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CEXI ELECTRIC VAPORIZER

CEXI MODEL NUMBER 480C-60-1.5-CO_2-LTCO

Job No. X011015

Date: July 1, 2006

I. Installation Instructions

1. Set heater on level concrete base and anchor holes provided in base angles.

2. Connect Process fluid lines to inlet and outlet connections. **CAUTION**: Be sure inlet is connected to inlet and outlet is connected to outlet; improper connections will damage equipment and void warranty. The inlet connection is normally the smaller connection. Bubble check all connections at 1.25 times the rated working pressure of the system.

3. Connect electric power to line terminals of disconnect switch. **CAUTION**: Be sure voltage supply agrees with name plate rating on equipment. Connect a 480 vac, 3 phase, 90 amp, 60 Hz, power supply to the top of the circuit breaker. If the unit is placed outdoors, we strongly recommend that the connections through the box be made through the side or the bottom of the box to reduce the possibility of water entering the electrical enclosure.

4. The unit is equipped with a lot temperature shut down valve that will shut off the flow of gas to the cylinder manifolds if the out let temperature drops below the set point on the temperature controller. For high pressure CO_2 we generally recommend that the temperature for the low temperature cut off sensor be set around 50^0F. The outlet gas temperature controllers should be set at around 70 to 80^0F. Be sure when piping the unit into the system that a pressure relief valve is provided on the outlet of the pump that will protect the piping and the vaporizer in the event that the LTCO valve closes while the pump is pumping.

II. Operating Instructions

1. **Initial Check Out :** The temperature controllers are set at factory at approximately correct setting for normal operation, however it is advisable to test controller settings before putting the equipment into service. The following is the recommended test procedure before starting flow of gas.

   A. Turn on main power switch to ON position. When the unit has power the green (Power on) light will illuminate.

B. Turn ON/OFF control switch to the ON position. The contactor enabled light, (amber), will illuminate if the temperature of the unit is below the temperature set on the temperature controllers.

C. The set point on the controllers was set at 70^{o}F at the factory. The unit has a total of 3 temperature controllers installed in the unit. The main controllers are TC1 and TC2. These controllers are the controllers that monitor the outlet gas temperature and turn the heaters on to maintain the desired outlet gas temperature - these controllers should be set at 70 to 80 ^{0}F. The other controller is the low temperature cut off controller and should be set at around 25^{0}F.

D. Start flow of gas. Check discharge gas temperature. If gas temperature is to low, adjust the controller set point up 2 or 3^{o}F at a time until gas temperature stabilizes to desired temperature. If the unit will not flow gas, adjust the low temperature cut off controller to a lower temperature to allow the outlet valve to open.

E. For maximum heater life and best operation, the discharge gas should be as cold as possible and still remain compatible with the user's needs. The unit is designed to deliver 80^{0}F gas so the heaters will run around 90 to 100^{0}F. These heaters should not be operated at temperatures above 100^{o}F (unless specifically ordered to deliver a higher temperature gas).

2. The heaters are powered by contactors. The contactors are given a signal from the controller to energize the heaters. The temperature controller senses the temperature of the outlet gas temperature with a device called a thermocouple. The thermocouple is a temperature sensitive device that produces a low voltage signal that is proportional to the temperature it is sensing.

3. The two temperature controllers - TC1 and TC2 - control separate sections of the heater assembly. These two controllers should be set at the same set point to keep the heat load even in the casting. It is also important to note that if a thermocouple needs to be replaced that it be installed exactly were it came from or the unit may not control the temperature properly.

4. High temperature safety switches (HTCO)'s are mounted on top of the heater castings to prevent overheating in case of temperature controller failure. The HTCO's are connected in series with the contactor that controls the heaters on which the HTCO's are mounted. These switches have a setting of 200^{0}F and will shut off power anytime casting temperature exceeds 200^{0}F . These switches will reset automatically when casting cool to approximately 195^{0}F . If one of the HTCO's trip out, the contactor will drop out and the heaters will be shut off.

5. **Operation :** The following sequence should be followed for normal operation.

A. Turn the power on to the unit

B. Turn on the circuit breaker on the unit

C. Turn on the ON / OFF Switch

D. Check the set points on the temperature controllers

E. Start the flow of gas through the unit.

F. The unit is now in operation.

G. In normal operation it is best to leave the power on to the unit at all times. This allows the unit to stay warm all the time - keeping the heaters dry. The power consumption will be very minimal during stand by conditions.

Specifications
Model 480C-60-1.5-CO_2 - LTCO

Direct to Process Electric Vaporizer

Flow	1500 lbs. per hour
MAWP	500 psig
Fluid	Liquid CO_2
Inlet Temp	0°F
Outlet Temp	80°F
Operating Press	300 psig
Pressure Drop	25 to 30 psig at 300 psig and full rated flow
Fluid Passages	304 Stainless Steel / Carbon steel
Power Required	480 vac, 3 phase, 50 htz, 75 amps
Kilowatts	60
Inlet Conn.	1" Male Pipe Thread
Outlet Conn.	1" Female Pipe Thread

The unit includes the following

1. NEMA 4 Electrical Enclosure
2. Circuit breaker type disconnect with door interlock
3. Aluminum casting assembly with replaceable heater elements.
4. Control circuit transformer
5. Control circuit fuse
6. Control circuit on off switch
7. Power on light
8. Contactor on lights
9. Iron base
10. Casting High Temperature Safety Switches
11. Outlet Gas Temperature Controllers - Zoned Temperature Control - Two each 30 kW sections.
12. Power Contactors - two each
13. Low temperature cut off
    a. Outlet gas temperature sensor
    b. Outlet pneumatically operated ball valve
    c. Outlet gas temperature controller - minus 50 to 125^0F range