OPERATING INSTRUCTIONS

Part # 1107523

SmartVap+
INTUITIVE EVAPORATOR CONTROL TECHNOLOGY

Pre-assembled electronic evaporator control system with Adaptive Defrost and Networking capabilities. Medium and Low Temperature Air + Electric Defrost Applications

SMARTVAP+
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Instructional videos, FAQ and more available at **www.b-rp.com/smartvap**

SMARTVAP+

IMPORTANT NOTE:

Your Intuitive Evaporator Control is pre-programmed (with the exception of bonding multiple controllers paired with a single condensing unit) at the factory and will begin operating as soon as power is applied using the following default settings : ROOM TEMP (tS) = -10 °F (freezer) or 35 °F (cooler), REFRIGERANT (rF) = R-404A, DEFROST TYPE (dtY) = Defrost Type (Air or Electric). Use this manual to make any adjustments you require.

NAVIGATION USING THE BASIC 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

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- Access Setpoint mode by pressing and holding the ENTER button until **tS** (temperature setpoint) displays on the screen
- Use the ▲ and ▼ arrows to scroll through the available setpoints.
- Press ENTER to view the current setting.
- Use the ▲ and ▼ 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.

USER INTERFACE

This display uses a familiar menu structure to allow service technicians to change the major setpoints. The setpoints may also be accessed using the controller's webpages.

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. If alarms are present, they will be displayed and can be viewed using the up and down arrows.

VIEWING BASIC SETPOINTS

Press and hold the ENTER button until **tS** is displayed to enter the Basic Setpoints menu. Press ▲ or ▼ to cycle through available Setpoints. Press ENTER to toggle between the setpoint and its current value. See page 3 for details.

VIEWING ADVANCED SETPOINTS

Press and hold the BACK button until **tS** is displayed to enter the Advanced Setpoints menu. Press ▲ or ▼ to cycle through available Setpoints. Press ENTER to toggle between the setpoint and its current value. See page 3 for details.

CHANGING SETPOINTS

When the Setpoint value is displayed, it may be changed by pressing ENTER. The ▲ and ▼ arrows will increase or decrease numerical values, or 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 the BACK button to return to the default view.

The ENTER button is used to save an input option when it has been changed. The ENTER button must be held for 3 seconds, to prevent accidental changes. Changes may be discarded by waiting, to allow the controller to time-out and return to default screen, or by pressing the BACK button. The BACK button is used to return to the previous screen. Pressing the BACK button several times will return the controller to the default view.

MANUAL VALVE CONTROL

Press and hold BACK & ▼ 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, and BACK will exit this mode and return to automatic control.

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. Power cycling the controller resets the one hour timer. If controller maintains SoF even after the proper button presses, check auxiliary inputs (AU1, AU2, AU3) for proper operation.

DISPLAY LOCK

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

DIAGNOSTICS MODE

The SmartVap+ 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 VERSION

Press ▲ until FIr is shown. Press ENTER to display the controller's firmware version.

WEB LOGIN

The User Name and Password are required when accessing the controller using the built-in webpages. Upon logging in for the first time the user will be required to change the password. Please record the new password in a secure location for future reference.

The defaults are: User Name: ke2admin Password: ke2admin

IMPORTANT: For security purposes, the Password MUST be changed from the default.

RESETTING THE CONTROLLER WEB PASSWORD

If the user name or password for the controller is forgotten or lost, the web page login must be reset to regain login access.

From the default screen, press and hold BACK until tS is displayed. Press ▲ several times to display PAS. Press and hold ENTER until the red LED blinks, then release.

The user name and password will be reverted to the default "ke2admin", however, the user will still be required to change from the default password when logging in for security purposes.

LEAK MITIGATION

When a refrigerant concentration of R-454A, R-454C, or R-455A is detected above the alarm lower flammability limit (LFL) percentage by any of the leak sensors, the controller will begin leak mitigation. During mitigation, the ▦ alarm will be displayed on the KE2 Basic Display, the fan relay will stay on, the LLS and defrost relays will stay off, the EEV will be closed, and 0-10 VDC output will go to 0 VDC if used as a leak alarm output.

The leak alarm must be manually cleared to ensure it is safe for the system to run again. To clear the alarm, press and hold the **BACK** button on the KE2 Basic Display to enter the setpoints menu. Press ▲ several times until ▦ is displayed. Press and hold **ENTER** until the red LED starts blinking, then release. If the lower flammability limit stays below the threshold for 5 minutes, then the controller will resume refrigeration. The alarm can also be cleared from the KE2 Combo Display, if installed.

BONDING (MULTI-EVAP APPLICATIONS)

In order to bond multiple units, firmware must be same on all boards. Bonding allows multiple controllers 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 SmartVap+ Basic Display. Bonding is limited to two controllers through the SmartVap+ Basic Display.

Run a CAT5E ethernet 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 synchronization. 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 ▦ in the Advanced Menu. Press and hold **ENTER** until the red LED is blinking. Wait several seconds. ▦ means the bond was successful and both controllers will restart. ▦ means the bond failed, check cables and ensure only two SmartVap+ controllers are on the network before trying again. Press **ENTER** again to return to the Advanced Menu.

To unbond controllers from the display, go to ▦. Press and **ENTER** hold 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 version can be bonded.

To check the firmware version of any unit, see "Display Firmware Version" above.

If you require assistance to update firmware, please contact our Trouble Shooting Specialist at troubleshooting@b-rp.com or 1 844 893 3222 ext 529

BASIC SETPOINTS MENU

Press and hold the (ENTER) button for 3 seconds to enter the Basic Setpoints menu.

ABR.	REMOTE DISPLAY	DASHBOARD DISPLAY	FULL NAME	MIN	MAX	A1 DEFAULT	A2L DEFAULT	DESCRIPTION
tS	ES	ROOM TEMP	Room Temp Setpoint	-50.0 °F	90.0 °F	-10 °F or 35 °F	-10 °F or 35 °F	Walk-in freezer (-10 °F) or cooler (35 °F) room temp to be maintained
rFG	rFG	REFRIGERANT	Refrigerant	N/A	N/A	R-404A	R454A	Type of refrigerant used: see table on page 6
dtY	dtY	DEFROST TYPE	Defrost Type	N/A	N/A	Air or Electric	Air or Electric	Type of Defrost for Evap: (ELE) for Electric. (Air) for off time

ADVANCED SETPOINTS MENU

Press and hold the (BACK) button to enter the Advanced Setpoints menu.

ABR.	ON-BOARD DISPLAY	DASHBOARD DISPLAY	FULL NAME	MIN	MAX	A1 DEFAULT	A2L DEFAULT	DESCRIPTION
tS	ES	ROOM TEMP	Room Temp Setpoint	-50.0 °F	90.0 °F	-10 °F or 35 °F	-10 °F or 35 °F	Walk-in freezer (-10 °F) or cooler (35 °F) room temp to be maintained
rFG	rFG	REFRIGERANT	Refrigerant	N/A	N/A	R-404A	R454A	Type of refrigerant used: see table on page 6
dtY	dtY	DEFROST TYPE	Defrost Type	N/A	N/A	Air	Air or Electric	Type of Defrost for Evap: (ELE) for Electric. (Air) for off time
Edt	Edt	VALVE TYPE	Expansion Valve Device Type	N/A	N/A	Carel	Carel	Type of valve used on system: mechanical, pre-configured electric, custom EEV configuration
ind	ind	DEFROST MODE	Defrost Initiation Mode	N/A	N/A	Demand	Demand	Mode to initiate a defrost: (dnd) demand. (SCH) schedule. (rnt) comp run time.
dPd	dPd	DEFROSTS / DAY	Defrosts per day	0	8	4	4	If DEFROST MODE = SCH: Number of evenly spaced defrosts per day.
dtP	dtP	DEFROST TERM TEMP	Defrost Term Temp	35.0 °F	90.0 °F	37°F for AD 50°F for ED	37°F for AD 50°F for ED	Temperature the coil sensor(s) must exceed to terminate defrost. *If DEFROST TYPE = AIR, term temp will automatically adjust 2.0°F above ROOM TEMP if ROOM TEMP is changed.
dEF	dEF	DEFROST PARAMETER	Defrost Parameter	0	90	40°F for AD 30°F for ED	40°F for AD 30°F for ED	Do not Change default settings – Consult Factory
dtL	dtL	MAX DEFROST TIME	Max Defrost Time	0 min	90 min	45 min	45 min	If DEFROST MODE = SCH: Maximum amount of time the defrost relay will be energized.
drn	drn	DRAIN TIME	Drain Time	0 min	15 min	0 min for AD 2 min for ED	0 min for AD 2 min for ED	Time to be in drain mode (drip time)
rFt	rFt	REFRIG FAN TYPE	Refrigeration Fan Type	Manage/Cycle, Permanent, On with Compressor, Title 24		Permanent	Permanent	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 California's Title 24 regulations.
FtS	FtS	MIN FAN SWITCH TIME	CONTACT FACTORY	10 sec	240 sec	10 sec	10 sec	Minimum time before fans can be turned on again after turning off.
FoC	FoC	FANS ON COMP	Fans on with Compressor	—	—	—	—	Manage fans in OFF, then ON in refrigeration
PEr	PEr	FANS PERMANENT	Permanent Fan	—	—	—	—	Fans on permanently during refrigeration cycle - RECOMMENDED

ADVANCED SETPOINTS MENU CONT'D

Press and hold the BACK button to enter the Advanced Setpoints menu.

ABR.	ON-BOARD DISPLAY	DASHBOARD DISPLAY	FULL NAME	MIN	MAX	A1 DEFAULT	A2L DEFAULT	DESCRIPTION
CYC		CYCLE	Cycle	—	—	—	—	Cycle (Managed) manage fans during refrig cycle. Not Recommended for Equipment Equipped with 2 Speed EC Motors (SmartSpeed) or Variable Speed EC Motors
t24		TITLE 24	Title 24	—	—	—	—	Cycle fans based on compliance with California Title 24 regulations (Available only with Equipment Equipped with Variable Speed EC Motors)
Stt		SUPERHEAT	Superheat	5.0 °F	30.0 °F	8.0 °F	8.0 °F	Target superheat value. Not available on Basic Display
LPt		LOW PRESSURE CUT OUT TIME	Low Pressure Cut Out Time	0 min	15 min	0 min	0 min	Only applies when non-mechanical valve selected; 0=Disabled
LPC		LOW PRESSURE CUT OUT	Low Pressure Cut Out	-5.0 psig	138.0 psig	8.0 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	Pressure Differential for LPCO	1.0 psig	20.0 psig	15.0 psig	15.0 psig	Displays when LOW PRESSURE CUTOUT TIME (LPt) is greater than zero. And,only applies if non-mechanical valve is selected
Att		LPCO ATTEMPTS	CONTACT FACTORY	1	5	5	5	If LPt greater then 0: Advanced topic. CONTACT FACTORY
rnt		COMP RUN TIME	Compressor Run Time	0 hrs	24 hrs	6 hrs	6 hrs	When rnt selected, number of hours of cooling before starting defrost
Htn		ELECTRIC DEFROST MODE	Electric Defrost Mode	N/A	N/A	Permanent for AD / Pulse for ED	Permanent for AD / Pulse for ED	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	High Temp Alarm Offset	0 °F	99.9 °F	3 °F AD 10°F ED	3 °F AD 10°F ED	The number of degrees above ROOM TEMP for a HIGH TEMP ALARM condition.
HAd		HIGH TEMP ALARM DELAY	High Temp Alarm Delay	0 min	120 min	60 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	Low Temp Alarm Offset	0 °F	20.0 °F	4.0 °F	4.0 °F	The number of degrees below ROOM TEMP for a LOW TEMP ALARM condition.
LAd		LOW TEMP ALARM DELAY	Low Temp Alarm Delay	0 min	30 min	10 min	10 min	Minutes the room temp must remain below ROOM TEMP-LOW TEMP ALARM OFFSET before issuing a LOW TEMP ALARM
dAd		DOOR ALARM DELAY	Door Alarm Delay	0 min	180 min	30 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	Aux Input 1 mode	N/A	N/A	Coil Temp	Coil Temp	See Auxiliary Input Modes table
A1A		AUX IN 1 STATE	Aux Input 1 state	N/A	N/A	Closed	Closed	oPn= active if input is an open / CLo=active if input is shorted
AU2		AUX IN 2 MODE	Aux Input 2 mode	N/A	N/A	Disabled	Disabled	See Auxiliary Input Modes table
A2A		AUX IN 2 STATE	Aux Input 2 state	N/A	N/A	Closed	Closed	oPn= active if input is an open / CLo=active if input is shorted
AU3		AUX IN 3 MODE	Aux Input 3 mode	N/A	N/A	Sys Off	Sys Off	See Auxiliary Input Modes table
A3A		AUX IN 3 STATE	Aux Input 3 state	N/A	N/A	Closed	Closed	oPn= active if input is an open / CLo=active if input is shorted

ADVANCED SETPOINTS MENU CONT'D

Press and hold the (BACK) button to enter the Advanced Setpoints menu.

ABR.	ON-BOARD DISPLAY	DASHBOARD DISPLAY	FULL NAME	MIN	MAX	A1 DEFAULT	A2L DEFAULT	DESCRIPTION
tS2		**ROOM TEMP**	2nd room temp SP	-50.0 °F	90.0 °F	-50.0 °F	-50.0 °F	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
10t		**0 TO 10 VDC MODE**	CONTACT FACTORY	-	-	Alarm Relay	Alarm Relay	(ALr) Alarm relay. (FSd) Evap Fan Speed Control. (dAL) Door alarm relay.
tEt		**MULTI EVAP MODE**	CONTACT FACTORY	-	-	Off	Off	Mode for Lead/Lag operation. (oFF) Off. (LGC) Redundant Cool. (LGF) Redundant Off. (ALt) Alternate.
PAd		**PAIRED DEFROST MODE**	CONTACT FACTORY	-	-	Off	Off	Select operation when lead/lag pair controller goes into defrost. (oFF) Off. (AUt) Auto.
LLt		**LEAD/LAG TIME**	CONTACT FACTORY	1 hour	168 hours	12 hours	12 hours	Time to toggle between lead/lag
Unt		**TEMP UNITS**	Temperature units	N/A	N/A	Fahrenheit	Fahrenheit	Units for temperature's display in °F or °C; FAH = Fahrenheit, CEL = Celsius
EdF		**EXTREME TEMP DIFF**	Extreme Temp Diff.	0 °F	99.9 °F	20.0 °F	20.0 °F	ADVANCED TOPIC: Call factory for assistance
CLA		**CLEAR ALARMS**	Clear Alarms	N/A	N/A	-	-	Press and hold to clear all active alarms
PAS		**WEB PASSWORD RESET**	Web password reset	N/A	N/A	-	-	Press and hold to reset the web password to the factory default
PAr		**PAIR L/L**	Pair controllers	-	-	-	-	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**	Unpair controllers	-	-	-	-	Press and hold ENTER until red LED blinks. (PAS) successful unpairing. (FAi) unpairing failed.
bnd		**BOND**	Bond controllers	-	-	-	-	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**	Unbond controllers	-	-	-	-	Press and hold ENTER until red LED blinks. Controllers will unbond and restart. Only works if bonded to one other controller.
SA		**SMART ACCESS**	Smart Access	N/A	N/A	Disabled	Disabled	Turn Smart Access on or off: EnA to enable smart access / diS to disable Smart Access (CONTACT FACTORY)
dHC		**DHCP**	DHCP Mode	N/A	N/A	Disabled	Disabled	Turn DHCP mode on or off: EnA to enable DHCP mode / diS to disable DHCP mode

ADVANCED SETPOINTS MENU - AVAILABLE ONLY ON DASHBOARD

DASHBOARD DISPLAY	FULL NAME	MIN	MAX	A1 DEFAULT	A2L DEFAULT	DESCRIPTION
MOTOR TYPE	EEV Motor Type	Unipolar or Bipolar		Bipolar	Bipolar	Unipolar if unipolar stepper used, Bipolar if bipolar stepper used
MOTOR STEP RATE	EEV Motor Step Rate	30	400	50	50	Motor Step rate for custom valve. Not available on Basic Display
MAX VALVE STEPS	Max Valve Steps	200	6400	480	480	Full stroke steps for custom valve. Not available on Basic Display
MAX OPERATING PRES	Max Operating Pres	10.0 psi	150.0 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	Fan Speed	-100.0%	100.0%	0.0%	0.0%	Fan speed %. Not available on Basic Display
MIN COMP RUN TIME	Min Comp Run Time	0 min	15 min	2 min	2 min	Minimum Compressor Run Time. Not available on Basic Display
MIN COMP OFF TIME	Min Comp Off Time	0 min	15 min	5 min	5 min	Minimum Compressor Off Time. Not available on Basic Display
REFRIG FAN MODE	Refrigeration Fan Mode	Manage, Permanent, ON with Compressor, Title 24		Permanent	Permanent	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	1st Defrost Delay	0 min	240 min	120 min	120 min	First Defrost Delay. Not available on Basic Display
DEFROST FAN STATE	Defrost Fan State	ON or OFF		ON	ON	OFF = fans off during defrost; ON = fans ON during defrost
FAN DELAY TEMP		-40.0 °F	35.0 °F	20.0 °F	20.0 °F	Fan delay temp. Not available on Basic Display
MAX FAN DELAY TIME	Max Fan Delay Time	0 min	20 min	2 min	2 min	Max fan delay time. Not available on Basic Display
PUMP DOWN TIME	Pump Down Time	0 min	90 min	0 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	Multi Air Temp Control	Warmest or Average		Warmest Air	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	Multi Evap Cooling	Synchronized or Independent		Synchronized	Synchronized	Synchronized = synchronize bonded controller in refrigeration mode; Independent = bonded controllers control temperature independently in refrigeration mode.
MULTI EVAP DEFROST	Multi Evap Defrost	Synchronized or Independent		Synchronized	Synchronized	Synchronized = synchronize bonded controller in defrost mode; Independent = bonded controllers defrost independently
MULTI EVAP SENSOR	Multi Evap Sensor	Shared or Unshared		Shared	Shared	Shared = share sensor readings from bonded controllers; Unshared = use local sensor readings only
SUCT PRES OFFSET	Suct Pres Offset	-5.0 °F	5.0 °F	0.0 °F	0.0 °F	An offset added or subtracted from the suction line pressure transducer reading, if needed
SUCT TEMP OFFSET	Suct Temp Offset	-5.0 °F	5.0 °F	0.0 °F	0.0 °F	An offset added or subtracted from the suction temperature sensor reading, if needed
COIL TEMP OFFSET	Coil Temp Offset	-5.0 °F	5.0 °F	0.0 °F	0.0 °F	An offset added or subtracted from the coil temperature sensor reading, if needed
AIR TEMP OFFSET	Air Temp Offset	-5.0 °F	5.0 °F	0.0 °F	0.0 °F	An offset added or subtracted from the room temperature sensor reading, if needed

ADVANCED SETPOINTS MENU - AVAILABLE ONLY ON DASHBOARD CONT'D

DASHBOARD DISPLAY	FULL NAME	MIN	MAX	A1 DEFAULT	A2L DEFAULT	DESCRIPTION
AUX 1 OFFSET	AUX1 Temp Offset	-5.0 °F	5.0 °F	0.0 °F	0.0 °F	When Aux1, Aux2, or Aux 3 are used as a temperature sensor, an offset is added or subtracted from the reading.
AUX 2 OFFSET	AUX2 Temp Offset	-5.0 °F	5.0 °F	0.0 °F	0.0 °F	
AUX 3 OFFSET	AUX3 Temp Offset	-5.0 °F	5.0 °F	0.0 °F	0.0 °F	
PROPORTIONAL	Proportional	0	255	3	3	A coefficient to the valve control algorithm that increases valve responsiveness as the value increases
INTEGRAL	Integral	0	255	5	5	A coefficient to the valve control algorithm that increases valve responsiveness as the value increases
DERIVATIVE	Derivative	0	255	3	3	Should not be adjusted unless instructed by factory
AIR TEMP DIFF	Air Temp Differential	0.1	5.0	1.0 °F	1.0 °F	The number of degrees above ROOM TEMP before the controller will go into REFRIGERATION mode
NUMBER OF SENSORS	Number of Leak sensors	0	3	0	2	Number of refrigerant leak sensors wired to the controller, generally determined/ set by the evaporator manufacturer. Once set CANNOT be decreased, and controller MAY NOT refrigerate without the correct number of sensors.
ALARM LEVEL	Leak Flammability Limit to Trigger Alarm	0%	20%	0%	20%	If LFL % rises above this level trigger Leak Warning alarm and activate fans. Value must be set below the Alarm Level setpoint
WARNING LEVEL	Leak Flammability Limit to Trigger Warning	0%	19.9%	0%	19.9%	If LFL % rises above this level trigger Leak Warning alarm and activate fans. Value must be set below the Alarm Level setpoint

SYSTEM MODES

ABR.	ON-BOARD DISPLAY	DASHBOARD DISPLAY	FULL NAME / DESCRIPTION
rEF	rEF	REFRIGERATE	Refrigeration
ddF	ddF	DEFROST DELAY FAN	Defrost Delay Fans
dEF	dEF	DEFROST	Defrost
drn	drn	DRAIN TIME	Drain Time
FdL	FdL	FAN DELAY	Fan Delay
SoF	SoF	SYSTEM OFF	System Off (External System Off)
oFF	oFF	OFF	Off (Satisfied on Temperature)

VARIABLES MENU

Use the ▲ and ▼ arrows to move through the available options.

ABR.	ON-BOARD DISPLAY	DASHBOARD DISPLAY	FULL NAME	DESCRIPTION
rtP	rtP	ROOM TEMP	Room Temp	Room Temperature as measured by controller
Hu	Hu	HUMIDITY	Humidity	Relative Humidity as measured by controller
CLt	CLt	COIL TEMP	Coil Temp	Coil Temperature as measured by controller
SYS	SYS	SYSTEM MODE	System Mode	Current operating status
SHt	SHt	SUPERHEAT	Superheat	Superheat as calculated by the controller
PrS	PrS	SUCTION PRESSURE	Suction Pressure	Suction Pressure as measured by controller
SUt	SUt	T1 SUCTION TEMP	Suction Temp	Suction Temperature as measured by controller
SAt	SAt	SATURATION TEMP	Saturation Temp	Saturation Temperature as calculated by controller
oPn	oPn	VALVE % OPEN	Valve% Open	Percentage EEV is open
Cor	Cor	COMPRESSOR RELAY	Compressor Relay	Current status of LLS/compressor relay
dEr	dEr	DEFROST RELAY	Defrost Relay	Current Status of Defrost relay
FAr	FAr	FAN RELAY	Fan Relay	Current Status of Fan relay
AU1	AU1	DIG 1 STATUS	Aux Input 1	Current Status/Temperature as measured by controller at Aux input 1
AU2	AU2	DIG 2 STATUS	Aux Input 2	Current Status/Temperature as measured by controller at Aux input 2
AU3	AU3	DIG 3 STATUS	Aux Input 3	Current Status/Temperature as measured by controller at Aux input 3
LL1	LL1	LEAK LEVEL 1	Leak Sensor 1	Concentration of Refrigerant detected by leak sensor 1, 2 or 3 measured as a percentage of the refrigerant's Lower Flammability Limit (LFL) R-454A, R-454C, R-455
LL2	LL2	LEAK LEVEL 2	Leak Sensor 2	
LL3	LL3	LEAK LEVEL 3	Leak Sensor 3	
iP1	iP1	IP OCTET 1	IP Address Part 1	First 3 digits of IP address
iP2	iP2	IP OCTET 2	IP Address Part 2	Second 3 digits of IP address
iP3	iP3	IP OCTET 3	IP Address Part 3	Third 3 digits of IP address
iP4	iP4	IP OCTET 4	IP Address Part 4	Fourth 3 digits of IP address
Fir	Fir	FIRMWARE VERSION	Firmware Version	Current Version of firmware on controller

REFRIGERANTS

ABBREVIATION	FULL NAME
A1 Refrigerants	
404	R-404A
449	R-449A
448	R-448A
744	R-744
410	R410A
438	R-438A
290	R-290
717	R-717
r22	R-22
134	R-134a
40C	R-407C
40A	R-407A
507	R-507
A2L Refrigerants	
54A	R-454A
54C	R-454C
55A	R-455A

VALVE TYPES

DISPLAY	ON-BOARD DISPLAY	DASHBOARD DISPLAY	DESCRIPTION
tHr	tHr	Mechanical	Traditional Thermostatic Expansion Valve
PLS*	PLS	Pulse Valve	Pulse Width Modulation (PWM) Valve
rS	rS	KE2 RSV	KE2 Therm's Refrigeration Stepper Valve
Sei	SEi	SER/ SEI 1 to 20	12 VDC Bipolar Sporlan EEV 1,600 max steps, 200 steps/ second
Ser	SEr	SER AA to L	12 VDC Bipolar Sporlan EEV 2,500 max steps, 200 steps/ second
CrL	CrL	Carel	12 VDC Bipolar Carel EEV with 480 max steps, 50 steps/ second

* NOTE - When using Pulse Valve, Solid state relay #21304 is required.

ALARM STATUS MENU

ABR.	ON-BOARD DISPLAY	DASHBOARD DISPLAY	FULL NAME	DESCRIPTION
PSA	PSA	PRESSURE SENSOR	Pressure Sensor Alarm	Suction pressure sensor is shorted, open or pressure out of range
SSA	SSA	SUCTION TEMP SENSOR	Suction Sensor Alarm	Suction temperature sensor is shorted or open
ASA	ASA	AIR TEMP SENSOR	Air Sensor Alarm	Return air temperature sensor is shorted or open
CSA	CSA	COIL TEMP SENSOR	Coil Sensor Alarm	Coil temperature sensor is shorted or open
HSH	HSH	HIGH SUPERHEAT	High Superheat Alarm	Superheat above upper limit
LSH	LSH	LOW SUPERHEAT	Low Superheat Alarm	Superheat below lower limit
HtA	HtA	HIGH AIR TEMP	High Temperature Alarm	Room temperature is above ROOM TEMP + AIR TEMP DIFF + HIGH TEMP ALARM OFFSET for longer than HIGH TEMP ALARM DELAY
LtA	LtA	LOW AIR TEMP	Low Temperature Alarm	Room temperature is below ROOM TEMP - LOW TEMP ALARM OFFSET for longer than LOW TEMP ALARM DELAY
EdF	EdF	EXCESS DEFROST	Excess Defrost Alarm	32 defrosts or more within 48 hours
dtt	dtt	DEFR TERM ON TIME	Defr Term on Time Alarm	Defrost terminated on time instead of temperature for two consecutive cycles
dor	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	CoA	COMMUNICATION ERROR	Communication Error	ONLY FOR BONDED CONTROLLERS: No communication between controllers for one minute or more
EA1	EA1	EXTERNAL ALARM 1	External Alarm 1	If AU1 IN MODE = EXT ALARM: The digital input is in an active state
EA2	EA2	EXTERNAL ALARM 2	External Alarm 2	If AU2 IN MODE = EXT ALARM: The digital input is in an active state
EA3	EA3	EXTERNAL ALARM 3	External Alarm 3	If AU3 IN MODE = EXT ALARM: The digital input is in an active state
EFL	EFL	EMAIL FAILURE	Email Failure Alarm	Email alert was not confirmed by email server provided after seven consecutive attempts
A1A	A1A	AUX1 SENSOR	AU1 Temp sensors Alarm	AU1 temperature sensor is shorted or open
A2A	A2A	AUX2 SENSOR	AU2 Temp sensors Alarm	AU2 temperature sensor is shorted or open
A3A	A3A	AUX3 SENSOR	AU3 Temp sensors Alarm	AU3 temperature sensor is shorted or open
Pdt	Pdt	PUMPDOWN TIMEOUT	Pump Down Timeout	Max time for LPCO pumpdown exceeded
SCC	SCC	SHORT COMP CYCLE	Short Compressor Cycle	Compressor is started an excessive number of times to maintain suction pressure
LPA	LPA	LOW PRESSURE	Low Pressure Alarm	Suction pressure dropped below expected point excessive number of times
PrF	PrF	N/A	Process Failure	Basic Display is not communicating to the controller

A2L Alarms can only be reset at the display. Not on dashboard or remotely.

The factory has pre installed 2 leak sensors. The quantity of sensors cannot be decreased. Only increased in the web based settings.

A2L leak sensors must be replaced with same addressed/ color coded sensor.

To address a sensor please contact our technical support dept.

VISIT B-RP.COM/SMARTVAP FOR DETAILS

ALARM STATUS MENU

ABR.	ON-BOARD DISPLAY	DASHBOARD DISPLAY	FULL NAME	DESCRIPTION
CLL		LEAD/ LAG COMMUNICATION ERROR	Lead/ Lag Communication Error	Communication Lost between Lead/ Lag controllers
CHA		HUMIDITY BOARD COMMUNICATION ERROR	Humidity board communication error	OEM Board lost communication with Humidity board for 10 seconds
LC1		LEAK COMMUNICATION 1 ERROR	Lost communication with leak sensor 1	OEM board lost communication with leak sensor 1 for 10 seconds
LC2		LEAK COMMUNICATION 2 ERROR	Lost communication with leak sensor 2	OEM board lost communication with leak sensor 2 for 10 seconds
LC3		LEAK COMMUNICATION 3 ERROR	Lost communication with leak sensor 3	OEM board lost communication with leak sensor 3 for 10 seconds
Li1		LEAK SENSOR 1	Internal fault Leak sensor 1	Leak sensor 1 has an internal fault
Li2		LEAK SENSOR 2	Internal fault Leak sensor 2	Leak sensor 2 has an internal fault
Li3		LEAK SENSOR 3	Internal fault Leak sensor 3	Leak sensor 3 has an internal fault
Ln1		LEAK WARNING 1	Leak sensor 1 above warning level	Leak level for refrigerant leak sensor 1 is above warning level
Ln2		LEAK WARNING 2	Leak sensor 2 above warning level	Leak level for refrigerant leak sensor 2 is above warning level
Ln3		LEAK WARNING 3	Leak sensor 3 above warning level	Leak level for refrigerant leak sensor 3 is above warning level
LrE		LEAK AT REM CONT	Bonded controller leak alarm	Bonded Controller is in Leak alarm. Only applicable if Multi Evap is set to be shared
LEA		LEAK DETECTED	Aux Input 1 leak detected	Aux Input 1 is set to Leak Alarm and the input is active
LEA		LEAK DETECTED	Aux Input 2 leak detected	Aux Input 2 is set to Leak Alarm and the input is active
LEA		LEAK DETECTED	Aux Input 3 leak detected	Aux Input 3 is set to Leak Alarm and the input is active
LEA		LEAK DETECTED	Leak sensor 1 above critical level	Leak level for refrigerant leak sensor 1 is above critical alarm level
LEA		LEAK DETECTED	Leak sensor 2 above critical level	Leak level for refrigerant leak sensor 2 is above critical alarm level
LEA		LEAK DETECTED	Leak sensor 3 above critical level	Leak level for refrigerant leak sensor 3 is above critical alarm level

A2L Alarms can only be reset at the display. Not on dashboard or remotely.

The factory has pre installed 2 leak sensors. The quantity of sensors cannot be decreased. Only increased in the web based settings.

A2L leak sensors must be replaced with same addressed/ color coded sensor.

To address a sensor please contact our technical support dept.

VISIT B-RP.COM/SMARTVAP FOR DETAILS

LAN START UP

The SmartVap+ Evap OEM controller includes a webpage interface built-into the hardware, no internet access is necessary to access the controller's webpage when on-site or in the local network. When the controller is provided access to the Internet, KE2 SmartAccess allows unprecedented real-time access to the controller via patented communication techniques, detailed data logs, graphs, alerts, and much more.

LOCAL ACCESS

Access the controller's webpage on-site by plugging a laptop directly into the controller,using a KE2 Service Tool Kit with your smartphone/tablet, or installing a KE2-Edge Manager. The KE2-Edge Manager/controller can also be incorporated into the local network for access from work stations etc. in the network.

The KE2-Edge Manager provides local Wi-Fi access & dashboard of controllers for easier service, Wi-Fi bridging, data logging, graphs, alerts, BACnet/IP integration and more. KE2 Switches may be added to connect multiple controllers to a single KE2-Edge Manager.
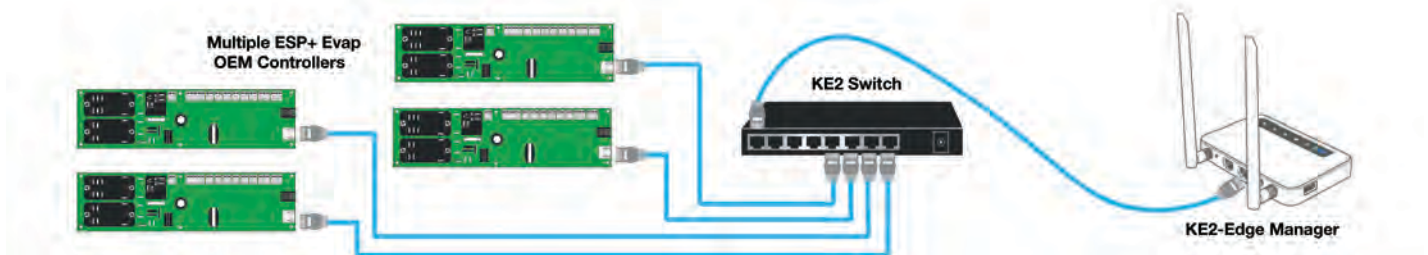
The service tool instructions and app for mobile devices are available at

Ke2therm.com/products/ke2-service-tool-app

Or scan QR code

REMOTE ACCESS

If provided access to the Internet, the controller may be accessed remotely by logging into the KE2 SmartAccess portal. For a nominal annual fee, the controller may be viewed and setpoints changed in real time from anywhere Internet is available. In addition to the 30 day graph and data log built-into the controller, the portal will store 1 year of additional data. Selectable alerts (sent via SMS or email), notes, detailed reports, alarm history, user controls and more are all provided by the portal. The controller may be published to the portal either by itself, or via a KE2-Edge Manager.

CONNECTING THE SMARTVAP+ TO A LAN (LOCAL AREA NETWORK) (IP ADDRESS STICKER AVAILABLE)

1. **Connect Ethernet (Cat5) cable to the SmartVap+ controller and to an open port on a network switc**h.

2. Use the on-board display to **enable DHCP setpoint**.

    a. Hold the **BACK** button for 3 seconds to access the set point menu.

    b. Use the ▲ and ▼ arrows to find the ▯▯▯ setpoint.

    c. Press and release the **ENTER** button to display the current setting.

    d. Use the ▲ and ▼ arrows to Enable (▯▯▯).

    e. Press and hold the **ENTER** button for 3 seconds to confirm the setting and Enable DHCP.

3. Press the **BACK** button a few times to r**eturn to the default display.**

4. **Find the IP address for your SmartVap+ controller**.

    This can be found on the Service Parts List sticker on the inside of the access panel of the evaporator:

NOTE: If you cannot locate this sticker, or the information is illegible, see next page to collect this information via the on-board display
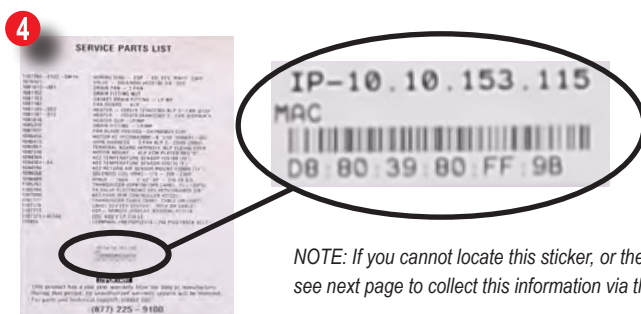
5. **On a computer connected to the same network as your SmartVap+ controller, open any browser** (Chrome, Firefox, Edge etc.).

6. **Enter the SmartVap+ controller IP Address** (from step 4 above) **into the address bar of the browser** and press enter. The controller Home page should be displayed.

If the controller webpage does not load, additional setup support or IT support may be required

CONNECTING THE SMARTVAP+ TO A LAN (LOCAL AREA NETWORK) (IP ADDRESS STICKER NOT AVAILABLE)

1. **Connect Ethernet (Cat5) cable to the SmartVap+ controller and to an open port on a network switc**h.

2. Use the on-board display to **enable DHCP setpoint.**

    a. Hold the BACK button for 3 seconds to access the set point menu.

    b. Use the ▲ and ▼ arrows to find the **dHC** setpoint.

    c. Press and release the ENTER button to display the current setting.

    d. Use the ▲ and ▼ arrows to Enable (**EnA**).

    e. Press and hold the ENTER button for 3 seconds to confirm the setting and Enable DHCP.

3. Press the BACK button a few times to **return to the default display.**

4. Use the ▲ and ▼ arrows to **scroll through the controller variables until the IP settings are found. (iP1)**

5. **Record the four IP (iP1, iP2, iP3, iP4) values**:

    a. Use the ▲ and ▼ arrows to find iP1 (**iP1**)

    c. Press and release the ENTER button to display the current setting.

    d. Record this number.

    e. Press the BACK button.

    f. Repeat for iP2 (**iP2**), iP3 (**iP3**) and iP4 (**iP4**),

    IP = **10 . 0 . 0 . 12**   *(Example)*

            iP1 iP2 iP3 iP4

6. **On a computer connected to the same network, open any browser** (Chrome, Firefox, Edge etc.).

7. **Enter the SmartVap+ controller IP Address** (from step 5 above) **into the address bar of the browser and press enter.** The controller Home page should be displayed.

If the controller webpage does not load, additional setup support or IT support may be required

SmartVap+ Dashboard

10 . 0 . 0 . 12
(Example)
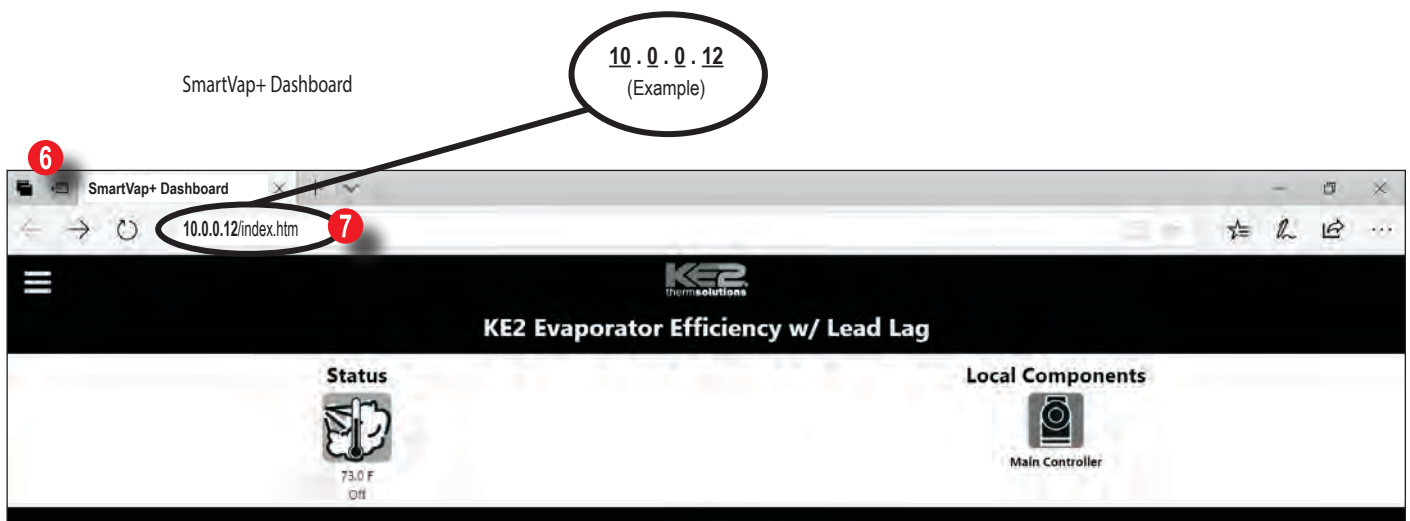
CONNECTING THE SMARTVAP+ TO THE OPTIONAL KE2 WIFI EDGE MANAGER

1 **Power On**

Plug the power cable into the power port of the KE2-EM. Use the **12V/1.5A** power adapter supplied with the KE2-EM in order to ensure proper operation.

Note: *If necessary to perform a Factory Reset, hold down the Reset button for 10 seconds, then release. Caution - all User Data will be cleared!*
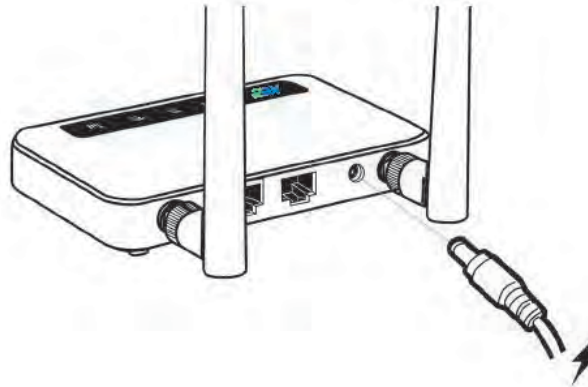
2 **Connecting to the KE2-EM**

You can connect to the KE2-EM via Wi-Fi or Ethernet Cat5e cable. Choose the most convenient method.

Note: *This step only connects your mobile/tablet/laptop/desktop to the local area network (LAN) of the KE2-EM. Internet access is not yet configured. In order to connect to the Internet, please finish the setup procedures below and then follow* **EZ-Install Wizard** *to setup an Internet connection.*

Method 1 - Connect via Wi-Fi

Search for the KE2-EM's Wi-Fi network (SSID) in your device's list of Wi-Fi networks and input the default password – All characters are upper case: **KE2EMPLS#1**.

The SSID is printed on the label on the bottom of the KE2-EM in the following formats:

KE2EMPLUS-XXXXX (Ex: KE2EMPLUS-04CDC7)

KE2EMPLUS-XXXXX-5G (Ex: KE2EMPLUS-04CDC7-5G)

Method 2 - Connect via LAN

Connect your device to the LAN port of the KE2-EM via Ethernet cable.

3 **Access the KE2-EM Dashboard**

Open a web browser (Firefox, Chrome, Edge, Safari) and visit https://em.ke2.io or http://192.168.50.1.

If this is a new install, you will be guided using the **EZ-Install Wizard.**

Note: *A MicroSD card is pre-installed in the KE2-EM.* **DO NOT** *remove or replace the MicroSD card.*

KE2-EM Cell only - install a GSM SIM card for internet/backup internet if desired.

Note: *Your device will not display both Wi-Fi networks unless it supports both 2.4GHz and 5GHz Wi-Fi.*

KE2EMCELL-XXXXXX (Ex: KE2EMCELL-04CDC7)

KE2EMCELL-XXXXXX-5G (Ex: KE2EMCELL-04CDC7)

SMARTVAP+ MULTI EVAPORATOR WITH SINGLE CONDENSER SET-UP

NOTE: Only controllers with the same firmware version can be bonded. To check the firmware version of any unit, see "Display Firmware Version" on page 3.

If you require assistance to update firmware, please contact our Trouble Shooting Specialist at troubleshooting@b-rp.com or 1 844 893 3222 ext 529

1. **Connect each evaporator to an Ethernet switch or a wireless router. ***

2. **On a computer connected to the same network as your SmartVap+ controller,** (see step 1) **open any browser** (Chrome, Firefox, Edge etc.).

3. **Enter the IP Address of any of the connected SmartVap+ controllers** (from step 1 above) **into the address bar of the browser** and press ENTER . The controller Home page should be displayed. (If the controller webpage does not load, additional setup support or IT support may be required)

4. **Navigate to the Network page from the navigation menu.**

5. **Select "Bonded Controllers"**

6. **Log into the controller by selecting the LOGIN button in the lower right corner. You will need the current user name and password credentials. Select submit or press ENTER on your keyboard.**

7. **Click "Discover". The IP addresses of the available controllers will populate. (Click "OK" if prompted by browser to confirm)**

8. **Type "1" in the "Bond State" area of each controller to be bonded.**

9. **Click "Save/Group". Screen will refresh, showing all controllers available in "Group 1"**

10. **Click "Bond".** (Click "OK" if prompted by browser to confirm) Controllers will reset and restart.

Note:
- **Make sure you Login before making changes, and then click Save after changing any settings on each page before navigating away from that page, otherwise your settings will not take effect.|**

- **Ethernet cables used to bond the system evaporators must remain connected to the network switch. Single refrigeration circuits with two bonded evaporators that are not connected to a network must have a switch with connected Ethernet cables or at minimum an Ethernet cable connected between the two bonded evaporators at all times.**

- **In the web-based settings there are two options for "Multi Evap Sensor" and these will cause your system to operate differently if a leak is detected when using an A2L refrigerant.**

    "Shared" - When a leak is detected, both evaps will go into mitigation.

    "Not Shared" - Only evap that detected leak will go into mitigation.

11. To ensure the evaporator units are bonded properly, **click the Navigation button to expose the menu.**

12. **Click Setpoints.**

13. **Click Bonded Controllers.**

14. **From the drop down menu of the Multi Evap Cool tab: select Synchronized.**

   Multi Evap Defrost will either make all the bonded controllers go into defrost at the same time (Synchronized) or limit the system to only one evaporator at a time (Independent). Multi Evap Sensor tells the controller whether or not to share sensor information. For example, if the controllers are "Shared" and one controller was to lose its air temperature sensor, then it could continue running using the temperature read by the other bonded controllers. This should be the default mode. If the controllers are located in different spaces, therefore controlling at different temperatures, then "Independent" mode should be selected. If a controller loses a sensor, the controller will continue to run based the default safety mode for the current alarm.

15. Locate and click the Refrigeration tab. **Select the type of Multi Air Tmp Ctrl (Warmest or Average air)**. This selection will determine which method is used to control the temperature.

16. **Click Save** to save the settings.

17. **The second controller and subsequent controllers must be configured to match the "Multi" settings of the first controller.** This is accomplished by entering the IP address of the second controller in the browser, and navigating to the Setpoints and repeating the process illustrated in this section.

   The bonded SmartVap+ controllers will now be operating in Synchronized mode. You can view the current operating status for each controller by connecting to the router and navigating to the IP address of each.

   To Unbond:

   1 - Follow steps 1-9 above.

   2 - **Click "Unbond".** (Click "OK" if prompted by browser to confirm) Controllers will reset and restart
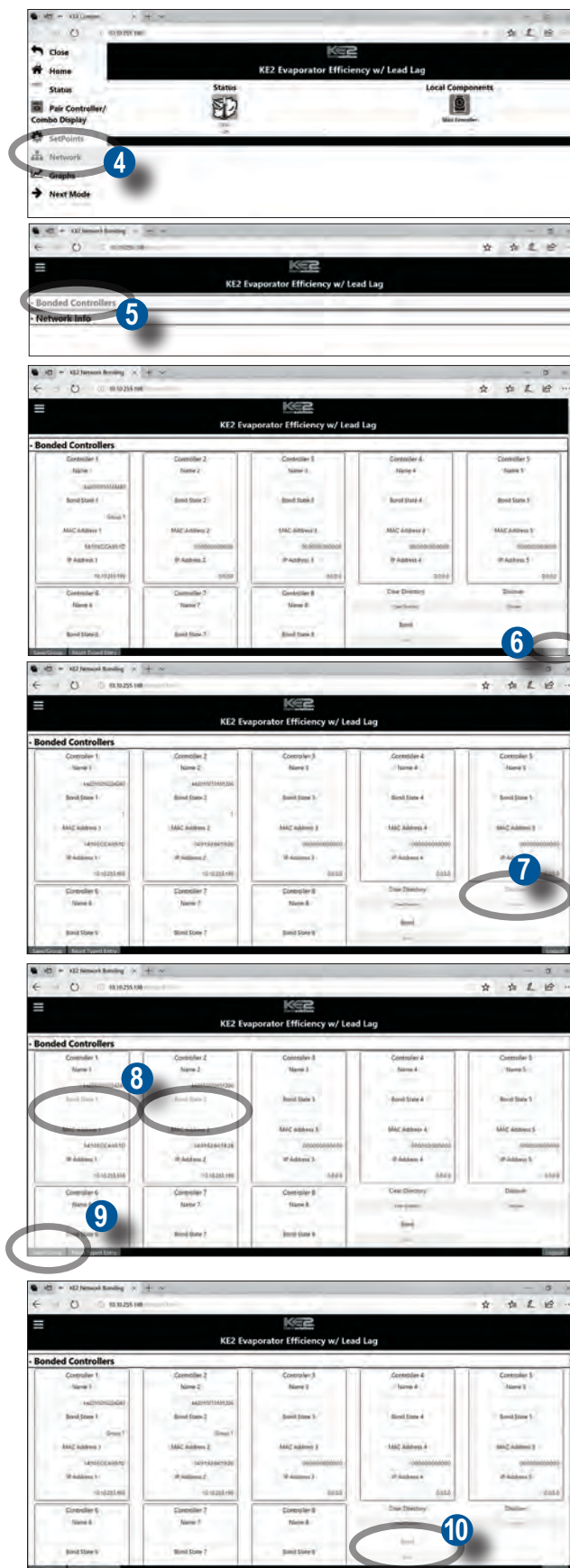

Note:

• **Make sure you Login before making changes, and then click Save after changing any settings on each page before navigating away from that page, otherwise your settings will not take effect.**

• **Ethernet cables used to bond the system evaporators must remain connected to the network switch. Single refrigeration circuits with two bonded evaporators that are not connected to a network must have a switch with connected Ethernet cables or at minimum an Ethernet cable connected between the two bonded evaporators at all times.**

• **In the web-based settings there are two options for "Multi Evap Sensor" and these will cause your system to operate differently if a leak is detected when using an A2L refrigerant.**

   "Shared" - When a leak is detected, both evaps will go into mitigation.

   "Not Shared" - Only evap that detected leak will go into mitigation.

POINT TO POINT WIRING DIAGRAM - SMARTVAP+ CONTROLLER WITH KE2 TERMINAL BOARD
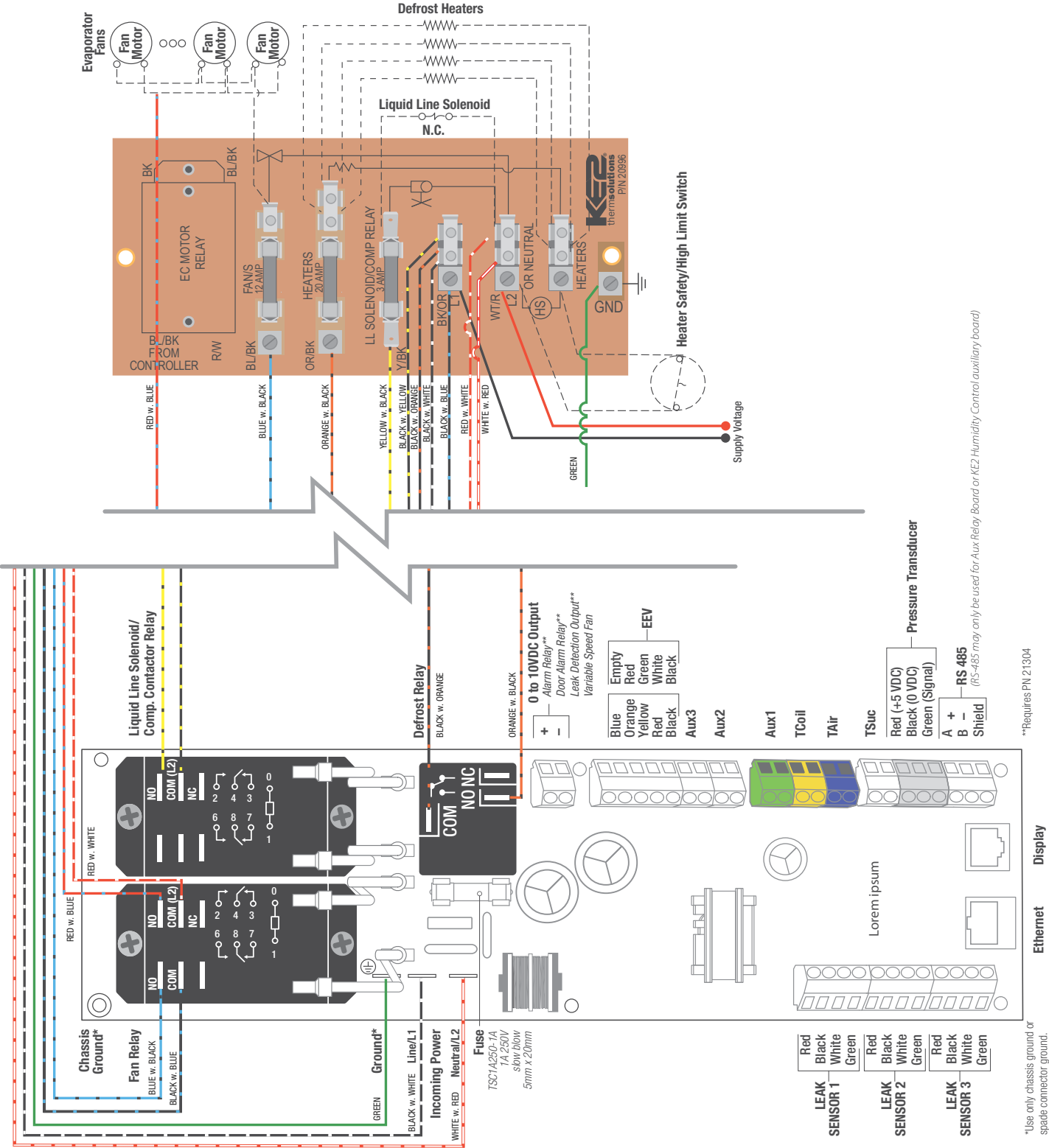
GENERAL WIRING DIAGRAM - SMARTVAP+ CONTROLLER WITHOUT KE2 TERMINAL BOARD
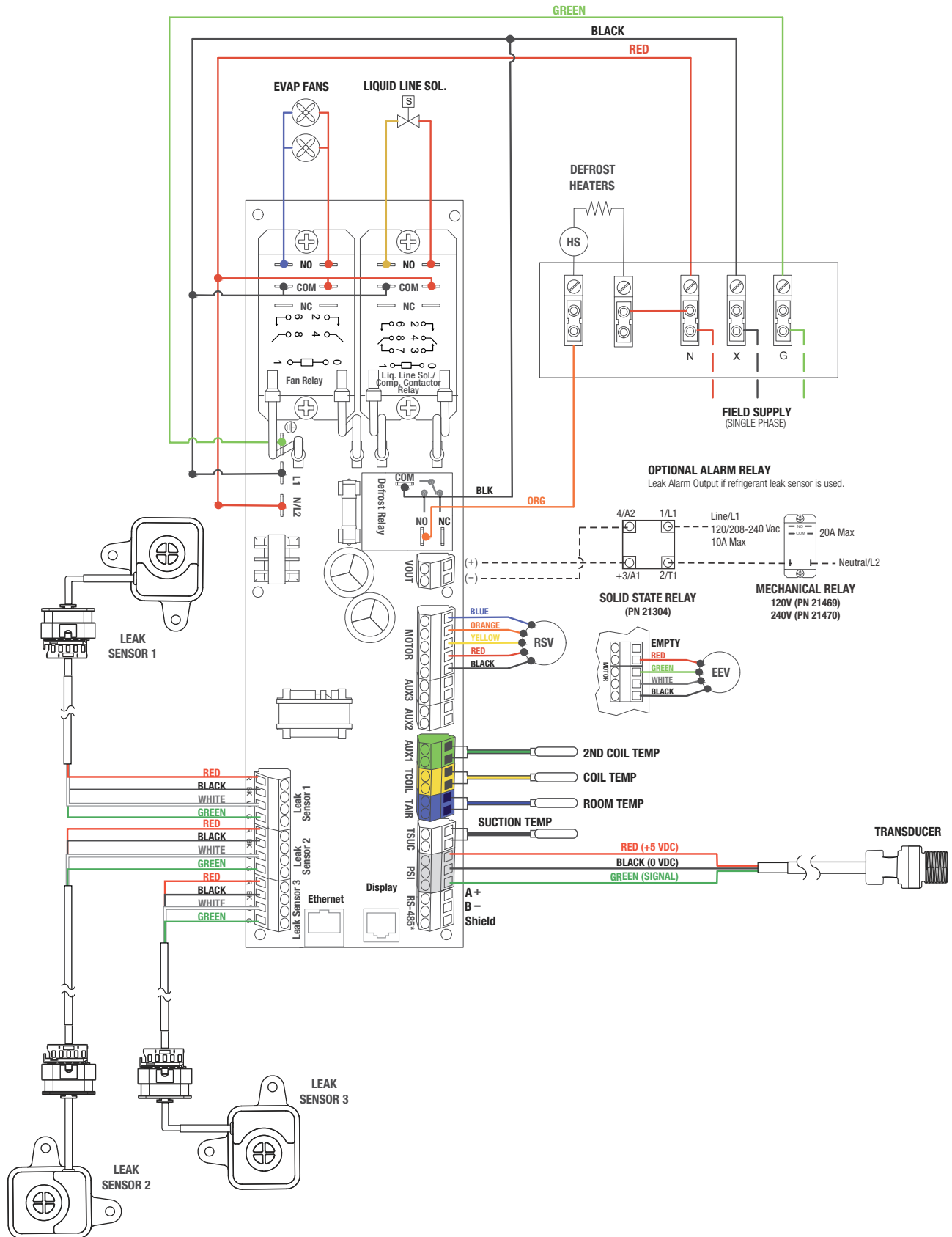
A1 REFRIGERANT
MODELS WITH SMARTVAP+

Includes factory installed:

• SmartVap+ Adaptive Defrost Control

• SmartVap+ Remote Display

• EEV Electronic Expansion Valve

• Solenoid Valve

A2L REFRIGERANT
MODELS WITH SMARTVAP+

Includes:

• A1 components Plus

• Leak Sensors

• Safety Shut Off Valve

• Safety Shut Off Check Valve

ALPHABETICAL LIST OF ABBREVIATIONS

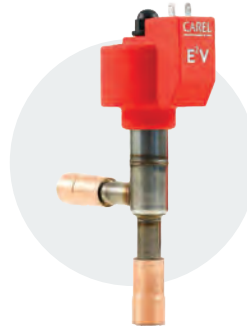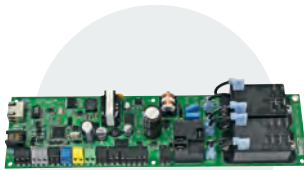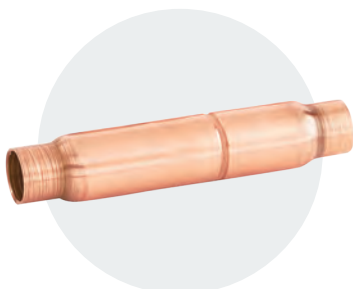| ABR.	REMOTE DISPLAY	FULL NAME	TYPE	DESCRIPTION
10t	10t	0 to 10 Vdc Mode	Setpoint	(ALr) Alarm relay. (FSd) Evap fan speed control. (dAL) Door alarm relay.
A1A	A1A	Aux Input 1 state	Setpoint	(oPn) active if input is open. (CLo) active if input is shorted.
A1A	A1A	AU1 Temp sensor Alarm	Alarms	AU3 temperature 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.
CCA	CCA	Compressor Communications Alarm	Alarms	[Siteview Only] Communication lost to KE2 Compressor Sequencer OEM
CEL	CEL	Celsius	Setpoint	Option for Temp Units (Unt) setpoint. (FAH) Fahrenheit. (CEL) Celsius.
CHA	CHA	Humidity Comms Alarm	Alarms	Evap OEM lost communication with Humidity control board for 10 seconds
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.

ALPHABETICAL LIST OF ABBREVIATIONS (cont'd)

ABR.	REMOTE DISPLAY	FULL NAME	TYPE	DESCRIPTION
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	Auxiliary 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	di A	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	di S	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	Auxiliary 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.
EA1	EA 1	External Alarm 1	Alarms	If AU1 IN MODE = EXT ALARM: The auxiliary input is in an active state
EA2	EA2	External Alarm 2	Alarms	If AU2 IN MODE = EXT ALARM: The auxiliary input is in an active state
EA3	EA3	External Alarm 3	Alarms	If AU3 IN MODE = EXT ALARM: The auxiliary input is in an active state
EAo	EAo	External Alarm Switch Active	Auxiliary Input	Auxiliary input set to external alarm is receiving an active signal.
EAF	EAF	External Alarm Switch Inactive	Auxiliary Input	Auxiliary input set to external alarm is not receiving an active signal.
Ed	Ed	Electric Defrost w/Mech. valve	Type of Control	System operates with default values for Electric Defrost with Mechanical Valve.
EdE	EdE	Electric Defrost w/EEV	Type of Control	System operates with default values for Electric Defrost with Electric Valve.
EdF	EdF	Extreme Temp Diff	Setpoint	Should not be adjusted unless instructed to by KE2 Therm.
EdF	EdF	Excess Defrost Alarm	Alarms	Excess Defrost Alarm - Time between defrosts too short in demand defrost.
Edt	Edt	Valve Type	Setpoint	Expansion valve on the system: (tHr) mechanical, pre-configured electric, or custom EEV configuration.

ALPHABETICAL LIST OF ABBREVIATIONS (cont'd)

ABR.	REMOTE DISPLAY	FULL NAME	TYPE	DESCRIPTION
EFL	EFL	Email Failure Alarm	Alarms	Email alert was not confirmed by email server provided after seven consecutive attempts.
ELE	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	EnA	Enabled	Setpoint	Enables connection with KE2 Smart Access for remote monitoring and control.
FAC	FAC	Factory reset	Setpoint	Press and hold ENTER to reset the controller to the factory default setpoints.
FAH	FAH	Fahrenheit	Setpoint	Option for Temp Units (Unt) setpoint. (FAH) Fahrenheit. (CEL) Celsius.
FAr	FAr	Fan Relay	Variables	Current state of the fan relay.
FdL	FdL	Fan Delay	System Mode	After drain mode (drn) , the LLS relay will energize, and the coil will pull down until it reaches 5 °F 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	Fir	Firmware Version	Variables	Current version of the firmware on the controller.
FrS	FrS	Fan Relay State	Setpoint	Fan relay operation. When set to (cLo) closed fans should be wired to N.C. on the fan relay. When set to (oPn) open, fans should be wired to N.o. on the fan relay
FoC	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	FSd	Evap Fan Speed	Setpoints	Sets 0 to 10 Vdc output to variable speed evap fan control.
FtS	FtS	Min Fan Switch Time	Setpoint	Minimum time before fan can be turned on again after turning off.
HAd	HAd	High Temp Alarm Delay	Setpoint	Delay before triggering a HIGH TEMP ALARM.
HAo	HAo	High Temp Alarm Offset	Setpoint	Degrees above ROOM TEMP + AIR TEMP DIFF to trigger HIGH TEMP ALARM.
HS	HS	HSV	Valve Type	Pre-configured EEV selection. (HS) KE2 Therm's HSV, Hybrid Stepper Valve.
HGF	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	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	HS	HSV	Valve Type	Pre-configured EEV selection. (HS) KE2 Therm's HSV, Hybrid Stepper Valve.
HSA	HSA	Humidity Sensor	Alarms	Humidity sensor is shorted or open.
HSH	HSH	High Superheat Alarm	Alarms	Superheat above upper limit for more than 90 minutes of cumulative runtime.
HtA	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	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	ind	Defrost Initiation Mode	Setpoint	Mode to initiate defrost. (dnd) demand. (SCH) schedule. (rnt) comp run time.
iP1	iP1	IP Address Part 1	Variables	First 3 digits of the controller's IP address.
iP2	iP2	IP Address Part 2	Variables	Second 3 digits of the controller's IP address.
iP3	iP3	IP Address Part 3	Variables	Third 3 digits of the controller's IP address.
iP4	iP4	IP Address Part 4	Variables	Fourth 3 digits of the controller's IP address.
LAF	LAF	No Leak	Auxiliary Input	Auxiliary Input is set to Leak Detect and the input is inactive, controller will operate as normal.
LAd	LAd	Low Temp Alarm Delay	Setpoint	Delay before triggering a LOW TEMP ALARM.
LAo	LAo	Low Temp Alarm Offset	Setpoint	Degrees below ROOM TEMP to trigger LOW TEMP ALARM.
LAo	LAo	Leak Detected	Auxiliary Input	An Auxiliary input is set to Leak Detect and the input is active.
LC1	LC1	Leak Comm 1	Alarms	OEM lost communication with Leak sensor 1,2, or 3 for 10 seconds
LC2	LC2	Leak Comm 2	Alarms	OEM lost communication with Leak sensor 1,2, or 3 for 10 seconds
LC3	LC3	Leak Comm 3	Alarms	OEM lost communication with Leak sensor 1,2, or 3 for 10 seconds

ALPHABETICAL LIST OF ABBREVIATIONS (cont'd)

ABR.	REMOTE DISPLAY	FULL NAME	TYPE	DESCRIPTION
LEA	LEA	Leak Alarm	Auxiliary Input	Option for auxiliary inputs. When active (Lao) will turn off all components except for fans and activate the leak alarm output. Once activated, the leak alarm may only be cleared by clearing alarms via the display. When inactive (LAF) controller runs as normal.
LEA	LEA	Leak Detected	Alarms	An Auxiliary input is set to Leak Alarm and the input is active, or the leak level for one of the refrigerant sensors is above the critical alarm level. System will run fans only and activate the leak output. Must be cleared manually from the display using CLA.
LGC	LGC	Redundant 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	LGF	Redundant 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.
Li1	Li1	Leak Sensor 1	Alarms	Leak sensor 1,2, or 3 has an internal fault.
Li2	Li2	Leak Sensor 2	Alarms	Leak sensor 1,2, or 3 has an internal fault.
Li3	Li3	Leak Sensor 3	Alarms	Leak sensor 1,2, or 3 has an internal fault.
LL1	LL1	Leak Level 1	Variables	Concentration of refrigerant detected by leak sensor 1,2, or 3 measured as a percentage of the refrigerants Lower Flammability Limit (LFL) R-454A and R454C only.
LL2	LL2	Leak Level 2	Variables	Concentration of refrigerant detected by leak sensor 1,2, or 3 measured as a percentage of the refrigerants Lower Flammability Limit (LFL) R-454A and R454C only.
LL3	LL3	Leak Level 3	Variables	Concentration of refrigerant detected by leak sensor 1,2, or 3 measured as a percentage of the refrigerants Lower Flammability Limit (LFL) R-454A and R454C only.
LLt	LLt	Lead/Lag Time	Setpoint	Time to toggle between lead/lag.
Ln1	Ln1	Leak Warning 1	Alarms	The leak level for refrigerant leak sensor 1,2 or 3 is above the warning level.
Ln2	Ln2	Leak Warning 2	Alarms	The leak level for refrigerant leak sensor 1,2 or 3 is above the warning level.
Ln3	Ln3	Leak Warning 3	Alarms	The leak level for refrigerant leak sensor 1,2 or 3 is above the warning level.
LPA	LPA	Low Pressure Alarm	Alarms	Suction pressure dropped below expected point excessive number of times.
LPC	LPC	Low Pressure Cut Out	Setpoint	Advanced topic.
LPd	LPd	Press Diff for LPCO	Setpoint	Advanced topic.
LPt	LPt	Max Time for LPCO	Setpoint	Advanced topic.
LrE	LrE	Leak at Rem Cont	Alarms	Bonded controller is on leak alarm. Only applicable if multi evap sensor is set to shared.
LSH	LSH	Low Superheat Alarm	Alarms	Superheat below lower limit.
LtA	LtA	Low Temperature Alarm	Alarms	Room temperature is below ROOM TEMP - LOW TEMP ALARM OFFSET for longer than LOW TEMP ALARM DELAY.
NTP	nTP	Time Server Comm Alarm	Alarms	Controller cannot communicate with external time of day server (SNTP server).
oFF	oFF	Off	System Mode	System has satisfied on temperature.
oFF	oFF	Defrost Heaters Off	Auxiliary Input	Defrost Interlock is active on the Auxiliary Input, defrost heaters forced off (oFF).
oFF	oFF	Off (Lead/Lag)	Setpoint	Option for Multi Evap Mode (tEt) setpoint. (oFF) lead/lag control is disabled.
oni	oni	Monitor Temp	Auxiliary Input	Monitor Temp as measured by the Auxiliary Input.
oPn	oPn	Valve % Open	Variables	Percentage the EEV is open (only available if EEV is selected).
oPn	oPn	Open	Setpoint	Option for Aux Input State (A1A, A2A, A3A) setpoints. Input will be Active when it reads an open circuit.
Pad	PAd	Paired Defrost Mode	Setpoint	Select operation when lead/ lag pair controller goes into defrost. (oFF) OFF, paired controller will stay off. (Aut) Auto, paired controller will refrigerate based on room temp.
PAR	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	PAS	Web password reset	Setpoint	Press and hold to reset the web password to the factory default.
Pdt	Pdt	Pump Down Timeout	Alarms	Max time for LPCO pumpdown exceeded.
PEr	PEr	Permanent Fan	Setpoint	Option for Refrig Fan Type (rFt) setpoint. (PEr) permanent forces fans to run during off cycle.

ALPHABETICAL LIST OF ABBREVIATIONS (cont'd)

ABR.	REMOTE DISPLAY	FULL NAME	TYPE	DESCRIPTION
PLS	PLS	Pulse Valve	Setpoint	Pulse Width Modulation (PWM) type expansion valve.
PrF	PrF	Process Failure	Alarms	KE2 Remote (Basic) Display is not communicating to the controller.
Prn	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	PrS	Suction Pressure	Variables	Suction pressure measured by the controller (only available if suction pressure transducer used).
PSA	PSA	Pressure Sensor Alarm	Alarms	Suction pressure sensor is shorted, open or pressure out of range.
PUL	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	rEF	Refrigeration	System Mode	System is currently in Refrigeration mode.
rFG	rFG	Refrigerant	Setpoint	Refrigerant used. See table on page 10.
rFt	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	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	rS	RSV	Valve Type	Pre-configured EEV selection. (RSV) KE2 Therm's Refrigeration Stepper Valve.
rtP	rtP	Room Temp	Variables	Walk-in freezer or cooler room temperature (TAir Sensor) as measured by the controller.
rtP	rtP	Room Temp	Auxiliary Input	Room temp as measured by the Auxiliary Input.
SA	SA	KE2 Smart Access	Setpoint	Turn KE2 Smart Access on or off. (EnA) enable KE2 Smart Access. (diS) disable KE2 Smart Access.
SAt	SAt	Saturation Temp	Variables	Saturation temperature as calculated by the controller (requires suction pressure transducer and T1 suction temperature sensor).
SCC	SCC	Short Compressor Cycle	Alarms	Compressor has started an excessive number of times to maintain suction pressure.
SCH	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	SEI	Valve Type	Pre-configured EEV selection. Sporlan Valve with 1,600 Steps.
SEr	SEr	SER	Valve Type	Pre-configured EEV selection. Sporlan Valve with 2,500 Steps.
SHt	SHt	Superheat	Variables	Superheat as calculated by the controller (requires suction pressure transducer and T1 suction temperature sensor).
SoF	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	SoF	System Off	System Mode	System off has been activated from the display, or by an external signal to an Auxiliary Input.
Son	Son	System Off Switch - System On	Auxiliary Input	System Off Auxiliary Input is Inactive (Son), system runs as normal.
SSA	SSA	Suction Sensor Alarm	Alarms	Suction temperature sensor is shorted or open.
Stt	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	SUt	Suction Temp	Variables	Suction Temperature as measured by controller.
SYS	SYS	System Mode	Variables	Current operating status.
t2F	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	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	tHr	Mechanical	Valve Type	Thermostatic Expansion Valve in the Expansion Device Type (Edt) setpoint.
t24	t24	Title 24	Setpoint	Option for Refrig Fan Type (rFt) setpoint. (t24) Title 24, cycle fans to comply with California Title 24 regulations.

ALPHABETICAL LIST OF ABBREVIATIONS (cont'd)

ABR.	REMOTE DISPLAY	FULL NAME	TYPE	DESCRIPTION
tEt	tEt	Multi Evap Mode	Setpoint	Mode for lead/lag operation. (oFF) Off. (LGC) Redundant cool. (LGF) Redundant off. (ALt) Alternate.
tS	tS	Room Temp SP	Setpoint	Room temperature to be maintained.
tS2	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	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	UnP	Unpair L/L	Setpoint	Press and hold ENTER until red LED blinks. (PAS) successful unpairing. (FAi) unpairing failed.
Unt	Unt	Temperature Units	Setpoint	Option for Temp Units (Unt) setpoint. (FAH) Fahrenheit. (CEL) Celsius.
Ust	USt	Max Superheat	Setpoint	Maximum allowed superheat for humidity control

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