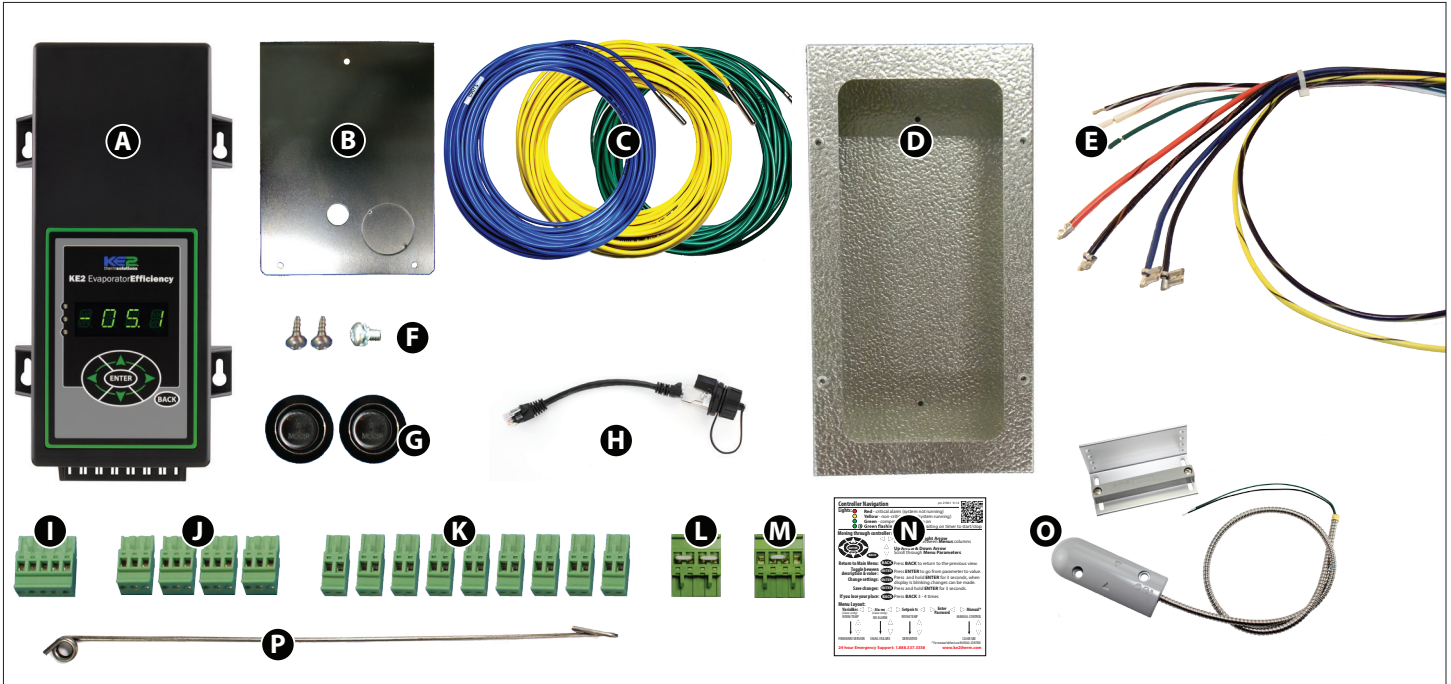




KE2 Evap for Rack Efficiency (PN 21096) Quick Start Guide

This reference should remain on site with the installed KE2 Evap for Rack Efficiency controller.



Parts List

The following parts are included in the KE2 Evap for Rack Efficiency (KE2 Evap-RE) controller kit:

■ Kit #21096

- A** (1) KE2 Evap-RE 120/208-240 VAC controller
- B** (1) high voltage safety shield
- C** (3) 15' colored temperature sensors
- D** (1) mounting box
- E** (1) 10' wire harness
- F** (2) course thread screws (1) fine thread machine screw with lock washer
- G** (2) 1/2" plastic knockout plugs
- H** (1) Ethernet adaptor kit
- I** (1) 5-position screw down terminal (for step motor valve)
- J** (4) 3-position screw down terminals (for power in, transducer and 3A relay)
- K** (9) 2-position screw down terminals (for sensors and digital input, analog output)
- L** (1) 120 Voltage jumper
- M** (1) 208-240V Voltage jumper (already on back of KE2 Evap-RE)
- N** (1) KE2 Evap-RE Navigation sticker
- O** (1) door switch
- P** (1) air sensor mount

Supplies List

The KE2 Evap-RE is supplied with all of the accessories required for the controller to work, however, standard truck stock items will also be required to install the controller. To simplify the installation, a list of items is provided.

- Conduit to go between the controller and the evaporator
- (2) Conduit connectors (straight or elbow as required)
- (2) High voltage wires matched to the load of AUX relay.
- Wire labeling (numbers, colors, etc.)
- Additional wire ties
- 18 gauge twisted shielded pair (if extending sensor wires)
- Foam insulation if running wires outside the space.
- Silicone (for sealing any box penetrations)



KE2 Evap for Rack Efficiency

Quick Start Guide

Arriving at the Jobsite

When arriving at any jobsite, it is good practice to verify the correct operation of the system. Even systems running for a considerable amount of time without requiring a service call may not be running properly.

Inspect the coil to see the current frost pattern. If the unit has not recently performed a defrost, look for the heaviest area of frost. This will be used to locate the coil sensor.

Installers should account for a full system diagnostic in the installation estimate for the controller.

Although it may seem unnecessary, identifying system issues before the controller is installed will save time overall. It will also allow the controller to provide the highest energy savings.

Verify the system is running correctly. Taking several measurements will help determine the current health of the system. Using the diagram below, fill in the necessary information.

Two of the most critical indicators of system health are the superheat and subcooling.

Superheat - Superheat is the most overlooked inefficiency in existing systems. Typically the superheat on a TEV is set when there is not product in the controlled space, if it is set at all.

When applying the controller to an existing system with a mechanical expansion valve, the superheat should be between 6-8 degrees

for low temperature applications and 8-10 degrees for medium temperature.

Subcooling - There should be a solid column of liquid at the inlet of the valve. This can be verified by looking at the sight glass, however, the proper method requires measuring the subcooling of the liquid entering the valve.

Verify Temperature Difference

A typical Temperature Difference (TD) between the coil temperature and the air temperature is between 5 and 15°F. An insufficient TD, between the coil and air temperature, indicates a system issue that needs to be addressed before installing the KE2 Evap-RE.

Understanding Frost

The air exiting side of the evaporator is often the coldest spot on the coil due to the load effecting the temperature. As air travels through the fins of the evaporator, the Relative Humidity will reach 100%. Moisture will begin to drop out of the air and deposit on the coil surfaces to form frost. Although frost typically has a negative connotation when discussed in refrigeration, initial frost formation has a positive effect. Some may even say "frost is our friend." It is not uncommon to see a small amount of frost on the coils that have KE2 Evap-RE controllers installed. The KE2 Evap-RE is continually measuring, monitoring, and managing the frost to assist in maximum energy efficiency. When the efficiency of the coil is reduced due to excessive frost, the KE2 Evap-RE will initiate a defrost.

Trouble Shooting Diagram

Refrigerant _____

Suction Pressure _____ PSI

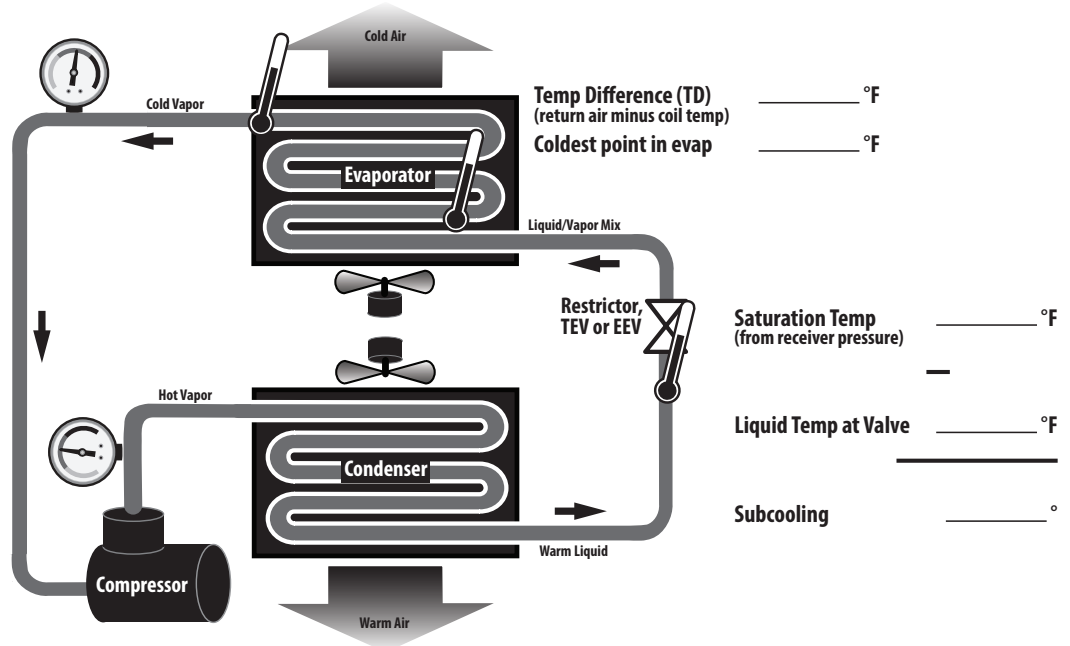
Suction Temp (evaporator outlet) _____ °F

Saturation Temp (calculated from Suct. Pressure) _____ °F

Superheat _____ °

Discharge Pressure _____ PSI

AMPS _____




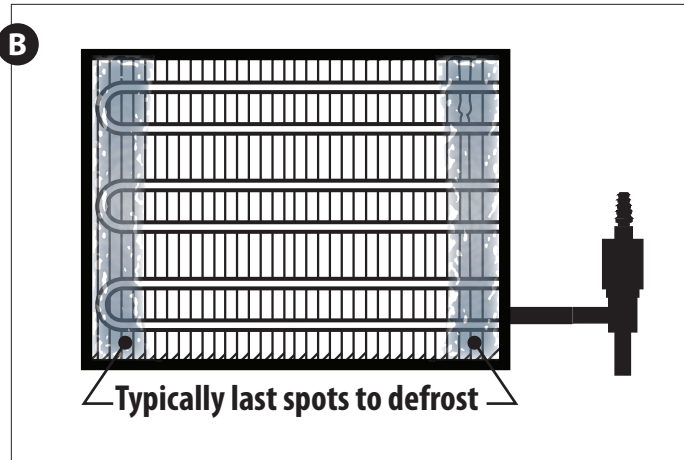


KE2 Evap for Rack Efficiency Quick Start Guide

IMPORTANT Preliminary Steps Determine the coil sensor location

- A** To determine the most appropriate sensor location, when arriving on site, put the system into defrost.
- B** The location where frost is last to disappear is where the coil sensor should be placed. Monitor both the air entering side, as well as the air exiting side, of the evaporator coil. Don't be surprised if the last place for frost to disappear is on the air exiting side. It is usually near the right or left end of the coil.

 It is important to verify all heating elements are working properly.



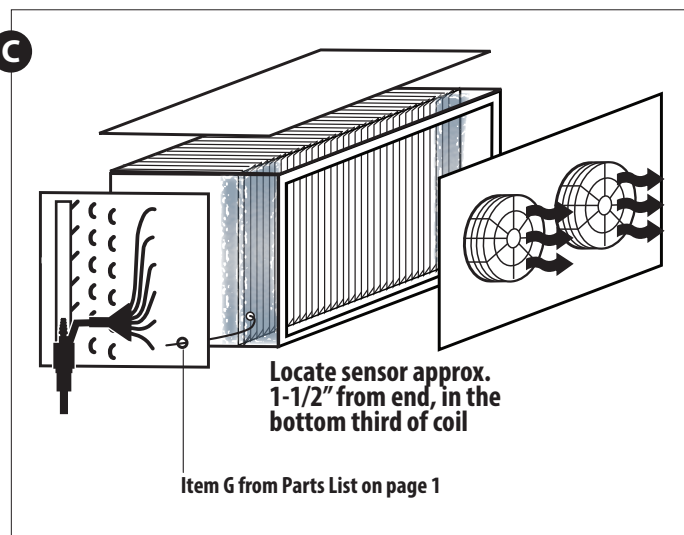
- C** More often than not on coils, the location of the sensor is a short distance from the end, approximately 1 to 1-1/2" away from the right and left edges of the active coil surface. The ice tends to grow from these edges towards the center. Therefore, the sensor location is best situated approximately 1 to 1-1/2" from the outer edges and typically near the bottom 1/3rd portion of the evaporator. The sensor needs to be as far away from the defrost heat sources as possible.

This is most easily located by viewing the current frost pattern. The last place frost disappears during the defrost cycle is the correct sensor location.

Note: Insert plug (Item G from parts list) into coil housing when mounting sensor wire to prevent damage to the sensor from sharp edges. Two plugs are provided. One plug should be inserted into the inner housing to access the coil, and the other into the outer housing to exit the coil. Installer must puncture plug to insert sensor.

As with any wiring installation, it is appropriate to leave a service loop. Enough wire should be left to move the sensor to the opposite end of the evaporator.

- D** Make note of the locations you have determined for placement of the coil sensors.





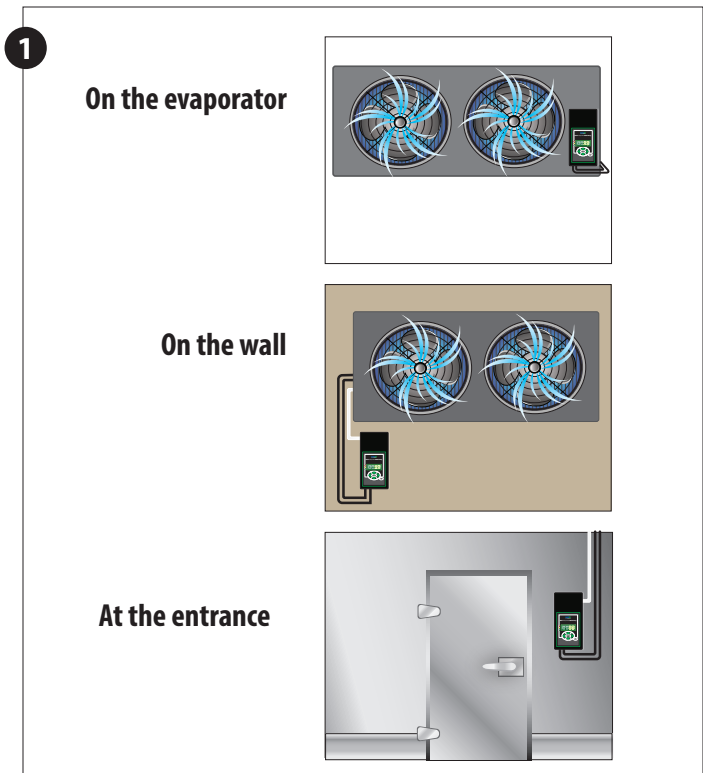
KE2 Evap for Rack Efficiency

Quick Start Guide

1 Determining Location

■ The controller is designed to be as versatile as possible. The location should be discussed with the end users to determine if they have a preference. It is designed so it can be installed inside or outside the controlled space.

■ The controller can also be located at the condenser, but should not be installed outdoors without an enclosure to protect it from sunlight and moisture (must be within operating range -40°F to 140°F)



2 Cut a length of conduit to go from the controller to the evaporator

■ Measure the distance between the controller and evaporator to account for the extra length necessary to properly route conduit.

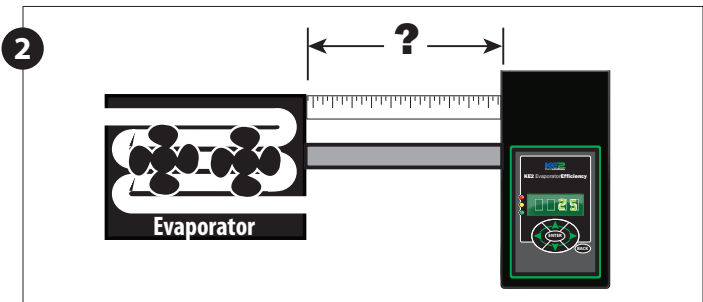
Determine the number of wires to go to the controller.

- Controller power (3 wires)
- Fan control (2 wires)
- Defrost (heater) control (2 wires)
- Liquid line solenoid (2 wires)

If the Aux Relay is used, the installer will need to supply an additional pair of wires to the controller

- Aux relay (2 wires)

Note: Install in accordance with local wiring codes. KE2 Therm does not accept responsibility for incorrect or unsafe wiring.

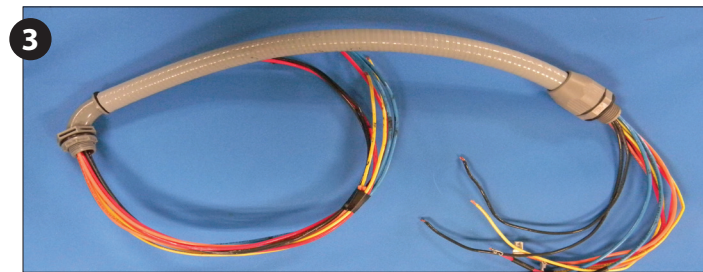


3 Cut wires to length

■ Once the number of wires is determined, cut the wires to length.

■ The wire should be long enough to account for the necessary connections in the controller and evaporator.

■ Use the included KE2 Wire Harness (blue - fan, orange - heaters, yellow - solenoid, purple - alarm). This 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.



Determine the current draw of the unit.

■ In rack applications, it is most common for the KE2 Evap-RE to pilot contactors. Contactors are required for applications using 3-phase power, or are in excess of the onboard relay ratings. Care should be taken to ensure the controller is being properly applied. Failure to match the load to the relay, or contactor, may result damage the controller.

MODEL NO.	SERIAL NO.			
QTY	HP	VOLTS	PH	HZ
1	1/20	208-230	1	60
MOTOR CIRCUIT	AMPS EA	MIN CKT AMPS	MAX OVRVRT PROT	
	1.0	15	20	
HEATER CIRCUIT	VOLTS	PH	AMPS	
	230	1	4.6	
REFRIG & M	REFRIG TYPE	REFRIG WGT	OIL TYPE	

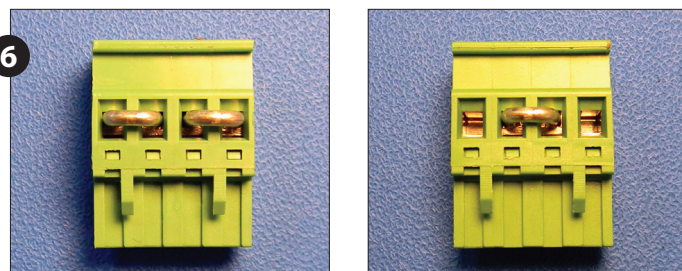
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Quick Start Guide

- 5 Preparing conduit**
- Feed the wires through the conduit.
 - The conduit connectors can be added at this time. Determine if a 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.

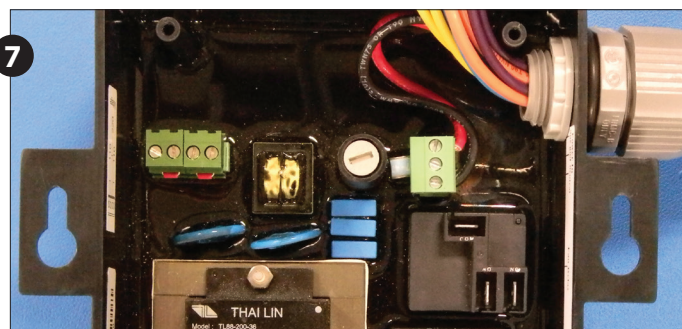


- 6 Wiring the controller**
- Locate the second Voltage Jumper in the accessory kit.
 - It is a 4 position plug with 2 jumpers already installed.
 - Use the plug with 1 jumper for 208-240V power or the plug with 2 jumpers for 120V power.
 - **Power is not connected to Voltage selector, it is a selector only.**
 - Power for the controller is connected to the **Power In** location using a 3 position connector.

⚠ Controller still illuminates display when 120V is applied with 208-240V selected, however controller will not function properly.



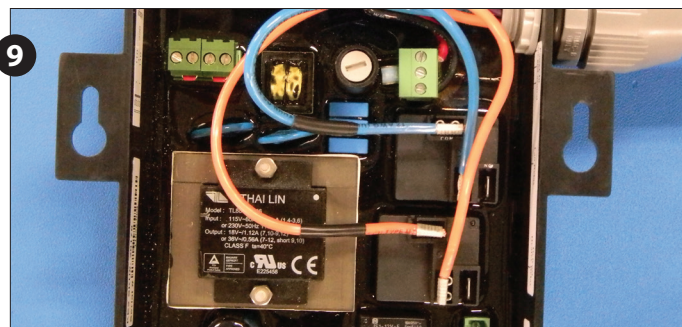
- 7 Controller Power**
- Remove the insulation from the pre-stripped end of the wire.
 - Locate a 3 position terminal in the accessories kit.
 - Fasten to the 3 position pluggable connector*.
 - Plug into the board as indicated in Wiring Schematic.
 - *All terminal screws should be tightened to 5 ft-lbs.



- 8 Fan Relay**
- **The blue wires are used for fan control.**
 - They are blue with a black stripe, and the black with a blue stripe.
 - Plug the black with a blue stripe to the COM terminal.
 - Plug the blue with a black stripe to the NO position of the Fan Relay
- Confirm combined fan motor load is not over 10 amps



- 9 Defrost (Heater) Relay**
- **The orange wires are used for the heater control.**
 - Locate the orange with black stripe, and black with orange stripe.
 - Plug the black with orange stripe to the COM terminal.
 - Plug the orange w. black stripe to the NO position of Defrost Relay.
- Confirm combined heater load is not over 20 amps.

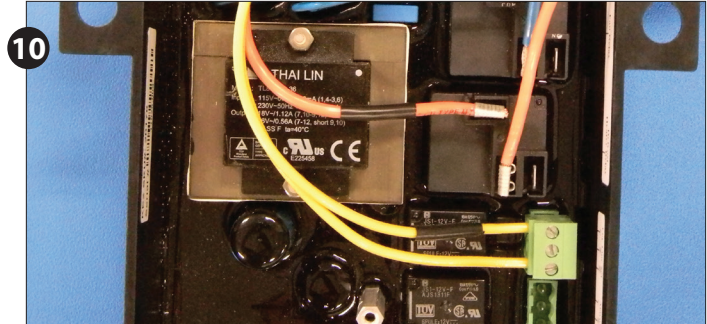




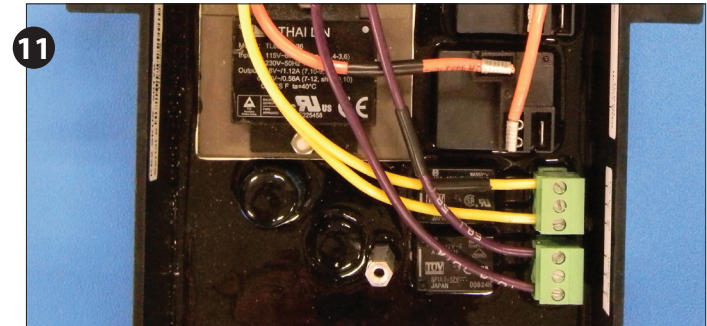
KE2 Evap for Rack Efficiency

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- 10 Liquid Line Solenoid /Compressor Relay**
- The yellow wires are used for Liquid Line Solenoid control.
 - Locate a 3-position connector from the accessories kit.
 - Fasten the black with yellow stripe to the fused lead.
 - Fasten yellow w. black stripe from the LLS to NO terminal position.
 - Plug into the location as indicated in Wiring Schematic.
- Max relay rating is 3A.



- 11 Auxiliary Relay**
- If using the Auxiliary Relay, the installer will need to supply an additional pair of wires to the controller.
 - Strip approx. 1/4" wire insulation on end of the 2 wires for the alarm
 - Locate a 3-position connector from the accessories kit.
 - Plug into the location as indicated in Wiring Schematic.



- !** Max relay rating is 3A.
- Note:** Before installing the safety cover, plug in any remaining connectors to store for future use.

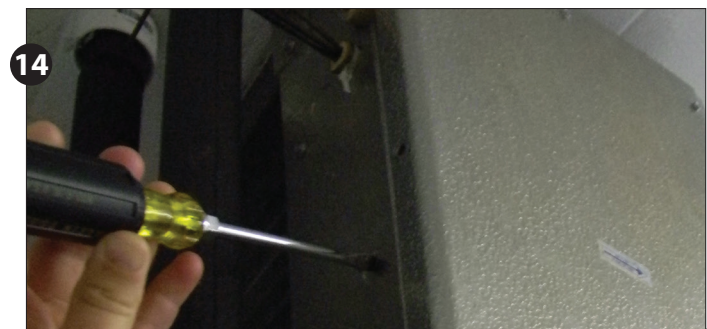
- 12 Install Safety cover**
- Once all of the high voltage wiring is complete, install the metal cover on the controller.
 - Locate the cover and 3 small screws from the accessories kit.
 - Position the cover over the 3 mounting posts.
 - Using 2 course thread screws attach controller to the plastic posts.
 - Use the fine threaded machine screw with lock washer to fasten the controller to the metal post.
- Set the controller in a safe place.**



- 13 Preparing the Evaporator**
- The evaporator wiring will require access to the high voltage terminal block on the coil.
 - Turn off power to the system.
 - Verify power is no longer present using a multimeter.



- 14 Evaporator wiring**
- Now that the conduit is prepared, it can be connected to the evaporator.
 - Locate the proper sized knockout and carefully remove knockout.
 - Connect conduit to the evaporator





KE2 Evap for Rack Efficiency Quick Start Guide

Study the existing wiring.

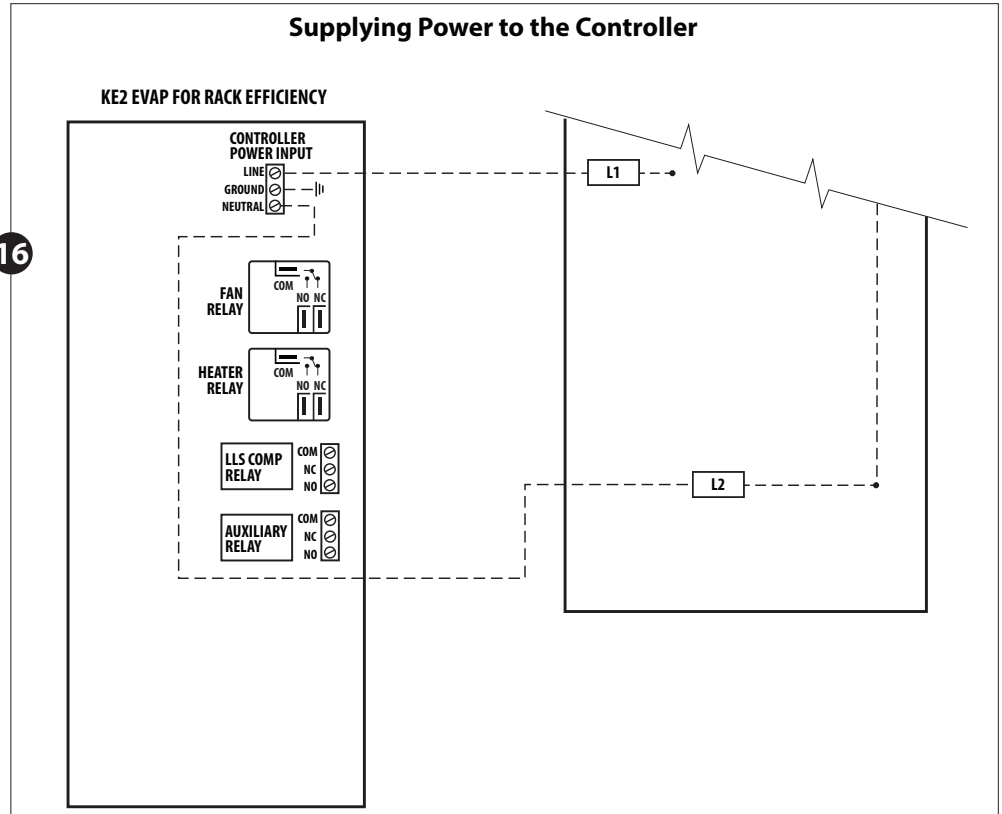
- 15** ■ Determine the location of the following: incoming power, fan leads, heater leads, defrost termination leads, and fan delay leads.

Evaporator wiring – Controller

- 16** ■ Strip the end of the wires used to power the controller.

- Attach to the line power to provide continuous power to the controller.
- Attach ground wire.

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



Evaporator wiring – Fans

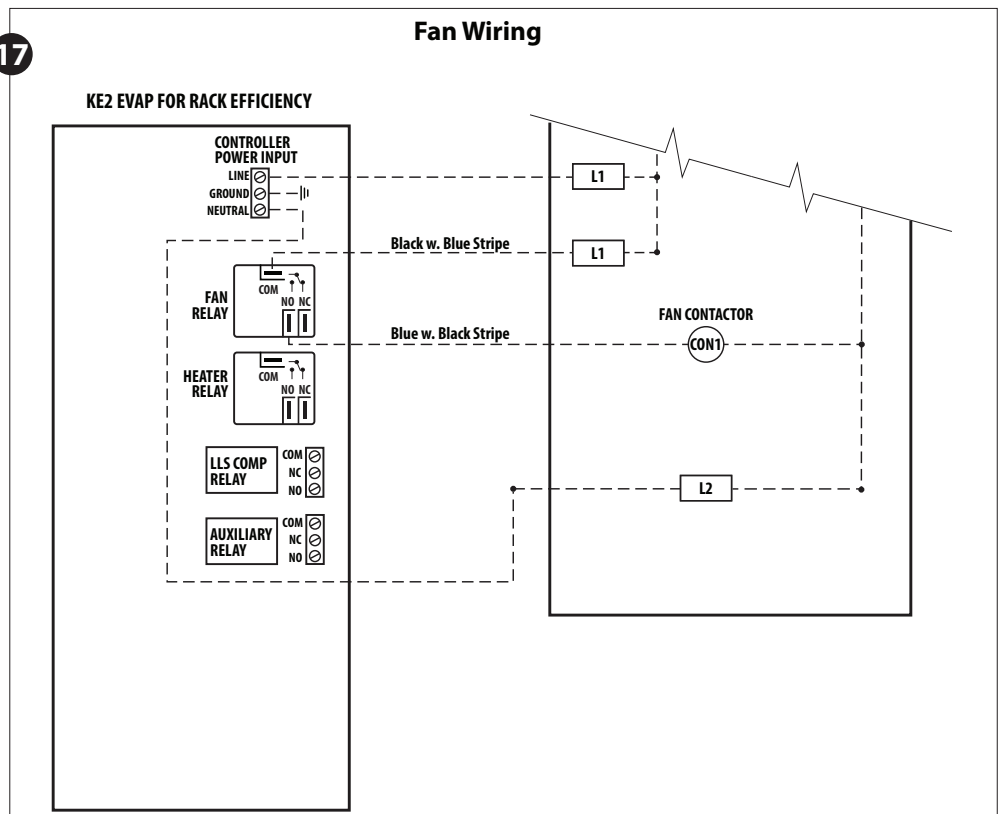
- 17** ■ Strip the ends of the wires (connected to the KE2 Evap-RE) used to control the evaporator fans.

■ The fan wires can be attached to the contactor using spade connectors.

■ Attach one of wires to the L1/Line. This wire will be connected to COM of fan relay on the controller.

■ Attach the wire connected to the NO terminal on the Fan Relay to one of the fan contactor.

■ Connect L2/Neutral to remaining fan contactor terminal.

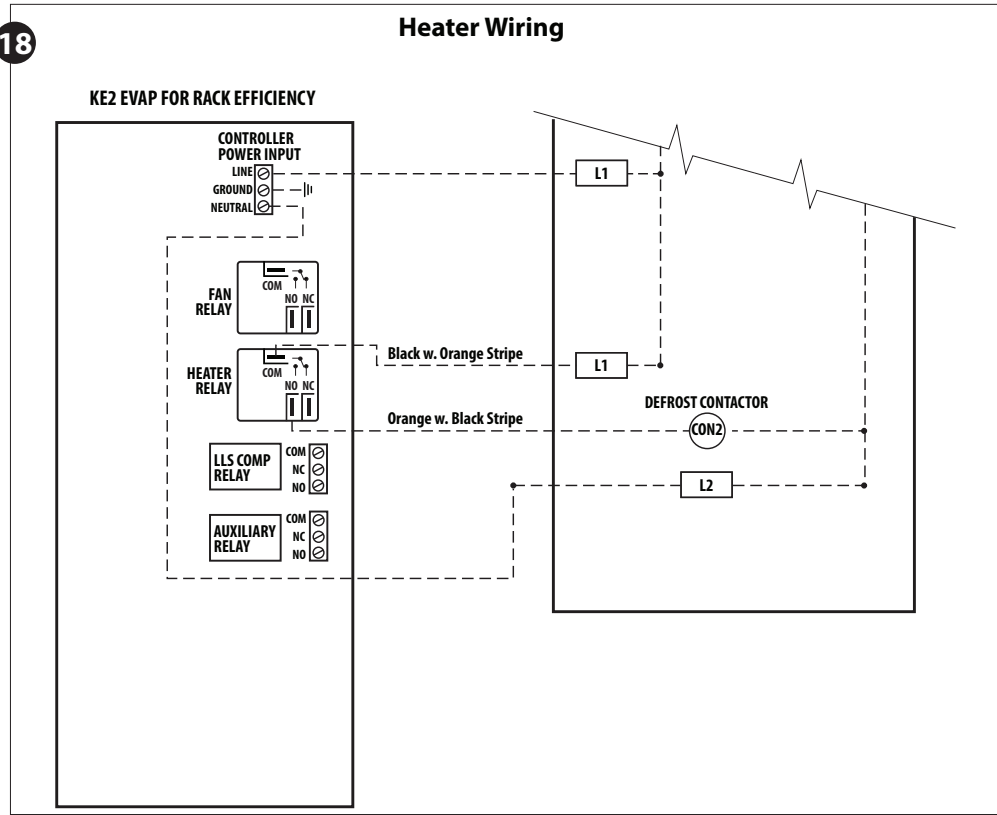




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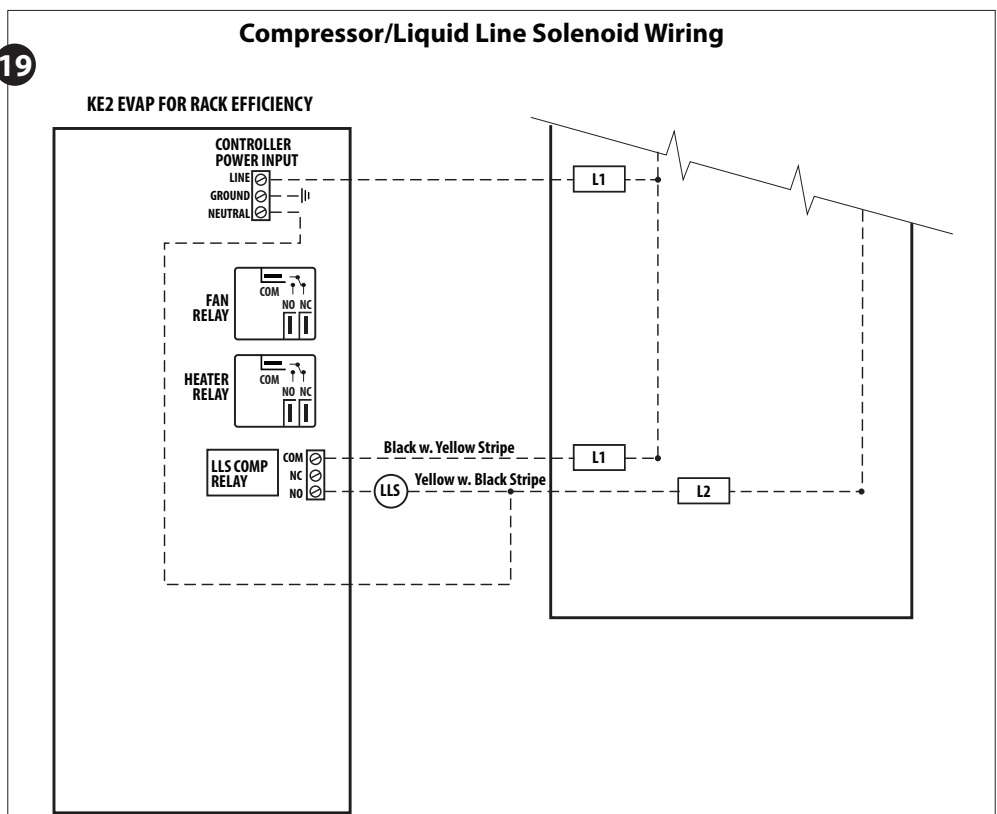
Evaporator wiring – Heater

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

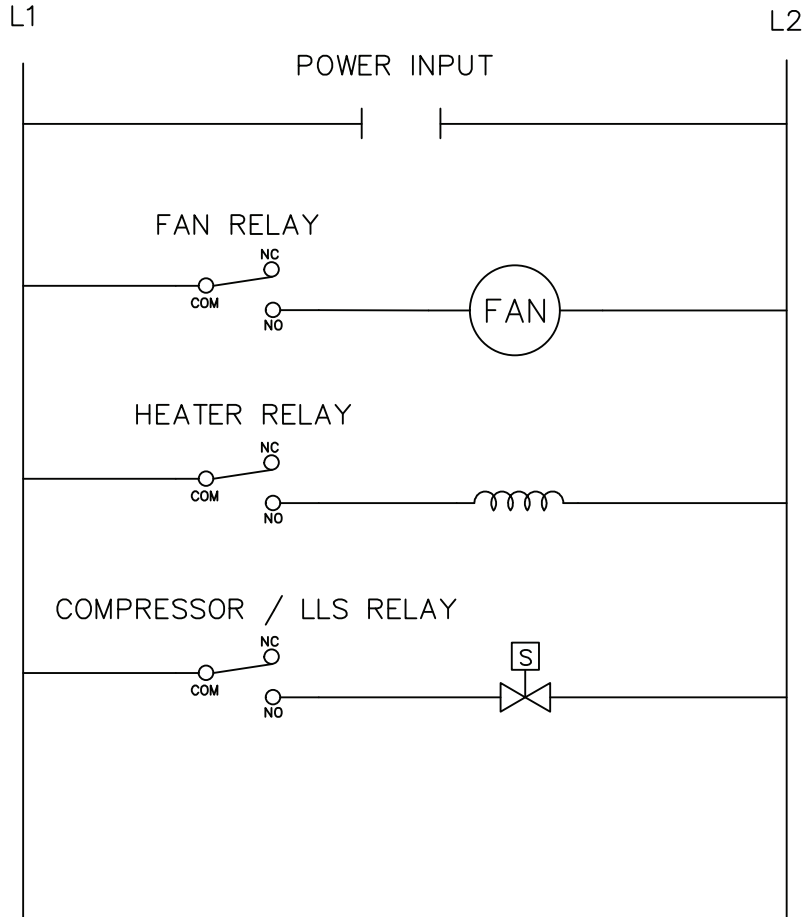


Evaporator wiring – Liquid Line Solenoid /Compressor

- 19** ■ Strip the ends selected to control the liquid line solenoid.
- Attach the wire from the NO terminal on the L.L. Solenoid/Compressor relay to one of the solenoid leads. Attach the wire from the COM on the L.L. Solenoid/Compressor relay to the L1/Line Voltage.
- Connect L2/Neutral to the remaining L.L. Solenoid/Compressor lead.



Wiring Schematic - Controller New Installation

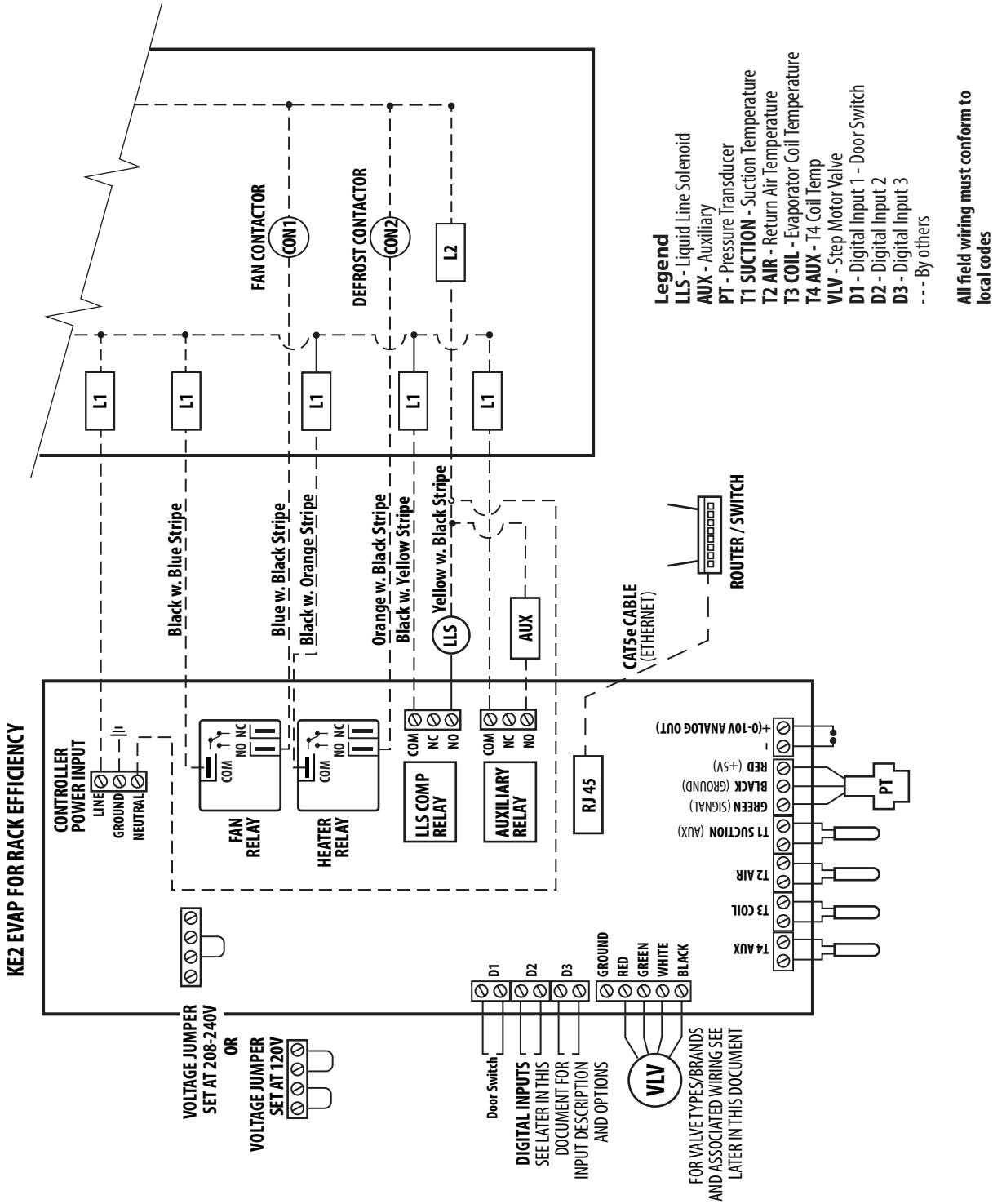




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Wiring Schematic - Controller with Contactor Box

Wiring Schematic - Controller with Contactor Box





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Evaporator wiring – Auxiliary

- 20** ■ The auxiliary relay is optional and wiring will vary depending on the auxiliary relay method selected.
- Depending on auxiliary relay location, an additional conduit may be required.
 - Strip the ends selected to control the auxiliary component.
 - Break the hot leg of the auxiliary component.
 - Attach the wire from the NO terminal on the auxiliary relay to one of the auxiliary component leads. Attach the wire from the COM on the auxiliary component relay to the L1/Line Voltage.
 - Connect L2/Neutral to the remaining auxiliary component lead.
 - Route and secure the conduit to the location the controller is to be installed.
 - Wiring must follow local wiring codes.

Installing the sensors

- 21** ■ Although not required, sensors should be labeled with their function. This will eliminate confusion when connecting the sensors to the controller.

Air Sensor Bracket

- 22** ■ Install the Air Temperature Sensor using the Stainless Steel air sensor mount from the accessory kit.
- The end with the single loop is designed to be mounted with the screw included.
 - The end with multiple loops is designed to hold the sensor.
 - Locate the best place to install the sensor.
 - The sensor should be located between 8 - 10 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.

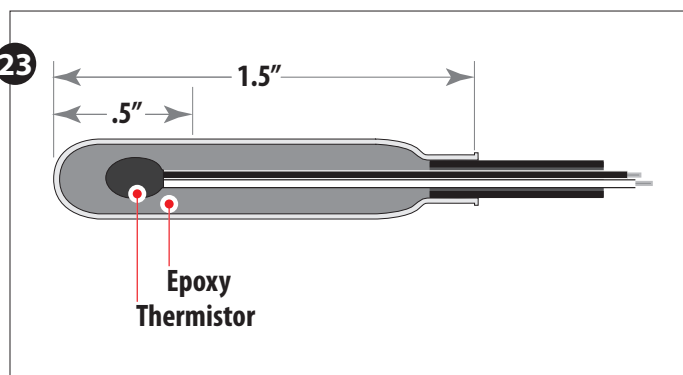
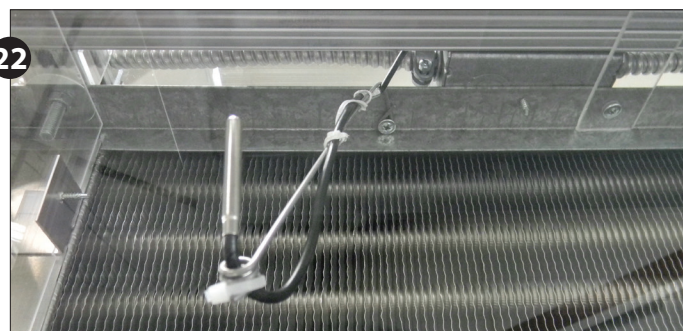
Coil Sensor

■ The coil sensor location is of the utmost importance for the proper operation of the controller. It is essential that the sensor is in the coldest location on the coil at the end of the defrost cycle, to ensure a complete defrost. See preliminary steps A-D on page 3 to determine the coldest location on the coil.

Once you determine the proper sensor location, as described in preliminary steps A-D on page 3, the sensor can be installed.

Installing the Sensor Properly

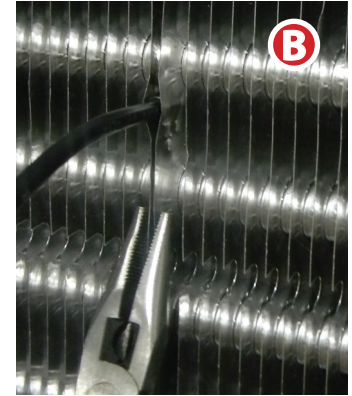
- 23** Note, the most active portion of the sensor is the first 1/2" of the 1-1/2" long stainless steel probe. Figures 25 and 26 show two methods for installing the sensor in the coil. The method shown in 25 will work in most applications, however in some cases inserting the sensor into the coil may position it too close to the defrost heat source. In these instances, the method shown in Figure 26 can be used.



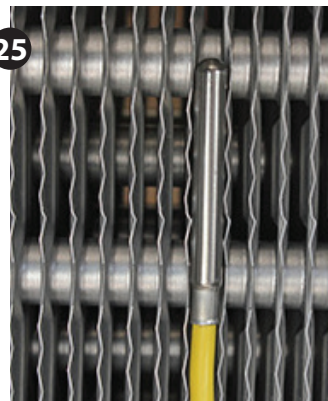


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24 **Figure 24A** shows the sensor touching two circuit tubes. When inserting the sensor into the coil, the tip should touch one of the circuit tubes. It should not be located adjacent to the electric heating elements. It should be about half the distance between the heaters if possible. In **Figure 24B** the probe is inserted into the fins approximately 1/16" deeper than the stainless shielding. Pinch the fins gently together, securing the sensor in place. This provides thermal ballast to ensure a complete defrost.



25 **Alternate method** - As the defrost termination sensor, it is important to ensure the sensor does not terminate defrost before all frost has been removed from the coil. In some installations, inserting the sensor into the coil may position it too close to the defrost heat source. An alternate method of positioning places the sensor vertically between the coil fins. This shows the coil sensor properly secured.



⚠ **Extending sensor wires**

- After the sensors are mounted, they are routed back to the controller. If the wires must be extended, use **18 gauge twisted shielded pair**. Maximum length for 18 gauge: 100ft.
- When running the wires back to the controller care must be taken to avoid interference being introduced into the sensor wires. Interference can be introduced when sensor wires are located near high voltage lines. High voltage is defined by Underwriter's Laboratories as above 30V. The higher voltage the more likely it is to introduce interference, and the more important to avoid.
- If crossing a high voltage line is necessary, the sensor wiring should be run at right angles to prevent noise.

26 **Connecting sensor wires to controller**

- The temperature sensors are designed to be attached to the controller using 2 position screw terminals. Using a connector from the accessory kit, attach the sensor to the screw terminal. The sensors are not polarized, so wire location does not effect sensor performance.
- Connect all sensors to a screw terminal.
- 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 Schematic.



Strain relief

- The enclosure is 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. Figure 27.
- Using a cable tie from the accessory kit, securely fasten the sensor wires to the strain relief bar.

Note: Unused connectors should be placed (installed) in their respective location for future use.

Controller Mounting

27

- Locate the mounting box in the accessories kit
- Mount the box in its permanent location.
- Place the controller on the mounting screws and tighten down the screws.



Final Step

28 ■ Leave the installation instructions onsite in a convenient location, where it can be easily located, for future service.



KE2 Evap for Rack Efficiency

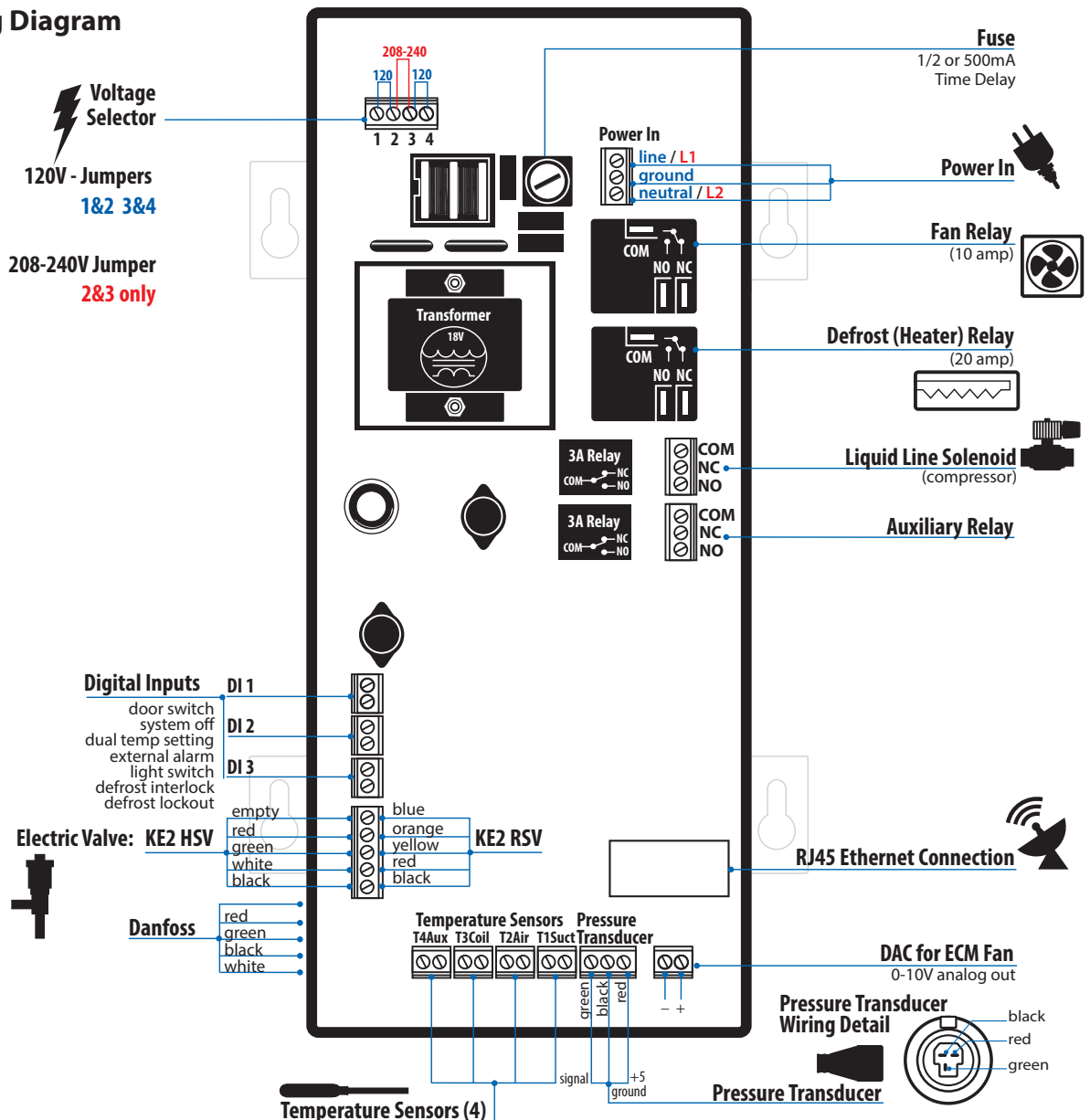
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Specifications

Controller	
Input Voltage:	120V or 208 - 240V
Ambient Temp:	-40° to 140°F
Operating Temp:	-40° to 140°F
Display:	4-digit alphanumeric LED
IP Rating:	IP65
Inputs:	(4) temperature sensors (1) pressure transducer (KE2 SKU 20204)
Valve Types:	unipolar and bipolar stepper motors (12V) (Beacon® is 21V)
Relays:	20A resistive (defrost) 10A inductive (evaporator fan) (2) 3A inductive rated cycles
Digital Input 1:	door contact, use 2nd air temp setpoint, disabled, system off, external alarm notification

Digital Input 2:	door contact, use 2nd air temp setpoint, disabled, system off, external alarm notification, defrost lockout, defrost interlock, defrost lockout quit defrost
Digital Input 3:	door contact, use 2nd air temp setpoint, disabled, system off, external alarm notification, lights
Communication:	Standard TCP/IP
Pressure Transducer - pn 20201 (10 ft lead) or pn 20204 (40 ft lead)	
Pressure Range:	0 to 150 psia
Proof Pressure:	450 psi
Burst Pressure:	1500 psi
Operating Temp:	-40° to 275°F
Temperature Sensor	
Sensor Specs:	-60° to 150°F moisture resistant package

Wiring Diagram





KE2 Evap for Rack Efficiency

Quick Start Guide

Table 1 - Controller Navigation - Menu Structure



Indicator lights:

- **Red light** - critical alarm (system off)
- **Yellow light** - non-critical alarm (system running)
- **Green light** - compressor on
- **Green flashing** - compressor waiting on timer to start/stop

To move through controller menus:

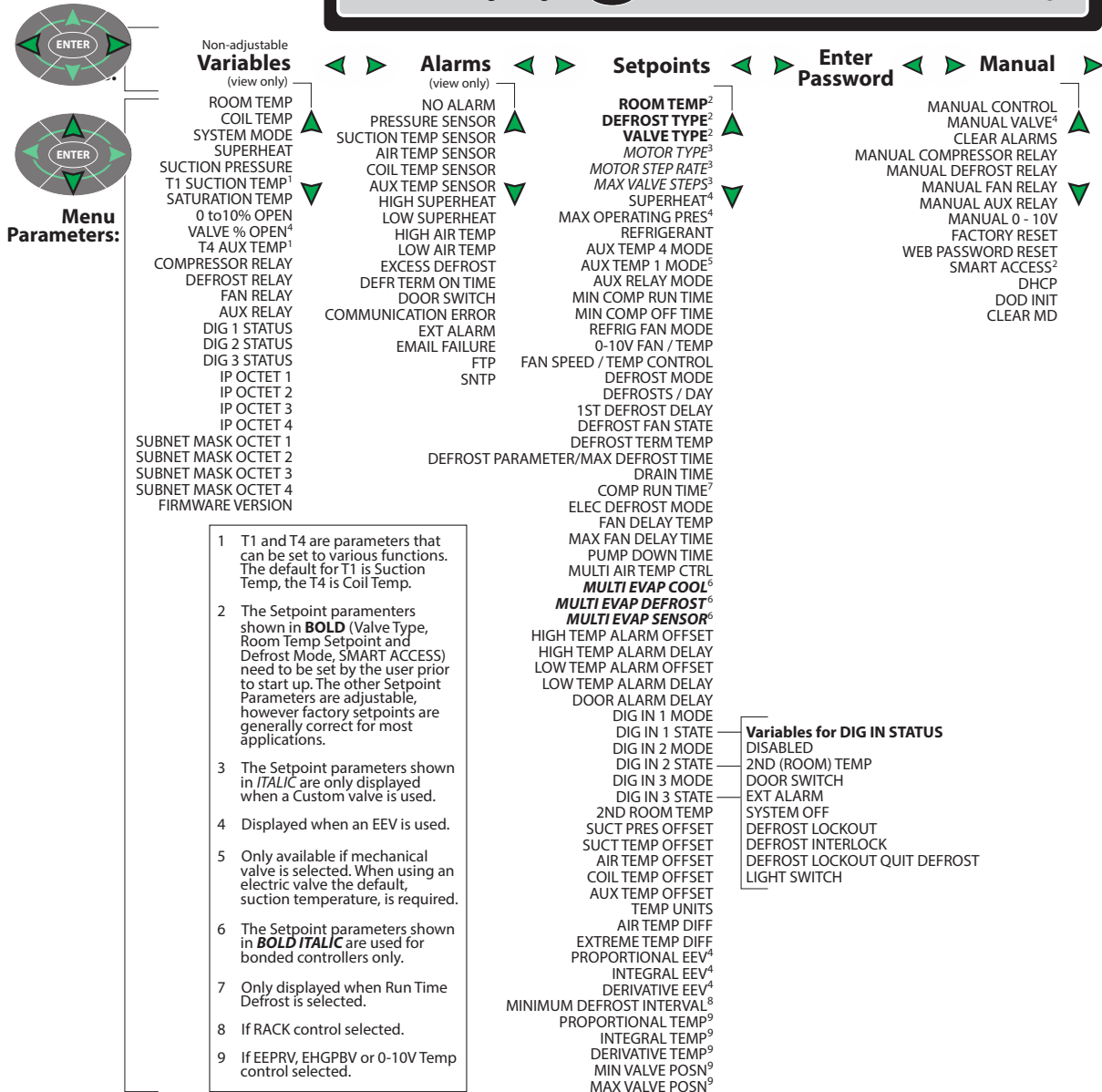
- Left and Right Arrows** Use to move between **Menus**
- Up Arrow and Down Arrow** Scroll through **Menu Parameters**

To return to Main Menu: **BACK** Press BACK to return to the previous view.

To toggle between description and value: **ENTER** Press ENTER to go from parameter to value.

To change settings: **ENTER** Press and hold ENTER for 3 seconds, when display begins blinking changes can be made

To save setting changes: **ENTER** Press and hold ENTER for 3 seconds to save change



User Interface

The KE2 Evap-RE's onboard user interface uses a familiar 6-button arrangement to simplify navigation through the controller's menus. The menu is grouped by category for each functional area. The user is not required to scroll through unrelated setpoints to access the desired function.

The **left** and **right arrows** move between the categories. When pressed while in a menu, the left and right arrows will move to the main screen or the adjacent menu.

The **up** and **down arrows** move the user through the available options for each group. All users are allowed access to the VARIABLES and ALARMS. All other information is password protected to prevent unauthorized access.

The **ENTER** button is used to save an input option that was changed. **ENTER must be held for 3 seconds to prevent accidental changes.** Changes can be discarded by waiting, to allow the controller to time-out and return to default screen, or pressing the **BACK** button.

The **BACK** button is used to return to the previous screen. Pressing the **BACK** button three times, at any time, will return the user to the default view. See **Table 1 Controller Navigation - Menu Structure.**

Controller Setup

When first applying power to the controller, it will initialize, then automatically enter the **Introduction Mode.** The Introduction Mode consists of as little as two options that must be configured for the KE2 Evap-RE to begin controlling the system. See **Table 2.**

First the user is asked to enter the **MODE OF CONTROL.** If one of the pre-programmed options is selected, then the only other step required is to select whether on not to enable **SMART ACCESS** to easily view the controller online.

If **CUSTOM** is selected then the desired **ROOM TEMP** is set. This is followed by the **DEFROST TYPE.** The controller is designed to work with electric, hot gas, and off-time defrosts. The last setpoint is the **VALVE TYPE.** The controller is defaulted to be used with a mechanical valve, but may be used with a variety of EEVs, including customer defined valves. Then the option to enable **SMART ACCESS.** These are the only setpoints required to begin controlling the system, when applied on a single evaporator with a mechanical valve.

If using a pre-defined EEV, the user is prompted to specify the **REFRIGERANT.** The KE2 Evap-RE may also be applied to custom, user defined EEVs. When this option is selected, the user will be prompted to select **MOTOR TYPE, MOTOR STEP RATE, and MAX VALVE STEPS.** Once these have been set, the KE2 Evap-RE will begin controlling the EEV and the system.

Adjusting Controller Parameters

The controller has the ability to access an abundance of information from the 4-digit alphanumeric display. However, the controller requires a password, adding a degree of protection from unwanted modifications. The controller will prompt the user for a **PASSWORD** when the user attempts to access and change **SETPOINTS.**

Table 1 shows the **Controller Navigation - Menu Structure.** The default display of the controller is the actual room temperature. By default, the controller allows access to the items in the **VARIABLES** and **ALARMS** menus. The **VARIABLES** consists of the current sensor readings and the relays' state. The **User Password (1111)** only provides access to the **ROOM TEMP** setpoint.

For the protection of the system, access to the **SETPOINTS** and **MANUAL** control menus require an **Installer Password (2222).** Pressing the right or left arrow will move from the **VARIABLES** menu to the next menu, shown in the **Table 1 Controller Navigation - Menu Structure** on page 14. A complete list of parameters, and their descriptions are shown in **Table 3.**

Pressing the **BACK** key at any time will return the user to next level up the menu. A second press will either return to the **MAIN MENU** or to the room temperature reading.

Table 2 - Introduction Modes

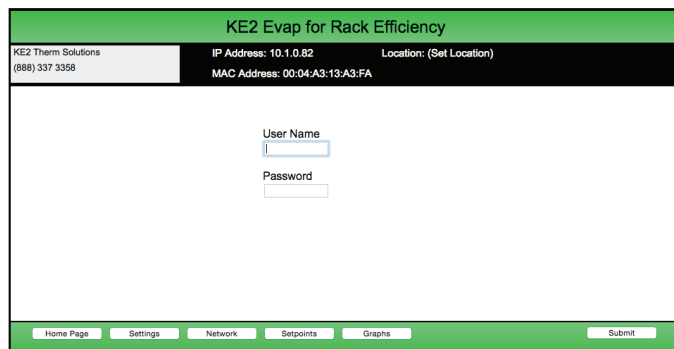
SELECT CONTROL MODE			
PRE-PROGRAMMED	CUSTOM		
Standard w. Electric Standard w. Air Rack w. Electric Rack w. Air	Mechanical Valve TEV	Defined EEV	Custom EEV
Smart Access	Room Temp	Room Temp	Room Temp
	Defrost Type	Defrost Type	Defrost Type
	Valve Type	Valve Type	Valve Type
	Smart Access	Refrigerant	Refrigerant
		Smart Access	Motor Type (Unipolar/Bipolar)
			Motor Step Rate
			Max Valve Steps
			Smart Access

Web Login

When accessing the controller using the webpage, the Username and Password are required.

DEFAULTS ARE: **User:** ke2admin **Password:** ke2admin

IMPORTANT: The Password should be changed from the default for security purposes.





KE2 Evap for Rack Efficiency Quick Start Guide

Introduction to Smart Access

Smart Access provides quick and easy, real time access to your refrigeration systems 24/7

The KE2 Evap-RE controller is Internet accessible, and now it is easier than ever to monitor and adjust your KE2 Evap-RE remotely, with Smart Access.

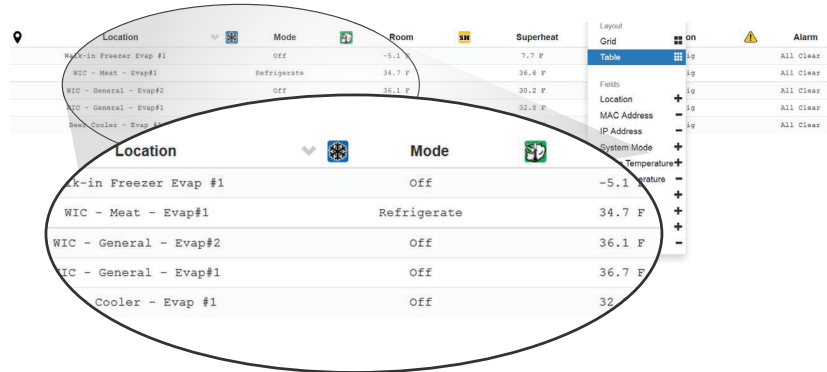
Smart Access doesn't require port forwarding or establishing a

vpn. All the KE2 Evap-RE needs is a physical connection to the network router with a cat 5 cable. Smart Access will automatically connect to your personal web portal.

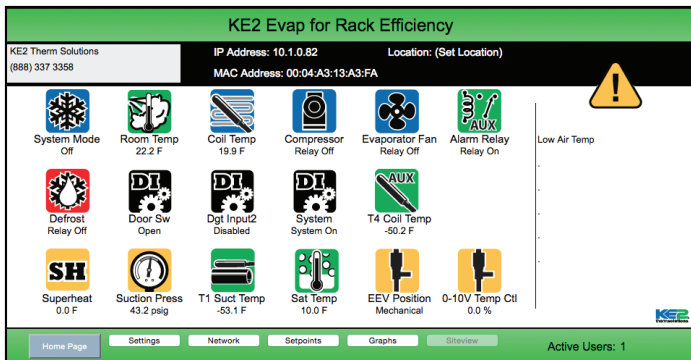
And, Smart Access provides a "customized" dashboard of all the controllers on that network on one page.

Benefits of Smart Access

- Smart Access auto connects, and can eliminate the need for costly IT support
- Doesn't require port forwarding or a vpn
- Customized dashboard lets you remotely view all the controllers on one page
- It's easier than ever to set up every controller you service to provide alarm notifications via text or e-mail
- Easy setup of remote monitoring & system control



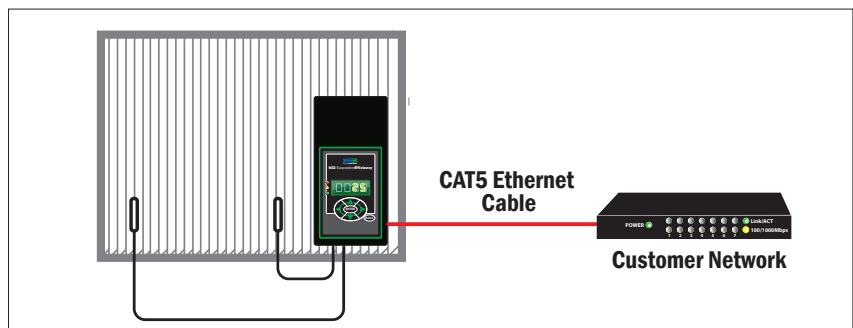
Screen shots of Smart Access dashboard. Controller and system information is displayed for all of the controllers on the portal.



Screen shot of a single KE2 Evap-RE connected through Smart Access

Preliminary

Connect the KE2 Evap-RE to the customer's network.





KE2 Evap for Rack Efficiency Quick Start Guide

Smart Access - Easy Online Access

Step 1

Enable Smart Access in the Introduction Mode menu

■ After following the other steps in the table, set Smart Access to **Enabled**.

■ Use the ▲ or ▼ arrow to change Smart Access to Enabled. Press and hold the **ENTER** button for 3 seconds to save the change.

Note: if using a **Defined EEV**, Refrigerant must be selected too.

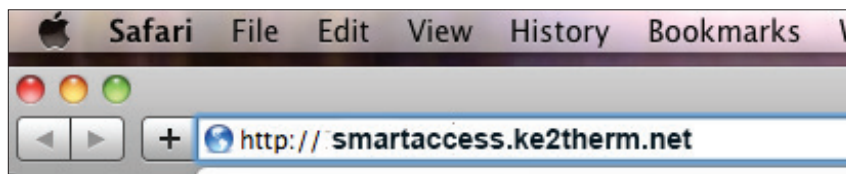
Note: if using a **Custom EEV** Refrigerant, Motor Type, Motor Step Rate, and Max Valve Steps must be selected.

SELECT CONTROL MODE			
PRE-PROGRAMMED	CUSTOM		
Standard w. Electric Standard w. Air Rack w. Electric Rack w. Air	Mechanical Valve TEV	Defined EEV	Custom EEV
Smart Access 1	Room Temp	Room Temp	Room Temp
	Defrost Type	Defrost Type	Defrost Type
	Valve Type	Valve Type	Valve Type
	Smart Access 1	Refrigerant	Refrigerant
		Smart Access 1	Motor Type (Unipolar/Bipolar)
			Motor Step Rate
			Max Valve Steps
			Smart Access 1

Step 2

Go to smartaccess.ke2therm.net

■ Using your PC, tablet or smartphone, enter <http://smartaccess.ke2therm.net> in the web browser's address bar.



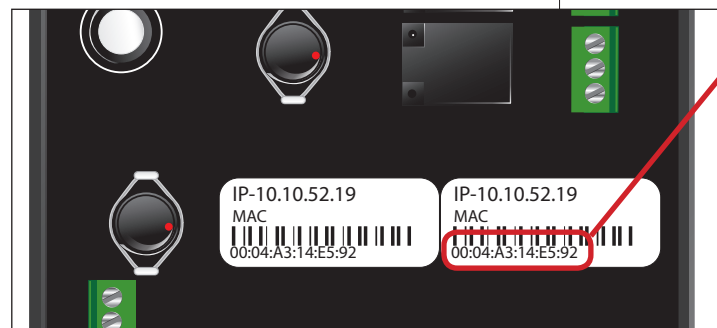
Step 3

Enter default information

■ Enter default information, and click **Log In** button.

Site: installer

Password: controllers Mac Address (from sticker on back of controller)



For additional information on SmartAccess, visit <http://ke2therm.com/ke2-evap-for-rack-efficiency>, and see bulletins A.1.76 The KE2 Evap v4.0 with Smart Access and Q.1.34 Smart Access Setup and Customizing.



KE2 Evap for Rack Efficiency

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Table 3 - Controller Menus and Menu Parameters
Setpoints Menu

Parameter Name	Description	
ROOM TEMP	Walk-in freezer or cooler room temperature to be maintained	
DEFROST TYPE	Method of defrost used on the evaporator coil: Electric, Air, Hot Gas with Liquid Line Solenoid/Compressor relay off, Hot Gas with Liquid Line Solenoid/compressor relay on	
VALVE TYPE	Type of valve used on the system: mechanical, pre-configured electric, custom configuration	
Custom Valve only	MOTOR TYPE	If VALVE TYPE = CUSTOM: The motor type used in the valve
	MOTOR STEP RATE	If VALVE TYPE = CUSTOM: The motor speed setting in number of steps per second
	MAX VALVE STEPS	If VALVE TYPE = CUSTOM: The total number of steps required to move the valve from closed to fully open
EEV only	SUPERHEAT	The superheat value that the controller will maintain, (not applicable if VALVE TYPE = MECHANICAL)
	MAX OPERATING PRES	The maximum allowable suction pressure, (not applicable if VALVE TYPE = MECHANICAL)
	REFRIGERANT	The type of refrigerant used in the refrigeration system
	AUX TEMP 4 MODE	Configuration mode of the auxiliary temperature sensor
	AUX TEMP 1 MODE	Configuration mode of the auxiliary temperature sensor (Not available if EEV is selected)
AUX RELAY MODE	Configuration mode of the auxiliary relay.	
Rack Only	MIN DEFR INTERVAL	IF RACK CONTROL SELECTED: The amount of time between the end of the previous defrost cycle, and the beginning of the next defrost cycle.
	MIN COMP RUN TIME	Minimum amount of time the liquid line solenoid/compressor relay must remain on after it is energized
	MIN COMP OFF TIME	Minimum amount of time the liquid line solenoid/compressor relay must remain off before it can be energized again.
	REFRIG FAN MODE	Fan operation while in refrigeration mode
	0-10V FAN / TEMP	If FAN (SPEED) selected 0 to 10V controls speed of fans; If TEMP selected 0 to 10V controls signal to external source to control temperature
	FAN SPEED / TEMP CONTROL	When FAN SPEED selected above provides 0-10V DC signal to control variable speed; When TEMP selected opens or closes valve select 0 to 10V open or closed
	DEFROST MODE	The method the controller uses to determine when to initiate a defrost.
	DEFROSTS / DAY	If DEFROST MODE = SCHEDULED: The number of evenly spaced defrosts per day the controller will initiate.
	1ST DEFROST DELAY	If DEFROST MODE = SCHEDULED: The amount of time from controller power up until the first defrost is initiated.
	DEFROST FAN STATE	Whether or not to run the evaporator fans during defrost
	DEFROST TERM TEMP	The temperature the coil sensor(s) must exceed in order to terminate defrost. The defrost relay is de-energized at this point.
	DEFROST PARAMETER	if DEFROST MODE = DEMAND: Coefficient to KE2 Defrost algorithm
	MAX DEFROST TIME	If DEFROST MODE = SCHEDULE or RUNTIME: The maximum amount of time the defrost relay will be energized. (Not available if DEFROST MODE = DEMAND)
	DRAIN TIME	Time to be in drain mode (drip time)
	COMP RUN TIME	If DEFROST MODE = RUN TIME: The amount of time liquid line solenoid/compressor relay is energized before the next defrost is initiated.
	ELEC DEFROST MODE	If DEFROST TYPE = ELEC: Whether to leave the defrost relay energized during the defrost cycle or to utilize advanced defrost algorithm.
	FAN DELAY TEMP	After defrost, the coil sensor reading must fall below this temperature set point in order for the controller to resume normal fan operation.
	MAX FAN DELAY TIME	Maximum amount of time after defrost to resume normal fan operation.
	PUMP DOWN TIME	Minimum amount of time between de-energizing the liquid line solenoid/compressor relay and energizing the defrost relay.
	MULTI AIR TEMP CTRL	Select control method to use with multiple room temperature sensors
	MULTI EVAP COOL	Select type of multi evaporator control - options are synchronous or independent
	MULTI EVAP DEFROST	Select whether to have all bonded controllers initiate defrost mode at the same time or independently.
	MULTI EVAP SENSOR	Select whether or not to share room temperature, coil temperature and suction pressure sensor data with bonded controllers.
	HIGH TEMP ALARM OFFSET	The number of degrees above ROOM TEMP for a HIGH TEMP ALARM condition.
	HIGH TEMP ALARM DELAY	Minutes the room temperature must remain above ROOM TEMP + HIGH TEMP ALARM OFFSET before issuing a HIGH TEMP ALARM
	LOW TEMP ALARM OFFSET	The number of degrees below ROOM TEMP for a LOW TEMP ALARM condition.
	LOW TEMP ALARM DELAY	Minutes the room temperature must remain below ROOM TEMP - LOW TEMP ALARM OFFSET before issuing a LOW TEMP ALARM
	DOOR ALARM DELAY	If DIG IN (1, 2 and/or 3) MODE = DOOR SWITCH: The amount of time, in minutes, before an alarm condition is initiated if door is open and room temperature is 5 degrees above ROOM TEMP + AIR TEMP DIFF
	DIG IN 1 MODE	Sets the function of the digital input
	DIG IN 1 STATE	Sets whether the switch activates when opened or closed
DIG IN 2 MODE	Sets the function of the digital input	
DIG IN 2 STATE	Sets whether the switch activates when opened or closed	
DIG IN 3 MODE	Sets the function of the digital input	
DIG IN 3 STATE	Sets whether the switch activates when opened or closed	
2ND ROOM TEMP	If DIG IN (1, 2 and/or 3) MODE = 2ND ROOM TEMP: This value becomes the ROOM TEMP setpoint when the digital input is active	
SUCT PRES OFFSET	An offset added or subtracted from the suction line pressure transducer reading, if needed	
SUCT TEMP OFFSET	An offset added or subtracted from the suction temperature sensor reading, if needed	
AIR TEMP OFFSET	An offset added or subtracted from the room temperature sensor reading, if needed	
COIL TEMP OFFSET	An offset added or subtracted from the coil temperature sensor reading, if needed	
AUX TEMP OFFSET	An offset added or subtracted from the auxiliary temperature sensor reading, if needed	
TEMP UNITS	Units for temperature's display in °F or °C	
AIR TEMP DIFF	The number of degrees above ROOM TEMP before the controller will go into REFRIGERATION mode	
EXTREME TEMP DIFF	ADVANCED TOPIC: Call KE2 Therm for assistance	
PROPORTIONAL EEV	A coefficient to the valve control algorithm that increases valve responsiveness	
INTEGRAL EEV	A coefficient to the valve control algorithm that increases valve responsiveness	
DERIVATIVE EEV	Should not be adjusted unless instructed by KE2 Therm technical support	
PROPORTIONAL TEMP	A coefficient to the valve control algorithm that increases responsiveness when controlling on temperature	
INTEGRAL TEMP	A coefficient to the valve control algorithm that increases responsiveness when controlling on temperature	
DERIVATIVE TEMP	Should not be adjusted unless instructed by KE2 Therm technical support	
MIN VLV POSN	When in refrigeration mode, minimum position valve can close	
MAX VLV POSN	When in refrigeration mode, maximum position valve can open	



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Range	Default	Current
-50°F to 90°F	Standard - Freezer or Custom = 0.0°F; Cooler = 37.8°F; Rack-Freezer = -5.0°F; Rack-Cooler = -37.8°F	
ELEC, AIR, HOT GAS COMP ON, HOT GAS COMP OFF	Standard - Freezer or Custom = ELECTRIC; Rack-Freezer = ELECTRIC; Rack-Cooler = AIR	
MECHANICAL, KE2 RSV, KE2 HSV, SER/SEI 1 TO 20, SER B TO L, SEI 30, SEI 50, SEH, CAREL, CUSTOM EEV, CDS 2-7, CDS 9-17, KVS 15, KVS 42, CUSTOM EEPR, SDR3, 3X, SDR 4, CUSTOM EHGBP, (In bold only shown if RACK control selected)	MECHANICAL	
BIPOLAR, UNIPOLAR	UNIPOLAR	
30 to 400 steps/second	30 steps	
200 to 6400 steps	500 steps	
5°F to 30°F	8°F	
10-500 psig if R-744 selected, 10-300psig if R-410A selected, 10-150 psig all other refrigerants	150 psig	
404A, R507, 407A, 407C, 422A, 422D, 134A, R22, R717, 438A, 408A, 409A, 407F, 410A, R744	404A	
DISABLED, MONITOR, T4 ROOM TEMP, T4 COIL TEMP	T4 COIL TEMP	
T1 SUCTION TEMP, MONITOR, T1 ROOM TEMP, 2ND COIL TEMP	T1 SUCTION	
ALARM RELAY, 2ND COMP RELAY, 2ND FAN RELAY, 2ND DEFR RELAY, 2 SPEED FAN CTL, LIGHT RELAY, PERM DEFROST RELAY	ALARM RELAY	
0-255 minutes	120 minutes	
0 to 15 minutes	Standard: 2 minutes; Rack: 5 minutes	
0 to 15 minutes	Standard: 5 minutes; Rack: 0 minutes	
ON WITH COMPRESSOR, PERMANENT, MANAGED, CONTROL FOR TITLE 24	Standard: ON WITH COMPRESSOR; Rack: PERMANENT	
FAN or TEMP	TEMP Control	
FAN SPEED -100% to 100%; TEMP 0V closed to 10V fully open or 0V open to 10V full closed	0V closed to 10V fully open	
DEMAND, SCHEDULED, RUN TIME	DEMAND	
0 to 8	5	
0 to 240 minutes	120 minutes	
ON/OFF	OFF if DEFROST TYPE = ELEC, HOT GAS COMP ON, HOT GAS COMP OFF ON if DEFROST TYPE = AIR	
35°F to 90°F	50°F if DEFROST TYPE = ELEC, HOT GAS COMP ON, HOT GAS COMP OFF 40°F if DEFROST TYPE = AIR	
0 to 90	30 if DEFROST TYPE = ELEC 10 if DEFROST TYPE = HOT GAS COMP ON, HOT GAS COMP OFF 40 if DEFROST TYPE = AIR	
0 to 90 minutes	45 minutes if DEFROST TYPE = ELEC 10 minutes if DEFROST TYPE = HOT GAS COMP ON, HOT GAS COMP OFF 40 minutes if DEFROST TYPE = AIR	
0 to 15 minutes	Rack Freezer: 5 minutes Standard Freezer: 2 minutes	
0 to 24 hours	6 hours	
PULSE, PERMANENT	PULSE	
-40°F to 35°F	20°F	
0 to 20 minutes	Freezer: 2 minutes; Cooler 0 minutes	
0 to 90 minutes	DEFROST TYPE = ELEC or AIR for RACK: 1 minute.; STANDARD 0 minutes DEFROST TYPE = HOT GAS ON/OFF 2 minutes	
AVERAGE, WARMEST	WARMEST	
SYNC, INDEPENDENT	SYNC	
SYNC, INDEPENDENT	SYNC	
SHARED, NOT SHARED	SHARED	
0°F to 99.9°F	Freezer: 10°F; Cooler 2.2°F	
0 to 120 minutes	60 minutes	
0°F to 20°F	4°F	
0 to 30 minutes	10 minutes	
0 to 180 minutes	30 minutes	
DISABLED, 2ND ROOM TEMP, DOOR SWITCH, EXT ALARM, SYSTEM OFF	Standard: DISABLED; Rack: DOOR SWITCH	
OPEN, CLOSED	Standard: CLOSED; Rack: OPEN	
DISABLED, 2ND ROOM TEMP, DOOR SWITCH, EXT ALARM, SYSTEM OFF, DEFR INTERLOCK, DEFR LOCKOUT, DEFR LOCKOUT QUIT DEFR	DISABLED	
OPEN, CLOSED	CLOSED	
DISABLED, 2ND ROOM TEMP, DOOR SWITCH, EXT ALARM, SYSTEM OFF, LIGHT SWITCH	SYSTEM OFF	
OPEN, CLOSED	CLOSED	
-50°F to 90°F	-50°F	
-5.0 to 5.0 psig	0.0 psig	
-5.0°F to 5.0°F	0.0°F	
-5.0°F to 5.0°F	0.0°F	
-5.0°F to 5.0°F	0.0°F	
-5.0°F to 5.0°F	0.0°F	
FAHRENHEIT/CELSIUS	FAHRENHEIT	
0.1°F to 5°F	1°F	
0 to 200	Standard: 20.0°F; Rack: 30.0°F	
0 to 255	3	
0 to 255	5	
0 to 255	3	
0 to 255	3	
0 to 255	5	
0 to 255	5	
0.0 to 100%	0.0%	
0.0 to 100%	100%	



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Manual Menu

Parameter Name	Description	Range	Default
MANUAL CONTROL	Force the controller into the next operating mode	REFRIGERATE/OFF, DEFROST, DRAIN TIME, FAN DELAY	
MANUAL VALVE	Manually open or close the EEV in percentage increments	1% increment	
CLEAR ALARMS	Clear all active alarms		
MANUAL COMPRESSOR RELAY	Manually energize or de-energize liquid line solenoid /compressor relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
MANUAL DEFROST RELAY	Manually energize or de-energize defrost relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
MANUAL FAN RELAY	Manually energize or de-energize evaporator fan relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
MANUAL AUX RELAY	Manually energize or de-energize auxiliary relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
FACTORY RESET	Reset the controller to the factory default setpoints	RESET	
WEB PASSWORD RESET	Reset the web password to the factory default	RESET	
SMART ACCESS	Turn Smart Access on or off	DISABLE, ENABLE	DISABLE
DHCP	Turn DHCP mode on or off	DISABLE, ENABLE	DISABLE
DOD INIT	Re-initialize KE2 defrost algorithm	RESET	
CLEAR MD	NO LONGER USED	HOLD TO CLEAR MD	

Variables Menu - Non Adjustable (view only)

Parameter Name	Description
ROOM TEMP	Walk-in freezer or cooler room temperature as measured by the controller
COIL TEMP	Coil temperature as measured by the controller
SYSTEM MODE	Current operating status
SUPERHEAT	Superheat as calculated by the controller (requires suction pressure transducer and T1 set as suction temperature sensor)
SUCTION PRESSURE	Suction pressure as measured by the controller (only available if suction pressure transducer installed)
T1 SUCTION TEMP	Suction temperature as measured by the controller
SATURATION TEMP	Saturation temperature as calculated by the controller (requires pressure transducer and T1 sensor)
0 TO 10V OR -100% TO 100%	0 to 10V open or close displayed when in Temp control
VALVE % OPEN	Percentage the EEV is open (only available if EEV is selected)
T4 AUX TEMP	Auxiliary Temperature (Taux) sensor reading as measured by the controller (Not available if T4 set to DISABLED)
COMPRESSOR RELAY	Current state of liquid line solenoid/compressor relay
DEFROST RELAY	Current state of the defrost relay
FAN RELAY	Current state of the evaporator fan relay; -100 to 100% displayed when in Fan (Speed) control
AUX RELAY	Current state of the auxiliary relay
DIG 1 STATUS	Current status of the Digital Input #1
DIG 2 STATUS	Current status of the Digital Input #2
DIG 3 STATUS	Current status of the Digital Input #3
IP OCTET 1	The first three digits of the IP address
IP OCTET 2	The second three digits of the IP address
IP OCTET 3	The third three digits of the IP address
IP OCTET 4	The fourth three digits of the IP address
SUBNET MASK OCTET 1	The first three digits of the subnet mask
SUBNET MASK OCTET 2	The second three digits of the subnet mask
SUBNET MASK OCTET 3	The third three digits of the subnet mask
SUBNET MASK OCTET 4	The fourth three digits of the subnet mask
FIRMWARE VERSION	Current version of the firmware on the controller

Only displayed when certain configurations are selected

Variables Menu Options for DIG IN 1,2,3 STATUS

DIG IN Setting	Status Displayed on Controller
DIG IN STATUS = DISABLED	DISABLED
DIG IN STATUS = 2ND (ROOM) TEMP	inactive = 2ND ROOM TEMP OFF; active = 2ND ROOM TEMP ON
DIG IN STATUS = DOOR SWITCH	inactive = DOOR CLOSED; active = DOOR OPEN
DIG IN STATUS = EXT ALARM	inactive = NO ALARM; active = EXT ALARM (x)
DIG IN STATUS = SYSTEM OFF	inactive = SYSTEM ON; active = SYSTEM OFF
DIG IN STATUS = LIGHT SWITCH	inactive = LIGHTS OFF; active = LIGHTS ON
DIG IN STATUS = DEFROST LOCKOUT	inactive = DEFROST RELAY AUTO; active = DEFROST LOCKED OUT
DIG IN STATUS = DEFROST INTERLOCK	inactive = DEFROST RELAY AUTO; active = DEFROST RELAY OFF
DIG IN STATUS = DEFROST LOCKOUT QUIT DEFROST	inactive = DEFROST RELAY AUTO; active = DEFROST TERMINATED; DEFROST LOCKED OUT

Alarms Status Menu Non Adjustable (view only)

Parameter Name	Description
NO ALARM	No alarms active, everything is running correctly
PRESSURE SENSOR	Suction pressure sensor is shorted, open or pressure out of range
T1 SUCTION SENSOR	Suction temperature sensor is shorted or open
T2 AIR SENSOR	Return air temperature sensor is shorted or open
T3 COIL SENSOR	Coil temperature sensor is shorted or open
T4 AUX SENSOR	Auxiliary temperature sensor is shorted or open
HIGH SUPERHEAT	Superheat above upper limit
LOW SUPERHEAT	Superheat below lower limit
HIGH AIR TEMP	Room temperature is above ROOM TEMP + AIR TEMP DIFF + HIGH TEMP ALARM OFFSET for longer than HIGH TEMP ALARM DELAY
LOW AIR TEMP	Room temperature is below ROOM TEMP - LOW TEMP ALARM OFFSET for longer than LOW TEMP ALARM DELAY
EXCESS DEFROST	Three consecutive defrosts with less than a one hour interval between each defrost
DEFR TERM ON TIME	Defrost terminated on time instead of temperature for two consecutive cycles
DOOR SWITCH	If door is open and room temperature is 5 degrees above ROOM TEMP + AIR TEMP DIFF for DOOR ALARM DELAY time
COMMUNICATION ERROR	ONLY FOR BONDED CONTROLLERS: No communication between controllers for one minute or more
EXT ALARM	If DIG IN (1, 2 and/or 3) MODE = EXT ALARM : The digital input is in an active state
EMAIL FAILURE	Email alert was not confirmed by email server provided after seven consecutive attempts
FTP COMMUNICATION ALARM	ONLY FOR SITEVIEW MANAGER: No communication to the ftp server defined in Settings/Logging Options
SNTP COMMUNICATION ALARM	ONLY FOR SITEVIEW MANAGER: No communication to the SNTP server defined in Settings/Siteview Options