

Temperature Control Panel Wiring Diagram

Model: IFPA-480-3P-64A

Shift Controls, Inc.

Installed Options:

Interlock Relay, RLY-1

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Temperature Control Panel Specifications

Model Number	IFPA-480-3P-64A
Rated Voltage	480 VAC
Phases	Three (3)
Power Controller	Zero Crossing SCR
Rated Frequency	60 Hz
SCCR	100 kA
Control Voltage	120 VAC; internal control transformer
Maximum Fuse Size	80 Amps, Class J, High Speed
Maximum Full Load Current	64 Amps, Resistive
Maximum Load	53.2 kW
Enclosure Type	Nema 4X Enclosure, Nema 12 Cooling Fan and Vent
Operating Environment	0 - 35 deg C, 10-85% RH, Non-Condensing, Indoor Use Only

REV.	DATE	DRAWN BY	DESCRIPTION
A	03/14/16	B. KETTLER	FOR CONSTRUCTION

DRAWING TYPE: WIRING SCHEMATIC

DRAWING DESCRIPTION
CONTROL PANEL SPECIFICATIONS AND WIRE COLOR STANDARDS

DRAWING NUMBER
E-IFPA-480-3P-64A
SHEET NUMBER
SHEET i



Fuse Replacement Voltage, Amperage, Class and Type Reference

FUSE REPLACEMENT NOTES:

1) Fuses are to be replaced with fuses of the same voltage rating, current rating, and fuse type.

Fuse Name	Description	Voltage Rating	Maximum Value	Fuse Type		Manufacturer Equivalent		
						Edison	Bussmann	Littelfuse
F1, F2, F3	Main Power Branch Fusing	600	80 Amps	Class J	High Speed	JHL	DFJ	N/A
F4, F5	Control Transformer Primary Fusing	500	1 Amp	Midget	Time-Delay	MEQ	FNQ	FLQ
F6	Control Transformer Secondary Fusing	250	1 Amp	Midget	Fast-Acting	MOL	BAF/BAN	BLF

Main Branch Fuse Protection (F1, F2, F3) Ampacity Reference Table

FUSE SIZING NOTES:

1) The maximum resistive heater load is 64 Amps / 53.2 kW at 480 VAC 3-Phase.

2) Fuses are to be sized 125-165% of the heater full load.

Heater Full Load Rating		Fuse Size, Current Rating						
		Littlefuse ® LRUJ16 Fuse Reducers Required for 35-60A Fuses					No Fuse Reducers Required	
		35A	40A	45A	50A	60A	70A	80A
Full Load Power, kW	Minimum	17.6	20.2	22.7	25.2	30.2	35.3	40.3
Full Load Power, kW	Maximum	23.3	26.6	29.9	33.3	39.9	46.6	53.2
Full Load Current, Amps	Minimum	21.2	24.2	27.3	30.3	36.4	42.4	48.5
Full Load Current, Amps	Maximum	28.0	32.0	36.0	40.0	48.0	56.0	64.0

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DRAWING TYPE: WIRING SCHEMATIC

DRAWING DESCRIPTION
FUSE AND FIELD WIRING SPECIFICATIONS

DRAWING NUMBER
E-IFPA-480-3P-64A
SHEET NUMBER
SHEET ii



Standard Wire Colors	
480VAC, 3-Phase Power	Brown (BR), Orange (OR), Yellow (YL)
Ground Wires	Green (GN)
AC Control Power, 120VAC Ungrounded AC	Red (RD)
Neutral / Grounded AC	White (WH)
Thermocouple Cable	Type K - Yellow Cable, Type J - Black Cable
DC Signal wires	2-Conductor Cable
RS-485, Data	2-Conductor Cable

Customer Supplied Wire Size, Rating and Terminal Tightening Torque Reference

NOTES:

1) Conductor Sizing to be Determined by NEC and Local Codes

2) Control wiring (Terminals 93-98) to be Class II unless customer supplied circuits to Alarm I (Terminals 91, 92) are greater than 150 Volts. If customer supplied wiring is greater than 150 Volts, then all control wiring (Terminals 91-98) are to be Class I.

Terminal Number	Description	Wire					Tightening Torque	
		Conductor Material	Minimum Voltage Rating	Minimum Temp. Rating	Minimum Wire Size	Maximum Wire Size	Minimum	Maximum
1, 2, 3, 4	Main Power Line (L1, L2, L3, GND)	Copper	600 VAC	75 C	14AWG, 1.6mm See Note 1	4AWG, 5.2mm See Note 1	23 in*lb, 2.5 N*m	26 in*lb, 3.0 N*m
5, 6, 7, 8	Heater Power Load (T1, T2, T3, GND)	Copper	600 VAC	75 C	14AWG, 1.6mm See Note 1	4AWG, 5.2mm See Note 1	23 in*lb, 2.5 N*m	26 in*lb, 3.0 N*m
91, 92	User Programable Alarm (Dry Contacts)	Copper	Class I	60 C	26AWG, 0.4mm See Note 1	10AWG, 2.5mm See Note 1	5.3 in*lb, 0.6 N*m	7.0 in*lb, 0.8 N*m
93, 94	Temp. Retransmit (4-20mA Sourcing)	Copper	Class II See Note 2	60 C	26AWG, 0.4mm See Note 1	10AWG, 2.5mm See Note 1	5.3 in*lb, 0.6 N*m	7.0 in*lb, 0.8 N*m
95, 96	RS-485 Modbus Communication	Copper	Class II See Note 2	60 C	26AWG, 0.4mm See Note 1	10AWG, 2.5mm See Note 1	5.3 in*lb, 0.6 N*m	7.0 in*lb, 0.8 N*m
97, 98	Thermocouple Input	TC Wire	Class II See Note 2	60 C	24AWG	14AWG Solid 16AWG Stranded	3.5 in*lb, 0.4 N*m	3.5 in*lb, 0.4 N*m
A1, A2	External Interlock (Option)	Copper	Class I	60 C	26AWG, 0.4mm See Note 1	14AWG, 1.6mm See Note 1	3.5 in*lb, 0.4 N*m	3.5 in*lb, 0.4 N*m

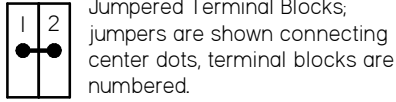
REV.	DATE	DRAWN BY	DESCRIPTION
A	03/14/16	B. KETTLER	FOR CONSTRUCTION
DRAWING TYPE			
WIRING SCHEMATIC			

DRAWING DESCRIPTION
FUSE AND FIELD WIRING SPECIFICATIONS

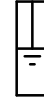
DRAWING NUMBER
E-IFPA-480-3P-64A
SHEET NUMBER
SHEET iii



Wiring Schematic Typical Symbols and Standards



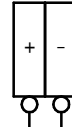
Jumpered Terminal Blocks; jumpers are shown connecting center dots, terminal blocks are numbered.



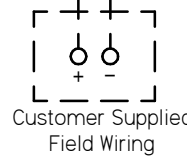
Grounded Terminal Block - grounded to DIN Rail and back panel



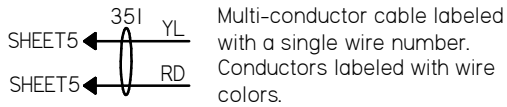
Fuse holder and fuse,



Customer field wiring connection, at terminal block, denoted by circles

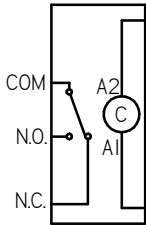
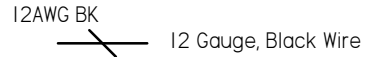


Customer Supplied Field Wiring

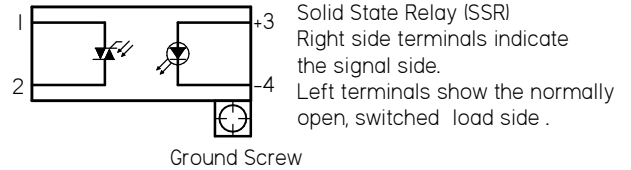


Multi-conductor cable labeled with a single wire number. Conductors labeled with wire colors.

--- Customer supplied, field wiring

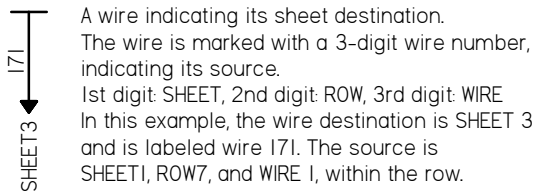


SPDT Mechanical Relay
Relay Coil marked as "C"
Switched contacts marked as Common, Normally Open (N.O.) and Normally Closed (N.C.).



Solid State Relay (SSR)
Right side terminals indicate the signal side.
Left terminals show the normally open, switched load side.

Ground Screw



A wire indicating its sheet destination. The wire is marked with a 3-digit wire number, indicating its source.
1st digit: SHEET, 2nd digit: ROW, 3rd digit: WIRE
In this example, the wire destination is SHEET 3 and is labeled wire 171. The source is SHEET 1, ROW 7, and WIRE 1, within the row.

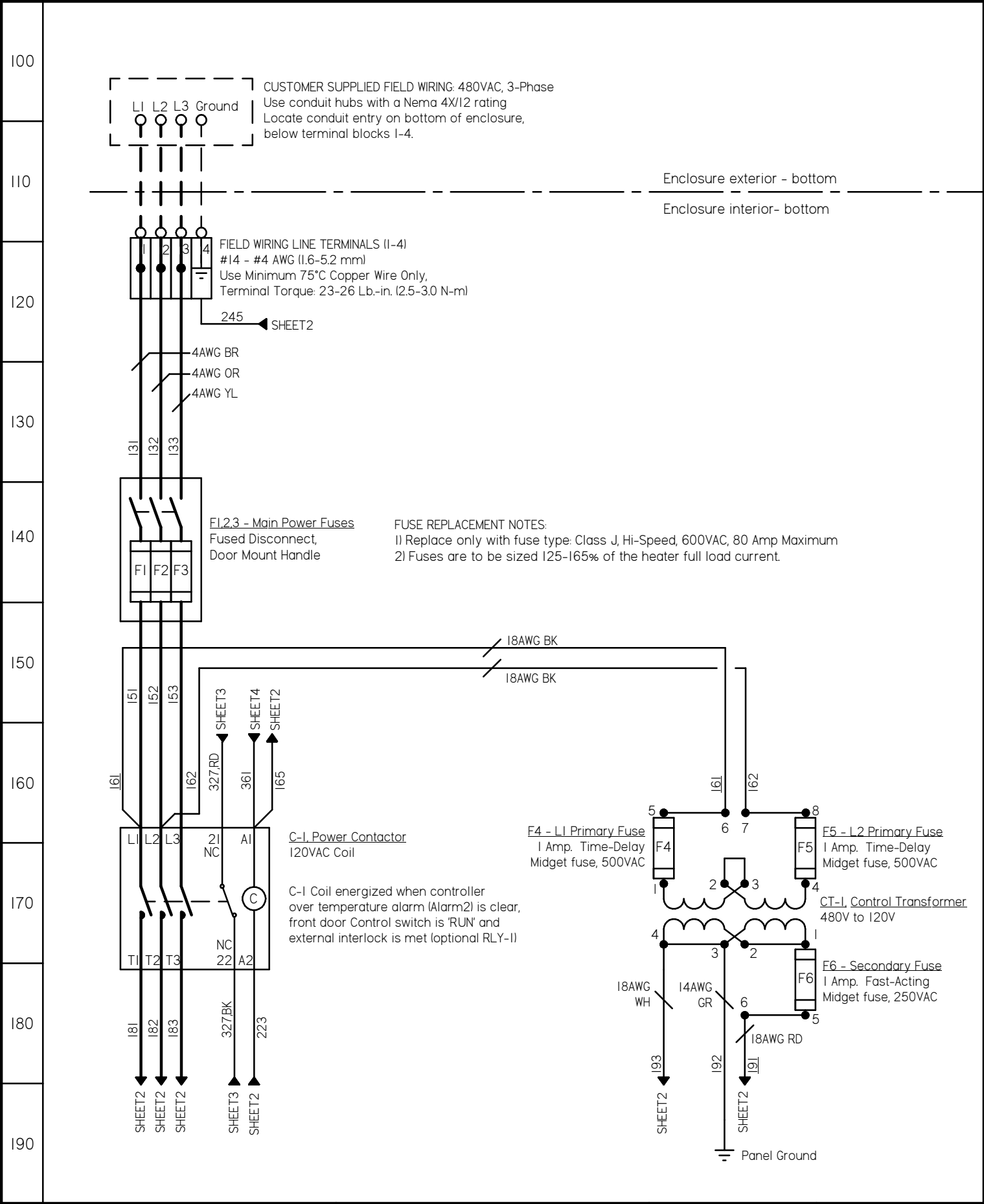


A wire indicating its sheet source. The wire is arriving at a terminal is marked with a 3-digit wire number, indicating its source.
1st digit: SHEET, 2nd digit: ROW, 3rd digit: WIRE
In this example, the wire source is SHEET 1 and is labeled wire 171. The source is SHEET 1, ROW 7, and WIRE 1, within the row.

170

REV.	DATE	DRAWN BY	DESCRIPTION	DRAWING DESCRIPTION	DRAWING NUMBER
A	03/14/16	B. KETTLER	FOR CONSTRUCTION	TYPICAL SYMBOLS, STANDARDS and WIRE LABELING CONVENTIONS	E-IFPA-480-3P-64A
DRAWING TYPE					SHEET NUMBER
WIRING SCHEMATIC					SHEET iv





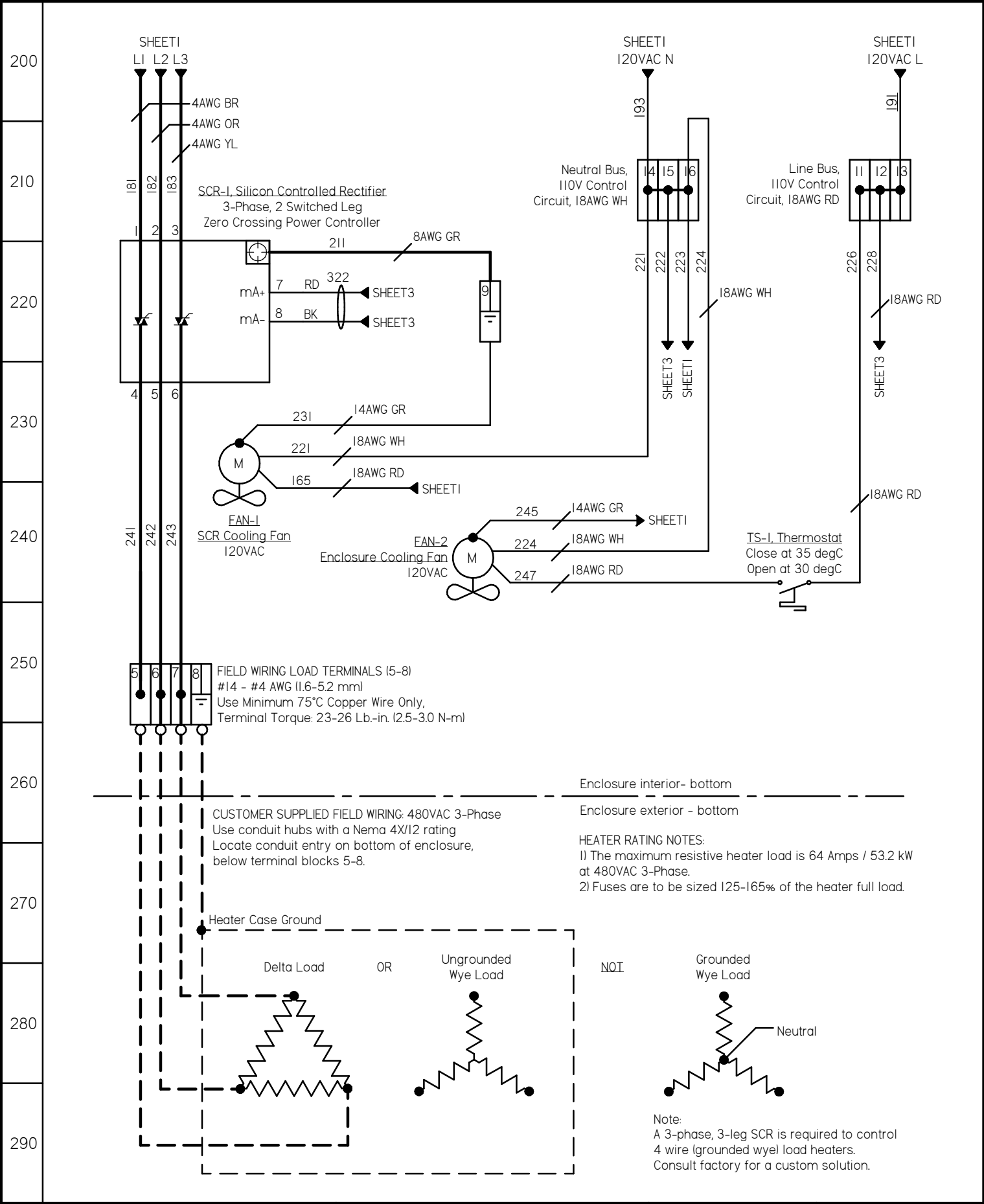
REV.	DATE	DRAWN BY	DESCRIPTION
A	03/14/16	B. KETTLER	FOR CONSTRUCTION

DRAWING TYPE: WIRING SCHEMATIC

DRAWING DESCRIPTION: FUSED DISCONNECT, CONTACTOR, AND CONTROL TRANSFORMER

DRAWING NUMBER: E-IFPA-480-3P-64A
 SHEET NUMBER: SHEET 1 of 4





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DRAWING TYPE: WIRING SCHEMATIC

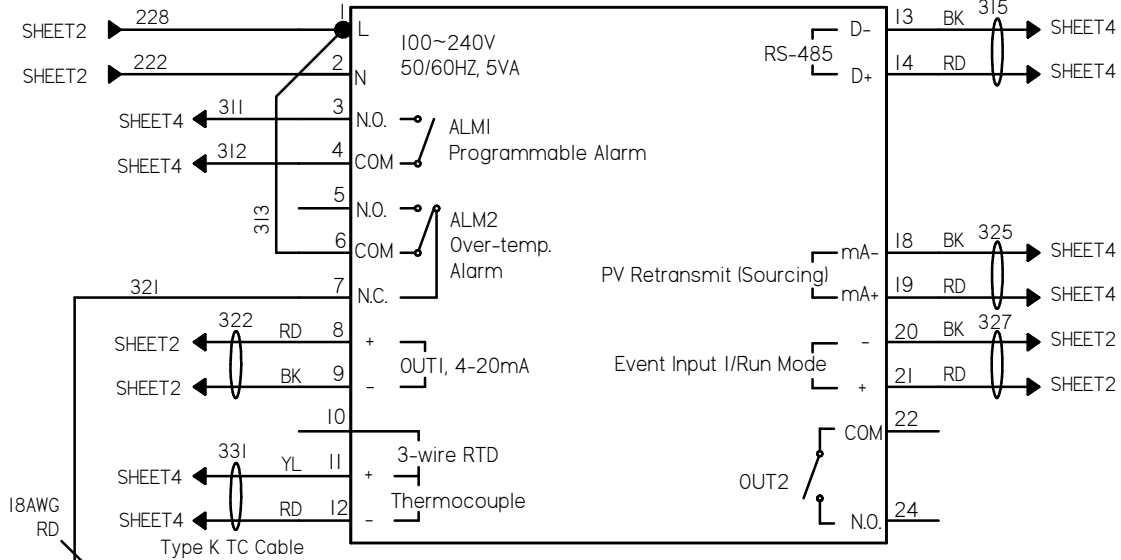
DRAWING DESCRIPTION: POWER CONTROLLER AND ENCLOSURE COOLING

DRAWING NUMBER: E-IFPA-480-3P-64A
SHEET NUMBER: SHEET 2 OF 4



300
310
320
330
340
350
360
370
380
390

TIC-I, PID Temperature Controller
Door Mount



Note:
Type K thermocouple: YL is + and RD is -
Type J thermocouple: WH is + and RD is -



360
SHEET4

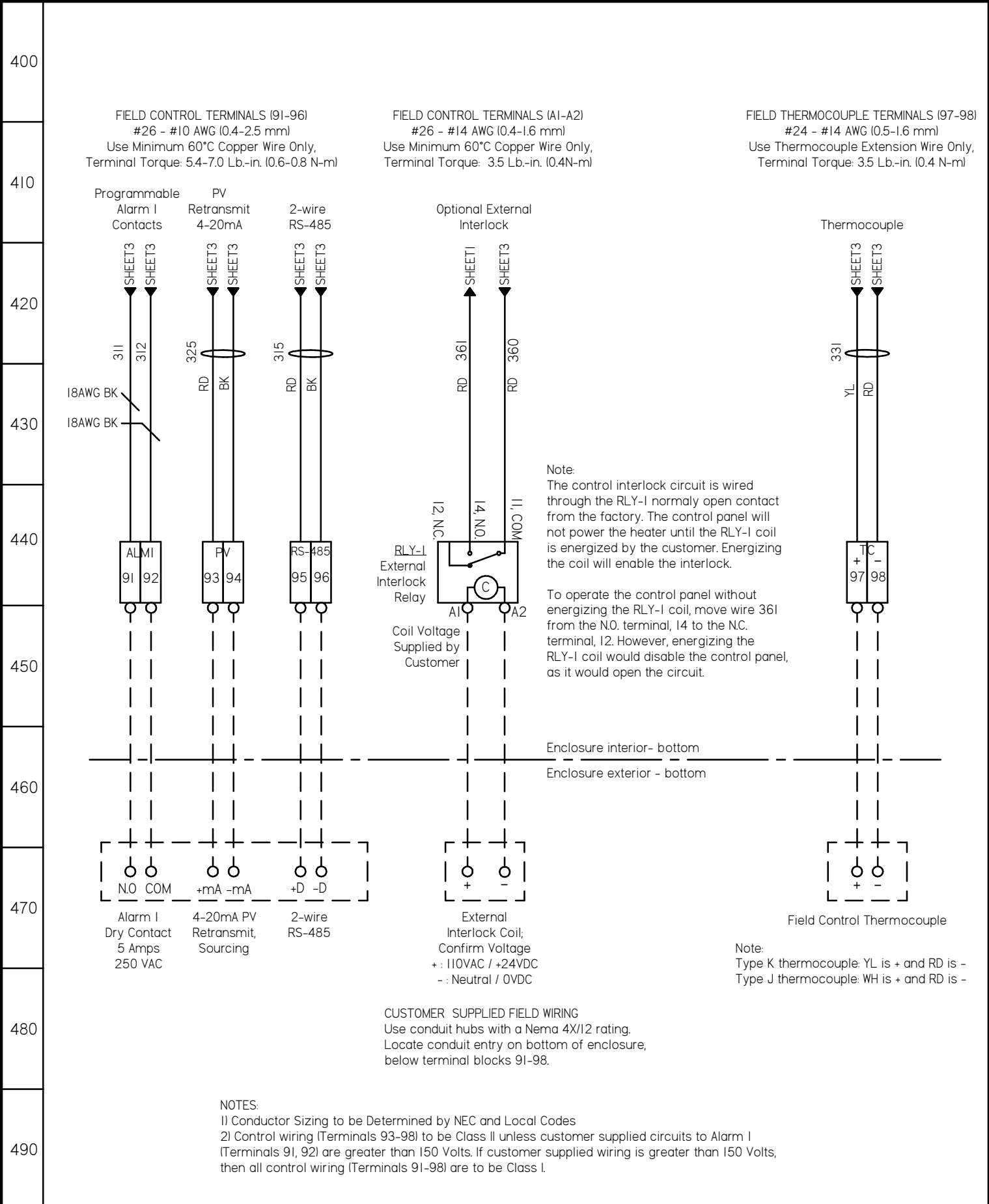
REV.	DATE	DRAWN BY	DESCRIPTION
A	03/14/16	B. KETTLER	FOR CONSTRUCTION

DRAWING TYPE: WIRING SCHEMATIC

DRAWING DESCRIPTION
TEMPERATURE CONTROLLER

DRAWING NUMBER
E-IFPA-480-3P-64A
SHEET NUMBER
SHEET 3 OF 4





FIELD CONTROL TERMINALS (91-96)
 #26 - #10 AWG (0.4-2.5 mm)
 Use Minimum 60°C Copper Wire Only,
 Terminal Torque: 5.4-7.0 Lb.-in. (0.6-0.8 N-m)

FIELD CONTROL TERMINALS (AI-A2)
 #26 - #14 AWG (0.4-1.6 mm)
 Use Minimum 60°C Copper Wire Only,
 Terminal Torque: 3.5 Lb.-in. (0.4N-m)

FIELD THERMOCOUPLE TERMINALS (97-98)
 #24 - #14 AWG (0.5-1.6 mm)
 Use Thermocouple Extension Wire Only,
 Terminal Torque: 3.5 Lb.-in. (0.4 N-m)

Note:
 The control interlock circuit is wired through the RLY-I normally open contact from the factory. The control panel will not power the heater until the RLY-I coil is energized by the customer. Energizing the coil will enable the interlock.

To operate the control panel without energizing the RLY-I coil, move wire 361 from the N.O. terminal, 14 to the N.C. terminal, 12. However, energizing the RLY-I coil would disable the control panel, as it would open the circuit.

Enclosure interior- bottom
 Enclosure exterior - bottom

CUSTOMER SUPPLIED FIELD WIRING
 Use conduit hubs with a Nema 4X/12 rating.
 Locate conduit entry on bottom of enclosure,
 below terminal blocks 91-98.

NOTES:
 1) Conductor Sizing to be Determined by NEC and Local Codes
 2) Control wiring (Terminals 93-98) to be Class II unless customer supplied circuits to Alarm I (Terminals 91, 92) are greater than 150 Volts. If customer supplied wiring is greater than 150 Volts, then all control wiring (Terminals 91-98) are to be Class I.

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A	03/14/16	B. KETTLER	FOR CONSTRUCTION				
DRAWING TYPE				WIRING SCHEMATIC			