Temperature Control Panel Wiring Diagram

Model: IFPA-240-IP-35A

Shift Controls, Inc.

Installed Options:
☒ *Interlock Relay, RLY-I*

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Temperature Control Panel Specifications	
Model Number	IFPA-240-IP-35A
Rated Voltage	240 VAC
Phases	Single
Power Controller	Zero Crossing SCR
Rated Frequency	60 Hz
SCCR	100 kA
Control Voltage	240 VAC
Maximum Fuse Size	45 Amps, Class J, High Speed
Maximum Full Load Current	35 Amps, Resistive
Maximum Load	8.40 kW
Enclosure Type	Nema 4X
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-240-IP-35A

SHEET NUMBER: SHEET i

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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	Main Power Branch Fusing	600	45 Amps	Class J	High Speed	JHL	DFJ	N/A
F3, F4	Control Circuit Supply Fusing	250	1 Amp	5x20mm	Fast-Acting	GMA	GMA	235

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

FUSE SIZING NOTES:
1) The maximum resistive heater load is 35 Amps / 8.40 kW at 240 VAC 1-Phase.
2) Fuses are to be sized 125-165% of the heater full load.

Heater Full Load Rating		Fuse Size, Current Rating										
		Littlefuse ® LRUJ63 Fuse Reducers Required for 1-30A Fuses								No Fuse Reducers Required		
		8A	10A	12A	15A	17.5A	20A	25A	30A	35A	40A	45A
Full Load Power, kW	Minimum	1.16	1.45	1.75	2.18	2.55	2.91	3.64	4.36	5.09	5.82	6.55
Full Load Power, kW	Maximum	1.54	1.92	2.30	2.88	3.36	3.84	4.80	5.76	6.72	7.68	8.40
Full Load Current, Amps	Minimum	4.85	6.06	7.27	9.09	10.6	12.1	15.2	18.2	21.2	24.2	27.3
Full Load Current, Amps	Maximum	6.40	8.00	9.60	12.0	14.0	16.0	20.0	24.0	28.0	32.0	35.0

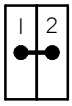
Standard Wire Colors	
240VAC, 1-Phase Power	Black (BK), Red (RD)
Gound Wires	Green (GN)
AC Control Power, 240VAC Ungrounded AC	Black (BK)
Thermocouple Cable	Type K - Yellow Cable, Type J - Black Cable
DC Signal wires	2-Conductor Cable
RS-485, Data	2-Conductor Cable

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 1 (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	Main Power Line (L1, L2, GND)	Copper	300 VAC	75 C	14AWG, 1.6mm See Note 1	6AWG, 4.1mm See Note 1	13.3 in*lb, 1.5 N*m	15.9 in*lb, 1.8 N*m
4, 5, 6	Heater Power Load (T1, T2, GND)	Copper	300 VAC	75 C	14AWG, 1.6mm See Note 1	6AWG, 4.1mm See Note 1	13.3 in*lb, 1.5 N*m	15.9 in*lb, 1.8 N*m
91, 92	User Programable Alarm (Dry Contacts)	Copper	Class 1	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 1	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

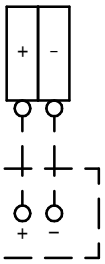
Wiring Schematic
Typical Symbols and Standards



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

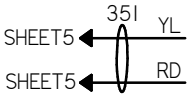
Grounded Terminal
Block - grounded to
DIN Rail and back panel

Fuse holder and
fuse,



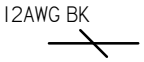
Customer field wiring
connection, at terminal block,
denoted by circles

Customer Supplied
Field Wiring

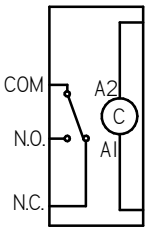


Multi-conductor cable labeled
with a single wire number.
Conductors labeled with wire
colors.

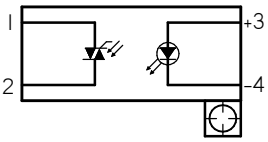
Customer supplied, field wiring



12 Gauge, Black Wire



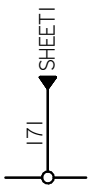
SPDT Mechanical Relay
Relay Coil marked as "C"
Switched contacts marked
as Common, Normally Open (N.O.)
and Normally Closed (N.C.).



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
SHEET1, ROW7, 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.

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

DRAWING TYPE
WIRING SCHEMATIC

DRAWING DESCRIPTION
TYPICAL SYMBOLS, STANDARDS and
WIRE LABELING CONVENTIONS

DRAWING NUMBER
E-IFPA-240-IP-35A

SHEET NUMBER
SHEET iv

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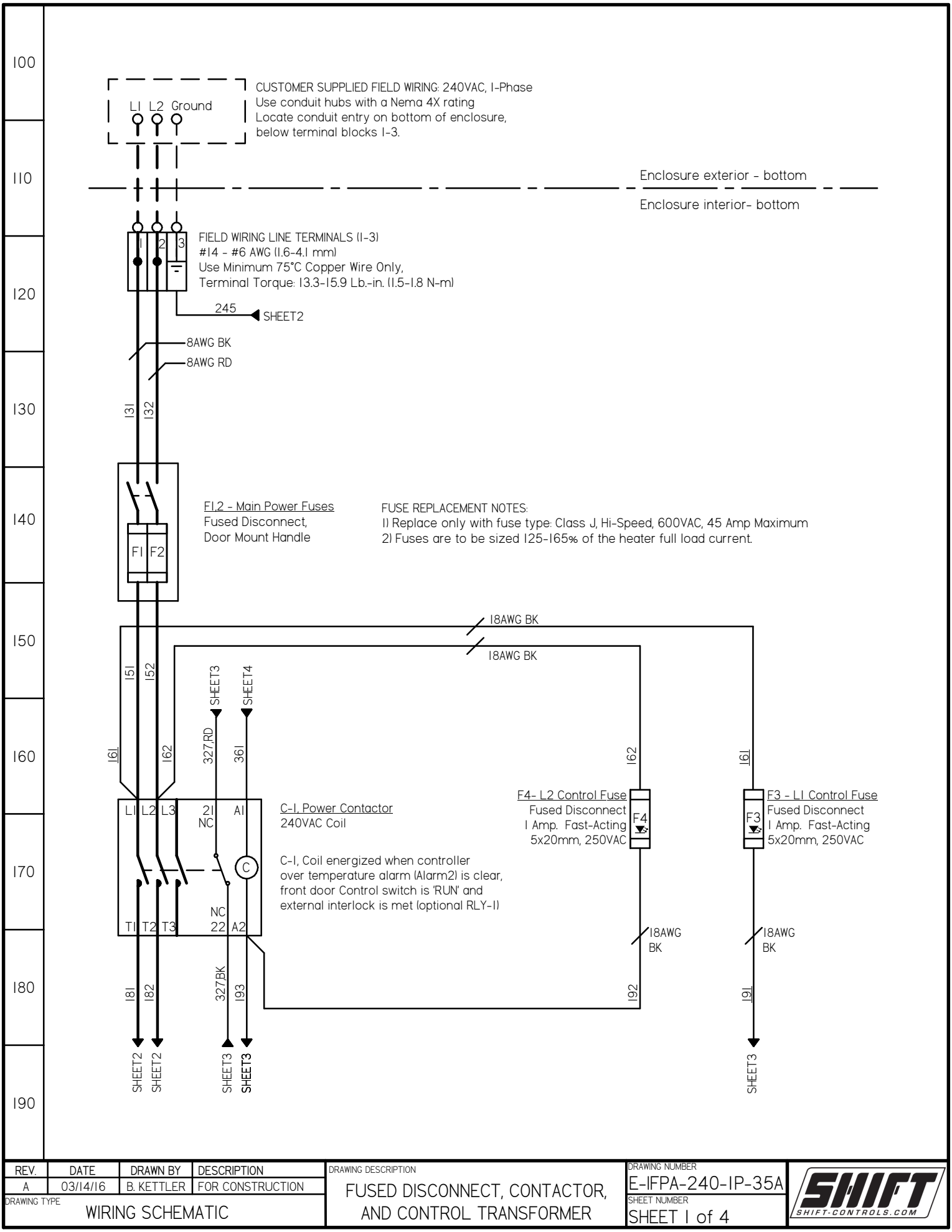

REV.	DATE	DRAWN BY	DESCRIPTION
A	03/14/16	B. KETTLER	FOR CONSTRUCTION

DRAWING TYPE
WIRING SCHEMATIC

DRAWING DESCRIPTION
FUSED DISCONNECT, CONTACTOR, AND CONTROL TRANSFORMER

DRAWING NUMBER
E-IFPA-240-IP-35A

SHEET NUMBER
SHEET 1 of 4

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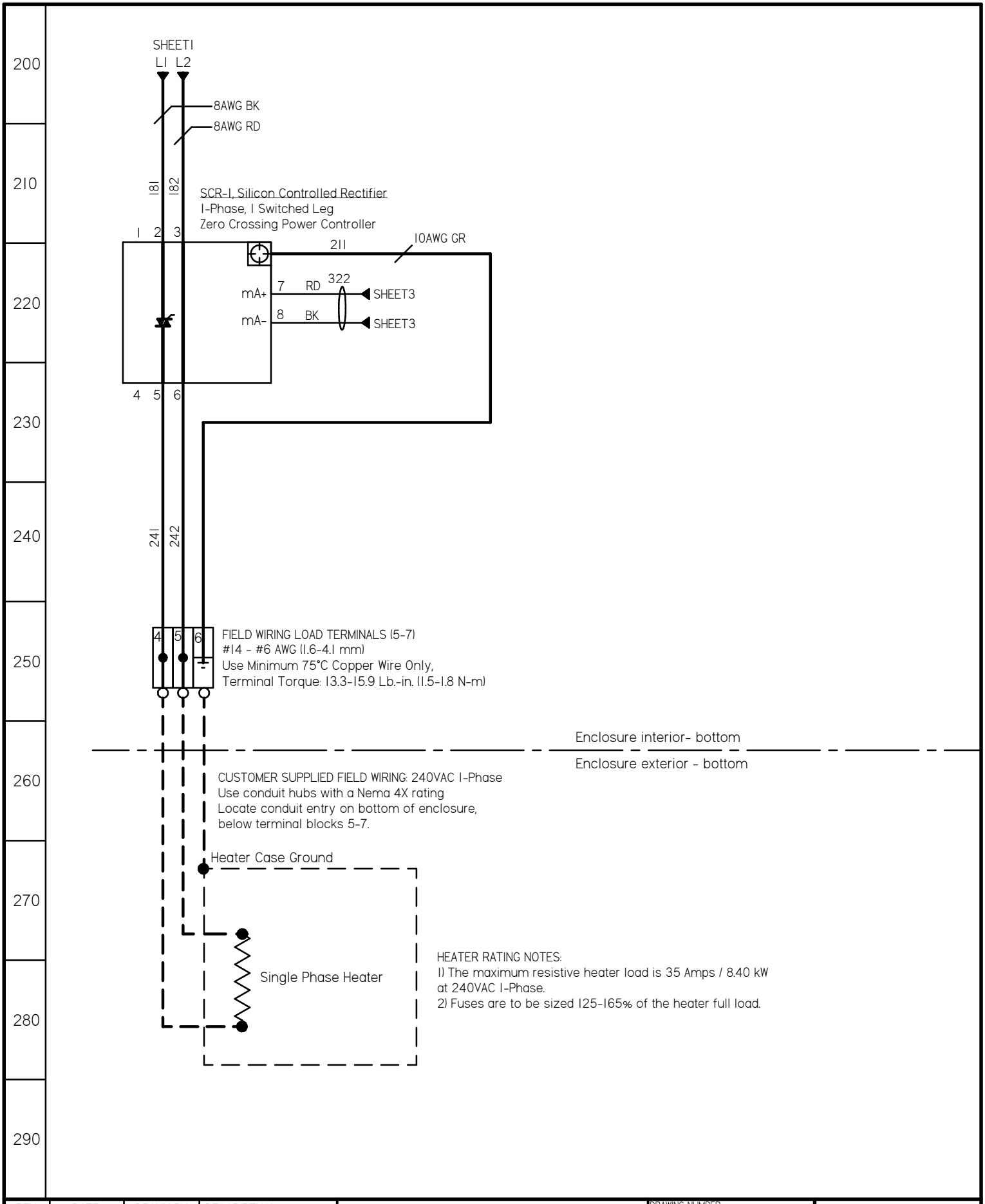

REV.	DATE	DRAWN BY	DESCRIPTION
A	03/14/16	B. KETTLER	FOR CONSTRUCTION

DRAWING TYPE: WIRING SCHEMATIC

DRAWING DESCRIPTION: POWER CONTROLLER AND ENCLOSURE COOLING

DRAWING NUMBER: E-IFPA-240-1P-35A

SHEET NUMBER: SHEET 2 OF 4

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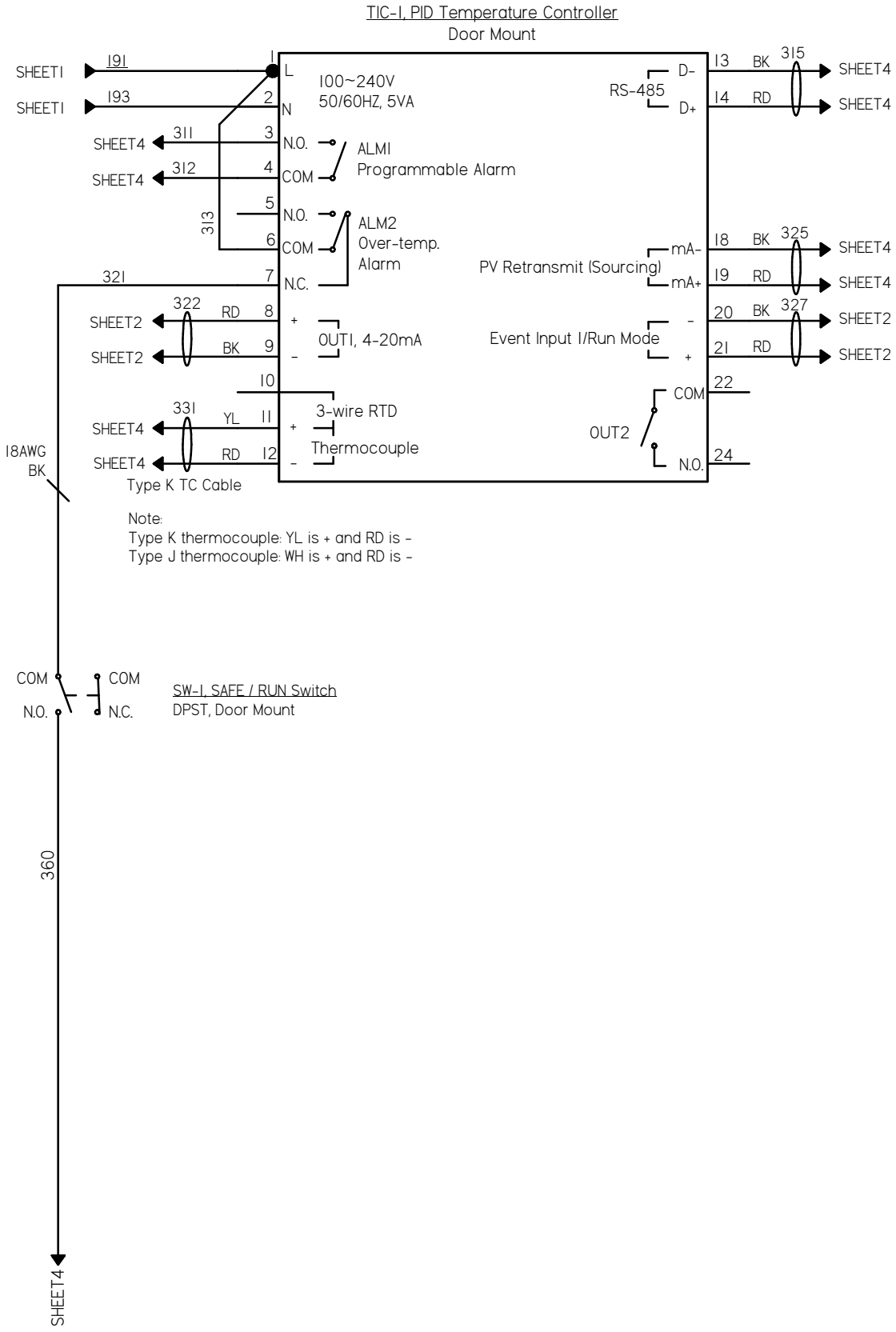

REV.	DATE	DRAWN BY	DESCRIPTION
A	03/14/16	B. KETTLER	FOR CONSTRUCTION

DRAWING TYPE: WIRING SCHEMATIC

DRAWING DESCRIPTION: TEMPERATURE CONTROLLER

DRAWING NUMBER: E-IFPA-240-IP-35A

SHEET NUMBER: SHEET 3 OF 4

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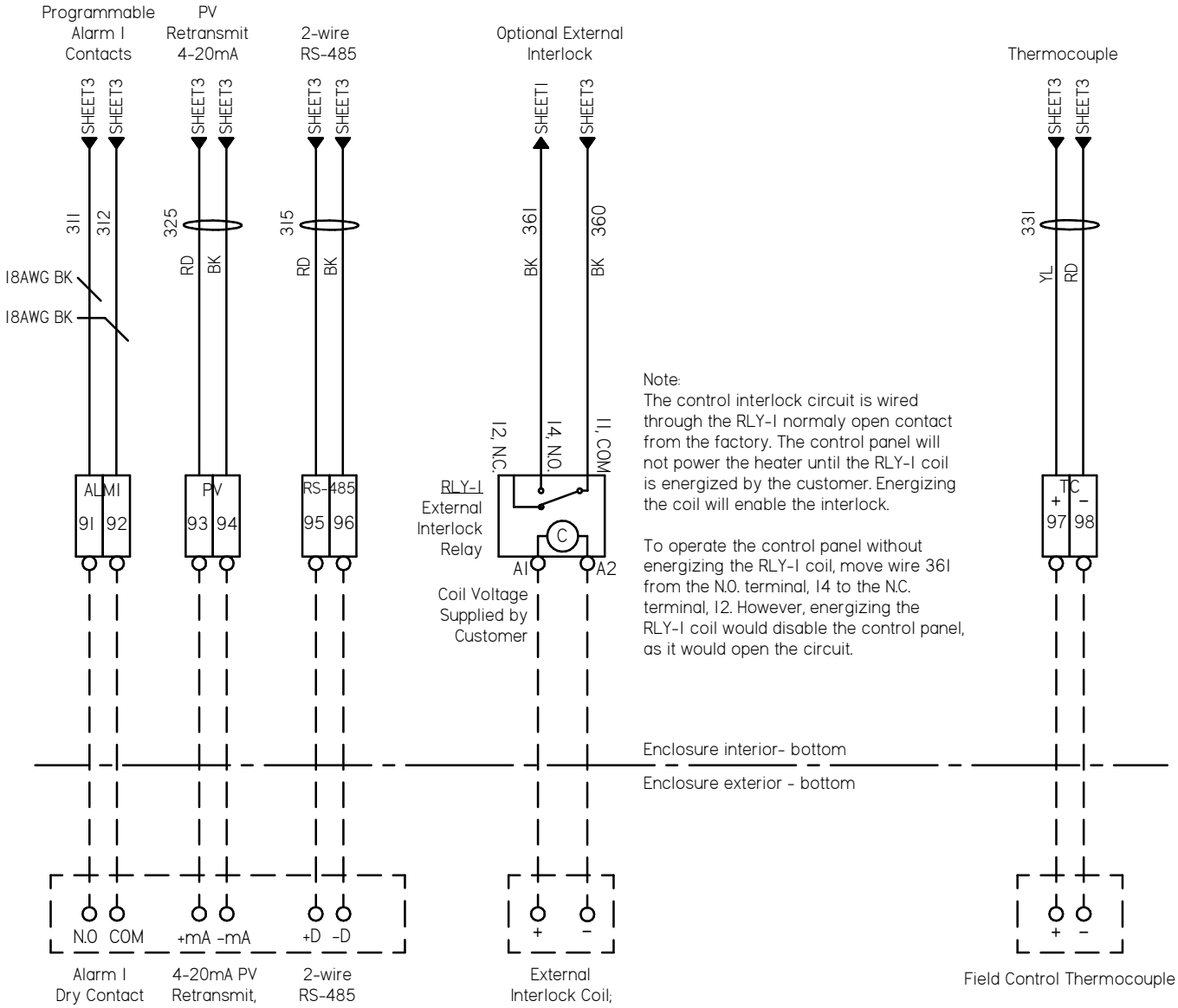
FIELD CONTROL TERMINALS (91-96)
#26 - #10 AWG (0.4-2.5 mm)
Use Minimum 60°C Copper Wire Only,
Terminal Torque: 5.4-7.0 Lb.-in. (0.6-0.8 N-m)

FIELD CONTROL TERMINALS (A1-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-1 normaly open contact from the factory. The control panel will not power the heater until the RLY-1 coil is energized by the customer. Energizing the coil will enable the interlock.

To operate the control panel without energizing the RLY-1 coil, move wire 361 from the N.O. terminal, 14 to the N.C. terminal, 12. However, energizing the RLY-1 coil would disable the control panel, as it would open the circuit.

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

CUSTOMER SUPPLIED FIELD WIRING
Use conduit hubs with a Nema 4X 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 1 (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.

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

DRAWING TYPE: WIRING SCHEMATIC

DRAWING DESCRIPTION: CONTROL FIELD CONNECTIONS

DRAWING NUMBER: E-IFPA-240-IP-35A

SHEET NUMBER: SHEET 4 OF 4

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