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Installation And Operating Instruction Model ETH480C-15-.5-CO₂ Electric Gas 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. Keep the unit as close to the gas use point as possible to eliminate the problem of gas re-condensing in the line due to low ambient temperatures. If the unit must be located a long distance from the use point, it may be advisable to heat trace the outlet line from the gas heater to the use point.
2. Connect the power to the top of the circuit breaker in the large control box. Make sure that all holes through the enclosure are made through the bottom or the side of the large enclosure. This is important because top entries have a tendency to leak and this will cause damage to the units electronics. The small enclosure mounted on the side of the unit contains the majority of the 120 vac components. There is no 480 / 240 vac in this panel.
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. It should not be more that 10% above or below the nameplate rating. If the amperage is more than 10% above or below the nameplate rating, check the voltage being supplied to the unit. If the voltage is wrong, correct the voltage. If the voltage is correct, call the factory.

This unit is a gas heater - Not A Vaporizer - It will not vaporize liquid.

II. Operating Instructions

1. Set the 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 controller set point can be reached by pushing the menu access key (round arrow key) - this is the key that looks like a circular arrow key on the left side of the controller. Once the set point is reached, the display will flash SP and the current setting. 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. The mode/enter key must be pushed to set the new value in the controller. The mode/enter key has three horizontal lines on the key.

2. Turn on the power to the unit. If the temperature is below the set point on the temperature controller, the output light on the controller will be on or flashing. The output light is an LED on the upper left corner of the temperature controller.
3. At this time the unit is ready to accept gas flow. As the gas flows through the unit the casting 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 on and off periods will depend on the outlet gas temperature and the amount of gas flowing through the casting assembly. If the contactor is cycling quickly - every second or less, there is a problem with the temperature controller. Shut the unit off immediately. This may require an adjustment of the parameters to slow the cycle time down.

4. Control Components

Temperature Controller - This is used to set the outlet gas temperature. Because of the pressure rating of the controller, the sensor - a type "T" thermocouple - is located in a well in the outlet header. The thermocouple is installed in the well so that it is inside the boundary of the casting. This allows the thermocouple to control the casting 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.

High Temperature Cut Off Switch - This is an over temperature sensing device that is located on the casting. It is used to prevent the casting from over heating in the event that the temperature controller is set too high or fails in the heating mode. This switch is set at 150°F.

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 casting and outlet gas temperature.

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

Amber Light - This is the contactor on light. It indicates that the contactor is pulled in and supplying power to the heaters.

III. Specifications

Electric Gas Heater For CO ₂ Service	
Flow	3000 lb. per hour
Mawp	500 psig
Fluid	Gaseous CO ₂

Inlet Temp	0°F
Outlet Temp	70°F
Operating Press	250 psig
Pressure Drop	7 to 10 psig at 250 psig
Fluid Passages	304 stainless steel
Power Required	480 vac, 3 phase, 60 htz, 18 amps
Kilowatts	15
Inlet Conn.	1 ½" male pipe thread
Outlet Conn.	1 ½" male pipe thread

The unit includes the following:

1. NEMA 4, 480 VAC Electrical Enclosure
2. NEMA 4, 120 VAC Enclosure
2. On/Off type Digital Indicating Temperature Controller for controlling outlet gas temp.
3. Single piece casting assembly with tube passages and heating elements cast in place.
4. Power contactor
5. Casting high temperature limit
6. Control circuit fuse
7. Control circuit on off switch
8. Power on light
9. Contactor on light
10. Heater junction box
11. Stand assembly for the electrical control box and the heater casting assembly.

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 top of the casting. 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.