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CEXI ELECTRICALLY HEATED WATER BATH VAPORIZER SERIAL NO. 961028 CEXI MODEL NUMBER EHVB 350

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Installation Instructions

1. Set vaporizer on level concrete base and anchor holes provided in base.
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. Bubble check all connections at 1.25 times the rated working pressure of the system. The outlet connection generally has a thermowell installed in it.
3. Connect the water make up line to the 1" connection on the side of the unit. Maximum water pressure is 150 psig. The unit has a by pass valve to allow the unit to be filled without powering the unit up. Fill the tank with water.
4. Connect the over flow pipe at the bottom of the tank to a drain connection. This will pipe any excess water away from the unit in the event there is a spill. Normally there will not be any water overflowing from the unit. This normally only occurs if the unit has been overfilled.
5. Connect electric power to the line terminals of the disconnect switch. **CAUTION:** Be sure voltage supplied agrees with name plate rating on equipment. Connect a 480 vac, 3 Phase, 70 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 keep water from entering the enclosure.
6. Once the unit is connected with power and full of water, we recommend that the heater load be checked to insure that the heater is pulling the proper amperage and that all legs are balanced. To do this, monitor the amperage of each leg with an amp

probe and turn the temperature setting up until the contactor turns on. Check each leg. All the readings should be within 5% of each other.

7. During the installation process, do not weld or drill on the tank side walls or bottom. This will damage the corrosion resistant coating on the interior of the tank wall and lead to premature failure of the tank

Operating Instructions

1. 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. Be sure that the unit is full of water.
 - C. Turn ON/OFF control switch to the ON position. The contactor on lights, (amber), will illuminate if the temperature is below the set point on the controllers. If the temperature is above the set point on the controllers, momentarily raise the set point on each controller to see that the contactor or solenoid valve operates properly. The contactor will make a noise as you turn the temperature up and the "Contactor On" light will illuminate. The solenoid valve will not make any noise as the dial is turned up, but it will make a fairly audible click as the dial is turned back down below ambient temperatures.
 - D. The set points on the controllers were set as follows:

1. Outlet gas temperature	70 ⁰ F
2. Low gas temp cut off	25 ⁰ F
3. Low water temp cut off	50 ⁰ F
4. High Temperature Cut Off Switch	200 ⁰ F
 - E. To initially start the unit, it is advisable to turn off a valve on the outlet of the vaporizer. Turn on a gas valve from the top of the CO₂ Storage tank to charge the system to full tank pressure. Then, once the unit is charged with gas, turn on the liquid. With the power on to the unit, the temperatures set on the controllers, it is then time to open the gas side valve on the outlet of the vaporizer to allow the unit to start vaporizing CO₂. Starting the unit up by this process will keep the unit from becoming plugged with dry ice that can form when the liquid CO₂ is rapidly depressurized.

- F. Start flow of gas. Check discharge gas temperature. If gas temperature is too low, adjust the controller set point up a little bit at a time until gas temperature stabilizes to desired temperature.
 - G. 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 70°F gas so the water will run around 100-120. This unit should not be set to deliver gas at temperatures above 80°F.
2. The heaters on this unit are powered by a single temperature controller. The controller is an On Off type controller. The sensor for the controller is located in the outlet header of the unit. The sensor is generally installed in a thermowell that is down inside the outlet header below the water level. This allows the temperature controller to control both the gas and the water temperature. The gas temperature is the primary control and when there is no gas flow, the water temperature takes over.
 3. A high temperature safety switch (HTCO) is mounted in a thermowell on the side of the tank. This high temperature safety switch is installed to prevent overheating in case of temperature controller failure. The HTCO controls a relay that must be energized to allow the contactors to pull in to power the heater sections. This switch has a setting of 200°F and will shut off power anytime water temperature exceeds set point. This switch will reset automatically when water cools to approximately 190°F. If the HTCO trips out, the contactor will drop out and the heaters will be shut off.
 4. The unit is equipped with a water make up system. The water make up system is designed to keep the tank full of water at all times. If the unit is located where freezing is a problem, the water line should be heat traced and insulated. The water make up system has a fixed non-adjustable set point that will turn the solenoid valve on and off. When the water drops below the sensor the solenoid valve turns on - when the water is in contact with the sensor, the solenoid valve will turn off.
 4. The unit is also equipped with a low water level cut off. The low water level cut off turns off the heaters if the water level drops too low to prevent damage to the heaters.
 5. The unit is equipped with a low temperature cut off system. The system consists of three basic components. The Outlet Gas temperature controller, the Water Temperature controller, and the outlet solenoid valve. The Outlet Gas temperature controller monitors the outlet gas temperature and will shut off the gas flow by turning off the solenoid valve if the outlet gas temperature drops below the set point on the controller. The Water Temperature controller will also shut off the solenoid valve if the water temperature drops below the set point on the water temperature controller. Do not mistake these controllers as devices that will elevate the temperature of the gas or water. They will simply turn off the solenoid valve if the gas or water temperature drops below the set point on the controllers. Therefore, turning the dial on either the Water Temperature or Gas Temperature controller to a higher temperature will only shut off the flow at a higher temperature.

6. The units water temperature will swing over a wide range during operation. At low flows the water will normally be fairly cool - close to the outlet gas temperature. As the flow rate increases, the water temperature will rise to meet the requirements of the system for vaporizing the flow of CO₂. The unit will respond to changes in temperature fairly slowly.
7. The unit is able to stand instantaneous flow changes that are within the flow parameters of the design. In other words, the unit is able go from 0% flow to 100% flow instantly if the water is fairly warm - 100⁰F or above. The unit will not withstand flows above the nameplate rating for any amount of time at all.
8. The heating element is a flanged element that can be replaced by the following procedure.
 - a. Turn off the CO₂ supply to the unit
 - b. Turn off the power to the unit and lock the power off
 - c. Drain the water from the tank
 - d. Disconnect the heater electrical connections from the heating element
 - e. Remove the flange bolts from the flange
 - f. Remove the heating element assembly
 - g. Remove the gasket and clean the gasket surface
 - h. Install a new gasket on the heater
 - i. Install the heater into the unit - reverse the prior instruction order.
9. Tube bundle removal procedure:
 - a. Turn of the power to the unit
 - b. Remove all electrical connections from the top of the lid assembly
 - c. Turn off the liquid supply to the unit
 - d. Depressurize the tube bundle
 - e. Remove all the bolts that attach the lid to the ring
 - f. Lift the tube bundle straight up out of the tank - be very careful not to hook any of the appendages of the tube bundle on any of the probes entering the tank from the side of the tank.
 - g. Perform any maintenance on the tube bundle and reverse the procedure to install the tube bundle.

Specifications
Model EHWB 250

Electric Heated Water Bath Vaporizer For CO ₂ Service	
Flow	1125 lb. per hour
MAWP	500 psig

Fluid	Liquid CO ₂
Inlet Temp	0 ⁰ F
Outlet Temp	70 ⁰ F
Operating Press	300 psig
Pressure Drop	<10 psig at 300 psig and full rated flow
Fluid Passages	304 Stainless Steel
Power Required	480 vac, 3 phase, 60 htz, 55 amps
Kilowatts	45
Inlet Conn.	3/4" male pipe thread
Outlet Conn.	1" female pipe thread
Water Make Up Conn.	1" female pipe thread
Over Flow Conn.	2" male pipe thread
Heater Flange Conn.	6" 150 lb. ANSI Flange

The unit includes the following:

1. NEMA 4 Electrical Enclosure
2. Circuit breaker type disconnect with door interlock
3. Flanged heating element assembly
4. 250 gallon epoxy coated and insulated carbon steel water tank.
5. Power contactors
6. Temperature controllers - 0 to 140⁰F range
 - a. Low gas temperature control
 - b. Low water temperature control
 - c. Outlet gas temperature
7. Tank high temperature safety switch set at 200⁰F.
8. Control circuit transformer
9. Control circuit fuse
10. Control circuit on off switch
11. Power on light
12. Contactor on lights
13. Stainless Steel Tube Bundle Assembly
14. Water Temperature Thermometer
15. Tank Drain Valve
16. Overflow Connection
17. Water Make-up System
 - a. Water level controller
 - b. Inlet water solenoid valve
18. Inspection Port
19. Sight Glass For Water Level
20. Low water cut off to stop the heater in the event that the water level drops too low.