Refrigeration Control

Wire Harness:

1. Measure the distance between the controller and evaporator to account for the extra length necessary to properly route conduit.
2. Determine the number of wires to go to the controller.
    a) Controller power (3 wires)
    b) Fan control (2 wires)
    c) Defrost (heater) control (2 wires)
    d) Liquid line solenoid (2 wires)
    e) Alarm relay (2 wires)

Note: Install in accordance with local wiring codes. Small Box Energy does not accept responsibility for incorrect or unsafe wiring.

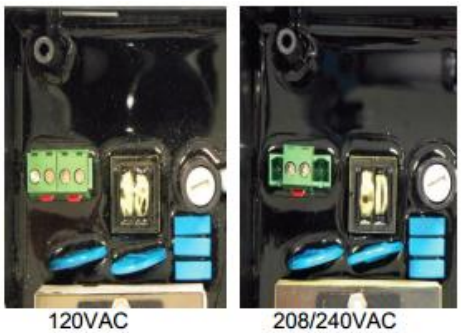
3. Cut wires to length. Once the number of wire is determined, cut the wires to length. The wire should be long enough to account for the necessary connections In the controller and evaporator. Using different colored wires, (blue - fan, orange - heaters, yellow - Solenoid, purple - alarm) will simplify the installation and troubleshooting. If only a single color is available, both ends of the wires should be labeled with a matching number. This will save time when wiring the evaporator.

Connecting the Conduit:

Feed the wires through the conduit. The conduit connectors can be added at this time. Determine if straight or 90 degree connector is most appropriate for the installation, and attach to the conduit. Securely connect one end of the conduit to the controller.

Wiring the Controller:

Locate the second Voltage Jumper in the accessory kit. It is a 2 position plug with red jumper already installed. Plug 1 jumper on the center 2 pins for 208-240V power and 2 jumpers on the outer 2 pins for 120V power**. Power is not connected to Voltage Selector, it is a selector only.** Power for the controller is connected to the **Power In** location using a 3 position connector.

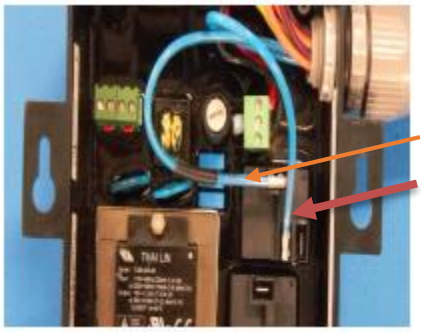


120VAC 208/240VAC

Controller Power:

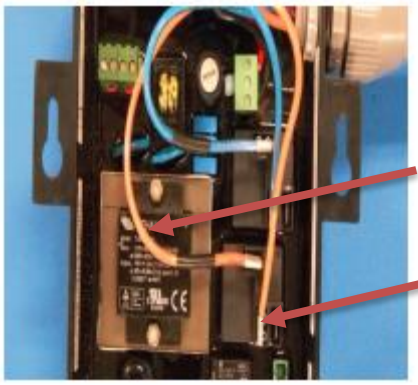
1. Strip the end of the wires used to provide power to the controller.
2. Locate a 3 position terminal in the accessories kit.
3. Fasten to the 3 position pluggable connector.
4. Plug into the board as indicated in Wiring Schematic.
5. All terminal screws should be tightened to 5 ft-lbs.

Fan Relay:



1. Interrupt the power to the fans, bring line/load into the controller
2. Strip the end of the 2 wires used for fan control.
3. Locate 2 female spade connectors in the accessories kit.
4. Crimp on the female spade connectors.
5. Plug the connectors to the COM and NO positions of the Fan Relay.
6. Confirm combined fan motor load is not over 10 amps

Defrost (Heater) Relay:



1. Interrupt the power to the Heat Strips, bring line/load into the controller
2. Strip the end of the 2 wires used for the defrost control.
3. Locate the remaining 2 female spade connectors in the accessories kit.
4. Crimp on the female connectors.
5. Plug the connectors to the COM and NO positions of the Defrost Relay.
6. Confirm combined heater load is not over 20 amps.

Liquid line solenoid /Compressor Relay:

1. Remove the two wires connected to the mechanical thermostat, bring into controller
2. Strip approximately 1/4” of wire insulation on the end of the 2 wires they will be used for the liquid line solenoid
3. Locate a 3 position connector from the accessories kit.
4. Fasten the wires to the screw terminals.
5. Plug into the location as indicated in Wiring Schematic.

Safety Cover:

1. Once all of the high voltage wiring is complete, install the metal cover on the controller.
2. Locate the cover and 3 small screws from the accessories kit.
3. Position the cover over the 3 mounting posts.
4. Using the 2 course threaded screws attach the controller to the plastic posts.
5. Use the fine threaded machine screw with lock washer to fasten the controller to the metal post.

Preparing the Evaporator:

The evaporator wiring will require access to the high voltage terminal block on the coil.

1. Turn off power to the system.
2. Verify power is no longer present using a multimeter.

Evaporator Wiring:

Now that the conduit is prepared, it can be connected to the evaporator.

1. Locate the proper sized knockout and carefully remove knockout.
2. Connect conduit to the evaporator

A. Study the existing wiring.

1. Determine the location of the following: incoming power, fan leads, heater leads, defrost termination leads, and fan delay leads.

B. Controller

1. Strip the end of the wires used to power the controller.
2. Attach to the line power to provide continuous power to the controller.
3. Attach ground wire.

Note: Ground is required for the internal safe ties to operate properly.

C. Fans

1. Strip the ends of the wires (connected to the KE2 Evap) used to control the evaporator fans.
2. The fan wires can be attached to the terminal block using either screw down terminals or spade Connectors.
3. Attach one of wires to the L1/Line. This wire will be connected to COM of fan relay on the controller.
4. Attach the wire connected to the NO terminal on the Fan Relay to one of the fan leads.
5. Connect L2/Neutral to remaining fan lead.

D. Heater

1. Strip the ends of the wires being used for heater control.
2. The heater wires can be attached to the terminal block using either screw down terminals or spade connectors.

E. Liquid Line Solenoid /Compressor

1. Strip the ends selected to control the liquid line solenoid.
2. Attach the wire from the NO terminal on the L.L. Solenoid/Compressor relay to one of the solenoid leads.
3. Attach the wire from the COM on the L.L. Solenoid/Compressor relay to the L1/Line voltage.
4. Connect L2/Neutral to the remaining L.L. Solenoid/Compressor lead.

F. Defrost Termination

1. Attach one of wires to the L1/Line. This wire will be connected to COM of defrost relay on the controller.
2. Attach the wire connected to the NO terminal on the Defrost Relay to one of the defrost leads.
3. Connect L2/ to the remaining defrost lead.

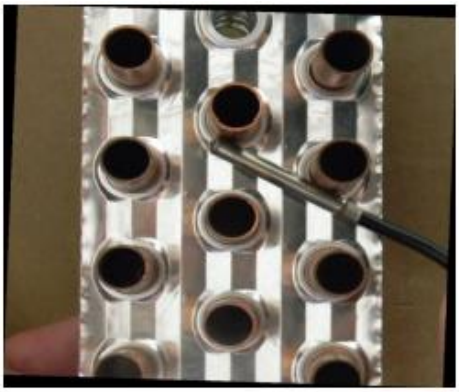
Air Sensor Bracket**:**

1. Install the Air Temperature Sensor using the Stainless Steel self-piercing screw and bracket from the accessory kit.
2. The end with the single loop is designed to be mounted with the screw included.
3. The end with multiple loops is designed to hold the sensor.
4. Locate the best place to install the sensor.
5. The sensor should be located between 6 and 12 inches away from the face of the evaporator. This distance prevents the sensor from sensing heat from the heating elements during the defrost cycle, but close enough to accurately sense the return air temperature. The sensor bracket may be bent as necessary to locate the sensor in the proper position.

WARNING!

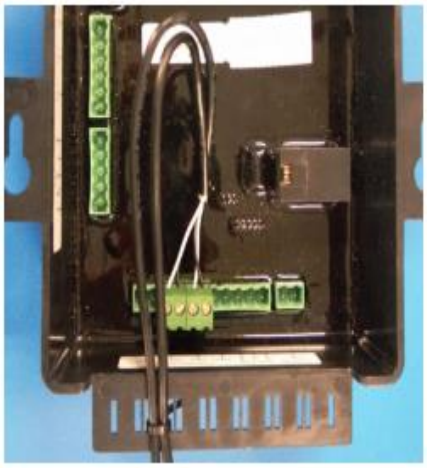
Do not allow the metal portion of the air sensor to touch anything other than air. It should not touch the bracket, nylon cable tie, or any other solid surface.

Connecting the Coil Temp Sensor:



Insert the sensor probe approximately 1/16” deeper than the stainless shielding of the probe in the fins. Pinch the two fins gently together to secure the sensor in place. This provides the thermal ballast to ensure a complete defrost every time. The refrigerant in the circuits cools the circuit tubes, the circuit tubes cool the fin sheets, and the fins make the air cold; in that order. Frost typically forms and builds in the greatest volume at the coldest spot of the evaporator. This location in detail is near the piercing/extrusion of fin sheets for the circuit tubes; this is where the coil temperature sensor should be laced.

It is important to touch two circuit tubes. When inserting the sensor into the coil, the tip should touch one of the circuit tubes. This location provides an appropriate location for the sensor.

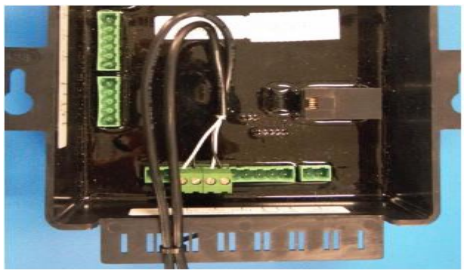


Connecting Sensors to the Controller:

The temperature sensors are designed to be attached to the controller using 2 position screw terminals.

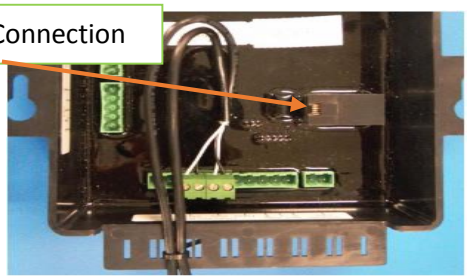
1. Using a connector from the accessory kit, attach the sensor to the screw terminal. The sensors are not polarized, so wire location does not affect sensor performance.
2. Connect all sensors to a screw terminal.

3. Once connected, the sensors should be plugged into the proper location on the controller. The location can be determined from the label on the interior wall of the enclosure or from the wiring.



Strain Relief:

The enclosure has been designed with a strain relief bar to prevent the sensor wires from becoming unplugged from inadvertent contact. Before securing the sensor wires, create a service loop using a cable tie from the accessory kit; securely fasten the sensor wires to the strain relief bar.



Ethernet Connection

Run and connect an Ethernet cable from the controller to the supplied Gateway

Mounting the Controller:

Once the wiring has been run to the controller location, the controller can be connected. When installing the KE2 Evaporator Efficiency, the (4) screws supplied in the kit may be preinstalled in the mounting surface. The controller has keyholes in each mounting tab to allow the controller to be installed over the screws.