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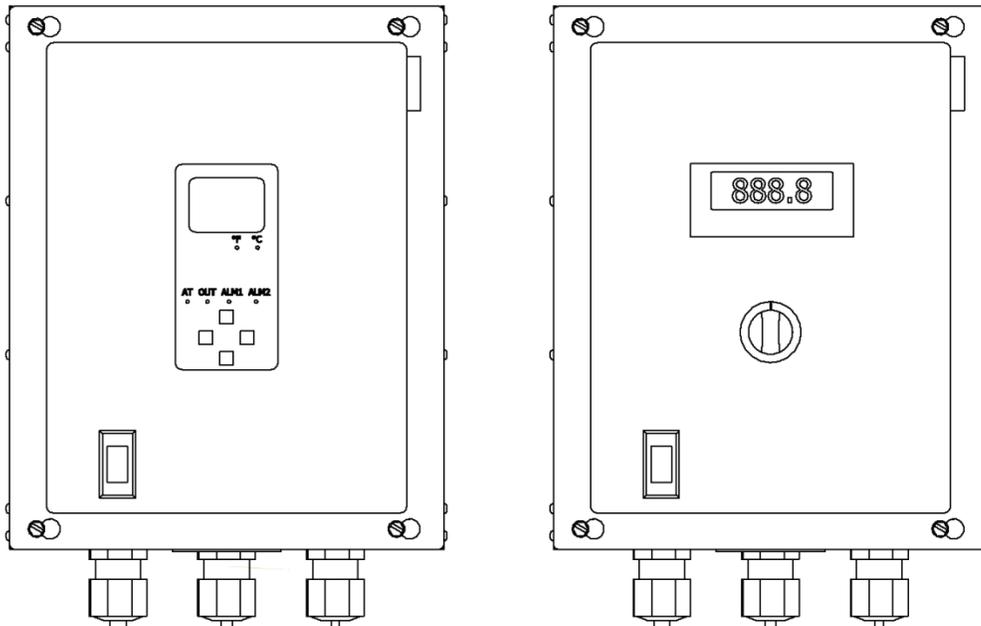
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AUTOMATIC AND MANUAL TEMPERATURE CONTROL ENCLOSURES FOR iHEAT

Manual 64572-001 | Revision B | Publication Date: 10/17/17

NOTE: Dimensions in () are informational only. English values take priority.



SPECIFICATIONS

Input voltage: 120V/60HZ/1PH

Thermocouple type: K

Output signal: 4-20 mA

Enclosure Dimensions: 10" H x 8" W x 4" D

Mounting: Flush mount utilizing front screws or rear 1/4" x 20 UNCF tapped holes

Introduction

The control box is the part of the burner system responsible for controlling the firing rate of the burner. This can be done either automatically, through use of a thermostat, or manually, controlled by the user through a knob. The control box transmits this information to the burner via a 4-20 mA signal. The control box is powered with line voltage fed to it from the burner box. When the switch on the control box is turned on, it will return this power to the burner, powering it on.

Mounting

The control box has four ¼"-20 threaded holes on the back face of the box which can be used to mount the box to a bracket or flat surface on the appliance. Alternatively, the box can be flush mounted by making a cutout in a panel that accommodates the four #6-32 screws that hold the cover plate to the control box, then mounting the box behind the panel and screwing the cover over it.

Connections

There are three cables that come out of the bottom of the box to connect. The large black cable carries the 120 Vac which powers the control box. This cable also returns 120 Vac to the burner when the power switch in the control box is turned on. The thermocouple is the metal-sheathed cable. This sensor relays the temperature of the appliance to the control box and can be read out on the LCD display on the front cover. Finally, the smaller grey cable carries the 4-20 mA signal which controls the burner's flame intensity. The appliance manufacturer will have instructions about mounting the thermocouple for optimal consistency and accuracy in readings. The other two cords plug directly into the mating connectors on the bottom of the burner enclosure as shown in Figure 1.

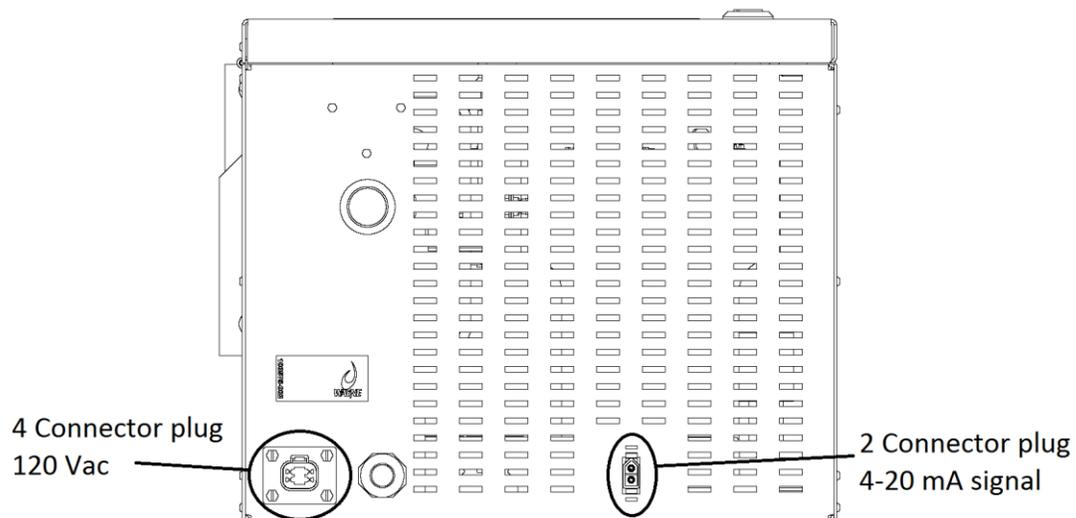


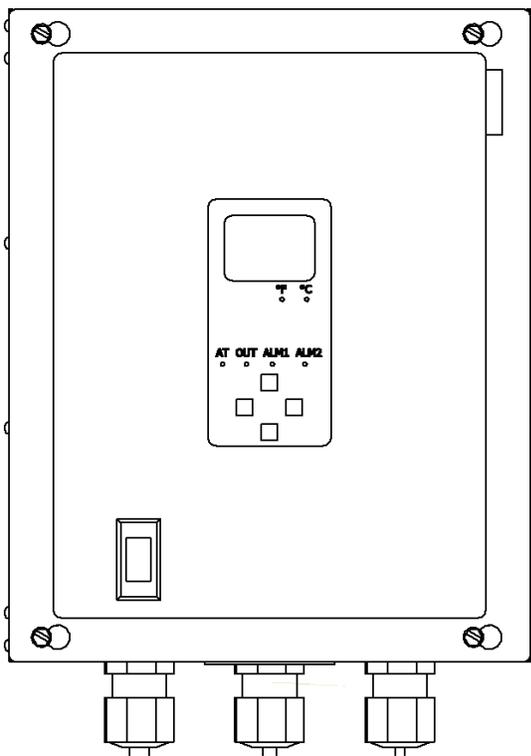
Figure 1: The four connector power cable (left) and 4-20 mA cable (right) plug into their mating receptacles on the bottom of the burner box as shown

Opening the Enclosure

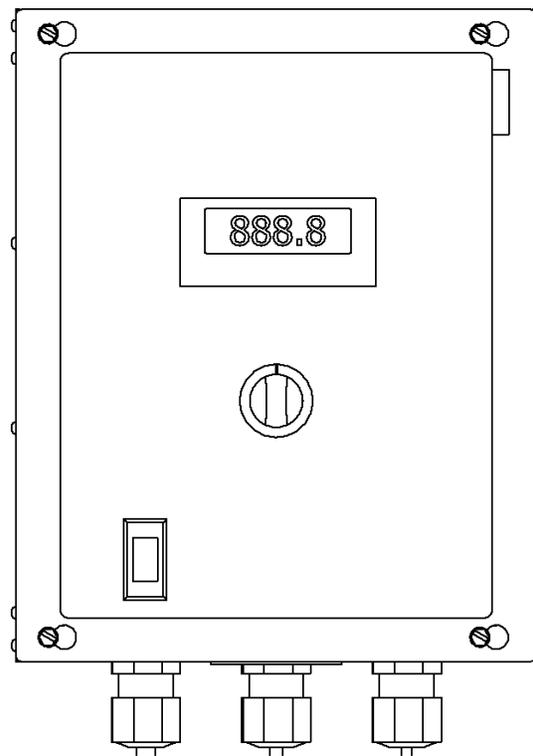
To open the control box loosen the four #6-32 screws holding the cover plate on, slide the cover plate to the left, and pull the screw heads that had been holding the cover in place through the larger side of the cover plate mounting holes. While working on the control box, the cover plate can be reversed and held in place by the screws for convenient access to panel-mounted components. Do not allow the cover plate to dangle supported only by the wires routed between the cover and the box interior.

Control Type

This burner system can be controlled by either a manual or automatic control box. The automatic version uses a variable thermostat to automatically maintain the oven at the temperature selected by the user. The manual version uses a control knob to allow the user to manually adjust the heat output of the burner. Presence of a control knob indicates that a control box is a manual type unit. If there is no knob, the unit is an automatic type unit.



Automatic control box



Manual control box

Automatic Controls

Function

The large black power cord supplies 120 Vac to the control box. When the switch is turned to "ON," 120 Vac is fed back to the burner and the thermostat powers on. The thermostat uses a PID control loop to generate a 4-20 mA signal, which is fed through the smaller gray cable into the burner box to control the firing rate of the burner. The current temperature is displayed on the top thermostat readout labeled "PV." The setpoint that the thermostat will maintain is displayed below on the readout labeled "SV." The setpoint can be adjusted using the up and down arrow buttons on the thermostat.

Components

Thermostat – The thermostat automatically controls the temperature of the appliance, holding it at the setpoint selected by the user. The temperature of the appliance is displayed in the LCD marked "PV" and the setpoint is displayed in the LCD marked "SV." The setpoint can be adjusted using the up and down arrow buttons. The other two buttons are not used in normal operation.

On/Off Switch – This switch supplies power to all components in the control box and in the burner box.

Thermocouple – This sensor is responsible for the temperature readings displayed on the digital readouts on the box's cover.

Manual Controls

Function

The large black power cord supplies 120 Vac to the control box. When the switch is turned to on, 120 Vac is fed back to the burner and the temperature readout powers on. Using the knob on the front cover of the box, the user can control the firing rate of the burner. This information is encoded in a 4-20 mA signal, which is fed through the smaller gray cable into the burner box. The current temperature is displayed on the temperature readout.

Components

Temperature Readout – This displays the temperature read by the thermocouple. Buttons on the face of the readout are for configuration purposes and are not used in normal operation.

Control knob – This knob adjusts the firing rate of the burner. The highest firing rate is achieved when the knob is in the detent, or stop, position with the line on the knob pointing up. The lowest firing rate corresponds to the point half a turn away from high fire with the line on the knob pointing down. Points in between these two extremes yield firing rates between the high and low fire rate. It does not matter whether the knob is turned clockwise or counterclockwise. The firing rates achieved by turning it in one direction are the same as the firing rates that result from turning it to the same position the opposite direction.

DC power supply – This supplies power to the control knob and temperature readout. It accepts line voltage as an input at the terminals marked “L,” “N,” and “FG.” It outputs 24 volts DC at the terminals marked “-V” and “+V.”

On/Off Switch – This switch supplies power to all components in the control box and in the burner box.

Thermocouple – This sensor is responsible for the temperature readings displayed on the digital readouts on the box’s cover.