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Installation And Operating Instruction Model IMETH-480C-25- .5-N₂ Electric Trim Heater

I. Installation Instructions

1. Mount the unit on a level concrete base and anchor through the holes provided in the base of the unit.
2. Connect the power to the top of the circuit breaker or contactor. Make sure that all holes through the enclosure are made through the bottom or the side of the enclosure. This is important because top entries have a tendency to leak and this will cause damage to the units electronics. Make sure that all wires are firmly seated in the connector and that the connector is tight. Torque all connectors to the specified tightness shown on the device. Double check all connections in the electrical box and on the heater terminals to be sure that they are tight. This is very important because connections tend to loosen up during shipping and long term storage.
3. Connect the inlet gas to the connection marked inlet and the outlet gas to the connection marked outlet. Bubble check the connections with gas at least 1.25 times the operating pressure of the system.
4. Turn on power to the unit and check the amperage to the heater. Make sure that the heater is pulling the required amperage. Make sure that all legs are pulling equal amperage. The leg to leg amperage should not be more than 5% off. The amperage should also be within 10% of the amperage stamped on the nameplate. If the voltage is wrong, correct the voltage. If the voltage is correct and the amperage readings are incorrect, call the factory. **Caution - do not leave the heaters on for any longer than necessary to check the amperage unless there is gas flow through the unit.**

This unit is a gas heater; it is NOT a vaporizer. Is must be supplied with gas not liquid at the inlet connection.

II. Operating Instructions

1. Set the main temperature controller to the desired outlet gas temperature. The unit utilizes a digital temperature controller that has been preset by the factory for normal operation. The lower display is the set point and the upper display is the process temperature. The set point can be set by simply pressing the up arrow on the controller to increase the set point

and pressing the down arrow on the controller to decrease the setting. It takes approximately 5 seconds for the change in the setting to take affect.

2. Turn on the power to the unit. The green light should turn on at this time. If the temperature is below the set point on the temperature controller, the amber light will turn on at this time as well.
3. At this time the unit is ready to accept gas flow. As the gas flows through the unit, the temperature will drop and the heater will turn back on. The heater will turn on and off as often as is necessary to keep the outlet gas temperature at the set point. The normal cycle will be on 15 seconds or so and off a short period of time. The ratio of off and on periods will depend on the outlet gas temperature and the amount of gas flowing through the gas heater assembly. If the contactor is cycling quickly - every second or less, there is a problem with the temperature controller. Shut the unit off immediately.
4. Control Components

Temperature Controller - This is used to set the outlet gas temperature. The sensor - a type "T" thermocouple - is located in a well in the outlet header. This allows the thermocouple to control the gas heater temperature when there is no gas flow through the unit. Refer to the Athena 32C Manual included with the installation and operating instructions for further details on the Temperature Controller.

Solid State Relays – These are power relays that control the power applied to the heaters. There are two of these relays that supply the power to the heaters – two leg three phase control. The solid state relays are controlled by the Athena 32 C controller.

Heater High Temperature Cut Off Switch - This is an over-temperature sensing device that monitors the heater sheath temperature. If the heater sheath temperature gets too hot, the controller will shut off the power to the contactor. This will turn off the heater. The controller is set to 300⁰F.

On Off Switch - This switch turns the control circuit power on and off.

Control Circuit Fuse - This fuse protects the control circuit from overload. It is a 5 amp fuse.

Thermocouple - This is a device that senses the outlet gas temperature or heater sheath temperature. The outlet gas temperature thermocouple is located in the outlet header of the unit. The heater sheath thermocouple is located in a well in the heater flange assembly.

Green Light - This is the power on light. It indicates that there is power to the unit.

Amber Light - This is the heater on light. It indicates that power is being supplied to the Solid State Relays and that they are supplying power to the heaters.

Control Circuit Transformer – This unit supplies 120 vac to the heater controls from the main 480 vac power feed to the unit.

III. Specifications

Model IMETH 480C-25-.25-4 x 60

Electric Immersion Heater For N₂ Gas Service (The heating element is directly immersed in the gas stream with this style unit). The unit can be ordered for 240 vac as well – pricing remains the same.

Flow	100,000 scfh
MAWP	250 psig
Fluid	Gaseous N ₂
Inlet Temp	30°F
Outlet Temp	70°F
Operating Press	60 psig
Pressure Drop	1 to 2 psig at 60 psig
Fluid Passages	Carbon steel
Power Required	480 vac, 3 phase, 60 htz, 31 amps
Kilowatts	25
Inlet Conn.	3" 150 lb. ANSI Flange
Outlet Conn.	3" 150 lb. ANSI Flange
Dimensions	24" wide 60" tall x 70" long approx.
Weight	400 lbs. approx.

The unit includes the following:

1. NEMA 4 Electrical Enclosure
2. Circuit breaker type disconnect
3. Power contactor - used in conjunction with the high temp limit to shut off the heater if the casting over heats or the SSR's fail.
4. Heater sheath high temperature limit set at 400°F
5. Solid state relays for applying power to the heaters (two leg control)
6. Control circuit transformer
7. Control circuit fuse
8. Control circuit on off switch
9. Power on light
10. PID Type Digital Temperature Controller
11. Immersion element assembly - low watt density heater
12. Carbon steel shell assembly – powder coated
13. Carbon steel stand assembly – powder coated

IV. Troubleshooting

1. Gas Temperature Too Cold
 - a. Temperature controller set point too low
 1. Change the temperature setting on the main temperature controller
 - b. Power not turned on to the unit
 1. Turn on the power to the unit
 - c. Contactor not pulling in

1. Check the out put from the temperature controller - make sure that 120 vac is being supplied to the contactor
 2. Make sure that the High Temperature Cut Off Switch is not tripped
 - d. Heaters not functioning properly
 1. Check the amperage on all the legs - be sure that all the legs are even.
 2. Check the nuts that hold the wires to the buss bars and be sure that they are tight.
 3. Check all the buss bar bolts on top of the heaters and be sure that they are all tight.
 4. Check the continuity of the heaters and be sure that the heaters are not shorted to ground and that they are not open.
 - e. Gas flow too high and the unit is being overdrawn
 1. Reduce gas flow through the unit.
 - f. Wrong power applied to the unit
 1. Correct the power to the unit.
 - g. Thermocouple not properly positioned
 1. Check the thermocouple position on the main temperature controller and be sure that the tip of the thermocouple is touching the end of the well.
 2. Be sure that the thermocouple is not shorted out or broken
2. Gas Temperature too hot
- a. Temperature controller set point too high
 1. Change the temperature setting on the main temperature controller
 - b. Contactor stuck
 1. Check the out put from the temperature controller - make sure that the output from the controller is cycling on and off.
 2. Turn off power immediately and replace the contactor.
 - d. Thermocouple not properly positioned
 1. Check the thermocouple position on the temperature controller and be sure that the tip of the thermocouple is touching the end of the well.
 2. Be sure that the thermocouple is not shorted out or broken
3. General
- a. Power on and the unit is not responding to changes in flow.
 1. Make sure that temperature controller is set properly
 2. Make sure that the thermocouple is installed properly - near the outlet connection.
 - b. The contactor is cycling quickly - every second or less, there is a problem with the temperature controller. Shut the unit off immediately.
 1. The thermocouple is shorted or bad
 2. The temperature controller is bad.
 3. Allow the unit to cool and turn the power back on to the unit. See if the unit continues to cycle rapidly. If the unit continues to cycle rapidly the controller has a problem and should be replaced. If the unit does not cycle rapidly, there is probably a problem with the

high temperature cut off switch mounted on the heater sheath or in the shell header. This can be checked by jumping the high temperature cut off switch out and observing if the rapid cycling stops. Do not leave the unit jumped out or catastrophic failure may occur.

V. Set Up Parameters - Watlow 965 Controller

LOC	0
Input	T
RSP	Off
C-F	F
RL	-50
RH	150
OT1	Ht
OT2	Ht
Sp2	73
PB-1	15
RE1	0.00
RA1	0.00
CT1	15
CAL	0
Aut	0