KE2 21994 Condensing Unit Control User Guide

Contents

KE2 21994 Condensing Unit Control

Product Information

The KE2 Condensing Unit Control is a control unit designed for condensing units. It provides various features such as compressor and condenser fan control, alarm outputs, and network connectivity.

Parts List

- 21232 Basic Display with 18 Cable
- 21324 Snaptrack 11
- 21994 KE2 Condensing Unit Control
- 20202 Additional Literature (Refer to the provided link or QR code for more information)

General Layout

The control unit has multiple inputs and outputs, including:

- Pilot relay for compressor contactor
- Suction pressure input
- Discharge pressure input
- 0-10VDC output
- Alarm output*
- 2-speed condenser fan output*
- Variable speed condenser fan output* (Requires PN 21304 Solid State Relay)
- Suction temperature input
- Discharge temperature input
- Ambient temperature input

- Auxiliary input 1
- Auxiliary input 2
- Display connection for KE2 Basic Display
- Network connection via Ethernet
- Auxiliary board connection

Wiring Schematic
The control unit requires incoming power of 24 VAC. It should be wired according to the equipment manufacturer's wiring diagram. The condenser fan motor may require an external contactor if its amp draw exceeds the rating of the onboard relay. The controller must be powered by a 24 VAC transformer (not provided) with a minimum rating of 40VA. The wiring should follow local wiring codes to ensure safety.

Sensor Installation
Sensors should be labeled according to their function. It is important to avoid running sensor cables and other low-voltage wiring next to high-voltage wiring to prevent electrical noise and interference with sensor readings. If necessary, use 18 AWG shielded twisted pair cables to extend sensor wires, with a maximum recommended total length of 100 ft.

Alarm output and condenser fan outputs may require additional components such as the PN 21304 Solid State Relay.

Product Usage Instructions

1. Ensure that all recommended parts are available for installation, including the Basic Display, Snaptrack, and KE2 Condensing Unit Control.
2. Refer to the provided link or QR code to access additional literature for detailed information on the product.
3. Follow the general layout diagram to understand the various inputs and outputs of the control unit.
4. Refer to the wiring schematic to correctly wire the control unit. Note that factory-installed units may have specific wiring diagrams provided by the equipment manufacturer.
5. Make sure to provide 24 VAC power to the controller using a transformer with a minimum rating of 40VA.
6. If necessary, use an external contactor for the compressor and/or condenser fan if their amp draw exceeds the rating of the onboard relay. Wire the onboard relay to switch power to the contactor coil.
7. Install the control unit according to local wiring codes for safety.
8. If using sensors, ensure they are labeled correctly and avoid running sensor cables next to high-voltage wiring to prevent interference. Use shielded twisted pair cables if extending sensor wires.
9. Standardize the installation process for all units.

Parts List

The following parts are recommended for each install.

- 21994 KE2 Condensing Unit Control
- 21232 Basic Display with 18" Cable
- 21324 Snaptrack 11"
- 20201 Pressure Transducer – 0 to 150 psia, 10 ft. (Suction Pressure)
- 20202 Pressure Transducer – 0 to 500 psig, 10 ft. (Discharge Pressure)
- 20199 Temp Sensor 10 ft. – Black (Suction Temp)

- 21794 Temp Sensor 10 ft. – Blue (Ambient Temp)
- 21230 Temp Sensor 15 ft. – White (Discharge Temp)

21994
KE2 Condensing Unit Control

21232
Basic Display with 18" Cable

21324
Snaptrack 11"

20201
Pressure Transducer – 0 to 150 psia, 10 ft.
(Suction Pressure)

20202
Pressure Transducer – 0 to 500 psig, 10 ft.
(Discharge Pressure)

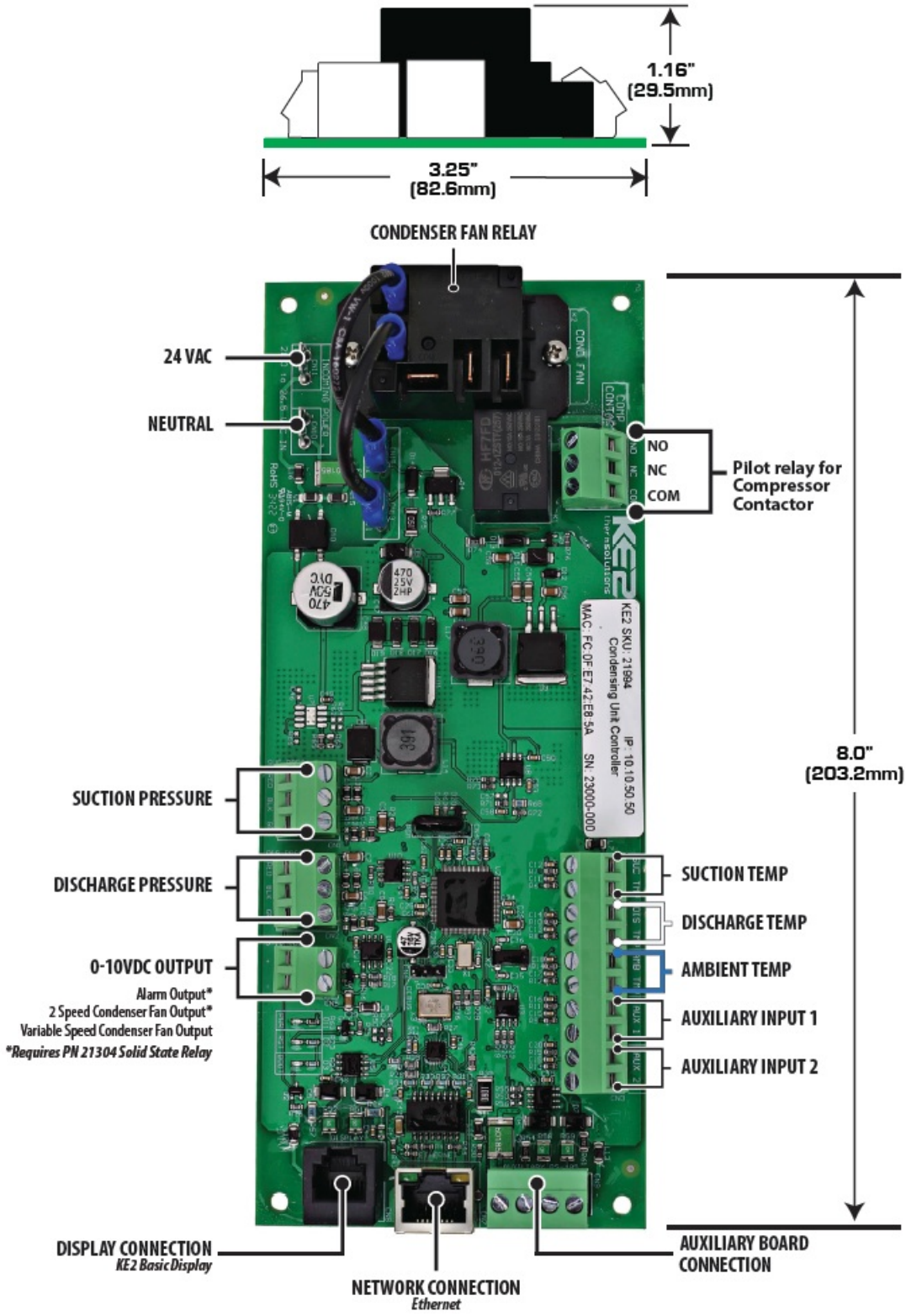
- 20199
  Temp Sensor 10 ft. – Black (Suction Temp)
- 21794
  Temp Sensor 10 ft. – Blue (Ambient Temp)
- 21230
  Temp Sensor 15 ft. – White (Discharge Temp)

Additional Literature

Please visit: **https://ke2therm.com/product/ke2-condensing-unit-control** and click the Link to Literature button.

Use this QR code:

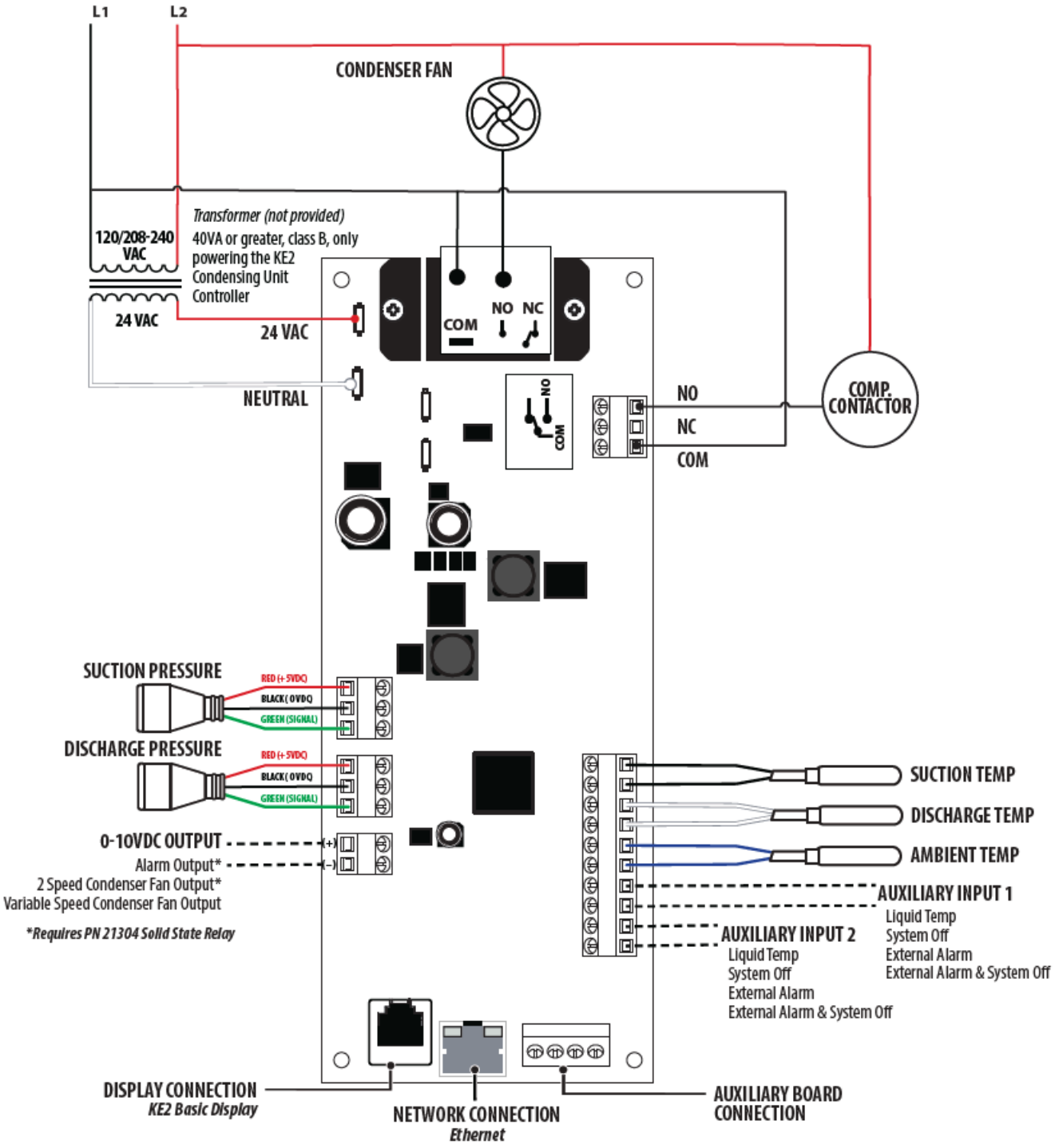
General Layout



Wiring Schematic

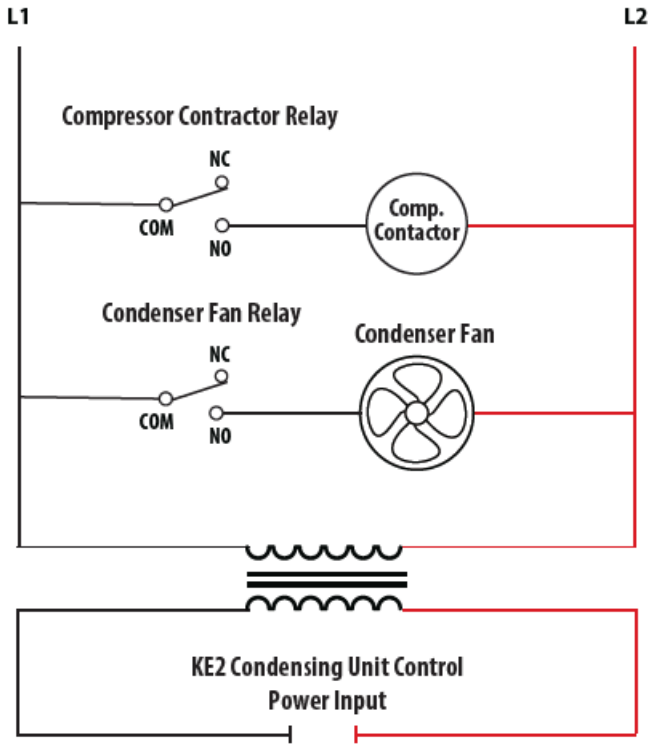
NOTE: If the factory is installed refer to the equipment manufacturer's wiring diagram.

CONTROLLER INCOMING POWER MUST BE 24 VAC.



Ladder Diagram

- The Compressor Contactor Relay must be used to pilot an external contactor for the compressor. If the amp draw of the condenser fan motor exceeds the rating of the onboard relay, an external contactor must also be used. The onboard relay should be wired to switch power to the contactor coil.
- 24 VAC must be provided to power the controller; a 24 VAC transformer is not included. The transformer must be 20 VA or greater, class B, and only provide power to a single KE2 Condensing Unit Control.
- Install in accordance with local wiring codes. KE2 Therm does not accept responsibility for incorrect or unsafe wiring.

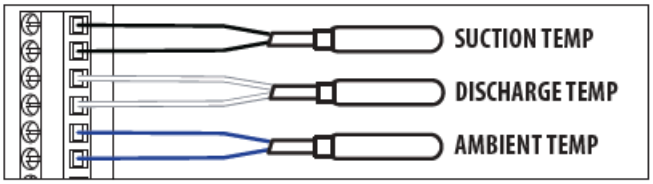


Sensor Installation

Sensors should be labeled with their function. DO NOT run sensor cables and other low-voltage wiring next to high-voltage wiring, as it will create electrical noise and interfere with sensor readings. If necessary to extend the sensor wire, use 18 AWG shielded twisted pair cables. The maximum recommends total length is 100 ft.

We recommend standardizing all installations

- Black (SUC TMP) – Suction Temperature
- White (DIS TMP) – Discharge Temperature
- Blue (AMB TMP) – Ambient Temperature



NOTE:
The suction and ambient temperature sensors can be used interchangeably. The discharge sensor must use PN 21230 – High-Temperature Sensor.

Controller Setup

Intro Mode
When powered up for the first time or after a factory reset the controller enters Intro Mode. Intro Mode consists of three initial startup setpoints that must be configured before refrigeration can begin.

1. for KE2 Condensing Unit Control, then for refrigerant will be displayed. Press several times until the correct refrigerant for the system is displayed, then press and hold ENTER .

2. SEt By default, the setpoint will be displayed next. This sets the initial cut-out pressure. Press ▼ to the appropriate default then press and hold ENTER ENTER .

404	R-404A
55A	R-455A
45C	R-454C
54A	R-454A

449	R-449A
448	R-448A
744	R-744
410	R-410A

438	R-438A
290	R-290
717	R-717
r22	R-22

134	R-134A
40C	R-407C
40A	R-407A
507	R-507

The above default cut-out pressure is a starting point only. ALWAYS refer to the condensing unit manufacturer's recommended low-pressure cut-out setting for the lowest space and ambient temperature the unit will experience. Adjust controller low-pressure cut-out setpoint as necessary.

3. SA for KE2 SmartAccess will be displayed next. KE2 SmartAccess allows you to easily view and modify your controllers online. Press ▼ to EnA for enabled or dIS disabled, then press and hold ENTER ENTER .

NOTE:
Enabling KE2 SmartAccess in Intro Mode will also enable DHCP client mode and allow the IP address of the controller to change from the factory default. Enable only if connecting directly to the local network without going through a KE2-Edge Manager.

Once Intro Mode is complete, the controller will begin to control the condensing unit. Review any necessary or desired additional setpoints and confirm the proper operation of the system.

Controller Navigation

INDICATOR LIGHTS

- RED LIGHT Critical alarm – a system not running, running may damage the system.
- YELLOW LIGHT Non-critical alarm – system running with potential issues.
- GREEN LIGHT Calling for refrigeration, compressor contactor relay energized.
- GREEN FLASHING Waiting on min. off timer to energize the compressor contactor relay.
- Access the setpoint menu by pressing and holding ENTER until rFG (refrigerant) 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 momentarily to move between digits to accelerate the changes.
- Press and hold ENTER to save setpoint changes.
- Press **BACK** to escape.

SETPOINTS MENU

rFG	REFRIGERANT
LPt	MAX PUMPDOWN TIME
LPC	LOW PRESSURE CUT OUT
LPd	PRESSURE DIFF*
Att	MAX PUMPDOWN ATTEMPTS
LAS	LOW AMBIENT SAFETY PRESSURE
AU1	AUX INPUT 1 MODE
A1A	AUX INPUT 1 STATE
AU2	AUX INPUT 2 MODE
A2A	AUX INPUT 2 STATE
10t	AUX OUTPUT MODE
CPt	CONDENSER FAN CONTROL MODE
CFC	CONDENSER FAN CUT OUT
Unt	TEMP UNITS
SHt	LOW SUCTION SUPERHEAT ALARM DELAY
SUt	HIGH SUCTION TEMP ALARM DELAY
dPt	HIGH DISCHARGE PRESSURE ALARM DELAY
dtt	HIGH DISCHARGE TEMP ALARM DELAY
LLr	COMPRESSOR CONTACTOR RELAY
Fnr	CONDENSER FAN RELAY
CLA	CLEAR ALARMS
DiA	DIAGNOSTICS MODE
FAC	FACTORY RESET
PAS	WEB PASSWORD RESET
bnd	BOND
Unb	UNBOND
SA	KE2 SMARTACCESS
dHC	DHCP MODE

*Low Pressure Cut Out + Pressure Differential = Low Pressure Cut In

ALARMS MENU

PSA	SUCTION PRESSURE SENSOR
STA	SUCTION TEMP SENSOR
DPA	DISCHARGE PRESSURE SENSOR
DTA	DISCHARGE TEMP SENSOR
LSH	LOW SUCTION SUPERHEAT
HST	HIGH SUCTION TEMP
HDT	HIGH DISCHARGE TEMP
HDP	HIGH DISCHARGE PRESSURE
LSS	LOW SUCTION SUPERHEAT SAFETY
HSS	HIGH SUCTION SUPERHEAT SAFETY
HST	HIGH DISCHARGE TEMP SAFETY
HSP	HIGH DISCHARGE PRESSURE SAFETY
ATA	AMBIENT TEMP SENSOR
A1A	AUX INPUT 1 SENSOR
A2A	AUX INPUT 2 SENSOR
EA1	EXTERNAL ALARM 1
EA2	EXTERNAL ALARM 2
EO1	EXTERNAL SYSTEM OFF 1
EO2	EXTERNAL SYSTEM OFF 2
LPA	LOW PRESSURE ALARM
PDT	PUMPDOWN TIMEOUT
SCC	SHORT CYCLE ALARM
LCT	CONDENSING UNIT LOCKOUT

VARIABLES MENU

SYS	SYSTEM MODE
PrS	SUCTION PRESSURE
SUt	SUCTION TEMP
SAt	SUCTION SATURATION TEMP
SHt	SUCTION SUPERHEAT
dPr	DISCHARGE PRESSURE
dSt	DISCHARGE TEMP
dSA	DISCHARGE SATURATION TEMP
dSH	DISCHARGE SUPERHEAT
CPr	COMPRESSOR CONTACTOR RELAY
FAr	CONDENSER FAN RELAY
Abt	AMBIENT TEMP
AU1	AUX1 STATUS
AU2	AUX 2 STATUS
SUb	SUBCOOLING
iP1	IP ADDRESS OCTET 1
iP2	IP ADDRESS OCTET 2
iP3	IP ADDRESS OCTET 3
iP4	IP ADDRESS OCTET 4
PnH	FIRMWARE PART NUMBER 1
PnL	FIRMWARE PART NUMBER 2
Fir	FIRMWARE VERSION

Specifications

Input Voltage:	24 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: Suction, Discharge, Ambient
	(2) Temp/Digital Input: Aux 1, Aux2
	(2) Pressure: Suction, Discharge
Outputs:	(1) Relay 2.5A, 240VAC Pilot Duty: Compressor Contactor
	(1) Relay 12A, 240VAC Inductive: Condenser Fan
	(1) 0-10 VDC: Variable Speed Condenser Fan, 2 Speed Condenser Fan*, Alarm*
Communication:	RS-485 (to auxiliary boards only)
	TCP/IP, RESTful API
	BACnet/IP**

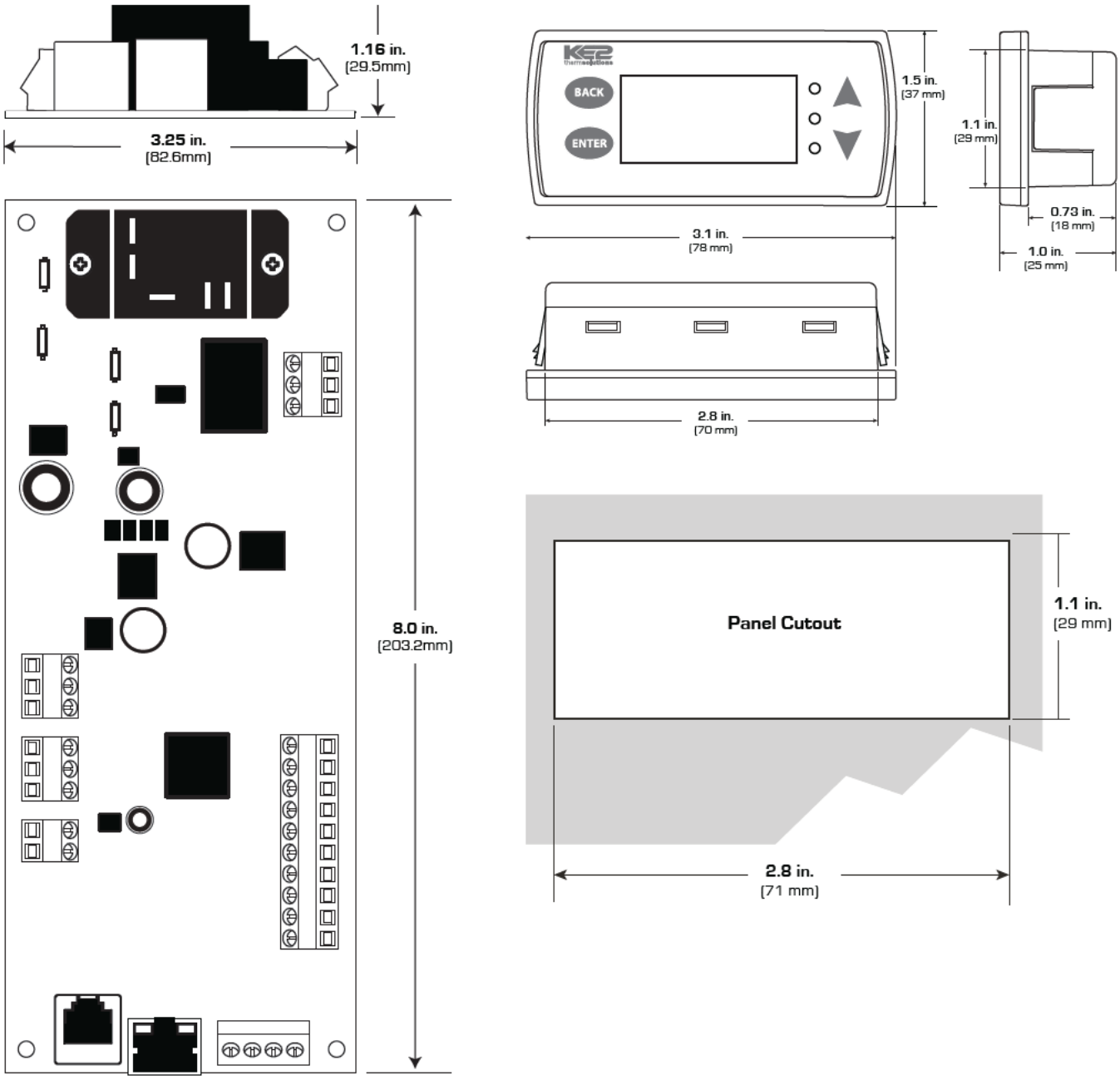
- Requires PN 21304 Solid State Relay
- Requires a KE2-EM w/ BACnet license (does not support BBMD)

Additional Part Numbers

Part #	Description
22060	Replacement Condenser Fan Relay
21902	KE2-Edge Manager Plus (Wi-Fi, Datalogging & more)
20200	Temp Sensor, 40 ft. – Black
21066	Temp Sensors – Set of 3– Blue, Yellow, Green, 40 ft.
20204	Pressure Transducer – 0 to 150 psia, 40 ft. (suction pressure)
20712	Pressure Transducer – 0 to 500 psig, 40 ft. (discharge pressure)
21872	Pressure Transducer – 0 to 750 psig, 10 ft. (R-744 suction pressure, R-410A discharge pressure)
21873	Pressure Transducer – 0 to 750 psig, 40 ft. (R-744 suction pressure, R-410A discharge pressure)
21671	Pressure Transducer – 0 to 1,000 psig, 10 ft. (R-744 discharge pressure)
21672	Pressure Transducer – 0 to 1,000 psig, 40 ft. (R-744 discharge pressure)
20208	Pressure Transducer – 0 to 300 psig, 10 ft. (R-410A suction pressure)
20711	Pressure Transducer – 0 to 300 psig, 40 ft. (R-410A suction pressure)

Dimensions

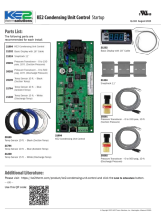
Inches (millimeters)



KE2 Therm Solutions

- 12 Chamber Drive Washington, MO 63090
- 1.888.337.3358
- www.ke2therm.com.

Documents / Resources

	KE2 21994 Condensing Unit Control [pdf] User Guide 21994, 21232, 21324, 21994 Condensing Unit Control, Condensing Unit Control, Unit Control

References

- Home - KE2 Therm Solutions
- KE2 Condensing Unit Control - KE2 Therm Solutions