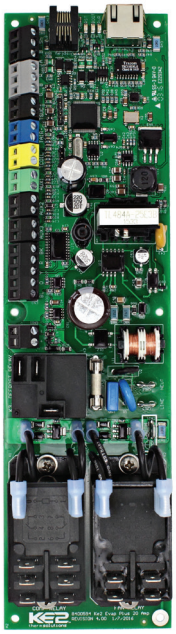
This reference should remain on site with the installed KE2 Evap OEM controller.

thermsolutions

KE2 EvapOEM pn21231

Quick Start Guide

Q.1.45
May 2019



Contents

Specifications

Controller	
Input Voltage:	100VAC - 240VAC
Ambient Temp:	-40°F to 140°F (-40°C to 60°C)
Operating Temp:	-40°F to 140°F (-40°C to 60°C)
Inputs:	(3) temperature sensor
	(3) multi-use (temp sensor or digital input)
	(1) pressure sensor input
Valve Types:	unipolar and bipolar stepper motors (12V)
Relays:	1-20A resistive (defrost)
	(2) 10A inductive
Auxiliary Input 1:	room temp, coil temp, monitor, 2nd temp setpoint, door
Auxiliary Input 2:	switch, external alarm, system off, defrost interlock, de-
Auxiliary Input 3:	frost lockout
Communication:	Standard TCP/IP

Pressure Transducer	
Pressure Range:	0 to 150 psia
Proof Pressure:	450 psi
Burst Pressure:	1500 psi
Operating Temp:	-40°F to 275°F (-40°C to 135°C)

Temperature Sensor	
Sensor Specs:	-60°F to 150°F (-51°C to 65°C) moisture resistant package

KE2 Therm Accessories

Remote Displays

Part #	Description
21232	KE2 Basic (Remote) Display w/ 15 ft. cable
21324	Snap track - 12"
21320	KE2 Combo Display (no accessories included)
21786	Combo Display - 25 ft. Cable
21320	Combo Display - Junction Box
21781	9V Rechargeable Battery for Combo Display

Temperature Sensors

Part #	Description	Lead Length
21151	Temperature Sensor Pack - 3-colors	15 ft.
21066	Temperature Sensor Pack - 3-colors	40 ft.
20199	Temperature Sensor - Black	10 ft.
20200	Temperature Sensor - Black	40 ft.
21795	Temperature Sensor - Yellow	10 ft.
21793	Temperature Sensor - Green	10 ft.
21794	Temperature Sensor - Blue	10 ft.

Pressure Transducer

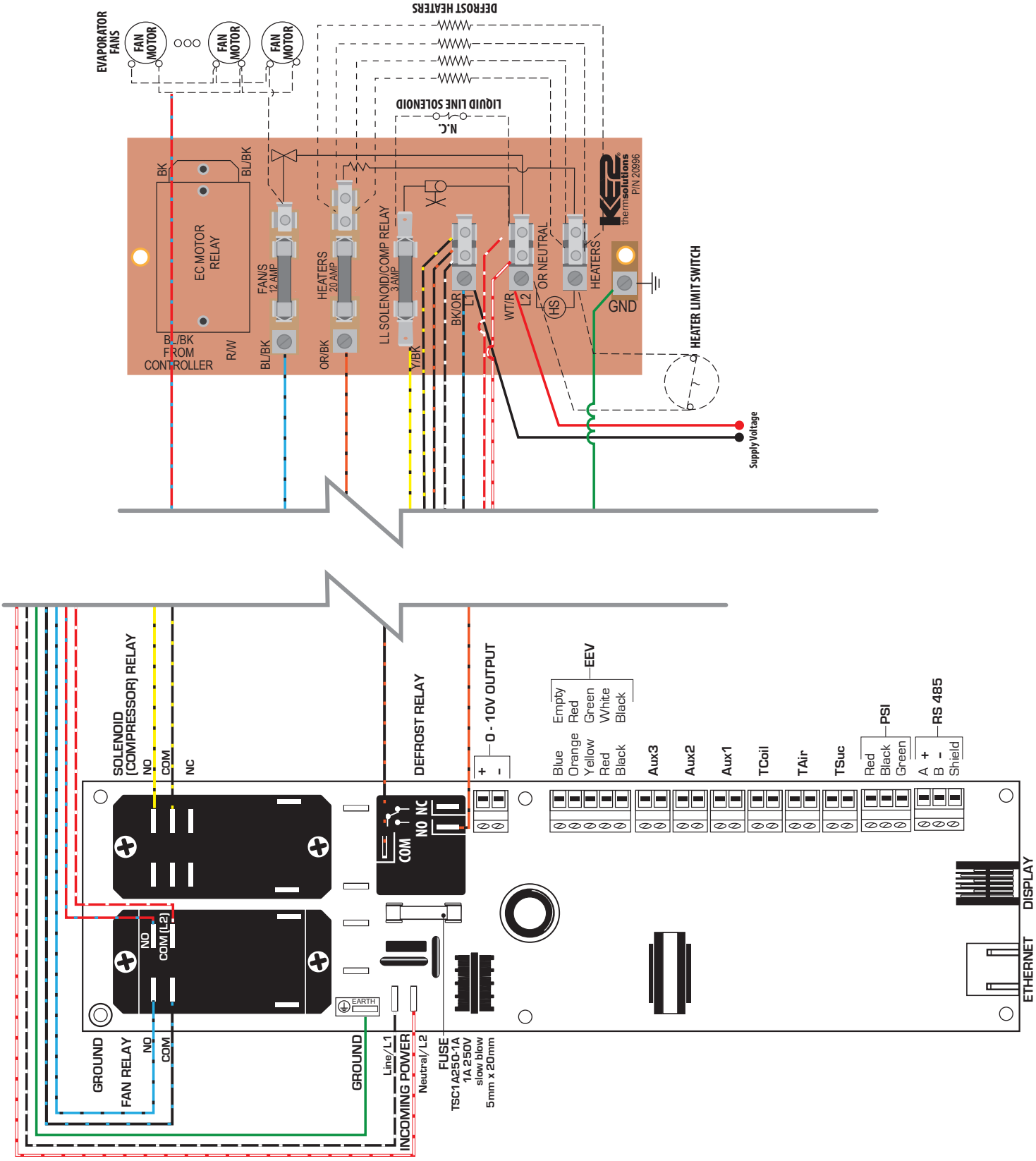
Part #	Description	Lead Length
20201	Pressure Transducer – 0 to 150 psia	10 ft.
20204	Pressure Transducer - 0 to 150 psia	40 ft.

RSV - Refrigeration Stepper Valves

Valve Body	Part #	Connections - Inches ODF Inlet x Outlet	Lead Length
RSV-100	*21667*	3/8 x 1/2	5 ft.
RSV-100	*21665*	3/8 x 1/2	10 ft.
RSV-100	*21666*	3/8 x 1/2	40 ft.
RSV-130	*21169*	3/8 x 1/2	5 ft.
RSV-130	*21161*	3/8 x 1/2	10 ft.
RSV-130	*21162*	3/8 x 1/2	40 ft.
RSV-220	*21170*	3/8 x 1/2	5 ft.
RSV-220	*21163*	3/8 x 1/2	10 ft.
RSV-220	*21164*	3/8 x 1/2	40 ft.
RSV-320	*21171*	3/8 x 1/2	5 ft.
RSV-320	*21165*	3/8 x 1/2	10 ft.
RSV-320	*21166*	3/8 x 1/2	40 ft.
RSV-320	*21172*	1/2 x 1/2	5 ft.
RSV-320	*21167*	1/2 x 1/2	10 ft.
RSV-320	*21168*	1/2 x 1/2	40 ft.
RSV-400	*21529*	5/8 x 7/8	15 ft.
RSV-400	*21530*	5/8 x 7/8	40 ft.
RSV-550	*21594*	5/8 x 7/8	15 ft.
RSV-550	*21595*	5/8 x 7/8	40 ft.
RSV-650	*21779*	5/8 x 7/8	15 ft.
RSV-650	*21778*	5/8 x 7/8	40 ft.
RSV-C10 Stator	*21149*	For RSV-100 to 320	10 ft.
RSV-C40 Stator	*21150*	For RSV-100 to 320	40 ft.
RSV-LC15 Stator	*21525*	For RSV-400 to 650	15 ft.
RSV-LC40 Stator	*21526*	For RSV-400 to 650	40 ft.

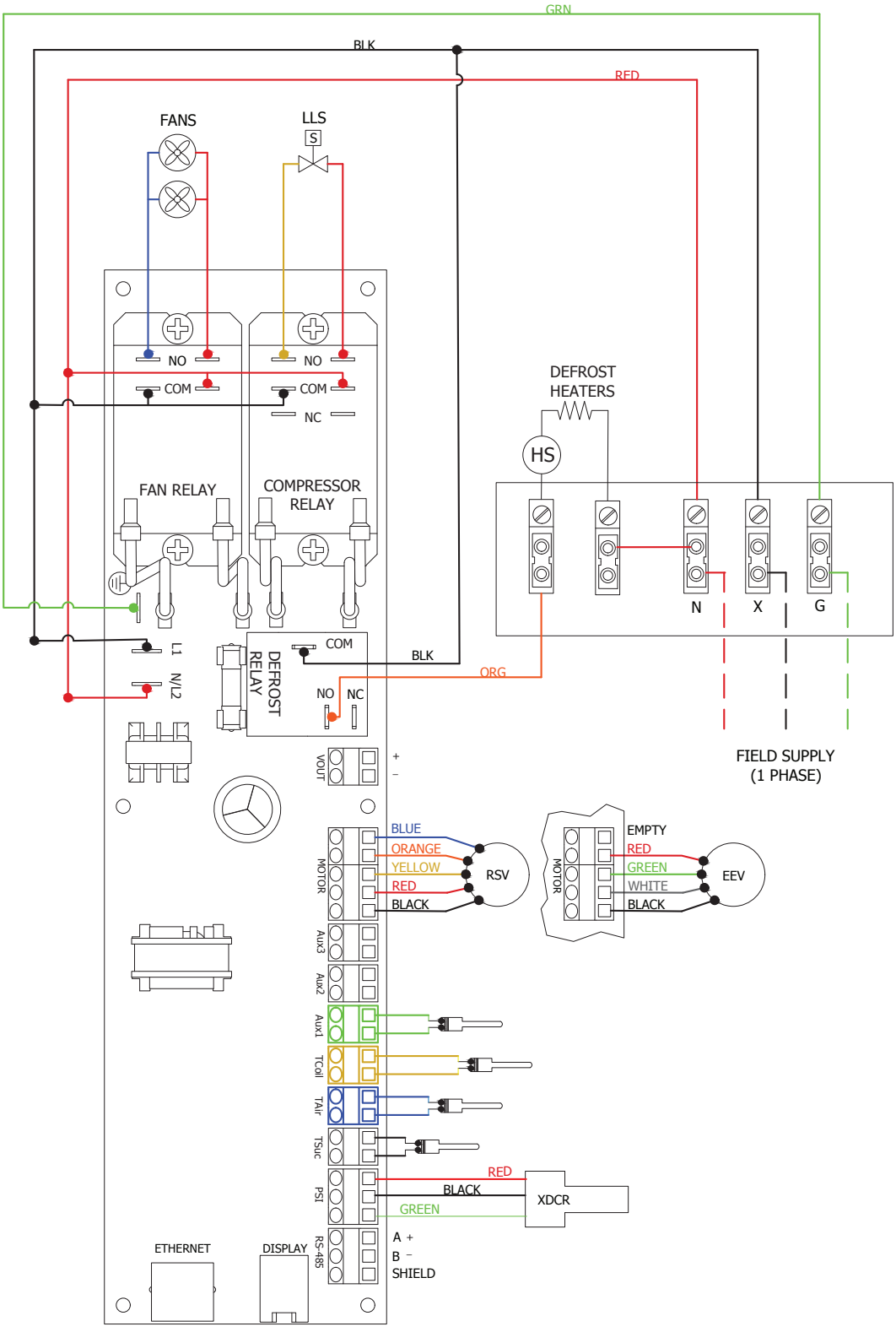
KE2 EvapOEM
Quick Start Guide

Point to Point Wiring Diagram - Controller with KE2 Terminal Board



KE2 EvapOEM
Quick Start Guide

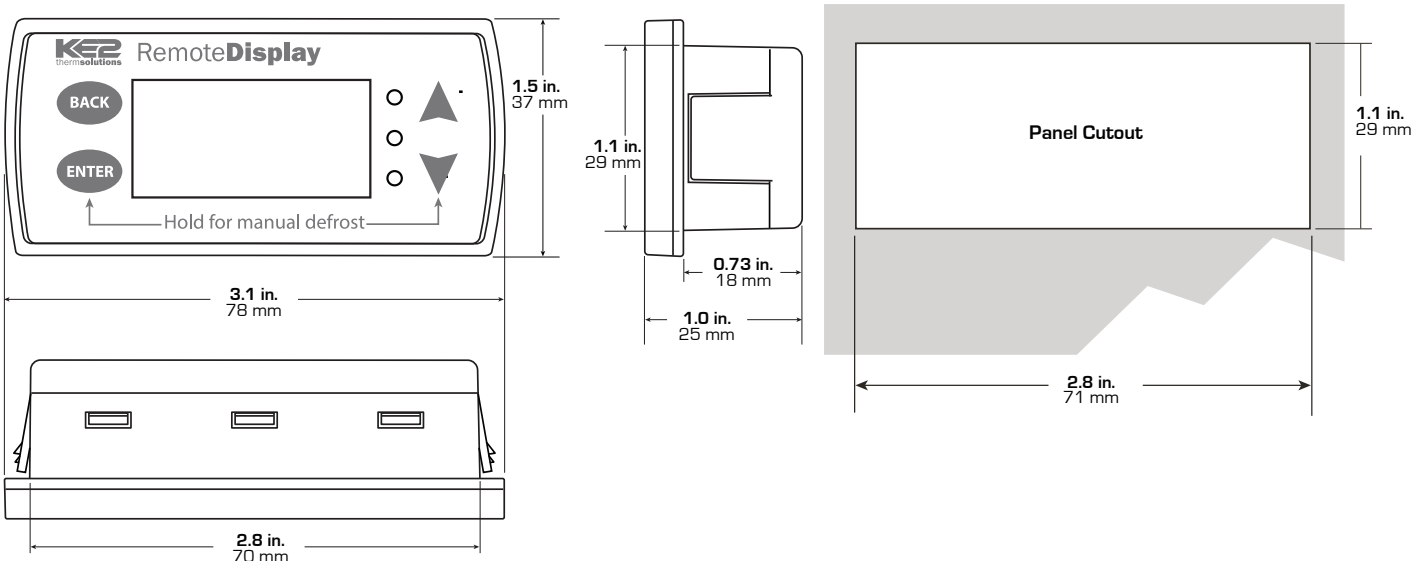
Wiring Diagram - Controller without KE2 Terminal Board



KE2 EvapOEM
Quick Start Guide

Dimensions

Remote (Basic) Display



IMPORTANT
Steps to Ensure Proper Coil Sensor Location

Installing the Sensor - The most active portion of the sensor is the first 1/2" of the probe.

The inset photo in **Figure 2** shows that the sensor is positioned so that it is touching two circuit tubes. When inserting the sensor into the coil, the tip should touch one of the circuit tubes, and the probe should be 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.

NOTE: The sensor should not be located adjacent to the electric heating elements. It should be about half the distance between the heaters if possible.

Alternate Method - As the defrost termination sensor, it is important to ensure the sensor does not terminate defrost before all frost is 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, **Figure 3a,** places the sensor vertically between the coil fins. **Figure 3b** shows the coil sensor properly secured.

NOTE: On a small fraction of installations the sensor placement may require adjusting. This is typically caused by product loading, door openings, air flow, etc. The sensor(s) should be placed where the frost disappears last on the coil.

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, combined length, for extension: 100 ft. Contact KE2 Therm if planning to extend sensor wires beyond 100ft.

If additional resistance affects the temperature or pressure reading of the controller, the temperature and pressure may be "offset" to read correctly. Use the OFFSET* function, in the SETPOINTS menu.

■ When running the sensor wires to the controller avoid introducing electrical noise. Electrical noise can occur when sensor wires are located near high voltage lines. Underwriter's Laboratories defines high voltage as above 30V. The higher the voltage, the more likely electrical noise will occur.

■ If crossing a high voltage line is necessary, run sensor wiring at right angles to prevent noise.

** Not available on Basic (Remote) Display.*

Figure 1

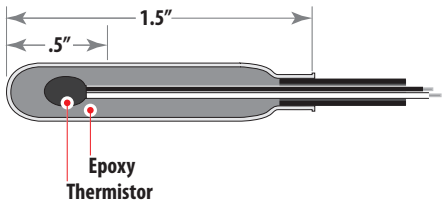


Figure 2

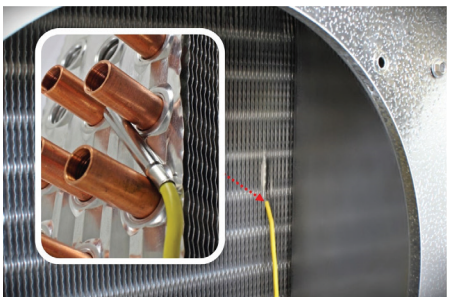


Figure 3a

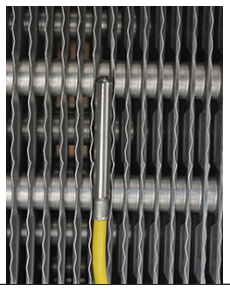
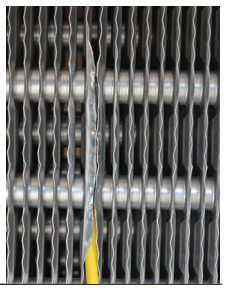


Figure 3b



KE2 EvapOEM
Quick Start Guide

Navigation Using the Basic (Remote) Display

Indicator lights
- **Red light** - critical Alarm (system not running)
- **Yellow light** - non-critical alarm (system running)
- **Green light** - compressor on
- **Green flashing** - compressor waiting on timer to start/stop

- **Access Setpoint mode by pressing and holding the ENTER button until tS (temperature setpoint) displays on the screen**
- **Use the ▲ up and ▼ down arrows to scroll through the available setpoints.**
- **Press ENTER to view the current setting.**
- **Use the ▲ up and ▼ down arrows to change the setpoint. Press ENTER to move between the digits to accelerate the changes.**
- **Press ENTER and hold to confirm each setpoint change.**
- **Press BACK to escape.**

Basic (Remote) Display User Interface

Most KE2 Evap OEM controllers ship with the Basic Display. The display allows service technicians to change the major setpoints. Setpoints can also be accessed using the KE2 Combo Display or the controller's webpages.

Controller Setup

Upon initially applying power to the controller, the controller will initialize, then automatically enter **Introduction Mode**. The Introduction Mode consists of four **Types of Control** options:

- **Ed -** Electric Defrost with Mechanical TEV
- **EdE -** Electric Defrost with Electric Expansion Valve
- **Ad -** Air Defrost with Mechanical TEV
- **AdE -** Air Defrost with Electric Expansion Valve

Step 1 - Using the ▲ and ▼ arrows, moves the user through the available **Types of Control** options. Once the preferred option is displayed press and hold the ENTER button for 3 seconds.

Note: For mechanical valve control, Ed and Ad options, continue to Step 4. For Ede and AdE control options continue to Steps 2, 3, &4.

Step 2 - Next, the controller prompts for the **Expansion Valve Type**, and displays **rS (RSV)**. If this is the correct selection, press and hold the ENTER button for 3 seconds. If not, use the ▲ or ▼ arrow to move to the correct valve.

With correct electric valve displayed, press and hold ENTER for three seconds.

Note: Custom valve setup is not available from the Basic Display.

Step 3 - The controller now prompts for **Refrigerant Type** and displays **404 (R-404a)** as the default. Change this value by pressing the ▲ or ▼ arrow. Once you have the correct value, press and hold ENTER for three seconds.

Step 4 - The fourth prompt is whether **KE2 SMART ACCESS** is **ENABLED** or **DISABLED**. **KE2 SMART ACCESS** allows you to easily view your controller online. Make your selection by using the ▲ or ▼ arrow, and then press and hold ENTER for **three seconds.THESE ARE THE ONLY SETPOINTS REQUIRED TO BEGIN CONTROLLING THE SYSTEM.**

Additional Setpoints

For the majority of users, the Basic Display will provide the necessary parameters to setup the controller.

From the default display, pressing the ▲ and ▼ arrows will cycle through the **Variables** menu. The ENTER button will toggle between the variable name and value.

Changing Setpoints

Pressing and holding the ENTER button will enter the **Basic Setpoints** menu. Press ENTER button to toggle between setpoint and value.

Pressing and holding the BACK button will enter the **Advanced Setpoints** menu. Press ENTER button to toggle between setpoint and value.

When the parameter value is displayed it may be changed by using ▲ and ▼ arrows, and ENTER buttons. The ▲ and ▼ arrows will increase or decrease numerical values, and will scroll through the available options, on the non-numerical setpoints.

Press and hold the ENTER button for 3 seconds to save the displayed value.

To abort changes, press BACK to return to the parameter abbreviation.

Manual Valve Control

Press and hold the BACK button & ▼ arrow to put the EEV in **Manual Control** mode. ▲ and ▼ arrows will control the valve opening. ENTER will advance to the next digit, and BACK will exit this mode.

Manual Defrost

Pressing and holding the BACK and ENTER buttons will put the controller into **Defrost (next mode)**.

Diagnostics Mode

The KE2 Evap OEM has been programmed with a diagnostics mode. When activated, the controller energizes each relay for 60 seconds. When the compressor relay is on the EEV will regulate to the Superheat setpoint.

Display Firmware

Pressing and holding all 4 buttons (▲ ▼ BACK and ENTER)will show the display's firmware revision **(dir – Display Revision)**

Display Options

Simultaneously pressing and holding the ▲ and ▼ arrows will show the address of the display (reserved for future versions).

Web Login

The User Name and Password are required when accessing the controller using the webpage.

The defaults are: **User Name:** ke2admin **Password:** ke2admin

IMPORTANT: For security purposes, the User Name and Password should be changed from the default.

KE2 EvapOEM
Quick Start Guide

Menus and Parameters

BASIC Setpoints Menu

Basic (Remote) Display Abbreviation	KE2 Combo Display Scrolling Text	Min	Max	Default	Description
tS	**ROOM TEMP**	-50.0 ºF	90.0 ºF	0.0 ºF	Room Temp Setpoint - Walk-in freezer or cooler room temp to be maintained
rFG	**REFRIGERANT**	N/A	N/A	R-404A	Type of refrigerant used: see table below
dtY	**DEFROST TYPE**	N/A	N/A	Electric	Type of Defrost for Evap: ELE for Electric/ Ai for off time/ HGn for hot gas w/ comp on/ HGF for hot gas w/comp off

ADVANCED Setpoints Menu

Basic (Remote) Display Abbreviation	KE2 Combo Display Scrolling Text	Min	Max	Default	Description
tS	**ROOM TEMP**	-50.0 ºF	90.0 ºF	0.0 ºF	Room Temp Setpoint - Walk-in room temp to be maintained
rFG	**REFRIGERANT**	N/A	N/A	R-404A	Type of refrigerant used: See table on page 8.
dtY	**DEFROST TYPE**	N/A	N/A	Electric	Type of Defrost for Evap: ELE for Electric/ Ai for off time/ HGn for hot gas w/ comp on/ HGF for hot gas w/comp off
Edt	**VALVE TYPE**	N/A	N/A	Mechanical	Type of valve used on system: mechanical, pre-configured electric, custom EEV configuration
ind	**DEFROST MODE**	N/A	N/A	Demand	Mode to initiate a defrost: dnd-demand; SCH-Schedule; rnt-comp run time
dPd	**DEFROSTS / DAY**	0	8	5	Defrosts per day - If DEFROST MODE = SCH: Number of evenly spaced defrosts per day the controller will initiate.
dtP	**DEFROST TERM TEMP**	35.0 ºF	90.0 ºF	50.0 ºF	The temperature the coil sensor(s) must exceed in order to terminate de-frost. The controller's defrost mode is complete at this point.
dEF	**DEFROST PARAMETER**	0	90	30	if DEFROST MODE = DEMAND: Coefficient to KE2 Defrost algorithm
dtL	**MAX DEFROST TIME**	0 min	90 min	45 min	If DEFROST MODE = SCH: The maximum amount of time the defrost relay will be energized. (Not available if DEFROST MODE = DEMAND)
drn	**DRAIN TIME**	0 min	15 min	2 min	Time to be in drain mode (drip time)
rFt	**REFRIG FAN TYPE**	Manage/Cycle, Permanent, On with Compressor, Title 24		On with Compressor	Manage/CYC - manage fans during refrig cycle; Permanent/PEr - fans on permanently during refrigeration cycle; On with Compressor/FoC - manage fans in OFF, then ON in refrigeration; Title 24/t24 - Cycle fans based on Title 24 regulations.
FoC	**FANS ON COMP**	—	—	—	Manage fans in OFF, then ON in refrigeration
PEr	**FANS PERMANENT**	—	—	—	Fans on permanently during refrigeration cycle
CYC	**CYCLE**	—	—	—	Cycle (Managed) manage fans during refrig cycle
t24	**TITLE 24**	—	—	—	Cycle fans based on compliance with California Title 24 regulations
Stt	**SUPERHEAT**	5.0 Fº	30.0 Fº	8.0 Fº	Target superheat value. Only applies when non-mechanical valve selected.
LPt	**LOW PRESSURE CUT OUT TIME**	0 min	15 min	0 min	Only applies when non-mechanical valve selected; 0=Disabled
LPC	**LOW PRESSURE CUT OUT**	-5.0 psig	138.0 psig	8.0 psig	Displays when LOW PRESSURE CUTOUT TIME (LPt) is greater than zero. And,only applies if non-mechanical valve is selected
LPd	**PRESS DIFF FOR LPCO**	1.0 psig	20.0 psig	15.0 psig	Pressure Differential for LPCO - Displays when LOW PRESSURE CUTOUT TIME (LPt) is greater than zero. And, only applies if non-mechanical valve is selected
rnt	**COMP RUN TIME**	0 hrs	24 hrs	6 hrs	Compressor Run Time - When rnt selected, number of hours of cooling before starting defrost
Htn	**ELECTRIC DEFROST MODE**	N/A	N/A	Pulse	If DEFROST TYPE = ELE: Whether to leave the defrost relay energized during the defrost cycle or to utilize advanced defrost algorithm. PUL = Pulse, Prn = Permanent
HAo	**HIGH TEMP ALARM OFFSET**	0 Fº	99.9 Fº	10.0 Fº	Number of degrees above ROOM TEMP for a HIGH TEMP ALARM condition.
HAd	**HIGH TEMP ALARM DELAY**	0 min	120 min	60 min	Minutes the room temperature must remain above ROOM TEMP + HIGH TEMP ALARM OFFSET before issuing a HIGH TEMP ALARM
LAo	**LOW TEMP ALARM OFFSET**	0 Fº	20.0 Fº	4.0 Fº	Number of degrees below ROOM TEMP for a LOW TEMP ALARM condition.
LAd	**LOW TEMP ALARM DELAY**	0 min	30 min	10 min	Minutes the room temp must remain below ROOM TEMP-LOWTEMP ALARM OFFSET before issuing a LOW TEMP ALARM
dAd	**DOOR ALARM DELAY**	0 min	180 min	30 min	If AU IN (1, 2 and/or 3) MODE = dor The amount of time, in minutes, before an alarm condition is initiated, if door is open & room temperature is 5 degrees above ROOM TEMP + AIR TEMP DIFF
AU1	**AUX IN 1 MODE**	N/A	N/A	Disabled	See Auxiliary Input Modes table
A1A	**AUX IN 1 STATE**	N/A	N/A	Closed	oPn= active if input is an open / CLo=active if input is shorted
AU2	**AUX IN 2 MODE**	N/A	N/A	Disabled	See Auxiliary Input Modes table
A2A	**AUX IN 2 STATE**	N/A	N/A	Closed	oPn= active if input is an open / CLo=active if input is shorted
AU3	**AUX IN 3 MODE**	N/A	N/A	Sys Off	See Auxiliary Input Modes table
A3A	**AUX IN 3 STATE**	N/A	N/A	Closed	oPn= active if input is an open / CLo=active if input is shorted
tS2	**ROOM TEMP**	-50.0 ºF	90.0 ºF	-50.0 ºF	If AU IN (1, 2 and/or 3) MODE = (t2n) 2ND ROOM TEMP: This value becomes the ROOM TEMP setpoint when the digital input is active
Unt	**TEMP UNITS**	N/A	N/A	Fahrenheit	Units for temperature's display in ºF or ºC; FAH = Fahrenheit, CEL = Celsius

KE2 EvapOEM
Quick Start Guide

ADVANCED Setpoints Menu (continued)

Basic (Remote) Display Abbreviation	KE2 Combo Display Scrolling Text	Min	Max	Default	Description
EdF	**EXTREME TEMP DIFF**	0 ºF	99.9 ºF	20.0 ºF	ADVANCED TOPIC: Call KE2 Therm for assistance
CLA	**CLEAR ALARMS**	N/A	N/A		Press and hold to clear all active alarms
diA	**DIAGNOSTICS MODE**	N/A	N/A		Energizes each relay individually for 60 seconds: fan relay, defrost relay, compressor relay
FAC	**FACTORY RESET**	N/A	N/A		Press and hold to reset the controller to the factory default setpoints
PAS	**WEB PASSWORD RESET**	N/A	N/A		Press and hold to reset the web password to the factory default
SA	**SMART ACCESS**	N/A	N/A	Disabled	Turn KE2 Smart Access on or off: EnA to enable smart access / diS to disable KE2 Smart Access
dHC	**DHCP**	N/A	N/A	Enabled	Turn DHCP mode on or off: EnA to enable DHCP mode / diS to disable DHCP mode
Not Available on Basic Display	**MOTOR TYPE**	Unipolar or Bipolar		Unipolar	Unipolar if unipolar stepper used, Bipolar if bipolar stepper used
	MOTOR STEP RATE	30	400	40	*Motor Step rate for custom valve. Not available on Basic Display*
	MAX VALVE STEPS	200	6400	500	*Full stroke steps for custom valve. Not available on Basic Display*
	MAX OPERATING PRES	10.0 psi	150.0 psi**	150.0 psi**	**Max operating pressure. Max is 300 when R-410A selected and 500 when R-744 selected
	FAN SPEED	-100.0%	100.0%	0.0%	*Fan speed %. Not available on Basic Display*
	MIN COMP RUN TIME	0 min	15 min	2 min	*Minimum Compressor Run Time. Not available on Basic Display*
	MIN COMP OFF TIME	0 min	15 min	5 min	*Minimum Compressor Off Time. Not available on Basic Display*
	REFRIG FAN MODE	Manage, Permanent, ON with Compressor, Title 24		ON with compressor	Managed = manage fans during refrig cycle; Permanent = fans ON permanent during refrig cycle; On with Compressor = manage fans in OFF then ON in refrig; Title 24 = cycle fans based on Title 24 regulations
	1ST DEFROST DELAY	0 min	240 min	120 min	*First Defrost Delay. Not available on Basic Display*
	DEFROST FAN STATE	ON or OFF		OFF(E)/ON(A)	OFF = fans off during defrost; ON = fans ON during defrost
	FAN DELAY TEMP	-40.0 ºF	35.0 ºF	20.0 ºF	*Fan delay temp. Not available on Basic Display*
	MAX FAN DELAY TIME	0 min	20 min	2 min	*Max fan delay time. Not available on Basic Display*
	PUMP DOWN TIME	0 min	90 min	0 min	Minimum amount of time between de-energizing the liquid line solenoid/ compressor relay and energizing the defrost relay.
	MULTI AIR TEMP CTRL	Warmest or Average		Warmest Air	Warmest air = use the warmest air temp from bonded controls; Average air = use the average air temp from bonded controls
	MULTI EVAP COOL	Synchronized or Independent		Synchronized	Synchronized = synchronize bonded controller in refrigeration mode; Independent = bonded controllers control temperature independently in refrigeration mode.
	MULTI EVAP DEFROST	Synchronized or Independent		Synchronized	Synchronized = synchronize bonded controller in defrost mode; Independent = bonded controllers defrost independently
	MULTI EVAP SENSOR	Shared or Unshared		Shared	Shared = share sensor readings from bonded controllers; Unshared = use local sensor readings only
	SUCT PRES OFFSET	-5.0 Fº	5.0 Fº	0.0 Fº	An offset added or subtracted from the suction line pressure transducer reading, if needed
	SUCT TEMP OFFSET	-5.0 Fº	5.0 Fº	0.0 Fº	An offset added or subtracted from the suction temperature sensor reading, if needed
	COIL TEMP OFFSET	-5.0 Fº	5.0 Fº	0.0 Fº	An offset added or subtracted from the coil temperature sensor reading, if needed
	AIR TEMP OFFSET	-5.0 Fº	5.0 Fº	0.0 Fº	An offset added or subtracted from the room temperature sensor reading, if needed
	AUX 1 OFFSET	-5.0 Fº	5.0 Fº	0.0 Fº	When Aux1, Aux2, or Aux 3 are used as a temperature sensor, an offset is added or subtracted from the reading.
	AUX 2 OFFSET	-5.0 Fº	5.0 Fº	0.0 Fº	
	AUX 3 OFFSET	-5.0 Fº	5.0 Fº	0.0 Fº	
	PROPORTIONAL	0	255	3	A coefficient to the valve control algorithm that increases valve responsiveness as the value increases
	INTEGRAL	0	255	5	A coefficient to the valve control algorithm that increases valve responsiveness as the value increases
	DERIVATIVE	0	255	3	Should not be adjusted unless instructed by KE2 Therm
	AIR TEMP DIFF	0.1	5.0	1.0 Fº	The number of degrees above ROOM TEMP before the controller will go into REFRIGERATION mode
	DEFROST FAN STATE	Off	Off	On	Fan state during the defrost cycle
	MULTI AIR TEMP CTRL	Average	Warmest	Warmest	Select control method to use with multiple room temperature sensors
	MULTI EVAP COOL	Sync	Independent	Sync	Select type of multi evaporator control - options are synchronous or independent
	MULTI EVAP DEFROST	Sync	Independent	Sync	Select whether to have all bonded controllers initiate defrost mode at the same time or independently.
	MULTI EVAP SENSOR	Shared	Not Shared	Not Shared	Select whether or not to share room temperature, coil temperature and suction pressure sensor data with bonded controllers.

KE2 EvapOEM
Quick Start Guide

First Time Setup - Types of Control & KE2 Smart Access

Basic (Remote) Display Abbreviation	KE2 Combo Display Scrolling Text	Description
Ed	ELECTRIC DEFROST /TEV	Electric Defrost w/Mechanical valve
EdE	ELECTRIC DEFROST /EEV	Electric Defrost w/Electric Valve
Ad	AIR DEFROST /TEV	Air Defrost w/Mechanical Valve
AdE	AIR DEFROST /EEV	Air Defrost w/Electric Valve
SA	SMART ACCESS MODE	KE2 SmartAccess (Enabled/Disabled)

System Modes

Basic (Remote) Display Abbreviation	KE2 Combo Display Scrolling Text
rEF	REFRIGERATE
ddF	DEFROST DELAY FAN
dEF	DEFROST
drn	DRAIN TIME
FdL	FAN DELAY
SoF	SYSTEM OFF
oFF	OFF

Auxiliary Input Modes

Basic (Remote) Display Abbreviation	KE2 Combo Display Scrolling Text	Description
diS	DISABLED	Not used
rtP	ROOM TEMP	Room temp as measured by TAIR Input
CLt	COIL TEMP	Coil Temp as measured by TCOIL Input
oni	MONITOR	Monitoring Temp as measured by Aux Input
t2n	2ND (ROOM) TEMP	Inactive=2nd room temp SP off (t2F)/Active=2nd room temp SP on (t2n)
dor	DOOR SWITCH	Inactive=Door Closed (dCL)/Active=Door Open (don)
EA1/EA2/ EA3	EXTERNAL ALARM 1 EXTERNAL ALARM 2 EXTERNAL ALARM 3	Active=EAo / Inactive=EAF
SoF	SYSTEM OFF	Inactive=System On (Son)/Active=System Off (SoF)
dFi	DEFROST INTERLOCK	Inactive=Defrost Heaters normal (AUt)/Active=Defrost Heaters Off (oFF)
dFL	DEFROST LOCKOUT	Inactive=Defrost Normal (AUt)/Active=Defrost Not Allowed (dLo)

Variables Menu

Basic (Remote) Display Abbreviation	KE2 Combo Display Scrolling Text	Description
rtP	ROOM TEMP	Room Temperature as measured by controller
CLt	COIL TEMP	Coil Temperature as measured by controller
SYS	SYSTEM MODE	Current operating status
SHt	SUPERHEAT	Superheat as calculated by the controller
PrS	SUCTION PRESSURE	Suction Pressure as measured by controller
SUt	T1 SUCTION TEMP	Suction Temperature as measured by controller
SAt	SATURATION TEMP	Saturation Temperature as calculated by controller
oPn	VALVE % OPEN	Percentage EEV is open
Cor	COMPRESSOR RELAY	Current status of LLS/compressor relay
dEr	DEFROST RELAY	Current Status of Defrost relay
FAr	FAN RELAY	Current Status of Fan relay
AU1	DIG 1 STATUS	Current Status/Temperature as measured by controller at Aux input 1
AU2	DIG 2 STATUS	Current Status/Temperature as measured by controller at Aux input 2
AU3	DIG 3 STATUS	Current Status/Temperature as measured by controller at Aux input 3
iP1	IP OCTET 1	First 3 digits of IP address
iP2	IP OCTET 2	Second 3 digits of IP address
iP3	IP OCTET 3	Third 3 digits of IP address
iP4	IP OCTET 4	Fourth 3 digits of IP address
Fir	FIRMWARE VERSION	Current Version of firmware on controller

Valve Types

Basic (Remote) Display Abbreviation	KE2 Combo Display Scrolling Text	Description
tHr	MECHANICAL	Traditional Thermostatic Expansion Valve
HS	HSV	KE2 Therm's Hybrid Stepper Valve
rS	RSV	KE2 Therm's Refrigeration Stepper Valve
SEi	SEI	Sporlan Valve with 1,600 steps
SEr	SER	Sporlan Valve with 2,500 steps
CrL	CAREL	Carel Valve with 500 steps

Refrigerants

Abbreviation	Full Name
R22	R-22
134	R-134a
42d	R-422D
42A	R-422A
40C	R-407C
40A	R-407A
507	R-507
404	R-404A
513	R-513A
450	R-450A
449	R-449A
448	R-448A
744	R-744
410	R-410A
407	R-407F
409	R-409A
408	R-408A
438	R-438A
717	R-717
452	R-452A
458	R-458A

KE2 EvapOEM
Quick Start Guide

Alarm Status Menu

Basic (Remote) Display Abbreviation	KE2 Combo Display Scrolling Text	Description
PSA	**PRESSURE SENSOR**	Suction pressure sensor is shorted, open or pressure out of range
SSA	**SUCTION TEMP SENSOR**	Suction temperature sensor is shorted or open
ASA	**AIR TEMP SENSOR**	Return air temperature sensor is shorted or open
CSA	**COIL TEMP SENSOR**	Coil temperature sensor is shorted or open
HSH	**HIGH SUPERHEAT**	Superheat above upper limit
LSH	**LOW SUPERHEAT**	Superheat below lower limit
HtA	**HIGH AIR TEMP**	Room temperature is above ROOM TEMP + AIR TEMP DIFF + HIGH TEMP ALARM OFFSET for longer than HIGH TEMP ALARM DELAY
LtA	**LOW AIR TEMP**	Room temperature is below ROOM TEMP - LOW TEMP ALARM OFFSET for longer than LOW TEMP ALARM DELAY
EdF	**EXCESS DEFROST**	Excess Defrost Alarm - 32 defrosts or more within 48 hours
dtt	**DEFR TERM ON TIME**	Defrost terminated on time instead of temperature for two consecutive cycles
dor	**DOOR SWITCH**	Door Open Alarm - If door is open and room temperature is 5 degrees above ROOM TEMP + AIR TEMP DIFF for DOOR ALARM DELAY time
CoA	**COMMUNICATION ERROR**	ONLY FOR BONDED CONTROLLERS: No communication between controllers for one minute or more
EA1	**EXTERNAL ALARM 1**	If AU1 IN MODE = EXT ALARM: The digital input is in an active state
EA2	**EXTERNAL ALARM 2**	If AU2 IN MODE = EXT ALARM: The digital input is in an active state
EA3	**EXTERNAL ALARM 3**	If AU3 IN MODE = EXT ALARM: The digital input is in an active state
EFL	**EMAIL FAILURE**	Email alert was not confirmed by email server provided after seven consecutive attempts
A1A	**AUX1 SENSOR**	AU1 temperature sensor is shorted or open
A2A	**AUX2 SENSOR**	AU2 temperature sensor is shorted or open
A3A	**AUX3 SENSOR**	AU3 temperature sensor is shorted or open
Pdt	**PUMP DOWN TIMEOUT**	Max time for LPCO pumpdown exceeded
SCC	**SHORT COMP CYCLE**	Compressor is started an excessive number of times to maintain suction pressure
LPA	**LOW PRESSURE**	Suction pressure dropped below expected point excessive number of times
PrF	**N/A**	Basic Display is not communicating to the controller

Alphabetical List of Abbreviations

Abbreviation	Full Name	Type	Description
A1A	Aux Input 1 state	Setpoint	oPn= active if input is an open / CLo=active if input is shorted
A1A	AU1 Temp sensor Alarm	Alarms	AU3 temperature sensor is shorted or open
A2A	Aux Input 2 state	Setpoint	oPn= active if input is an open / CLo=active if input is shorted
A2A	AU2 Temp sensor Alarm	Alarms	AU2 temperature sensor is shorted or open
A3A	Aux Input 3 state	Setpoint	oPn= active if input is an open / CLo=active if input is shorted
A3A	AU3 Temp sensor Alarm	Alarms	AU3 temperature sensor is shorted or open
Ad	Air Defrost w/Mechanical valve	Type of Control	System operates with default values for Air Defrost and Mechanical Valve
AdE	Air Defrost w/EEV	Type of Control	System operates with default values for Air Defrost and Electric Valve
Ai	Air Defrost (Off time)	Setpoint	Option for evaporator Defrost Type (dtY) - Air Off time Defrost is used; other options Electric (ELE), Hot Gas w Compressor On (HGN),or Hot Gas with Compressor Off
ASA	Air Sensor Alarm	Alarms	Return air temperature sensor is shorted or open
AU1	Aux Input 1	Variables	Current status/temperature as measured by controller at Aux1 input
AU1	Aux Input 1 mode	Setpoint	Options for configuring the Auxiliary Input, see Auxiliary Input Modes table
AU2	Aux Input 2	Variables	Current Status/Temperature as measured by controller at Aux2 input
AU2	Aux Input 2 mode	Setpoint	Options for configuring the Auxiliary Input, see Auxiliary Input Modes table
AU3	Aux Input 3	Variables	Current Status/Temperature as measured by controller at Aux3 input
AU3	Aux Input 3 mode	Setpoint	Options for configuring the Auxiliary Input, see Auxiliary Input Modes table
AUt	Defrost Interlock -Heaters Normal	Auxiliary Input	Inactive = defrost heaters normal
AUt	Defrost Lockout - Defrost Normal	Auxiliary Input	Inactive = defrost will occur by normal controller logic
CEL	Celsius	Setpoint	Option for the units for the temperature display in degrees - Celsius or Fahrenheit (FAH)
CLA	Clear Alarms	Setpoint	Press and hold to clear all active alarms
CLo	Closed	Setpoint	Option under Auxiliary Input State
CLt	Coil Temp	Variables	Coil temperature (TCoil Sensor) as measured by the controller
CLt	Coil Temp	Auxiliary Input	Coil Temp as measured by Aux input
CoA	Communication Alarm	Alarms	ONLY BONDED CONTROLLERS: No communication between controllers for one minute or more
Cor	Compressor Relay	Variables	Current state of liquid line solenoid/compressor relay
CrL	Carel	Valve Type	Carel valve with 500 steps
CSA	Coil Sensor Alarm	Alarms	Coil temperature sensor is shorted or open
CYC	Cycle	Setpoint	Option under Refrig Fan Type (rFt) to cycle (Managed) fans during refrig cycle
dAd	Door Open Alarm Delay	Setpoint	If AU IN (1, 2 and/or 3) MODE = dor 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

KE2 EvapOEM
Quick Start Guide

Alphabetical List of Abbreviations (continued)

Abbreviation	Full Name	Type	Description
dCL	Door Switch - Door Closed	Auxiliary Input	Door switch indicates door is closed
ddF	Defrost Delay Fan	System Mode	At defrost, fans will continue running for several minutes, using stored cooling in the coil. Once the coil reaches room temp, the fans will stop, and the heaters will turn on and begin the electric defrost.
dEF	Defr Parameter	Setpoint	if DEFROST MODE = DEMAND: Coefficient to KE2 Defrost algorithm
dEF	Defrost	System Mode	Controller is performing a defrost cycle
dEr	Defrost Relay	Variables	Current state of the defrost relay
dFi	Defrost Interlock Switch	Auxiliary Input	Inactive=Defrost Heaters normal (AUT)/Active=Defrost Heaters Off (OFF)
dFL	Defrost Lockout Switch	Auxiliary Input	Inactive=Defrost Normal (AUT)/Active=Defrost Not Allowed (dLO)
dHC	DHCP	Setpoint	Turn DHCP mode on or off: EnA to enable DHCP mode / DiS to disable DHCP mode
diA	Diagnostics Mode	Setpoint	Energizes each relay individually for 60 seconds: fan relay, defrost relay, compressor relay
diS	Disabled	Auxiliary Input	Input is not used by the controller
dLo	Defrost Lockout	Auxiliary Input	Active = Defrost not allowed while signal is active
dnd	Demand Defrost	Setpoint	Option for Defrost Initiation Mode (ind) - when Demand Defrost (dnd) selected, system defrosts only when dictated by decrease in evaporator efficiency; other options: Scheduled (SCH) or Compressor Run Time (rnt)
don	Door Switch - Door Open	Auxiliary Input	Door switch indicates door is open
dor	Door Switch	Auxiliary Input	Inactive=Door Closed (dCL)/Active=Door Open (don)
dor	Door Open Alarm	Alarms	If door is open & room temp is 5 degrees above ROOM TEMP + AIR TEMP DIFF for DOOR ALARM DELAY time
dPd	Defrosts per day	Setpoint	If DEFROST MODE = SCH: The number of evenly spaced defrosts per day the controller will initiate.
drn	Drain Time	Setpoint	Time to be in drain mode (drip time)
drn	Drain	System Mode	Time after defrost to allow moisture to drain from coil
dtL	Max Defrost Time	Setpoint	If DEFROST MODE = SCH: The maximum amount of time the defrost relay will be energized. (Not available if DEFROST MODE = DEMAND)
dtP	Defr Term Temp	Setpoint	Temp the coil sensor(s) must exceed to terminate defrost. Controller's defrost mode is complete at this point
dtt	Defr Term on Time Alarm	Alarms	Defrost terminated on time instead of temperature for two consecutive cycles
dtY	Defrost Type	Setpoint	Type of Defrost: ELE - Electric; Ai - off time; HGn - hot gas w.comp on; HGF - hot gas w/comp off
EA1	External Alarm Switch	Auxiliary Input	Active=EAo / Inactive=EAF
EA1	External Alarm 1	Alarms	If AU1 IN MODE = EXT ALARM: The digital input is in an active state
EA2	External Alarm 2	Alarms	If AU2 IN MODE = EXT ALARM: The digital input is in an active state
EA3	External Alarm 3	Alarms	If AU3 IN MODE = EXT ALARM: The digital input is in an active state
EAo	External Alarm Switch Active	Auxiliary Input	External Alarm switch is receiving Active signal
EAF	External Alarm Switch Inactive	Auxiliary Input	External Alarm switch is not receiving external signal
Ed	Electric Defrost w/Mech. valve	Type of Control	System operates with default values for Electric Defrost with Mechanical Valve
EdE	Electric Defrost w/EEV	Type of Control	System operates with default values for Electric Defrost with Electric Valve
EdF	Extreme Temp Diff	Setpoint	ADVANCED TOPIC: Call KE2 Therm for assistance
EdF	Excess Defrost Alarm	Alarms	32 defrosts or more within 48 hours
Edt	Valve Type	Setpoint	Type of valve used on the system: mechanical, pre-configured electric, custom EEV configuration
EFL	Email Failure Alarm	Alarms	Email alert was not confirmed by email server provided after seven consecutive attempts
ELE	Electric Defrost	Setpoint	Option for evaporator Defrost Type (dtY) - Electric defrost heaters used; other options, Hot Gas w Compressor Off (HGF), Hot Gas with Compressor On (HGn) or Air Off time Defrost (Ai)
EnA	Enabled	Setpoint	Enabled - Option to allow connection with KE2 Smart Access
FAC	Factory reset	Setpoint	Press and hold to reset the controller to the factory default setpoints
FAH	Fahrenheit	Setpoint	Option for units for the temperature display, in degrees - Fahrenheit or Celsius (CEL)
FAr	Fan Relay	Variables	Current state of the fan relay
FdL	Fan Delay	System Mode	Coming out of defrost, the LLS relay will be energized, and the coil will pulldown until it reaches 20ºF, or 2 minutes, before the fans turn on. This allows any moisture on the coil to re-freeze, keeping it from spraying and forming ice drops on the walk-in's surfaces.
Fir	Firmware Version	Variables	Current version of the firmware on the controller
FoC	Fans on with Compressor	Setpoint	Option under Refrig Fan Type (rFt) to manage fans in OFF, then turn ON in refrigeration
HAd	High Temp Alarm Delay	Setpoint	Minutes the room temperature must remain above ROOM TEMP + HIGH TEMP ALARM OFFSET before issuing a HIGH TEMP ALARM
HAo	High Temp Alarm Offset	Setpoint	The number of degrees above ROOM TEMP for a HIGH TEMP ALARM condition.
HGF	Hot Gas Defrost w. Compressor Off	Setpoint	Option for evaporator Defrost Type (dtY) - Hot Gas defrost used with the Compressor Off; other options Electric (ELE), Hot Gas w Compressor On (HGN), or Air Off time Defrost (Ai)
HGn	Hot Gas Defrost w. Compressor On	Setpoint	Option for evaporator Defrost Type (dtY) - Hot Gas defrost used with the Compressor On; other options Electric (ELE), Hot Gas w Compressor Off (HGF), or Air Off time Defrost (Ai)
HS	HSV	Valve Type	KE2 Therm's HSV, Hybrid Stepper Valve
HSH	High Superheat Alarm	Alarms	Superheat above upper limit
HtA	High Temperature Alarm	Alarms	Room temperature is above ROOM TEMP + AIR TEMP DIFF + HIGH TEMP ALARM OFFSET for longer than HIGH TEMP ALARM DELAY
Htn	Electric Defrost Mode	Setpoint	If DEFROST TYPE = ELE: Whether to leave the defrost relay energized during the defrost cycle or to utilize advanced defrost algorithm.
ind	Defrost Ini Mode	Setpoint	Mode to initiate a defrost: dnd=demand / SCH=Schedule / rnt=comp run time
iP1	IP Address Part 1	Variables	The first three digits of the IP address
iP2	IP Address Part 2	Variables	The second three digits of the IP address

KE2 EvapOEM
Quick Start Guide

Alphabetical List of Abbreviations (continued)

Abbreviation	Full Name	Type	Description
iP3	IP Address Part 3	Variables	The third three digits of the IP address
iP4	IP Address Part 4	Variables	The fourth three digits of the IP address
LAd	Low Temp Alarm Delay	Setpoint	Minutes the room temperature must remain below ROOM TEMP + LOW TEMP ALARM OFFSET before issuing a LOW TEMP ALARM
LAo	Low Temp Alarm Offset	Setpoint	The number of degrees below ROOM TEMP for a LOW TEMP ALARM condition.
LPA	Low Pressure Alarm	Alarms	Suction pressure dropped below expected point excessive number of times
LPC	Low Pressure Cut Out	Setpoint	Only applies when non-mechanical valve selected
Lpd	Press Diff for LPCO	Setpoint	Only applies when non-mechanical valve selected
LPt	Max Time for LPCO	Setpoint	Only applies when non-mechanical valve selected
LSH	Low Superheat Alarm	Alarms	Superheat below lower limit
LtA	Low Temperature Alarm	Alarms	Room temperature is below ROOM TEMP - LOW TEMP ALARM OFFSET for longer than LOW TEMP ALARM DELAY
oFF	Off	System Mode	System has satisfied on temperature
oFF	Defrost Heaters Off	Auxiliary Input	Defrost heaters are being interrupted by external input
oni	Monitor Temp	Auxiliary Input	Monitoring Temp as measured by Aux Input
oPn	Valve% Open	Variables	Percentage the EEV is open (only available if EEV is selected)
oPn	Open	Setpoint	Option under Auxiliary Input State
PAS	Web password reset	Setpoint	Press and hold to reset the web password to the factory default
Pdt	Pump Down Timeout	Alarms	Max time for LPCO pumpdown exceeded
PEr	Permanent Fan	Setpoint	Option under Refrig Fan Type (rFt) to have fans on permanently during refrigeration cycle
PrF	Process Failure	Alarms	Display is not communicating to the controller
Prn	Permanent	Setpoint	Option when Defrost Type (dtY) is set for Electric (ELE) - Permanent (Prn) means defrost relay is energized during the entire defrost cycle; other option Pulse (PUL) uses the advanced defrost algorithm to cycle the relay
PrS	Suction Pressure	Variables	Suction pressure measured by the controller (only available if suction pressure transducer used)
PSA	Pressure Sensor Alarm	Alarms	Suction pressure sensor is shorted, open or pressure out of range
PUL	Pulse	Setpoint	Option when Defrost Type (dtY) is set for Electric (ELE) - Pulse (PUL) uses the advanced defrost algorithm to energize the defrost relay during the defrost cycle; other option Permanent (Prn)
rEF	Refrigeration	System Mode	Indicates the system is currently in Refrigeration mode
rFG	Refrigerant	Setpoint	Type of refrigerant used: see table below
rFt	Refrigeration Fan Type	Setpoint	Select how fans will be run: Manage/Cycle, Permanent, On with Compressor, Title 24
rnt	Compressor Run Time	Setpoint	Option for Defrost Initiation Mode (ind) - when Compressor Run Time (rnt) selected, number of hours cooling before starting defrost; other options are Demand Defrost (dnd) or Scheduled (SCH)
rS	RSV	Valve Type	KE2 Therm's (RSV) Refrigeration Stepper Valve
rtP	Room Temp	Variables	Walk-in freezer or cooler room temperature (TAir Sensor) as measured by the controller
rtP	Room Temp	Auxiliary Input	Room temp as measured by Aux Input
SA	KE2 Smart Access	Setpoint	Turn KE2 Smart Access on or off: EnA to enable KE2 Smart Access / DiS to disable
SAt	Saturation Temp	Variables	Saturation temperature as calculated by the controller (requires pressure transducer and T1 sensor)
SCC	Short Compressor Cycle	Alarms	Compressor is started an excessive number of times to maintain suction pressure
SCH	Scheduled Defrost	Setpoint	Option for Defrost Initiation Mode (ind) - when Scheduled (SCH) selected, system defrosts on a programmed schedule; other options for (Ind) are Demand Defrost (dnd) or Compressor Run Time (rnt)
SEi	SEI	Valve Type	Sporlan Valve with 1,600 Steps
SEr	SER	Valve Type	Sporlan Valve with 2,500 Steps
SHt	Superheat	Variables	Superheat as calculated by the controller (requires suction pressure transducer and TSUC sensors)
SoF	System Off Switch	Auxiliary Input	Inactive=System On (Son)/Active=System Off (SoF)
SoF	System Off	System Mode	System has been turned off by external signal
Son	System Off Switch - System On	Auxiliary Input	Inactive=System On (Son)/Active=System is running normally
SSA	Suction Sensor Alarm	Alarms	Suction temperature sensor is shorted or open
Stt	Superheat	Setpoint	Superheat setpoint
SUt	Suction Temp	Variables	Suction Temperature as measured by controller
SYS	System Mode	Variables	Current operating status
t2F	2nd Room Temp Setpoint Off	Auxiliary Input	System is controlling to Room Temp setpoint
t2n	2nd Temp Switch	Auxiliary Input	Inactive=2nd room temp SP off (t2F)/Active=2nd room temp SP on (t2n)
tHr	Mechanical	Valve Type	Thermostatic Expansion Valve
t24	Title 24	Setpoint	Option under Refrig Fan Type (rFt) to cycle fans based on compliance with California Title 24 regulations
tS	Room Temp SP	Setpoint	Walk-in freezer or cooler room temperature to be maintained
tS2	2nd room temp SP	Setpoint	If AU IN (1, 2 and/or 3) MODE = (t2n) 2ND ROOM TEMP: This value becomes the ROOM TEMP setpoint when the digital input is active
Unt	Temperature Units	Setpoint	Units for temperature's display in °F or °C

KE2 EvapOEM
Quick Start Guide

Introduction to KE2 Smart Access

KE2 Smart Access provides quick and easy, real time access to your refrigeration systems, 24/7

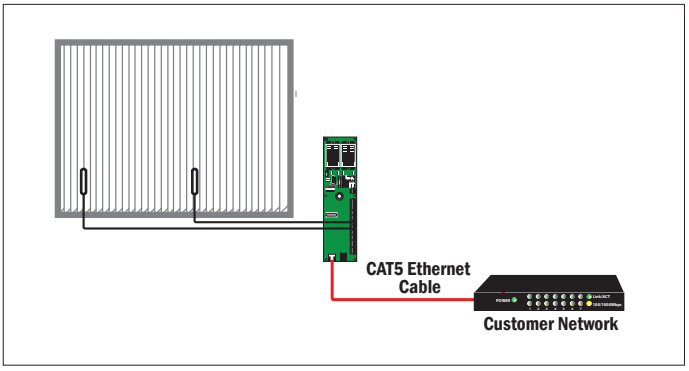
Now it's easier than ever to monitor and adjust your KE2 Evap OEM remotely. While the KE2 Evap OEM's free connectivity is still available, some customers prefer the simplicity and convenience of KE2 Smart Access to enjoy the benefits of the controller's communication capability.

All the KE2 Evap OEM needs is a physical connection to the network router with a cat 5 cable. Once enabled, KE2 Smart Access quickly connects to your personal web portal, hosted by KE2 Therm, and provides a "customized" dashboard of all the controllers you setup with KE2 Smart Access, akk for a nominal monthly fee. No port forwarding. No VPN.

KE2 Smart Access - Online Access In 3 Easy Steps

Preliminary

Connect the KE2 Evap OEM to the customer's network.



Step 1 Enable KE2 Smart Access in the Setpoints menu

- After the initial Introduction Mode setup, press and hold the ENTER button.
- Press the ▲ arrow two times to view **SA** (abbreviation for KE2 Smart Access). Press ENTER, then use the ▲ arrow to change **diS** (disabled) to **EnA** (enabled)

Press and hold the ENTER button for 3 seconds to save the change.

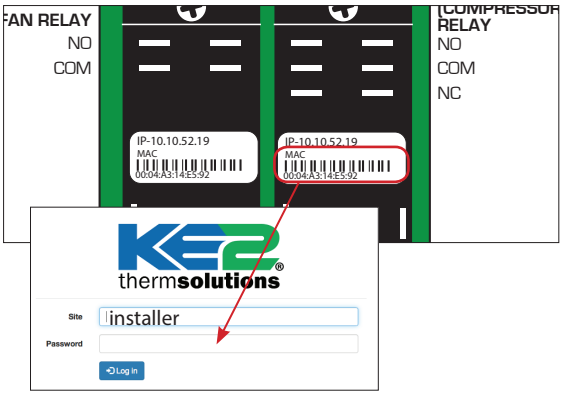
Step 2 Go to smartaccess.ke2therm.net

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

Step 3 Enter default information and click Log In button

Site: installer

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



For additional information on KE2 Smart Access, visit:

http://ke2therm.com/productliteratureevap4.html
and see bulletins A.1.76 The KE2 Evap v4.0 with KE2 Smart Access and Q.1.34 KE2 Smart Access Setup and Customizing.

Visit our YouTube channel for videos on KE2 Smart Access.

youtube.com/ke2therm

Q.1.45 May 2019 supersedes Q.1.45 June 2018, and all prior publications.

KE2 Therm Solutions
12 Chamber Drive . Washington, MO 63090
1.888.337.3358 . www.ke2therm.com

pn 21350