

## **SAHARA OVEN CONTROL INSTRUCTIONS STEAM SOLENOID OPERATION**

FDC 9090 Temperature Controller is factory set for PI control with a separate delay off timer inside the panel to control valve cycle time. The factory setting on the delay off timer (Valve Saver) is 5 seconds with a range of 0.1 to 10 sec. This timer prevents the solenoid valve from rapid continuous cycling as the oven approaches its set point. The valve saver feature provides the user with ability to extend the valve life by increasing the delay off time. However, as the delay off time is increased the oven temperature variation around the set point will increase. Factory testing with a 5 second delay off time indicates a valve life estimated at 2 years in continuous duty and temperature regulation of +/- 3 Degrees.

Factory Setting on the controller will be:

Process Band = 21

Integral Time = 447 seconds

Derivative Time = 0 seconds

Cycle Time = 10 seconds

It is strongly recommended that a globe type manual flow control valve be installed between the solenoid valve and oven heat exchanger coil. This valve should be trimmed to obtain the best possible temperature regulation without causing steam hammer or slow response.

Oven Tuning :

Initial setting of the flow control valve should be 1 turn open.

Turn power on to the control panel, and use the up and down arrow keys on the FDC-9090 to set the desired oven temperature.

Observe the operation:

If the oven heats up to slowly open the flow control valve at ¼ turn per try until the start up time is within a satisfactory range for your process.

Once the oven is at temperature observe the temperature deviations above and below the set point. Variations of 3 degrees around the set point would be considered normal.

If the process is slow to respond or if the temperature variations around the set point are to large then try opening the flow control valve ¼ turn at a time and observe the operation. The lowest flow setting on the globe valve, which allows the oven to operate at an acceptable level, is the best setting and will result in the longest life span on all the components.

Turning the knob on top of the valve saver timer can change the amount of delay off time. This relay is located inside the control panel, CCW will decrease the delay off time and CW will increase the delay off time. When optimizing this setting make small changes and observe the operation. The larger the time delay the longer the valve will last, but temperature variations will likely increase.

## OPTIONAL HIGH TEMPERATURE CUT OFF

If your steam control system is ordered with the optional FDC L91 Limit Controller the following procedure will be used to set up and use the High Limit lockout:

After the control power is turned on the unit will go through a self-test routine.

Once the display has stabilized ( about 5 seconds ) press the scroll key once to select HSP1 (High Set Point 1)

Use the up and down arrow keys to select the desired High Temperature Limit and then press the reset key. It is recommended that the high temp limit be set 20 degrees higher than the operating temperature to prevent nuisance tripping, however your process requirements must be used to determine the best value for your use.

The unit is now ready for operation.

Note: Two minutes after power up the FDC-L91 will go into Lock Mode and the arrow keys will no longer operate. Press and hold the Reset Key for 10 seconds or until the lock light turns off, the arrow keys will now function.

If the oven temperature exceeds the High Limit setting the OP1 light will turn on and the solenoid valve will close. The FDC-L91 will lock out preventing further heating of the oven. Once the oven cools below the high limit setting the RESET Button will have to be pressed for the oven to begin heating again.

Cycling the power switch off and then back on will also reset the L91 limit controller.

CAUTION: The high limit control is an electrical interlock and controls the safety solenoid valve. In the event that the oven temperature exceeds the high limit value the solenoid valve will be de-energized, however since this is mechanical device steam shut off is not guaranteed. ***Oven temperature could continue to climb and create an unsafe condition.*** The end user must evaluate their process and determine if a hazard could exist if the valve fails. The user is responsible to implement additional engineering controls to prevent a hazardous condition within the oven and not rely solely on the High Limit Controller. Operating instructions should include a periodic test of the safety valve shut off function. Lowering the high limit setpoint HSP1 on the L91 controller to a value below the current oven temperature and checking to see if the solenoid valve closes and the oven begins to cool down can accomplish this. After the test the HSP1 should be returned to it's original setting and the reset button pressed to return to normal operation.

Piping of the heating coils and the solenoid valves are the responsibility of the oven owner. The two-solenoid valves are to be piped in series along with the recommended globe type flow control valve. If your oven has multiple heating coils with external connections they should also be piped in series so that the oven has one inlet and one outlet connection. The solenoid valve manifold is connected to the inlet and a steam trap is installed on the outlet.