

# **CRYOGENIC EXPERTS, INC.**

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## **CEXI ELECTRIC PRESSURE BUILD VAPORIZER WITH PNEUMATICALLY OPERATED BALL VALVE**

**CEXI MODEL NUMBER \_\_\_\_\_**

**SERIAL NUMBER \_\_\_\_\_**

### **I. Installation Instructions**

1. Set heater on level concrete base and anchor holes provided in base angles. When mounting the unit, be sure to plan the installation to keep the vaporizer as close to the tank as is practical. Long liquid and gas lines will degrade performance of the unit. The installation location should allow as much vertical drop between the bottom of the tank and the vaporizer as possible as well as keeping the fluid lines as short as possible.
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. Make sure that the liquid supply line slopes down to the inlet connection and the outlet or gas return line slopes up to the tank. Horizontal lines will retard flow to and from the unit. Down slopes from the unit to the tank in the return line should be avoided at all costs and uphill slopes from the tank to the vaporizer in the gas line should be avoided at all costs as well. Either can cause traps that will stop the fluid flow to the unit. Be sure to install pressure relief valves in any line that there is a possibility of liquid being trapped to protect the lines from becoming over-pressurized.
3. Connect the electrical power to lines to the top terminals of contactor or circuit breaker. **CAUTION:** Be sure voltage supply agrees with nameplate rating on equipment. Connect the proper power supply to the top of the circuit breaker or contactor. 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 electrical cabinet.
4. Connect a line from the top of the tank - vapor phase to the inlet regulator connection on the ball valve actuator. This line can be full tank pressure because the regulator is capable of 3000 psig inlet pressure. The tank connection should be a connection point to which liquid cannot possibly flow. This is important because this connection will supply gas to the actuator and liquid flowing to the actuator may cause a problem for the actuator.

5. The temperature controller is preset at the factory at the correct setting for normal operation. The temperature controller is set to maintain the casting at 50<sup>0</sup>F - this is the optimum temperature for the casting. The following is the recommended test procedure before starting flow of gas.
  - 5.1. Turn on disconnect switch to the ON position.
  - 5.2. Turn ON/OFF control switch to the ON position. The contactor may pull in or it may not - this depends on the casting temperature. If the casting is warm the contactor will not pull in. The contactor makes a loud clunk when it pulls in. If the temperature controller is a fixed set point controller (no potentiometer) then there is no further testing to be done. If the unit has a potentiometer, then rotate the dial on the potentiometer up to a warmer setting to see if the power contactor will pull in - it should. Once the contactor has been checked, return the potentiometer to the 50<sup>0</sup>F set point.
  - 5.3. The set point on the controller was set at 50<sup>0</sup>F at the factory. The set point is not adjustable.
  - 5.4. Once the installation is complete, check the amperage of each phase of the heater and be sure that it is pulling the proper amperage on each leg. The unit should be balanced and pulling approximately the nameplate rating. If the voltage is lower than the nameplate rating, the amperage will also be lower.
6. A high temperature safety switch (HTCO) is mounted on top of the heater casting to prevent overheating in case of temperature controller failure. The HTCO is connected in series with the temperature controller to energize the contactor. This switch has a setting of 200<sup>0</sup>F and will shut off power anytime casting temperature exceeds 200<sup>0</sup>F. These switches will reset automatically when casting cool to approximately 180<sup>0</sup>F. If the HTCO trips out, the contactor will drop out and the heaters will be shut off.

## **II. Operating Instructions**

1. Turn the power on to the unit.
2. Turn on the liquid and gas supply valves to the unit.
3. The casting temperature controller should be set for 50<sup>0</sup>F. The unit will turn on if the casting temperature drops below the set point on the controller. The Thermocouple is located on the top of the casting and is siliconed in place.
4. The unit is equipped with a pneumatically operated ball valve that controls the flow of liquid to the unit. A pressure switch that is set to open the valve at 285 psig and to close the valve at 295 psig controls the valve. The pressure switch is preset from the factory, but is fully adjustable for both dead band and pressure set point.
5. The ball valve is a fail-closed valve so that if there is a power failure, the valve will shut stopping the flow of CO<sub>2</sub> to the unit and the pressure build action.

6. For further information on the pressure switch, ball valve, regulator, or temperature controllers refer to the information provided in the operating instructions.

### III. Trouble Shooting

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(s) is (are) 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 of 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 of the temperature controller and be sure that the tip of the Thermocouple is touching the casting.
    2. Be sure that the Thermocouple is not shorted or broken.
2. Gas Temperature too hot
  - a. Temperature controller set point too high
    1. Change the temperature setting on the main temperature controller
    2. Check the set point on the high temperature cut off controller - make sure that it is set no higher than 80°F.
  - 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 of temperature controller and be sure that the tip of the Thermocouple is touching the casting.
    2. Be sure that the Thermocouple is not shorted out.
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 outlet connection on top of the casting.
  - 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 Potentiometer is bad
    - 2. The Thermocouple is shorted or bad
    - 3. The temperature controller printed circuit board is bad
4. The Ball Valve Will Not Open
- a. Pressure switch is set wrong - check operating set point
  - b. Pressure switch is faulty - replace
  - c. Inadequate instrument air supply to the ball valve actuator
    - 1. Faulty regulator
    - 2. Regulator not connected to the instrument air supply
    - 3. Regulator set wrong
  - d. Tank pressure too high or above set point on pressure switch
  - e. Faulty Solenoid Valve
  - f. Faulty Actuator
5. The Ball Valve Will Not Close
- a. Pressure switch is set wrong - check operating set point
  - b. Pressure switch is faulty - replace
  - c. Inadequate instrument air supply to the ball valve actuator
    - 1. Faulty regulator
    - 2. Regulator not connected to the instrument air supply
    - 3. Regulator set wrong
  - d. Tank pressure low or below the set point on the pressure switch
  - e. Faulty Solenoid Valve
  - f. Faulty actuator
  - g. Something stuck in the ball of the valve