KE2 thermsolutions

First year free
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KE2 EvapOEM
Quick Start Guide
pn21231 (21214v2.02)

Q.1.45
May 2020

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*Get your controller online, & benefit from remote monitoring, control, and text / e-mail alarm notices.
Just a few easy steps, with*
KE2 Smart Access

Contents

Technical Videos

KE2 Therm has created quick technical videos based on commonly asked questions, and are often the quickest way to find the answer to common questions:

KE2 Therm YouTube channel:

https://www.youtube.com/user/KE2Therm/videos

Ice buildup on coil:

https://youtube.com/watch?v=RHXX3ane5as

Troubleshoot temperature sensor:

https://www.youtube.com/watch?v=JI789uGUKRM

Troubleshoot pressure transudcer:

https://www.youtube.com/watch?v=4MvlXVh-Dic

Connect directly to the controller (static IP):

https://www.youtube.com/watch?v=NjRLXLGnbkU

Overview

The KE2 Evap OEM provides the energy savings, precise temperature control, frost reduction, and communications capability of the KE2 Evaporator Efficiency in a compact and economical package. It replaces and performs the function of multiple mechanical components such as the thermostat, defrost time clock, defrost termination, and fan delay. The KE2 Evap OEM controls the liquid line solenoid (LLS), evaporator fans, and defrost heaters (if present). It is able to control an electronic expansion valve (EEV) to regulate superheat, but will also function with a mechanical thermostatic expansion valve.

Defrosts are initiated by a proprietary calcutation of actual evaporator efficiency. When evaporator efficiency has dropped to 90%, the controller will initiate a defrost. Defrost is terminated based on one or more coil temperature sensors. To maximize efficiency, fans may run for several minutes at the start of a defrost before turning off fans and energizing heaters.

Fans are also managed in a unique way. If wired to control fans and fan management is enabled, during the off cycle the controller will intelligently cycle fans based on room and coil temperature for precise room temperature control. Fans should always be running when the controller is calling for refrigeration.

Communications capability on the KE2 Evap OEM was designed with the service technician in mind. The controller has built-in webpages that show system performance in real time, allow setpoint changes, provide a 30 day room/coil temperature graph, and a 30 day datalog of all variables. The webpages can be accessed by smartphone or tablet through a KE2 Therm Wi-Fi accessory, a local network, or by plugging directly into the controller with a Cat5e cable and laptop. If the controller is provided wired internet access, it can be accessed remotely via KE2 SmartAccess.

This **Quickstart** guide provides an overview of the controller, general wiring, basic display operation, and setpoints. Please follow the link below for the latest version of this document, alarm troubleshooting guide, and webpage explanations for further information.

KE2 Evap OEM Literature
https://ke2therm.com/literature/literature-ke2-evap-oem/

KE2 Combo Display
KE2 Evap OEM controllers may be installed with the KE2 Combo Display. The KE2 Combo Display provides a remote display for the KE2 Evap OEM and a number of extra features. Please follow the link below for further information on the KE2 Combo Display.

KE2 Combo Display Literature
https://ke2therm.com/literature/literature-ke2-combo-display/

KE2 Combo Display

- Remote Display
- Door Heater Control
- Light Control
- Temp Alarm
- Panic Alarm

+

KE2 Evap OEM

- TEV/EEV
- Precise Room Temperature
- Evap. Fan Management
- Liquid Line Sol./ Comp. Contactor
- Defrost Heater Management
- Multiple Alarms
- Remote Access & Control
- Data Logging

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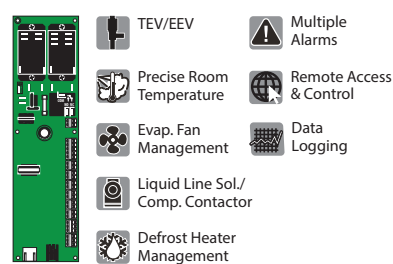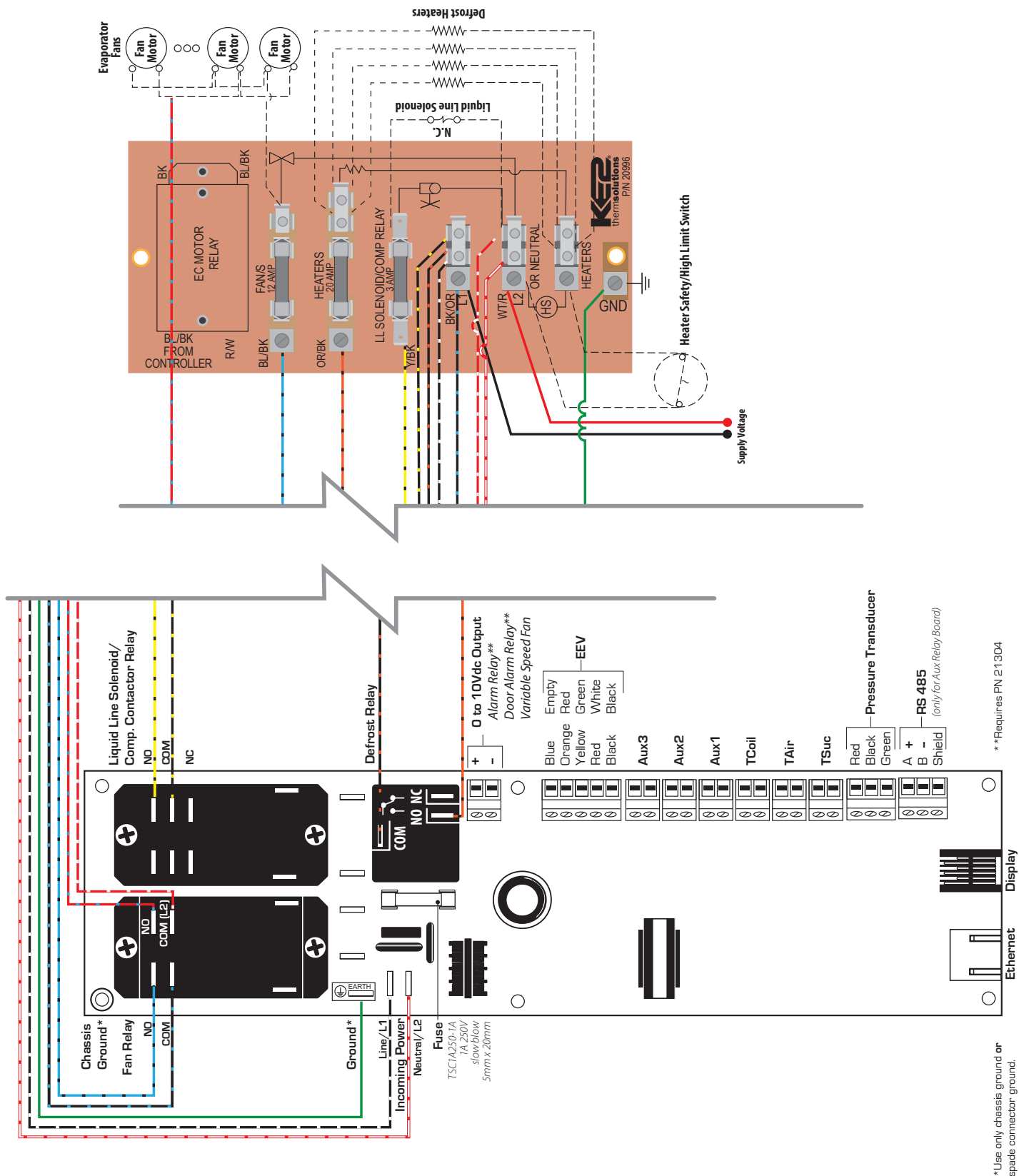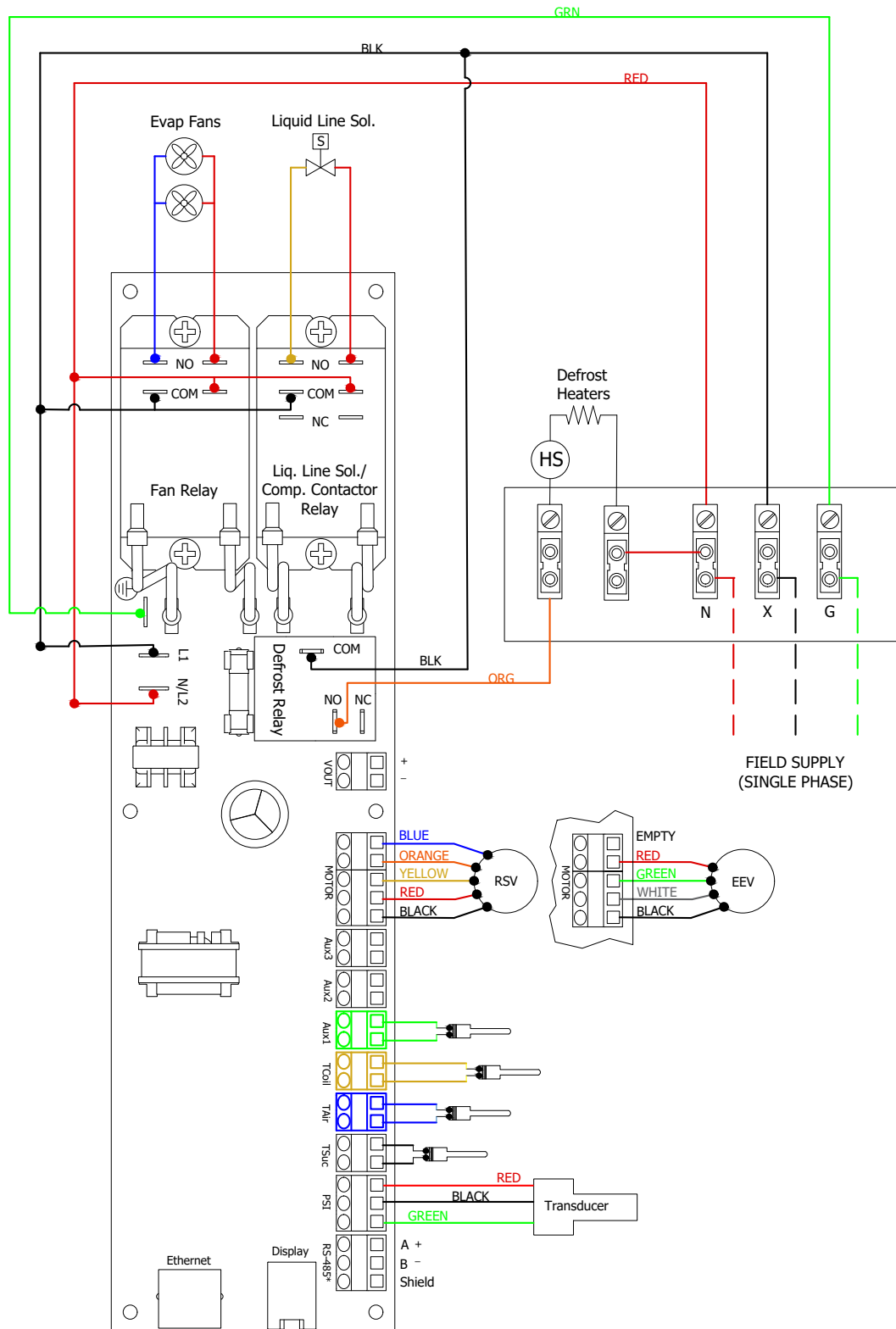
Point to Point Wiring Diagram - Controller with KE2 Terminal Board

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General Wiring Diagram - Controller without KE2 Terminal Board

FIELD SUPPLY
(SINGLE PHASE)

*Only for use with Aux Relay Board.

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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 recommended combined length for extension is 100 ft.

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.

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

■ 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.

Figure 1

1.5"
.5"
Epoxy
Thermistor
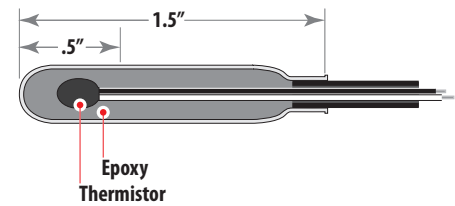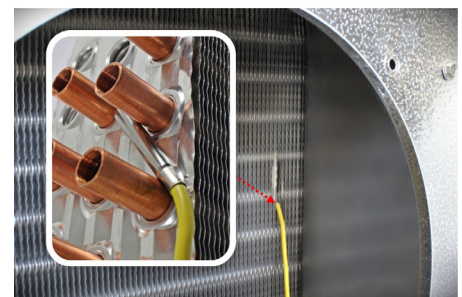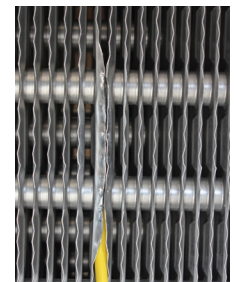
Figure 2

Figure 3a   **Figure 3b**

Technical Videos

Further information on coil sensor placement and installation are available in the videos below:

Determine coil sensor location:
https://www.youtube.com/watch?v=ZZWfEkNK-cE

Properly install a coil sensor:
https://www.youtube.com/watch?v=Q9p3rcjKlAM

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KE2 Basic (Remote) Display

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

Navigation Using the Basic Display

Indicator lights		
●	Red light	Critical alarm (system not running)
○	Yellow light	Non-critical alarm (system running)
○	Green light	Liquid line solenoid/compressor on
○●	Green flashing	Liquid line solenoid/compressor waiting on start/stop timer

- **Access the basic setpoint menu by pressing ENTER until tS (temperature setpoint) displays on the screen.**
- **Press ▲ or ▼ to scroll through available setpoints.**
- **Press ENTER to view the current setting.**
- **Press ▲ or ▼ to change the setpoint. Press ENTER to move between the digits to accelerate the changes.**
- **Press and hold ENTER to confirm each setpoint change.**
- **Press BACK to escape.**

Controller Setup

Upon initially applying power to the controller, the controller will initialize, then enter **Introduction Mode**. Introduction Mode consists of four **Types of Control**. A maximum of four steps are required to begin refrigeration.

Step 1

Press ▲ or ▼ to move through the available **Types of Control**. Once the correct option is displayed, press and hold the ENTER button for 3 seconds.

Ed	`Ed`	Electric Defrost with Mechanical TEV
AdE	`AdE`	Air Defrost with Electric Expansion Valve (EEV)
Ad	`Ad`	Air Defrost with Mechanical TEV
EdE	`EdE`	Electric Defrost with Electric Expansion Valve (EEV)

Note: For mechanical valve control options (Ed and Ad), go to Step 4.
For EEV control options (Ede and AdE), go to Step 2.

Step 2

Next, the controller asks for the **Expansion Valve Type** and display **rS (RSV)**. If this is the correct valve, press and hold ENTER for 3 seconds. If not, press ▲ or ▼ to select the correct valve. See pg. 10 for a list of valve types.

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

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

Step 3

The controller next prompts for **Refrigerant Type** and displays **404 (R-404a)**. Press ▲ or ▼ to change the selection. See pg. 10 for a list of refrigerants.

Once you have the correct refrigerant, press and hold ENTER for three seconds.

Step 4

The final prompt is to set **KE2 SMART ACCESS** to **ENABLED** or **DISABLED**. **KE2 SMART ACCESS** allows you to easily view and modify your controllers online. Press ▲ or ▼ to make your selection, then press and hold ENTER for **three seconds.**

THESE ARE THE ONLY SETPOINTS REQUIRED TO BEGIN REFRIGERATION.

Variables Menu

When not in a menu, press ▲ or ▼ to cycle through the **Variables**. The variables show important system information in real time. Press ENTER to toggle between the variable name and value.

Changing Setpoints

Press and hold ENTER until tS is displayed to enter the **Basic Setpoints** menu. Press ENTER to toggle between the setpoint and its current value.

Press and hold BACK until tS is displayed to enter the **Advanced Setpoints** menu. Press ENTER to toggle between the setpoint and its current value.

▲ or ▼ will increase or decrease number value or scroll through the available options. Press ENTER momentarily to change the number being modified.

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

To cancel changes, press BACK to return to the setpoint abbreviation.

Manual Valve Control

Press and hold BACK and ▼ to switch to EEV **Manual Control** mode. The current valve open percentage will be displayed. To open the valve press ▲. To close the valve press ▼. The controller will immediately attempt to move the valve in the direction indicated. ENTER will advance to the next digit. BACK will exit this mode and return to automatic control.

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Manual Defrost

Press and hold **ENTER** and ▼ to put the controller into **Defrost**. The defrost will terminate automatically based on coil temperature, however, pressing and holding **ENTER** and ▼ again during defrost will skip to drain (drip) mode.

Note: Fans may run for the first few minutes of electric defrost before fans turn off and heaters are energized.

System Off (Pumpdown)

Press and hold **BACK** and ▲ at the same until **SoF** is displayed. The controller is in system off and will not refrigerate or defrost until system off is cleared or one hour has passed. Press and hold **BACK** and ▲ again to exit system off.

Display Lock

Press and hold **BACK** and **ENTER** at the same until **LoC** is displayed. The display will be locked and show **LoC** whenever a button is pressed. To unlock, press and hold **BACK** and **ENTER** until **LoC** dissapears.

Diagnostics Mode

The KE2 Evap OEM has been programmed with a diagnostics mode. When activated in the advanced setpoints menu, the controller energizes each relay for 30 seconds. When the compressor relay is on the EEV will regulate to the Superheat setpoint.

To activate diagnostics mode, go to **dIA** in the Advanced Menu. Press and hold **ENTER** until fan relay **FAr** is displayed. The defrost relay **dEr**, then compressor relay **CPr** will be energized in turn.

Display Firmware

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

Display Address

Simultaneously pressing and holding ▲ and ▼ 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 webpages.

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

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

Bonding (Multi-Evap Applications)

Bonding allows multiple contollers to synchronize refrigeration and/or defrost. It is required on systems with multiple evaporators on one condensing unit with no unloading capability. Bonding can be done easily through the controller webpages, but can also be done from the KE2 Basic Display. Bonding is limited to two controllers through the KE2 Basic Display.

Run a Cat5e cable between the two controllers. Plug the cable into the Ethernet port at each controller. The cable will remain permanently plugged into both controllers in order to allow the sychronization. Cables can also be run from each controller to a network switch, however, only the two controllers to be bonded can be connected to the switch during the bonding process.

Go to **bnd** in the Advanced Menu. Press and hold **ENTER** until the red LED is blinking. Wait several seconds. **PAS** means the bond was successful and both controllers will restart. **FAn** means the bond failed, check cables and ensure only two KE2 Evap OEM controllers are on the network before trying again.

To unbond controllers from the display, go to **Unb**. Press and hold **ENTER** until the red LED is blinking. Wait several seconds. The controllers will unbond and restart. If bonded to more than one controller, the controllers must be unbonded using the webpages.

Note: Only controllers with the same firmware and version can be bonded.

Pairing (Lead/Lag, KE2 Combo Display)

Pairing is used to setup two KE2 Evap OEM controllers for lead/lag control, or to allow them to both be displayed on a KE2 Combo Display.

Run a Cat5e cable between the two controllers. Plug the cable into the Ethernet port at each controller. The cable will remain permanently plugged into both controllers in order to communicate. Cables can also be run from each controller to a network switch, however, only the two controllers to be paired can be connected to the switch during the bonding process.

Go to **PAr** in the Advanced Menu. Press and hold **ENTER** until the red LED is blinking. Wait several seconds. **PAS** means the pair was successful. **FAn** means the pair failed, check cables and ensure only two KE2 Evap OEM controllers are on the network before trying again. Press **ENTER** again to return to the Advanced Menu.

To enable lead/lag control, go to **LLC** in the Advanced Menu. Select **LCt** for redudant cool, **LOF** for redundant off, or **ALt** for Alternate. If using a redundant mode, the default switch time is 12 hours. This can be adjusted using the Lead/Lag Time setpoint **LLt**. Please confirm the 2nd Room Temp setpoint **tS2**, as this will be the backup temperature setpoint for the lag controller.

To unpair controllers from the display, go to **UnP**. Press and hold **ENTER** until the red LED is blinking. Wait several seconds. **PAS** means the unpairing was successful. **FAn** means the unpair failed. Press **ENTER** again to return to the Advanced Menu.

Note: Only controllers with the same firmware and version can be paired.

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Menus and Parameters

BASIC Setpoints Menu - Press and hold ENTER

Basic Display Abbreviation	KE2 Combo Display Scrolling Text	Min	Max	Default	Description
tS	ROOM TEMP	-50.0°F	90.0°F	0.0°F	Room temperature to be maintained.
rFG	REFRIGERANT	N/A	N/A	R-404A	Refrigerant used. See table on page 10.
dtY	DEFROST TYPE	N/A	N/A	Electric	(ELE) for Electric. (Air) for off time. (HGn) for hot gas with LLS relay on. (HGF) for hot gas with LLS relay off.

ADVANCED Setpoints Menu - Press and hold BACK. Setpoints with grey background only appear when the related setpoint is selected.

Basic Display Abbreviation	KE2 Combo Display Scrolling Text	Min	Max	Default	Description
tS	ROOM TEMP	-50.0°F	90.0°F	0.0°F	Room temperature to be maintained.
rFG	REFRIGERANT	N/A	N/A	R-404A	Refrigerant used. See table on page 10.
dtY	DEFROST TYPE	N/A	N/A	Electric	(ELE) for Electric. (Air) for off time. (HGn) for hot gas with LLS relay on. (HGF) for hot gas with LLS relay off.
Edt	VALVE TYPE	N/A	N/A	Mechanical	Expansion valve used on system. See table on page 10.
ind	DEFROST MODE	N/A	N/A	Demand	Mode to initiate defrost. (dnd) demand. (SCH) schedule. (rnt) comp run time.
dPd	DEFROSTS / DAY	0	8	5	**If DEFROST MODE = SCH:** Defrosts per day. Number of evenly spaced defrosts per day.
dtP	DEFROST TERM TEMP	35.0°F	90.0°F	50.0°F	Temperature the coil sensor(s) must exceed to terminate defrost.
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:** Maximum amount of time the defrost relay will be energized.
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 w/ Compressor	Select evaporator fan management. (CYC) cycle, i.e. manage, fans during refrigeration and off cycle. (FoC) fans on w/ compressor will primarily manage fans only during the off cycle. (PEr) permanent forces fans to run during refrigeration and off cycle. (t24) Title 24 cycles fans based on Title 24 regulations.
FtS	MIN FAN SWITCH TIME	10 sec	240 sec	10 sec	Minimum time before fans can be turned on again after turning off.
Stt	SUPERHEAT	5.0 F°	30.0 F°	EEV = 8.0 F° TEV = 20.0 F°	Target superheat value. Only applies when non-mechanical valve selected. When mechanical valve is selected, it is the high superheat alarm threshold.
LPt	LOW PRESSURE CUT OUT TIME	0 min	15 min	0 min	**If EEV selected selected:** Advanced topic, 0 = Disabled.
LPC	LOW PRESSURE CUT OUT	-5.0 psig	138.0 psig	8.0 psig	**If LPt greater than 0:** Advanced topic.
LPd	PRESS DIFF FOR LPCO	1.0 psig	20.0 psig	15.0 psig	**If LPt greater than 0:** Advanced topic.
Att	LPCO ATTEMPTS	1	5	5	**If LPt greater than 0:** Advanced topic.
rnt	COMP RUN TIME	0 hrs	24 hrs	6 hrs	**If DEFROST MODE = rnt:** Hours of cooling before starting a defrost.
Htn	ELECTRIC DEFROST MODE	N/A	N/A	Pulse	**If DEFROST TYPE = ELE:** (Prn) Permanent, leaves defrost relay energized during the defrost cycle. (PUL) Pulse, utilizes advanced heater management.
HAo	HIGH TEMP ALARM OFFSET	0 F°	99.9 F°	10.0 F°	Degrees above ROOM TEMP + AIR TEMP DIFF to trigger HIGH TEMP ALARM.
HAd	HIGH TEMP ALARM DELAY	0 min	120 min	60 min	Delay before triggering a HIGH TEMP ALARM.
LAo	LOW TEMP ALARM OFFSET	0 F°	20.0 F°	4.0 F°	Degrees below ROOM TEMP to trigger LOW TEMP ALARM.
LAd	LOW TEMP ALARM DELAY	0 min	30 min	10 min	Delay before triggering a LOW TEMP ALARM.
dAd	DOOR ALARM DELAY	0 min	180 min	30 min	Time door must be open before triggering a DOOR OPEN ALARM. Requires door switch to activate.
AU1	AUX IN 1 MODE	N/A	N/A	Disabled	See Auxiliary Input Modes table on page 10.
A1A	AUX IN 1 STATE	N/A	N/A	Closed	(oPn) active if input is open. (CLo) active if input is shorted.
AU2	AUX IN 2 MODE	N/A	N/A	Disabled	See Auxiliary Input Modes table on page 10.
A2A	AUX IN 2 STATE	N/A	N/A	Closed	(oPn) active if input is open. (CLo) active if input is shorted.
AU3	AUX IN 3 MODE	N/A	N/A	Sys Off	See Auxiliary Input Modes table on page 10.
A3A	AUX IN 3 STATE	N/A	N/A	Closed	(oPn) active if input is open. (CLo) active if input is shorted.
tS2	2ND ROOM TEMP	-50.0°F	90.0°F	-50.0°F	If AU1, AU2, or AU3 = (t2n) 2ND ROOM TEMP: This value becomes the ROOM TEMP setpoint when the Auxiliary Input is active.
10t	0 TO 10 VDC MODE	-	-	Alarm Relay	(ALr) Alarm relay. (FSd) Evap fan speed control. (dAL) Door alarm relay.
tEt	MULTI EVAP MODE	-	-	Off	Mode for lead/lag operation. (oFF) Off. (LGC) Redundant cool. (LGF) Redundant off. (ALt) Alternate.
PAd	PAIRED DEFROST MODE	-	-	Off	Select operation when leag/lag pair controller goes into defrost. (oFF) Off. (AUt) Auto.
LLt	LEAD/LAG TIME	1 hour	168 hours	12 hours	Time to toggle between lead/lag.
Unt	TEMP UNITS	N/A	N/A	Fahrenheit	Display temperature in °F or °C. (FAH) Fahrenheit. (CEL) Celsius.

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ADVANCED Setpoints Menu (continued)

Basic Display Abbreviation	KE2 Combo Display Scrolling Text	Min	Max	Default	Description
EdF	**EXTREME TEMP DIFF**	0°F	99.9°F	20.0°F	Should not be adjusted unless instructed to by KE2 Therm.
CLA	**CLEAR ALARMS**	N/A	N/A	-	Press and hold ENTER until red LED starts blinking, alarms will be reset. Sensor and transducer alarms will immediately return until fixed.
diA	**DIAGNOSTICS MODE**	N/A	N/A	-	Press and hold ENTER until FAr is displayed. Energizes each relay individually for 30 seconds: (FAr) fan relay, (dEr) defrost relay, (CPr) compressor relay.
FAC	**FACTORY RESET**	N/A	N/A	-	Press and hold ENTER to reset the controller to the factory default setpoints.
PAS	**WEB PASSWORD RESET**	N/A	N/A	-	Press and hold ENTER to reset the web password to the factory default.
PAr	**PAIR L/L**	-	-	-	Press and hold ENTER until red LED blinks. (PAS) successful pairing. (FAi) pairing failed. Only two controllers can be present on network.
UnP	**UNPAIR L/L**	-	-	-	Press and hold ENTER until red LED blinks. (PAS) successful unpairing. (FAi) unpairing failed.
bnd	**BOND**	-	-	-	Press and hold ENTER until red LED blinks. (PAS) successful bond. (FAi) bond failed. Only two controllers can be present on network to bond from display.
Unb	**UNBOND**	-	-	-	Press and hold ENTER until red LED blinks. Controllers will unbond and restart. Only works if bonded to one other controller.
SA	**SMART ACCESS**	N/A	N/A	Disabled	Turn KE2 Smart Access on or off. (EnA) enable KE2 Smart Access. (diS) disable KE2 Smart Access.
dHC	**DHCP**	N/A	N/A	Enabled	Turn DHCP mode on or off. (EnA) enable DHCP mode. (diS) disable DHCP mode.
	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.
	MAX VALVE STEPS	200	6400	500	Full stroke steps for custom valve.
	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 %.
	MIN COMP RUN TIME	0 min	15 min	2 min	Minimum Compressor Run Time.
	MIN COMP OFF TIME	0 min	15 min	5 min	Minimum Compressor Off Time.
	1ST DEFROST DELAY	0 min	240 min	120 min	First Defrost Delay.
	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°F	35.0°F	5.0°F	Fan delay temp.
	MAX FAN DELAY TIME	0 min	20 min	3 min	Max fan delay time.
	PUMP DOWN TIME	0 min	90 min	0 min	Minimum time between de-energizing the liquid line solenoid/compressor contactor relay and energizing the defrost relay.
Not Available on Basic Display	**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.
	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.
	ROOM TMP IND DEF	-50.0 F°	90.0 F°	0.0 F°	Room temp while bonded contoller is in defrost. Only applies to bonded controllers with Multi Evap Defrost set to Independent.
	SUCT PRES OFFSET	-5.0 F°	5.0 F°	0.0 F°	Offset added or subtracted from the suction line pressure transducer reading, if needed.
	SUCT TEMP OFFSET	-5.0 F°	5.0 F°	0.0 F°	Offset added or subtracted from the suction temp sensor reading, if needed.
	COIL TEMP OFFSET	-5.0 F°	5.0 F°	0.0 F°	Offset added or subtracted from the coil temperature sensor reading, if needed.
	AIR TEMP OFFSET	-5.0 F°	5.0 F°	0.0 F°	Offset added or subtracted from the room temperature sensor reading, if needed.
	AUX 1 OFFSET	-5.0 F°	5.0 F°	0.0 F°	When Aux1, Aux2, or Aux 3 is used as a temperature sensor, an offset is added or subtracted from the reading.
	AUX 2 OFFSET	-5.0 F°	5.0 F°	0.0 F°	
	AUX 3 OFFSET	-5.0 F°	5.0 F°	0.0 F°	
	PROPORTIONAL	0	255	3	Coefficient to valve control algorithm that increases valve responsiveness as the value increases.
	INTEGRAL	0	255	5	Coefficient to the valve control algorithm that increases valve responsiveness as the value increases.
	DERIVATIVE	0	255	3	Should not be adjusted unless instructed to by KE2 Therm.
	AIR TEMP DIFF	0.1 F°	5.0 F°	1.0 F°	Degrees above ROOM TEMP before the controller will begin REFRIGERATION.

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Alarm Status Menu

Basic (Remote) Display	KE2 Combo Display	Description
Abbreviation	Scrolling Text	
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 - Time between defrosts too short in demand defrost.
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 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 auxiliary input is in an active state.
EA2	EXTERNAL ALARM 2	If AU2 IN MODE = EXT ALARM: The auxiliary input is in an active state.
EA3	EXTERNAL ALARM 3	If AU3 IN MODE = EXT ALARM: The auxiliary 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 has 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	KE2 Remote (Basic) Display is not communicating to the controller.
CLL	LEAD/LAG COMM ERROR	Communications lost between lead/lag controllers.
NTP	TIMER SERVER COMM	Controller cannot communicate with external time of day server (SNTP server).

See Q.1.61 Alarm Troubleshooting Guide for further details.

https://ke2therm.com/literature/literature-ke2-evap-oem/

Variables Menu

Basic (Remote) Display	KE2 Combo Display	Description
Abbreviation	Scrolling Text	
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 the Compressor Contactor/LLS 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 the controller's IP address.
iP2	IP OCTET 2	Second 3 digits of the controller's IP address.
iP3	IP OCTET 3	Third 3 digits of the controller's IP address.
iP4	IP OCTET 4	Fourth 3 digits of the controller's IP address.
Fir	FIRMWARE VERSION	Current version of firmware on controller.

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First Time Setup - Types of Control & KE2 Smart Access

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

Auxiliary Input Modes

Basic Display		KE2 Combo Display	Description
Abbreviation		**Scrolling Text**	
diS	diS	**DISABLED**	Not used.
rtP	rtP	**ROOM TEMP**	Sets the Aux Input as an additional room temperature sensor input.
CLt	CLt	**COIL TEMP**	Sets the Aux Input as an additional coil temperature sensor input.
oni	oni	**MONITOR**	Sets the Aux Input as a monitor temperature input. Monitor temp does not affect controller operation.
t2n	t2n	**2ND (ROOM) TEMP**	Switches between main and 2nd Room Temperature setpoints. Inactive = 2nd room temp SP off (t2F). Active = 2nd room temp SP on (t2n).
dor	dor	**DOOR SWITCH**	Inactive = Door Closed (dCL). Active = Door Open (don).
EAL	EAL	**EXT ALARM**	Receive a dry contact from a 3rd party device to show an alarm for that device on the controller. Active = EAo. Inactive = EAF.
SoF	SoF	**SYS OFF**	Active input will cause the controller to enter system off (pumpdown). Inactive = System On (Son). Active = System Off (SoF).
dFi	dFi	**DFR INTERLOCK**	Prevents the defrost relay from energizing when active. Inactive = Defrost Heaters normal (AUt). Active = Defrost Heaters Off (oFF).
dFL	dFL	**DEFR LOCK**	Prevents defrost from initiating when active. Inactive = Defrost Normal (AUt). Active = Defrost Not Allowed (dLo).

Valve Types

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

Refrigerants

Abbreviation		Full Name
404	404	R-404A
458	458	R-458A
452	452	R-452A
513	513	R-513A
450	450	R-450A
449	449	R-449A
448	448	R-448A
744	744	R-744
410	410	R-410A
407	407	R-407F
409	409	R-409A
408	408	R-408A
438	438	R-438A
717	717	R-717
r22	r22	R-22
134	134	R-134a
42d	42d	R-422D
42A	42A	R-422A
40C	40C	R-407C
40A	40A	R-407A
507	507	R-507

System Modes

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

KE2 EvapOEM
Quick Start Guide

Alphabetical List of Abbreviations

Abbreviation		Full Name	Type	Description
10t	`10t`	0 to 10 Vdc Mode	Setpoint	(ALr) Alarm relay. (FSd) Evap fan speed control. (dAL) Door alarm relay.
A1A	`A1A`	Aux Input 1 state	Setpoint	(oPn) active if input is open. (CLo) active if input is shorted.
A1A	`A1A`	AU1 Temp sensor Alarm	Alarms	AU3 temperature sensor is shorted or open.
A2A	`A2A`	Aux Input 2 state	Setpoint	(oPn) active if input is open. (CLo) active if input is shorted.
A2A	`A2A`	AU2 Temp sensor Alarm	Alarms	AU2 temperature sensor is shorted or open
A3A	`A3A`	Aux Input 3 state	Setpoint	(oPn) active if input is open. (CLo) active if input is shorted.
A3A	`A3A`	AU3 Temp sensor Alarm	Alarms	AU3 temperature sensor is shorted or open.
Ad	`Ad`	Air Defrost w/Mechanical valve	Type of Control	System operates with default values for Air Defrost and Mechanical Valve.
AdE	`AdE`	Air Defrost w/EEV	Type of Control	System operates with default values for Air Defrost and Electric Valve.
Ai	`Ai`	Air Defrost (Off time)	Setpoint	Option for evaporator Defrost Type (dtY) setpoint. (Ai) Air Off time Defrost. Other options are (ELE) Electric, (HGn) Hot Gas w/ Compressor On, and (HGF) Hot Gas w/ Compressor Off.
ALt	`ALt`	Alternate	Setpoint	Sets lead/lag control to alternate. Lead/lag will switch after every refrigeration run cycle.
ALr	`ALr`	Alarm Relay	Setpoint	Sets 0 to 10 vdc output to alarm relay.
ASA	`ASA`	Air Sensor Alarm	Alarms	Return air temperature sensor is shorted or open.
AU1	`AU1`	Aux Input 1	Variables	Current status/temperature as measured by controller at Aux1 input.
AU1	`AU1`	Aux Input 1 mode	Setpoint	Options for configuring the Auxiliary Input, see Auxiliary Input Modes table.
AU2	`AU2`	Aux Input 2	Variables	Current Status/Temperature as measured by controller at Aux2 input.
AU2	`AU2`	Aux Input 2 mode	Setpoint	Options for configuring the Auxiliary Input, see Auxiliary Input Modes table.
AU3	`AU3`	Aux Input 3	Variables	Current Status/Temperature as measured by controller at Aux3 input.
AU3	`AU3`	Aux Input 3 mode	Setpoint	Options for configuring the Auxiliary Input, see Auxiliary Input Modes table.
AUt	`AUt`	Defrost Interlock -Heaters Normal	Auxiliary Input	Defrost interlock inactive. Defrost heaters will energize as needed.
AUt	`AUt`	Defrost Lockout - Defrost Normal	Auxiliary Input	Defrost lockout inactive. Defrost will be initiated as normal by controller logic.
bnd	`bnd`	Bond	Setpoint	Press and hold ENTER until red LED blinks. (PAS) successful bond. (FAi) bond failed. Only two controllers can be present on network to bond from display.
CEL	`CEL`	Celsius	Setpoint	Option for Temp Units (Unt) setpoint. (FAH) Fahrenheit. (CEL) Celsius.
CLA	`CLA`	Clear Alarms	Setpoint	Press and hold ENTER until red LED starts blinking, alarms will be reset. Sensor and transducer alarms will immediately return until fixed.
CLL	`CLL`	Lead/Lag Comm Error	Alarms	Communications lost between lead/lag controllers.
CLo	`CLo`	Closed	Setpoint	Option for Aux Input State (A1A, A2A, A3A) setpoints. Input will be Active when it reads a closed circuit.
CLt	`CLt`	Coil Temp	Variables	Coil temperature (TCoil Sensor) as measured by the controller.
CLt	`CLt`	Coil Temp	Auxiliary Input	Coil Temp as measured by Aux input.
CoA	`CoA`	Communication Alarm	Alarms	ONLY BONDED CONTROLLERS: No communication between controllers for one minute or more.
Cor	`Cor`	Compressor Relay	Variables	Current state of liquid line solenoid (LLS)/compressor contactor relay.
CrL	`CrL`	Carel	Valve Type	Carel valve with 500 steps.
CSA	`CSA`	Coil Sensor Alarm	Alarms	Coil temperature sensor is shorted or open.
CYC	`CYC`	Cycle	Setpoint	Option under Refrig Fan Type (rFt) setpoint. (CYC) to cycle, i.e. managed fan control. Other options are (FoC) on w/ compressor, (PEr) permanent, and (t24) title 24.
dAd	`dAd`	Door Open Alarm Delay	Setpoint	Time door must be open before triggering a DOOR OPEN ALARM. Requires door switch to activate.
dAL	`dAL`	Door Alarm	Setpoint	Sets 0 to 10 Vdc output to door alarm. Will only activate for door alarm.
dCL	`dCL`	Door Switch - Door Closed	Auxiliary Input	Auxilliary input set to Door Switch indicates that the door is closed.
ddF	`ddF`	Defrost Delay Fan	System Mode	At start of defrost, fans will continue running for several minutes, using stored cooling in the coil. Once the coil reaches room temp, fans will stop, and heaters will turn on to begin electric defrost.
dEF	`dEF`	Defr Parameter	Setpoint	If DEFROST MODE = DEMAND: Coefficient to KE2 Defrost algorithm.
dEF	`dEF`	Defrost	System Mode	Controller is performing a defrost cycle.
dEr	`dEr`	Defrost Relay	Variables	Current state of the defrost relay.
dFi	`dFi`	Defrost Interlock Switch	Auxiliary Input	Inactive (AUt) defrost energize as normal. Active (oFF) defrost heaters forced off.
dFL	`dFL`	Defrost Lockout Switch	Auxiliary Input	Inactive (AUt) defrost will be initiated as normal by controller logic. Active (dLo) defrost not allowed.
dHC	`dHC`	DHCP	Setpoint	Turn DHCP mode on or off. (EnA) enable DHCP mode. (diS) disable DHCP mode.
diA	`diA`	Diagnostics Mode	Setpoint	Press and hold ENTER until FAr is displayed. Energizes each relay individually for 30 seconds: (FAr) fan relay, (dEr) defrost relay, (CPr) compressor relay.
diS	`diS`	Disabled	Auxiliary Input	Input is not used by the controller.
dLo	`dLo`	Defrost Lockout	Auxiliary Input	Defrost Lockout active. Defrost not allowed while signal is active.
dnd	`dnd`	Demand Defrost	Setpoint	Option for Defrost Initiation Mode (ind) setpoint. (dnd) Demand Defrost, system will defrost only when dictated to by a decrease in evaporator efficiency. Other options are (SCH) Scheduled, and (rnt) Compressor Run Time.
don	`don`	Door Switch - Door Open	Auxiliary Input	Auxilliary Input set to Door Switch indicates door is open.
dor	`dor`	Door Switch	Auxiliary Input	Inactive (dCL) door closed. Active (don) door open, refrigeration and fans will temporarily stop.
dor	`dor`	Door Open Alarm	Alarms	If door is open and room temperature is above ROOM TEMP + AIR TEMP DIFF for DOOR ALARM DELAY time.
dPd	`dPd`	Defrosts per day	Setpoint	If DEFROST MODE = SCH: Defrosts per day. Number of evenly spaced defrosts per day.
drn	`drn`	Drain Time	Setpoint	Time to be in drain mode (drip time).
drn	`drn`	Drain	System Mode	Time after defrost to allow moisture to drain from coil (drip time).
dtL	`dtL`	Max Defrost Time	Setpoint	If DEFROST MODE = SCH: Maximum amount of time the defrost relay will be energized.
dtP	`dtP`	Defr Term Temp	Setpoint	Temperature the coil sensor(s) must exceed to terminate defrost.
dtt	`dtt`	Defr Term on Time Alarm	Alarms	Defrost terminated on time instead of temperature for two consecutive cycles.
dtY	`dtY`	Defrost Type	Setpoint	(ELE) for Electric. (Air) for off time. (HGn) for hot gas with LLS relay on. (HGF) for hot gas with LLS relay off.
EA1	`EA1`	External Alarm Switch	Auxiliary Input	Active (EAo) external alarm input is active. Inactive (EAF) external alarm input is inactive.

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Alphabetical List of Abbreviations (continued)

Abbreviation	Full Name	Type	Description
EA1	External Alarm 1	Alarms	If AU1 IN MODE = EXT ALARM: The auxilliary input is in an active state
EA2	External Alarm 2	Alarms	If AU2 IN MODE = EXT ALARM: The auxilliary input is in an active state
EA3	External Alarm 3	Alarms	If AU3 IN MODE = EXT ALARM: The auxilliary input is in an active state
EAo	External Alarm Switch Active	Auxiliary Input	Auxilliary input set to external alarm is receiving an active signal.
EAF	External Alarm Switch Inactive	Auxiliary Input	Auxilliary input set to external alarm is not receiving an active 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	Should not be adjusted unless instructed to by KE2 Therm.
EdF	Excess Defrost Alarm	Alarms	Excess Defrost Alarm - Time between defrosts too short in demand defrost.
Edt	Valve Type	Setpoint	Expansion valve on the system: (tHr) mechanical, pre-configured electric, or 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) setpoint. (ELE) Electric. Other options are (Ai) Air Off time Defrost, (HGn) Hot Gas w/ Compressor On, and (HGF) Hot Gas w/ Compressor Off.
EnA	Enabled	Setpoint	Enables connection with KE2 Smart Access for remote monitoring and control.
FAC	Factory reset	Setpoint	Press and hold ENTER to reset the controller to the factory default setpoints.
FAH	Fahrenheit	Setpoint	Option for Temp Units (Unt) setpoint. (FAH) Fahrenheit. (CEL) Celsius.
FAr	Fan Relay	Variables	Current state of the fan relay.
FdL	Fan Delay	System Mode	After drain mode (drn), the LLS relay will energize, and the coil will pulldown until it reaches 5℉ or 3 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) setpoint. (FoC) on w/ compressor. Other options are (CYC) to cycle, i.e. managed fan control, (PEr) permanent, and (t24) title 24.
FSd	Evap Fan Speed	Setpoints	Sets 0 to 10 Vdc output to variable speed evap fan control.
HAd	High Temp Alarm Delay	Setpoint	Delay before triggering a HIGH TEMP ALARM.
HAo	High Temp Alarm Offset	Setpoint	Degrees above ROOM TEMP + AIR TEMP DIFF to trigger HIGH TEMP ALARM.
HGF	Hot Gas Defrost w. Compressor Off	Setpoint	Option for evaporator Defrost Type (dtY) setpoint. (HGF) Hot Gas w/ Compressor Off. Other options are (Ai) Air Off time Defrost, (ELE) Electric, and (HGn) Hot Gas w/ Compressor On.
HGn	Hot Gas Defrost w. Compressor On	Setpoint	Option for evaporator Defrost Type (dtY) setpoint. (HGn) Hot Gas w/ Compressor On. Other options are (Ai) Air Off time Defrost, (ELE) Electric, and (HGF) Hot Gas w/ Compressor Off.
HS	HSV	Valve Type	Pre-configured EEV selection. (HS) KE2 Therm's HSV, Hybrid Stepper Valve.
HSH	High Superheat Alarm	Alarms	Superheat above upper limit for more than 90 minutes of cumulative runtime.
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: Leave defrost relay energized during the defrost cycle or utilize advanced heater management. (PUL) Pulse. (Prn) Permanent.
ind	Defrost Initiation Mode	Setpoint	Mode to initiate defrost. (dnd) demand. (SCH) schedule. (rnt) comp run time.
iP1	IP Address Part 1	Variables	First 3 digits of the controller's IP address.
iP2	IP Address Part 2	Variables	Second 3 digits of the controller's IP address.
iP3	IP Address Part 3	Variables	Third 3 digits of the controller's IP address.
iP4	IP Address Part 4	Variables	Fourth 3 digits of the controller's IP address.
LAd	Low Temp Alarm Delay	Setpoint	Delay before triggering a LOW TEMP ALARM.
LAo	Low Temp Alarm Offset	Setpoint	Degrees below ROOM TEMP to trigger LOW TEMP ALARM.
LGC	Redudant Cool	Setpoint	Sets lead/lag control to redundant cool. Switches lead/lag based on time. Lag system will act as backup system and refrigerate if room temperature rises.
LGF	Redudant Off	Setpoint	Sets lead/lag control to redundant off. Switches lead/lag on time. Both systems will never simultaneously refrigerate, however, lead/lag will switch under certain alarm conditions.
LLt	Lead/Lag Time	Setpoint	Time to toggle between lead/lag.
LPA	Low Pressure Alarm	Alarms	Suction pressure dropped below expected point excessive number of times.
LPC	Low Pressure Cut Out	Setpoint	Advanced topic.
LPd	Press Diff for LPCO	Setpoint	Advanced topic.
LPt	Max Time for LPCO	Setpoint	Advanced topic.
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.
NTP	Time Server Comm Alarm	Alarms	Controller cannot communicate with external time of day server (SNTP server).
oFF	Off	System Mode	System has satisfied on temperature.
oFF	Defrost Heaters Off	Auxiliary Input	Defrost Interlock is active on the Auxilliary Input, defrost heaters forced off (oFF).
oFF	Off (Lead/Lag)	Setpoint	Option for Multi Evap Mode (tEt) setpoint. (oFF) lead/lag control is disabled.
oni	Monitor Temp	Auxiliary Input	Monitor Temp as measured by the Auxiliary Input.
oPn	Valve % Open	Variables	Percentage the EEV is open (only available if EEV is selected).
oPn	Open	Setpoint	Option for Aux Input State (A1A, A2A, A3A) setpoints. Input will be Active when it reads an open circuit.
PAR	Pair L/L	Setpoint	Press and hold ENTER until red LED blinks. (PAS) successful pairing. (FAi) pairing failed. Only two controllers can be present on network.
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 for Refrig Fan Type (rFt) setpoint. (PEr) permanent forces fans to run during off cycle.

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Alphabetical List of Abbreviations (continued)

Abbreviation		Full Name	Type	Description
PrF		Process Failure	Alarms	KE2 Remote (Basic) Display is not communicating to the controller.
Prn		Permanent	Setpoint	Option for Electric Defrost Mode (Htn) setpoint. Applies if DEFROST TYPE = ELE. Permanent (Prn) forces the defrost relay to stay energized during the entire defrost cycle.
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 for Electric Defrost Mode (Htn) setpoint. Applies if DEFROST TYPE = ELE. Pulse (PUL) uses the advanced defrost algorithm to manage the defrost relay during the defrost cycle.
rEF		Refrigeration	System Mode	System is currently in Refrigeration mode.
rFG		Refrigerant	Setpoint	Refrigerant used. See table on page 10.
rFt		Refrigeration Fan Type	Setpoint	Select evaporator fan management. (CYC) cycle, i.e. manage, fans during refrigeration and off cycle. (FoC) fans on w/ compressor will primarily manage fans only during the off cycle. (PEr) permanent forces fans to run during refrigeration and off cycle. (t24) Title 24 cycles fans based on Title 24 regulations.
rnt		Compressor Run Time	Setpoint	Option for Defrost Initiation Mode (ind) setpoint. (rnt) Compressor Run Time, system will defrost after a set number of cumulative hours of run time. Other options are (SCH) Scheduled, and (dnd) Demand Defrost.
rS		RSV	Valve Type	Pre-configured EEV selection. (RSV) KE2 Therm's 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 the Auxiliary Input.
SA		KE2 Smart Access	Setpoint	Turn KE2 Smart Access on or off. (EnA) enable KE2 Smart Access. (diS) disable KE2 Smart Access.
SAt		Saturation Temp	Variables	Saturation temperature as calculated by the controller (requires suction pressure transducer and T1 suction temperature sensor).
SCC		Short Compressor Cycle	Alarms	Compressor has started an excessive number of times to maintain suction pressure.
SCH		Scheduled Defrost	Setpoint	Option for Defrost Initiation Mode (ind) setpoint. (SCH) Scheduled, system will defrost a set number of times per day, spaced evenly throughout the day. Other options are (dnd) Demand Defrost, and (rnt) Compressor Run Time.
SEi		SEI	Valve Type	Pre-configured EEV selection. Sporlan Valve with 1,600 Steps.
SEr		SER	Valve Type	Pre-configured EEV selection. Sporlan Valve with 2,500 Steps
SHt		Superheat	Variables	Superheat as calculated by the controller (requires suction pressure transducer and T1 suction temperature sensor).
SoF		System Off Switch	Auxiliary Input	Inactive (Son), system runs as normal. Active (SoF), system enters pumpdown mode and will not refrigerate or defrost until cleared.
SoF		System Off	System Mode	System off has been activated from the display, or by an external signal to an Auxiliary Input.
Son		System Off Switch - System On	Auxiliary Input	System Off Auxiliary Input is Inactive (Son), system runs as normal.
SSA		Suction Sensor Alarm	Alarms	Suction temperature sensor is shorted or open.
Stt		Superheat	Setpoint	Target superheat value. Only applies when non-mechanical valve selected. When mechanical valve is selected, it is the high superheat alarm threshold.
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	2nd Temp Auxiliary Input is Inactive (t2f). System is controlling to the regular Room Temp setpoint.
t2n		2nd Temp Switch Setpoint On	Auxiliary Input	2nd Temp Auxiliary Input is Active (t2n). System is controlling to the 2nd Room Temp Setpoint.
tHr		Mechanical	Valve Type	Thermostatic Expansion Valve in the Expansion Device Type (Edt) setpoint.
t24		Title 24	Setpoint	Option for Refrig Fan Type (rFt) setpoint. (t24) Title 24, cycle fans to comply with California Title 24 regulations.
tEt		Multi Evap Mode	Setpoint	Mode for lead/lag operation. (oFF) Off. (LGC) Redundant cool. (LGF) Redundant off. (ALt) Alternate.
tS		Room Temp SP	Setpoint	Room temperature to be maintained.
tS2		2nd room temp SP	Setpoint	If AU1, AU2, or AU3 = (t2n) 2ND ROOM TEMP: This value becomes the ROOM TEMP setpoint when the Auxiliary Input is active.
Unb		Unbond	Setpoint	Press and hold ENTER until red LED blinks. Controllers will unbond and restart. Only works if bonded to one other controller.
UnP		Unpair L/L	Setpoint	Press and hold ENTER until red LED blinks. (PAS) successful unpairing. (FAi) unpairing failed.
Unt		Temperature Units	Setpoint	Option for Temp Units (Unt) setpoint. (FAH) Fahrenheit. (CEL) Celsius.

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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 Cat5e 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, all 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.

Cat5e Ethernet Cable

Customer Network
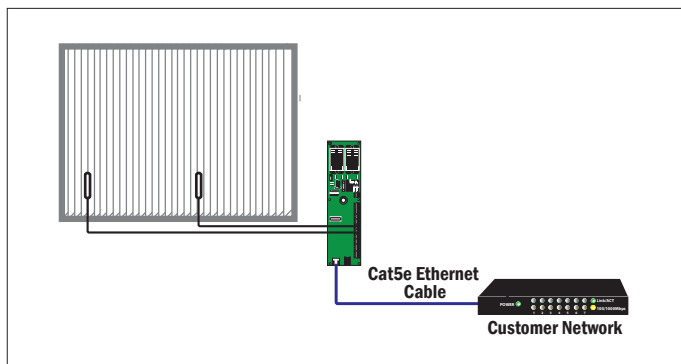
Step 1 **Enable KE2 Smart Access in the Setpoints menu**
- After the initial Introduction Mode setup, press and hold **BACK** until `E5` appears.

- Press ▲ two times to view `SR` (abbreviation for KE2 Smart Access). Press **ENTER**, then use ▲ to change `d S` (disabled) to `EnR` (enabled)

- Press and hold **ENTER** 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)

```
IP-10.10.52.19
MAC
00:04:A3:14:E5:92
```


| Site | installer |
| Password | |
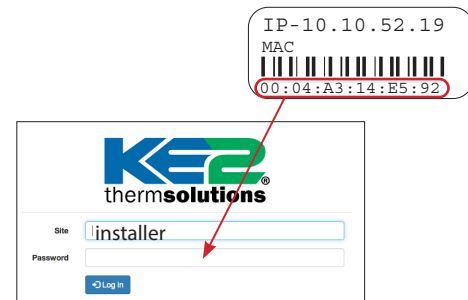
For additional information on KE2 Smart Access, visit:

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

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KE2 Remote (Basic) Display Dimensions

RemoteDisplay

BACK

ENTER

Hold for manual defrost

1.5 in.
37 mm

3.1 in.
78 mm

2.8 in.
70 mm

1.1 in.
29 mm

0.73 in.
18 mm

1.0 in.
25 mm

Panel Cutout

1.1 in.
29 mm

2.8 in.
71 mm
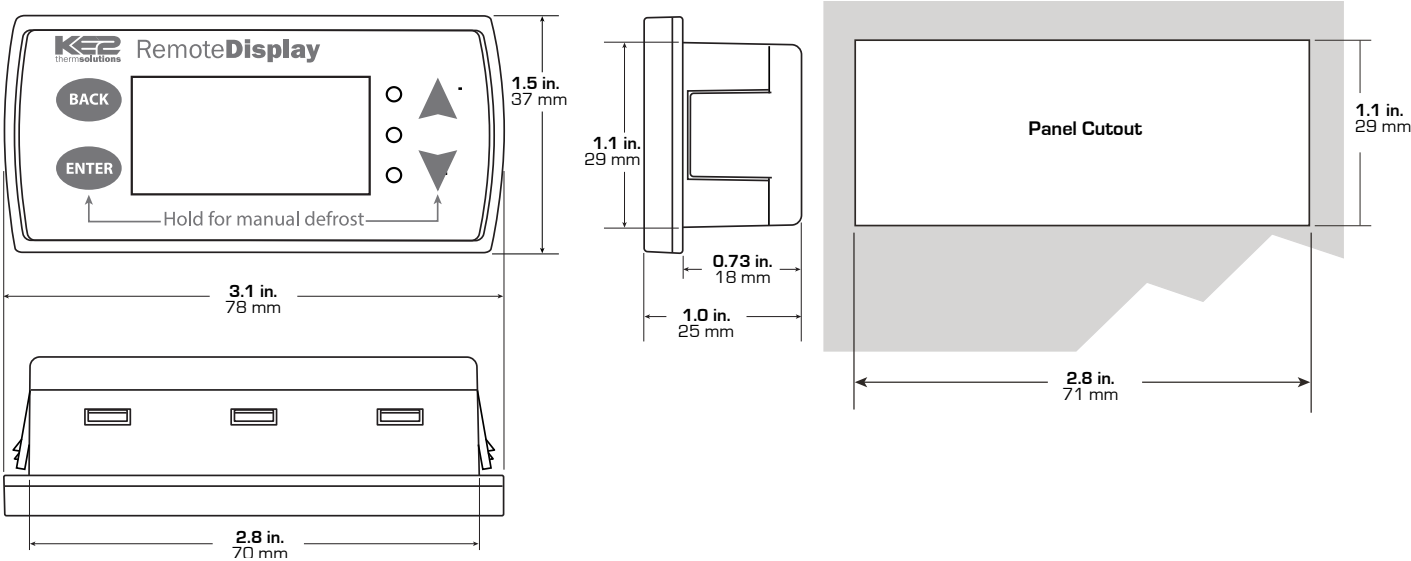
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Accessories

Remote Displays

Part #	Description
21232	KE2 Basic (Remote) Display w/ 18" 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
21843	Temperature Sensor Pack - Yellow, Green, Blue	5 ft.
21151	Temperature Sensor Pack - Yellow, Green, Blue	15 ft.
21066	Temperature Sensor Pack - Yellow, Green, Blue	40 ft.
21851	Temperature Sensor - Yellow	5 ft.
21852	Temperature Sensor - Green	5 ft.
21850	Temperature Sensor - Blue	5 ft.
20199	Temperature Sensor - Black	10 ft.
21795	Temperature Sensor - Yellow	10 ft.
21793	Temperature Sensor - Green	10 ft.
21794	Temperature Sensor - Blue	10 ft.
20200	Temperature Sensor - Black	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.

Pressure Transducer

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

External Relay

Part #	Description
21304	Solid State Relay for 0/10 Vdc Alarm Output

Replacement Relays

Part #	Description
21373	Replacement Fan Relay (Form A)
21374	Replacement LLS Relay (Form C)

Replacement Fuse

Part #	Description
21375	Replacement Fuse, 1 Amp, 250V ceramic

Specifications

Controller

Input Voltage:	100 Vac to 240 Vac
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,
Auxiliary Input 2:	door switch, external alarm, system off, defrost inter-
Auxiliary Input 3:	lock, defrost lockout
Communication:	Standard TCP/IP, RESTful API

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