection in systems where an over temperature fault condition could present a fire hazard or other hazard. Failure to install temperature control protection where a potential hazard exists could result in damage to equipment and property, and injury to personnel.***

Failure of components in a temperature control loop, such as the sensor, heater control relay or main temperature control, can result in damage to a product in process, a melt down of a heater, and / or damaging fire.

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To protect against this possibility, over temperature protection must be provided to interrupt or remove power from the heater circuit. **A bulb and capillary thermostat is not recommended for this function since it may not respond quickly enough to adequately protect the heater. In cases where the thermostat bulb gets too hot before the system is turned off, the thermostat bulb could rupture. This could result in the thermostat remaining in the "ON" condition since there is insufficient fluid to move contacts apart.** We recommend the temperature protection have appropriate third party approval, and be applied in the classification for which it was tested and approved.

In immersion applications, to help prevent premature failure and a potentially hazardous condition in cases where consequences of failure may be severe, use an appropriate third party approved liquid level protection device. The liquid level should be such that the entire heater is fully submerged with enough liquid above the heater to adequately dissipate heat from itself as under normal operating conditions. Consult your local authorized sales representative for specific recommendations for your application.

### 3. Termination / Environment

In order to maintain termination integrity, the termination should be kept below 250°F (121°C) or the maximum temperature rating of the end seal. Keep terminations clean, dry and tight.

**DANGER: HAZARD OF FIRE.** Electric heaters are capable of developing high temperatures so extreme care should be taken to locate heaters in safe environments. Mounting heaters in atmospheres containing combustible gases and vapors should be avoided. According to article 501 of the NEC, the maximum surface temperature of the heater shall not exceed 80 % of the auto-ignition of the surrounding atmosphere when the heater is continuously energized. Care should also be taken to keep combustible materials far enough away to be free of the effects of high temperatures.

### 4. Wiring

**WARNING: HAZARD OF ELECTRIC SHOCK.** Any installation involving electric heaters must be grounded to earth to eliminate shock hazard.

Electrical wiring to the heaters must be installed in accordance with the National Electric Code and any state and local electrical code by qualified personnel.

Line voltage must be equal to or less than rating stamped on the heater assembly.

### 5. Miscellaneous

For immersion applications, extend the heated section completely into the media being heated at all times to maximize heat transfer and heater reliability.

For FIREBAR<sup>®</sup> elements, Watlow does not recommend field bending of the elements. However, if the element must be bent in the field, please consult your local Watlow sales engineer or authorized distributor for assistance.

## Start Up

Before energizing the heater the following items should have been checked with the heater power disconnected:

1. Immersed section of heater is completely covered by liquid in immersion applications
2. Electrical termination is tight

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3. Proper disconnecting means and fusing have been installed
4. The voltage rating of the heater is the same as that being applied
5. Megohm is within acceptable limits
6. Proper temperature controls and safety limiting devices are in place
7. Heater is securely installed in application

After applying power to the heater make sure that the system is being controlled properly before leaving it to run unattended. Failure to do this could result in overheating resulting in personnel danger and fire.

## Troubleshooting

PROBLEM	Cause / Correction
No power available to heater	Check disconnect switch to ensure it is in the "ON" position and that fuses are not blown. Replace fuses if they are blown
Fuses blowing	Check heater electrical rating. Applied voltage may be wrong Check fuse rating. Fuses should be at least 25% more than full load amperage. Disconnect heater power source. Check the heater resistance to ground. This should be no less than 1 Megohm. Refer to Megohm checking.
Not enough power	Check line voltage to ensure it is within specification Check full line current if voltage is correct. If line current is lower, the heater may be wired wrong or has open elements
Application not heating to desired temperature	Not enough Kw or incorrect voltage being applied Too much heat loss, higher wattage heater may be required

## Preventative Maintenance



**CAUTION: HAZARD OF ELECTRIC SHOCK. TURN ALL POWER TO HEATER OFF, USE APPROPRIATE DISCONNECT LOCKOUTS AND ALLOW SYSTEM/HEATER TO COOL BEFORE PERFORMING ANY MAINTENANCE**

Check line connections to make sure they are tight, free of oxide build-up, and that no dust or dirt build-up is present.

Liquid immersed units should be removed from tank and checked periodically for scale build-up. Clean as required. Scale can cause high sheath temperature and result in inefficiency and shortened life.

## Replacement Parts

Reference the Watrod or FIREBAR<sup>®</sup> part number on the heater when ordering replacement parts.  
Recommended spare parts would be : a Watrod or FIREBAR<sup>®</sup> heater

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Contact your local Watlow distributor for ordering replacement parts. Check the Yellow Pages under "Electrical Heating Elements" in the largest industrial area nearest you.

## Warranty

Watlow warrants its products against defects in material and workmanship for 12 months from the date of delivery for custom products and 18 months for stock products providing such products are properly applied, used and maintained. Watlow does not warrant any product against damage from corrosion, contamination, misapplication, improper specification or operating conditions beyond our control. The terms of this warranty are the exclusive terms available to any person. No person has authority to bind the Company to representation or warranty other than this warranty. Watlow is not liable for incidental or consequential damages resulting from use of the product whether a claim for such damages is based upon warranty, contract, negligence or other fault. Should any product fail under these warranty conditions it will be repaired or replaced at no charge. Advanced authorization must be obtained within 30 days of failure.

## Return Policy

1. Call Watlow Industries at 573-221-2816, for a Return Material Authorization (RMA) number before returning any item for repair or replacement. The following information is needed to process a returned heater expeditiously:
  - Customer name
  - Contact Name
  - Part number
  - Quantity
  - Reason for return
  - Application information
  - MSDS sheet of material(s) that came in contact with heater, if used.
  - Customer account number
  - Phone Number
  - P.O. number
2. Prior approval and an RMA number is needed when returning any unused product for credit. Make sure the RMA number is on the outside of the carton, and on all paperwork. Return all material Freight Prepaid basis.
3. Stock heaters and accessories which have not been used or modified can be returned to the plant for a 20% restocking charge. Modified stock units can only be returned, if they are not permanently modified, for a minimum 30% restocking charge.
4. All
5. stock and modified stock must have a date code no later than 2 years from the date of shipment.

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## REVISIONS

LEVEL	DESCRIPTION	INITIALS	DATE
1.00	SEE PART COMMENTS		
2.00	ADDED "Date:6/11/2008" TO HEADER PER ECO HAN2838	TBR	06-11-08
3.00	Updated Watlow company name, was Watlow IND EC2928	JPH	11-25-13
4.00	Removed unnessecary information from Page 2 under Miscellaneous.	JDF	9-13-16