

WATLOW ELECTRIC MFG CO.

ECO-HEAT® Installation & Maintenance Manual (Model with removable lid)

I&M NUMBER: 316-42-76-1

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Date: 02/05/2016

Rev: 3.00

Safety Statements



DANGER – *This is a Danger statement that is related to the use of this heater. Failure to heed these messages has a high likelihood resulting in serious personal injury or death!*



WARNING – *This is a Warning statement that is related to the use of this heater. These statements warn of actions that may result in physical injury.*



WARNING - Risk of Electric Shock – *This is a Warning statement that warns of the presence of electrical voltages which can cause physical injury*



CAUTION – *This is a Caution statement that is related to the use of this heater. These statements cautions against actions which may damage the heater or associated equipment.*

Pre Installation

Check to make sure that heater received is the same as that ordered, and that no damage has occurred during shipping. If the unit appears to have been damaged, contact your local Watlow representative.

Safety



WARNING - Risk of Electric Shock:

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 applicable national and local electrical codes. It is the user's responsibility to ensure that the heater being used is properly selected and installed in the application.



WARNING:

This unit may include sharp sheet metal edges. Use appropriate gloves when handling.



WARNING:

The heater's weight may require appropriate lifting equipment. Use caution when handling.

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Installation

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

1. Orientation / Mounting

Preferred orientation is for the assembly to be mounted with the electrical enclosure aligned horizontally to the heater. The heater is manufactured out of 439SS. It is designed to be welded in place using GTAW or GMAW. Appropriate care should be taken to avoid damaging the sensor ports.

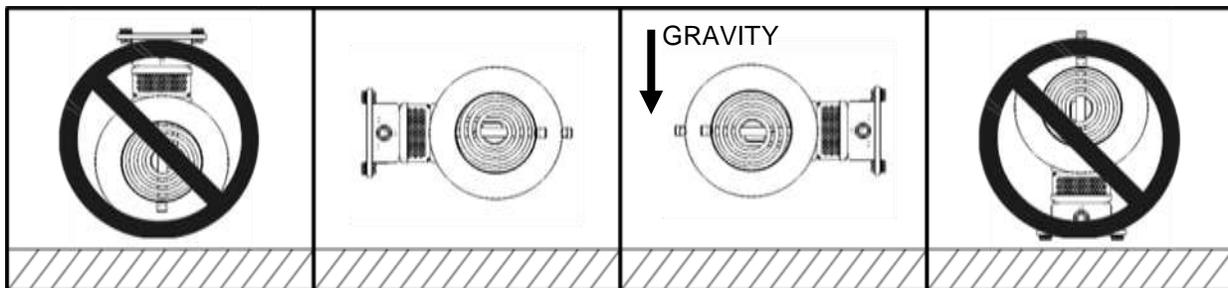


Figure 1 Acceptable heater installation orientations

The maximum rated temperature for components within the electrical enclosure is 180C. Ensure routing of exhaust system components will not contribute to raising junction box temperatures above this level.

2. Protection of heater elements from over temperature

This heater is supplied with either a health sensor or high limit thermocouple. It is the user's responsibility to connect the sensor(s) to appropriate controls to ensure safe operation of the heater.

The temperature control thermocouple should be located near the outlet to sense **exiting** air temperature. It may be desirable to use in inlet and outlet temperature sensor for cascade style control. Conduct process temperature sensing in the outlet stream away from the heater. ECO-HEAT® can halves have been engraved with a flow direction arrow to assist with installing the heater with the proper direction of flow going through the unit.



CAUTION:

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 meltdown of a heater, and / or damaging fire.

To protect against this possibility, over temperature protection must be provided to interrupt or remove power from the heater circuit.

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3. EXACTSENSE™ temperature sensors

Standard ECO-HEAT® heaters are shipped with EXACTSENSE™ sensors for monitoring the inlet and outlet flow temperatures as well as the current health status of the heater. These sensors have spin nuts with either M12x1.5, M14x1.5, or M16x1.5 mounting threads to ensure their proper installation into the system, as indicated by the diagram below:

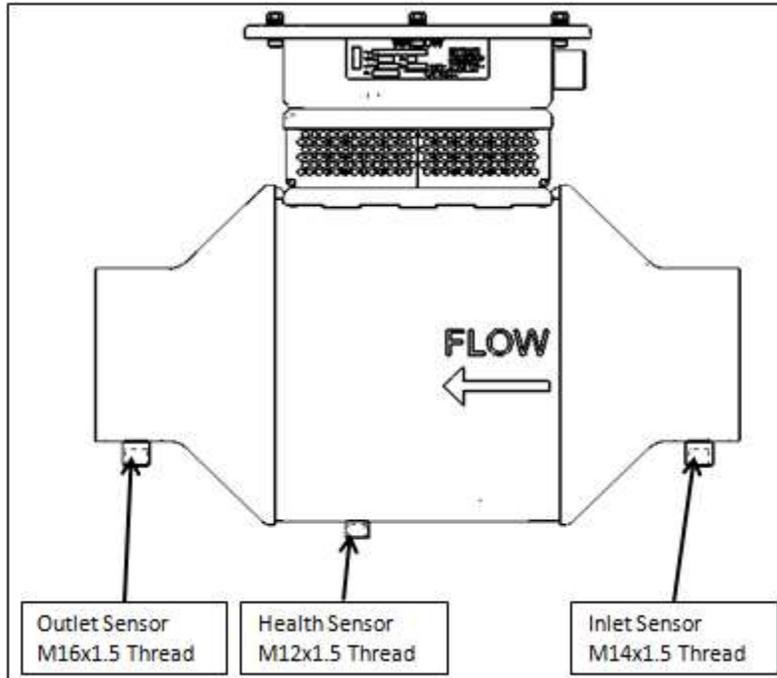


Figure 2 Sensor Locations on ECO-HEAT® Unit

Sensor Thread Size	Torque Limit (in-lbs)	Torque Limit (Nm)
M12x1.5	220	25
M14x1.5	280	32
M16x1.5	280	32

Due to the design of the sensors and sensor ports, the use of Teflon or other sealing tapes is not required to insure proper seating of the sensors within their respective ports. To ensure the sensors can be removed from the system in the event of sensor failure, the sensor fittings are pre-coated with a dry anti-seize. Additional anti-seize coatings are not required.

EXACTSENSE™ sensors are available in two DC power supply options: regulated 5V or 12V battery. The regulated 5V option will be able to operate at voltages between 4.75 and 5.25 V DC. The 12V battery option will be able to operate at voltages between 6.0 and 16 V DC. Refer to your documentation to ensure the proper voltage is supplied.

4. Terminal Enclosures

The ECO-HEAT® Heater terminal enclosure is designed to be compliant with IP69K. In order to maintain termination integrity, the terminal enclosure should be kept below the maximum temperature rating of the internal components. Insulation must not be added to the bare external surface of the electrical enclosure or stand-off assembly.

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The design of the Terminal Enclosure does not require the use of any Teflon or other sealing tapes on the lid hardware to ensure proper sealing of the enclosure. Anti-seize coating is applied to the lid hardware at the factory. It is recommended that anti-seize rated for at least 500°F (260°C) be reapplied to the hardware before resealing the enclosure anytime it is opened. The use of anti-seize coatings is also not required. To ensure proper sealing of the enclosure, the M6x1.0 lid hardware should be tightened to a torque value of 80 in-lbs (9 Nm), according to the sequence shown in Figure 3.

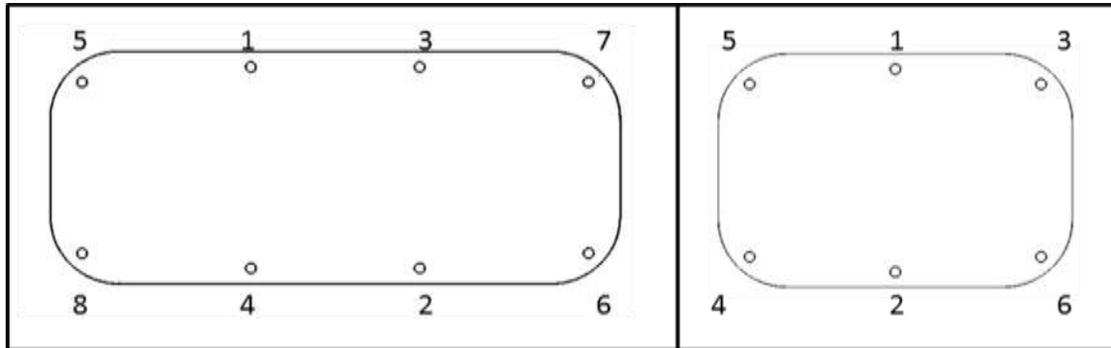


Figure 3 Lid Hardware Tightening Sequences

To prevent the bolts from shaking loose during operation, it is recommended to use the flat and lock washers included as shown in the figure below.

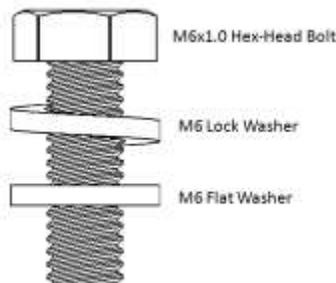


Figure 4 Lid Hardware Assembly Sequence

It is the user's responsibility to properly assemble and tighten all cable glands and conduit fittings to maintain IP69K compliance.

5. Torque Values for Terminal Connections

To prevent arcing it is important that all of the terminals connections be tightened, whether it the individual element terminals or the connection blocks. Watlow recommends the following torque specifications for the feeder wire connection blocks:

Wire Size	Recommended Torque (in-lbs)	Recommended Torque (Nm)
#4-#6 AWG	45	5.1
#8 AWG	40	4.5
#10-#14 AWG	35	4.0

A 1/8" hex head drive is required for tightening the compression block set screw.

The top #10-32 threaded hex nuts on the individual element terminals may need to be tightened to 20 inch/pounds using a 3/8" hex nut driver.

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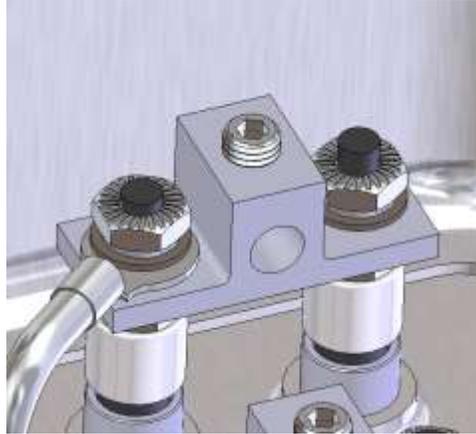


Figure 5 Tin Plated Aluminum Connection Block

6. Wiring



WARNING - Risk 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.

Consult wiring diagram supplied with the unit for correct feeder wires connections. If one is not supplied, the factory should be consulted for the appropriate wiring diagram. Feeder wire should be properly selected based on amperage, electrical power rating, ambient temperature, and type of environment. It is the user's responsibility to properly size and install feeder wire.

Feeder wire line connections should be made directly to the installed compression fittings. Compression fittings will accept a #4 AWG maximum wire. It is essential that these connections be tight. Stud terminals should be tightened to a maximum torque of 20 in-lbs while the bottom nut is supported. Ground connection (color coded "green") is supplied inside the housing for ground wire.

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

The power circuit is required to include a branch circuit over current protective device and a disconnect.

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Start-Up



WARNING:

The heater may be destroyed if there is a “no flow” condition! It is recommended that the control system monitor the Health Sensor to ensure that the heater does not overheat.

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

1. Electrical termination is tight and wiring is per wiring diagram supplied with heater
2. Proper disconnecting means and fusing have been installed
3. The voltage rating of the heater is the same as that being applied
5. Proper temperature controls and safety limiting devices are in place
6. Heater is securely installed in system

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



WARNING - Risk of Electric Shock:

Trouble shooting should only be performed by qualified personnel.

If the heater is not operating properly, check all electrical wiring, protection devices and disconnects to make sure power is being supplied to the heater. If the proper voltage is found to be present at the connection blocks in the junction box, please contact the factory for additional instructions.

Preventative Maintenance



WARNING - Risk of Electric Shock

Turn off all power to the heater and use appropriate disconnects lockouts before performing any maintenance. Preventative maintenance should only be performed by qualified personnel.



WARNING:

If the heater has been operating, it should be allowed to cool to a safe temperature before servicing.

Check electrical connections to make sure they are tight, free of oxide build-up and that no dust or dirt build-up is present. If contamination is present, clean connections, and re-tighten compression terminals to recommended values, and stud nuts to 20 in-lbs as necessary.

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Check enclosure (inside) for rust, dirt or dust. Remove rust if present and thoroughly blow clean with dry, oil-free air.

Check condition of cover and gasket to ensure proper levels of moisture resistance. If damaged, contact your local Watlow representative for assistance.

Check sensor fittings to ensure proper seating of sensors in the system. Re-tighten to proper torque values if necessary.

Check cable glands and/or conduit fittings to ensure proper sealing of the electrical termination box.

Replacement Parts

The only replaceable component on an ECO-HEAT® heater is the sensor module. Contact your local Watlow representative with the heater's part number and serial number for ordering a replacement.

Warranty

For warranty information, please refer to the Terms and Conditions included on your Purchase Order.

Return Policy

1. Call Watlow Electric Manufacturing Co. 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 AND Serial Number
 - Quantity
 - Application information including operating environment
 - MSDS sheet of material(s) that came in contact with heater, if used.
 - Customer account number
 - Contact Phone Number
 - P.O. number
 - Reason for return
2. Prior approval and an RMA number are 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.