

Temperature Control Panel Wiring Diagram

Model: IFPA-240-IP-35A

Shift Controls, Inc.

Installed Options:
 None

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 720.532.1776

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 | DRAWING DESCRIPTION | DRAWING NUMBER | |
| A | 03/14/16 | B. KETTLER | FOR CONSTRUCTION | CONTROL PANEL SPECIFICATIONS AND WIRE COLOR STANDARDS | E-IFPA-240-IP-35A | |
| DRAWING TYPE WIRING SCHEMATIC | | | | | 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 | 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 |

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| DRAWING TYPE | | | |
| WIRING SCHEMATIC | | | |

| | |
|--------------------------------------|--|
| DRAWING DESCRIPTION | |
| FUSE AND FIELD WIRING SPECIFICATIONS | |

| | |
|----------------|-------------------|
| DRAWING NUMBER | E-IFPA-240-IP-35A |
| SHEET NUMBER | SHEET ii |



Standard Wire Colors

| | |
|--|---|
| 240VAC, 1-Phase Power | Black (BK), Red (RD) |
| Ground 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 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 | 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 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 |

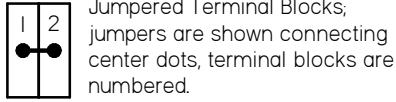
| REV. | DATE | DRAWN BY | DESCRIPTION |
|------------------|----------|------------|------------------|
| A | 03/14/16 | B. KETTLER | FOR CONSTRUCTION |
| DRAWING TYPE | | | |
| WIRING SCHEMATIC | | | |

| DRAWING DESCRIPTION |
|---|
| FUSE AND FIELD WIRING SPECIFICATIONS |

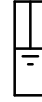
| DRAWING NUMBER |
|-------------------|
| E-IFPA-240-IP-35A |
| SHEET NUMBER |
| SHEET iii |



Wiring Schematic Typical Symbols and Standards



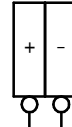
Jumpered Terminal Blocks; jumpers are shown connecting center dots, terminal blocks are numbered.



Grounded Terminal Block - grounded to DIN Rail and back panel



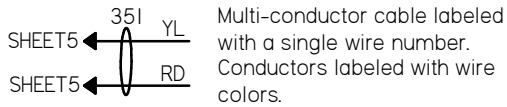
Fuse holder and fuse,



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

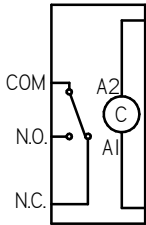
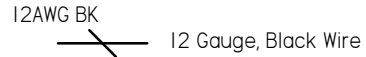


Customer Supplied Field Wiring

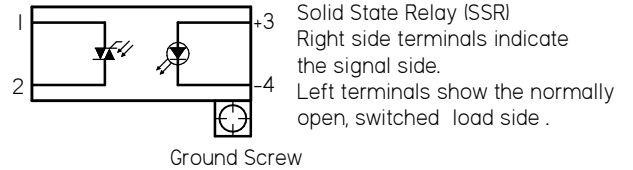


Multi-conductor cable labeled with a single wire number. Conductors labeled with wire colors.

--- Customer supplied, field wiring

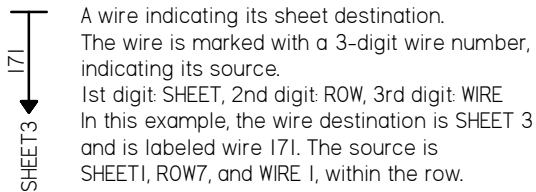


SPDT Mechanical Relay
Relay Coil marked as "C"
Switched contacts marked as Common, Normally Open (N.O.) and Normally Closed (N.C.).

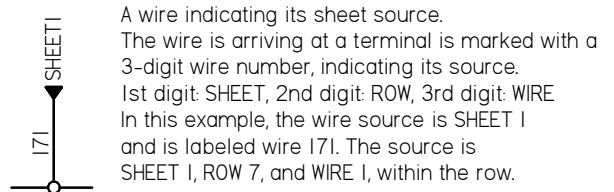


Solid State Relay (SSR)
Right side terminals indicate the signal side.
Left terminals show the normally open, switched load side.

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.

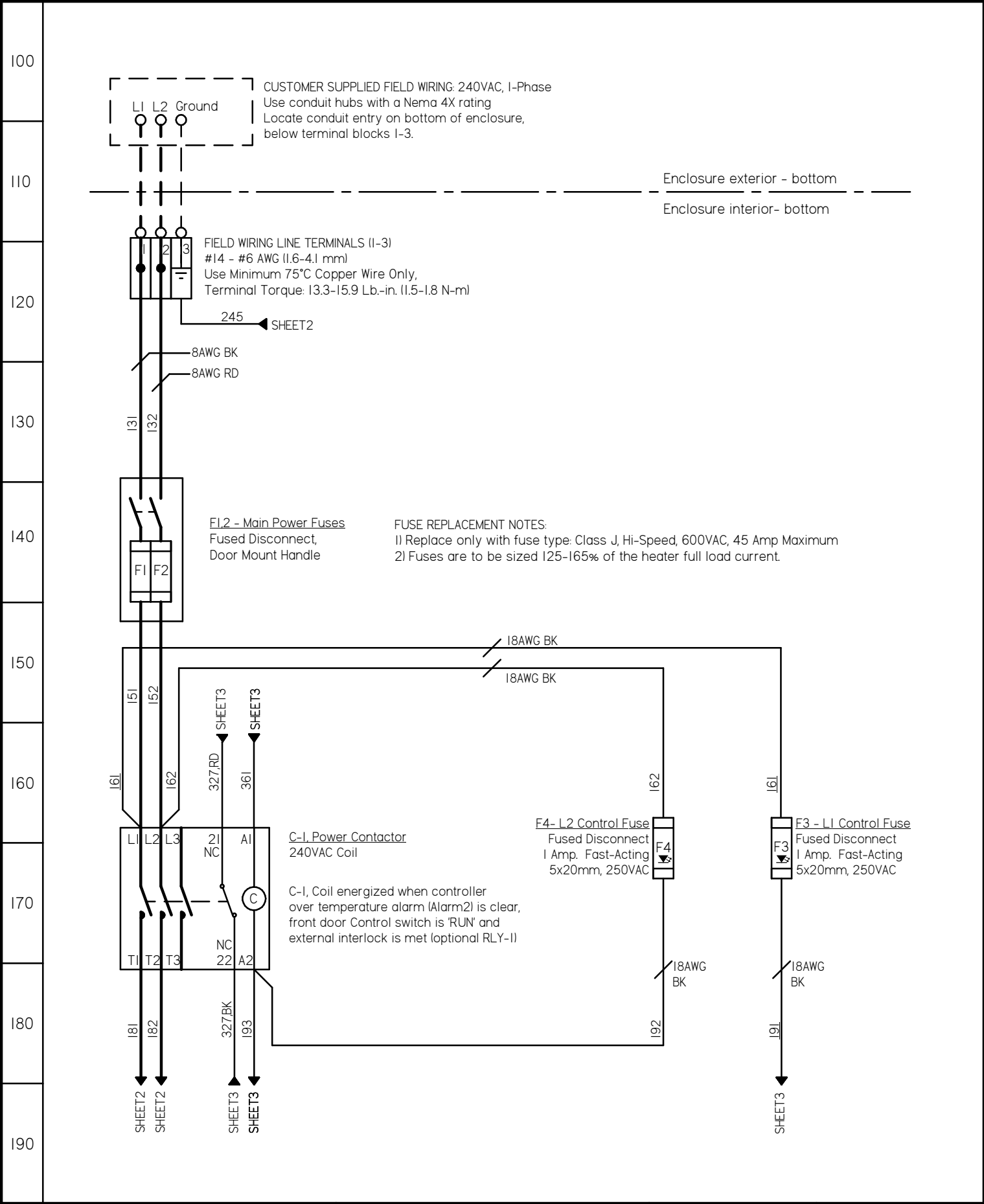


A wire indicating its sheet source. The wire is arriving at a terminal is marked with a 3-digit wire number, indicating its source.
1st digit: SHEET, 2nd digit: ROW, 3rd digit: WIRE
In this example, the wire source is SHEET 1 and is labeled wire 171. The source is SHEET 1, ROW 7, and WIRE 1, within the 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-240-IP-35A |
| DRAWING TYPE WIRING SCHEMATIC | | | | | SHEET NUMBER SHEET iv |





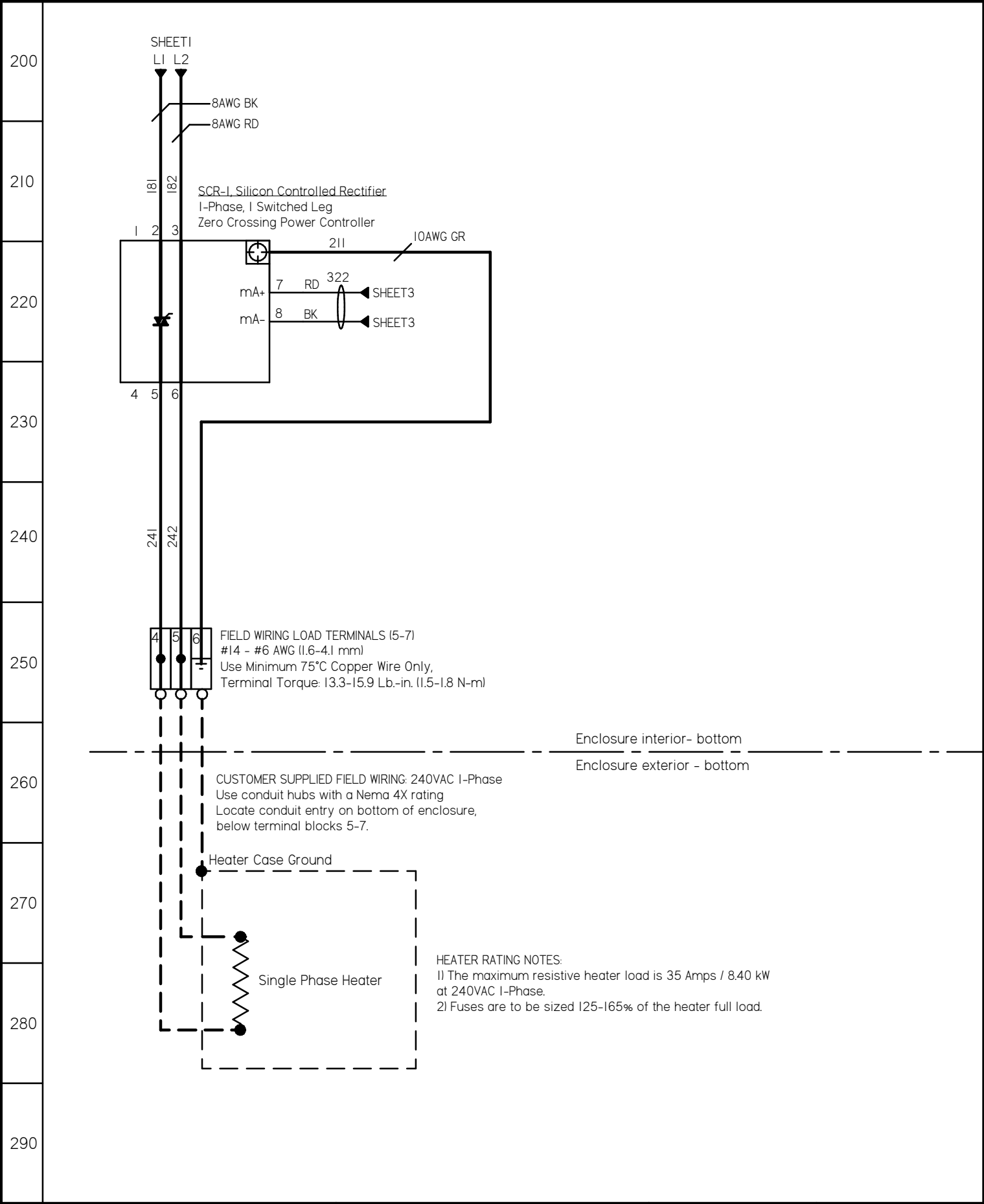
| REV. | DATE | DRAWN BY | DESCRIPTION |
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DRAWING TYPE: WIRING SCHEMATIC

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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DRAWING TYPE: WIRING SCHEMATIC

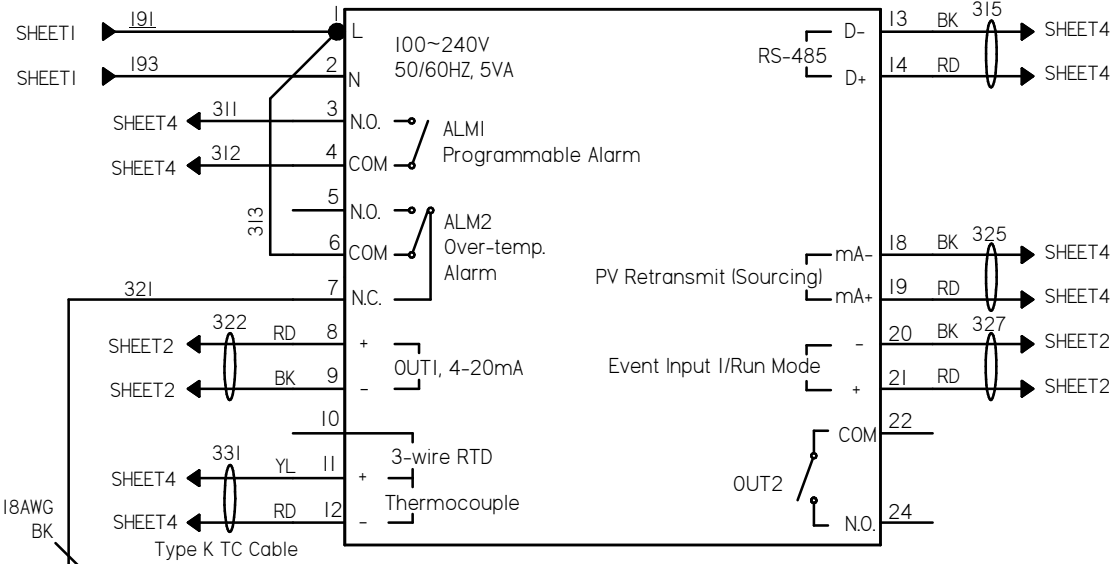
DRAWING DESCRIPTION: POWER CONTROLLER AND ENCLOSURE COOLING

DRAWING NUMBER: E-IFPA-240-IP-35A
 SHEET NUMBER: SHEET 2 OF 4

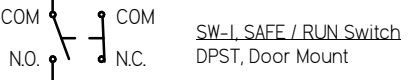


300
310
320
330
340
350
360
370
380
390

TIC-I, PID Temperature Controller
Door Mount



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



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DRAWING TYPE: WIRING SCHEMATIC

| DRAWING DESCRIPTION |
|------------------------|
| TEMPERATURE CONTROLLER |

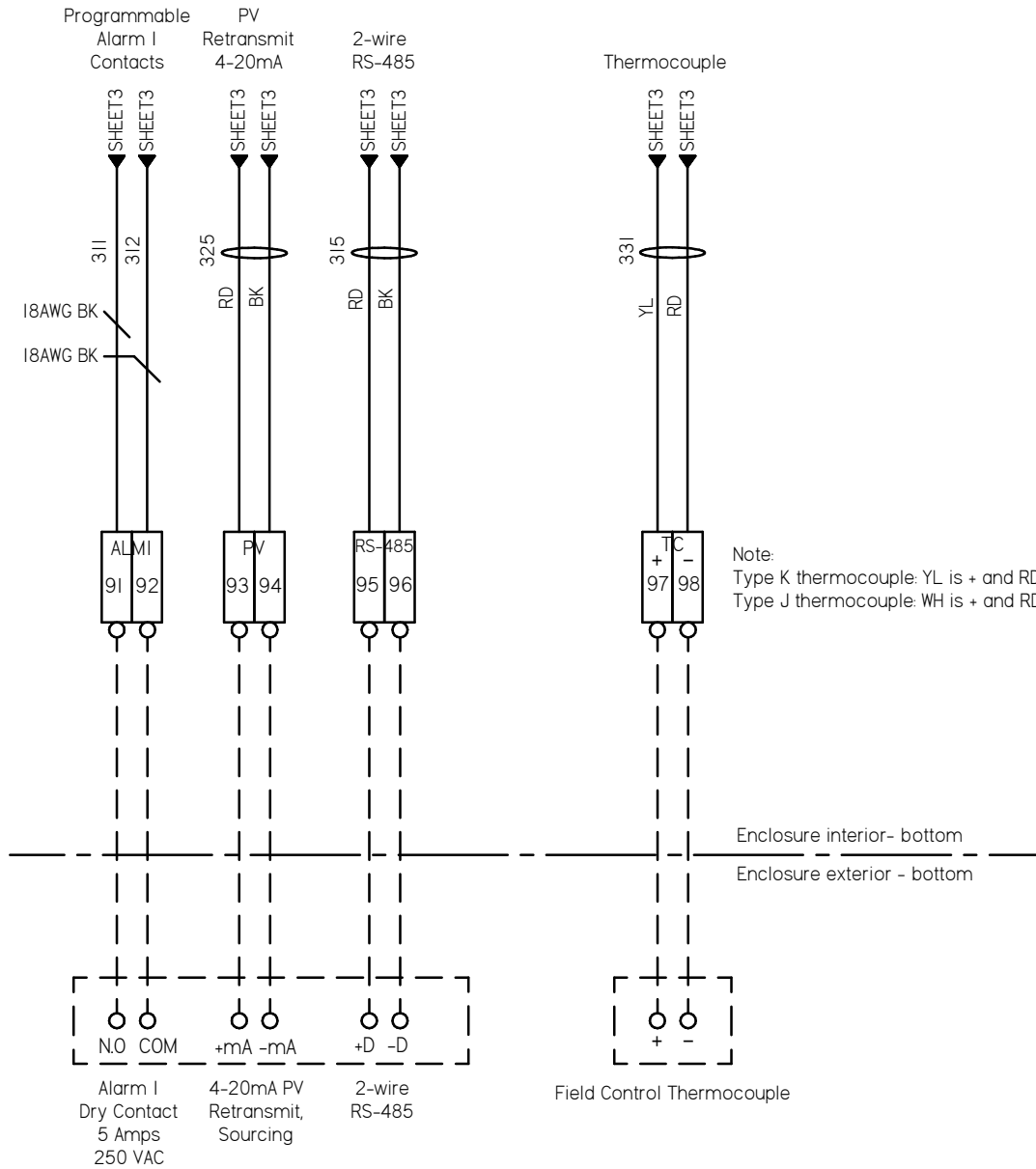
| DRAWING NUMBER |
|-------------------|
| E-IFPA-240-IP-35A |
| SHEET NUMBER |
| SHEET 3 OF 4 |



400
410
420
430
440
450
460
470
480
490

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 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)



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) or optional Interlock (Terminals A1, A2) 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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DRAWING TYPE: WIRING SCHEMATIC

| DRAWING DESCRIPTION |
|---------------------------|
| CONTROL FIELD CONNECTIONS |

| DRAWING NUMBER |
|-------------------|
| E-IFPA-240-IP-35A |
| SHEET NUMBER |
| SHEET 4 OF 4 |

